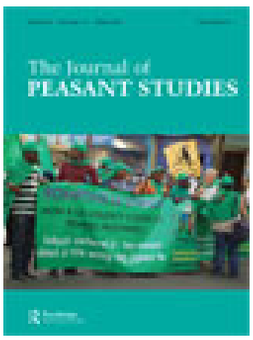

The Journal of Peasant Studies

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fjps20

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To cite this article: Renato S. Maluf, Luciene Burlandy, Rosângela P. Cintrão, Emilia Jomalinis, Mariana Santarelli & Theresa Tribaldos (2022): Global value chains, food and just transition: a multi-scale approach to Brazilian soy value chains, The Journal of Peasant Studies, DOI: 10.1080/03066150.2022.2105700

To link to this article: https://doi.org/10.1080/03066150.2022.2105700

Published online: 19 Sep 2022.

THE JOURNAL OF PEASANT STUDIES
https://doi.org/10.1080/03066150.2022.2105700

Routledge
Taylor & Francis Group

Global value chains, food and just transition: a multi-scale approach to Brazilian soy value chains

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ABSTRACT

The article analyses the Brazilian soy value chains using a justice-based, multi-scale approach following the international debate on just transition to sustainable and healthy food systems in the context of climate change. It highlights the challenges and limits to promote just transitions based on dominant global value chains, while assessing private strategies as false solutions for sustainability and climate change. The multi-scale approach allows for linking global trends and private strategies to their intersections with local and national food systems. Systemic drivers of inequalities together with parameters for promoting food and environmental justices are the backdrop of the approach.

KEYWORDS

Just transition; just food; soy value chain; food systems; climate change; Brazil

Introduction

The global food system can be described as an increasingly interconnected network of standardized and specialized production, trading and consumption processes with soy value chains as one of the supporting pillars as it represents an important component of international trade flows, involves large transnational corporations and is an agrifood product with wide and varied use on a global scale, a condition that has been reinforced by the increase in world meat consumption. Signs of social, environmental, human health and climatic repercussions of the continued growth in soybean growing and meat consumption can no longer be ignored, including its encroachment of native forest areas (Willet et al. 2019; Weis 2013; Trase 2018; Nepstad et al. 2019; Kastens et al. 2017; Rajão et al. 2020; Schmitt 2015). Calls for more sustainable food systems are becoming louder, in particular with a focus on low carbon transitions to address climate change. Simultaneously, the need for taking questions of social justice into account have entered the debate in the form of the concept of just transitions (Kaljonen et al. 2020). Based on a bibliographic review, the article analyses the Brazilian soy value chains using a justice-based, multi-scale approach in order to assess the possibilities of having these chains participating in

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just transition processes towards sustainable and healthy food systems in the context of climate change, a perspective that has acquired great relevance at international level.

The central question of this work is to what extent and with what requirements a just and sustainable transition in soy value chains is feasible. To this end, the article argues for a multi-scale approach and points out analytical parameters for dealing with the multiple dimensions involved in such a perspective which are all the more relevant considering Brazil's outstanding importance in the growing, processing and trading of soybeans globally. Social inequalities and inequities to be faced by just transition processes and food justice goals, together with challenges to promoting sustainable food systems in the context of climate change, are the dimensions that receive more attention in this paper. The latter includes a sample of government and private sector initiatives presented as limited or false 'responses' to the challenge of transiting towards low-carbon agriculture.

The dominant pattern in which the intense expansion of the growing, processing, commercialization and consumption of soybean occurs, as part of the industrial grain–oilseed–livestock complex, hinders a just and sustainable transition in soy value chains. A multi-scale systemic approach to soy value chains – a symbol of the internationalization of agrifood chains and one of the shaping pillars of what could be characterized as a world food system – allows for identifying soy value chains' important and diverse influences on food systems at various levels (e.g. national and territorial-local scales). Besides, these pivotal roles make it mandatory to assess soy value chains based on references to justice (e.g. food justice and environmental justice) and social processes if we are to adequately consider social demands and environmental imperatives allowing for the so-called just transition in food systems as expressed by different social sectors, national and international bodies and agencies.

Thus, the multi-scale approach implies broadening the focus of the analysis in order to consider connections between soy value chains and food systems at different scales and their implications to just transition processes. As a first step in this direction, we establish conceptual and analytical differentiations between the notions of chains and systems in order to better connect long and international soy value chains with food systems at various levels. In a second step, we address the complex topic of food system transitions. We start by recollecting the meanings usually attributed to just transition and the requirements for applying it to food system transitions by connecting just transition and food justice.

The justice-based assessment of the main trends in Brazilian soy value chains made in this article considers three dimensions of justice – distributive, procedural and recognitive justice (Fraser and Honneth 2003) – in order to highlight systemic threats to food and environmental justices stemming from these chains at various levels. Furthermore, addressing tensions, conflicts and contradictions associated with the private sector's hegemonic actors and governments sheds light on important aspects of food politics, notably at the national level.[1]

The paper is organized as follows. The first section proposes a multi-scale approach to soy value chains as a way to connect features and trends in these chains with food systems and the just transition debate. The second section deals with the notions of environmental justice and food justice and points out the main expressions of injustices

[1]It is assumed that interactions between soy value chains and food systems could be better verified at territorial scale, according to the multi-scale approach proposed here.

in soy value chains considering the above mentioned three dimensions of justice. Considering hard criticisms associating deforestation with the expansion of soybean growing and cattle breeding, the third section assesses the meanings and effectiveness of the responses and initiatives adopted in this regard in Brazil. As final remarks, the paper resumes the question of the non-feasibility of a just and sustainable transition in soy value chains, and suggests broadening the focus to encompass food systems at various scales and explores the possibilities of transiting to more sustainable, just and healthy national and subnational food systems.

Value chains, food systems and just transitions

As previously mentioned, the multi-scale approach implies considering soy value chains as one of the shaping pillars of what could be considered as a world food system, while taking also into account their connections with national and subnational food systems. Actually, soy value chains are an icon that polarizes debates with strong criticisms by civil society organisations and academia around internationalized food systems, long chains and distant links between food production and consumption, in which the roles played by large corporations, national states or blocs of countries, international trade and multilateral bodies stand out (Weis 2013; Escher and Wilkinson 2019; Garret and Rauch 2016; Trase 2018). Debates and controversies are especially intense in South America which has become the leading region in soy production, as demonstrated in the detailed discussion of the social, political, economic and ecological scenarios of the contemporary soy production boom in several countries of the region in Oliveira and Hecht (2016). As for Brazil, large-scale soybean growing as an important driver of land concentration and the corresponding political power of land owners (Pompeia 2020) are both highlighted further on in this paper among the sources of inequalities and injustices related to soy value chains. Just as they support the questioning presented here about the possibilities of a just transition in these chains.

Among the various uses of soybean, global demand for this commodity is especially linked to an increasing consumption of animal proteins based on modern industrial methods of confinement, particularly when it comes to beef, chicken and pork meat. According to Weis (2013), 'industrial livestock production' is one of the driving forces behind the increase in meat consumption worldwide, with the use of large volumes of industrial grains and oilseeds for a growing population of confined animals. The author concludes that the growth of the industrial grain–oilseed–livestock complex is implicated in an expansion of the land area, input and energy consumption, GHG emissions, and pollution load of industrial monocultures.

Global alliances and panels have claimed that the dominant global food system, as well as the global increase in meat consumption pose a serious threat to the planet (IPES-FOOD 2017; Swinburn et al. 2019; Willet et al. 2019; IPCC 2019). They pinpoint the term 'global syndemy' for expressing the synergy of three pandemics: obesity, malnutrition, and climate change (Swinburn et al. 2019).

In the geography of meat production and consumption, consumption is concentrated in countries of the global north with an average per capita consumption of meat above 85 kg / year, although there is an increase in emerging countries such as Brazil and China as well (Weis 2013). From the production point of view, Brazil stands out amongst the largest

world soy producers and exporters, along with the United States and Argentina, having China and the European Union as the main destinations of these exports. Brazil has had an exponential increase in the area planted with soybean since at least the 1970s, which has intensified in the last twenty years. The years ranging from 2000 to 2021 have witnessed the incorporation of roughly 23 million hectares, reaching 39,195 million hectares and 138 million tons in the harvest 2020/2021 (CONAB 2022). All this expansion has always had strong governmental support in technological research, rural credit and infrastructure. The soy chain has become one of the most significant items in the export basket of the Brazilian agricultural sector, with a prominent participation of trading companies (eg, ADM, Bunge, Cargill, Dreyfus), a strong process of economic concentration and denationalization of the sector (Leite and Wesz 2009) and expansion into native forest areas in the Amazon and Cerrado biomes. Political coalitions are formed at local and national level, gathering interests of large landowners and agro-industrial capital supported by macroeconomic and agricultural policies aimed at internationalization.

These agrifood chains and industrial complexes could be taken as expressions of a food regime under corporate hegemony as analyzed by Friedman (2005) and McMichael (2009), reflecting also a more general process of financialization of wealth in contemporary capitalism. Financial players operate in the fields of agriculture, food and land market, while agrifood companies operate through financial instruments. Transnational corporations increasingly dominate the upstream (machinery, biotechnology and agrochemicals) and downstream (food processing) industries related to agriculture (Escher and Wilkinson 2019). The link previously established between the expansion of soybean cultivation and meat consumption leads us to follow the diagnosis of the emergence of an interdependent Brazil-China soy-meat complex (Escher and Wilkinson 2019). Moreover, it highlights China's pivotal role in the international reordering of the contemporary food regime (Wesz, Escher, and Fares 2021).

For reasons of clarity, it is important to note that the focus on food regimes mobilizes macro-theories and emphasizes broad analyses of structures and processes of coordination and regulation between state, societal and market spaces, considering large-scale economic and political systems. The multi-scale approach to food systems does not disregard these fundamental elements, however, it dialogues with middle-range theories and processes that develop within the scope of micro-institutionality and food practices in specific territorial geopolitical spaces. Nonetheless, for applying the perspective of promoting just transitions towards sustainable food systems, a second conceptual precision is needed with reference to the conceptualization and uses of systems and chains.

Food systems commonly (and sometimes carelessly) appear as a self-explanatory analytical tool to overcoming segmented approaches and pointing to multiple factors at work. While there may be different conceptualizations of systems, misunderstandings or analytical losses can occur when 'system' is used to classify what is no more than a set of activities that are interconnected or linked together as chains or networks, or when the dynamics of a system are limited to the existence of multiple factors working in almost mechanical ways to determine processes or events. We argue that food systems are more than the mere aggregation of a set of interconnected activities and do not permit unclear or interchangeable usage of systems and chains.

The concept of food systems is widely used to construct comprehensive and integrated approaches, from the production and circulation of food products through to consumption. Human needs are at the core of food systems' definitions in Malassis (1993) and

Rastoin and Ghersi (2010). A precursor attempts to 'spatialize' or 'territorialize' the approach was the notion of 'localized food systems' (Cirad 1996; Requier-Desjardins 2002). Food systems are also usually characterized by the nature of the goods or processes that generate food, a methodology that risks an undifferentiated use of the notions of systems and chains (Colonna, Fournier, and Touzard 2013; Morgan, Marsden, and Murdoch 2006). A different stance is taken by Fine, Heasman, and Wright (1996) to whom food systems are formatted from the meanings associated with food consumption.

This paper assumes that food systems should be designed and characterized with food and eating as starting point from which the interconnected activities that compose them are identified, up to the scope of agricultural production. This approach also seeks to shed light on the actors, processes, and tensions that shape food politics at various levels, based on a multi-dimensional and multi-scale approach. Food systems are complex ensembles of actors and activities characterized by interdependent flows that evolve with complementarities, conflicts, and contradictions, and consequently require public and private mechanisms to coordinate components of systems that do not function harmoniously and may take a variety of directions. In starting from food and eating, the approach implies a distinct stance in relation to notions of food systems that by starting from the sphere of agricultural production present the risk of taking food systems, agri-food systems, and agro-industrial systems almost as synonymous; thus, systems, chains, circuits, and networks would also be interchangeable (Maluf 2021). Nonetheless, it is assumed that starting from food and eating allows for a better assessment of the roles and possibilities of diversified family-based agriculture in the food provisioning of localities in the face of the multidimensional dynamics that converge in them. Although perspectives for family farming as a source of food are a fundamental aspect including as a path to just transitions to sustainable and healthy food systems, dealing with it goes beyond the scope of this paper.

The multi-scale approach is premised on the plurality of food systems at different scales (international, national and subnational levels) whose coexistence also involves interdependence, complementarities and conflicts under multiple territorial dynamics with important repercussions on food provisioning. When it comes to the local level, the confluence and interaction among systems could be observed with the notion of decentralized food systems corresponding to 'how food is produced, circulated, and consumed in localities resulting from the intersection between local, national, or international systemic dynamics involving a wide variety of social actors, conflicts, and decision-making processes that also exist on multiple levels' (Maluf 2021, 3).

Thus, the article assesses global soy value chains through establishing connections to food systems, justice, and transitions, while having food justice (Gottlieb and Joshi 2010) and environmental justice (Acselrad, Herculano, and Pádua 2004) as underlying concepts and just food transition as a general perspective. While having in mind the multi-scale approach to food systems, connecting soy value chains and the desired transitions to sustainable and healthy food systems means assessing the socio-environmental and health repercussions of the production and consumption models they are associated with globally, as well as the ways soybean growing, processing and commercialization interact with food systems at national and subnational levels. This perspective encompasses, among others, (i) interactions between the modalities of soybean growing and cattle breeding for export and local-territorial food systems, (ii) systemic determinants of inequalities/inequities and justice/injustice in social and environmental aspects, (iii) ongoing

processes and transitions related to global trends in the demand for soy and meat and consumption patterns, (iv) social claims and regulatory measures due to environmental concerns and climate change; (v) interests and conflicts expressed in food politics at various levels and scales, including the territorial one.[2]

The idea of 'just transition' finds its origins in debates interlinking climate change, environment and energy, primarily concerned with environmental regulations and the impacts on employment in the transition towards low-carbon societies (Ciplet and Harrison 2019; Heffron and Mccauley 2017). Further developments lead to the perspective of 'just food transitions' proposing changes food systems must undergo to significantly reduce greenhouse gas emissions (IPCC 2019; Ericksen 2008). In a recent report, IPCC (2019) estimated that between 21 and 37% of greenhouse gas emissions are attributed to food systems in its stages of land use, storage, transport, packaging, processing, retail and consumption, and food waste. The panel recommendation to combine actions on both production and consumption sides shifts the debate, which had so far been centred on agriculture, to a systemic view on transition processes that also includes changes in diets.

The paper assumes a primary need for a procedural focus on transitions to address food systems' just transition which renders the idea of transition more complex in so far as it requires surpassing formalist and mechanical transition models by assuming transitions as open processes with tensions and conflicts. First of all, the idea of transitions with desired pre-established goals should face processes of transformation inherent and immanent to capitalist dynamics. Secondly, a procedural view allows for surpassing the mechanistic formalism of approaches based on a starting point (current adverse reality) and a point of arrival (desired world), which often neglect power relations and the different perspectives that guide relevant actors at play. There is also the need of going beyond focusing exclusively on the environment dimension of climate change, therefore bringing to the fore the double-exposure of populations in situation of social-environmental vulnerabilities (O'Brien and Leichenko 2000), as well as the focus on social justice and its derivatives absent in some uses of just transition.

Actually, literature on just food transition is gaining consistency influenced by three intertwined dimensions of justice – distributive, procedural and recognitive – all of them prominent in Fraser and Honneth's (2003) work, and more recently applied in just transition research, commonly joining environmental justice and energy transitions (Jenkins, Sovacool, and McCauley 2018; McCauley and Heffron 2018; Williams and Doyon 2019; Kaljonen et al. 2020).[3] Distributive justice refers to the equitable distribution of harms and benefits of the various activities in question. Procedural justice refers to equal opportunities to participate and have a voice in political and decision-making processes. Finally, recognitive justice involves the recognition of different groups / subjects, value systems and rights (Ciplet and Harrison 2019). A relevant finding is that claims for justice in low-carbon transitions are often context-specific, having as a minimum principle

[2]It is beyond the scope of this article to address conflicts over dietary patterns and contrasting food systems, as well as disputes for social control over food provisioning (Goodman, Melaine DuPuis, and Goodman 2012).

[3]Heffron and Mccauley (2017) argue for the need to include a fourth dimension - restorative justice - that will not be considered in this assessment. In Brazil, the judiciary has been using restorative justice techniques as an instrument for the negotiated resolution of socio-environmental conflicts at territorial level, but large structural asymmetries of power hinder the possibility of repairing related harms and injustices.

that it does not make the most vulnerable groups worse off. A central question is 'What must just transition fix to be just?' (Kaljonen et al. 2020).

There is a call for researchers to engage with creating proper approaches for capturing the transition dynamics and related issues of power relations, justice, and participation (Lamine, Darnhofer, and Marsden 2019). Besides, more cross-sectoral, cross-country, empirical and normative research is also needed considering the wide spectrum of issues related to potential injustices in the decarbonisation pathways, especially regarding food and nutrition security, livelihoods, and environment (Kaljonen et al. 2020). As we argue in this article, the need for taking questions of social inequalities and injustices into account have entered the debate highlighting the challenges of tackling systemic determinants and the setting in motion of just transition processes to reducing inequalities and promoting social justice as formulated in Amartya Sen's idea of justice presented in the next section (Sen 2009).

Finally, special attention should be given to the debate of socio-technical transition following a call for an ecological turn in the studies of agrifood systems that implies a conceptual and methodological debate on the approach of the environmental and social dimensions of these transitions (Lamine, Bui, and Olivier 2015). The original idea was to overcome more technical analysis in which the notion of technique was instrumentalized in a disaggregated way from the social component. Ciplet and Harrison (2019) argue the need for a focus on just transition to overcome the limitation of research on socio-technical transition that hide issues of power and other social elements that are indispensable in proposing transitions. Lamine, Bui, and Olivier (2015), in turn, build a systemic, historicized and pragmatic view of transition processes by incorporating in the socio-technical approach the power relations and the macro perspective of the approach on food regimes and the emphasis on the changes 'being made' in French Pragmatic Sociology.

All aspects mentioned above are especially relevant when dealing with highly unequal countries from the so-called Global South, as Brazil, and the complexity of socio-environmental conflicts in global-long food chains, as in the case of territorial and sectoral impacts of soy value chains expansion.

Dimensions of (in)justice in Brazilian soy value chains

The concern about just food transitions in a context of climate change, which is more strongly perceived in Europe, raises the need to address the different dimensions of injustice associated with the expansion of soy value chains, which are not only related to carbon neutral transitions, as they reflect also the deepening of a historically dominant development model and a hegemonic food system in which soy is one of the key elements. This bring the challenge of finding ways to identify reparable injustices as proposed by Sen (2009)[4], a perspective that can be translated into our theme as promoting social justice through food – in line with the concept of food justice – by finding ways to

[4]Amartya Sen (2009) proposes a theory of justice that allows for judging how to reduce injustice and advance justice, by identifying redressable injustices that could be eliminated, rather than aiming only at the characterization of perfectly just societies. In his view, the search for justice is procedural and the identification and reparation of injustices involves social processes and political disputes.

overcome redressable social injustices associated with food systems at various scales. Thus, using the notions of food justice and environmental justice, we will seek to embrace the different dimensions of (in)justice present in Brazilian soy value chains, taking into account that any transition is a process that involves conflicts, disputes and different perceptions of ongoing processes.

Food justice is a key concept in the analysis of food politics and systemic drivers of injustices inequalities and injustice involving questions related to: (a) how, where, what, and by whom food is produced, processed, sold, and consumed; (b) how the related benefits and arms are shared, and how and by whom food systems decisions are made (Gottlieb and Joshi 2010; Gilson and Kenehan 2018). Cadieux and Slocum (2015) argue that doing food justice means finding ways to intervene against structural inequalities and promoting transformative changes, with a specific goal of institutionalizing equity in the food system and expanding control over food production and consumption. Greater control tends to be associated with less dependency on capital-intensive inputs, greater attention to social and environmental contexts, and the creation of supply networks that contribute to systemic wellbeing (Cadieux and Slocum 2015). Notwithstanding, references to food justice are still few in Brazil, although quite compatible with the public debate that takes place more around the notions of food and nutrition sovereignty and security and the human right to adequate and healthy food. This was an outcome of a social construction gathering social movements, civil society organizations, academics and public servants, that gave rise to building up an institutional framework and a bunch of public policies (Leão and Maluf 2012).

Environmental justice, in turn, refers not only to inequalities in the distribution of environmental risks, but also expands the concept of social justice by understanding the environment and nature as conditions for social justice (Schlosberg 2013). For Acselrad, Herculano, and Pádua (2004, 9), environmental justice is understood as a set of principles that assure that no group of people (ethnical, racial or class) should support a disproportionate part of the collective space degradation. This approach emphasizes the unequal distribution of environmental costs, denominating it as environmental racism.

The interrelationship between food justice and environmental justice issues requires the observation of socio-environmental conflicts and the power dynamics inherent in food systems, especially the unequal distribution of risks and benefits, and the ways in which they reproduce processes and dynamics that historically generate inequalities, expropriations, and restrict production or access to adequate and healthy food at the local level, mostly the ways of life of traditional people and communities. Socio-environmental conflicts relate to the dispute over the use and appropriation of natural resources among divergent groups and social stakeholders, cosmologies and practices, which environmental justice frames in order to highlight threats that some groups' practices pose to the continuity of one or more social groups' social forms of appropriation of the environment (Acselrad, Herculano, and Pádua 2004, 26). Although socio-environmental conflicts are important to highlight injustices, it is worth mentioning that not all injustices are manifested in the form of open conflicts.

The predominant pattern in which soybean value chains are expanding in Brazil is among the main determinants of the reproduction and even worsening of huge social inequalities and environmental damages, in line with their condition of being a pillar of

the globalized hegemonic food system that articulates a set of distributive, procedural and recognitive injustices. Some of the features of this predominant pattern were mentioned in the previous section and will now be taken up again in light of the focus on the inequalities and injustices associated with it. The treatment of these inequalities and injustices at their multiple scales and intersections is an essential component of the just food transition conceptual framework.

The distributive dimension of food justice concerns the determinants of inequalities in food systems, with emphasis on the high concentration in income and land ownership in Brazil. This concentration pattern is reinforced by the productive model prevalent in the industrial grain-oilseed-livestock complex, in which soybean cultivation and large-scale livestock activity stand out, resulting in socioeconomic inequalities and inequities and food insecurity. This model is characterized by great dependence on products and services external to agricultural establishments, high mechanization with low job generation, high production costs requiring scale gains and large volumes, high economic risks, power inequalities of producers vis-à-vis large corporation, indebtedness and exclusion of small-scale producers, promotion of social and economic inequality at the local level (Leite and Wesz 2009; Wesz 2019; Favareto et al. 2019; Silva et al. 2020).

As mentioned before, the continuous increase in world meat consumption, anchored in the industrial livestock production, makes up the framework of determinants of distributive injustices, first of all for the uneven distribution in world meat consumption concentrated in Global North countries, while social and environmental costs are concentrated in the Global South (Weis 2013). Also, the fundamental role played by global financial markets in the operations of extraction of raw materials, in organization of the logistics of its circulation, determining price dynamics (Svampa 2019). Commodities' international price increases in future markets stimulate speculative increase in prices of potential land for planting these commodities in Brazil, boosting land grabbing (Pitta and Cerdas 2017; Favareto et al. 2019; Garret and Rauch 2016; Escher and Wilkinson 2019). The continuous expansion of soybean and associated infrastructure (warehouses, roads, railways, ports, bulk terminals) stand out as main regional drivers of the opening of new agricultural frontiers in areas of native vegetation in the Amazonia and Cerrado[5], causing an increase in deforestation even if these lands are not used for soy at first. In agricultural frontier areas, extensive cattle breeding often paves the way for soy expansion and land speculation (Mello 2016; Sauer and Leite 2012; Aguiar 2017).

In both biomes, the expansion of the productive model of the industrial grain-oilseed-livestock complex unleashes a set of social and environmental injustices involving the rural populations of these territories, whose ways of life and food systems are severely affected by the expansion of the soy-meat complex, leading to conflicts over land tenure, expulsion from their ancestral territories, deforestation and reduced access to natural resources. Family farmers, agrarian reform settlements, extractive communities, diverse indigenous peoples and traditional people and communities are under this condition.[6] They largely do not have legal documents and in some cases use systems of

[5]Although less known than the Amazon, the Cerrado biome – the brazilian savanna, has great biodiversity, with about 10,000 different species of plants, 759 species of birds; 180 reptiles; 195 of mammals (WWF/Brasil 2003 as quoted in Schlesinger and Noronha 2006).

[6]Traditional peoples and communities are legally recognized in Brazil and represent a social diversity, including quilombolas (afro-descendants of former slaves), riverside dwellers peasants, quebradeiras de coco (babaçú coconut

common usufruct of land and resources. Numerous socio-ambiental conflicts erupt with poor and vulnerable populations, facing asymmetrically large economic agents that even resort to violence such as arson and murders of workers and leaders of social movements (Schlesinger and Noronha 2006; Sauer and Leite 2012; Acselrad, Herculano, and Pádua 2004; Leguizamón 2016; Almeida 2010). The weaknesses of land policy, inaccuracies in land documentation and the unequal access to the judicial system refer to the dimension of procedural justice mentioned below in more detail.

Rather, it is important to highlight the uneven distribution of harms and benefits of this production model at different scales, with liabilities and socio-environmental costs falling heavily on the poorest sectors of the population at the local and regional levels, to the benefit of regions that import primary products. Several of these injustices are reported by local populations, but they do not always manifest themselves locally in the outbreak of open socio-environmental conflicts. Environmental and human health damage are caused by the intensive application of agrochemicals, including glyphosate, the herbicide associated with transgenic soy, which corresponds to more than 95% of the soy produced in Brazil. Spraying toxic agrochemicals endangers the health of workers in the sector, as well as members of villages and towns neighbouring soy farms, harms neighbouring non-GM crops, and generates environmental imbalances that aggravate problems with pests and diseases. The disappearance of fauna and flora due to deforestation and contamination of the environment harms hunting, fishing and vegetal extractivism. There are reports of damage to water resources, with silting of springs and reduction of water courses and contamination by agrochemicals of waters and groundwater that supply cities (Schlesinger and Noronha 2006; Greenpeace 2006; Pitta and Cerdas 2017). It should be noted that about half of the original forest cover of the Cerrado biome has already been lost and the springs of eight of the twelve major Brazilian hydrographic basins are located in the Cerrado.

The great concentration of economic, land and financial power around the soy value chains and cattle breeding translates into political influence at both the local, regional and national levels, intertwining distributive and procedural injustices. The corporations become actors with great influence and power also at the local and regional level, making cities and populations often hostages to their interests (Raasch 2020; Favareto et al. 2019). The growing economic weight of soy and meat in Brazilian exports has transformed these commodities into an instrument of economic and political power, contributing to the strengthening of political coalitions around the industrial grain – oilseed – livestock complex, articulating organizations of landowners, rural patronage and associations linked to different agro-industrial complexes. Although not exempt from internal contradictions, its main form of political expression is the Parliamentary Front for Agriculture – called the 'Bancada Ruralista' ('Ruralist Bench') – which is articulated in the National Congress and constitutes one of the largest inter-party caucus (Escher and Wilkinson 2019; Ferrante and Fearnside 2019; Moura, Rozendo, and Oliveira 2020).

These strong procedural inequalities lead public policies for credit and investment in infrastructure to benefit the dominant food system and the long production and

processors), rubber tappers, pasture fund communities, artisanal fishermen, among others, whose identities collectively are based on territorial rights and cultural self-awareness (Calegare, Higuchi, and Bruno 2014; Pitta and Cerdas 2017; Almeida 2010).

consumption chains to the detriment of short circuits and more diversified food production by family farmers. Tax exemptions (including on pesticides) subsidize the sector, failing to collect public resources. The approval of changes in environmental legislation should also be mentioned with weakening inspections against deforestation, blockages to land policies, reduction in the territorial rights of indigenous peoples and traditional communities, and changes in the regulation of pesticides, allowing the intensification of their use and the release of new products (Ferrante and Fearnside 2019; Moura, Rozendo, and Oliveira 2020; Almeida 2010).

Recognitive inequalities are added to the distributive and procedural inequalities and injustices affecting food politics. From the local to the national level, coalitions around the industrial grain – oilseed – livestock complex proclaim the great success of soy value chains in obtaining foreign exchange for the Brazilian trade balance and in supplying oil and feed in large quantities and at low prices, which contributes to the popularization and continuous growth of animal protein consumption and to the narrative of world food security. Ruralists even deny the relationship between the expansion of soy monoculture, extensive cattle breeding, deforestation and global warming. An example of the strength of Ruralists in influencing public policies is the 'Sectorial Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Economy in Agriculture', known as 'Plan ABC – Low Carbon Agriculture'. This plan, approved in 2012, does not include measures aimed at the soy chain, as it considers that 'the main export culture in Brazil did not have significant emissions', as 'it does not require the application of nitrogen fertilizers (the main source of direct GHG emissions)' (Observatório do Plano ABC 2015, 6). The main action of the ABC Plan is credit policies for the 'recovery of degraded pastures' based on the assumption that the main contribution to global warming from Brazilian agriculture is degraded pastures and extensive cattle breeding. That means the plan disregards the association between expansion of extensive cattle breeding, large-scale soybean growing and deforestation, mentioned above.

One should take note of social movements fighting for access to land and natural resources, including family farmers, peasants and indigenous people as part of the picture, giving voice to socio-environmental injustices of the dominant production model that are subject to huge national and international criticism. Socio-environmental conflicts erupt locally and could be reconfigured in the context of debates around climate change. Anyway, there is a recognitive justice involved here in the pleading for food systems and production models based on agroecological principles and short circuits linking production and consumption, while valuing distinct ways of life closely connected to territories and natural resources. To be sure, these movements though organized nationally have to cope with great power asymmetries in relation to the dominant model that has soybean as its main political and economic expression.

In early 2000s, the election of governments led by Workers Party (Partido dos Trabalhadores, PT) brought about the Zero Hunger program under which many of these social movements mostly rural started to associate with urban movements against hunger and in defense of healthy diets. They had in the National Council for Food and Nutrition Security (Consea), an advisory body to the Presidency of Republic, a space for participating in the making of national policies and programmes in which many of the socio-environmental threats mentioned above have been included. Nonetheless, strong setbacks have occurred, especially since 2016 with the rise of conservative

governments, the extinction of Consea and the dismantling of many food and environmental policies.

An exercise of framing the referred threats, conflicts and impacts according to the three dimensions of justice as proposed by Fraser and Honneth (2003) is found in the Table 1 below.

Claims, responses and initiatives related to deforestation

The importance of forests in carbon sequestration places deforestation and changes in land use as central concerns for climate change. The great expansion of soybean areas in Brazil has gained international prominence as one of the important vectors of deforestation in the Amazon, also associated with extensive cattle raising. The association between soy and deforestation, denounced by social movements and environmental NGOs, has come under international pressure, especially from the European community. A set of private and governmental initiatives seek to respond to these pressures, preventing soy production from causing deforestation and trying to induce more sustainable forms of production. We have chosen to analyse two of these initiatives that have gained prominence in Brazil, which are moratoriums and sustainability certifications, presented here as an empirical exercise of the limits for promoting a transition guided by the references of food and environmental justice in value chains such as soy. The concept of just food transitions allows analysing these initiatives in addition to carbon emissions, observing the different dimensions of (in)justice evident in food systems at their different scales, while taking into account that any transition is a process that involves conflicts and disputes, and includes different perceptions of these same injustices.

The soy moratorium in the Amazon is an initiative that was established in Brazil in 2006, within the scope of international private governance, after some years of increases in deforestation rates attributed to the expansion of soy. It arises in a local context of worsening socio-environmental conflicts involving peasant populations affected by the construction of a Cargill bulk port in Santarém, in the state of Pará in the Brazilian Amazon, for the export of soybeans. Strong campaigns by international environmental NGOs (especially Greenpeace) with European consumers have blamed large European corporations for the purchase of soybeans and meat associated with deforestation, violence in the countryside, land grabbing, and the exacerbated use of pesticides (Greenpeace 2006; Piatto and Souza 2017). These campaigns posed threats of boycotts and urged large companies and supermarkets to adhere to corporate social responsibility policies. In response to these pressures, the 'Soy Moratorium' consisted of a voluntary agreement in the soy chain, whereby associations of soy processing and exporting companies committed themselves not to purchase soy from deforested areas in the Amazon (Sousa 2015; Piatto and Souza 2017; Mello 2016).

Between 2006 and 2016 there was a significant reduction in deforestation rates in the Amazon, which some authors attributed to the moratorium (Kastens et al. 2017; Trase 2018). Other authors, while not being unanimous about the most important factors of this reduction, highlight different measures taken by the Brazilian federal government, among them the improvement of satellite monitoring of deforestation, and the intensification of environmental inspection (Ferrante and Fearnside 2019; Schmitt 2015; Mello

Table 1. Dimensions and expressions of (in)justice associated with the soy-meat complex expansion at different scales.

	Local	Regional	National	Global
Distributive justice	Uneven distribution of harms and costs of the production model. Dependency on external capital-intensive inputs (including agrochemicals). High production costs requires scale gains. Indebtedness and exclusion of small-scale soybean growers. Power asymmetries of soybean growers vis-à-vis large corporations. Displacement of rural populations and diversified crops, deforestation, socio-environmental violent conflicts over land tenure and access to natural resources due to soy-meat complex advancing over new areas at Cerrado and Amazonia biomes. Human health, neighbouring villages and non-GM crops endangered by agrochemicals. Threatens to local food systems and ways of life, hunting, fishing and vegetal collection due to deforestation and environment contamination. Environmental imbalances and damages to water resources.	Soy-meat complex intensifies land concentration. Draining out of local produced wealth, income concentrated in local and regional elites and pole-cities, worsening socio-economic inequalities. Deforestation and regional losses in biodiversity and sociobiodiversity resulting from soybean acreage and associated infrastructure expansion towards new agricultural frontiers and deforestation (Amazonia and Cerrado). Damages to water resources harming hydrographic basins.	Soy-meat complex reinforces some determinants of Brazilian food insecurity through income and land concentration. Lack of food sovereignty, economic concentration and denationalization. Land speculation, expansion of agricultural frontiers, land grabbing and deforestation boosted by increasing commodity demand and prices. Tax exemptions (including on pesticides) affecting the collect of public resources. Strong governmental support in technological research, rural credit and infrastructure benefits dominant food system at the expenses of diversified family farming and local food systems. Unequal access to public resources, policies and public programs.	Reinforcement of hegemonic dynamics of neo-extractivism and spoliation of Global South countries. Financial market drives the value chains, determining commodities prices, boosting investment in land purchase and land grabbing. Increase with uneven distribution in world meat consumption concentrated in Global North. Industrial grain-oilseed- livestock complex as drivers of food and environmental injustices. Unequal distribution of wealth benefits of large international corporations and Global North. Deforestation influences climate change and possibilities of future just food transitions.
Procedural justice	Power asymmetries and unequal influence on decision making processes and allocation of public policies and resources resulting in strong procedural inequalities at local level opposing local	Intertwined economic and political power of soy-meat complex actors leading to inequalities in influencing institutional spaces of decision. Rising power and	Growing power of political coalitions gathering interests of large landowners and agro-industrial sectors influencing legislations and public policies related to food systems (changing environmental	Increasing concentration of power with unequal geographic distribution: large international corporations and global financial markets reinforce dynamics of neo-

(*Continued*)

Table 1. Continued.

	Local	Regional	National	Global
	populations and large economic agents. Exposure to violence and unequal access to the judicial system and legal channels. Land grabbing favoured by weaknesses of land policy and inaccuracies in land documentation. Economic actors influence political and legal processes. Unequal access to instruments such as certifications that may reinforce existing power asymmetries.	influence of corporations.	legislation, weakening inspections against deforestation, blockages to land policies, changements in regulation of pesticides, weakening of food and nutrition Security policies). Weak institutionality regarding the guarantee of human and territorial rights of indigenous peoples and traditional communities.	extrativism and global food systems.
Recognition justice	Political struggles over the recognition of rural populations' right to accessing territories and preserving ways of life. Industrial grain–oilseed–livestock complex claiming the success of dominant food systems while putting local populations' ways of life as barriers to development.	Great asymmetries between the voicing of dominant food systems economic success vis-à-vis social movements denouncements and claims for different food systems, relations with territories and natural resources. Social discrimination reinforced by wealth concentration, political power asymmetries and social values. Sectors and actors negatively affected by the agricultural frontier expansion regarded as less important vis-à-vis business or governmental actors.	National campaigns in defence of Amazon and Cerrado and against the use of pesticides seek to draw attention to the health and environmental problems, but with less influence than those who defend the dominant food system. International recognition of indigenous people and traditional communities as important for the conservation of biodiversity can favour national recognition of their way of life and their rights. On the other hand, national inequalities can affect the internal repercussions of these international movements of recognition.	Global concerns around climate change and health problems in dominant food systems can favour injustice recognitions, but solutions with limited-reach, or even false, can weaken claims for just food transitions.

2016; Rajão et al. 2020; Piatto and Souza 2017).[7] The importance of these governmental measures becomes more evident after 2016, when political changes in the federal government led to a loosening of environmental policies, largely due to pressure from actors linked to soy agribusiness. After this period, deforestation rates in the Amazon rose

[7]In 2003, the newly elected Lula government established an Action Plan for the Prevention and Control of Deforestation in the Legal Amazon, seeking to articulate a set of actions and measures in different areas (Mello 2016).

again, although the moratorium was maintained. And the situation got even worse after 2018, with the election of a conservative president extremely aligned with the more conservative sectors of Ruralists (Ferrante and Fearnside 2019; Rajão et al. 2020).

It should be noted, however, that in the same period in which there was a reduction in deforestation in the Amazon, there was an increase in deforestation rates in the Cerrado biome, especially in the agricultural frontier called MATOPIBA[8], where there was a great expansion of the area planted with soybeans, driven by the increase in the international demand. The increase in socio-environmental conflicts involving rural populations in this region triggered complaints and campaigns in defence of the Cerrado[9], leading some social actors, especially rural social movements and national and international environmental NGOs, to demand the expansion of the soy moratorium to the Cerrado (Nepstad et al. 2019; Pitta and Cerdas 2017; Piatto and Souza 2017).

However, as can be seen, the moratoriums do not interfere with some of the main drivers of deforestation, namely the relationship among the price of soy, financial markets and the speculative land market (Macul 2020). Land speculation associated with the expansion of the soy-meat complex, the appreciation of land as a result of infrastructure works and the increase of world meat consumption continues to drive the expansion of agricultural frontiers, both in the Cerrado and in the Amazon. Thus, when considered from the point of view of environmental justice and just food transitions, initiatives such as the moratorium are very limited and do not contribute to addressing socio-environmental conflicts at the local and territorial level.

Similar limitations are observed in certifications for sustainable soy, which gained international prominence as responses to the demands of the European consumer market, establishing stamps with criteria and regulations as a means to assure buyers that the soy they are purchasing originates from 'responsible' or 'sustainable' production, with lesser social and environmental impact. Although the RTRS-Roundtable for Responsible Soy is considered by some authors as a path to greater sustainability (Grenz and Angnes 2020; Draengni 2015; Raasch 2020), data collected by these same authors and analysed under the lens of just food transitions indicate that the certifications can reinforce the great inequalities and asymmetries of existing power. Access to certification is still restricted to a few producers and regions[10], taking place mainly by large producers and business groups, dependent on large traders to guarantee the segregation and disposal of this certified soy, reinforcing distributive injustices. Although the RTRS has some effectiveness in ensuring that certified soy does not come from deforested areas after 2008 (the limit year in Brazil), the certified farms are located mainly in regions of the Cerrado biome in the states of Mato Grosso and Goiás, where the expansion of the agriculture frontier – and deforestation – occurred in the 1980s and 1990s and in which the native vegetation was quite devastated and a major percentage of the territory is covered by large monocultures of transgenic soybeans.

The exports of this certified soy also depend on infrastructure (roads, railways, ports) that drive deforestation in other regions of the country, including the Amazon. The same

[8]MATOPIBA is an acronym formed by the combination of the acronyms of the four states covered by this expansion front: Maranhão, Tocantins, Piauí and Bahia.
[9]About that campaign, consult: https://campanhacerrado.org.br/.
[10]In 2018, there were 226 RTRS certified properties in Brazil, covering about 1 million hectares, with an average area of 4,600 hectares (Raasch 2020).

company can produce certified soy in one region and be associated with deforestation in another. The great asymmetries of power present in the global food systems are reflected in the determination of the certification standards, so that 'sustainability' tends to adjust to the existing reality: the soy certified by the RTRS is almost entirely transgenic and the standards of certification practically do not alter the use of agrochemicals, bringing changes mainly in the care with pesticides storage, disposal of packaging and in the distribution of personal protective equipment to workers (Grenz and Angnes 2020; Raasch 2020). The participation of large corporations and traders in setting standards (internationally and nationally) weakens the very meaning of the term 'sustainable' (Elgert 2012). There are internal disputes in the definition of standards, with agribusiness sectors pressing for the requirements of the standard to follow national legislation, while using their political, economic and symbolic strength to change legislation and policies in a way that favours the sectors and dominant practices, as observed in disputes over the easing of environmental legislation (Ferrante and Fearnside 2019) and the legalization of pesticides (Moura, Rozendo, and Oliveira 2020). Thus, there are strong indications that the certification systems embody politics and reflect the unequal existing power relations. In this sense, they can legitimize large-scale industrial soy production and weaken social movements that denounce the associated human and environmental costs (Elgert 2012).

Thus, considering that a food system can move towards reducing carbon emissions, however, it can remain uneven in other dimensions (Kortetmaki 2020, 54), it is clear that the international agenda to which the different actors linked the soy value chains have sought to provide answers, do not necessarily incorporate the historical agendas and demands of social movements at the local and national levels in the face of historical (and perpetuating) injustices linked to the neo-extractive model. Often, even, they reinforce asymmetries and situations of previous injustices, acting at the same time as expressions of injustice and determinants of inequalities. Thus, these initiatives can perpetuate a more general and complex picture of historically constituted food and environmental injustices from the local to the national level, besides showing limits even to contain deforestation. For this reason, social movements such as Via Campesina tend to address many of public and private initiatives pretending to face global warming crisis as 'false solutions', considering that more than solving the problem, they are contributing with their share of damages.

Some land tenure measures that legally recognize lands occupied by indigenous peoples and traditional communities, such as the homologation of indigenous lands and the creation of conservation units, seem to be closer to the perspective of just transitions. This recognition originates from socio-environmental conflicts that erupt locally, many of them in regions of expansion of agricultural frontiers, both in the Amazon and in the Cerrado. These populations mobilize and demand public policies that guarantee permanence in their territories, access to natural resources and basic social rights. A growing body of evidence suggests that these measures play a measurable and significant role in keeping forests intact, acting as buffers against deforestation and large-scale carbon emissions and mitigating climate change (Mello 2016; Walker et al. 2020). By incorporating the environmental variable as a dimension of their political struggles for the right to land and access to natural resources, they gain international recognition in the face of global concerns around environmental issues. Although the large disparities in power mean that they have little voice at the local and regional level, their national recognition is favoured by international agreements, such as the Conventions on Biological Diversity (CBDs) (Calegare, Higuchi, and Bruno 2014).

These processes can be considered as recognitive justice, insofar as these populations and their ways of life are no longer considered as barriers to development and are now recognized as 'guardians of the forest' and important for the conservation of biodiversity and socio-diversity (Walker et al. 2020; Calegare, Higuchi, and Bruno 2014; Almeida 2010). These social subjects, who recognize themselves as victims of injustices (in terms of Fraser and Honnet) bring to light 'correctable injustices'' (in terms of Sen,). These measures are an example of environmental justice, which is also reflected in food justice, in its distributive dimensions, providing legal certainty for the permanence of these populations in their territories traditionally occupied and at the same time contribute to the reduction of carbon emissions.

However, this recognition does not alter existing power asymmetries and the continuous expansion of soy areas (driven by rising demand) increases the political pressure from sectors linked to the soy-meat complex to avoid creating new protected areas and to reduce the legal protection of areas already recognized (Mello 2016; Almeida 2010; Ferrante and Fearnside 2019). After 2019, the election of a conservative government, there has been a strong reversal of all these recognition policies (Ferrante and Fearnside 2019).

Concluding remarks

The analytical exercise of looking at Brazilian soy value chains using a justice-based, multi-scale approach to identify both the expressions of (in)justice and the meaning and effectiveness of some responses that intend to promote just and sustainable transition in such global chains, brings some conceptual insights as well as crucial elements to respond to the central question of this paper: to what extent and with what requirements is a just and sustainable transition in soy value chains feasible?

At first, we scrutinized the value chain approach arguing that food systems are more than the mere aggregation of a set of interconnected activities, and do not permit unclear or interchangeable usage of systems and chains. Frameworks restricted to soy value chains, as part of the industrial grain–oilseed–livestock complex, are not enough to understand just transitions to sustainable and healthy food systems, especially in realities with huge inequalities and injustices, as is the case of Brazil. Combining a multi-scale approach to value chains and food systems, with a procedural view of transitions, is a central element of the analytical framework we propose.

A multi-scale approach is premised on the plurality of food systems at different scales (international, national and subnational levels) whose coexistence also involves interdependence, complementarities and conflicts under multiple territorial dynamics with important repercussions on food provisioning. Having in mind the multi-scale approach to food systems, connecting soy value chains and the desired transitions to sustainable and healthy food systems means assessing the socio-environmental and health repercussions of the production and consumption models they are associated with globally, as well as the ways soybean growing, processing and commercialization interact with food systems at national and subnational levels.

The main actors interested in this process include the big producers of soy for export, cattle breeders, transnational producers of inputs, equipment, ultra-processed food, social movements fighting for agroecological modes of production, the affected extractive

communities and the governments, especially at national level. Governments are central players in this process, due to the non-transferable regulatory attributions and their institutionality that can potentially promote mechanisms for coordination and conflict management, in addition to the dialogue between government and society, as in the case of the extinct Consea. The governmental failure to do so and its active promotion of the agri-industrial model reinforces power asymmetries between segments of the private commercial sector that operates at a transnational level, associated with national producers focused on agro-export. Consequently, local populations end up by perversely paying the social and environmental costs of food systems.

Although it is not possible to observe through the literature review the impacts of soy value chains on the food consumption of local populations, which should be subject of case studies, it is possible to indicate the reverse movement, that is, how much the increase in the consumption of meat associated with intensive industrial livestock production reinforces food injustices. Even though we are analysing a global chain, we observe along the article that the injustices to be fixed under transition processes manifest themselves mainly at the local level. Claims for justice in low-carbon transitions are often context specific, and the search for reparation and justice in food systems is procedural and built through various scales.

The analysis of the different dimensions of justice – distributive, procedural and recognitive – applied to food systems at multiple scales and, specifically, to soy value chains help us to problematize and point out the limits of the paths to sustainable and just transition. Along the paper we were able to conclude that soy value chains stand out as one of the most unjust and unsustainable agrifood chains due to social impacts and environmental and climatic implications of dominant forms of large-scale and highly technical soybean monoculture together with intensive industrial livestock. Private and governmental initiatives in reaction to social demands, international commitments and regulatory impositions in the context of climate change have been identified as a sample of various types and strategies with limited reach and even false solutions in terms of just transition processes. Moratoriums and certifications do not contribute to reducing inequalities and distributive, procedural and recognitive injustices associated with the expansion of soy monocultures. Certifications can even reinforce, both locally and internationally, distributive, procedural and also recognitive injustices by serving as an element to legitimize large-scale industrial grain-oilseed–livestock complexes and weaken civil society's political action. This picture allows for the conclusion that options are limited for socio-environmental changes in soy value chains towards social justice and sustainability. In other words, a just and sustainable transition in soy value chains seems not to be feasible. It's hard to imagine just transitions in soy value chains, considering that these huge inequalities that characterize them are socially constructed through processes that connect different types of drivers (social, economic, political, cultural) at international, national and territorial-local scales.

It is important to recognize the growing international recognition (especially from Europe) of the rising demand for soy (and meat) as a root cause of social, environmental and human health problems posed by the dominant food systems as well as international agreements on climate change with the potential to induce change. However, an analysis of the different dimensions of injustices involved in current initiatives and responses to climate change show that they do not always move towards just food transitions.

Some of them, such as the Brazilian ABC Plan and the RTRS certification, come close to what social movements in the global South have called 'false solutions' (for example, Grains and Grupo Carta de Belém 2019). They have limits in reducing deforestation and carbon emissions, while they do not alter the power structures and determinants of injustices stemming from dominant food systems, and may even reinforce them.

The injustices associated with the soy value chains are not necessarily related to transitions to carbon neutral, but to the deepening of a historically dominant development model and a hegemonic food system in which soy is one of the key elements. A food system can move towards reducing carbon emissions and even deforestation; however, it can remain unequal in other dimensions. This international agenda to which different actors in the chain are linked does not necessarily incorporate the historical agendas and demands of social movements at local and national levels in the face of historical (and perpetuating) injustices linked to the neo-extractive model. Often, it even reinforces asymmetries and situations of previous injustices.

By focusing specifically on the issue of climate change, these initiatives for the most part fail to move towards a just transition that adds the mitigation of climate change, on the one hand, and the multiple dimensions of justice, on the other. The different initiatives seek to respond to the concerns of the Global North with a view to mitigating climate change; but they perpetuate a more general and complex picture of injustices historically constituted from the local to the national level. Thus, they promote partial gains in matters of (in)justice, including environmental (in)justice. Initiatives that contribute to just transitions refer to land tenure, the legal recognition of lands of indigenous peoples and traditional communities, and the creation of conservation units, which simultaneously contribute to mitigate environmental, food and social injustices.

At the heart of the issues regarding transitions to a just system are actors, conflicts and power relations as underlying manifestations of injustices. Besides, injustices occur differently in the territories, which requires understanding the territoriality of chains and systems for building up a just transition, therefore, it also presupposes precisely a multi-scale approach to food systems. It is also relevant to consider different transition strategies and their corresponding social and environmental repercussions in the respective territories in which they occur.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Strategic Research Council, Academy of Finland [funding decision 327371].

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