

IDS Bulletin

Transforming Development Knowledge

Volume 54 | Number 1 | February 2023

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

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Mapping Fire: The Case of Matopiba*

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Abstract This article examines fire as a political tool to advance the expansion of the agricultural frontier in Brazil and proposes a methodology for working with affected communities to protect their territories. Historically, fire has been used by communities as a traditional resource management strategy. However, it has also been associated with environmental degradation and agribusiness expansion. Our analysis focuses on the territories of black rural communities in Matopiba and shows how territorial conflict is now shifting to the productive spaces of these communities, indicating a politicisation of these spaces and implications for the regional agri-food system. Using satellite imagery and participatory methods, the authors worked with community members and activists to create an integrated map documenting and assessing the extent of fires in the area. The methodology developed can support the protection of areas and communities in other parts of this region and help gather evidence that can be used in court cases and support whistleblowing to the authorities.

Keywords fire, territorial conflicts, productive space, black peasants, Matopiba, Geographic Information System (GIS).

1 Introduction

In this article, we use some expressions in Portuguese, as there is no 'one-word translation' into English for them and they are important for people's struggles. '*Quilombola*' is the black population living in '*quilombos*', historic settlements of African slaves who fled plantations and forced labour during the colonial period. '*Roça*' or '*roça de toco*' is a small area of an agriculturally productive field (of up to one hectare) created through the cultivation of a forest area, which involves a long process of ploughing, traditional fire management, stumping, cultivation, use of the land until it 'weakens', and a seven-year dormant period. We use '*quilombo*' to name black rural communities that claim ethnical and historical identity and are recognised by the

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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.



Brazilian state. 'Black peasants' is the term used to name other communities, residing in Gleba Tauá, that claim their identity and are recognised by Brazilian institutions as traditional peasants but who are not necessarily *quilombolas*.

Since 2019, fires in agricultural production spaces (comprising *roças*, home gardens, and agroforests) of black peasants and *quilombola* communities have been spreading along the agricultural frontier known as Matopiba, raising concerns about the use of fire in disputed areas.⁴ Although fire is a widely used traditional resource management strategy for peasants, in recent years, it has also been associated with environmental degradation and agribusiness expansion areas (Fagundes 2019; Moura *et al.* 2019; Barradas *et al.* 2020), especially in the Amazon and the Cerrado.⁵

The Matopiba region, described by the Brazilian agricultural industry as the last agricultural frontier, is responsible for about 10 per cent of the country's grain production (soybeans, corn, and cotton). It has also become a symbol of the implementation of Brazil's Green Revolution technology package in conjunction with monoculture technology for export production.⁶ However, traditional communities and social movements have denounced the violent foundations of this expansion, which take the form of environmental destruction, land grabbing, and territorial expropriation. The ultra-conservative Brazilian former president Jair Bolsonaro was highly supported by the agribusiness sector of the Matopiba region. The agribusiness website of the region has regularly stated this support daily on its webpages.⁷

Combining methods such as geotechnologies and participatory methodologies, this article aims to explore the political use of fire in traditional communities, asking the following questions. To what extent is the use of fire related to the expansion of the agricultural frontier in the Matopiba region? Is there a link between the recent escalation of fires and the strengthening of ultra-conservative agribusiness in the region? A series of fires in agriculturally productive areas of Matopiba communities has been denounced and documented by social movements, activists, and researchers since 2020.⁸ The collaboration between researchers and activists has given rise to the *Agro é Fogo*⁹ web platform. This article draws on this activist scholarship and focuses specifically on the productive spaces of black rural communities in northern Tocantins State (TO). This is a highly contested area with a history of land conflicts between agribusiness elites and local communities. This conflict is a political struggle fought in different areas with different strategies on each side. Our hypothesis is that these fires are part of a new strategy related to the politicisation of agri-food systems in Matopiba by ultra-conservative agribusiness, which has intensified during the Covid-19 pandemic.

Drawing on a political economy perspective (Anderson and Leach 2019), we work with the notion of agri-food systems to 'examine the different power relations in all aspects of food systems – from harvesting and production to distribution, consumption and waste management – and the associated influences and impacts' (Duncan, Levkoe and Moragues-Faus 2019: 37). However, our focus is on the destruction caused by fire set by external actors on agriculturally productive land in communities where traditional systems are used.

The territorial conflict in the Tocantins has historically been marked by violence against the *quilombola* and the black peasant population. The Brazilian re-democratisation process and the adoption of the 1988 Brazilian Federal Constitution led to a judicial resolution of a regional conflict where hitmen ordinarily threatened peasants, thus leading to illegal land occupations. In most cases, the judicial process favoured the original rights of the populations that had occupied these lands for decades. We argue in this article that the eviction strategies derived from the historical territorial conflict are now shifting to the agriculturally productive lands of these traditional communities, indicating the politicisation of the regional agri-food system. *Roças de toco*, forested home gardens, riverine floodplains, and agroforestry lands have been politicised in recent years. Their products have been promoted by communities and social movements as an alternative to the Green Revolution logic and production for the international market, a dynamic that is widespread in Matopiba plantations.

The food produced by these communities using traditional techniques has been discursively constructed by communities and social movements as a healthier alternative. As agri-food systems exist in a territorialised way (Hinrichs 2003), we contend that the territorial conflicts caused by the expansion of the agricultural frontier are fundamental to understanding the new faces of agrarian conflict in Brazil.

The article is divided into six sections. Section 2 contextualises the relationship between fire and traditional communities in the Cerrado, and the communities involved in a historical land conflict in northern Tocantins. In section 3, we present our participatory methodology and the central role of institutional alliance in building a protection network for communities facing territorial problems, particularly with the Pastoral Land Commission (Comissão Pastoral da Terra, CPT)¹⁰ and the university. In section 4, we present the two case studies and the satellite images that were jointly produced by social movements, the university, and communities. The images show the area affected by fire in the municipality of Gleba Tauá between July and September 2020 and in the Quilombo Grotão in August 2020. The images also show how close the incidents were to the houses, illustrating how they were aimed at scaring the families and making them leave

their territory, and how the fires reached *roças*, home gardens, and agro-ecological production areas established in rural development projects.

In section 5, we discuss how the empowerment and alliance of radical actors in the context of national agribusiness, following the election of Jair Bolsonaro in 2018, has affected regional associations of livestock and soybean farmers. In this context of intensifying conflict, violent strategies are increasingly used against the inhabitants of traditional communities in the Matopiba region. Section 6 concludes.

2 A historical perspective on fire and territorial conflicts in Tocantins

The relationship between fire and black rural production systems in the Cerrado is ancient and diverse (Moura *et al.* 2019; Fagundes 2019). While fire has traditionally been used as a forest management technology to create small productive areas by rural communities, in recent decades, it has been associated with environmental degradation and the clearing of new land for livestock and soybean plantations (Silvério *et al.* 2019). In the state of Tocantins, the location of the case studies in this article, the use and management of fire by traditional populations within a protected area (Unidade de Conservação, UC) has undergone a process of demarginalisation. The work carried out since 2014 in the Conservation Unit of the Serra Geral in Tocantins state (Estação Ecológica Serra Geral do Tocantins, EESGT) is an example of an integrated fire management plan that respected the knowledge of the *quilombola* and was the first in Brazil to be developed and implemented in a federally protected area (Barradas *et al.* 2020). This success was possible mainly because the ecological station is home to eight *quilombola* communities recognised by the Palmares Cultural Foundation (Fundação Cultural Palmares, FCP)¹¹ (Beserra *et al.* 2014).

It is worth noting that black rural communities use fire to open forest areas for *roças de toco*. In Gleba Tauá, some members of the community raise cattle and use fire to manage pastureland. In both cases, fire is used after the beginning of the rainy season, around mid-September. This strategy ensures that fire can be controlled, and the danger of accidental spreading is avoided. Despite the traditional management of fires, the communities are now struggling with arson in their areas. Incidents have occurred in the Quilombo Grotão and Gleba Tauá. Despite their recent intensification, these types of incidents have a long history. Since 1980, communities in the region have reported fires in their home backyards due to conflict with soybean farmers (Gomes and Ramos Júnior 2020).¹²

Quilombo Grotão, in Filadélfia municipality, is a traditional community in northern Tocantins that was founded in 1860. It began to suffer from land pressure from cattle ranchers in 1970.

In 2008, about 19 families were 'legally' evicted from their land by a court order after the farmers sued. Sixty days later, the judge of Filadélfia County, the municipality where the *quilombo* is located, allowed them to reoccupy 5 per cent (about 100 hectares) of their original territory (Rodrigues 2021). The case has been pending in court ever since. The *quilombo* leader, Dona Aparecida, reports constant threats against her physical integrity. Every year, herds of cattle are released into the area during the dry season, damaging productive areas. Around 2011, eucalyptus plantations were established near the *quilombo*, which she says lead to the depletion of water in streams and soil.

Gleba Tauá, in Barra do Ouro, is another long-established community. By 1992, it was already a traditional area that had been inhabited by black peasants for at least three generations. The historical dispute was fuelled by soybean farmers, as the land occupies a large part of the Barra do Ouro municipality in northern Tocantins. In 2009, an attempt to legally evict about 100 families who lived in the municipality was prevented by a politically popular organisation within the judicial system. However, in 2015, the families were evicted by court order and allowed to return to their land after evidence of irregularities in the eviction process. Dona Raimunda, the community leader whose land was surrounded by soybean plantations, reports that her life and integrity were threatened. The community also reports that every year, aerial spraying of pesticides by neighbouring soybean farmers ends up contaminating community gardens and farms.

Quilombo Grotão and Gleba Tauá were initially outside the disputed land market of Tocantins. As the Matopiba frontier expanded into these areas, it triggered a process of land grabbing and illegal occupation. When all the surrounding areas were sold, the communities appeared as an obstacle to this expansion. In addition to the strategy of land grabbing, the judicial settlement of the territorial conflict is another means to displace the communities. On the other hand, the communities continued their resistance by organising their associations and joining forces with civil society organisations such as the CPT and universities to create a network of protection and political support.

Quilombo Grotão was part of the Ubuntu project, funded by the International Labour Organization (ILO) and promoted by the CPT, the Federal University of Northern Tocantins (Universidade Federal do Norte do Tocantins, UFNT), and the Public Labour Prosecution Office. The community began producing agroecological-based food products for the city of Araguaína (Ramos Júnior *et al.* 2021). These products were sold in street markets and in the largest supermarket chain in the city until March 2020. In the sales section of the supermarkets, the products had posters saying: 'Pesticide-free product!'. This message not only conveys the idea of a healthier food product, but it is also an expression of political opposition to the Green Revolution technology package which

is central to agribusiness discourse in the region – agribusiness products are known for their intensive use of pesticides and indiscriminate use of biotechnologies. The message calls on urban consumers to take a stand and bring the rural conflict to the city. Strengthening this political positioning means securing the land rights of communities, as agricultural production reinforces the social function of land, which is established in the Brazilian Constitution for Agrarian Reform.

3 Methodology: using geotechnology in activist scholarship

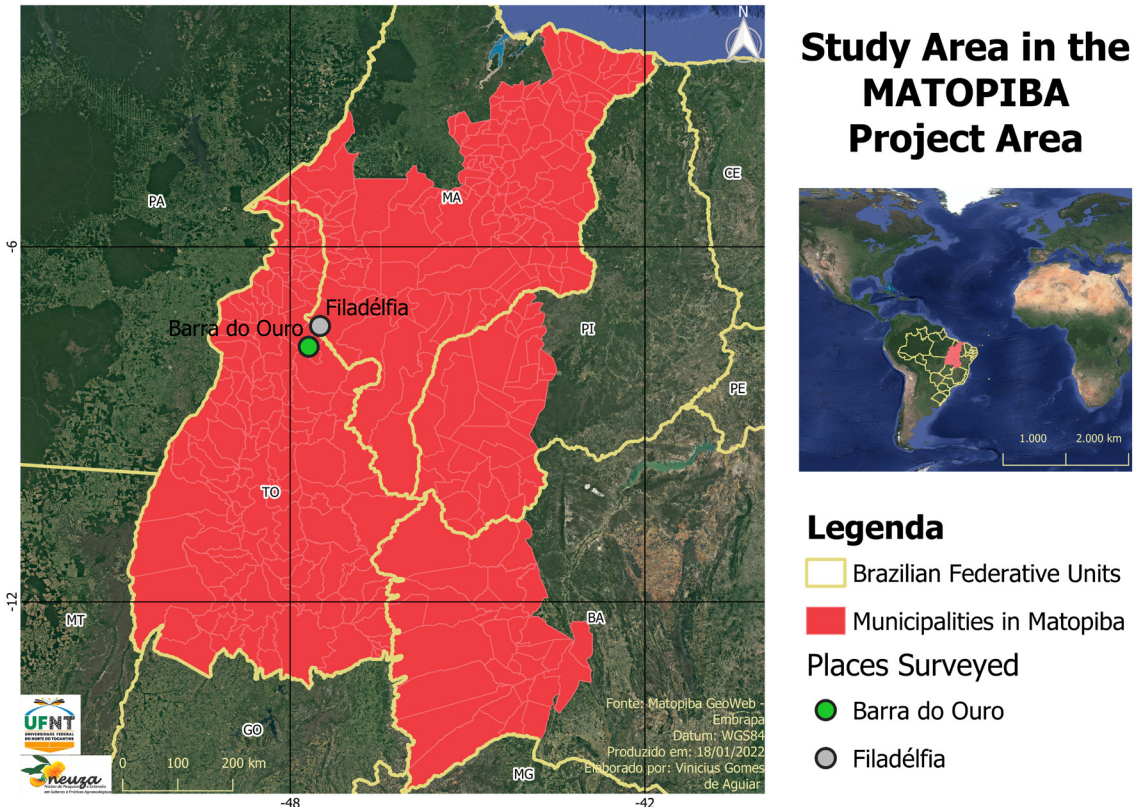
Cartographic methods can provide powerful tools of resistance to secure land rights for traditional communities by producing accurate data on territorial occupation. Menezes and Fernandes (2013) highlight cartography's commitment to the precision and accuracy of spatial data. Geotechnologies contribute to the analysis of spatial phenomena by supporting access to data, the creation of spatial representations, and the design of maps. This field has been influenced by the development of computer software and methods for managing and displaying spatial data (*ibid.*).

Cartographic representations of traditional communities have increased worldwide, especially in research conducted by community associations, civil society organisations, and academia, but also by some government agencies. Digital cartography enables the integration of spatial information through geotechnologies, particularly through the incorporation of the Geographic Information System (GIS), Remote Sensing, and Navstar (Navigational Satellite Timing and Ranging)/Global Navigation Satellite System (GNSS). These enable the acquisition of spatial data and their spatial dynamics as well as their representation on maps (Lang and Blaschke 2007).

The spatial data of a map, when stored in a GIS, helps in landscape, urban, and environmental planning. Due to the constant conflict experienced by communities in northern Tocantins, this technology can also help support resistance actions by creating maps that can help them in litigation and in reporting grievances to the authorities. The shared work with this technology between people from black rural communities and *quilombolas* with non-governmental organisations, social movements, universities, and religious institutions has brought together cartography and resistance movements. As a result of a participatory methodology (Tan-Kim-Yong 1992; Chambers 2006; Santos 2011; Aguiar, Ramos Júnior and Costa 2021), these experiences constitute activist studies and evidence that can serve as a basis for court cases and support whistleblowing to regulatory authorities.

This study was part of such a collaboration involving researchers from the Centre for Research and Extension in Agroecological Knowledge and Practices (Núcleo de Pesquisa e Extensão

Figure 1 Matopiba location and extension

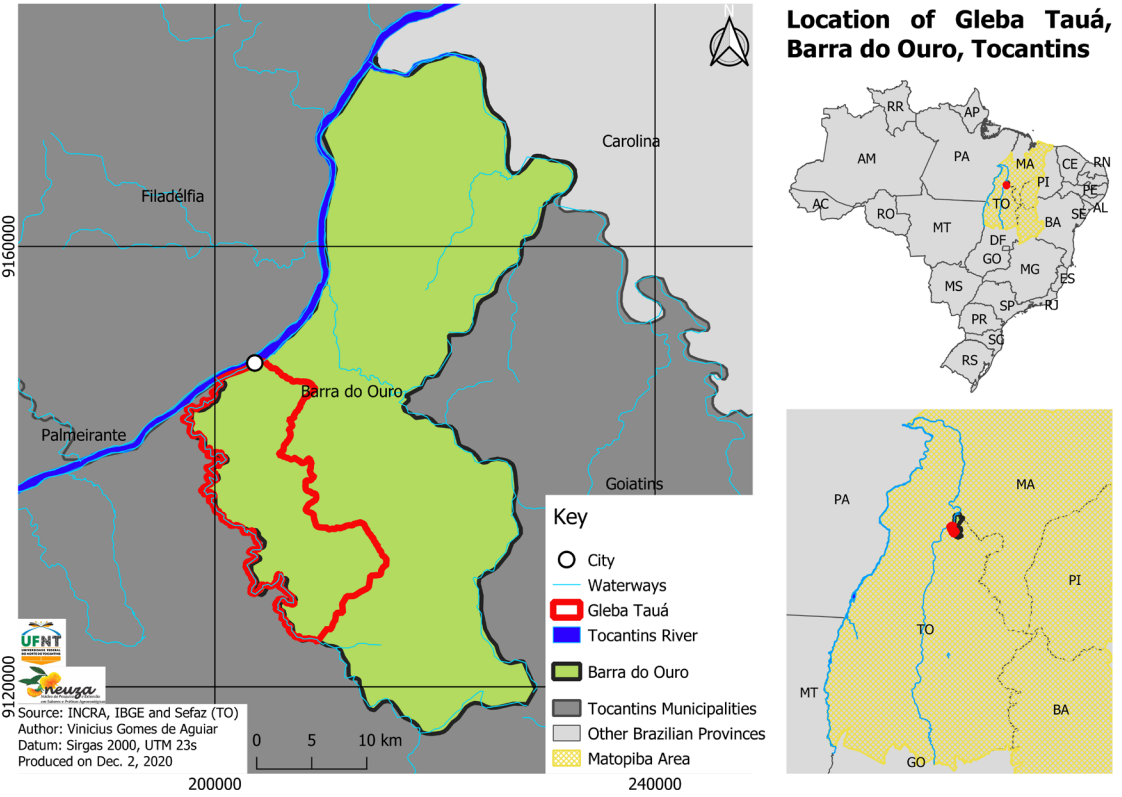


Source © Embrapa. Data on the spatial limit of the territory from GeoWeb – Embrapa and province information from Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística, IBGE).

em Saberes e Práticas Agroecológica, Neuza-UFNT),¹³ the CPT, and the *quilombola* and black peasant communities in northern Tocantins. Institutional linkages with institutions working continuously in these communities, especially the CPT, have been fundamental to the development of activities and the protection of all stakeholders. Through the partnership between communities, civil society organisations, and universities, we were able to develop spatial representations using geotechnologies to show the fires in the communities' areas and the impact of these actions on productive spaces. Using a participatory methodology, we carried out coordinated actions: first, community leaders and pastoral agents reported the fires and obtained Global Positioning System (GPS) coordinates of the affected areas; then researchers observed the affected areas using satellite imagery and created spatial representations of the fire locations (Aguiar *et al.* 2021). These coordinated actions allow the collective denunciation and control of arson in the territory.

The data generated by this method was studied in both Quilombo Grotão and Gleba Tauá. These communities are

Figure 2 Location of Gleba Tauá



Source Vinicius Gomes de Aguiar, based on data on the spatial limit of the territory from Instituto Nacional de Colonização e Reforma Agrária, INCRA; province information from IBGE; and the remaining data from Secretaria da Fazenda, Sefaz (the State Treasury Department).

located in an area where intensive cattle breeding is carried out. As noted in section 2, they have recently become hotspots for the expansion of soybean and eucalyptus plantations due to the advancement of the Matopiba frontier (see Figure 1).

4 Fires in Gleba Tauá and Quilombo Grotão territories

4.1 Fires in Gleba Tauá territory

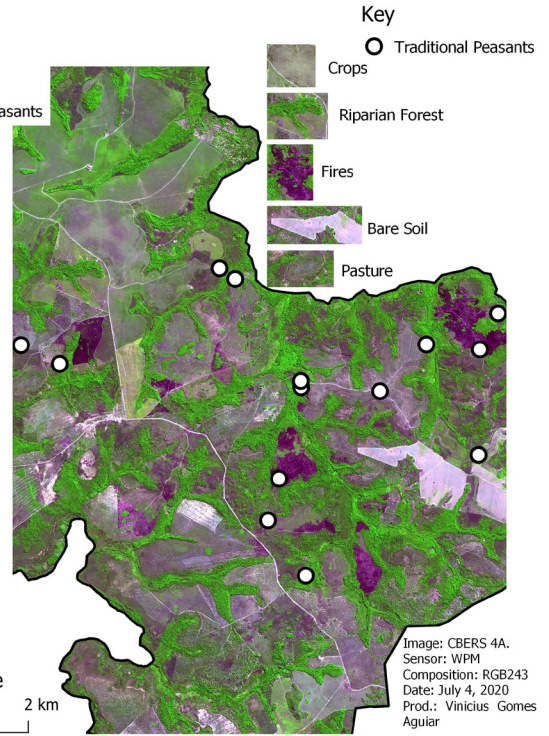
Gleba Tauá (see Figure 2) is located in the centre of Matopiba and is an area that has always been inhabited by peasant farmers. In recent years, it has also been occupied by soybean farmers who use the land as part of industrialised cereal production, including the intensive use of pesticides that affects the local environment and the lives of people who inhabit the land. A study published in *Agro é Fogo* (Santos *et al.* 2021) documents the eviction attempts faced by the population in this region through the use of *pistolagem* (the use of guns and armed men to threaten people) and constructive strategies such as throwing pesticides into the *roças* and home gardens.

Figure 3 Fire spots in Gleba Tauá on 4 July 2020

Natural colour images



False colour images



Note In the image on the right, the green areas (riparian forest) have been highlighted.

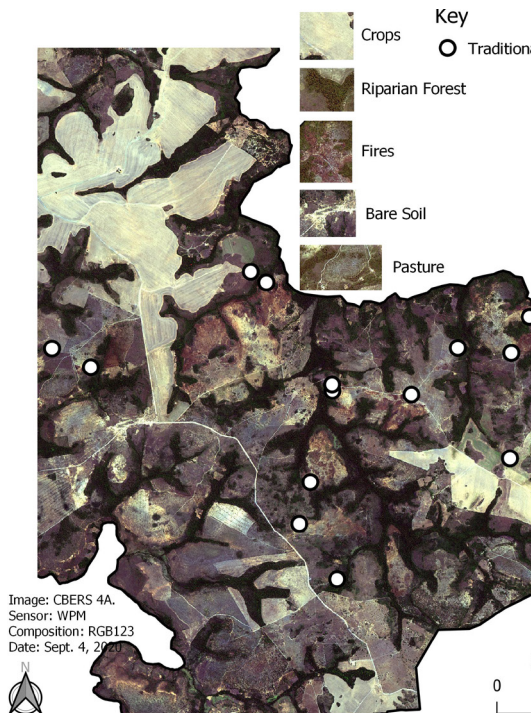
Source © CBERS-4A, National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE) 2020.

After the beginning of the fire events in July 2020, the inhabitants of Gleba Tauá and CPT agents used Navstar GNSS receivers to determine the position of their houses in relation to the arson attacks. The intention was to use spatial representations to reinforce community complaints about the arson attacks on families' productive spaces.

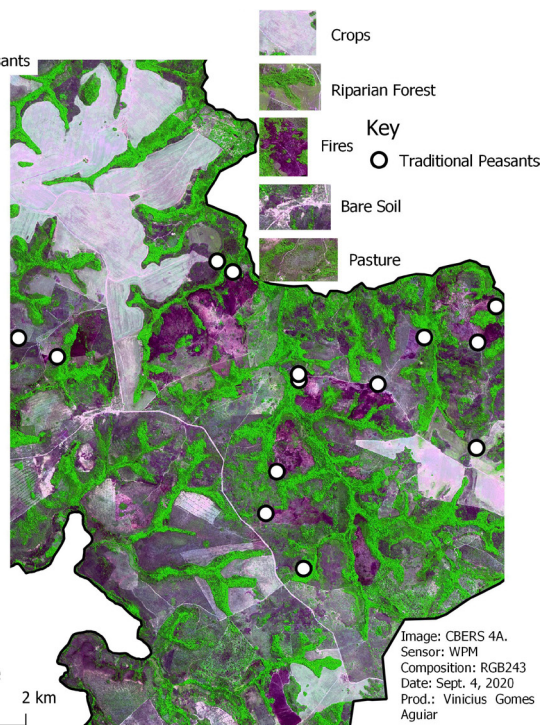
For this study, our main strategy was to work with a remote sensing device capable of detecting scars in the land where fires and deforestation had occurred. We then used the CBERS-4A satellite images from July and September 2020, as they have a more detailed spatial resolution, as the sensor for multispectral imagery (water productivity mapping, WPM) has a nominal spatial resolution of 8 metres (m) and a panchromatic band of 2m. These satellite images differ significantly from the spatial resolutions of the Landsat series images, which in the region of visible spectra and the infrared portion offer a nominal spatial resolution of 30m and 15m for the panchromatic band. To produce the images we needed in small green regions, we merged the

Figure 4 Fire spots in Gleba Tauá on 4 September 2020

Natural colour images



False colour images



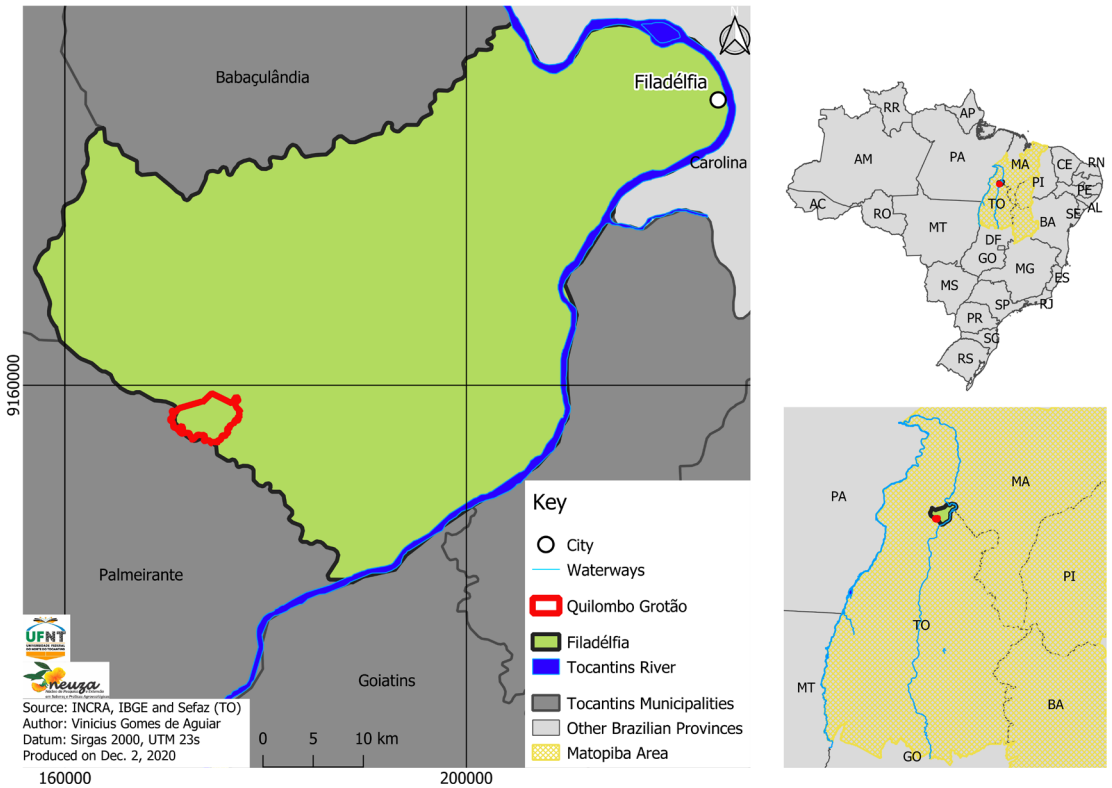
Note In the image on the right, the green areas (riparian forest) have been highlighted.

Source © CBERS-4A, INPE 2020.

CBERS-4A multispectral image with bands 1, 2, 3, and 4 with the panchromatic band. With the image composed of four bands (1, 2, 3, and 4) and a pixel of 2m obtained by merging it with the panchromatic band, we made an overlap between the settlement points and the detected burn scars (see Figures 2, 3, and 4). The occupation points of the communities were recorded in the field by themselves in collaboration with CPT agents using a GNSS receiver.

As these images show, the burn patches are in close proximity to the peasant settlement in both July and September 2020. Gomes and Ramos Júnior (2020) argue that these fire spots and patches emerged near peasant occupations, agriculturally productive areas, and home gardens as an eviction strategy aimed at creating insecurity and forcing the community to abandon its territory. To illustrate this, two band compositions were created. In the one with visible bands (bands 1, 2, and 3), the scars caused by the fire are barely visible. In the other composition, which contains infrared and consists of bands 2, 3, and 4, the areas identified as burned are visible in magenta (see 'fires' in the key), similar to the dark brown patches identified by Liu (2006) in Landsat 7 images.

Figure 5 Location of Quilombo Grotão



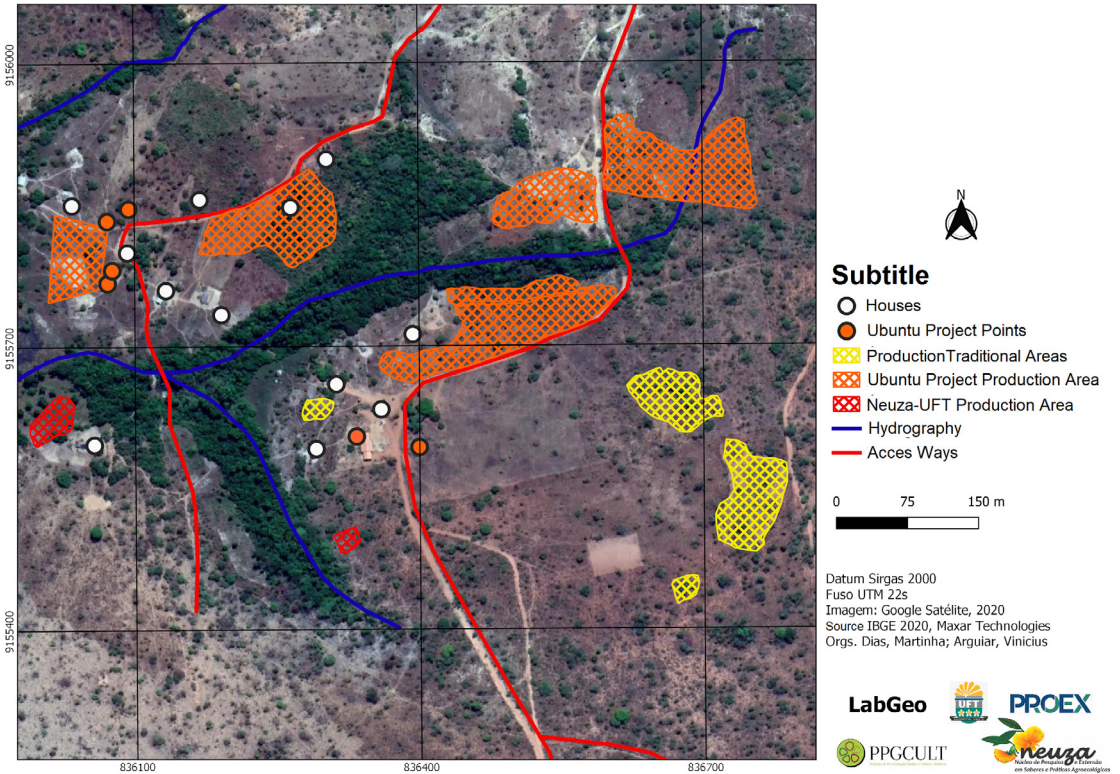
Source Vinicius Gomes de Aguiar, based on data on the spatial limit of the territory from INCRA; province information from IBGE; and the remaining data from Sefaz.

4.2 Fires in Quilombo Grotão territory

Since Neuza-UFNT’s inception in 2018, the research and extension group has conducted partnerships with traditional and peasant communities in northern Tocantins. The experience with the Quilombo Grotão and the CPT is one of our most consolidated collaborations, based on agroecological knowledge and technical development projects. The community is located in the municipality of Filadélfia where the young *quilombolas* go to middle and high school and where the community goes to buy groceries and used to sell their agricultural products before the Covid-19 pandemic (see Figure 5).

As in Gleba Tauá and several other areas in Matopiba, the land in Quilombo Grotão is used at different times of the year based on the management of small agricultural production areas. Therefore, we chose the same satellite images to identify and represent these different land uses, as well as the territorialisation of projects developed through the institutional link between Quilombo Grotão and the CPT. The same methodological choice was made for Gleba Tauá because, for example, one of the

Figure 6 Quilombo Grotão productive areas catalogued in 2019 fieldwork

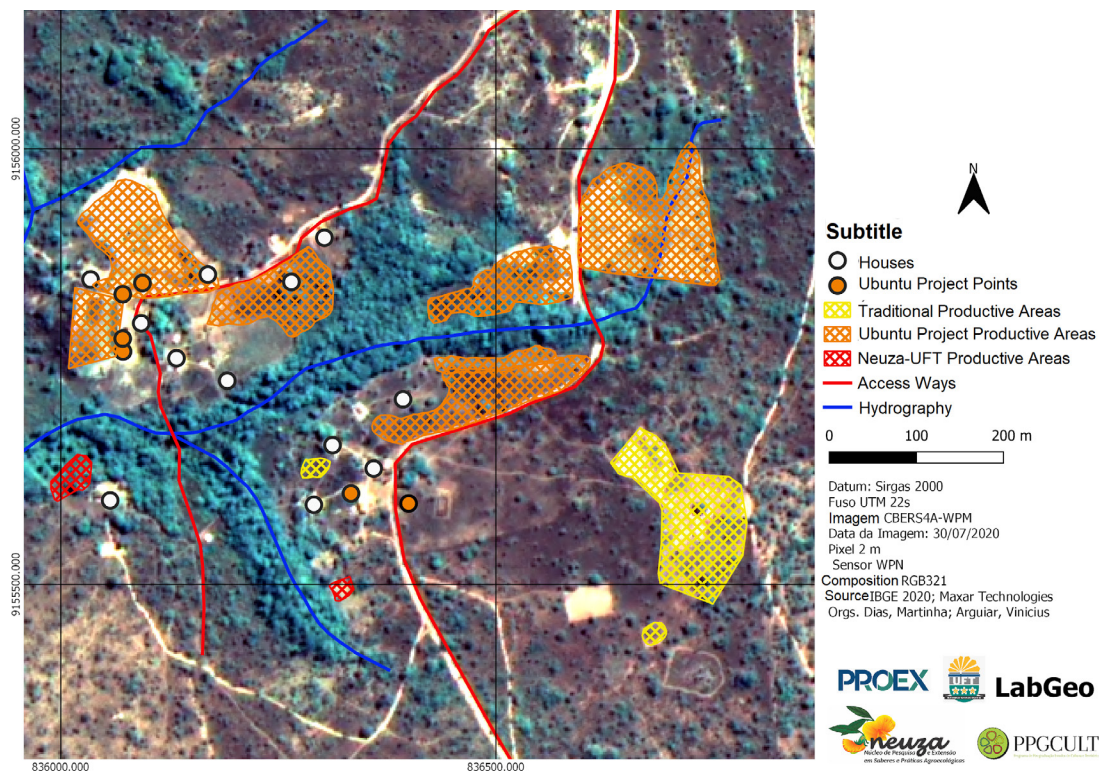


Source © Google Satellite 2020; IBGE 2020; Maxar Technologies.

largest development projects of productive land in Quilombo Grotão (from the Ubuntu project) has about 5,000m² on which to harvest vegetables in a short period of time (the first harvests lasted three months). We then realised that it was better to work with nominal resolution images – perceived as the smallest feature that the current sensor can detect (Novo 2008) – which allow greater identification of area details. At this point, our challenge was the fact that these types of images are usually purchased through commercial agreements or are available via the Google Earth software.

Due to a lack of funding, we were unable to acquire the image type needed for the analysis in the first half of 2020. We therefore had to use data from the Neuzá-UFNT archive regarding the territorial vector data (points, lines, and polygons) of Quilombo Grotão. In a collaborative data collection led by community members in 2019, Neuzá-UFNT researchers focused on home gardens, *roças*, houses, paths, and roads in the area, designated as historically relevant places by the *quilombola* leaders. The georeferenced data of the location of the Quilombo Grotão production areas were collected using the app 'C7 GPS Data' for

Figure 7 Quilombo Grotão productive areas identified through image interpretation in the Quilombo Grotão in July 2020



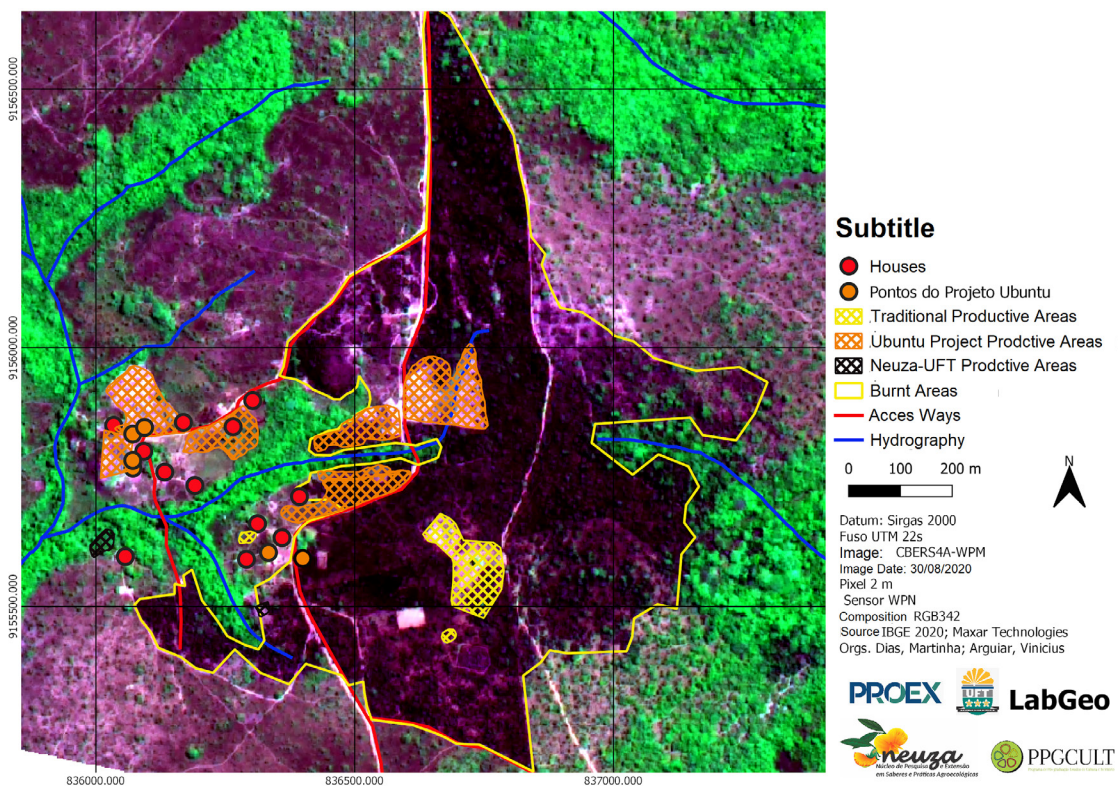
Source © CBERS-4A, INPE 2020.

smartphones, which allowed for an accuracy of about 5m, as the equipment (community mobile phones) could be made ready for use about 30 minutes before the start of data collection.

Questionnaires were also distributed to houses in the community and georeferenced coordinates were obtained. Our objective was to collect data on how many families there are in the *quilombo*, where their houses are located, and how many of them participate in existing projects in the community. To supplement our data, we used Google Earth 2017 images of *quilombo* as its good spatial resolution allowed us to work with the area details. We then overlaid the vectors from the fieldwork data with the image provided by Google Earth. After collecting and organising all of this data in 2019, we looked at the georeferenced images from 2020 to identify the change in food production in the *quilombola* area.

Using QGIS 3.14 software,¹⁴ it was possible to validate the images collected during the fieldwork and identify the new vector points of the productive areas in Quilombo Grotão and their adaptations for 2020.

Figure 8 Productive areas affected by fire in Quilombo Grotão in 2020



Source © CBERS-4A, INPE 2020.

In 2019, we catalogued 12 agriculturally productive plots in Quilombo Grotão, divided into native cassava and watermelon cultivation (traditional production areas); vegetable, bean, and cassava (areas of the Ubuntu project); and natural manure plots with *feijão-de-porco* and *mucuna*, two different bean species (a Neuza-UFNT experiment) (see Figure 6).

To analyse the changes in agricultural production areas in the *quilombo* from 2019 to 2020 and some of the possible impacts, data collected during the 2019 fieldwork was compared with CBERS-4A satellite images acquired with the WPM sensor and taken in July 2020. Some food-growing areas recorded an increase in size during this period. To identify, measure, and vectorise these areas, it was necessary to use satellite images with a nominal spatial resolution of 2m (see Figure 7). With this level of accuracy, we were able to determine that the cassava and vegetable areas of the Ubuntu project saw a significant increase.

As Figure 6 shows, the partnership between the *quilombo* community, the CPT, and the UFNT has had an impact on traditional production methods in the *quilombo* in recent years.

This change was different from what was happening in the surrounding rural communities. The *quilombo* had achieved an established position as producers of organic food in the towns that were their marketing areas (Filadélfia, TO and Araguaína, TO). However, this supremacy in the regional agri-food system was followed by political conflicts: one of the community leaders reported that she was so threatened that she was afraid to display the Ubuntu project declaration sticker, which identifies the vehicle used to transport the vegetables for sale.

As we argue here, the social isolation of *quilombo* partner communities enforced by the pandemic restrictions also contributed to the increase in insecurity in the community. In August 2020, a fire broke out in the *quilombo*, which mainly affected the food-growing areas and also reached gardens near some houses (see Figure 8). The methodology we used increased the contrast between the image elements and we were able to improve the visualisation of the affected areas.

The fire completely destroyed the traditional production area managed by one of the *quilombo* patriarchs, which guarantees the food sovereignty of Quilombo Grotão. It also endangered a large part of the cassava plants of the Ubuntu project, which were to be harvested in a few weeks to start flour production. Finally, it also reached home gardens and threatened people's lives, as most of the community's houses are self-built constructions of wood and leaves.

5 Discussion

While communities advanced in their demands for rights, agribusiness actors have radicalised their actions since 2014, when the political crisis of Brazilian democracy was potentiated by a close and contested election. The crisis was exacerbated by the election campaign and Bolsonaro's victory in 2018. According to Pompeia (2022), middle-class producers resented the industrial concentration in the meat chain that resulted from the proximity of livestock elites to the Workers' Party (PT) governments from 2002 to 2016. These farmers also reacted 'to the recognition of traditional territorial rights – such as indigenous land rights' and positioned themselves against 'the adoption of environmental and labour laws' (Pompeia 2022: 2). Within these radicalised groups, which articulate themselves by promoting events in support of former President Bolsonaro, there are associations of cattle ranchers and soybean farmers from across Matopiba, such as the Tocantins Soybean and Corn Producers Association (Associação de Produtores de Soja e Milho do Tocantins, APROSOJA-TO) and regional farmers' associations such as the Rural Union of Araguaína.

While agribusiness actors have become increasingly comfortable using violent strategies against rural and black peasant populations, the restrictions imposed by the Covid-19 pandemic are holding back the institutions that work for the security of

these communities. Moreover, former President Bolsonaro's government openly supported an expansion of the agribusiness frontier and ignores environmental regulation. The combination of the pandemic and a government that encourages deforestation has led to an intensification of land conflicts that have resulted in a series of arson attacks on the communities' agriculturally productive lands. Even though Quilombo Grotão and Gleba Tauá have suffered attacks on their territorial rights since 1970, we have seen an increase in the use of violence by the Bolsonaro government itself, as regulatory bodies have been systematically dismantled and even Bolsonaro's first Environment Minister was in favour of free regulation of agribusiness development. Since 2020, these strategies of constructive displacement of traditional communities have been combined with arson attacks on their agricultural production areas to drive them off their land by destroying their 'pesticide-free' agricultural production areas.

The land struggle of the Gleba Tauá and Quilombo Grotão communities underscores the proposition that food systems are riddled with power relations (Duncan *et al.* 2019). In a region historically marked by land conflicts, the productive spaces of black peasant communities have become politicised sites towards which territorial conflicts are directed.

Fires set on the productive lands of Quilombo Grotão and Gleba Tauá are the new eviction strategy by elite agribusiness farmers who expand their own land. Their actions aim to demobilise communities and stop proactive strategies through political and institutional alliance. These communities have in turn shifted their historical resistance to open street markets and supermarkets. They are constituting alternative food production systems that are regionally rooted and safe, environmentally and health-wise.

The pandemic has enabled the radicalisation of Brazil's agribusiness actors, which began in 2016. The weakening of the institutional networks protecting communities was crucial to the advance of violent actions carried out by articulate far-right Brazilian agricultural producers. While communities complied with health policies and measures, Covid-19-denying producers took to the streets and spread terror with arson attacks. In the face of these attacks and social distancing measures, the social networks and remote sensing techniques that had previously been established became essential. While violence against territories and collective livelihoods continues, we also renew our strategies to ensure data production through mobile phone apps and participatory methodologies that see community engagement as fundamental to knowledge construction.

We argue that food production is at the centre of this conflict. At one end, there is subsistence production that supplies regional food markets with crops rooted in regional cultures, produced using traditional or agroecological technologies and collective

labour based on community ownership of land. At the other end, there is industrialised production of export commodities that enriches regional elites, increases land concentration, uses precarious labour, and is disconnected from regional food cultures.

6 Conclusion

The experiences in Gleba Tauá and in Quilombo Grotão in the Matopiba region show that the partnership between communities, universities, and civil society organisations is key for the production of quality data and analysis. This, in turn, is crucial to the condemnation of the arson attacks, and to protect the environment and black peasant communities. The analysis in this article highlights the politicisation of agricultural production spaces and helps to generate new hypotheses on territorial conflicts and violence caused by the expansion of the agricultural frontier in the Matopiba. Such incidents have alerted us to the importance of reconstructing the institutional alliance as it existed before the pandemic. Improving this institutional alliance can also help to develop multi-level strategies based on local techniques and knowledge. In addition to generating spatial data, the creation of a *quilombolas* fire brigade to combat forest fires ensures the quality of community food production and guarantees the continuity of traditional territories and the supply of organic food to the regional agri-food system. Political alliances to put pressure on the government and demand territorial justice for black peasant communities are important strategies to reduce violence against communities in the Matopiba frontier. Finally, this article highlights the importance of maintaining and enhancing the capacity of communities to use technological tools as these can be instruments of resistance and criminal denunciation in areas that have been historically subjected to significant violence.

Notes

- * We thank Máira Vale for the translation of this article from Portuguese into English. We would also like to thank the communities and the CPT (Pastoral Land Commission) who trusted in our work and accepted our partnership. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) through Edital 21/2018 PROCAD AM.
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- 4 As a result of the territorialisation process of agribusiness in the northern Brazilian Cerrado region since 1980, Matopiba is an area composed of geographical parts of four Brazilian

- provinces (Maranhão, Tocantins, Piauí, and Bahia) whose initials form the acronym that names this region.
- 5 The national and international press also denounce the relationship between criminal fire and agribusiness (Hughes on BBC 2019; Symonds in *The New York Times* 2019; Alessi in *El País* 2021; Ennes on *Mongabay* 2021).
 - 6 See **Pesquisas webpage** on the Observatório Matopiba website.
 - 7 See the 'Bolsonaro effect on agribusiness', whereby the president is applauded by agrobusiness people because he listened to their historical claims (Matopiba Agro n.d.).
 - 8 Data published in 2019 shows an increase of 48 per cent in fires in the Matopiba area to after the beginning of Bolsonaro's presidential mandate in 2018. To access this data, see Freitas Paes (2019).
 - 9 Agro é Fogo is an alliance of movements and organisations that have been campaigning for decades for human rights in the Amazon, the Cerrado, and the Pantanal, as well as for the rights of the peoples and communities living there. The alliance was formed in response to the forest fires that have devastated Brazil over the last two years. To access their studies, maps, and analyses, see the **Agro é Fogo website**. Juliana Ennes (2021) translated the name of the platform as 'Agribusiness Means Fire'.
 - 10 The Pastoral Land Commission (CPT) is an institution affiliated to the Catholic Church and founded in 1975. The institution helps rural communities in conflict situations, supports their political organisation, and denounces human rights violations. The CPT publishes an annual report, *Conflito no Campo* [*Conflict in the Countryside*], to register violent incidents against rural workers over the course of a year.
 - 11 The Fundação Cultural Palmares (FCP) is a federal agency that promotes the 'identification of the remaining *quilombolas* communities and carries out the recognition, delimitation and demarcation of their occupied lands and assures them the title deed' (Brazil 1988: Art. 2º). The FCP is a very important institution, created 100 years after the abolition of slavery in Brazil, which took place without any guarantee of rights for the black population. The presence of the *quilombolas*, for example, was only officially taken into account in the 1988 Federal Constitution, which established it as a state duty to guarantee property titles to these populations (Brazil 1988: Art. 68), issued by another federal agency called the National Institute for Colonization and Agrarian Reform (Instituto Nacional de Colonização e Reforma Agrária, INCRA).
 - 12 The fire in Glebá Tauá was started on 4 July 2020, weeks before the designated 'fire day'. On 10 August 2020, farmers and Bolsonaro's supporters, in an orchestrated effort, increased the range of the fire in the Amazon by 300 per cent in a single day. In Quilombo Grotão, the fire was started two weeks later, on 29 August.

- 13 For more information about Neuzá-UFNT, see **Núcleo de Pesquisa e Extensão em Saberes e Práticas Agroecológicas website**.
- 14 QGIS 3.14 software is material created on GIS capable of capturing, storing, manipulating, analysing, and presenting the collected data, as well as creating a spatial view with maps (Carvalho, Pina and Santos 2000).

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