

Social determination of health of small-scale fishing workers in oil disasters

Determinação social da saúde de trabalhadores da pesca artesanal em desastres com petróleo

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ABSTRACT

This essay reflects on the oil-dependent model and its relationship with vulnerability in the health of small-scale fishing communities from the Social Determination of Health perspective. Three analysis axes were structured as follows: characterising the industry's dependence on fossil fuels and the consequences for the populations of the affected territories; the Brazilian oil disaster crime in 2019; and finally, considering Breilh's conception (2013), characterising the social determination of health in the vulnerable territories affected by these disasters. The notion of health dissociated from social, cultural, economic, spiritual, and political constructions represents an insufficient model for analysing the health-disease process, identifying a fragmented being and disregarding the overlapping of "inorganic" layers that suppresses and reorganises existence.

Keywords: Petroleum Pollution. Disaster vulnerability. Environmental health. Health-Disease Process.

RESUMO

Este ensaio apresenta reflexões sobre o modelo por petróleo dependente e sua relação com os processos de vulnerabilização na saúde das comunidades da pesca artesanal sob a perspectiva da determinação social da saúde. Estruturou-se em três eixos de análise: a caracterização do processo de dependência dos combustíveis fósseis pela indústria e as consequências para as populações dos territórios afetados; o desastre-crime do petróleo ocorrido no Brasil a partir de 2019 e, por fim, à luz da concepção de Breilh (2013), a caracterização do processo da determinação social da saúde nos territórios vulnerabilizados e afetados por esses desastres. A noção de saúde dissociada das construções sociais, culturais, econômicas, espirituais e políticas conforma um modelo insuficiente na análise do processo saúde-doença, identificando um ser fragmentado e desconsiderando a sobreposição de camadas "inorgânicas" que suprime e reorganiza a existência.

Palavras-chave: *Poluição por petróleo. Vulnerabilidade a desastres. Saúde ambiental. Processo saúde-doença.*

1 INTRODUCTION

Energy models dependent on non-renewable matrices, such as oil, play a primary role in the global climate crisis and determine extreme weather events. They also advance deforestation, destroy biomes, and trigger diseases and food and nutrition insecurity (EL-SAYED; KAMEL, 2020; PATZ *et al.*, 2014). While the association between the consumption of fossil fuels, such as oil, and the climate crisis is known, the global installation of petrochemical complexes is recurrent. It raises different narratives for the transition to renewable energy sources, especially in developing countries (VIGLIO *et al.*, 2019).

We observe different levels and types of human exposure to pollutants, especially workers in this production chain, the contamination of fauna and flora, and disasters caused by oil production activities (extraction, refining, and other operations). These events trigger socioenvironmental vulnerability, compromising material and symbolic aspects and affecting people's health, especially vulnerable populations (GURGEL, 2011; SANTOS *et al.*, 2019; SOARES *et al.*, 2021).

Disasters such as oil spills are a systemic problem. They can entail ecological and socioeconomic harm, with implications for ecosystems and human health around the projects or coastal areas, such as small-scale fishing communities. They are an environmental and public health emergency issue of concern (CARMO; TEIXEIRA, 2020; GURGEL, 2011; PENA *et al.*, 2020; SANTOS, 2019; SILVA *et al.*, 2022).

Studies from complex and systemic perspectives on the health-disease process of affected communities can provide us with alternatives to improve life in communities affected by these disasters. Theoretical-conceptual aspects of the social determination of health in Latin America are proven to be a way toward apprehending harm and diseases from a complex analysis and contributing to action plans in these contexts.

This essay aims to reflect on the oil-dependent model and its relationship with vulnerability in the health of small-scale fishing communities from the perspective of the social determination of health. This work was structured from the historical and dialectical perspective of the social determination of health proposed by epidemiologist Jaime Breilh (2013) to comprehend collective health.

Three axes of analysis were defined from the identified scientific literature: initially, we featured the industry's dependence on fossil fuels, particularly in Brazil, and the implications for the populations in the affected territories. Then, we underscored the Brazilian oil crime disaster in 2019 and its reverberations on small-scale fishing communities, considering issues related to small-scale fishing management, anthropic actions in the environment, and harm to the health of small-scale fishermen. Finally, in light of Breilh's conception (2013), we featured the social determination of health in these vulnerable territories affected by such disasters.

2 STRUCTURAL TRANSFORMATIONS: THE OIL-DEPENDENT INDUSTRY

The significant oil valorisation primarily stems from three principal milestones in the 1970s: a) the United States losing its centrality in oil production, sharing space with the Middle East; b) the oil barrel price hike in 1973, when it almost tripled in value and started to be used as a contention instrument in the Middle East, which holds most of the good quality oil reserves globally; and c) the second oil crisis in 1979, when Iran, second-largest producer at the time, cut its exports (D'ALMEIDA, 2015, 2019; GASPAR, 2015). Such facts boosted the extraction of this finite resource, entailing vulnerability in the lives of subjects and territories residing in the territories of the implemented projects. We should consider territorial vulnerability originates from historical and social relationships and processes extending beyond the biological dimension, marked by environmental and social injustice (BREILH, 2013; GURGEL, 2011, 2019; PORTO, 2014; SANTOS, 2019).

In Brazil, oil prevails among the primary sources of fossil fuels employed in the energy matrix, including natural gas and mineral coal. On the other hand, solar energy, hydraulic energy, biomass, and wind energy are renewable sources representing about 44.7% of the energy used in Brazil. We highlight the use of large hydroelectric/wind power plants and sugarcane derivatives, which can also develop risks and harm to health and the environment, although oil and its derivatives remain a structural element of the Brazilian energy matrix (EPE, 2022; SANTOS, 2019).

Several Brazilian states, especially in the Northeast region, have expanded their petrochemical complex by implementing industries and port complexes, such as the Abreu e Lima Refinery (RNEST) and Petrochemical Plant Suape in Pernambuco; the Potiguar Clara Camarão Refinery in Rio Grande do Norte; the expanded Camaçari Petrochemical Complex in Bahia; and the Premium I and Premium II Refineries, which would be installed in Maranhão and Ceará respectively, but whose works were cancelled in 2015 (GURGEL, 2011; PÉREZ, 2016; SANTOS, 2017; SILVA, 2017).

The scale-up installation of these refineries is also inversely proportional to their territory's organisational rationale, causing vulnerability, escalated conflict and environmental injustice, environmental pollution, and chemical exposure that compromise people's health and quality of life (DOMINGUES *et al.*, 2014; SANTOS, 2017; SANTOS *et al.*, 2022).

Oil chain-associated disasters can harm marine ecosystems and those dependent on them (PENA *et al.*, 2020; SILVA *et al.*, 2022). One of the most critical aspects related to the implementation of large undertakings such as these is concealing problems and changing their construction and operation entail to the territory where people live and work, such as the violation of human rights and socio-environmental injustice (CPP, 2021; SANTOS, 2011, 2017).

Respiratory, neurological, liver, kidney, endocrine, haematological, and other diseases are other effects of direct exposure to oil and its derivatives (LAFFON, 2016). There could be acute or chronic physiological effects, and there is no safe exposure threshold for specific effects, such as cancer (CROISANT; SULLIVAN, 2018; RIBEIRO, 2012).

The loss of fishing territory, environmental devastation, and the substandard conditions of small-scale fishing are examples of primary human and ecological rights violations that distinguish the reality of these Brazilian communities. The current historical moment is marked by profound ecological, economic, and social crises and requires reformulating the oil-dependent production model in light of the very limits of nature (MARTINEZ-ALIER *et al.*, 2016).

In August 2019, large oil slicks were recorded on beaches in the northeastern coastal Brazilian states, also reaching the country's southeast. Eleven states, 130 municipalities, 1,009 locations, and more than 3,000 km of the Brazilian coastline were affected, resulting in the largest extensive disaster in Brazil. More than 5,300 tons of oil residues were reportedly collected from the beaches (MESQUITA; QUINAMO, 2020; REDDY, 2022; SOARES, 2022).

Small-scale fishermen were among the most affected populations. Oil directly affected their territories, affecting life in the mangroves, sea, and beaches. During the period, the media engaged in disinformation and cover-up, arbitrarily announcing the contamination of all fish and shellfish on the coast, which led to vulnerability due to the sudden decline in the sale of fish and shellfish, which in turn entailed extensive financial losses to fishermen (PENA *et al.*, 2020; SANTOS *et al.*, 2022).

Mental distress was also identified as a result of this experience, especially concerning lack of work and loss of income. In similar disasters, as with the explosion of the Deepwater Horizon platform in the Gulf of Mexico, the oil spill was a national fish consumption-related security issue, contributing to mental distress and work, health, and lifestyle encumbrance of these people (GOLDSTEIN *et al.*, 2011; MOREIRA, 2017).

3 SMALL-SCALE FISHING COMMUNITIES AND OIL DISASTER CRIME REPERCUSSIONS

Water people's knowledge builds on the use, observation, coexistence, and dependence on the natural resources in the marine and continental environments, as recommended by the National Policy for the Comprehensive Health of Rural, Forest and Water Population to protect and qualify health care access for these populations in Brazil, "these peoples' and communities' lifestyle, production, and social reproduction are predominantly related to water environments", such as small-scale fishermen (BRASIL, 2014, art. 2°).

Artisanal fishermen are characterised by small-scale fishing activities, landed or in small boats, to capture different species of fish, shellfish, and crustaceans for sale through direct buyers, go-betweens, and at fairs and public markets (RÊGO *et al.*, 2018). Fishing also takes on an affective and food consumption dimension for coastal populations.

The fishing community, other peoples, and traditional communities are part of a specific set of populations that reproduce their traditional lifestyles characterised by relative autonomy (BRANDÃO, 2010). Small-scale fishermen's lifestyle is linked to healthy and sustainable productive conditions in the sense of subsistence in the natural environment – tides, rivers, estuaries, and mangroves.

Brazil is one of the largest fish producers in Latin America, ranking 18th globally; an approximative data since Brazil has not made official fishing production data available since 2014 (FAO, 2020, p. 21). Thus, despite the cultural and productive relevance of these people, the registration of small-scale fishery workers by the Brazilian government needs to be updated. Furthermore, existing data are not adequately organised, hindering the retrieval of reliable data (MENDONÇA; MATTOS, 2021).

We highlight three issues faced by small-scale fishermen that directly impact working and living conditions: 1) small-scale fishing political management problems; 2) anthropic-derived environmental problems; 3) harm to health caused by the small-scale fishing work activity.

In the political and public management fields, the regulation of small-scale fishing activity started with the organisational training of fishermen in colonies, that is, in social organisations representing small-scale fishing activity, currently responsible for recognising individual professionalisation (OLIVEIRA; SILVA, 2012). Fishing activity governance endured more than one hundred years of instability after the natural establishment of colonies among fishermen between the Ministries of the Navy and Agriculture.

In the meantime, a significant increase was observed in the number of colonies across the national territory, which has approximately 800 units of this type, resulting from the Navy's clear intention to encourage militarisation by fostering national defence by sea and significantly boost the country's economic development, as fishermen would stand at strategic points at sea (SILVA, 2014). The modernisation of national productive practices, mainly agriculture and fishing, underlies the idea of mechanising activities for the 'nation's economic development' (CUNHA, 2012).

Modernising small-scale fishing was related to encouraging the sector's industrialisation. It was mainly supported by political actions, such as enacting the Fisheries Code in 1967, which regulates fishing activities. Brazil promoted industrial fishing based on financial incentives and exemption from some product and machinery levies while neglecting small-scale fishing. As a result, small-scale fishing could have been more characterised, making these communities' identities and social reproduction vulnerable. Some authors argue that the considerable increase in industrial fishing can deplete different fish species, mainly harming small-scale fishermen (GUIMARÃES; LEITÃO, 2020).

In the advances in the legislative field, Law Nº 10.779/2003 established in Brazil a legal regulation aimed at securing social rights for small-scale fishing, granting labour benefits such as unemployment insurance during the species' reproduction period – when fishing is not allowed to preserve the species (BRASIL, 2003). Fishing Law Nº 11.959/2009 did not update social rights but legalised small-scale fishing, allowing low-interest loans to preserve this sector's operations (BRASIL, 2009). As a result, Oliveira and Silva (2012) emphasised the relevance of the, albeit late, legal regulation of small-scale fishing:

The regulation of the activity enables the professional recognition of workers. So, the fisherman starts to benefit from all the rights arising from work activities, especially regarding social security benefits. Last, regulation is a means to assert public policies to encourage community and non-industrial activities, neglected and even suppressed by Brazilian authoritarian regimes (OLIVEIRA; SILVA, 2012, p.10).

Besides labour guarantees for regulating the fishing profession, the legal systems must also be reflected in working conditions intertwined with preserving and protecting nature. They should even formulate protocols and instruments such as contingency plans, disaster preparedness, and response plans to curb harm to affected communities or populations (FREITAS *et al.*, 2018).

The lack of these legal frameworks or their operationalisation, as in the oil crime disaster in 2019, reflects the insufficient governmental actions that have severely affected the health and the environment due to oil-derived exposure and contamination (RAMALHO; SANTOS, 2021; SOARES *et al.*, 2020). However, this fact should not be analysed on a stand-alone basis as it is overdetermined by historical and social processes that affect these territories.

The second group of problems – anthropic action in fishing environments – is related to the changes imposed on traditional territories caused mainly by the industrialised economic activities, the establishment of large undertakings such as hydroelectric/power/steelwork plants and urbanisation, for example, and agribusiness, neo-extractivism, disasters, or environmental crimes. They result in deterritorialised fishing communities, disrupted social reproduction of these groups, pollution in fishing environments, impracticable fishing activity, search for other productive activities, and long travel to other fishing areas (PAULA, 2018).

The frequent oil accidents are some examples of how the ideals of unbridled modernity can attach incalculable harm to traditional communities and the environment. They produce harm in the medium and long term, escalating socioeconomic, environmental, and health vulnerability, especially for communities socioeconomically dependent on tourism and small-scale fishing, and the ecosystems where they reside, such as coral reefs, estuaries, and mangroves, often establishing emotional bonds with these places. However, studies analysing these impacts from a complex viewpoint are still incipient, considering the reverberation of these disasters on this population's living and health conditions (SILVA, 2022).

The third group is related to health risks linked to fishing activity. Pena and Minayo (2014) found about thirty different types of diseases related to the work process and living conditions in fishing communities in Bahia state. Some of the exposures and problems identified are similar to those observed in small-scale fishermen in Pernambuco, such as sun exposure, systemic arterial hypertension, overweight or obesity, tobacco and alcohol abuse, repetitive strain injuries, weight overload, and respiratory problems caused by the constant use of firewood (PENA; MARTINS, 2014).

These health problems result from the long and strenuous working hours to which small-scale fishing workers are subjected (FALCÃO *et al.*, 2019; PENA *et al.*, 2014). Besides the illnesses already mentioned, we should stress that the oil spill engendered new illnesses in the territories from oil exposure and mental distress caused by income loss and work environment contamination (RAMALHO; SANTOS, 2021; SILVA *et al.*, 2022).

Although small-scale fishing is an autonomous activity, it is a way of life and production not solely aimed at profit. However, it has a solid community base, as several stages of the production process involve and depend on different community stakeholders – those catching fish/shellfish, those processing the products, and those selling the products. Thus, the chain is fed to ensure these individuals' livelihoods (NASCIMENTO, 2022; PENA *et al.*, 2013; PENA; GOMES, 2014; PENA *et al.*, 2014).

The oil spill interrupted this organisation, compromising the production chain and livelihoods. The lack of actions by government institutions and media outlets sharing news without scientific basis strengthened and legitimised the constructed imaginary that all fish was unfit for consumption, reducing sales by around 80% to 100% in the months following the onset of the disaster (ARAÚJO *et al.*, 2020).

4 SOCIAL DETERMINATION OF HEALTH AS AN EMANCIPATORY ANALYSIS TOOL

We identified the need to understand the oil spill impacts on the health of the affected communities from the brief discussion of the problems that permeate the lives of water people. A complex and systemic analysis is required to grasp how the environment is central to preserving their productive activities, cultural practices, way of life, and social reproduction. In this sense, the Social Determination of Health aims to integrate health into the social frameworks of life in a broad, complex, and profound sense. (BREILH, 2013; PESSOA *et al.*, 2018).

This means that the sequence of social determinations, from the most general features of society, the global socioeconomic macro-determinants, to the most particular ones, from small groups and interpersonal relationships, shape individualities, but these are active in choosing themselves, manifesting actively in their choices and actions (FLEURY-TEIXEIRA; BRONZO, 2010, p.38).

Thus, when analysing these impacts, we must observe the dependence of these populations on their environment and how the 'health' of this environment determines the rhythm and social organisation of the communities. In this sense, we understand that changes in these environments resonate in

individuals' living conditions and organisational structure. The vulnerability from the oil spill in the territories affects complex and deep dimensions not limited to undersized fish or one-off environmental issues. However, it makes lifestyle, or the most significant expression of the subject in the territory where it reproduces socially, vulnerable (BRANDÃO, 2010; BREILH, 2013).

Grasping the essence of the territory is based on Santos (1999), who understands territory as the expression of courage, authenticity, and strength to promote protective tools against destructive processes:

The territory has to be understood as the land space employed, not the territory itself. The territory used is the ground plus the identity. Identity is the feeling of belonging to what belongs to us. The territory is the foundation of work, the place of residence, the material and spiritual exchanges, and the exercise of life (SANTOS, 1999, p. 8).

From this correlation, traditional fishing communities achieve autonomy vis-à-vis their social and work processes. However, it can often be traversed by social and environmental conflicts, such as those promoted by shrimp farming, for example; by the advance of neo-extractivism, a central model in the Brazilian economy; and by disasters and environmental injustice, relativising their autonomy (BRANDÃO, 2010; RIGOTTO *et al.*, 2018). Such processes are subsumed to other overdetermined events that should be considered when observing the processes established in the territories, as they influence the health condition and recovery from disasters such as oil spills.

Disasters escalate the socio-environmental vulnerability of populations that have historically experienced vulnerability. They highlight the limited ability to understand health under the particularities of individuals and their social groups, as of traditional communities that live under specific circumstances. As the individual is formed by biological singularities, perennial to his condition and political, socioeconomic, cultural, and spiritual factors, the construction of what is health begins with intersubjectivities created in a communal and then societal construction (SAMAJA, 2000).

Therefore, health is a multifaceted condition influenced and determined by different markers and social processes that challenge subjects and groups. The implication of the systemic approach by analysing the social determination of health in different cultural groups becomes increasingly necessary to familiarise oneself with individuals' social and cultural universe when confronting different contexts, experiences, and values (CONCONE, 2003).

The National Policy for the Comprehensive Health of the Rural, Forest, and Water Population (PNSIPCFA) shows how much progress still needs to be made in meeting the needs of these people. The policy understands and alerts us to diverse communities in the rural environment and sheds light on the various needs that emerge from this close relationship with the land, forests, fields, and, in this case, waters (BRASIL, 2014).

Considering this, we observe that such necessities surface from work relationships built and perpetuated in this type of environment and the environmental transformations imposed by the productive model – that affect the health of communities and compromise a range of knowledge and practices that shape their identity and sovereignty (BRASIL, 2014). Such injustice results in several processes that make life vulnerable in its social, economic, cultural, and spiritual aspects, causing illness and, often, death (PORTO, 2014).

5 FINAL CONSIDERATIONS

Understanding health, whether to preserve a healthy state or manage illness processes, must be thought of from a multidimensional, systemic, and convergent perspective, without overcoming the particular reality of each community or people, due to the insurmountable and complex barrier of totality, which shelters a multifaceted life in its status quo, inherent to the social history of these individuals.

Thus, it assumes that the oil spill impacts are pondered from the complex reproduction of life and health processes, intrinsic to the construction of meanings and feelings in these communities, subjective and divergent from developmental and globalising ideas. Furthermore, more than strictly technical methods focusing on body intervention in a cause-effect rationale is required, and a fragmented health action can exacerbate existing vulnerabilities.

Disregarding individuals as 'multisystemic' beings is stealing the existential life dynamics, isolating them from socio-environmental processes, and addressing health as a static element, not a process of compensations and experiences. Individuals' historical path, relationship with nature, spirituality, and cosmovision underpin how they experience the world and conceive their understanding of health.

Finally, we should consider in this paper this textual genre's limitations. We reiterate that the text considers and prioritises the theoretical postulates advocated by the authors and is, to a certain extent, the defence of a thesis based on expertise in Health, Environment, and Work.

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