

SOCIAL CARTOGRAPHY OF ENVIRONMENTAL INJUSTICE IN CHAPADA DO APODI, CEARÁ

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Abstract

Chapada do Apodi, in the state of Ceará, is an expansion area for cotton agribusiness, producing environmental injustice against peasant communities. The study reveals the potential of social maps created through participatory mapping to expose environmental injustice caused by agribusiness. The research aims to demonstrate the environmental injustice triggered by the territorialization of agribusiness in the region through social cartography. A qualitative approach, participatory research, and social cartography are the core procedures for the investigation. The results show that it was possible to demonstrate increased deforestation, areas with a "smell of poison," the incorporation of former goat breeding areas, the deactivation of apiaries and bee deaths, the destruction of social technologies, and the possible contamination of storage tanks for household water. Furthermore, it is evident that environmental injustice can be revealed through participatory mapping processes based on social cartography.

Keywords: Social cartography; Environmental injustice; Agribusiness; Chapada do Apodi.

Resumo / Resumen

CARTOGRAFIA SOCIAL DA INJUSTIÇA AMBIENTAL NA CHAPADA DO APODI, CEARÁ

A Chapada do Apodi, no Ceará, se constitui como uma área de expansão do agronegócio do algodão, que tem produzido processos de injustiça ambiental sobre comunidades camponesas. Através deste estudo, tenciona-se a potencialidade dos mapas sociais, produzidos a partir de mapeamento participativo, revelarem a injustiça ambiental ocasionada pelo agronegócio. Nesse sentido, pretende-se evidenciar, por meio da cartografia social, a injustiça ambiental deflagrada pela territorialização do agronegócio na região. Para isto, partiu-se de uma abordagem qualitativa mediante a pesquisa participativa, tendo na cartografia social um procedimento central para a investigação. Através dos mapas sociais produzidos, foi possível demonstrar o desmatamento ampliado, as áreas com registro de "cheiro de veneno", a incorporação de antigas áreas de criação de caprinos, a desativação de apiários e mortandade de abelha, a destruição de tecnologias sociais e a possível contaminação das cisternas de placas. Adicionalmente, percebeu-se que a injustiça ambiental pode ser revelada por processos de mapeamento participativo, pautados na cartografia social.

Palavras-chave: Cartografia social; Injustiça ambiental; Agronegócio; Chapada do Apodi.

CARTOGRAFÍA SOCIAL DE LA INJUSTICIA AMBIENTAL EN CHAPADA DO APODI, CEARÁ

Chapada do Apodi, en Ceará, es una zona de expansión de la agroindustria algodonera, que ha producido procesos de injusticia ambiental contra las comunidades campesinas. A través del estudio se pretende conocer el potencial de los mapas sociales, elaborados a través de mapeo participativo, para revelar la injusticia ambiental causada por los agronegocios. En este sentido, el presente estudio pretende visibilizar, a través de la cartografía social, la injusticia ambiental desencadenada por la territorialización de los agronegocios en la región. Para lograrlo, partimos de un enfoque cualitativo a través de la investigación participativa, con la cartografía social como procedimiento central de la investigación. A través de los mapas sociales elaborados se pudo evidenciar el aumento de la deforestación, áreas con "olor a veneno", la incorporación de antiguos criaderos de cabras, la desactivación de apiarios y muertes de abejas, la destrucción de tecnologías sociales y la posible contaminación de depósitos de placas. Además, se comprendió que la injusticia ambiental puede revelarse a través de procesos de mapeo participativo, basados en la cartografía social.

Palabras-clave: Palabras-clave: Cartografía social; Injusticia ambiental; Agronegocios; Chapada do Apodi.

INTRODUCTION

In recent decades, Chapada do Apodi has become a breeding locus for agribusiness in the state of Ceará, emphasizing irrigated fruit growing (CAVALCANTE, 2019). However, in the past few years, the southern portion of this territory, which had not experienced the effects of the territorialization of agribusiness, is feeling the negative repercussions of this production model, now linked to the cultivation of transgenic cotton (CAVALCANTE, 2021; SOUSA, 2023), causing scenarios of environmental injustice (FREITAS; BARCELLOS; PORTO, 2004; ACSELRAD; MELLO; BEZERRA, 2009; PORTO, 2012; SOUZA, 2019).

Since 2018, this process has been put into practice by Nova Agro Agropecuária LTDA, a large cotton agribusiness company that provides the raw material for the production of fabrics to one of Brazil's largest textile businesses, Santana Textiles S/A (MELO, 2019). The state supports this private initiative with financing, technical assistance, granting of water use grants, and environmental licensing (SOUSA, 2023).

Owing to the territorialization of the cotton agribusiness in Chapada do Apodi, peasants perceive environmental injustice due to the aggressive incorporation of new land, accelerated deforestation, intensive-dependent use of pesticides and transgenics, and intense pressure on nature, all characteristics found in neo-extractivist agricultural activities (SVAMPA, 2019). However, this dynamic has not occurred without resistance from individuals affected by agribusiness. Through partnerships and cooperation with civil society organizations, social movements, research groups, legal advisors, and collective health institutions, peasants have mobilized resistance to the expansion of agribusiness in the region.

As a result of this cooperation to defend the territories for a life free of pesticides, a series of social maps were produced with the peasants using participatory mapping or social cartography. According to Gorayeb, Meireles, and Silva (2015) and Acselrad and Viégas (2022), this involves the appropriation of mapping techniques by social groups historically excluded from decision-making about their territory, valuing popular, symbolic, and cultural knowledge and making the unjust and perverse dynamics produced by hegemonic subjects or groups visible.

Thus, social cartography and its most visible product, the social map, are fundamental instruments for evidencing and denouncing environmental injustice in a given population and territory since, according to Joliveau (2008), social maps make phenomena more understandable. Therefore, the question is how social maps, produced through participatory mapping, can reveal the environmental injustice caused by agribusiness. Accordingly, the present study aims to highlight, through social cartography, the processes of environmental injustice triggered by the territorialization of cotton agribusiness in Chapada do Apodi in Tabuleiro do Norte-CE.

METHODOLOGY

This work has a qualitative methodological design based on the principles of participatory research (BRANDÃO, 1999) and sensitive science (PORTO, 2012; RIGOTTO; LEÃO; MELO, 2018). It persistently seeks to re-signify objects as subjects, guide the complexity inherent in problems, recognize nature's restrictions, and acknowledge scientific knowledge's limitations and uncertainties (PORTO, 2012). At the same time, participatory research assumes that "something about life, society or culture is only known in depth, when through a personal involvement – in some cases, a commitment – between the researcher and that, or the one, under investigation" (BRANDÃO, 1999, p. 8).

In this sense, a survey and bibliographic review of environmental injustice processes was carried out to broaden the understanding of the repercussions of agribusiness on peasant territories in Chapada do Apodi. Subsequently, five field studies were carried out between 2022 and 2023. The highlight was a 15-day field trip when researchers were immersed in the territory, aiming to learn about peasant daily life in the face of agribusiness expansion in the region, conduct semi-structured interviews with peasants, and produce the social cartography of peasant territories and agribusiness territories (FERNANDES, 2008).

A total of 20 semi-structured interviews were carried out with "key informants" (SOUZA; PESSÔA, 2013), which included leaders of community associations, directly impacted peasants and representatives of civil society organizations, with emphasis on Caritas Diocesana de Limoeiro do Norte and Fundação de Educação e Defesa do Meio Ambiente do Vale do Jaguaribe (FEMAJE). Ten peasants participated in the social cartography and undoubtedly had an accurate knowledge of the territory impacted by the agribusiness company.

It is taken as given that mapping processes are permeated with power relations (SANTOS; SILVA, 2015; MEIRELES et al., 2018; TETAMANTI, 2018; ACSELRAD; VIÉGAS, 2022), which determine what is visible or hidden, depending on the mapping subjects' interests. Agricultural enterprises' target territories tend to be considered "empty spaces" and "unproductive" (RIGOTTO, 2012). These notions are printed on the maps produced by these hegemonic actors. On the other hand, when handled and mobilized by the subjects affected by agribusiness' territorialization, social cartography contributes to the promotion of health and environmental justice, as it evidences dynamics that, as shown by Aguiar and Rigotto (2021), can produce negative repercussions on the health of those affected. Therefore, social maps, products of participatory mapping, are strategic instruments for demands and confrontation (MEIRELES et al., 2018).

Given the role of social cartography in "vulnerable contexts," where risks are aggravated by social vulnerabilities that allow the social (re)production of populations, productive sectors and territories vulnerable to hazards (PORTO, 2012, p. 44) triggered by the promotion of environmental injustice processes, Table 1 shows the participatory mapping procedures adopted.

Steps	Detailing
Collective planning	Participatory mapping work was planned with peasants and members of social organizations. What would be mapped, what kind of social maps would be generated, and what they would show was decided.
Field	The collection of georeferenced primary data carried out with peasants through the C7 Campeiro mobile application served as the basis for constructing the next stage.
Google Earth Cartography	With the georeferenced primary data in hand and the peasants' supervision, the polygons and points were vectorized, with subsequent construction of the initial maps in the Google Earth software.
Validation of social cartography with communities	We set out to validate the material produced collectively with the communities. The preliminary results of the mapping and required changes in the Google Earth cartographic products were analyzed collectively.
Finalization of social maps	Subsequently, the social maps were finalized using the QGIS 3.16 Hannover software, and all the cartographic elements (title, legend, scale, orientation, symbologies, etc.) were inserted into the maps.
Presentation and delivery of the social maps to the communities	At this stage, the social maps were delivered to communities and civil society organizations to help fight and defend the territory against the injustices produced by the territorialization of agribusiness.
Use of social maps in the processes of struggle	Afterward, printed social maps began to be used by peasants and members of social organizations to make complaints and present them at public hearings, popular assemblies, events, fairs, meetings with parliamentarians, media reports, etc.

Table 1 – Stages of the participatory mapping process. Source: Elaborated by the authors (2024).

Initially, the interviews were transcribed and organized to systematize the data collected. In addition, those social maps that revealed the environmental injustices carried out in Chapada do Apodi were selected to compose the subsequent debate.

In the data analysis stage, the Thematic Content Analysis technique (GOMES, 2016) was adopted, which consists of perceiving "nuclei of meaning" in the reports collected, whose frequency allows interpretations and meanings for the analytical objectives selected by the researcher.

THE STUDY AREA

The Chapada do Apodi is a geological formation composed predominantly of sedimentary rocks on the crystalline basement, leading to groundwater accumulation in the Jandaíra-Açu Aquifer system, which provides water for multiple uses, such as animal watering, human consumption, and irrigation (COGERH, 2009). As it is a flat relief with soils favorable to irrigation (SOUZA et al., 2006), it is an area of interest for agribusiness due to the ease of agricultural mechanization, a process materialized in Tabuleiro do Norte with the territorialization of cotton production and soybean, corn, and sorghum in the off-season (SOUSA, 2023).

However, dozens of families lived in Chapada do Apodi long before agribusiness' arrival, forming several communities, such as those included in the spatial scope of this study: Aroeira D'Água, Baixa do Juazeiro, Curral Velho, Currais de Cima, Lagoa do José Alves, Santo Antônio dos Alves, Santo Estevão, São José do Gerardo, Sítio Ferreira, and Sítio Sabiá (Figure 1), which together have 189 resident families, according to data collected by Limoeiro do Norte's Diocesan Caritas.

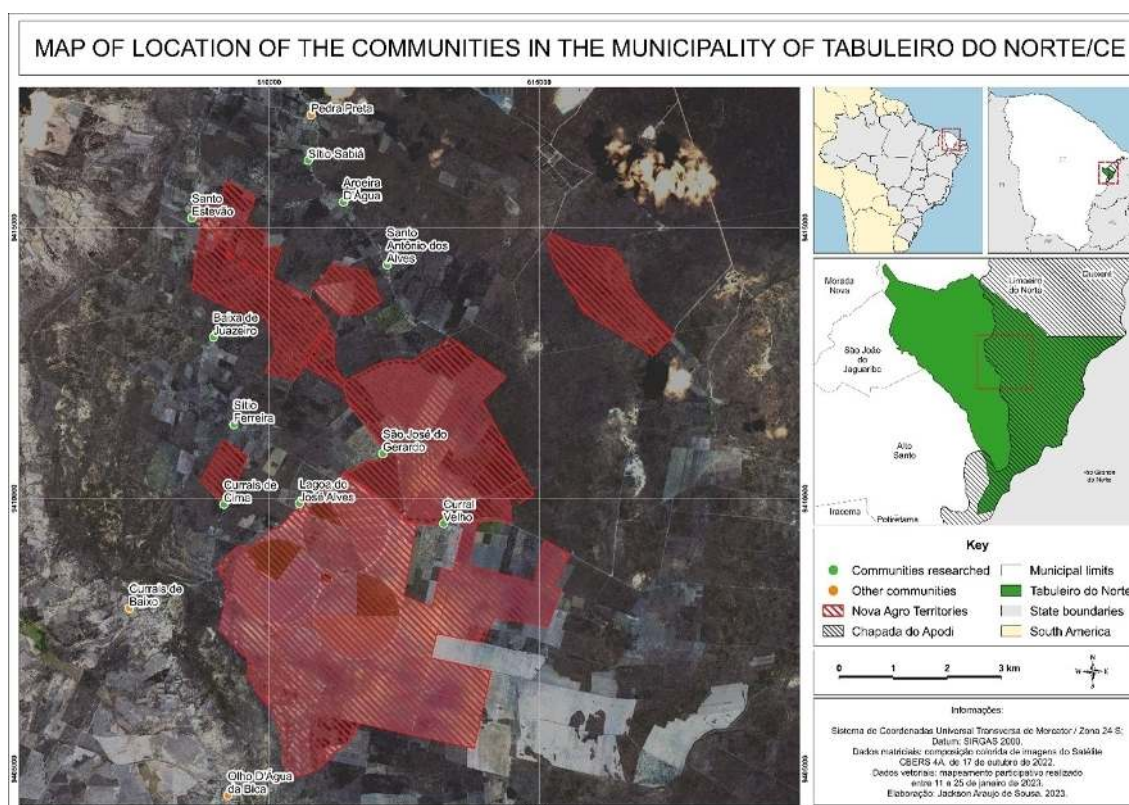


Figure 1 – Location map of the communities surveyed. Source: By the authors (2024).

Based on producing food for personal consumption and selling the surplus, agriculture is the main peasant economic activity in Chapada do Apodi, generating income for families that sell production in solidarity economy circuits (SOUSA, 2023; MAIA, 2023). In addition, Viana Júnior and Lopes (2023) indicate the economic importance of beekeeping for the peasants of Tabuleiro do Norte, who produced about 125 thousand kilos of honey between 2018 and 2021. Goat farming is also an essential source of income since the commercialization of goats increases peasant families' incomes. As we will see throughout this work, the expansion of agribusiness has severely impacted such activities, revealing environmental injustice.

DENY AND EXPOSE: ENVIRONMENTAL INJUSTICE IN AGRIBUSINESS' WAKE

The population does not suffer equally from the perverse effects of human activities. The benefits of various economic sectors are reserved for some, while the tailings are socialized for many, configuring what Porto-Gonçalves (2018) calls the "unequal geography of tailings and profits."

The materialization of this process, interpreted as environmental injustice, results from the installation of mining, agricultural, energy, and industrial activities in the territories, experienced as the exposure of the local population to contaminants and/or the denial of access to the natural goods necessary to maintain life, and may also imply the deepening of these scenarios (FREITAS; BARCELLOS; PORTO, 2004; ACSELRAD; MELLO; BEZERRA, 2009; SOUZA, 2019, 2020). Therefore, environmental injustice is fundamental to understanding the local implications arising from the territorialization of capital enterprises.

In economically and socially unequal societies, environmental injustice is the mechanism that places the heaviest burden of environmental damage from development on the low-income population and those social groups historically discriminated against, such as traditional peoples and communities, working-class neighborhoods, and marginalized and vulnerable populations (FREITAS; BARCELLOS; PORTO, 2004; PORTO, 2012). According to Acselrad, Mello, and Bezerra (2009), such risks are directed at populations with fewer financial, political, and informational resources, forming scenarios of environmental injustice and vulnerable contexts, according to Porto (2012).

These elements allow us to understand the population most affected by environmental injustice. In the territories, this portion of the population suffers from the territorialization of economic activities through exposure and (lack of) access to those natural goods required to maintain life, as Souza (2019) explains. For this author, environmental injustice refers to:

[...] any process in which the possible harms arising from exploiting and using resources and generating undesirable waste are asymmetrically socio-spatially distributed due to class cleavages and other social hierarchies. To this, we must also add the inequality in exposure to risks derived from hegemonic models of spatial organization (as illustrated by the strong correlation between residential segregation and landslides) and in the ability to access environmental resources and enjoy natural amenities, due to class cleavages and other social hierarchies (SOUZA, 2019, p. 130, emphasis added).

Thus, in unequal societies, environmental injustice is a dimension of social injustice, observed and understood from the environmental analysis of reality (ACSELRAD; MELLO; BEZERRA, 2009; SOUZA, 2019). By framing mining as neoextractivism, understood as the set of economic activities that exploit nature, destroy biodiversity, concentrate land, consume much water, and expel traditional communities from their territories in order to obtain profit through the sale and export of commodities, agribusiness imposes environmental injustice processes on territories (SVAMPA, 2019).

Contact with pesticides widely used by agribusiness is responsible for the emergence of diseases directly associated with these dangerous products. Rigotto, Santos, and Costa (2022) identified this phenomenon when they realized that interaction with poison increases the chances of acute poisoning and congenital malformations in children under five years whose parents are engaged in chemical-dependent agriculture. In a study in Chapada do Apodi, Aguiar and Rigotto (2021) identified that the birth of children with congenital malformations or precocious puberty were related to exposure to the pesticides used in irrigated fruit plantations.

In the case of access in Chapada do Apodi, Ferreira et al. (2016) identified an unequal relationship in water management and use, which is prioritized for the demands of agribusiness to the detriment of human consumption needs. In addition, the authors above show that the incessant increase in the use of pesticides in plantations means surface and groundwater contamination, compromising human supply. The case of groundwater is even more revealing of environmental injustice since, in addition to being contaminated due to the intensive-dependent use of pesticides, access depends on a complex technological apparatus that is not available to peasant populations, being feasible only for large economic actors (PORTO-GONÇALVES, 2012).

Social cartography is fundamental in highlighting such processes of environmental injustice since no one knows their reality better than the subjects who suffer daily from the perverse effects of the territorialization of certain dangerous economic activities (ANDRADE; SANTAMARIA, 1997). As explained below, we will seek to elucidate these dynamics from social maps.

SOCIAL CARTOGRAPHY UNVEILING ENVIRONMENTAL INJUSTICE

The negative repercussions derived from the territorialization of the agribusiness production model are revealed in the territorial context closest to agricultural enterprises. This scenario can be identified through the perception of environmental risks, according to Porto (2012), which occurs when the locations close to the hazard generators are the ones that suffer the most from the perverse results of the production processes, even if they are not, in any sense, benefited. It is precisely the production of these vulnerable contexts that gives environmental injustice content.

The peasants who have lived for decades in Chapada do Apodi, Tabuleiro do Norte are the subjects who suffer most from the intensification of the blocked right of access to natural goods and, dramatically, exposure to contaminants, notably pesticides. Given this, it is salutary to use social cartography to highlight the risks to which the territories are exposed.

The map of land uses by Nova Agro (Figure 2) shows the territories dominated by agribusiness in Chapada do Apodi, as well as the uses that have been made of these lands. The territorialization of agricultural companies inevitably implies the intensive exploitation of the soil, accompanied by excessive deforestation to plant crops, which in the present cut is a cotton monoculture, with intensive use of land, water, and pesticides.

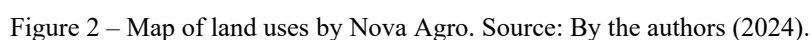
Removing vegetation cover has occurred in areas with agricultural production and, more currently, in deforested areas (Figure 2). aggressive techniques, such as tractor and chain, are always used. The latter is a long chain whose ends are coupled to two tractors that when in motion, destroy the vegetation and result in the elimination of the fauna, as "it is not possible for the animals to leave, it is faster" (Discourse of peasant interviewee in January 2023).

Social cartography maps the size of the cotton agribusiness in Chapada do Apodi, which has incorporated 4,311.5 hectares into its lands. Of these, approximately 1,862 hectares are areas under deforestation, 2,067 hectares are under production, and the company does not yet use 382.5 hectares. It is important to note that as the company incorporates former peasant territories into its domains, there is a gradual homogenization of these lands, which initially undergo an aggressive deforestation process for later agricultural cultivation.

As stated by Cavalcante (2019), by appropriating these spaces and exercising almost unrestricted control of the territory, capital mobilizes the land according to its needs, giving rise to direct clashes with peasant communities.

As a result of Nova Agro's territorialization in Chapada do Apodi, peasant communities are surrounded by agribusiness territories (Figure 3), leading to a scenario of exposure to environmental risks. Consequently, given that the negative consequences of agribusiness are approaching daily, the peasant's lives are full of uncertainty about the future, making them consider the possibility of moving somewhere else: "[...] I will have to leave, right, because I will not stay inside a dusty and poisonous catinga" (Discourse of peasant interviewee in January 2023).

More immediately, the community of Curral Velho suffers daily from this enclosure, as evidenced by the location of the company's farms to the north, south, east, and west (Figure 3). In addition, this community has become an example of what may happen to other communities that are further from the farms, demonstrating what Porto (2012) and Rigotto et al. (2018) define as "psychological suffering." Peasants unaffected until now develop anxiety, anguish, and fear before the possibility of having to leave their places of residence and work in the future. This suffering is revealed in the speech of one of the peasants interviewed: "[...] the greatest feeling we have just hearing about it is fear, at least me, my feeling is fear, fear of having to leave what is mine, to leave here that we like to live, to look for another corner" (Discourse of peasant interviewee in January 2023).



The chemical-dependent agribusiness production model affects other aspects of life, such as environmental and economic dimensions. The map of the apiaries and areas of Nova Agro (Figure 4) shows the impacts on one of the main economic activities in Chapada do Apodi: organic honey production. With the expansion and territorialization of agribusiness, rampant land acquisition and intensive pesticide use mean that many apiaries formerly located in what are now Nova Agro's farms had to be deactivated or transferred to other locations.

Even the apiaries located in peasant territories but close to the firm's production areas were impacted to the point that bee mortality was recorded in two of these apiaries. In research on beekeeping in Chapada do Apodi, Viana Júnior and Lopes (2023) show that of the 100 beekeepers who participated in the investigation, 38 reported the loss of honey production and/or death of bees, a fact that is strongly correlated with the company's arrival. According to the authors mentioned above, these economic impacts (on honey production) and environmental impacts (on bee mortality) are related to the increase in areas under deforestation and the intensive use of pesticides by the company, as also verified in Sousa (2023).

Taking analysis reports issued by the Oswaldo Cruz Foundation (Fiocruz) on the existence of pesticides in samples of dead bees in apiaries near the Nova Agro farm as a reference, Viana Júnior and Lopes (2023) confirm that there is a correspondence between the type of poisons used by the company with those found in the bees. Types of bee poisons that are not included in the Nova Agro Environmental Regularization Plan were identified, and 100% of the samples found the pesticides carbofuran and fipronil, which are harmful to bees. Such evidence, in addition to the spatial proximity shown in social cartography, allows the inference that the dimension of exposure to environmental injustice processes has been imposed on nature and peasant territories, resulting from the advance of agribusiness.

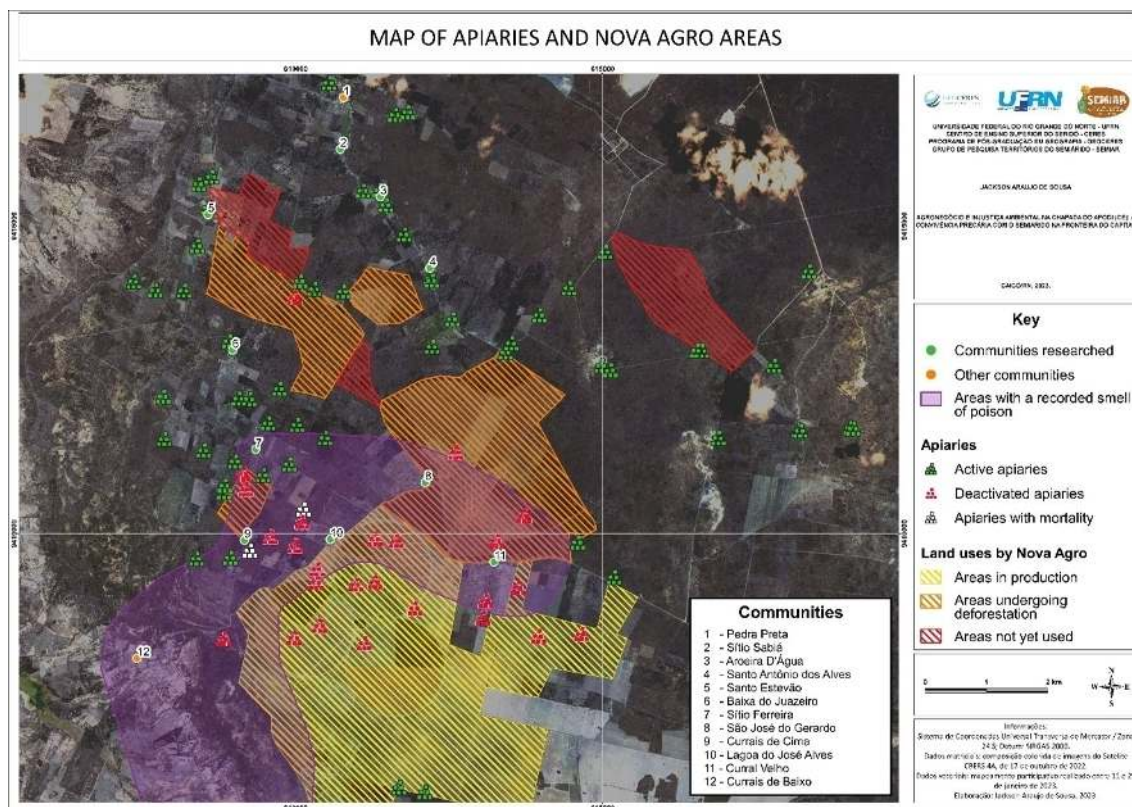


Figure 4 – Map of apiaries and Nova Agro areas. Source: By the authors (2024).

Evidence of the proximity of apiaries to areas under deforestation is shown in the following map (Figure 5). Fata, Chaves, and Nodri (2021) warn that deforestation, followed by monoculture planting,

affects bees by dramatically decreasing plant diversity and, consequently, their source of trophic resources. For the authors:

If, on the one hand, deforestation reduces the bees' habitat, then monoculture, conducted in an industrial or chemical agricultural system, reduces the diversity of bee pasture in most areas of large properties. Thus, forest fragments and small properties remain when several varieties of species are cultivated as a source of food for bees (FAITA; CHAVES; NODARI, 2021, p. 84).

Therefore, the scenario in the map in Figure 5 is apparent in several other apiaries, which have faced decreased honey production, bee mortality (VIANA JÚNIOR; LOPES, 2023), or even the deactivation of apiaries due to the proximity to deforested areas or Nova Agro production areas.

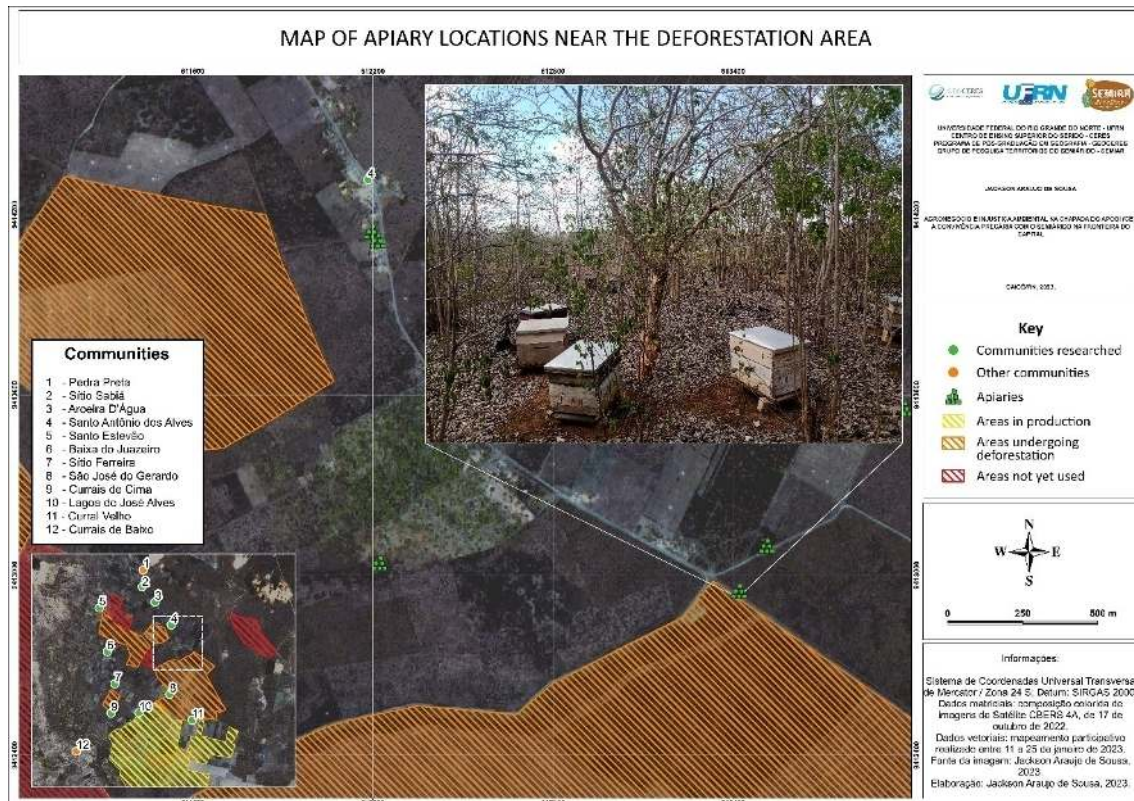


Figure 5 – Map of apiary locations near the deforestation area. Source: the authors (2024).

Figure 6 also reveals the detrimental result of agribusiness on life in Chapada do Apodi, involving environmental injustice processes. It is possible to perceive several aspects of the peasant way of life in the semi-arid region being affected by Nova Agro's expansion, including the destruction and possible contamination of cisterns and the deactivation of apiaries and bee mortality. Furthermore, the enclosure or incorporation of collective goat breeding areas, known as loose lands, that the peasants recognize as lands that have an owner, but as they are not fenced, are "loose," being available for collective use. This whole dynamic is closely linked to the expansion of land concentration and the company's productive dynamics.

Thus, the expansion of agribusiness has destroyed coexistence with the semi-arid region, understood as the "ability to sustainably use natural and cultural potential in productive activities appropriate to the environment" (SILVA, 2008, p. 194).

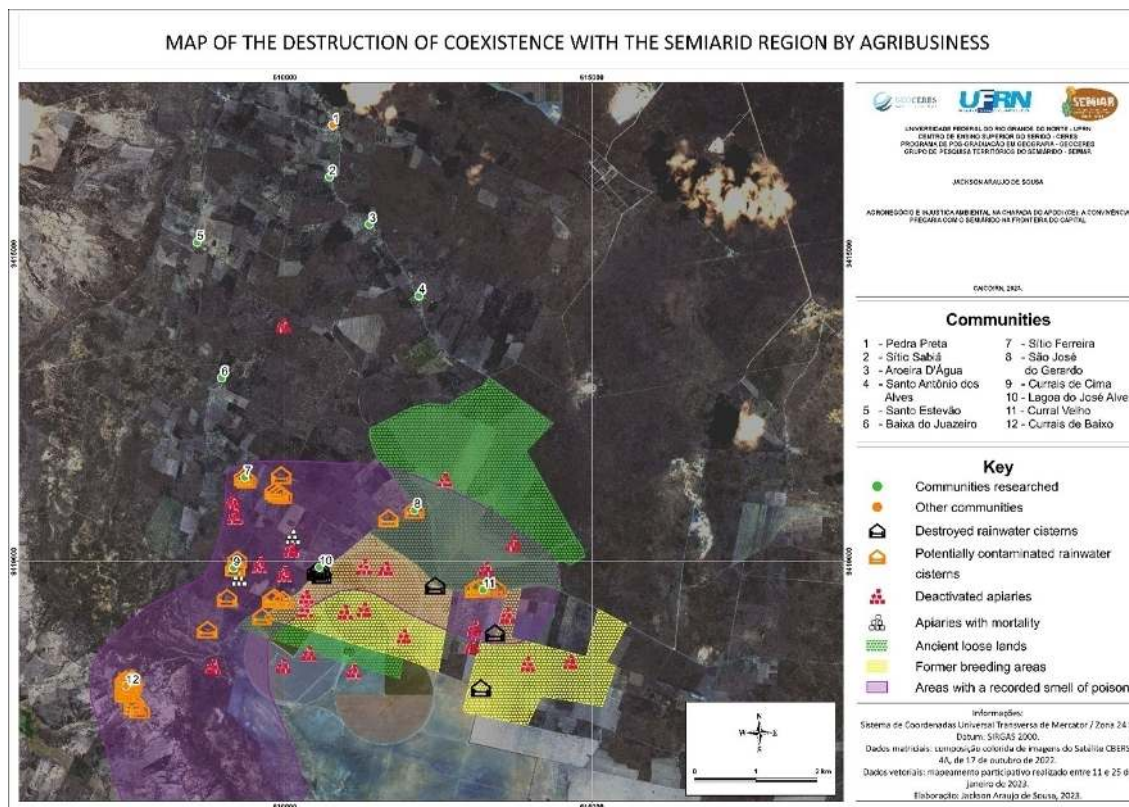


Figure 6 – Map of the destruction of coexistence with the semi-arid region by agribusiness. Source: By the authors (2024).

The maps of the destruction of the coexistence with the Semi-arid (Figure 6) and the location of the destroyed cisterns (Figure 7) reveal how agribusiness has produced destructive and perverse dynamics in nature and society. As Sousa (2023) shows, social technologies have permitted the democratization of access to water, which has historically been denied to the peasants of Chapada do Apodi. However, as the author also shows, agribusiness has destroyed these achievements, resulting from decades of struggle for public policies that improve water and food security.

The proximity to agricultural areas that use pesticides intensively entails a problem for water springs, which run a dramatic risk of being contaminated by the poison, as shown by Pignati (2016). Given this reality, it is inferred that the proximity of plate cisterns, and consequently, houses and their roofs that collect rainwater, are threatened by pesticide contamination from cotton, soybean, corn, and sorghum plantations.

Thus, it is evident that agribusiness has produced environmental injustice processes in Chapada do Apodi by exposing the population and nature to contaminants and intensifying the denial of the right of access to natural goods necessary for maintaining life. Therefore, agribusiness gradually destroys coexistence with the semi-arid region by producing environmental injustice, given the incompatibility of these two models.

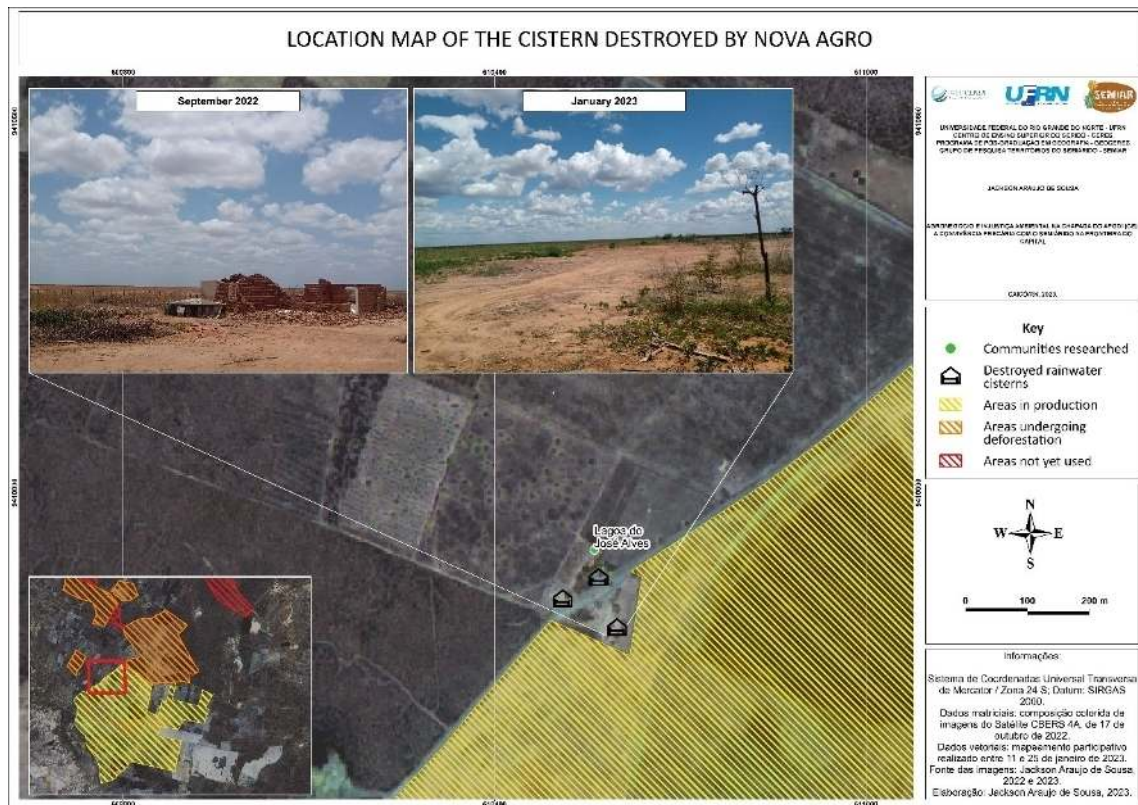


Figure 7 – Location map of the cistern destroyed by Nova Agro. Source: By the authors (2024)

CONCLUSION

Given the above, social cartography shows how environmental injustice has produced scenarios of uncertainty and fear for the peasants of Chapada do Apodi in Tabuleiro do Norte-CE. The social maps produced highlighted the expanded deforestation, areas with a record of a "small of poison," the incorporation of old individual and collective breeding areas, the deactivation of apiaries, the death of bees, the destruction of social technologies, and the possible contamination of plate cisterns.

As an instrument of visibility of the territories and the affirmation of the mapping subjects' identities, social cartography has the potential to unveil the environmental injustice processes in progress in the territories of traditional peoples and communities since these subjects suffer directly from the perverse results of the territorialization of capitalist enterprises. As a map construction method that proposes to be collective, horizontal, and participatory, social cartography renounces a supposed neutrality and scientific objectivity (TETAMANTI, 2014) since the maps reveal disputes between different representations of space, which are a reflection of territorial conflicts (ACSELRAD; COLI, 2008).

Moreover, it enables social maps to be appropriated by peasants, who use them as instruments of struggle and resistance against the territorialization of agribusiness and to denounce the inequities generated on vulnerable populations. Therefore, the social cartography of environmental injustice asserts itself as an initiative engaged and committed to the emancipation of peoples, fighting to promote health, environmental justice, and coexistence with the semiarid region.

This scenario declares the need for a research agenda that stimulates investigations using social cartography to reveal the environmental injustice produced by neo-extractivist activities. In the semiarid region, such research has the potential to demonstrate how the expansion of agribusiness, mining, and renewable energies limits coexistence in the region since they focus on people's quality of life and the ability to support the environment.

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