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The contradictions of renewable energy in the Brazilian semiarid: the case of environmental injustice produced by solar energy enterprise in the Quilombola Community Pitombeira (Paraíba – Brazil)

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Abstract

The expansion of renewable energy in the Brazilian semiarid region has threatened the territories and territorialities of traditional peoples and communities, aggravating the scenario of environmental injustice. A case study discusses the environmental injustice suffered by the Quilombola Community Pitombeira in Paraíba due to the installation and operation processes of a solar park in its vicinity, seeking to highlight the impacts of this type of energy production. The methodology favored open interviews and conversation circles with residents. The data analysis proves the picture of environmental injustice in which the quilombola community finds itself amidst the cumulative impacts generated by the solar park, destabilizing the ecological balance and limiting life in society.

Keywords: Traditional communities; environmental impacts; territory.

As contradições da energia renovável no Semiárido: o caso da injustiça ambiental produzida por empreendimento de energia solar na Comunidade Quilombola Pitombeira (Paraíba – Brasil)

Resumo

A expansão das energias renováveis no Semiárido tem ameaçado os territórios e as territorialidades de povos e comunidades tradicionais, agravando o cenário de injustiça ambiental. Por meio de um estudo de caso, objetiva-se discutir a injustiça ambiental acometida à comunidade quilombola Pitombeira (na Paraíba), em decorrência dos processos de instalação e operação de um parque solar localizado nas suas proximidades, buscando evidenciar os impactos decorrentes desta modalidade de produção de energia. A

metodologia privilegiou a realização de entrevistas abertas e rodas de conversa com moradores. Com a análise dos dados, comprovou-se o quadro de injustiça ambiental no qual a comunidade quilombola se encontra, em meio a impactos cumulativos gerados pelo parque solar, os quais desestabilizam o equilíbrio ecológico e limitam a vida em sociedade.

Palavras-chave: Comunidades tradicionais; impactos ambientais; território.

Las contradicciones de la energía renovable en el semiárido brasileño: el caso de la injusticia ambiental producida por la empresa de energía solar en la Comunidad Quilombola Pitombeira (Paraíba – Brasil)

Resumen

La expansión de las energías renovables en la región semiárida brasileña ha amenazado los territorios y territorialidades de los pueblos y comunidades tradicionales, agravando el escenario de injusticia ambiental. A través de un estudio de caso, el objetivo es discutir la injusticia ambiental que sufre la comunidad quilombola Pitombeira (Paraíba), como resultado de los procesos de instalación y operación de un parque solar, buscando resaltar los impactos derivados de este tipo de producción de energía. La metodología privilegió entrevistas abiertas y círculos de conversación con los residentes. Con el análisis de los datos se confirmó la situación de injusticia ambiental en la que se encuentra la comunidad quilombola, en medio de impactos acumulativos generados por el parque solar, que desestabilizan el equilibrio ecológico y limitan la vida en sociedad.

Palabras-clave: Comunidades tradicionales; impactos ambientales; territorio.

Introduction

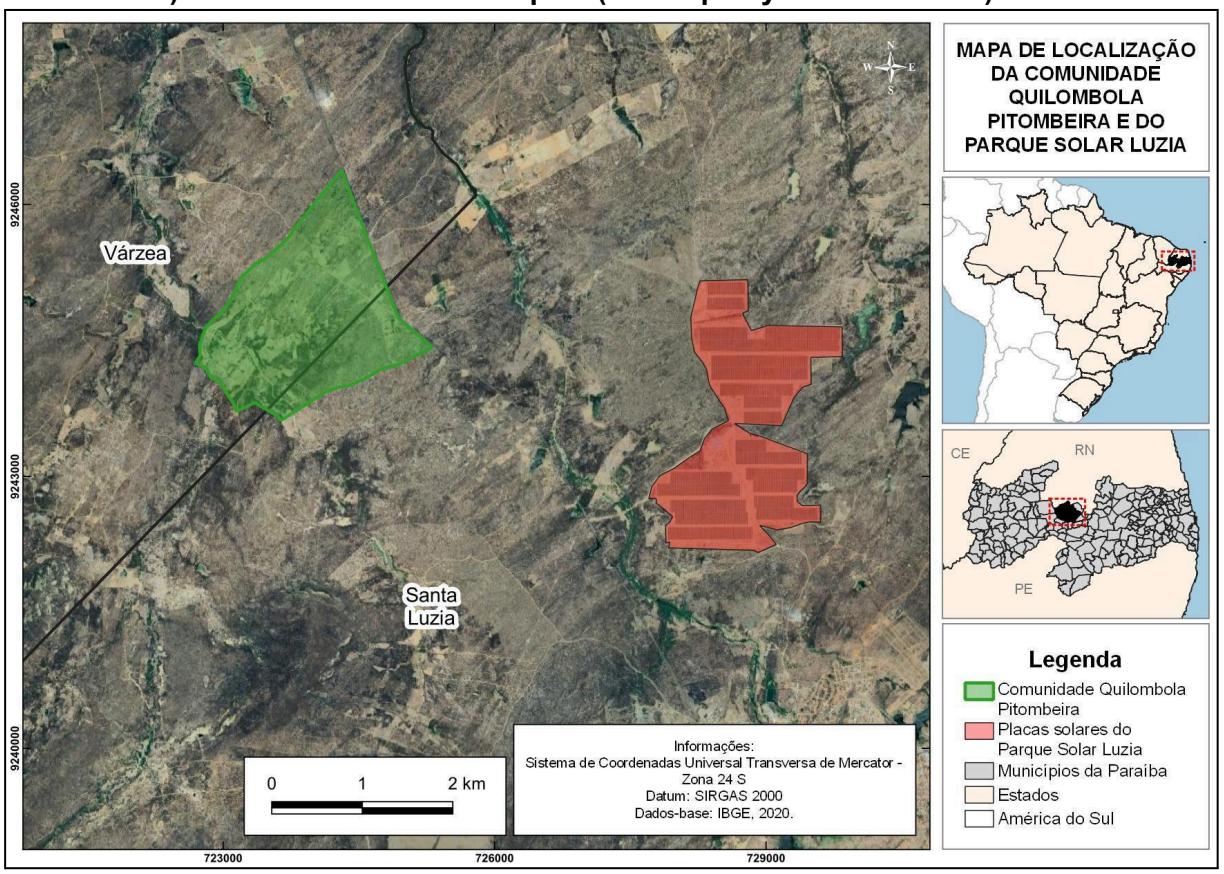
The advance of renewable energies, particularly in the Brazilian semiarid region, has threatened traditional peoples and communities' territories and territorialities as it is based on the destruction of biodiversity, the expansion of land concentration, the aggravation of conflicts over land, and the cession of the right to come and go. These processes limit peasant production practices and deny the right to nature, among others, thus aggravating environmental injustice by exposing the affected population to potential health risks and the continued maintenance of their way of life (Acselrad; Mello; Bezerra, 2009; Porto, 2011; Rigotto *et al.*, 2018; Souza, 2019).

The impacts of the spread of wind energy parks have already been widely identified by the academic community (Traldi, 2019; Gorayeb *et al.*, 2019; Lima, 2022; Maia *et al.*, 2022). In addition, a similar scenario is associated with installing and operating photovoltaic energy parks (solar energy). In any case, they are clear examples of capitalist enterprises that promote "injustices of sustainability," as stated by Porto, Finamore, and Ferreira (2013), in which the hegemonic vision of corporations and government agencies is denounced and confronted by the affected populations.

This context can be observed in numerous traditional communities throughout the semiarid, which lie in the wake of the destruction and evils implemented in the territories by

renewable energy companies (Traldi, 2018; Dantas, 2022; Maia *et al.,* 2022). In this study, we take the case of the Quilombola Pitombeira Community, located in the municipality of Várzea, in the semiarid region of Paraíba. Since 2021, this community has been experiencing the impacts of installing and operating a photovoltaic energy park less than three kilometers from the quilombola territory (Figure 1). This example of environmental injustice is a case study that highlights the problems related to the impacts of renewable energy in the semiarid region.

Figure 1: Location map of the Quilombola Pitombeira Community (municipality of Várzea) and the Luzia Solar Complex (municipality of Santa Luzia) – Paraíba



Source: Elaborated by the authors (2024).

Suffused by relationships based on territorial appropriation, kinship ties, and bonds with the location (Gaudênico, 2018), the Pitombeira rural community is a traditional territory anchored in peasant social reproduction with a claim to quilombola identity (Souza, 2011; Grunewald, 2013), through which they build historically established territorialities and sociabilities. The community consists of 89 resident families occupying a total area of 354 hectares and has been certified as a quilombo by the Palmares Cultural Foundation since 2005. However, its recognition by the National Institute of Colonization and Agrarian Reform

only occurred at the end of 2023, and there is no deadline for the definitive titling of the quilombola territory.

Constituted as a "community of blacks" by Grunewald (2013), Pitombeira can also be defined as a "peasant-quilombola community," where the relationships established with the land have a remarkable centrality. Rainfed agriculture has a substantial prevalence, emphasizing cultivating corn, beans, watermelon, pumpkin, and fava beans for family consumption. There is also goat breeding and bee honey production. Despite this, access to water, basic education, and health services is limited, and there is a lack of opportunities to generate employment and income in the community itself.

In addition to the State's lethargy in ensuring the community's fundamental rights, such as the right to the territory itself and recognition as a quilombola community, Pitombeira residents report a series of social and environmental impacts resulting from the installation and operation of a solar energy park, the Luzia Solar Complex. Works began in 2021, and it was inaugurated in 2023 at a ceremony attended by President Lula da Silva (PT) and state governor João Azevêdo (PSB), among other authorities. At the time, the Minister of Mines and Energy, Alexandre Silveira (PSD), stated that the Northeast has "a true role in Brazil's energy transition" (Agência Brasil, 2023).

The project had an estimated investment of R$3 billion, occupies about 1,700 hectares, and has 228,000 solar panels (Figure 2). This photovoltaic park is operated by the company Neoenergia (of the Spanish Iberdrola group), and its activities are integrated with wind energy parks in the region, being the first hybrid renewable energy production complex authorized in the country by the National Electric Energy Agency (ANEEL). Consequently, the Luzia Solar Complex's power transmission infrastructure will be shared with the Chafariz Wind Complex, also operated by Neoenergia in the municipality of Santa Luzia, with 15 wind farms in operation. The transmission lines built by the company are directed to the Santa Luzia substation, which is responsible for transmitting the energy generated in the parks, as reported by the Portal Correio news agency (2023).

Figure 2: Partial panorama of the Luzia Solar Complex (Santa Luzia – Paraíba)

Source: Salesmydon Izidro, 2022. Available in Google Docs.

According to information released by Neoenergia (2023), the Luzia Solar Complex aims to generate enough energy to supply more than 100,000 homes, with an installed capacity of 149.3 MWp, making it one of the largest in the country. According to data from ANEEL (2024), the Luzia Solar Complex, formed by two parks (Luzia 2 and Luzia 3), has been granted a total of 117,864.00 kW of power. This is Neoenergia's first venture in large-scale centralized photovoltaic generation, whose production is destined for the Free Contracting Environment (ACL). Notably, Neoenergia S.A. is already one of the largest companies in the electricity sector operating in Brazil, whose operations are associated with the multinational Iberdrola, self-styled as a "world leader in renewable energy" and has operations registered on all continents (Iberdrola, 2023).

It is inferred that in addition to this project, the Santa Luzia Solar Complex, under the responsibility of the Rio Alto company, is also being installed in the municipality of Santa Luzia – a complex that will have 28 photovoltaic plants distributed over approximately 3,600 hectares. Thus, the Neoenergia park has been installed to the east of the Pitombeira community, and the Rio Alto company park will operate to the south, aggravating the impacts. Santa Luzia has become a locus of renewable energy production, principally threatening the territories and territorialities of quilombola communities, especially the Talhado Quilombola Community, surrounded by wind farms (Alves, 2023), and the Pitombeira Quilombola Community, in the neighboring municipality of Várzea, bordered by solar power plants.

Therefore, this study aims to discuss the context of environmental injustice affecting the Quilombola Pitombeira Community due to the installation and operation of the photovoltaic park located near this traditional territory, focusing on the Luzia Solar Complex. The intent is to highlight the impacts of this energy production mode, which, far from being

sustainable, worsens the population's social vulnerability and overloads environmental systems. A case study is used to reveal the contradictory scenario of the expansion of renewable energies in the semiarid region.

Methodology

The first step of the methodology, in 2023, was to hold a conversation circle with leaders of the Quilombola Pitombeira Community, employing sensitive listening (Barbier, 1998) to form a preliminary diagnosis of the scenario of environmental injustice. Additionally, the Luzia Solar Complex facilities were visited to understand the size of the project. Subsequently, fieldwork was conducted in the community to learn about the areas impacted by the installation of the solar park, and open interviews were conducted with the affected residents who had reported the problems.

Subsequently, in 2024, a new conversation circle was held to discuss the problems raised by the participating group. As a participatory methodology, which values the dialogical process based on the dialogue of knowledge, Méllo *et al.* (2007, p. 30) argue that conversation circles foster discussions around a central theme, giving visibility to everyday practices and allowing "a greater exchange of information, enabling fluidity of discourses." The conversation circle was also an instrument of debate among the community about the different impacts of the installation and operation of the solar farm.

Leaders of the quilombola community and residents directly impacted by the project participated in the conversation circle. The debate was guided by issues related to these impacts and the perception of risk and environmental suffering (Porto; Finamore, 2012), focusing on the design, installation, and operation stages of the solar plant, according to the methodology adopted by Rigotto *et al.* (2018), to comprehend the different dimensions and scales pointed out by the community concerning environmental injustice processes. Subsequently, the quilombolas utterances were transcribed and analyzed according to the project's installation and operation stages.

The research respected the ethical protocols agreed upon with the community by establishing a dialogue with the Pitombeira Quilombola Community Association leaders, representing quilombola residents. In addition, consent was given for photographic records and audio recordings of the conversation circles, provided that the subjects' identities would be withheld when the excerpts of the speeches, which are part of the article, were published. The publication of this work is expected to amplify the scope of the complaints reported by the community, as is already the case of reports published in the media, especially an article in the *Folha de São Paulo* (2024).

Environmental injustice and renewable energy

Environmental injustice is understood as the imposition or deepening of degrading conditions on the lives of affected populations, either through exposure to contaminants, such as pesticides and metal particles, or the generation and deepening of the denial of the right of access to natural goods necessary for the maintenance of life, notably water, whether in quantity or quality (Acselrad; Herculano; Pádua, 2004; Acselrad; Mello; Bezerra, 2009; Souza, 2019). Such processes materialize due to the territorialization of economic activities that explore or transform nature, such as mining, agribusiness (Rigotto et al., 2018; Svampa, 2019), and industry (Freitas; Barcellos; Porto, 2004; Silva, 2012; Tavares, 2022).

Environmental injustice, mainly due to activities based on the exploitation of natural assets and the plunder of territories, or even actions that imply a profound change in people's ways of life, is considered to negatively affect the ecological balance and life in society, subjecting low-income communities and ethnic minorities to disproportionate amounts of environmental and social pressure (Acselrad; Herculano; Pádua, 2004; Acselrad; Mello; Bezerra, 2009; Rigotto, *et al.,* 2018; Whyte, 2018; Souza, 2019). According to Vaz, Anthony, and McHenry (2017), environmental injustice incorporates many elements, such as economic externalities, unequal political power relations, and unequal influence of certain groups on land use decisions, which function as strategies to benefit certain restricted social groups, to the detriment of others.

As the environmental expression of social injustice (Acselrad; Mello; Bezerra, 2009; Souza, 2019), a striking economic and social characteristic of unequal societies, such as Brazilian society (Freitas; Barcellos; Porto, 2004), environmental injustice processes affect the spaces chosen for the installation of economic enterprises turning them into "sacrifice zones" (Souza, 2019). The lack of adequate urban infrastructure and services verified in vulnerable areas in Brazilian cities should be integrated into the scope of environmental injustice cases (Cartier *et al.*, 2009).

When these environmental injustice processes affect a mostly racialized population, as in quilombola communities, environmental injustice can be qualified as environmental racism (Herculano, 2006; Acselrad; Mello; Bezerra, 2009; Silva, 2012; Souza, 2019). Thus, in the context of economically, politically, and socially unequal societies, in which the environmental damages of development racially discriminate against poor populations or groups (Silva, 2012), environmental racism is an inherent dimension of the production and aggravation of environmental injustice.

The dynamics involving the performance of a given enterprise, from the conception phase to installation and effective operation, produce processes derived from environmental

injustice, revealed in the environmental suffering of the affected populations. Auyero and Swistun (2009) explain that this specific type of suffering is triggered by the territorialization of economic activities that exploit nature, which directly affect traditional peoples and communities, resulting in different types of "discomforts that can harm the physical and/or mental health of individuals, from contamination in various environments – water, air, and soil" (Tavares, 2022, p. 62).

Thus, as an aggravating factor of environmental injustice, environmental suffering affects the physical dimension of people's bodies, related to suffering due to diseases and illnesses resulting from contact with contaminants and to the psychological dimension, linked to the feelings of fear, anguish, anxiety, and depression that affect populations (Souza, 2019). Although specific types of environmental suffering can be identified, as Porto (2012) warns, it is noteworthy that it is impossible to separate biological effects from those of a psychic and subjective nature since human beings have an integrated socio-bio-psychic nature.

Environmental injustice processes in the countryside are commonly produced by neo-extractivist activities. These large-scale economic initiatives exploit nature with the ultimate purpose of producing raw materials/*commodities* mainly for export, such as mining and agribusiness, with negative repercussions on natural assets and the territories of traditional peoples and communities (Svampa, 2019). Moreover, the production of renewable energy can also be inserted in the context of neo-extractivist activities, as when installed in the territories, the projects produce processes that can be interpreted as environmental injustice since they directly affect the nature and living conditions of the communities located in the exploration areas and their surroundings.

The process triggered by renewable energy projects is effective because it is led by corporate interests, which do not involve substantial changes to solve the central problems of contemporary socio-ecological collapse since there is no concern about the profound inequality in the distribution of energy resources (Svampa, 2023). The expansion of economic activities that produce renewable energy has repercussions not only in installation and operation locations, but also when installing photovoltaic panels or wind energy towers. When extracting the mineral raw materials (lithium, cobalt, copper, and aluminum, for example) for the production of components such as batteries, cables, wiring, and photovoltaic panels, the impacts and processes of environmental injustice are similar to those verified in extraction areas of other ores, such as iron (Bringel; Svampa, 2023; Wanderley; Leão, 2023).

Therefore, the advance of renewable energies announces a renewal in the debate on the agrarian issue (Maia *et al.,* 2024; Fernandes *et al.*, 2024) by inserting other agendas

on the current agenda, including new land uses in the context of wind and solar parks, land leasing, private appropriation of natural assets, and the land market associated with the energy transition. This denotes an intrinsic relationship between agrarian, environmental, and climate issues, as has been defended by authors such as Moore (2008, 2022), Akram-Jodhi and Kay (2010), Porto-Gonçalves (2016), Krenak (2020), Santos (2023), Sauer (2024) and Gradón, Vasconcelos, and Smolski (2024).

Consequently, expanding renewable energy projects, especially wind and solar, has vast potential to generate and aggravate environmental injustice. This is especially the case when parks are installed in territories historically occupied by traditional peoples and communities. The Brazilian semiarid region is remarkably central in the context of the territorialization of renewable energy sector companies, and this has intensified particularly in the last two decades. During this time, projects have been in the interior, especially in mountain areas, and not only near the coast. This process has resulted in the private appropriation of nature, land, and territory generating potential environmental and social harm for traditional communities (Traldi, 2019; Gorayeb *et al.*, 2019; Santana; Silva, 2021; Pereira, 2021; Lima, 2022; Dantas, 2022; Maia *et al.*, 2022, 2024; Furtado; Paim, 2024; Fernandes *et al.*, 2024).

According to Alves (2023, p. 15), the social and environmental impacts produced by renewable energy companies on the quilombola communities of Paraíba are notable for the alteration of the landscape due to the removal of native forest and the demolition of mountains with explosives. These actions violate the population's fundamental rights, such as the absence of prior, free, and informed consultation and the false promises of job creation alongside a discourse of local development and sustainability. The author also highlights the problems related to land lease agreements that are unsuitable for the reality of a quilombola territory, the access and movement of people outside the communities, and the demobilization of the quilombola associations and the quilombolas themselves.

Therefore, by currently housing 1,064 wind energy parks and 315 solar energy macro-generation parks in operation or under construction (ANEEL, 2024), the Northeast, especially the semiarid, has emerged as a vital energy frontier in Brazil, focusing on renewable sources. In 2024, the Northeast concentrates about 90% of all wind energy parks in the country, prominently in Bahia and Rio Grande do Norte. In the same year, the region is home to about 60% of all solar energy macro-generation parks in Brazil, with a generation capacity above 10,000.00 kW, emphasizing the large units installed in Piauí and Bahia. The difference between centralized and distributed photovoltaic solar energy generation is noteworthy. The former is produced by macro-generation in large plants, and the former uses solar panels installed on building roofs. In this scenario, the interior of the Northeast plays a

leading role in generating centralized photovoltaic solar energy, given its high levels of solar irradiation and low monthly variability, as evidenced by the Brazilian Atlas of Solar Energy (Pereira *et al.*, 2017).

Paraíba has 23 photovoltaic macro-generation projects either installed or under construction, with emphasis on the municipality of Santa Luzia, with 15 operational parks and four under construction, which are part of the Neoenergia and Rio Alto complexes, with a total granted power of 767,864.00 kW (ANEEL, 2024). The number of projects has aggravated environmental injustice, as discussed below, using the Quilombola Pitombeira Community as an example of the problem presented here. This location shows how renewable energy projects can produce environmental injustice.

Environmental injustice in the Pitombeira community

Rigotto *et al.* (2018) posit that environmental injustice materializes in territories through the actions of large capitalist enterprises, creating a more significant burden of environmental damage to vulnerable populations conditioned by social class, ethnicity, race, and gender, among others. For these authors, environmental injustice is manifested differently, depending on the stage the conflict catalyst enterprise has reached. In the case of the Luzia Solar Complex, we focused on the analysis of environmental injustice in the design, installation, and operation phases of the solar park based on the perceptions of risk and environmental suffering reported by the residents of the Quilombola Pitombeira Community.

According to the reports of the quilombolas who participated in the conversation circles, there was no clear understanding of what a "solar park" in the community would be, and the company Neoenergia was not concerned with timely communication regarding their intention to install the project in the vicinity of the community. Initially, there was a disinformation campaign denying the right to know, as residents were neither informed nor communicated about the construction of a solar plant that would directly impact them, as seen below:

> We had never heard or talked about what a solar park was. Nobody knew what it was. How could we ask anything if no one had even heard of it? Everyone was taken by surprise. Solar Panel? No one even knew they had these things! (oral report of quilombola in conversation circle held in 2024).

For a quilombola, "at first it caused fear in us; it caused a panic because they said that it was going to deforest, that it was going to destroy everything." Another reported that "it is a very new thing. No one was used to seeing these things". One resident also expressed concern about the community's future: "We were even afraid of being expelled from the land, of someone saying they owned it and telling everyone to leave." This perception is shared in

another account: "People were afraid of having to leave the community. Some people thought they were going to get us out of here. That the company was going to mess up in here. It gave a certain fear, right [...]". These statements reveal the psychological environmental suffering initially produced in the community, which triggered fear, anxiety, and concern in the residents about what could happen, given the denial of information by the company and the authorities.

While the news of the solar park's construction was spreading in the rural communities of Várzea and Santa Luzia, professionals responsible for preparing the Environmental Impact Study (EIA) began to visit the vicinity of the project site, which includes the polygonal of the Quilombola Pitombeira Community (Figure 1), three kilometers away from the farms that were leased for the construction of the plant. According to the quilombolas, in December 2018, studies were carried out in the community as a mandatory requirement for granting environmental licenses. These studies only lasted three days and included visits to the community's houses and gardens and carrying out questionnaires and interviews.

Next, Neoenergia held meetings in the community, addressing the issue of the impacts that the construction of the park could cause. However, from the residents' point of view, the overly technical language used by the company impaired their proper understanding of the enterprise's size and the environmental impacts that the community was likely to face, as observed in the accounts below. This approach was another strategy by the company to intentionally hide the risks to aggravate the scenario of misinformation and fear, revealing environmental injustice.

> We were not told what damage they would cause in the community. They only talked about [...] the bonuses. What bonuses were those? The compensations. And it was done (oral report of quilombola in progress promoted by the Federal Public Prosecutor's Office in 2024).
>
> They held a meeting and brought a booklet. But it was a technical thing that we who don't have a certain knowledge would not understand (oral report of quilombola in conversation circle held in 2024).
>
> Those documents that they brought for us to read and understand what it was, no one understood. They explained with that technical language, which we did not understand (oral report of quilombola in conversation circle held in 2024).

Before the project's construction started, a public hearing was held in the municipality of Santa Luzia in July 2021 to present the results of the environmental impact study regarding the construction area of the photovoltaic park. Due to health restrictions related to the COVID-19 pandemic, the hearing was held face-to-face and transmitted *online*.

Virtual participants could not ask questions in real-time and had to send questions by *email* later (Sudema, 2021). However, according to reports passed on by the quilombola leaders of Pitombeira, community representatives did not participate in the public hearing. They claimed not to have been informed of the hearing, further evidence of how disinformation is inherent in the installation of large enterprises.

Once the studies were completed and because of the imminent installation of the solar park, a notable expectation formed in the community regarding the offer of jobs generated by the works. The generation of direct and indirect jobs during the installation and operation phases was foreseen in the EIA prepared by the company, which predicted that the plant's construction would be directly related to "[...] job generation, considered one of the most important impacts because even if this type of work is temporary, it will increase the region's income; local labor should be chosen, when possible" (EIA, 2021).

However, this expectation of job creation for the community was not met, either in the installation or operation phases. The residents were frustrated and felt deceived by the false promises of work on the project. By generating an expectation of employment in the community, coupled with the subsequent compensation measures, there was an apparent attempt to control public perception of the environmental risks, paving the way for the installation of the park.

> It generated a very high expectation of employment in the community, and this did not happen. They said just to send the resume and the job was guaranteed. But that didn't happen. Today, if there are two people from the community working in the company, it is a lot (oral report of a quilombola in a conversation circle held in 2024).

> We have to understand that to get a job there [in the park], you have to be prepared. And the community does not have this preparation, you know. It doesn't. People get a craving for something that is not within our reach. A lot of people came from outside, white people. From here, there are one or two (oral report of quilombola in the conversation circle held in 2024).

During the installation phase, which began in mid-2021, residents began to experience the actual dimension of environmental injustice, manifested in different ways. Among the main impacts reported during the conversation circles are: deforestation of the native Caatinga vegetation; displacement and/or death of wild animals; dust; increased traffic and people "from outside"; cracks in houses and cisterns due to the explosions that were carried out during the installation of the solar panels. For a quilombola leader, "the impacts will be felt in the short, medium and long term." Other reports that:

> Today there are many problems in the community because of these renewable energies. These projects bring a range of impacts. The environment ends completely. The whole world is uncovered. Now, it is to

> hope that God has mercy on us (oral report of quilombola in a conversation circle held in 2023).

Residents report that the company's first action was to deforest all the vegetation on the farms leased to install the solar park. The nature of a photovoltaic project requires a total suppression of vegetation to place the solar panels. It is estimated that 335 hectares of native Caatinga forest have been completely deforested. According to the quilombolas, the streams, dams, and ponds inside the farms have also silted due to soil compaction and waterproofing actions.

With deforestation, two other impacts were immediately perceived in the quilombola territory. The first was the appearance of wild animals that fled the solar park area and moved to nearby communities. There are also reports of dead animals on the highway located next to the project and the deliberate relocation of animals in the surrounding area. According to the quilombolas, "… with deforestation, we started to see a huge number of animals dying run over on the tarmac [highway], fleeing the company's land, in addition to those who fled here". This appearance of wild animals in the quilombola community has already altered the way of life and certain peasant practices, as seen in the following accounts:

> The environment suffers a lot from this kind of thing. Deforestation. Death of young animals. All this brings some problems. It has brought damage to us and the whole environment. The environment is over (oral report of quilombola in conversation circle held in 2024).

> It [the solar energy company] not only destroys people, it destroys every living thing. [...] An anteater was found inside a house. An anteater. Outside snake, fox, bush cat. Animals that we never saw in our community, nowadays it is common for us to see. They were running away from this environment to go to a place that was not their place. And this affects all of us. [...] They no longer have space (oral report of quilombola in progress promoted by the Federal Public Prosecutor's Office in 2024).

> We no longer raise free-range chickens because many foxes are circulating in the community. Today, those who have chickens have them all in chicken runs. This decreased our production (oral report of quilombola in conversation circle held in 2023).

Another impact concerns the occurrence of dust in the community, resulting from deforestation, which denudes the soil and facilitates the dispersal of sediments by the wind, and the use of explosives in the park. Residents report that dust is a constant problem, which was not restricted to the installation process since the absence of vegetation has caused the incidence of dust swirls within the park that spread to Pitombeira. The result is increased respiratory problems among residents, who directly associate these illnesses with the constant dust on their homes, cisterns, and bodies. This aligns with the observations of

Rigotto *et al.* (2018), who indicate that communities in environmental conflict situations commonly report health-related problems.

> At the time of deforestation there was a lot of dust, which even covered the community. The wind brought all this dust (oral report of quilombola in conversation circle held in 2024).
>
> Increased frequency of dust whirlpools in the community. There is a whirlpool that forms within the company. It was less before, but now it has increased more (oral report of quilombola in conversation circle held in 2024).
>
> We had to get used to so much dust. We sweep the house several times a day. This is very damaging to our health. There are people sickened by all this dust (oral report of quilombola in conversation circle held in 2024).
>
> What came? The dust diseases, because it was very close, so the dust from the explosions would come home to us. [...] We showed the situation [to the company]. Two sick kids, People losing their health due to dust. Nothing to do because it was already being installed (oral report of quilombola in progress promoted by the Federal Public Prosecutor's Office in 2024).

Furthermore, the geological structure on which the park is built requires that explosions be detonated to fix the solar panels on the parent rock. The explosions during the installation were the environmental impact most reported by the quilombolas, who felt they were the most serious, as they flung open the doors to environmental injustice by exposing the community to the environmental risks resulting from the explosions. According to a quilombola woman: "When the explosions started, that's when the whole community realized the impact. Sometimes one felt it, and the other didn't. But with the detonations, everyone, in general, was impacted".

According to the quilombolas, the company warned them when the explosions would occur. However, according to reports, this was insufficient to mitigate the impact of the noise and tremors felt by residents and animals. It is estimated that there were six months of constant explosions before all 228 thousand solar panels were fixed to the ground. There were about three big weekly explosions, always in the late afternoon. The reports inserted below give a dimension of the explosions' impact, highlighting the scenario of environmental injustice based on the perception of risk and suffering to which they were exposed.

> There were a lot of explosions for the installation of the plate bases. There were too many explosions. Explosions with dynamite. We felt the ground shake with the explosions. It was terrible (oral report of quilombola in conversation circle held in 2024).
>
> In everyday life it was immoral. We got a shock. [...] Even knowing the times of the explosions, it was a huge scare. So many people got sick with it (oral report of quilombola in progress promoted by the Federal Public Prosecutor's Office in 2024).

> When there was an explosion, it gave us a fright. It was so strong, but so strong, that people were scared. It hurt in our hearts. It felt like it was an earthquake. It shook everything (oral report of quilombola in conversation circle held in 2024).
>
> When it exploded, the animals were very frightened. When there was an explosion, the dog hid under the bed. The goats ran into the woods, desperate. The floor trembled (oral report of quilombola in conversation circle held in 2024).

Despite being about three kilometers from the photovoltaic park, residents reported the occurrence of cracks in their houses and cisterns (Figures 3, 4, and 5) due to explosions caused by the project installation. According to one resident, "The houses had no structure because they are old houses; there was no structure to cope with that amount of dynamite, so the houses cracked, they are cracked." In addition to fissures in the houses, the explosions also cracked rainwater plate cisterns. "Our cisterns are all cracked. The community is poor, and there is no way to repair the cisterns. My cistern is leaking a lot, and it doesn't hold water anymore. I'm afraid it will burst for good," said another resident.

Figures 3, 4, and 5: Images of cracks recorded on the house walls and cistern of a resident of the Quilombola Pitombeira Community.

Source: Elaborated by the authors (2024).

The company resorted to compensation measures to "mitigate" the impacts which had been discussed with community leaders beforehand. These measures include providing courses and training, constructing a warehouse, and renovating and expanding the

association's headquarters. They are specific, short-term actions and do not guarantee better living conditions for the population. From the residents' discourse, the compensation is intended to silence the community and shape public opinion about the impacts produced by the solar park. In any case, it is an entrepreneurial management strategy of "social risks," as analyzed by Acselrad and Pinto (2009), which occurs when an enterprise adopts mechanisms of coercion of the impacted subjects to protect their image and business. Despite the measures already adopted, it is concluded that by 2024, no repairs had been carried out by the company on the cracked houses and cisterns.

In addition to the impacts already reported, the residents' perception of the risks and environmental suffering also include increased temperatures in the community due to deforestation in the vicinity and the incidence of solar energy in the park; this temperature rise has also led to bee mortality. Although the company has denied it, there is possible soil and water contamination due to the use of herbicides to prevent vegetation growth in the plant and possible contamination of the river that bisects the community, owing to the silting of upstream water bodies. Using copious amounts of water from wells and weirs transported via water tankers to clean the plant's solar panels aggravates the community's water injustice.

This scenario of environmental injustice is also intensified as solar energy parks encircle the community. In addition to the Luzia Solar Complex (in operation since March 2023), the Santa Luzia Solar Complex is under construction, three times larger than the former, and located about four kilometers south of Pitombeira. Thus, deterritorialization is looming for residents: "If it happens, a lot of people will leave here, they will have to leave, because no one will stand it," said a quilombola. This issue of encirclement is highlighted in the accounts below, which demonstrate another dimension of environmental injustice:

> They [the companies] are surrounding us. No, we don't want them there. We don't think about giving up our land. But they are surrounding us. We'll be stranded. And if we are already suffering today, with them three to four kilometers away, imagine them as neighbors. [...] The situation is very difficult (oral report of quilombola in progress promoted by the Federal Public Prosecutor's Office in 2024).

> If you continue with these energies, everything will be worse. If the energies come closer, we will be so squeezed here in our little corner that it will limit us in many things. We will be suffocated (oral report of quilombola in conversation circle held in 2024).

Given the above, there is a dimension of risks and environmental suffering in Pitombeira resulting from installing and operating solar energy projects. According to a quilombola woman, "there was a lack of consideration and respect for the community, " arising from the company's irresponsible conduct and by the State, which issued the

necessary licenses. For a resident: "We were not prepared. We have suffered before, we are suffering now, and we will continue to suffer. The biggest impacts we will feel in the long term are the ones that will remain". This feeling reflects the uncertainties about the future of community life, as observed in the following report: "Until now, we do not know exactly what can still happen. No one knows what's coming."

All the accounts given here, collected from the conversation circle and in other moments of listening to quilombolas, are valid because what people feel, how they perceive the impacts, and what affects them matters. This exercise of alterity, part of sensitive listening, must also include a praxis that contributes to denouncing the environmental injustice in Pitombeira and announcing a collective resistance to interrupt the persistent set of evils befalling the community.

The residents of Pitombeira are constantly crying out, as in the following distress call:

> **I just want to ask for help!** We call for help. [...] In other meetings that I went to talk about this, we saw a lot of people saying all this. Leave to where? What will be done with this information? Just listening, being aware of our suffering, and not doing anything causes a certain disillusionment in us. You know our reality. They just don't know the pain we feel seeing all this. But I tell you that **it is a pain that tears away something that we do not know or will not be able to bear**. But what will be done with all this information? So that's what I'm here to know. **What will be done with all this information you have and with the pain we are feeling?** (oral report of quilombola in a course promoted by the Federal Public Prosecutor's Office in 2024, emphasis added).

In the quilombola leader's accounts, the scenario of environmental suffering experienced by the community is manifest. The “being aware of suffering" she describes also reveals the dimension of the environmental conflict, which in turn expresses the environmental injustice and violation of rights that began to affect residents from the installation and operation of the photovoltaic project. Combined with the discourse of sustainability and energy transition, it is responsible for further aggravating the historical inequalities affecting the traditional peoples and communities of the Semiarid region.

Final Considerations

The installation of the solar park in the vicinity of Pitombeira negatively impacted the territory, given that the environmental and social impacts that struck this quilombola community were not considered, as is also observed in other traditional communities affected by wind and solar power plants in the Semiarid region. In Pitombeira, access to and storage of water in cisterns is limited. People live in houses with cracks and cannot reproduce

peasant agriculture due to the imbalance of local fauna and flora associated with social deregulation.

In view of the above, we have observed the scenario of environmental injustice in which the Pitombeira community finds itself, surrounded by cumulative impacts that destabilize the ecological balance and limit life in society. Furthermore, the territorialization of renewable energy also reveals evident environmental racism and human rights violations, which are grave expressions of the injustice committed against the quilombola community. Contrary to what Bursztyn (2020) proposed, it is evident that, in the case presented, the Sun did not rise for everyone; quite the contrary.

Accordingly, the "environmental sustainability" discourse, commonly linked to renewable energy projects, collapses. We agree with Porto, Finamore, and Ferreira (2013, p. 58) when they state that the recognition of multiple environmental conflicts calls into question "the assumptions of eco-efficiency and the theory of ecological modernization in the face of the supposed universal benefits of greening society by expanding so-called sustainable energy technologies and patterns." The authors call this process "injustices of sustainability," revealing the limits imposed by the infamous energy transition, understood as a potential vector of conflict and injustice.

This scenario also points to the need to rethink the resistance strategies of traditional and peasant communities in the face of environmental injustice caused by renewable energy projects, making it possible to build a truly just and democratic energy transition (Melo, Malerba, and Tupinambá, 2024). Given the context presented here, only the strengthening of struggles and mobilizations can stop and/or mitigate the advance of wind and solar energy in a political context markedly favorable to the territorialization of capital in the countryside.

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