IDS Bulletin
Transforming Development Knowledge
Volume **54** | Number **1** | February 2023

FRONTIER TERRITORIES: COUNTERING THE GREEN REVOLUTION LEGACY IN THE BRAZILIAN CERRADO

Issue Editors **Lídia Cabral, Sérgio Sauer and Alex Shankland**

Notes on Contributors iii

Introduction: Reclaiming the Cerrado – A Territorial Account of a Disputed Frontier
Lídia Cabral, Sérgio Sauer and Alex Shankland 1

Transformations of the Agricultural Frontier in Matopiba: From State Planning to the Financialisation of Land
Cássio Arruda Boechat, Fábio Teixeira Pitta, Lorena Izá Pereira and Carlos de Almeida Toledo 17

Matopiba's Disputed Agricultural Frontier: Between Commodity Crops and Agrarian Reform
Estevan Coca, Gabriel Soyer and Ricardo Barbosa Jr 33

Green Grabbing in the Matopiba Agricultural Frontier
Anderson Antonio Silva, Acácio Zuniga Leite, Luís Felipe Perdigão de Castro and Sérgio Sauer 57

Brazilian Agricultural Frontier: Land Grabbing, Land Policy, and Conflicts
Matheus Sehn Korting, Débora Assumpção e Lima and José Sobreiro Filho 73

Environmental Policy Reform and Water Grabbing in an Agricultural Frontier in the Brazilian Cerrado
Andréa Leme da Silva, Ludivine Eloy, Karla Rosane Aguiar Oliveira, Osmar Coelho Filho and Marcos Rogério Beltrão dos Santos 89

Mapping Fire: The Case of Matopiba
Dernival Venâncio Ramos Júnior, Vinicius Gomes de Aguiar and Komali Kantamaneni 107

Brazilian Civil Society and South–South Cooperation: Countering the Green Revolution from Abroad
Laura Trajber Waisbich and Lídia Cabral 127

Glossary 145

Matopiba's Disputed Agricultural Frontier: Between Commodity Crops and Agrarian Reform*†

Estevan Coca,[1] Gabriel Soyer[2] and Ricardo Barbosa Jr[3]

Abstract Matopiba's agricultural frontier has been at the centre of political and scientific debates since its establishment in 2015. However, the impact of agribusiness expansion and intensification on land distribution in the region has yet to be studied. How has the establishment of Matopiba affected commodity crop production and agrarian reform in the region? This article analyses historical trends in soybean and corn production, and recent developments across Matopiba microregions. These are then juxtaposed with data on agrarian reform at microregion level. The findings help to clarify the ways in which agricultural frontier expansion has been reliant on government support and reveal conflicting agricultural development at work in Matopiba. While commodity crop production has increased in Matopiba as expected, agrarian reform has halted. The few agrarian reform settlements that have been created are in areas with lower agricultural potential within the limits of Matopiba's frontier.

Keywords agricultural frontier, agribusiness, agrarian reform, conflicts, Matopiba, Cerrado, Brazil.

1 Introduction

Brazil's agricultural frontier has been greatly expanding in Matopiba,[4] especially through the increased production of commodities such as soybean and corn (Araújo *et al.* 2019; Lopes, Lima and Reis 2021). However, the advance of agribusiness in the region has not been a smooth and linear process. Agricultural and agrarian dynamics in Matopiba reflect the tensions between competing agricultural development models in Brazil (Cabral *et al.* 2016; Sauer 2017).

The Brazilian countryside is characterised by a dispute between industrial commodity crop production for export and smallholder food production for domestic supply.[5] In this way, agribusiness

The *IDS Bulletin* is published by Institute of Development Studies, Library Road, Brighton BN1 9RE, UK
This article is part of *IDS Bulletin* Vol. 54 No. 1 February 2023 **'Frontier Territories: Countering the Green Revolution Legacy in the Brazilian Cerrado'**; the Introduction is also recommended reading.

and family farming represent two models of rural development that are opposed but coexist.[6] In Matopiba, these two models are fiercely contesting access to arable land and other resources. Such disputes lead to a range of problems, including increasing violence against rural communities in the region (AATR 2020; CPT 2022; see also Barbosa Jr and Roriz 2021).

While critical research on Matopiba often refers to the disputes and conflicts that characterise this agricultural frontier, current scholarship has not yet examined the contradictory coexistence of agribusiness and family farming. To address this gap, this article examines the expansion and intensification of industrial agriculture and its impact on land distribution. The available data is explored through the question: 'How has the establishment of Matopiba affected commodity crop production and agrarian reform in the region?'.

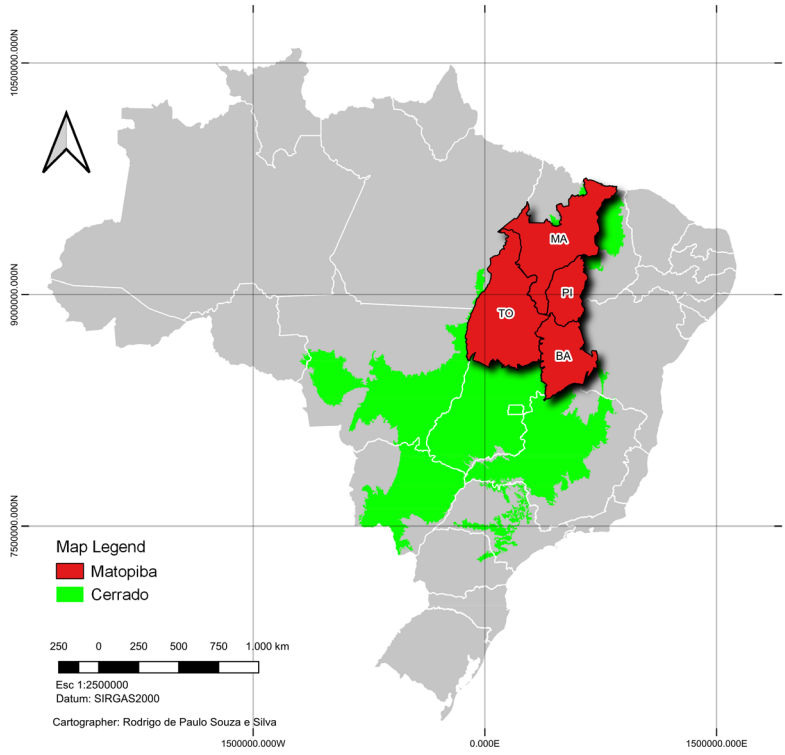
The premise of this article is that analysing agricultural frontier dynamics is relevant for understanding drastic land-use changes and other socioenvironmental transformations (Kröger and Nygren 2020). It departs from current efforts that have analysed agricultural frontiers as export-oriented farming areas motivated by global demand and land privatisation (Brannstrom 2009). And it adopts the counternarrative that conflict and violence are at the heart of frontier-making, which calls for greater attention to political and spatial governance across these regions (Thaler, Viana and Toni 2019). The findings assess how the expansion of agriculture in Matopiba has also promoted the social and environmental exclusion of local actors as a result of frontier development (Lopes *et al.* 2021), particularly through the stagnation of land distribution.

2 Conceptualising agricultural frontiers

Behind the concept of 'frontier' lies the idea of 'edge' or contact with the 'new', which usually supports the assumption of 'free land' (Billington 1971). Early scholarship has framed agricultural frontiers as portions of supposedly 'unoccupied' land (Tella 1982). Usually, the description of frontiers takes the presence of resources for granted, and the landscape itself is seen as inert, ready to be dismembered, extracted, and exported (Tsing 2003). In Bunker's (1985) classic work on the Amazon rainforest, the author investigates various economic models that treat natural resources as infinity pools to be explored by capitalist development.

Frontiers in Brazil are usually analysed in terms of economic expansion, the occupation of new lands, and the absorption of migrants, putting the expansion of capitalism and the continuance of local livelihoods at odds with one another (Sawyer 1984). Martins (1997) describes how discourses of the Brazilian frontier privileged the figure of 'the pioneer', leaving aside tragic aspects of violence and conflicts. Long-standing scholarship has emphasised ties between research, development, and extension

Figure 1 Location of Matopiba in the Cerrado



Note MA – Maranhão, TO – Tocantins, PI – Piauí, BA – Bahia.
Source Authors' own, based on spatial data from Pereira *et al.* (2019).

services to 'open up' areas in the tropics for highly productive agriculture in the Cerrado (Abelson and Rowe 1987). This biome is experiencing a rapid agricultural intensification (Arvor *et al.* 2012), mainly because, unlike most other biomes protected by the Constitution, the Cerrado has been deliberately left unregulated, allowing for the implementation of an agribusiness complex (Pfrimer and Barbosa Jr 2016).

3 Matopiba as the 'world's last agricultural frontier'

From the 1970s onwards, the Cerrado biome has become a hotspot of capitalist agriculture in Brazil. The Brazilian Agricultural Research Corporation (Embrapa) played a central role in the introduction of chemical fertilisers and new seed varieties adapted to the tropics, especially in the Centre-West region of the Cerrado (Nehring 2016). Cabral (2021) indicates that in the official history of the scientific development of agriculture in the Cerrado, concerns over the environmental and social impacts of large-scale commodity crop production are hardly mentioned. Moreover, this development is often presented as an epic narrative highlighting the heroic power of science and technology in the Cerrado's agricultural expansion (Cabral, Pandey and Xu 2021).

Critics and social movements contest such narratives, portraying agricultural development in the Cerrado as the creation of a 'sacrifice zone' (CPT 2021; Sauer *et al.* 2021). This perspective highlights the shortcomings of 'green revolution' narratives as the solution to hunger and poverty, overlooking the environmental and social costs (Oliveira and Hecht 2016).

Within the Cerrado biome, Matopiba has become the new agricultural frontier as the result of a broad political articulation of key agribusiness actors with the intention of developing capitalist agriculture. Since the 1980s, with the installation of a 'regional network' of southerners in the Cerrado of Northeastern Brazil (Haesbaert 1996), commodity production has significantly increased. Until the second decade of the twenty-first century, agribusiness intensified in Matopiba without a clear articulation between public policies or development projects proposed by the Federal Government. However, in 2015, the Matopiba region was delineated by Embrapa's Territorial Intelligence Group to span 73 million (m) hectares in 337 municipalities, forming a total of 31 microregions (see Figure 1), becoming institutionalised as a new priority development region by the Matopiba Agricultural Development Plan (Brazil 2015). The Plan sought to promote public policies that foster and coordinate sustainable economic development based on agricultural and livestock activities that improve the quality of life for the population.

There is much scholarship analysing Matopiba as an agricultural frontier (e.g. Araújo *et al.* 2019; Calmon 2020; Lopes *et al.* 2021). Sauer and Leite (2012) have argued that the vigorous expansion of agricultural production has rapidly incorporated new areas in Northern Cerrado. Former Minister of Agriculture Kátia Abreu (2016) claimed that Matopiba was Brazil's 'last agricultural frontier', leading the Federal Government to call the region 'the last agricultural frontier in expansion in the world' (Planalto 2015; see also Calmon 2020). Agricultural expansion in Matopiba, as in other parts of the Cerrado, has continued to prioritise soybean production. This has been the case due to strong concerns over deforestation in the Cerrado–Amazon transition area in the state of Mato Grosso (Oliveira and Schneider 2016), a known hotspot of soybean expansion in this biome (Jepson 2006). Rocha (2020) has argued that the territorial delimitation of Matopiba mobilised elements such as land, territory, and population to pave the way for the very idea of an 'agricultural frontier': a new frontier that must exist in Matopiba because it is the last supposedly possible place in Brazil and – some argue – in the world where agricultural land can still expand to feed a growing population.

Whereas recent scholarship confirms existing narratives concerning the expansion and intensification of industrial agriculture in the Cerrado (Lopes *et al.* 2021), its development in Matopiba is not linear (Lima and Kmoch 2021). Cropland

availability has more than doubled in Matopiba since 2000 with a 244 per cent increase, representing the largest proportion of conversion from natural vegetation to cropland within the Cerrado (Zalles *et al.* 2019). Not only is natural vegetation being converted to cropland, but this newly 'opened' land is also becoming concentrated in the hands of a few landowners. The 2017 agricultural census shows that the number of rural properties decreased by 17 per cent between 1995 and 2017 in Matopiba (IBGE 2017), indicating the simultaneous territorial expansion and land concentration of agribusiness. Such a process is accompanied by an increase in prices and speculation of land, the transformation of informal ownership into formalised land tenure, and land grabbing (AATR 2020). These processes can take place through illegal strategies that circumvent legislation[7] and due to lack of enforcement – especially since President Jair Bolsonaro took office in 2019 (see Menezes and Barbosa Jr 2021).

4 The struggle for land as exemplifying disputes over agricultural development models

Brazil's agrarian reform experience is a unique example of the state's response to pressure from rural social movements, since agrarian reform settlements have emerged largely as result of land occupations (Fernandes 2000). These movements have sought to draw attention to the precarious circumstances that landless peasants and family farmers, as well as traditional and indigenous communities, face due to the territorial expansion of agribusiness. Land occupations seek to induce land redistribution by denouncing how industrial agriculture often fails to fulfil the social function of land,[8] thus forcing the state to dispropriate unproductive units across Brazil.

Until the late 1990s, land occupations sought to denounce the impact of the *latifundio* (large land holdings) on social inequality in Brazil (Moreira 2012). Over the last two decades, however, the *latifundio* has been reconceptualised as a modern and entrepreneurial agribusiness that is mechanised and often uses technology, such as genetic sequencing technologies (Pfrimer and Barbosa Jr 2017), to increase efficiency and market competitiveness. As a result, land occupations no longer have the sole purpose of denouncing and combating unproductivity but also denouncing exclusion due to high productivity (Fernandes, Welch and Gonçalves 2014; Barbosa Jr and Coca 2015).

Between 1979 and 2019, 9,529 agrarian reform settlements were created in Brazil, with 1,095,883 families settled and 82,496,027 hectares of land redistributed (DATALUTA Network 2021). However, this remains insufficient to meet the needs of all families that demand land. For example, in 2019, 3,476 families participated in land occupations (*ibid.*). This underscores the argument that conflict, especially over land, remains a central characteristic of Brazil's countryside (Fernandes 2008).

5 Research design

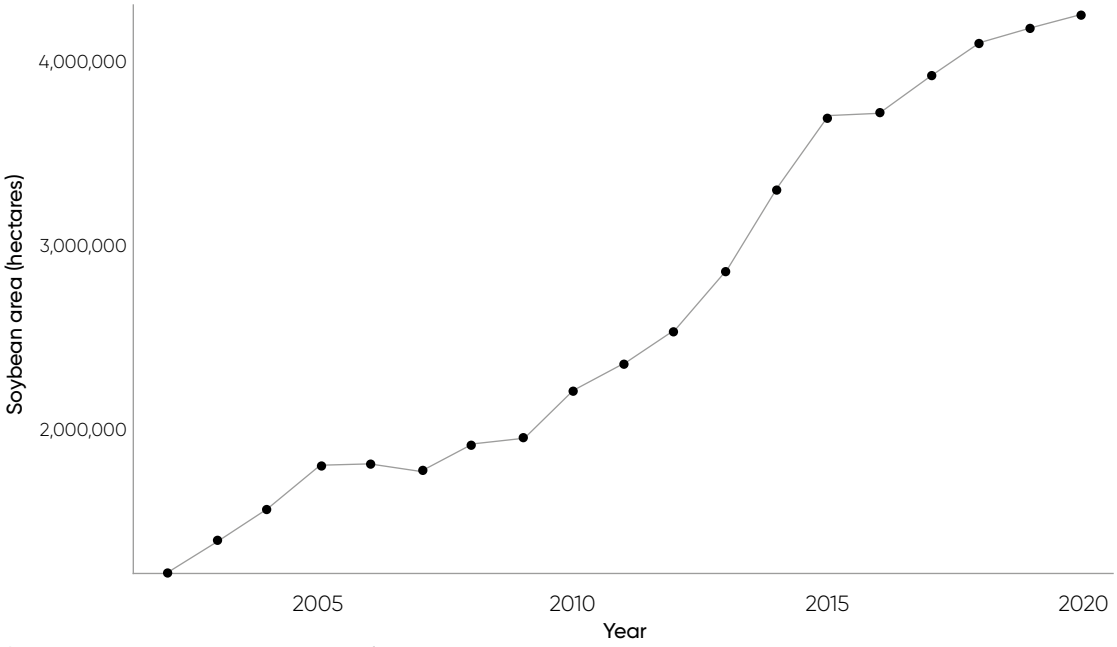
Data on agribusiness expansion is widely available on official Brazilian government platforms. The Municipal Agricultural Survey (Pesquisa Agricola Municipal, PAM), collected annually by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, IBGE), provides data for measuring agribusiness expansion in the Matopiba. PAM provides annual data on harvested area, amount produced, average yield, and average price paid to the producer, for 64 agricultural crops. A subset of PAM variables was selected to operationalise agribusiness expansion by creating two new data sets with data from 2002 to 2020 (the latest year available at the time of writing). The data sets contain data on production area in hectares by specific crop types for each of the 31 microregions within Matopiba on a yearly basis. The choice to centre the analysis from 2002 onward was made because prior to that point, there is a recurrent absence of data disaggregated per microregion. R was used to organise and systematise the available data, which was then visualised in graphs and maps. The shapefiles and spatial data sets used come from the Institute for Applied Economic Research (Instituto de Pesquisa Econômica Aplicada, Ipea) (Pereira *et al*. 2019).

Data on the struggle for land and agrarian reform is found in material produced by activists and academics. Agrarian reform is analysed using data from the Banco de Dados da Luta pela Terra (DATALUTA), which is compiled by 18 research groups located across Brazil that make up the DATALUTA Network. The DATALUTA Network collects and organises data on agrarian reform from the National Institute for Colonization and Agrarian Reform's (Instituto Nacional de Colonização e Reforma Agrária, INCRA) annual reports. The database provides data on the year agrarian reform settlements are founded, number of families settled, total area occupied, agrarian reform policy used to attain land, and land use from 1979 to 2019. Since the first agrarian reform settlement in Matopiba was founded in 1986, this year is used as the starting point for analysis.

6 Findings

How has the establishment of Matopiba affected commodity crop production and agrarian reform in the region? The question is answered by looking at production trends for the two largest crops (i.e. soybean and corn), measured in terms of cultivated area, between 2002 and 2020 (section 6.1.1); analysing these crops at the microregion level during Matopiba's first five years, from 2015 to 2020 (section 6.1.2); and finally, contrasting these findings with agrarian reform data on the number of agrarian reform settlements created, number of families settled, and area of agrarian reform settlements from 1986 to 2019 (section 6.2).

Figure 2 Matopiba soybean production area (2002–20)



Source Authors' own, based on data from PAM.

6.1 Commodity crop expansion in Matopiba

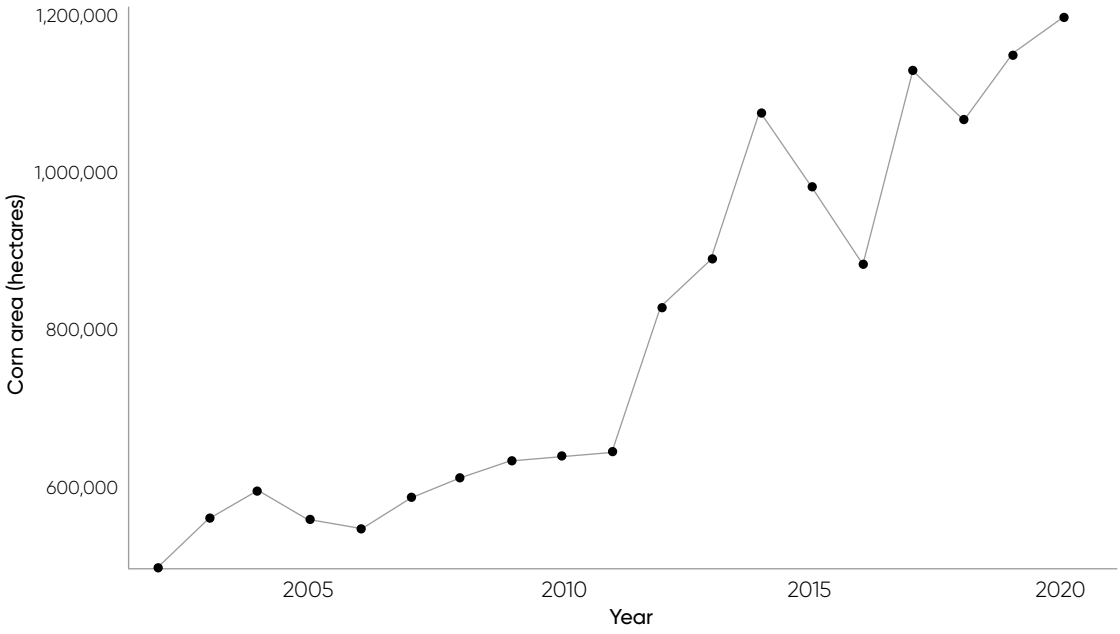
6.1.1 Soybean and corn production from 2002 to 2020

Since the early 2000s, the area in hectares directed to soybean and corn production has been increasing in the Matopiba region (see Figures 2 and 3). For instance, total corn production area increased from less than 600,000 hectares to about 1.2m hectares, which represents more than 100 per cent expansion in production area (Figure 3) – to the extent that 6 per cent of Brazil's corn production area is now located in Matopiba (Embrapa 2020). Similarly, but at a more substantial pace, the data also shows how soybean production has expanded significantly in the region. As Figure 2 indicates, between 2002 and 2020, soybean production area in Matopiba increased from about 1m hectares to more than 4m hectares. These findings indicate that soybean production area has grown more than 400 per cent in less than two decades – to the extent that roughly 10 per cent of Brazil's soybean production area is now located in Matopiba (Embrapa 2021).

In 2015, the total area under soybean production in hectares was 3,683m. Five years after the formal establishment of Matopiba, in 2020, the total soybean production area had increased to 4,231m hectares. Additionally, the data shows that the corn production area had also increased from 981,000 hectares in 2015 to about 1.2m hectares in 2020.

Soybeans are Brazil's most exported commodity (Trase 2018). The value of Brazilian soybean exports reached US$28.5bn

Figure 3 **Matopiba corn production area (2002–20)**



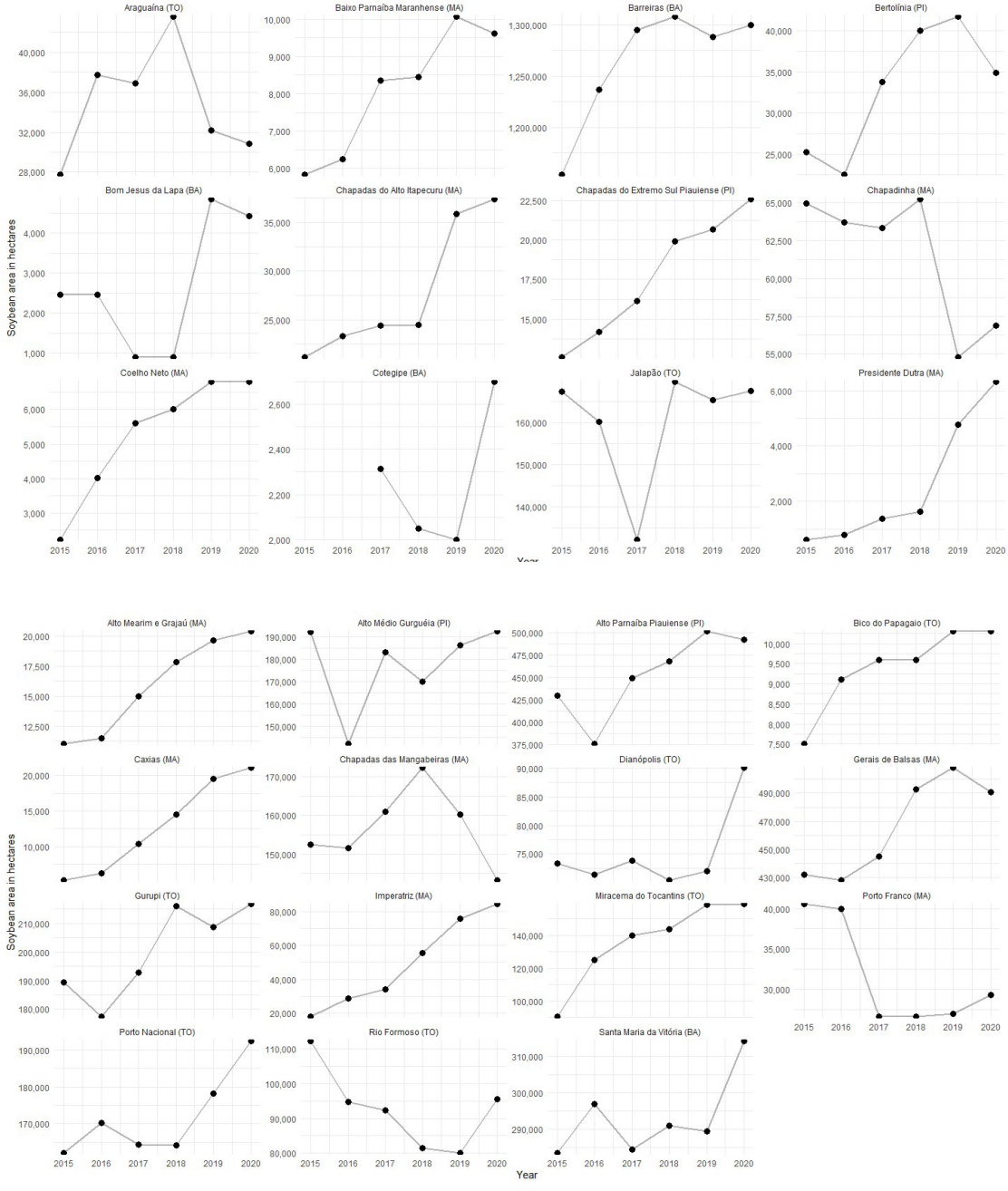
Source Authors' own, based on data from PAM.

in 2020 (United Nations Comtrade Database 2021). It was also in 2020 that Brazil overtook the United States as the leading soybean-producing country, becoming the largest exporter of soybeans worldwide, accounting for about 44.3 per cent of the total global value of soybean exports. Whereas soybean is the most important crop for the Brazilian commodity market, corn is likewise relevant, standing as the second most cultivated crop in the country (Zalles *et al.* 2019). For instance, in 2016, Brazil was the third largest global corn producer and the second largest corn exporter (Allen and Valdes 2016).

6.1.2 Soybean and corn production by microregion from 2015 to 2020

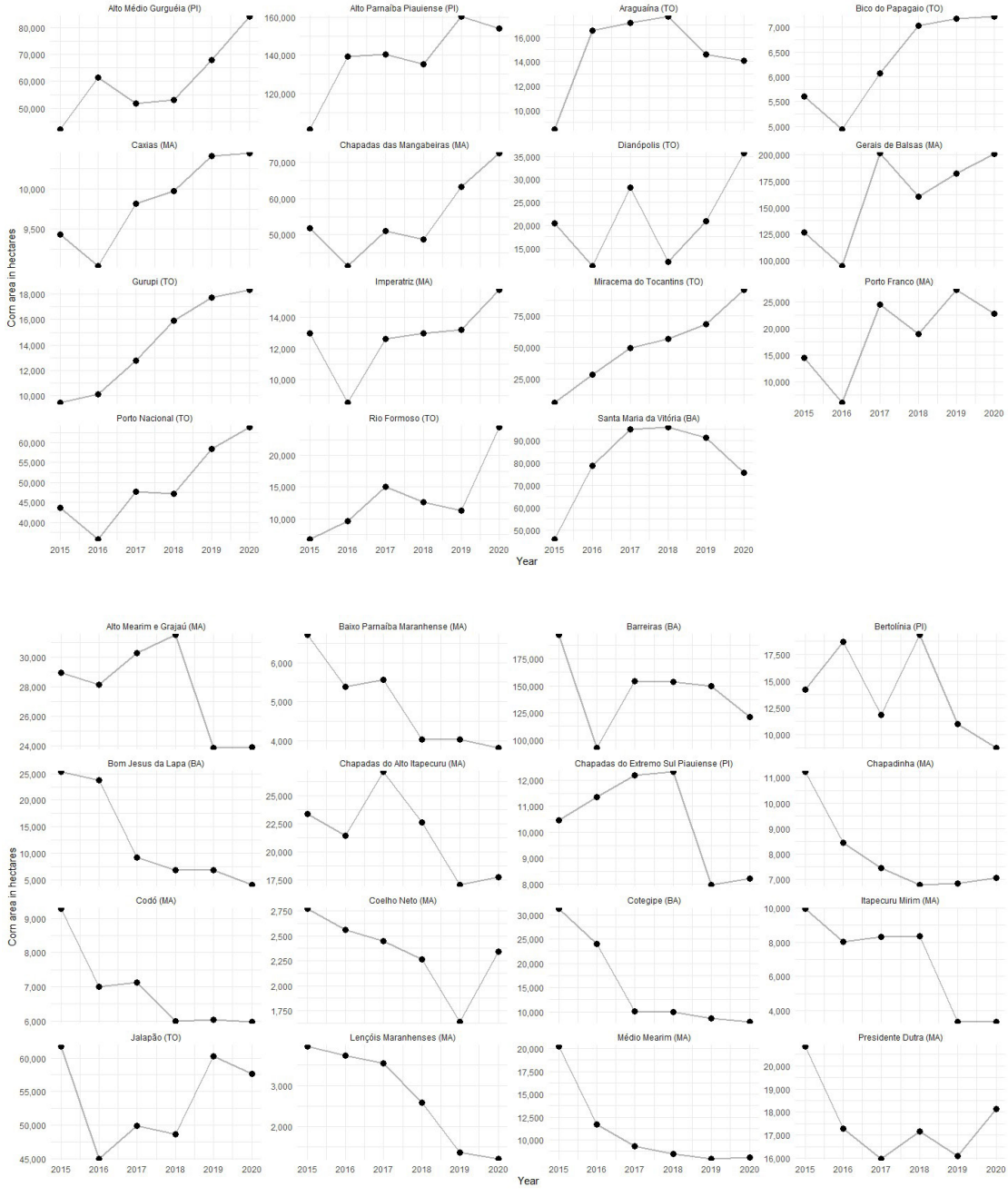
The findings show a heterogeneity in the expansion of both soybean and corn in Matopiba. Only four microregions report reduced soybean production in terms of area between 2015 and 2020 (Figure 4). Most noticeably, soybean production area has been increasing across the majority of Matopiba's microregions (23 in total). However, and this is an important component of the findings, such an increase does not follow a homogeneous pattern. On the one hand, only the Barreiras microregion in the state of Bahia (BA) has more than 1.3m hectares of soybean production area, followed by Alto Parnaíba Piauiense (Piauí – PI) which reports about 500,000 hectares for 2020. On the other hand, the microregions with the least soybean production area are Cotegibe (BA), Coelho Neto (BA), and Presidente Dutra

Figure 4 Matopiba microregion soybean production area (2015–20)



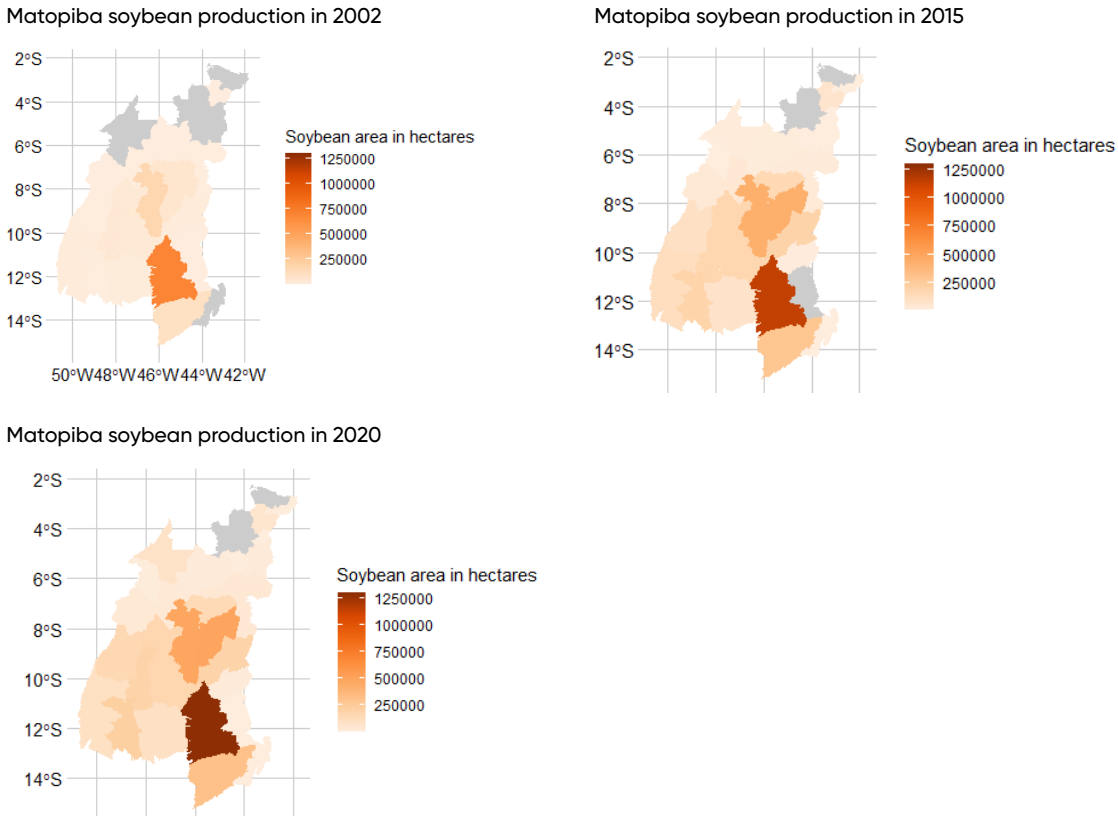
Note MA – Maranhão, TO – Tocantins, PI – Piauí, and BA – Bahia.
Source Authors' own, based on data from PAM.

Figure 5 Matopiba microregion corn production area (2015–20)



Note MA – Maranhão, TO – Tocantins, PI – Piauí, and BA – Bahia.
Source Authors' own, based on data from PAM.

Figure 6 Maps of Matopiba soybean production in 2002, 2015, and 2020

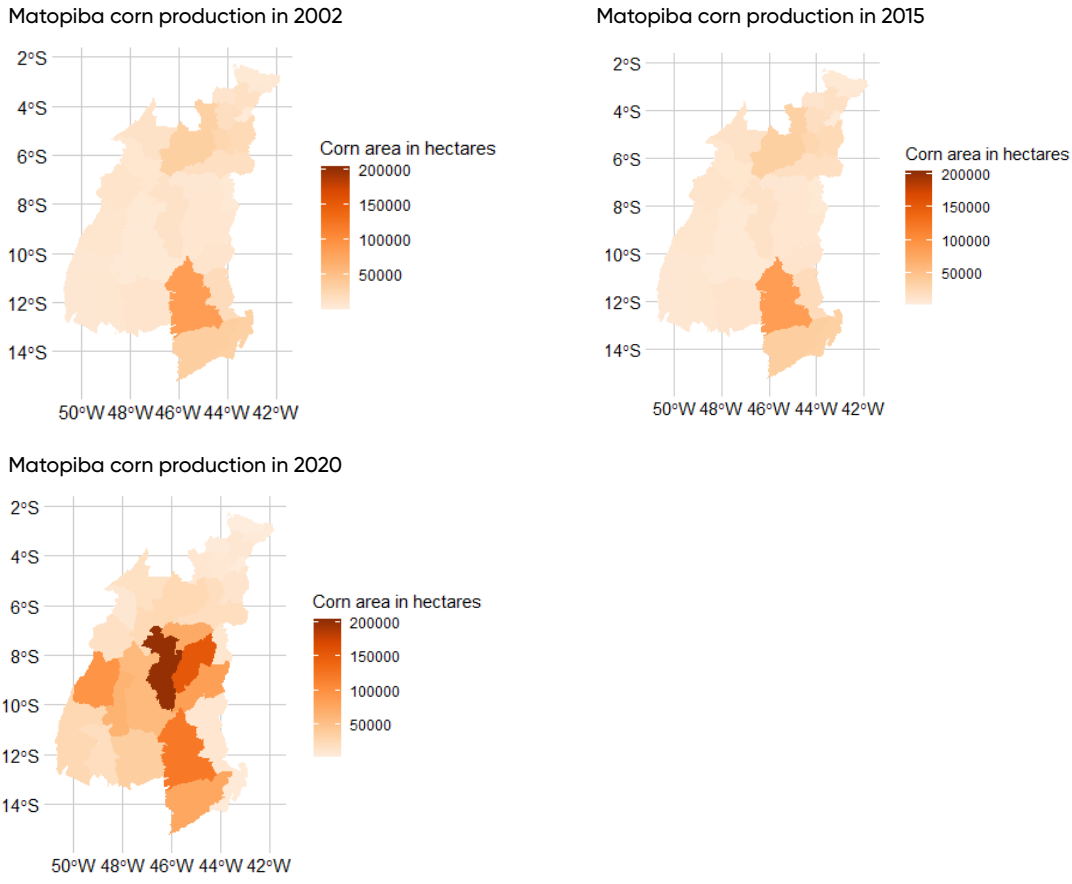


Source Authors' own, based on spatial data from Pereira *et al.* (2019) and data from PAM.

(Maranhão – MA). Four microregions in northwest Maranhão (i.e. north Matopiba) were not included in the analysis because no data was provided by PAM: Codó, Itapecuru Mirim, Lençóis Maranhenses, and Medio Mearim.

The results for corn production follow a similar pattern that indicate a total expansion of production area (Figure 5). Yet 16 microregions are identified where the total corn production area in hectares has decreased. A shift amongst the leading producer microregions in terms of area from 2015 to 2020 is identified. On the one hand, Barreiras (BA), which cultivated 175,000 hectares in 2015, reports only 125,000 hectares directed to corn production in 2020. On the other hand, Gerais de Balsas (MA) has increased its corn production and is now the leading region in terms of corn production area, increasing from 125,000 hectares in 2015 to more than 200,000 hectares in 2020, followed by Alto Parnaíba Piauiense, which expanded its area by about 80 per cent, from almost 100,000 hectares in 2015 to about 180,000 hectares in 2020. The findings also show that all microregions have increased corn production in the state of Tocantins (TO) apart from Jalapão,

Figure 7 **Maps of Matopiba corn production in 2002, 2015, and 2020**

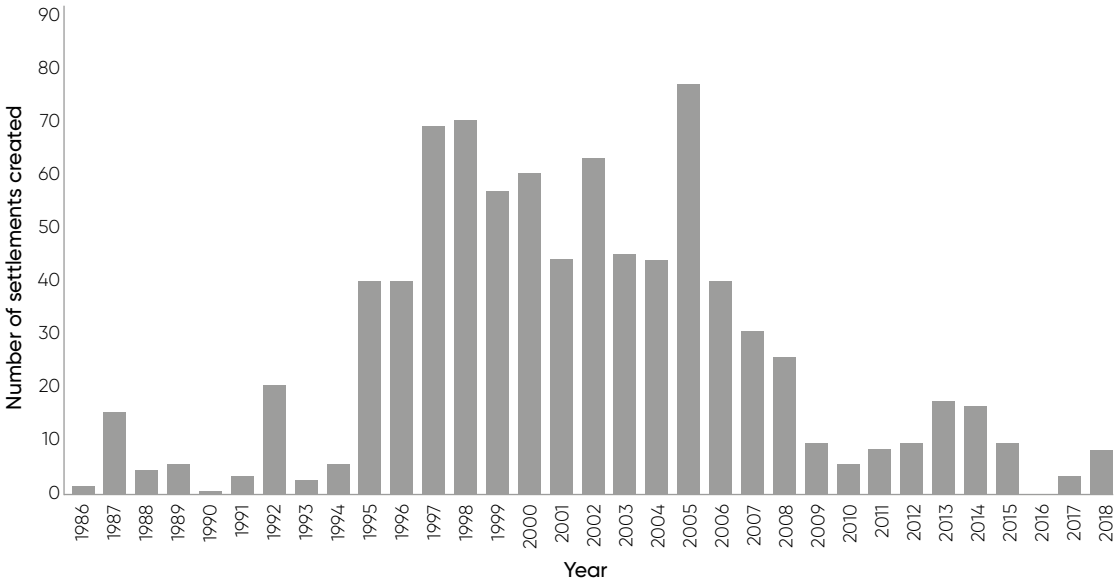


Source Authors' own, based on spatial data from Pereira *et al.* (2019) and data from PAM.

which reports a slight decrease; with the highest increase taking place in Miracema do Tocantins (TO), which expanded its corn production area from less than 25,000 hectares in 2015 to more than 75,000 hectares in five years, a 300 per cent increase.

Figures 6 and 7 illustrate the changes in soybean and corn production areas in Matopiba by comparing data from 2002, 2015, and 2020. These spatialised visualisations show that Barreiras in Northwest Bahia was already the largest soybean and corn producer more than a decade before Matopiba was established. It also shows how soybean and corn production has expanded to new regions across Matopiba, especially in Southern Maranhão. This is also the case for soybean and, especially, corn in Southwest Piauí and Mideast Tocantins. While Barreiras (BA) still reports the largest soybean production area, Gerais de Balsas in southern Maranhão has become the largest corn producer by area. Despite the variations in the expansion of these crops on an annual basis, with significant differences within Matopiba,

Figure 8 Number of agrarian reform settlements created in Matopiba (1986–2019)



Source Authors' own, based on data from DATALUTA Network (2021).

the findings show that agribusiness has expanded throughout the region with spatial aggregation around central Matopiba, precisely the area that reaches across the four state lines.

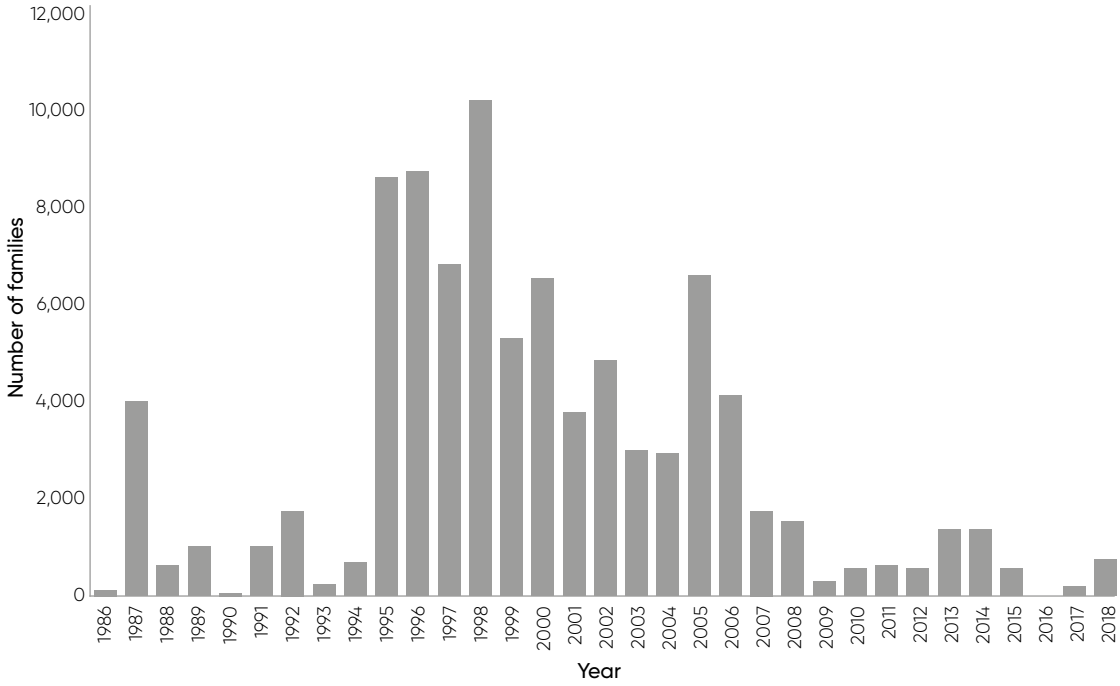
6.2 Agrarian reform stagnation in Matopiba

The findings above illustrate the ways and extent to which agribusiness has been expanding across Matopiba. While providing a specific view of Matopiba's agricultural frontier, this article seeks to examine how commodity crop expansion has affected family farming and access to land in the region. We do so by analysing agrarian reform in Matopiba.

The DATALUTA Network (2021) indicates that the first two agrarian reform settlements in Matopiba were founded in 1986 (Figure 8), with both located in the state of Maranhão. Since then, the majority of agrarian reform settlements created (Figure 8), families settled (Figure 9), and area settled (Figure 10) took place during the Cardoso administration (1995–2002). Re-democratisation and collective actions against neoliberal policies, such as land occupations, became a strong motivator for agrarian reform during this period (Stédile and Fernandes 1999).

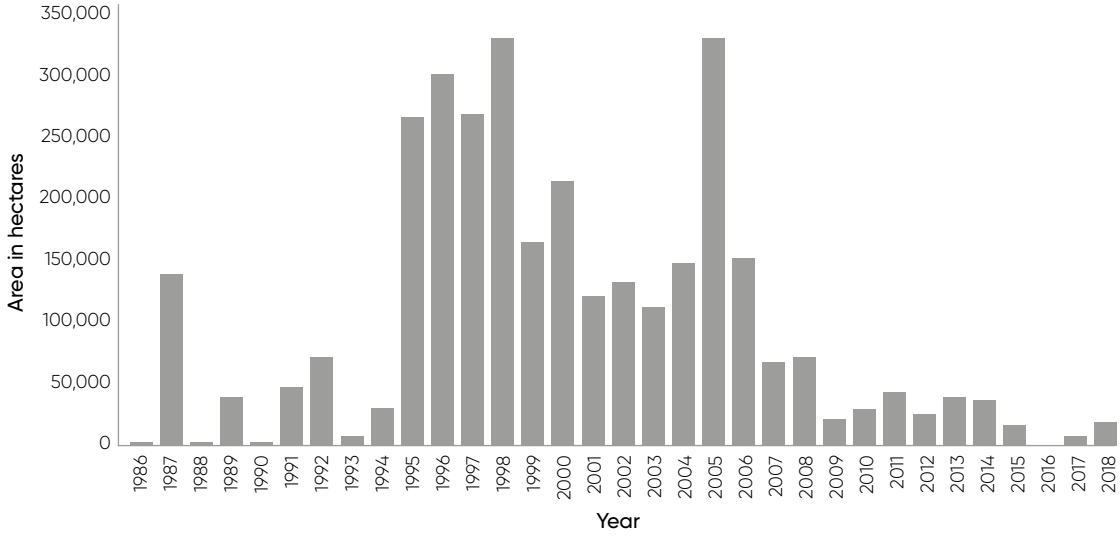
During President Lula da Silva's first term (2003–06), the historical proximity of the Workers' Party with rural social movements gave rise to hopes for a broad and massive agrarian reform (Sauer 2017). As a result, the number of land occupations and agrarian reform settlements created increased (DATALUTA Network 2021), which led to 206 agrarian reform settlements being created in

Figure 9 Number of families settled in Matopiba (1986–2019)



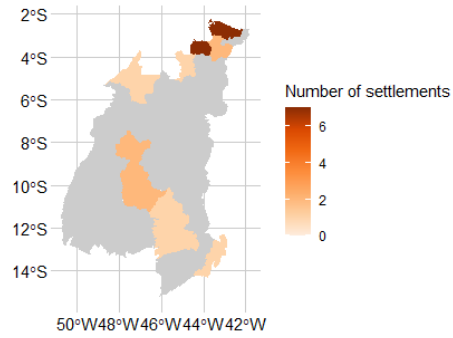
Source Authors' own, based on data from DATALUTA Network (2021).

Figure 10 Area of agrarian reform settlements in Matopiba (1986–2019)



Source Authors' own, based on data from DATALUTA Network (2021).

Figure 11 Map of Matopiba agrarian reform settlements (2015–20)



Source Authors' own, based on spatial data from DATALUTA Network (2021).

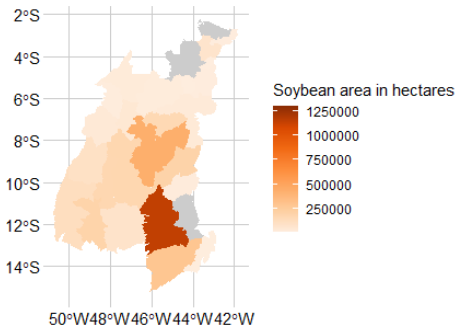
Matopiba (25 in Bahia, 121 in Maranhão, 22 in Piauí, and 38 in Tocantins) from 2003 to 2006.

Figure 8 draws attention to the fact that since Matopiba was designated as a new priority production region in 2015, the number of new agrarian reform settlements in the region have significantly decreased. Such a decrease was already evident during President Dilma Rousseff's first term (2011–14), when only 54 agrarian reform settlements were founded in Matopiba, of which 40 were created through dispropriation. From 2015 to 2019, agrarian reform stagnates further, with only 23 agrarian reform settlements created (two in Bahia, two in Tocantins, and 19 in Maranhão), 13 of which occurred through dispropriation. With seven each, the two microregions with the most agrarian reform settlements created since Matopiba was established in 2015 are Lençóis Maranhenses (MA) and Itapecuru Mirim (MA), both located in north Matopiba (see Figure 11).

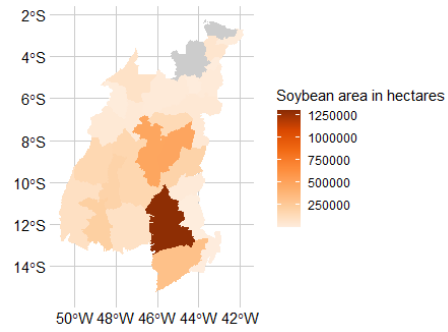
Since Matopiba's official designation, there have been two years during which no agrarian reform settlement was created in the region, 2016 and 2019 – the first time this occurs since the initial agrarian reform settlements in the region back in 1986. In this regard, it is worth noting that since 2016, when President Dilma Rousseff was impeached, the state's relationship with key agribusiness sectors has been strengthened (Mitidiero Junior and Feliciano 2018). This became even more evident when radical right populist Jair Bolsonaro took office as president in 2019 (Soyer and Barbosa Jr 2020), and the allocation of land for agrarian reform or the demarcation of indigenous territories was drastically reduced (DATALUTA Network 2021). Thus, a preliminary correlation between the expansion of commodity crop production and a stagnation of agrarian reform in the Matopiba region since 2015 can be observed.

Figure 12 Comparing spatialised data on commodity crop production and agrarian reform settlement in Matopiba (2015–20)

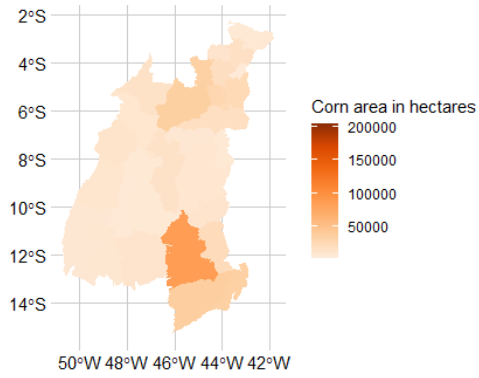
Matopiba soybean production in 2015



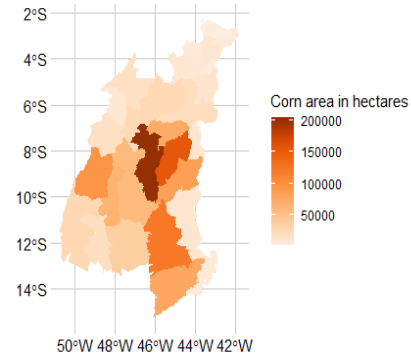
Matopiba soybean production in 2020



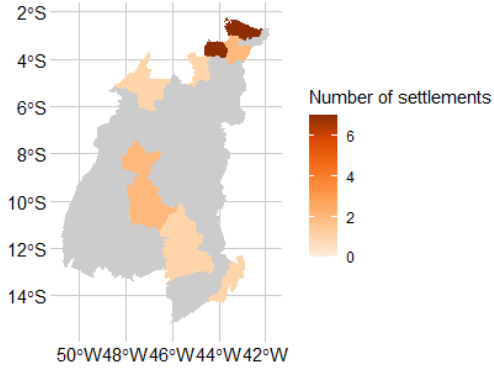
Matopiba corn production in 2015



Matopiba corn production in 2020



Matopiba agrarian settlements (2015–20)



Source Authors' own, based on spatial data from Pereira *et al.* (2019) and data from PAM and DATALUTA Network (2021).

7 Discussion

In what ways and to what extent do the findings extend the established understanding of Matopiba's agricultural frontier? Empirically, this article has sought to unpack the evolution of agribusiness since Matopiba's establishment in 2015 by examining commodity crop production across all microregions. For this reason, the decision was made to focus the analysis on soybean and corn production which are both of strategic importance for export-oriented agribusiness (see section 6.1). Whether this has had an impact on agrarian reform in the Matopiba region up to this point has been investigated. The results suggest a link between the expansion and intensification of commodity crop production and a stagnation of agrarian reform (see section 6.2). By comparing the findings, the ways and extent to which opposing models of agricultural development operate in Matopiba are assessed.

Since the establishment of Matopiba, commodity production has increased across most microregions, but especially around central Matopiba, precisely where the four state lines meet (see Figure 12). This is representative of how a new agricultural frontier, as per Matopiba's mandate (Brazil 2015), emerges out of existing agricultural infrastructure and regions – for example, Barreiras (BA) was already a commodity crop-producing microregion as far back as 2002 (see Figures 6 and 7). At the same time, compared to other periods (see section 6.2), agrarian reform settlements are established with lower intensity and are concentrated in the microregions of north Matopiba (i.e. northeast Maranhão; see Figure 12). Such findings support Ribeiro *et al.*'s (2020: 12) assessment of the economic growth patterns in Matopiba which characterises a cluster of municipalities in the north as 'not specialised in agriculture'. These are precisely the very microregions that had no commodity crop production data available (see section 6.1.2) and which are characterised by their lower agricultural potential and/or previous land-use processes (see Almeida, Sodré and Mattos Júnior 2019). In this way, north Matopiba can be considered not only as being at the margins, but also as an area of past occupation.

The article has argued that the expansion of commodity production and agrarian reform in Matopiba's agricultural frontier is both spatial and temporal. This point underscores critical scholarship which insists that agricultural frontiers are not static, do not evolve linearly, and are not free of contradictions (Thaler *et al.* 2019; Lopes *et al.* 2021). Rather, frontiers are built through disputes and conflicts.

Figure 12 summarises the findings and suggests that agrarian reform in the region has not only stagnated since Matopiba was established but that agrarian reform has also been pushed to the margins. Agrarian reform settlements being created, almost exclusively, in areas identified as being of low agricultural potential are evidence supporting claims that agrarian reform is set up to

fail. This illustrates that government support for agrarian reform, even during progressive governments, is less radical than it may appear, because agrarian reform is being implemented in areas that are often less suitable for agriculture. Critical scholarship has long argued this point at the national level (Coca 2020; DATALUTA Network 2021). The findings show how national structural conditions are replicated at the regional level in Matopiba. Such an examination of the Matopiba case reinforces established findings on how conflict and violence are at the core of frontier-making (Thaler *et al.* 2019; Kröger and Nygren 2020). The article argues that an awareness of such disputes remains central to understanding how the contemporary agricultural frontier reproduces contradictions that characterise Brazilian agriculture.

8 Conclusion

This article has argued that data on the increasing expansion of commodity cultivation and the reduction of agrarian reform combine to provide a more complete characterisation of Matopiba's agricultural frontier – a new frontier that reflects long disputes within Brazilian agriculture, whilst resulting in new contradictions and conflicts. Agriculture remains a central element in understanding, questioning, and perhaps rethinking what 'development' means in Brazil.

The contribution to current scholarship lies in identifying a preliminary correlation between the expansion of commodity crop production and a stagnation of agrarian reform in the Matopiba region since 2015. Yet agribusiness expansion does not take place arbitrarily and does not represent a natural condition that occurs after the designation of Matopiba. The region has a history that precedes Matopiba's creation with its own local actors long participating in agribusiness, political dynamics, and international trends of agriculture trade that certainly have been influencing the ways and extent to which Matopiba's agricultural frontier expands. Similarly, agrarian reform settlements can take decades to be officially approved and have a different temporality than that of industrial agriculture, which means a study that accounts for a longer period will be needed. Moreover, other explanatory variables which we do not account for may also play a role such as budget cuts, the 2014 economic crisis, the dismantling of land policies since the far right came to power in 2016, and so on. Future studies could also address how the agribusiness expansion is affected by international trade, environmental concerns, local politics, access to rural credit, and land grabs.

Notes

* This *IDS Bulletin* was supported by the Newton Fund Researcher Links Workshops grant, ID 2019-RLWK11-10177. The grant was funded by the UK Department for Business, Energy and Industrial Strategy and the Fundação de Apoio a Pesquisa do Distrito Federal (FAPDF) in Brazil, and delivered by the British Council. Some material was developed under the project

Green Revolutions in Brazil, China and India: Epic Narratives of the Past and Today's South–South Technology Transfers, funded by the UK Economic and Social Research Council (ID ES/R00658X/1). The opinions expressed are those of the authors and do not necessarily reflect the views or policies of IDS or the funders.

† The authors thank Lídia Cabral, Sérgio Sauer, Pedro Vasconcelos Rocha, and the anonymous reviewers for their insightful feedback on this article and are grateful to Ronaldo Sodré for his insights into North Matopiba.

1 Estevan Coca, Assistant Professor, Federal University of Alfenas, Brazil.

2 Gabriel Soyer, PhD student, University of Georgia, USA.

3 Ricardo Barbosa Jr, Graduate Student, University of Brasília, Brazil.

4 The name 'Matopiba' is an acronym for a region located in the Cerrado biome spanning four states in Northern and Northeastern Brazil: Maranhão (MA), Tocantins (TO), Piauí (PI), and Bahia (BA).

5 To illustrate, on the one hand, it is claimed that the Brazilian agribusiness industry feeds more than 800 million people in the world (Contini and Aragão 2021), while on the other hand, most of the food consumed by families in Brazil still comes from family farms, where most rural jobs also exist (IBGE 2017).

6 In Brazil, family farming is defined by **Law 11.326** from 2006. Family farms can be as large as four tax modules in size but must rely predominantly on family labour. The tax module refers to the average minimum size of rural property according to the municipality in which the property is located. This flexible distinction is important as the average size of rural landholdings varies widely in Brazil.

7 For example, false declarations provided to the National System of Rural Environmental Cadastre (Sistema Nacional de Cadastro Ambiental Rural, SICAR).

8 Article 184 of the **1988 Federal Constitution** foresees that 'it shall be incumbent upon the Union to dispropriate, for the purposes of agrarian reform, rural property that does not fulfil its social function, in the social interest'. Examples of failure to fulfil the social function are unproductivity and the cultivation of psychotropic drugs.

References

AATR (2020) ***Legalizing the Illegal: Environmental and Land Legislation and the Expansion of the Agricultural Borderlands in Matopiba***, Bahia: Association of Lawyers of Rural Workers (accessed 15 September 2022)

Abelson, P.H. and Rowe, J.W. (1987) 'A New Agricultural Frontier', *Science* 235.4795: 1450–1

Abreu, K. (2016) '**Kátia Abreu destaca potencial do Matopiba, última fronteira agrícola do país**', *Senado Notícias*, 19 October (accessed 15 September 2022)

Allen, E. and Valdes, C. (2016) *Brazil's Corn Industry and the Effect on the Seasonal Pattern of U.S. Corn Exports*, Outlook Report AES-93, Washington DC: United States Department of Agriculture, Economic Research Service

Almeida, J.G.; Sodré, R.B. and Mattos Júnior, J.S. de (2019) '**MATOPIBA nas Chapadas Maranhenses: Impactos da Expansão do Agronegócio na Microrregião de Chapadinha**', *Revista NERA* 22.47: 248–71, DOI: 10.47946/rnera.v0i47.6271 (accessed 15 September 2022)

Araújo, M.L.S. de *et al.* (2019) '**Spatiotemporal Dynamics of Soybean Crop in the Matopiba Region, Brazil (1990–2015)**', *Land Use Policy* 80: 57–67, DOI: 10.1016/j.landusepol.2018.09.040 (accessed 15 September 2022)

Arvor, D.; Meirelles, M.; Dubreuil, V.; Bégué, A. and Shimabukuro, Y.E. (2012) '**Analyzing the Agricultural Transition in Mato Grosso, Brazil, Using Satellite-Derived Indices**', *Applied Geography* 32.2: 702–13, DOI: 10.1016/j.apgeog.2011.08.007 (accessed 15 September 2022)

Barbosa Jr, R. and Coca, E. (2015) '**Conflitos Entre O Campesinato E O Agronegócio No Brasil: Os Planos-Safra 2015-2016**', *Eutopía. Revista De Desarrollo Económico Territorial* 8.11: 13–27, DOI: 10.17141/eutopia.8.2015.1828 (accessed 15 September 2022)

Barbosa Jr, R. and Roriz, J. (2021) '**The Subversive Practice of Counting Bodies: Documenting Violence and Conflict in Rural Brazil**', *Journal of Agrarian Change* 21.4: 870–86, DOI: 10.1111/joac.12416 (accessed 15 September 2022)

Billington, R.A. (1971) *The Genesis of the Frontier Thesis: A Study in Historical Creativity*, San Marino: Huntington Library Press

Brannstrom, C. (2009) '**South America's Neoliberal Agricultural Frontiers: Places of Environmental Sacrifice or Conservation Opportunity**', *AMBIO: A Journal of the Human Environment* 38.3: 141–9, DOI: 10.1579/0044-7447-38.3.141 (accessed 15 September 2022)

Brazil (2015) ***Plano de Devenvolvimento Agropecuário do Matopiba***, presentation, Presidência da República, Secretaria-Geral, Subchefia para Assuntos Jurídicos (accessed 15 September 2022)

Bunker, S.G. (1985) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*, Chicago IL: University of Chicago Press

Cabral, L. (2021) '**Embrapa and the Construction of Scientific Heritage in Brazilian Agriculture: Sowing Memory**', *Development Policy Review* 39.5: 789–810, DOI: 10.1111/dpr.12531 (accessed 15 September 2022)

Cabral, L.; Favareto, A.; Mukwereza, L. and Amanor, K. (2016) '**Brazil's Agricultural Politics in Africa: More Food International and the Disputed Meanings of "Family Farming"** ', *World Development* 81: 47–60, DOI: 10.1016/j.worlddev.2015.11.010 (accessed 15 September 2022)

Cabral, L.; Pandey, P. and Xu, X. (2021) '**Epic Narratives of the Green Revolution in Brazil, China, and India**', *Agriculture and*

Human Values 39: 249–67, DOI: 10.1007/s10460-021-10241-x (accessed 15 September 2022)

Calmon, D. (2020) '**Shifting Frontiers: The Making of Matopiba in Brazil and Global Redirected Land Use and Control Change**', *Journal of Peasant Studies* 49.2: 263–87, DOI: 10.1080/03066150.2020.1824183 (accessed 15 September 2022)

Coca, E. (2020) '**Políticas de obtenção dos territórios dos assentamentos rurais em Minas Gerais**', *Revista Campo-Território* 15.39: 103–116, DOI: 10.14393/RCT153907 (accessed 15 September 2022)

Contini, E. and Aragão, A. (2021) '**O Agro Brasileiro alimenta 800 milhões de pessoas**', *Embrapa*, 4 March (accessed 15 September 2022)

CPT (2022) *Conflitos no Campo: Brasil 2021*, Comissão Pastoral da Terra

CPT (2021) ***Campanha Nacional em Defesa do Cerrado***, Comissão Pastoral da Terra (accessed 15 September 2022)

DATALUTA Network (2021) ***Relatório DATALUTA Brasil 2020***, Banco de Dados da Luta pela Terra (DATALUTA) (accessed 15 September 2022)

Embrapa (2021) ***Soja em números (safra 2020/21)***, Embrapa Soja (accessed 15 September 2022)

Embrapa (2020) ***Publicação atualiza cultivares de milho disponíveis no mercado***, 8 June (accessed 15 September 2022)

Fernandes, B.M. (2008) 'Questão agrária: Conflitualidade e desenvolvimento territorial', in A.M. Buainain (ed.), *Luta Pela Terra, Reforma Agrária e Gestão de Conflitos no Brasil: Agricultura, Instituições e Desenvolvimento Sustentável*, Campinas SP: Editora da Unicamp

Fernandes, B.M. (2000) *A formação do MST no Brasil*, Petrópolis: Vozes

Fernandes, B.M.; Welch, C.A. and Gonçalves, E.C. (2014) *Os usos da terra no Brasil*, São Paulo: Editora Unesp

Haesbaert, R. (1996) 'Região e rede regional "gaúcha": Entre redes e territórios', *Boletim Gaúcho de Geografia* 21.1: 15–27

IBGE (2017) ***Censo Agropecuário 2017***, Rio de Janerio: Instituto Brasileiro de Geografia e Estatatística (accessed 15 September 2022)

Jepson, W. (2006) '**Producing a Modern Agricultural Frontier: Firms and Cooperatives in Eastern Mato Grosso, Brazil**', *Economic Geography* 82.3: 289–316, DOI: 10.1111/j.1944-8287.2006.tb00312.x (accessed 15 September 2022)

Kröger, M. and Nygren, A. (2020) '**Shifting Frontier Dynamics in Latin America**', *Journal of Agrarian Change* 20.3: 364–86, DOI: 10.1111/joac.12354 (accessed 15 September 2022)

Lima, M.G.B. and Kmoch, L. (2021) '**Neglect Paves the Way for Dispossession: The Politics of "Last Frontiers" in Brazil and Myanmar**', *World Development* 148: 105681, DOI: 10.1016/j.worlddev.2021.105681 (accessed 15 September 2022)

Lopes, G.R.; Lima, M.G.B. and Reis, T.N.P. dos (2021) '**Maldevelopment Revisited: Inclusiveness and Social Impacts of Soy Expansion over Brazil's Cerrado in Matopiba**', *World Development* 139: 105316, DOI: 10.1016/j.worlddev.2020.105316 (accessed 15 September 2022)

Martins, J. de S. (1997) *Fronteira: A degradação do outro nos confins do humano*, São Paulo: Hucitec

Menezes, R.G. and Barbosa Jr, R. (2021) '**Environmental Governance Under Bolsonaro: Dismantling Institutions, Curtailing Participation, Delegitimising Opposition**', *Zeitschrift Für Vergleichende Politikwissenschaft [German Journal of Comparative Politics]* 15.2: 229–47, DOI: 10.1007/s12286-021-00491-8 (accessed 15 September 2022)

Mitidiero Junior, M.A. and Feliciano, C.A. (2018) '**A violência no campo brasileiro em tempos de golpe e a acumulação**', *Revista OKARA: Geografia Em Debate* 12.2: 220–46, DOI: 10.22478/ufpb.1982-3878.2018v12n2.41315 (accessed 15 September 2022)

Moreira, R. (2012) *A formação espacial brasileira: Uma contribuição crítica à geografia do Brasil*, Rio de Janerio: Consequência

Nehring, R. (2016) '**Yield of Dreams: Marching West and the Politics of Scientific Knowledge in the Brazilian Agricultural Research Corporation (Embrapa)**', *Geoforum* 77: 206–17, DOI: 10.1016/j.geoforum.2016.11.006 (accessed 15 September 2022)

Oliveira, G. and Hecht, S. (2016) '**Sacred Groves, Sacrifice Zones and Soy Production: Globalization, Intensification and Neo-Nature in South America**', *Journal of Peasant Studies* 43.2: 251–85, DOI: 10.1080/03066150.2016.1146705 (accessed 15 September 2022)

Oliveira, G. de L.T. and Schneider, M. (2016) '**The Politics of Flexing Soybeans: China, Brazil and Global Agroindustrial Restructuring**', *Journal of Peasant Studies* 43.1: 167–94, DOI: 10.1080/03066150.2014.993625 (accessed 15 September 2022)

Pereira, R.H.M. *et al*. (2019) ***geobr: Loads Shapefiles of Official Spatial Data Sets of Brazil***, GitHub repository (accessed 15 September 2022)

Pfrimer, M.H. and Barbosa Jr, R. (2017) '**Neo-Agro-Colonialism, Control over Life, and Imposed Spatio-Temporalities**', *Contexto Internacional* 39.1: 9–33, DOI: 10.1590/s0102-8529.2017390100001 (accessed 15 September 2022)

Pfrimer, M.H. and Barbosa Jr, R. (2016) '**(De)Securitizing Collectives of the Brazilian Cerrado and the Implementation of an Agribusiness Complex**', *Revista NERA* 19.30: 58–79, DOI: 10.47946/rnera.v0i30.4178 (accessed 15 September 2022)

Planalto (2015) '**Governo Federal lança plano para desenvolver nova fronteira agrícola**', 13 May (accessed 15 September 2022)

Ribeiro, L.C. de S.; Lôbo, A.S.; Silva, L.D. da and Andrade, N.F.S. (2020) '**Padrões de crescimento econômico dos municípios**

do MATOPIBA', *Revista de Economia e Sociologia Rural* 58.3: e212613, DOI: 10.1590/1806-9479.2020.212613 (accessed 15 September 2022)

Rocha, P.V. (2020) '**Sentidos de uma "Fronteira agrícola" para o desenvolvimento: Desenho de projeto e práticas locais na iniciativa Matopiba**', MA thesis in Rural Development, Federal University of Rio Grande do Sul (accessed 15 September 2022)

Sauer, S. (2017) '**Rural Brazil during the Lula Administrations: Agreements with Agribusiness and Disputes in Agrarian Policies**', *Latin American Perspectives* 46.4: 103–21, DOI: 10.1177/0094582X16685176 (accessed 15 September 2022)

Sauer, S. and Leite, S.P. (2012) '**Agrarian Structure, Foreign Investment in Land, and Land Prices in Brazil**', *Journal of Peasant Studies* 39.3–4: 873–98, DOI: 10.1080/03066150.2012.686492 (accessed 15 September 2022)

Sauer, S. *et al.* (2021) ***Conflitos Socioambientais: Concepções e aplicação no Observatório MATOPIBA***, Brasília: Observatório MATOPIBA (accessed 15 September 2022)

Sawyer, D. (1984) 'Frontier Expansion and Retraction in Brazil', in M. Schmink and C.H. Wood (eds), *Frontier Expansion in Amazonia*, Gainesville FL: University of Florida Press

Soyer, G. and Barbosa Jr, R. (2020) '**O extrativismo agrário do Governo Bolsonaro a partir das relações Estado-Sociedade**', *Revista Da ANPEGE* 16.29: 522–54, DOI: 10.5418/ra2020.v16i29.12553 (accessed 15 September 2022)

Stédile, J.P. and Fernandes, B.M. (1999) *Brava gente: A trajetória do MST e a luta pela terra no Brasil*, São Paulo: Fundação Perseu Abramo

Tella, G.D. (1982) 'The Economics of the Frontier', in C.P. Kindleberger and G.D. Tella (eds), *Economics in the Long View*, London: Palgrave Macmillan

Thaler, G.M.; Viana, C. and Toni, F. (2019) '**From Frontier Governance to Governance Frontier: The Political Geography of Brazil's Amazon Transition**', *World Development* 114: 59–72, DOI: 10.1016/j.worlddev.2018.09.022 (accessed 15 September 2022)

Trase (2018) ***Brazil Soy Supply Chain***, GitHub (accessed 15 September 2022)

Tsing, A.L. (2003) 'Natural Resources and Capitalist Frontiers', *Economic and Political Weekly* 38.48: 5100–6

United Nations Comtrade Database (2021) ***International Trade Statistics Yearbook—2020*** (accessed 15 September 2022)

Zalles, V. *et al.* (2019) '**Near Doubling of Brazil's Intensive Row Crop Area Since 2000**', *Proceedings of the National Academy of Sciences* 116.2: 428, DOI: 10.1073/pnas.1810301115 (accessed 15 September 2022)

This page is intentionally left blank