Environmental conflicts and the waters of the São Francisco river

Conflitos ambientais e as águas do rio São Francisco

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Abstract

This article presents a study on the environmental conflicts over water in states directly involved in the context of the Integration Project of the San Francisco River in Northeastern Brazil. It is based on an approach guided by the social determination of health involving the relationships between the use of natural resources, political domination and economic ownership that underlie the processes of environmental injustice. A transversal, descriptive, and observational study was carried out. The database from the Pastoral Land Commission—which monitors conflicts over water—was used as a source of information. The states of Ceará, Paraíba, Pernambuco and Rio Grande do Norte were chosen as scope for the study. The conflicts were characterized according to state, status and the number of affected families. We observed that conflicts existed in all states studied, but especially in Ceará and Pernambuco. We, thus, concluded that the water transposition project for the São Francisco river worsens environmental conflicts involving indigenous populations and others vulnerable groups rooted in the territories that demand access to the water.

Keywords: Health; Environment; Environmental conflicts; Development; Territory.

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Resumo

Este artigo apresenta um estudo de conflitos ambientais por água nos estados diretamente envolvidos e que se contextualizam no Projeto de Integração do Rio São Francisco, partindo de uma abordagem orientada pela determinação social da saúde envolvendo relações entre o uso de recursos naturais, dominação política e apropriação econômica que estão na base dos processos de injustiça ambiental. Procedeu-se a um estudo exploratório de caráter descritivo, observacional, transversal. A base de dados para a produção de informações foi a da Comissão Pastoral da Terra que monitora os conflitos por água. Tomou-se como a área de estudo os estados do Ceará, Paraíba, Pernambuco e Rio Grande do Norte. Caracterizou-se os conflitos segundo estados, situação do conflito e números de famílias afetadas. Verificou-se a existência de conflitos em todos os estados investigados, principalmente no Ceará e Pernambuco. Conclui-se que o projeto de transposição das águas do São Francisco agudiza conflitos ambientais envolvendo populações indígenas e outros grupos vulnerados radicados nos territórios e que reinvindicam o acesso e uso da água.

Palavras-chave: Saúde; Ambiente; Conflitos Ambientais; Desenvolvimento; Território.

Introduction

The Integration Project of the San Francisco River (*Projeto de Integração do Rio São Francisco*, PISF) has been characterized by the allocation of water for economic use, leaving to second plane the ethical principle of its essential function for human and animal supply. Cappio (2008) confirmed these objectives. These statements put official propaganda, which claimed these waters were necessary to provide drinking water to semi-arid population, in check.

It is recognized that, in environmental conflicts, there are disputes over the material basis of ecosystems, coveted by economic activities, such as market value (Silva, 2012). The resistance of the people that live in that territory has been defined as a fight against environmental injustice (Herculaneum; Pacheco, 2006; Porto; Pacheco, 2009).

To Silva (2012), environmental injustice comes in situations where differences could lead vulnerable social groups to be exploited, expropriated or to suffer from violent actions arising from private interests or lawsuits. Thus, the affected communities, by expressing their dissatisfaction with the processes that focus on social and environmental transformation of their territories, face violence through forms of resistance that mark conflicts (Rigotto; Augusto, 2007).

In the current context of globalization, social struggles revive from the importance attributed to the integration of social and economic development with democracy, freedom and sparing use of natural resources. The development of technoscience, along with processes of industrialization, accelerated the occupation of geographical areas with the aim of exploiting non-renewable energy matrices (Schramm, 2012).

The globalization of the economy is related to the process of dispossession of vulnerable social groups; to political domination and to appropriation (Breilh, 2013). This presents itself as an important aspect to consider in understanding the links between health and the environment, with the aim of overcoming the parted and utilitarian view of the practices that conceal rather than recognize and mediate related conflicts (Tambelini; Câmara, 1998).

The social determination of health is marked by the globalization that orchestrates the World

economy, by the historical intensification of market internationalization that negatively interferes with communities' way of life. Large corporations part with individual initiatives–both local and regional–seeking to homogenize social groups from the point of view of consumption patterns (Breilh, 2013; Rattner, 2009).

Identifying and giving visibility to the conflicts contributes to the assessment of environmental problems and the development of socially just public policy. The creation of environmental conflict maps, for example, aims to strengthen minority social groups, to give visibility to asymmetries in power relations and facilitate the interaction of other groups in situations of conflicts favoring environmental justice (Silva, 2012). This comprises a set of principles and social practices that ensure the protection of rights in face of negative consequences of dynamics and actions of economic purpose, aiming to ensure a fair and equitable access to environmental resources and information relevant to the society and the affected groups (Porto; Pacheco, 2009).

For public health, identifying and analyzing environmental conflicts contributes to environmental health surveillance and enables the formulation of protective actions for vulnerable social groups (Schramm, 2012). Thus, mapping the conflicts over the use and ownership of resources available in a given territory can show dispossession processes of local people and violation of basic rights to life, as well as relevant judicial measures (Porto, 2011). For Quintas (2005), it becomes necessary for society to be aware of the problem and have the desire to change, mobilizing in such a way as to halt or eliminate the processes that are harmful to health.

The aim of this paper is to analyze environmental conflicts over water in the context of the Integration Project of the San Francisco River, discussing their implications from the social determinantion of health.

Methods

The research design is descriptive exploratory. The study period involved the years from 2003 to 2012, with the area of research being the states of Ceará (CE), Paraiba (PB), Pernambuco (PE) and Rio Grande do Norte (RN), which are the states that will receive the water transposed by the Project.

Secondary data on the conflicts over water were used, and the Health, Environment and Work Laboratory/CPqAM/Fiocruz-PE requested databases through an official letter to the Pastoral Land Commission (CPT). A Statistical Package for Social Sciences (SPSS) database was built to process and systemitize the data, which was then extracted to Excel spreadsheets to register the information quickly and accurately. To create and validate the database into which conflicts over water were entered, a sample of 10% of the data transferred from the CPT database to the research database, was randomly selected, checking and comparing the selected variables. When data inconsistencies were identified, the data was recreated. The extraction of absolute and relative frequency was used to present the analysis of the data in tables and charts.

Table 1 - Environmental conflict over water analysis plan according to operational category: Ceará, Paraíba, Pernambuco, Rio Grande do Norte, 2003 to 2012

Operational category	Variables
Conflicts over water in the states of CE, PB, PE e RN	Number of registered conflicts in the states of Ceará, Paraíba, Pernambuco and Rio Grande do Norte.
Conflict status	Lack of a resettlement project; No resettlement; Impeded access to water; Threat of expropriation; Reduced access to water; Disagreement; Destruction and/or pollution; Predatory fishing; Historical and cultural deconstruction; Failure to comply with legal procedures.
Families Involved	Number of families involved

Results

The Graph 1 presents the results of the environmental conflicts over water identified in the states of Ceará, Paraíba, Pernambuco and Rio Grande do Norte. Note that the states of Ceará and Pernambuco present the highest recorded number of conflicts over water in absolute terms.

When analyzing conflicts over water, according to the situation in the area of influence of the Integration Project of the San Francisco River (Table 2), stand out as the most registered incidents destruction/pollution, lack of resettlement projects, impeded access to water and inadequate resettlement.

Table 3 shows that the state of Pernambuco has the highest number of families affected by environmental conflicts, 22,356 households, followed by the state of Paraíba with 12,796 families.

Discussion

Regarding the states surveyed, the results point to important aspects related to Ceará that has more recently been pointed out as a state where agribusiness is heavily present. This is the main production process competing with the use of water by small landowners, landless, indigenous people, *quilombolas*, and for human consumption.

Graph 1 – Number of environmental conflicts over water in CE, PB, PE, RN, Integration Project of the San Francisco River, 2003 to 2012

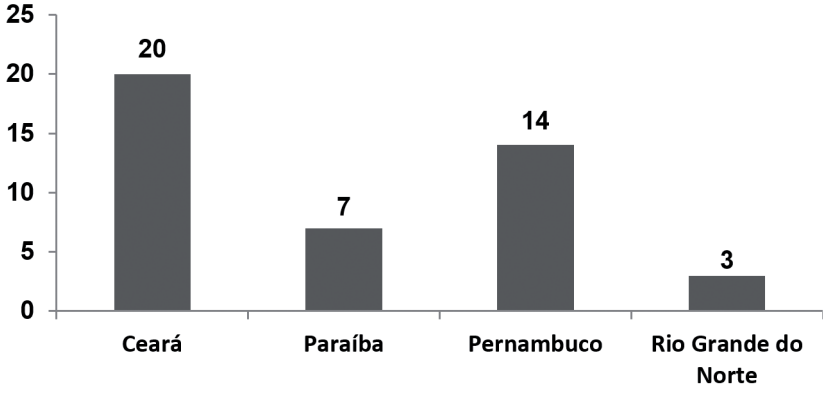

Table 2 – Number of water-related conflicts by status: Ceará, Paraíba, Pernambuco and Rio Grande do Norte, 2003 to 2012

Conflict status	CE	PB	PE	RN	TOTAL
Lack of a resettlement project	4	2	2	-	8
No resettlement	2	-	-	-	2
Impeded access to water	2	-	3	1	6
Inadequate resettlement	1	2	1	-	4
Threat of expropriation	1	-	1	-	2
Reduced access to water	3	-	1	-	4
Disagreement	1	-	4	-	5
Destruction and/or pollution	4	3	-	2	9
Predatory fishing	1	-	-	-	1
Historical and cultural deconstruction	-	-	1	-	1
Failure to comply with legal procedures	1		1	-	2
TOTAL	20	7	14	3	44

Table 3 – Number of families affected in environmental conflicts over water in Ceará, Paraíba, Pernambuco, Rio Grande do Norte, 2003 to 2012

State	N
Ceará	8.780
Paraíba	4.231
Pernambuco	6.697
Rio Grande do Norte	-
TOTAL	19.708

Similarly, Pernambuco has a fruit grower complex in an irrigated area, where conflicts over water have intensified since this mode of agribusiness was installed in the semi-arid.

Another important aspect is that in all territories where there is influence of the PISF, there is a strong presence of socially and environmentally vulnerable groups that fight for land reform and the demarcation of land to plant, which also requires water (Brazil, 2004; Rabelo, 2010). In addition, there is the threat of historical and cultural deconstruction of indigenous peoples in the state of Pernambuco, the 500 families of Truká indigenous people that fight for the use and preservation of their territory located in the municipality of Cabrobó / PE are an example (Arcanjo, 2003; Rabelo, 2010).

The possibility of expanding the use of water by agribusiness with intensified use of pesticides, another aggravating element of the agricultural model adopted, points to the fact that the PISF negatively affects the way of life of families in the project's area of influence, especially of health and the historically built social ties (Porto; Milanez, 2009).

According to the Dossier on health and pesticides (Part I) of the Associação Brasileira de Saúde Coletiva (Carneiro et al., 2012), during the last three years Brazil has been seen as the largest consumer of pesticides in the world. The impacts on public health are great because they affect large territories and involve different population groups, such as workers in several different business areas, people living around factories and farms, and consumers of contaminated food. These impacts are associated with the current development model supported in agribusiness. Port and Milanez (2009) consider that the ventures seem to be implemented in places where struggles and social movements are fragile, most likely because this way, social pressure, the regulatory power of the state and the action of Public Ministries (Ministérios Públicos) are smaller. It is actually a locational blackmail presented as the only way to overcome the problem of migration to urban centers and to develop the semi-arid, avoiding developmental delay in the region.

The discourse used by project proponents has been regional development with the potential to generate employment and income, by competitive productive participation in the modern economy, including tourist centers, irrigated agriculture and aquaculture (Brazil, 2004). However, water contamination, especially by leaching in material or waste deposit areas is not internalized, which further aggravates the existing environmental conflicts.

The water contamination of the São Francisco River is a challenge that involves complex relationships because of the many sources of pollution related mainly to the discharge of organic effluents from industrial parks. Regarding punctual sources, the main potential problems of water quality impairment are related to the urban services of solid waste destination and moderate load municipal sewage concentration in areas of high potential for degradation of water quality (Rodrigues et al., 2004).

According to Rodrigues et al. (2004), Petrolina/PE and Juazeiro/BA concentrate, approximately 42% of the load in the Middle São Francisco Basin, highlighting the important industrial park of Petrolina, especially food industries, whose potential pollutant loads are reduced to moderate, because they are composed mainly of nutrients and organic load. Next come the chemical / pharmaceutical industries of the two municipalities, where 77% of polluting industries are located, having tanneries, whose potential pollutant loads are high, and which are likely to contain toxic organic substances and heavy metals.

This information is important to hold the industries that pollute water bodies with a variety of highly toxic products—including heavy metals, toxic chemicals, solvents and hydrocarbons, as well as other substances with high pollutant load—responsible. These discharges, for being point source, can be easily monitored and must fall within standards set by environmental agencies.

A pollution control program through water reuse processes should be considered for pollution mitigation proposition, as it helps to reduce the amount of waste dumped in water bodies. The establishment of water quality standards, intended uses, and effluent discharge standards for the maintenance of good quality are provided by the National Water Agency (*Agência Nacional de Águas*, ANA) of Brazil (Quintas, 2005).

The National Program for Water Quality Assessment, thus, arises with the prospect of facing a number of needs related to the monitoring of water quality in Brazil which directly influences the management of water resources and resolution of conflicts between different uses of water. The intention is to overcome the existence of geographic and time gaps, lack of standardization and information about collection and laboratory analysis. It also contributes to the dissemination of information to the public and to decision-makers. Despite ANA's efforts to prepare the Situation Reports for Water Resources in Brazil, there is no information on the quality of water in the context of PISF (Brazil, 2013, 2014).

An important aspect is that the management of access to water proposed in PISF will be done by public concession for the operation of the system, in a way that the State pays for operation and maintenance costs (Brazil, 2004). Considering the possibility of the private sector taking over the concession, water unease of the policy of access to water for human consumption will become even greater.

State management bodies show evidence of major fragilities regarding the organization of water management systems in their respective territories, especially with regard to the supervision and monitoring of the operation (Brazil, 2004; Quintas, 2005).

As Rodrigues et al., (2004) state, the pollution caused by inadequate final destination of urban waste reflects the existing weaknesses. It is not difficult to agree that most states and municipalities have no surveillance systems capable of monitoring waste dump.

Thus, local exhaustion, due to lack of adequate treatment, results in high levels of potential effluent emissions, which is a major problem. They carry to water bodies, rivers and aquifers a significant amount of nutrients, organic load, coliforms and vectors of various diseases. The role of affected municipalities was not properly assessed by PISF consultants (Brazil, 2004).

These issues relate to the environmental conflicts over water worsening disagreements between specific groups because of confronting objectives and interests in the use of land and natural resources. These are important aspects that threaten vulnerable groups that, by resisting the violation of essential rights, build legitimizing forms of participation for their models of appropriation of territories and natural resources (Acserald, 2004).

For example, conflicts involving indigenous territories indicate that there is a mismatch between the PISF and indigenous Pipipã and Kambiwá people (Arcanjo, 2003). Environmental conflicts arising from the dispute between the different development models involve not only organized social movements, transnational agro-export companies and industries, but also regulatory institutions and public policy (Porto; Pacheco, 2009).

Understanding the health-disease process and health *per se* in the context of environmental violation permeated by such conflicts, allows us to rescue the purpose of public health in addressing social inequalities and the historic role of public health in the construction of just and democratic societies (Breilh, 2013; Tambelini; Câmara, 1998).

To Rigotto and Augusto (2007), the consolidation of the social and environmental crisis in different territories expresses the appropriation of natural and public space resources for specific purposes, generating exclusion and dispossession, and producing reactions by social movements, groups and populations whose fundamental rights—such as health, work, culture and environmental preservation—have been affected.

In this context, new arguments and fights need to be developed (Cappio, 2008; Breilh, 2013). This is the case of indigenous territories directly affected by the transposition, such as the Kambiwá in the district of Ibimirim (2,574 inhab.), the Pipipãs in the district of Floresta (1,033 inhab.) and the Truká in Cabrobó (3,462 inhab.), with a total of about 7,000 affected people (Brazil, 2004).

Despite identifying the lands and the indigenous people through secondary data sources, the consul-

tants of the environmental impacts study did not take the time to carry out a survey of the negative impacts to these indigenous groups. These indigenous people already deal with many problems related to the struggle to establish their land, like the Pipipãs that are considered Indians without land for not. The Kambiwás and Pipipãs consider Serra Negra as the sacred place where their ancestors came from, which was not considered in the licensing (Arcanjo, 2003).

The Federal Constitution of 1988 (Brazil, 1988) established the obligation of listening to indigenous communities (paragraph 3 of Article 231). National Congress must consult them before any intervention that may affect their territories. The transposition project committed to contribute to the regulation of these territories, as well as those of about 50 *quilombolas*, as a mitigation measure of socio-economic impacts, and yet, by 2013, nothing had been done in that direction. Rural settlements have also been directly impacted by the project, whose channels still in construction cut their lands, as well as the lands of the *quilombolas* and other indigenous groups.

The fact is that the increased flow of migrants contributes to the disruption of local life and will impact the lives of traditional groups. Although the Brazilian National Health System proposes health indicators that can point out early on damage to health, the environmental licensing process has not considered them (Rigotto; Augusto, 2007).

Conclusion

Environmental conflicts present in implantation territories of large ventures contribute to the worsening of violation of human groups in their contexts of life. Environmental conflicts show that populational groups will be affected by PISF, materializing active processes of violence and discrimination.

The identification of conflicts over water in the area of influence of the São Francisco transposition project can serve as a basis for comparison, a *posteriori* since the project is still under implementation. At the same time, it favors the discussion on the value of water as a natural resource essential to health and the lives of people. The use of water for human consumption should be defended as a guarantee of basic human rights, especially for rural and small diffuse urban centers that will least benefit from the project.

To think from the perspective of public health requires the inclusion of the identification of environmental conflicts involving human groups in order to promote the debate on the development model adopted by the Brazilian government and production of environmental injustice.

Further studies are needed to better identify, characterize, deepen and interpret the meanings, motivations, implications, affections and representations involving the actors involved in the conflict in order to mediate the conflict and establish protective measures for vulnerable groups by proposing of social protection policies.

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Authors' contribution

Silva and Santos performed the data collection. Silva made the analysis of the results and the initial wording. Augusto; Gurgel, A. M.; Gurgel I. D. G. and Costa contributed to the final version.

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