

Artisanal fishers, consumers and the environment: immediate consequences of the oil spill in Pernambuco, Northeast Brazil

Pescadores artesanais, consumidores e meio ambiente: consequências imediatas do vazamento de petróleo no Estado de Pernambuco, Nordeste do Brasil

Pescadores artesanales, consumidores y medioambiente: las consecuencias inmediatas del derrame de petróleo en Pernambuco, noreste de Brasil

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In August 2019, the Brazilian Northeast coast was hit by the largest environmental disaster caused by oil spill (petroleum) in its history, with the first record (30th) in Paraíba ¹. Since then, the leak has spread to over 70% of the 3,300 kilometers of other northeastern states, reaching almost 500 locations in early November ².

Until late November, assumptions regarding the source of the leak have not yet been confirmed by the government. According to Santos et al. ³, major offshore hydrocarbon oil transportation routes pass by reef environments. Large freighters carry more than 2x10⁶ tons across the world, representing a high risk of oil leakage in and around this particular ecosystem. Crude oil is a mixture of thousands of molecules and several concurrent processes occur when it comes into contact with seawater. Smaller molecules (higher volatility such as benzene, toluene and xylene) tend to evaporate rapidly into the atmosphere within the first week. Simultaneously, solubilization, dispersion in the water column and spreading by currents and tides are initiated. Moreover, the processes of emulsification ("water in oil" type mousse), biodegradation, photochemical oxidation and sedimentation also occur ⁴. These pollutants include aromatic and aliphatic compounds and may contain heavy metals among other substances extremely harmful to human health ⁵.

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Volunteers and contamination of fishing resources

As the terrifying and unexpected stains and waves of crude oil hit the beaches, several Northeastern volunteers acted spontaneously, individually and collectively, and were driven by humanitarian and environmental forces to clean the beaches (Figure 1). They were fishers, residents, students, businessmen, tourists, surfers; all exposed to these products and risking their health. In the early days, when these pollutants first arrived on the coast, most of these people had no knowledge of how to deal with such disaster, there was no guidance from brigade members, nor they had access to Personal Protective Equipment (PPE). To assist the volunteers, several centers donating PPE equipment, water and food were set up in universities and in the affected locations. Professional oil cleaning methods applied on the Spanish Galician coast ⁶, are radically opposed to the amateurism found here.

This catastrophe is extremely serious and an emergency to public health and to the environment, and anyone who has had contact with these chemicals should be monitored as indicated by



Figure 1

Local volunteers trying to remove the oil from the beach. Itapuama, Pernambuco State, Brazil.



Note: photo by Sidney Vieira (21/Oct/2019).

the Health, Environment and Work Laboratory, Oswaldo Cruz Foundation (Lasat-Fiocruz) ⁵. The Letter stated that most of these products are carcinogenic and may cause miscarriages, neurological, hepatic, renal, dermatological, pulmonary, blood (e.g., leukemia) complications, or even death; when inhaled, ingested via water, or by direct contact. According to the report of the Executive Secretariat for Health Surveillance of the state of Pernambuco ⁷, there are 149 suspected cases of oil poisoning. Symptom cases were mainly neurological (e.g., headache, nausea, dizziness), cutaneous (e.g., skin irritation and blemishes), respiratory (e.g., breathlessness, sore throat) and digestive (e.g., vomiting, diarrhea, abdominal pain). The situation is urgent and it is strongly recommended not to use the beaches affected by oil residues or to consume fish from these regions, the report argues that “*it is very important that the Unified Health System guarantees the right to comprehensive health care and information to protect*” these people ⁵.

Even though it is a constitutional right, transparency and broader government actions to contain the oil spilled on the coast are lacking, as stated by scientists of the University of São Paulo (USP) in an open letter ⁸. The National Contingency Plan for Oil and Water Pollution Incidents under National Jurisdiction was only formalized by the Minister of Environment 41 days after the disaster ⁹, and several of its resolutions are insufficient. Official information, especially from the federal government, is superficial and practically disregards the guidelines issued by the researchers.

There is an interflow between coastal ecosystems that links nutrients, sediments, pollutants, and organisms ¹⁰. This connectivity regulates the daily or seasonal activities of these individuals and ensures that species complete their life cycles. Several species of fish breed in the sea, their larvae occupy the mangroves, while the young ones grow on the reefs and return to the sea as adults ¹¹. Thus, when one of these ecosystems is impacted (for example, by oil pollutants), the connectivity is disrupted, populations are isolated and hardly survive the extreme conditions, disappearing in the

medium and long term. Almost all marine life depends on this mosaic, and the chemical poisoning of the air, water, and substrate of an ecosystem can lead to the accumulation of toxic compounds, disease, or death of all living things, including humans. Turtles, birds and fish were found covered in oil, some of them dead ¹.

In late October, Federal University of Bahia (UFBA) researchers found the presence of oil in the digestive and respiratory tract of fish, mollusks and crustaceans ¹². Since this environmental crime is still very recent, studies related to the negative impacts of oil on marine life are still insufficient. Research in other countries indicates that the oil causes nervous disorders in young fish, altering their perception and making them more susceptible to predation ¹³. Crabs also accumulate toxins from petroleum hydrocarbons and dispersant products which, in theory, solve the oil spill problem – like in the Gulf of Mexico in 2010 ¹⁴.

Shellfish, one of the largest protein sources for human consumption and heavily fished on the northeastern coast, are rapidly being impacted in areas hit by oil spills, with high mortality rate in the Northeast coast ¹². Mollusks and other benthic animals, such as corals, have rapid bioaccumulation of pollutants. Their direct contact with the oil causes asphyxiation, leading to death and the decimation of their populations for decades, as well as of organisms that depend on them ³. Bivalve mollusks are excellent filtering agents and considered very good bioindicators for coastal marine pollutants ¹⁵. Toxins accumulate in the tissues of these mollusks ¹⁶, causing diseases that inhibit their locomotion and cause the onset of necrosis and neoplasms ¹⁷. In oysters, the presence of oil stuck in the sediment can seriously impact the fertilization process of the gametes and the larvae in the initial stages ¹⁸.

Socioeconomic impacts

Bibliographic survey, on-site observations and interviews with fishers and traders were conducted (from October, 24 to November, 16, 2019) by the present authors, researchers from the Federal University of Pernambuco (UFPE), in several municipalities of the state. The social and environmental results provided subsidies for the following discussion.

Fishing communities can no longer market their shellfish, oysters, charru mussel and crabs. Through interviews and informal conversations, 51 people were heard, fishers (17 women and 18 men), 6 middlemen and 10 fish markets, in the affected municipalities (São José da Coroa Grande, Tamandaré, Rio Formoso and Cabo de Santo Agostinho) and unaffected municipalities (Goiana, Itapissuma, Olinda and Recife), noting that the latter also felt the negative repercussions of the oil spill. Between the second half of October and the first week of November, sales drops of these products ranged from 80% to 100% in Pernambuco. The trade-in deep-sea fish (mackerel, red snapper, goldfish) was also affected as it declined by at least 60%, and cultivated species (salmon, shrimp) by about 50% of the previous market price. Although the entire fishing community is affected, fisherwomen were hit the hardest, as they catch shellfish, oysters and charru mussel ¹⁹.

The great decrease in fish sales has led to three immediate effects on communities due to the lack of monetary resources: (1) fishery products are restricted to feeding native families (2) making it impossible to buy basic items such as beans, rice, noodles, coffee and (3) leading to delays and defaults on payments (energy, clothes, appliances).

When asked if they would stop consuming fish if it were decreed to stop fishing across the coast, the response was unanimous: “*No. We will keep eating*”. One statement provides a justifiable explanation: “*What will we eat?! Beef, chicken, salad?! Salmon!? These are rich people things, for people with money. We always ate what comes from our waters, and it’s free, the fruits of our labor, it’s a gift from God to be a fisher. I love being a fisherman, and we suffer as the fish also suffer from all of this [the oil leak]*” (Crab fisherman from Carne de Vaca beach, Goiana).

This phrase reveals the complex connections that involve the condition of being fishers. Fishing is more than just a job that generates income and food; it is an existential mark, a life project and a desire for the world, mainly because it is composed of affection and pride, representing a unique type of work and way of life. Nature is a companion and a sister for fishers, and when nature is injured it also injures the artisanal fishing communities. A fisherman from Suape (Santo Agostinho Cape) argued that “*we all were jeopardized here; those who fish on open sea or fish here in the beaches and rivers*”. A

fisherwoman of Rio Formoso said that “*if it is bad for men, for us women it is much worse here in Pernambuco, because we catch shellfish, oysters, charru mussel; and the consumers are even more afraid of eating it*”.

The environmental and socioeconomic damages caused by the oil contamination in the Northeast are incalculable. The fish trade and tourism sectors are paralyzed, leading to an increase in unemployment of professionals in these industries. However, it was the artisanal fishers and the traditional communities that were hit the hardest by an environmental crime that they did not commit but that prevents them from working and surviving²⁰. The freezers are crammed because the markets, bars and restaurants are no longer consuming. There are no customers even in traditional gastronomic centers such as the Itapissuma stew (northern coast). The problem is compounded further by the approach of summer, since the income of fishers and tourism professionals tend to increase²¹.

In 2010, the Oceanarium Institute (Federal Rural University of Pernambuco – UFRPE) estimated that 30,000 people were living from artisanal fishing in Pernambuco, which means that at least the same number of people is directly and indirectly affected by the scenario caused by the largest socio-environmental tragedy in Brazil. Such workers were responsible for approximately 97% of the fish caught in the state during 1990s and 2000s^{22,23,24}. These form the basis of a complex production chain: boat and net manufacturers and repairers, fish processors, sale of nylon nets, lines, fuel, sail and ranch; small, medium and large traders of fish, tourism, bars, restaurants, inns and hotels in the Northeast region.

Sea workers call for efficient and urgent government action to diagnose the health of the estuary and, consequently, of fish.

“We have no money and we will not stop feeding our children. What do we have to offer them?! Our fish. They may be contaminated but what can we do? My God!... The government gives us no other way” (fisherwoman from Sirinhaém).

Of the 35 respondents, 73% came into direct contact with oil and this figure rises to 95% when it involves a family member or friend. They all complained that they are not being followed-up by public health. Fishers are undoubtedly the social group most exposed to the negative impacts caused by the spills since their workplaces and addresses were hit the hardest and this situation will probably remain for an undefined timeframe.

Final considerations

Representatives of the social movements of artisanal fishing stated at a meeting at UFPE last November 4th (organized by the UFPE SOS Mar Committee): *“We are not beggars, we are not begging, we are sea workers and we want the government to pay the salary of all fishers until we can fish again so we don’t starve”*.

At this same meeting, the Pastoral Council of Fishers argued that *“a healthy nature also means healthy seafood and fishers”*. Therefore, there is no way to disconnect the harmful impacts on the environment without disregarding its direct implications in the living of the fishing communities. This line of work has been clearly affected by the oil spill and the lack of policy-making by the State that can, at least in a compensatory manner, minimize the major damages caused to the fishing economy and also possible damages to fishers’ health.

Contributors

M. E. Araújo conceived the study and wrote the paper. C. W. N. Ramalho participated in the study conception and writing and provided the socioeconomic data. P. W. Melo participated in the study conception and writing and provided the ecologic data.

Additional informations

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