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Agroecology in Metropolitan Regions in Brazil – Socioterritorial and Socio-Spatial Movements

By Marcelo Gomes Justo

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Keywords: *agroecology, metropolitan regions, socio-territorial movements, socio-spatial movements.*

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Abstract- This article aims to analyze agroecology in metropolitan regions in Brazil, based on the concepts of socio-spatial and socio-territorial movements. It also draws parallels regarding the presence of agroecology in different metropolitan regions. Another aspect is to continue evaluating these concepts to understand the dynamics of agroecology. The method relies on primary sources from previous research and secondary sources for data comparison. As concluding considerations, the advancement of agroecology depends on the conquest of land and territory -stemming from socio-territorial movements - and on its spatial dissemination, where socio-spatial movements may have an impact. While socio-territorial movements are necessary for agroecology, they are not sufficient on their own. In this case, the concept of socio-territorial movement is explanatory. The expansion of agroecology in metropolitan regions is driven by the actions of movements, associations, and universities. This is a socio-spatial action, such as networks, not merely the presence of socio-spatial movements.

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I. Introduction

This article seeks to analyze, based on the concepts of socio-spatial and socio-territorial movements, the mobilization around agroecology in metropolitan regions across Brazil. Is agroecology strong enough to become a new sustainable food system in the face of an agro-industrial model that harms the environment? The interest in examining the dynamics of agroecology in metropolitan regions - where the most people live - lies in understanding its potential to promote adequate and healthy diets, based on *in natura* or minimally processed products, as established by the *Food Guide for the Brazilian Population* (2014). In fact, this *Food Guide* was pioneering in presenting to the world the new food classification (*in natura*, condiments, minimally processed, and ultra processed foods), which, for more than ten years, has been driving a scientific revolution in nutrition.

We have a dual objective: to advance the discussion on agroecology in metropolitan regions in Brazil and to evaluate the concepts of socio-territorial and socio-spatial movements to understand the defense of agroecology. The guiding question is: how can the presence of socio-spatial and socio-territorial movements in metropolitan regions contribute to overcoming the dominant food system?

Brazilian metropolises are arenas where contemporary tensions and contradictions converge climate change with environmental racism, hunger and obesity affecting peripheral populations. Metropolitan regions encompass cities with high urban density as well as rural characteristics. Within them, food industries and agroecology movements are in conflict: junk food versus slow food; ultra processed versus *in natura* foods; restaurants led by chefs who are in favor of regional cuisines based on peasant family farming. Agroecology cannot remain confined to market niches; hence the emphasis on the need for popular agrarian reform - through socio-territorial movements - and spatial diffusion. Agroecology can consolidate as a new food system by reaching the masses concentrated in metropolitan regions, since the so-called Green Revolution appeared as the only way to produce food for such large populations. Will this require the joint action of socio-spatial and socio-territorial movements?

Over the past decades, agroecology research and practices have multiplied. Well-known figures as Miguel Altieri, who, since the late 1980s, established agroecology as an alternative agriculture; Eric Holt-Giménez, with the *campesino a campesino* method; Stephan Gliessmann; Eduardo Sevilla Guzmán; and not least Ana Primavesi, they have solidified the academic field of agroecology in the Western world. Other important names, such as Vandana Shiva (2016), have strengthened the discussion on how harmful agribusiness is and underlined that it is peasant family farming that truly feeds the world, with this debate expanding globally. In earlier work, a literature review on agroecology was systematized, grouping a set of its interdependent characteristics: agrobiodiversity, peasant way of life and the role of women, knowledge dialogue, resistance to cooptation by capital, and the action of socio-spatial and socio-territorial movements (JUSTO, 2020). It is common in agroecology literature to elaborate systematizations gathering characteristic elements, especially when drafting public policy recommendations, such as in FAO (2019). It is worth adding that one of the first authors to link agroecology with the socio-territorial movement concept has insisted on its non-cooptation by capitalist agriculture, distinguishing between neoliberal or reformist agroecology and truly emancipatory agroecology

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(GIRARDO; ROSSET, 2017; 2021). *Recampesinization* (to learn the peasant ethos) is a process that has been analyzed and is related to territorial conquests that reposition peasant and agroecological farming in opposition to the process of *descampesinization* (dispossession or to lose the peasant ethos) driven by the "Green Revolution" (FERNANDES, 2019; ULE MUÑOZ; ROSSET, 2022; PLOEG, 2016).

On the other hand, this article aims to contribute to the theoretical discussion on the concepts of socio-spatial and socio-territorial movements (FERNANDES, 2012; HALVORSEN, FERNANDES & TORRES, 2019) and their applications to explain agroecology in metropolitan regions. By comparing data from earlier research with other works addressing agroecology in metropolitan regions, the goal is to deepen the interpretation of how agroecology can be established in these regions through a combination of socio-territorial and socio-spatial movements (JUSTO, 2020; 2023). As Fernandes (2019) underscores, peasant movements have evolved and, recently, in addition to the struggles for land and territory, peasants have fought against food empires and, for healthy food. "Peasantry reinvented food with the concept of food sovereignty and agroecology" (FERNANDES, 2019, p. 207). In collaborative work, the author states that public policies for family farming during the *lulista*[1] period (2003–2016) enabled the "territorialization of agroecological production" (HALVORSEN, FERNANDES & TORRES, 2019, p. 10).

Fernandes (2005) coined the concepts of socio-spatial and socio-territorial movements to bring a geographic perspective into the sociological concept of social movement, adding the spatial dimension to social movements. His main contribution was to characterize some movements as having the conquest of territory as their power, explaining that in socio-territorial movements territory is essential to their existence. "Territorialized movements are those that act across multiple macro-regions and form a network of relations with political strategies that promote and foster their territorialization" (FERNANDES, 2005, p. 31). Based on these definitions, the present work seeks to advance the discussion on the use of these concepts applied to agroecology movements.

The research is based on primary sources and, principally, secondary data such as bibliographic reviews, the IBGE (Brazilian Institute of Geography and Statistics) census, and the national register of organic producers. Secondary data enabled comparisons between previous studies (JUSTO, 2020; 2023) and the situation in other metropolitan regions. The method involved drawing parallels between agroecology and metropolitan regions, based on research on six Land Communes across four metropolitan regions in the state of São Paulo, plus a fifth metropolitan region in another state as a counterpoint. The MST (Landless Rural Workers Movement) has ensured agroecology's entry into metropolitan regions through land occupation, as socio-territorial action. The Land Communes studied are: in the São Paulo Metropolitan Region, Sister Aberta (Perus, SP/SP), Bishop Tomás Balduíno (Franco da Rocha, SP), Bishop Pedro Casaldáliga (Cajamar, SP); in the Campinas Metropolitan Region, Milton Santos (between Cosmópolis and Americana); in the Ribeirão Preto Metropolitan Region, Mário Lago settlement (Ribeirão Preto); in the Vale do Paraíba and North Coast Metropolitan Region, New Hope settlement (São José dos Campos). Additionally, there is the Porto Alegre Metropolitan Region (RMPA), with a set of cooperatives and renowned national production of agroecological rice, which serves as a counterpoint to the Land Communes experiences.

The following section presents a contextualization. Beyond this Introduction, the article has by two main parts: the first exposes and analyzes socio-territorial movements conquering territories for agroecology in metropolitan regions; the second addresses socio-spatial movements related to changes in eating habits toward an agroecological food system.

In recent decades, a colonized notion has consolidated in Brazil. The country has finally "modernized" by overcoming the rural, viewed as synonymous of underdevelopment. Brazil has shifted from rural to urban. The latest population census reports less than 15% of the population living in rural areas. Between the 1950s and the late 1980s, approximately 30 million people migrated from rural areas in the Northeast to major urban centers in the Southeast, constituting one of the largest internal migrations in the Western world in the 20th century, as noted by various scholars.

In truth, the country's structural under-development lies not in the persistence of rural areas, but in the deep concentration of land and wealth, severe social inequalities, the enduring presence of authoritarian and clientelist practices, and the lack of basic infrastructure and sanitation.

Despite the rapid expansion of cities, over 87% of Brazil's 5,570 municipalities have populations of up to 50,000, and 94.15% have fewer than 100,000 inhabitants. Only 326 cities, 5.85% of the total, have populations above 100,000, yet these urban centers account for 57.7% of the national population, according to the Brazilian Institute of Geography and Statistics (IBGE).

There are currently 74 officially recognized metropolitan regions in Brazil. The states with the most are: Santa Catarina (11), Alagoas (9), and Paraná (8). Additionally, five urban agglomerations were identified: three in the state of São Paulo and two in Rio Grande do

[1] It is related to the period of Brazilian´s President Lula and Dilma, both of Labor Party (PT).

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Sul. In 2015, the Statute of the Metropolis (Law No. 13,089/2015) was enacted, defining a metropolitan region as a regional unit established by state-level complementary law, comprising a group of neighboring municipalities organized for the integrated planning and execution of public functions of common interest. A metropolitan area is characterized by the continuous expansion of the urban fabric, marked by the integration of road systems and high rates of commuting across residential, industrial, and service areas.

According to IBGE, the most populous metropolitan regions, in descending order, are São Paulo, Rio de Janeiro, Belo Horizonte (and its surrounding metropolitan area), Porto Alegre, Fortaleza, Salvador, Recife, Curitiba, Campinas, Manaus, Vale do Paraíba and Litoral Norte, Goiânia, and Belém. The present research focuses on four of these regions, which together have an estimated population of approximately 28 million people.

In this context, urban agriculture movements have spread across large cities, involving residents, social organizations, and, in some cases, municipal governments. Over the past two decades, cities such as São Paulo, Rio de Janeiro, and Recife have developed public policies to support urban agriculture, while grassroots initiatives led by local communities have established spontaneous urban gardens. These actions bring agroecology and discussions around healthy food systems into urban environments and can be characterized as socio-spatial movements that, at times, begin to engage in territorial disputes[2].

The presence of agroecology in metropolitan regions occurs mainly in two forms: through land reform settlements (independently of being or not defined as Land Communes), which represent socio-territorial movements; and through urban and peri-urban agriculture, which may constitute either socio-territorial or socio-spatial movements (JUSTO, 2019; 2022).

It is also important to highlight the survey conducted by the National Articulation of Agroecology (ANA) on municipal-level initiatives supporting family farming and agroecology. The study identified more than 700 local actions, including public policies, programs, laws, and other measures, across 531 municipalities in 26 states, addressing around 40 different thematic areas. Among them, the city of São Paulo stands out as one of the municipalities with the highest number of initiatives, totaling 15 (ANA, 2021).

a) Agroecology in Metropolitan Regions and the Conquest of Territories: Socio-Territorial Movements

In the early 2000s, the Landless Rural Workers' Movement (MST) developed the concept of Land Communes, agrarian reform settlements in metropolitan regions, with relatively small plots for housing and work, collective food production areas aimed at urban supply, blending rural and urban characteristics, and adopting agroecological and cooperative practices (MATHEUS, 2003). According to Goldfarb (2007), Land Commune expropriations range from 100 to 800 ha (hectare), while those located further inland typically exceed 1,000 ha. Individual plots in these settlements range from 1 to 10 ha, compared to an average of 16 ha in non-urbanized areas. Although the Land Communes were conceived as agroecological, they face the same external pressures as other settlements, which often push against such practices.

We are addressing initiatives with two decades of existence. The comparison centers on to be a Land Commune (which means families originating from urban areas or marked by an urban ethos, managing relatively small plots, seeking cooperation and agroecology), as well as the socio-territorial actions of the MST in every case; and, how the exchange of knowledge and experiences allows traditional peasant agriculture to become agroecological. A key finding shared among the Communes experiences is the recreation of a peasant ethos (JUSTO, 2008) and the viability of a way of life based on their plots production. The case of Porto Alegre, which is not a Land Commune, serves as a counterpoint.

i. *The Land Communes in Four Metropolitan Regions of the State of São Paulo*

This section presents studies on six Land Communes located in four metropolitan regions of the state of São Paulo: Greater São Paulo, Campinas, Ribeirão Preto, and the Paraíba Valley and North Coast. The state has six metropolitan regions, but Baixada Santista and Sorocaba were excluded due to lack of available data.

Together, these four regions comprise a population of approximately 28 million. The São Paulo Metropolitan Region (RMSP) alone accounts for about 10% of the entire Brazilian population, with over 20 million residents across 39 municipalities. Population density varies widely, from 39.7 inhabitants/km² in Salesópolis to 13,715 in Taboão da Serra. The Campinas Metropolitan Region (RMC), established by law in 2000, has 3.5 million inhabitants and includes 20 municipalities. The Ribeirão Preto Metropolitan Region (RMRP), created in 2016, comprises 34 municipalities with a combined population of around 1.7 million. The Paraíba Valley and North Coast Metropolitan Region (RMVPLN), established in 2012, includes 39 municipalities and 2.5 million inhabitants. According to the IBGE Agricultural Census (2017), São Paulo state has 188,620 agricultural establishments, of which 122,555 are family farms and 66,065 are agribusiness operations.

[2] Some São Paulo city cases was analyzed by Justo (2020). Biazoti et al (2021) analyzed the growing of urban agriculture in São Paulo city.

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a. *The three Land Communes in São Paulo Metropolitan Region (RMSP)*

This subsection focuses on three Land Communes in the RMSP, analyzed in previous empirical and secondary-source research (JUSTO, 2023), allowing for over a decade of insight. In Cajamar, the Sustainable Development Project (PDS) São Luís, official name, known as Land Commune Bishop Pedro Casaldáliga, was established in 2006 with 29 families on 121 ha. In Franco da Rocha, the São Roque Settlement Project, known as Land Commune Bishop Tomás Balduíno, was also created in 2006, with 61 families on 538.7 ha. Lastly, the Land Commune Sister Alberta is a land occupation in Perus (São Paulo city) on a 117-ha plot owned by a public sanitation company (SABESP), still pending expropriation.

Main results are: former urban dwellers have embraced the identity of peasant family farmers as a way of life; there are varying levels of engagement with agroecology, with most families in a transitional phase; production faces challenges in distribution, with modest outputs (e.g., fortnightly sales of organic produce baskets); and produce partially sustains the settler families' diets. Besides, there are two Social Control Organizations (OCS), one in Bishop Tomás and one in Bishop Pedro, each involving around 30 families.

b. *Land Commune Milton Santos in Americana – SP (RMC)*

Initiated in 2005, the Milton Santos Settlement is located between Americana and Cosmópolis, in the Jacutinga stream basin, and comprises 73 families on 105 ha. The families originated from urban peripheries in Limeira, Sumaré, and Campinas, in line with the Land Commune proposal. In the early years, researchers noted that urban habits created resistance to collective projects and the settlers preferring individual plots. To address this, academic extension efforts promoted the recovery of peasant farming practices (BOMBARDI; MANFREDINI; FERNANDEZ, 2009, p. 137).

In 2015, an OCS was formed with support from the Agroecology Center of ESALQ–USP (University of São Paulo), involving four neighboring families. Subsequently, a cooperative called Cooperflora was created with 12 families to commercialize their production to consumer groups near the settlement. By 2017, they were supplying 50 weekly baskets of seasonal fruits and vegetables (MARQUES et al., 2017).

c. *Mário Lago Settlement in Ribeirão Preto – RMRP*

In Ribeirão Preto city, the Sustainable Development Project *Fazenda da Barra*, better known as the Mário Lago Settlement. An MST land occupation in 2003 originated this settlement and it was officially recognized by INCRA (National Institute of Land Reform) as a land reform settlement on June 20, 2007. It comprises 473 families on 1,549.5 ha. The Land Commune is well known for its agroforestry practices. Gomes (2015) described 264 families living there, with each plot measuring 1.5 to 1.7 ha.

Iha (2015) reflects on the tensions between traditional peasant knowledge and agroecological training. One example is the debate over whether to keep or remove spontaneously growing weeds around crops: agroecological practice values them for soil protection, whereas traditional views see them as neglectful.

d. *Nova União Settlement in São José dos Campos – RMVPLN*

Located in São José dos Campos, the Nova União settlement was formalized by INCRA in 2001 with 64 families on 446.7 ha (average plot size: 5 ha). A study documented how agroforestry *mutirões* (community working together) improved both quality of life and the local landscape (DEVIDE et al., 2020). Settler families mostly came from the metropolitan peripheries of Osasco, São Paulo, and São José dos Campos. In 2006, of the 63 resident families, 18 worked exclusively with livestock; some families were unable to produce due to financial, health, or personal reasons.

From 2012, the state agency ITESP (São Paulo State´s Institute of Land) partnered with APTA (São Paulo's Agribusiness Technology Agency) to train settlers in soil recovery, intercropping, green manuring, and agroforestry systems. Between 2011 and 2012, the Vale do Paraíba Agroforestry Network was created, involving settlers, academics, technicians, and public managers. In 2013, a project to regenerate soil and forest led to the implementation of 32 agroforestry areas (SAFs). The agroforestry *mutirões* involved around 300 people from 2013 - 2014 and had positive impacts on forest corridors, healthier food production and consumption (pesticide-free). Resistance to agroecology remains among settlers who did not participate in the training, while SAF areas have inspired neighboring farmers to begin their own agroecological transition.

ii. *The Metropolitan Region of Porto Alegre (RMPA) - a counterpoint*

The Porto Alegre Metropolitan Region includes 34 municipalities and a population of 4.2 million. In 2020, Rio Grande do Sul had 14 settlements across 13 municipalities, with 364 families cultivating 3,215 ha of rice and other crops. Coopan, a cooperative founded in 1990s, operates in the Capela Settlement in Nova Santa Rita city with 75 members (including 35 youth) and produced 3.5 tons of rice in 2018. In addition to cooperatives and OCS structures, there are 27 groups involving 158 families from RMPA, engaged in vegetable production (ORIGUÉLA, 2019).

According to Origuéla (2019), Rio Grande do Sul is the country's largest rice producer, accounting for nearly 70% of national output. Agroecological rice cultivation in the Porto Alegre Metropolitan Region (RMPA), during the 2016/17 harvest, reached 337,000

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sacks over 3,628 hectares, involving 445 families (ORIGUÉLA, 2019). The total production was 513,916 sacks across 5,100 hectares, with 562 settled families. It is estimated to be the largest agroecological rice production experience in Latin America. The cultivated area increased from 468 hectares in the 2003/2004 harvest to 4,886 hectares in 2016/17. The rice fields are managed collectively; thus, family labor is organized through partnerships and collective management. In 2024-2025, they harvested 14,000 tons.

Rice cultivation in Rio Grande do Sul began in the 1960s, characterized by capitalist land renting on large tracts, with industrial machinery and wage labor. With the monetary crisis of the 1980s, this model collapsed. Consequently, family farmers from Santa Catarina migrated to the Porto Alegre Metropolitan Region, renting land to grow rice. These "Catarinas" had credit lines from rice mills in Santa Catarina and introduced pre-germinated seed techniques to the region. Their experience later served as an example for the future settlers to implement rice production in floodplains without the use of agrochemicals. These settlers, who began their land struggles in the 1980s, came mostly from the northwest region of the state and had no prior experience with flooded rice cultivation. Initially, their production in the occupations followed the model of the Green Revolution (ORIGUÉLA, 2019, p. 184). However, their traditional vegetable cultivation was already pesticide-free. The agroecological transition occurred in the late 1990s. There was conflict between settlers who sought organic/agroecological production and others who rented their plots for conventional, agrochemical-based farming. This was resolved in 2008 through legal action by the Public Prosecutor's Office, which prohibited the use of agrochemicals in Banhado dos Pachecos (swamp area) from then on, all rice fields had to be organic. Currently, the Filhos de Sepé Settlement in Viamão is considered an agroecological territory. Finally, the research shows that the yield of agroecological rice production is 85 sacks per hectare, compared to 150 in conventional systems. However, the cost of conventional cultivation is three times higher than that of the agroecological method (ORIGUÉLA, 2019, p. 188).

After the information presented in this first part, some systematization is necessary. Two temporal patterns can be observed: (1) land occupations occurred between 2002 and 2006 and followed the agroecological proposal, initially more as an intention, and later as a practical learning process; (2) the resurgence of agroecology (through extension projects and/or technical assistance) occurred around 2012–2017. Despite some similar processes, the scale of agroecological rice production in the RMPA is unparalleled due to its larger area, which naturally results in greater output. In the case of rice in the RMPA, the agroecological transition occurred in the late 1990s. The secondary data allow us for a decade-long comparison, highlighting the following elements: a process of *recampesinization*; agroecological transition driven by the exchange of knowledge with external agents, aimed at "recovering" peasant practices and/or promoting dialogue between peasant knowledge and agroecological methods; and relatively small-scale production, distribution, and consumption in comparison with the metropolitan scale. It is important to emphasize that without territorial conquest, there would be no grounds for dispute over this theme. On one hand, we observe qualitative achievements and challenges of socio-territorial movements. On the other, we note a great numerical difference in production, particularly due to the larger scale of land and agroecological rice production in the RMPA when compared to ongoing initiatives in the metropolitan regions of São Paulo State.

b) Oligopolies of Production and Distribution Versus Socio-spatial Movements of Agroecology

In this second part, we will outline the contemporary global food system, which is structured around oligopolistic agribusiness control, and how "urban/metropolitan" food systems are characterized by dietary "monotony." From there, we will explain the expansion of socio-spatial movements promoting changes in eating habits and agroecology. This represents a significant socio-spatial shift in the struggle for agroecology, aiming for the conquest of immaterial territories (GIRARDO; ROSSET, 2017; ULE MUÑOZ; ROSSET, 2022).

Two main models mark agricultural production in Brazil: the simple commodity production of peasant family farming, and the capitalist agribusiness commodity production. According to Agriculture census (IBGE), peasant family farming is responsible for 70%, on average, of food production like cereals, vegetables, and fruits. They occupy 20% of the total agricultural area. Capitalistic agribusiness occupies 80% of the total area to produce commodities like soy, corn, coffee, and meat.

Since the 1980s, Oliveira has analyzed Brazilian agriculture and agrarian conflicts through the concepts of the *territorialization of monopoly* and *monopolization of territory*. Peasant agriculture is subordinated to the dominant mode of capitalist production. Subordination occurs when capitalists monopolize production (imposing monoculture) and control land ownership (*territorialization of monopoly*), or when they dictate production methods without owning the land (*monopolization of territory*). Therefore, the struggle for land by peasants represents a way to escape or reduce this subordination. Still, even with access to land, peasants often need to engage in dominant crop cultivation, while managing to maintain a degree of diversity in other plots (OLIVEIRA, 2016). The author

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analyzed the recent period in which Brazil solidified its position as a key global player in agricultural trade, specially as the biggest meat producer. Bombardi (2017), examining the same period, shows how transnational agrochemical corporations dominated agricultural production in Brazil, capitalizing on the country's lack of regulations on pesticide and GMO use, conditions far more permissive than those in Europe.

The agribusiness-based food system[3], relying heavily on agrochemicals and ultra processed foods, affects the entire population in unequal ways. We will now consider this global context of corporate control in the agriculture and food sector. According to the *Agrifood Atlas* (2017), major corporations are powerful enough to shape markets and policies, creating extremely unequal relationships between themselves and farmers, peasants, and rural workers around the world. Price pressure from supermarkets and food companies is cited as the main driver of precarious labor conditions and poverty at the base of the supply chain. Loss of soil fertility and biodiversity, pollution, and greenhouse gas emissions are attributed to the rise of industrial agriculture.

Among the academic defenders of agribusiness, notable are the works of Francisco Graziano and Roberto Rodrigues (the latter from a family of landowners). For a critique of the dominant food system in terms of sustainability and the UN 2030 Agenda for Sustainable Development, see: *The State of Food and Agriculture 2023 – Revealing the True Cost of Food to Transform Agrifood Systems* (FAO, 2023).

It is no coincidence that the *Agrifood Atlas* (2017) was published when Brazil had become the "barn" of global agricultural commodities. The report shows that, from the 1980s onward, transnational corporations became global agents with worldwide interests. The ten largest corporations now include five manufacturers and five distributors - six headquartered in the USA, three in Europe, and one in Brazil: Nestlé, PepsiCo, JBS, Coca-Cola, Anheuser-Busch InBev (industry); and Wal-Mart, Cargill, Costco, Kroger, Tesco (distribution).

Since the late 20th century, there has been significant growth in land cultivated with palm oil, corn, sugarcane, and soybeans. In Brazil, seven joint ventures between domestic capital and Western commodity corporations' control 50% of sugarcane mills. The agricultural machinery industry is dominated by three groups - Deere, CNH, and AGCO - which control 50% of the global market.

Another feature of these corporations is their technological investments, setting trends in agriculture digitalization: GPS-guided tractors, soil-monitoring apps, drones for pesticide spraying, and weather-linked sensors. These innovations represent an annual trade market of $30 billion. Pesticide sales have increased sixfold since 1961, reaching $175 billion globally in 2013. In 2014, there were seven major pesticide and seed companies; by 2017, mergers reduced them to four: Monsanto/Bayer, DuPont/Dow, Syngenta/Chem China and BASF. These corporations held over 1,700 plant patents in 2015. Genetic research has heavily invested in "climate genes", plants genetically adapted to climate change.

ADM, Bunge, Cargill, and Louis Dreyfus dominate agricultural commodity trade, managing transportation, processing, and storage through ports, railways, ships, refineries, silos, and factories - together responsible for 70% of global trade. Since 2015, Chinese state-owned Cofco has entered this elite group.

Supermarkets also exert considerable influence over dietary habits (AGRIFOOD ATLAS, 2017). When four corporations dominate seeds, pesticides, and patents; four others control trade; three dominate machinery; and a handful manage retail dismantling this system seems almost impossible. Not to mention the ideological production through agribusiness advertising.

Thus, opposition takes the form of territorial struggle and the search for spaces for new dietary habits. Brazilian eating habits are deeply influenced by this global context. According to Belik (2020), food expenditure by the wealthiest families (earning more than 25 minimum wages per month) is 165% higher than the *total income* of the poorest families (earning up to 2 minimum wages). The main finding is the dietary "monotony" across Brazil - north to south, urban and rural - where just 10 items account for more than 45% of consumption: rice, beans, French bread, beef, chicken, banana, milk, soda, beer, and sugar. As rural incomes rise, diets become more like urban ones.

Belik writes: "Food monotony is the opposite of what is considered an adequate and healthy diet" (2020, p. 9). With rising income, consumption of meat increases, while rice and beans decline. Higher income can reduce consumption of manioc flour, sugar, fresh fish, soybean oil, and increase purchases of beer, olive oil, cheese, fruits, and vegetables. Among the lower-income population, any income increases boosts consumption of these items. Regardless of income, meat is the highest food expenditure. Between 2002 and 2018, *in natura* food consumption fell 7%, while ultra processed food rose 46%. Frozen ready meals grew by 250%. Food retail is concentrated in supermarkets, which capture 93% of revenue.

However, a creative resistance emerges from Brazilian recent culinary. We see a socio-spatial movement involving scholars, politically engaged chefs, and civil society organizations that are connecting people and territories through agroecology. The dominant food system relies on culinary standardization. Dória (2009) analyzes the formation of a "Brazilian cuisine" and the recent interest in healthier

[3] McMichael (2016) defines it as corporate food regime.

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"ingredients." For him, Brazilian cuisine is a recent amalgam of Indigenous, African, and European traditions emerging as a set of regional cuisines rather than a cohesive whole.

Dória argues that from the 1970s, a tourism-driven culinary regionalization based on IBGE's 1940s geopolitical divisions prevailed. He proposes a new regionalization based on discontinuous "culinary patches" defined by ingredients:

- *Amazonian Cuisine:* Cassava, fruits, river fish, forest products.
- *Coastal Cuisine:* Fish, seafood, coconut milk (from Ceará to Espírito Santo).
- *Recôncavo Baiano Cuisine:* Palm oil, Afro-Brazilian religious food.
- *Southern Cuisine:* Corn-based dishes (like *cuscuz*), small animal meats, offal.
- *Other Patches: Pequi* in the Center-West, *mate* in the Guarani regions, *pinhão* in Araucaria forests, and *caipira* cuisine (São Paulo, Minas, Center-West) based on corn, pork, chicken, and garden vegetables.

The emerging "ingredient-based cuisine" promotes rooted, popular products with the sophistication of haute cuisine. Dória (2009, p. 66) envisions a future Brazilian cuisine based on biodiversity and native ingredients: "Thus, we can safely say that a Brazilian cuisine, setting aside recipes and ethnic contours to focus on ingredients, is a work yet to be done."

Dória's 2009 prediction has materialized in cooking shows on TV and gastronomy circuits. Notable examples include: cuisine chef Bela Gil: owner of *Camélia Ododó* restaurant, co-founder of *Instituto Brasil Orgânico*, TV host, agroecology advocate, and influencer with over 500,000 followers; chef Rodrigo Oliveira: from *Mocotó* restaurant, nationally and internationally recognized for promoting regional cuisine and distributing thousands of free meals during the pandemic; chef Teresa Corção: founder of *Instituto Maniva* (RJ), fostering relationships between traditional food knowledge and chefs.

On the other end of the social scale, we have chef Tia Nice, from *Organicamente Rango* in São Paulo's south periphery, earned international awards for culinary excellence and social work during the pandemic[4]. Upper class chef Alex Atala and the *Instituto ATA* promote Brazil's biomes and support Organicamente Rango, connecting popular cooking with agroecological food from Parelheiros (an extremely poor neighborhood), recognizing that peripheral communities have long used conventional and unconventional edible plants.

These examples show agroecology's socio-spatial expansion in São Paulo, surpassing earlier analyses (JUSTO, 2019).

We see a socio-spatial movement involving middle - and upper - income consumers who can influence dietary trends. While not all will adopt agroecological diets, such movements expand the reach of socio-territorial actors who supply healthy food to thousands, still small relative to metropolitan inhabitants.

These trends counter the dominant global agribusiness system and manifest as socio-spatial agroecological movements. Academia also plays a role, notably the *Food Gude for Brazilian Population* and the internationally recognized *NOVA food classification system* from NUPENS-USP (Center for Epidemiological Research in Nutrition and Health). Also noteworthy are the efforts of the *Josué de Castro Chair for Healthy and Sustainable Food Systems*, *Rede PENSSAN* (Brazilian Network for Research on Food and Nutritional Security), and various civil society organizations (NGOs) advocating for *in natura* and minimally processed foods, and for new food labeling regulations. TV advertisements such as ACT's (Health Promotion NGO) warning against sugar in soft drinks require massive diffusion to effect real change on nutrition habits.

Socio-spatial manifestations include the growth of *Armazéns do Campo* (MST run stores) in big cities like São Paulo, Porto Alegre, and Campinas. The first was launched in São Paulo in 2016 and now totaling nearly 30 units, accelerated by the pandemic. Other examples include solidarity kitchens in major cities during the pandemic, organized by the Homeless Workers' Movement (MTST), which distribute free meals and cultivate urban gardens. It is agroecology taking root in the city.

Finally, we highlight the Mission *Josué de Castro*, launched in March 2024 to ensure agroecological food access for 5 million people. This mission is led by organizations such as Agroecological National Coalition (ANA), Coalition of Semiarid Region (ASA), AS-PTA – Family farm and agroecology, Coalition of Popular Movements (CMP), *De Olho nos Ruralistas*, Fiocruz (autarchy related to State health system), Small Farms Movement (MPA), Homeless Workers' Movement (MTST), trade unions, *Unisol Brasil* (Cooperative Center) and many others. Then, we have the most relevant socio-territorial and socio-spatial movements, NGOs, trade unions, cooperative center and coalitions forming a public mission spatializing the agroecological struggle.

II. Final Considerations

The possibility of a food system transition depends on the joint action of socio-territorial and socio-

[4] Watch a video called Taking health food to peripheric neighborhood during pandemic. Available at: https://www.youtube.com/watch?v=G3-Dj9UgJhE. Accessed in 09/24/2023.

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spatial movements, given that the dominant food system is highly concentrated and, therefore, enormously powerful. The conquest of land and territory by agroecology through the MST and other peasant socio-territorial movements in metropolitan regions is a necessary condition for agroecology to advance, but not a sufficient one.

There are common elements across the experiences of the Land Communes: a process of *recampesinization* (which takes a relatively long time - about 10 to 20 years), peer-to-peer learning and experience exchange among peasants, and the involvement of external agents who engage in dialogue with peasant knowledge, sometimes introducing agroecological elements. There were two significant phases:

1. Occupations occurred between 2002 and 2006, with an initial discourse of agroecology, although less reflected in practice.
2. A resurgence of agroecology - more concretely through extension projects and/or technical support - emerged between 2012 and 2017.

The Land Communes experiences differ from those in the Metropolitan Region of Porto Alegre (RMPA) in terms of size and the external support that allowed the latter to become a national reference. On one hand, we recognize the qualitative achievements and challenges of socio-territorial movements. On the other, there are clear differences in production scale, especially in terms of land area and agroecological rice production, where RMPA stands in stark contrast to the still modest initiatives in the metropolitan regions of São Paulo state.

The concept of socio-territorial movement contributes to interpreting this phenomenon by highlighting the essential need for agroecological agriculture to secure land and territory. Beyond territorialization (which varies in intensity across different metropolitan areas), we observe the socio-spatialization in defense of *in natura* (fresh) or minimally processed food, ideally agroecological. However, the current dynamics go beyond socio-spatial movements and involve social organizations, labor unions, universities, and celebrity chefs.

Thus, the category of socio-spatial movement does not fully capture the complexity of the current context. The socio-spatialization of agroecology creates a network of socio-spatial and socio-territorial movements, NGOs, universities, mission, and famous cuisine chefs.

The agribusiness-based food system is a global network of oligopolies. Brazil is a hotspot in that net. This kind of food system creates a nutritional monotony which is not heathy and neither environmentally sustainable.

Finally, living in large urban centers means consuming trends. We hope that the trend toward an agroecological food system continues to grow.

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