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SPECIAL FEATURE: CASE REPORT

The EJAtlas: Ecological Distribution Conflicts as Forces for Sustainability

The map of conflicts related to environmental injustice and health in Brazil

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Abstract This article discusses the experience of the map of conflicts related to environmental injustices and health in Brazil and its potential contribution to international movements for environmental justice. Inventories and maps of environmental injustices are important instruments of struggle against injustice and racism, since they increase the visibility of populations, whose lives are threatened. The Brazilian map is published online since 2010 and was an initiative of FIOCRUZ, a public health and academic institution, and the NGO FASE, in cooperation with the Brazilian Network of Environmental Injustice (RBJA), created in 2001. Environmental justice arised in Brazil as a field of reflection and mobilization, and as a rallying point to identify the struggle of several groups and entities, such as rural and urban grassroots movements, indigenous peoples, traditional populations, and peasants affected by different hazards and risks, as well as environmentalists, trade unions, and scientists. Currently, the map has 570 emblematic environmental conflicts in all regions of Brazil. Many economic activities are causing the conflicts such as mining expansion, oil and gas extractions, infrastructure (roads, mega-dams), agribusiness, and pesticide pollution, often with the support of governmental institutions.

Keywords Maps · Environmental conflicts · Environmental justice · Collective health · Social movements

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Introduction

The article discusses the experience and some results of the Brazilian map of conflicts related to environmental injustices and health in Brazil and its potential contribution to the international movements for environmental justice. The map is a project that since 2008 has organized and made available emblematic cases of environmental conflicts in all Brazilian regions. This map is coordinated by FIOCRUZ and initially by FASE, an NGO that acted as Executive Secretary of the Brazilian Network of Environmental Justice (Rede Brasileira de Justiça Ambiental, RBJA, by its initials in Portuguese) between 2002 and 2011. The map is online since 2010 on the website www.conflitoambiental.icict.fiocruz.br.

RBJA is a solidary coalition founded in 2002 that joins academic groups and environmental justice organizations (EJOs) with the demands of social movements and several populations affected by economic ventures or the failure of public policies and institutions. Since the beginning, RBJA was linked with international groups and networks working with environmental justice (EJ), for instance, activists and academic researchers from United States, Chile, Ecuador and Uruguay who participated at the International Colloquium on Environmental Justice, Labor and Citizenship,

held in the city of Niteroi in 2001. The set of environmental injustices and racism focused on by RBJA include socio-environmental impacts and risks affecting different local groups like peasants, indigenous peoples, quilombos (Afro-Brazilians settlements), as well as poor people living in the peripheries of urban areas. The basic aims of RBJA are to develop tools to promote EJ; to denounce cases of environmental injustice and organize campaigns to face them; to encourage dialogue among multiple actors in EJ struggles with an interchange of experiences, ideas, data, and strategies of actions; to put pressure on politicians and governmental agencies to develop and implement public policies concerned to EJ, as well as to publicize and give public accessibility to information about the conflicts (Porto 2012). The mentioned map of conflicts seeks to respond to these objectives.

Drawing from the experience and some results of the Brazilian map of conflicts related to environmental injustices and health, some questions that the article will pose are: what is the importance and the role of a national map of environmental conflicts according to our experience? What are the most important economic sectors in the map and how do these reflect the development model of Brazil? Who are the most important social groups affected by the conflicts? How can we understand the contributions from rural and urban areas and populations in terms of conflicts? How does this map contribute to the Environmental Justice Movement at different scales, from the local to the national, regional, and global?

To answer these questions, we use political ecology as a critical reference to understand environmental injustices in connection with the distribution conflicts in different scales arising from economic, social, and ecological phenomena that place the burdens of development squarely on the poorer, the most discriminated and excluded populations and their territories (Martinez-Alier 2003; O'Connor 2001). This theoretical background is important in linking the Brazilian conflicts within the international unfair trade and the global social metabolism, and it gives support to overcome the restricted approach used by local, communitarian EJOs disconnected from international or global movements. In this sense, one important role of the Brazilian map is to make explicit the impacts of ecologically unequal exchanges in a semi-peripheral country of the world system.

According to Hornborg (1998), neoclassical economic ideology has dispelled all possible criteria for assessing a market transaction as unequal or unfair. However, the fact is that the productive potential of energy and materials is permanently being transferred from the peripheries (i.e., Latin America, Africa, and Asia, or the Global South) to the manufacturing centres, generating ecological destruction and global, core/periphery inequalities. For instance, the Brazilian development model is based on mainly the production of rural and metallic commodities for export. Many economic activities are causing the conflicts such as mining expansion, oil and gas extraction, infrastructure (roads, mega-dams), and agribusiness, often with the support of governmental institutions. This is a central point to link the Brazilian map with the international environmental justice movement.

Another important reference comes from political geography working on social cartography. According to some authors, the mapping of environmental injustices and conflicts is more than the use of the conventional statistical approaches and geographic information systems (GIS) to develop multiscale analysis incorporating spatial and environmental issues related to socioeconomic, race, risk, and health indicators (Mennis 2002). Acselrad (2005) uses the expression geography of dissent to represent the dynamics of environmental conflicts, a counterhegemonic way of understanding environmental injustices as consequences of an unequal distribution of risks produced by economic development and the abusive power of economic agents. Historically, maps were designed to facilitate and legitimize conquests, define the state as a spatial entity, as well as construct post-colonial nationalisms. In a pessimistic view, the relations between knowledge and cartographic power would preclude a popular cartography and the use of maps as a critical instrument of contestation and mobilization (Acselrad 2008). However, the environmental justice movements in recent years have gathered many experiences that seek to strengthen more autonomous political processes in the use and building up alternative maps by affected communities, social movements, and academic groups. These experiences search not only to characterize the impacts of environmental injustices, but to show territories from the point of view of communities, their values, and cosmovisions related to the meaning of life, nature, work, economics, and the commons. The maps portray both cartographic and territorial disputes of a complex nature involving numerous dynamics; political, economic, technological, and symbolic ones. Therefore, the use of maps through collaborative approaches can be an important element of mobilization and struggle for environmental justice movements.

Environmental conflicts should be analyzed not only under their negative and divisive aspect, but also their dynamic potential that is revelatory, transforms the social organization, and boosts actions for more democracy, human rights, environmental protection, and health promotion. Due to their nature, conflicts allow the emergence of social movements and community organizations that can be viewed in different ways. From the hegemonic perspective, the space in which to resolve conflict is limited to the consolidated institutional instances and to the search for consensus among stakeholders through mechanisms such

as composition, negotiation, or decision by majority vote in a process that can hide important social dissent and isolate demands, favoring the establishment of fragmented social identities. In contrast, there is a plurality of demands, protests, and collective rights achievements which, through their joint coordination, produce subjectivities, platforms, agendas networks, and social movements wider than stakeholders (Porto and Martinez-Alier 2007), which are fundamental to social transformation. Maps of conflicts make this conception more visible and support networks at different spatial scales due to alliances between communities, environmental entities, and social movements who are suffering or concerned with specific types of environmental conflicts and problems. For instance, they can support the exchange of information about corporate preventive measures used in different countries, or successful legal or court cases to defend human rights. Actions derived from such information and alliances can produce new social and cultural relations.

The article is organized as follows: after this introduction, in the next section, we present a discussion about environmental conflicts as outcomes of the current social metabolism and a systematization of four relevant types of conflicts in Latin America and Brazil. Afterwards, we present the construction and some outcomes of the Brazilian map, followed by a discussion in understanding Brazilian conflicts and the link with local, national, and international movements for environmental justice. We conclude by reaffirming the importance of maps of environmental conflicts for the development of strategies of social transformation towards a more democratic, just and sustainable model of society.

Understanding environmental conflicts in Latina America: the Brazilian case

In the view of political ecology, in its interface with ecological economics, environmental conflicts can be defined as ecological distribution conflicts within the current social metabolism. They are linked to access to natural resources and services and to damage caused by pollution, since the industrial trade and the production consumption model set up a social metabolic structure that generates such conflicts. These occur in accordance with moments along the "commodity chain" from the material's extraction or the production of energy used, during the production or transport stage or, ultimately, the disposal of tailings (Porto and Martinez-Alier 2007). The link between social metabolism and environmental conflicts in Latin America and Brazil has been recently discussed by some authors (de Molina and Toledo 2014; Porto and Martinez-Alier 2007).

Conflicts at the time of extraction of materials and production of the energy used are present in almost all regions of the world. They may be associated with land occupation and pollution caused by various activities such as: iron, bauxite, and uranium mines; foundries, steel mills, and aluminum plants; oil or gas extraction and refining; or even conflicts related to the extraction of building materials. Several international social networks with operations in Latin America have been established around these conflicts, such as oil watch. Another source of conflicts, also known as biopiracy, is found in the appropriation of genetic resources (wild or agricultural) without acknowledgment of ownership of peasants or indigenous people over them, including the extreme case of the Human Genome Project.

Soil degradation has been another major source of conflicts in many countries and results from soil erosion caused by the unequal distribution of land or the pressure caused by export-related monocultures, such as soybeans in Brazil. A similar situation is found in crops that, unlike what is often stated, are not forests, because they work as monocultures of tree plantings like eucalyptus used in the field of pig iron and steel (important in Brazil), or even in the manufacture of paper pulp or cellulose, whose output is routinely exported. In recent years, besides trees, the use of biomass for the production of biofuel (particularly sugar cane, but also diesel from vegetable oils) has been scaling up. There is a strong relationship between the growth of biomass material flow and the increase of environmental conflicts, including land-grabbing, the spread of monocultures on family farming areas, and the consequent danger of losing food security and sovereignty. Another example of appropriation and degradation of natural resources and soil is the increase of agriculture aimed at the production of meat and dairy products, as well as shrimp farming that have destroyed mangroves and caused reactions to preserve the means of survival of fishermen and shellfish pickers. Also related to fishing are local, national, and international conflicts regarding the demarcation of exclusive fishing areas and the defense of local and community fisheries opposed to industrial fishing, as well as offshore oil and gas exploration. Water-related conflicts have created important movements in various countries, such as those against the construction of large dams to generate electricity or for irrigation purposes, or even conflicts related to groundwater private use, pollution by pesticides, or industrial pollution.

Transport-related conflicts are booming due to the increased use of materials in the economy that need to be moved between the locations of extraction, production, and consumption. During the 20th century, transport-related indicators (e.g., the amount of tons transported per the number of road kilometers) show stronger growth than GDP and the outputs of material and energy from the

economy. Transport-related conflicts are compounded by events such as oil spills from tankers or pipelines leaks, or even due to the construction of new highways, waterways, ports complexes, and airports used to the increasing runoff of agricultural, mineral, and industrialized products. Such ventures generate extensive conflicts that can simultaneously affect the areas necessary for the survival of distinct peoples or populations, often stimulating strategic alliances among them.

Conflicts related to waste disposal and pollution are consequences of the "outputs" of social metabolism. The first conflicts of this nature were referred to in the U.S. as toxic struggles, referring to the struggle against the risks caused by exposure to heavy metals, dioxins, and other hazardous pollutants emitted mainly, but not only, by chemical and petrochemical industries. Cross-border pollution amplifies the issue and points to problems such as sulfur dioxide which crossed borders in Europe and produced acid rain, but it has also become a problem in Latin American metropolises. Another type of conflict that is widespread worldwide in the Global South and is especially serious in Latin American countries is related to landfills, waste incineration, and the export of toxic waste from rich to poor countries, including tires, scrap, plastic, and electronic or chemical waste.

A recent and particular type of conflict is associated with the so-called green economy and mechanisms aimed at the use and commodification of oceans, forests, soil and atmosphere for carbon sequestration or as temporary carbon dioxide reservoirs. Besides discussions regarding the equal distribution of rights to use and the fight against disproportionate releases of carbon dioxide (carbon debt), several environmentalist groups have mobilized to prevent the use of resources from funds such as CDM and REDD for the maintenance and scale-up of monocultures such as those of eucalyptus, besides criticizing the maintenance of polluting practices and the nature commoditization feature imposed by such market mechanisms.

A final type of conflict to be mentioned relates to the safety of consumers and citizens around the potential risk of new and dangerous productive technologies and investments. Both in rich and in poor countries, several disputes revolve around technologies like nuclear power, genetically modified organisms, pesticides, and emerging diseases that are related to environmental issues. Disputes deal with the safety criteria in risk management and control and the application of the precautionary principle, and they show how public perception of risks of a same technology can be very different among countries. At the same time, such differences and the speech of "progress" have been used to scale-up forms of labor and risk division internationally through investments in more polluting and/or dangerous sectors in the so-called "less developed countries".

In the following, we present a schematic summary of four major groups of environmental conflicts of relevance to Latin America and Brazil. The typology adopted relies mainly on the formulation expressed previously and the experience of the authors with the environmental conflicts and the Brazilian map. The proposal typology focuses on four groups of conflicts.

The first, present in nearly all Latin America and of great importance in the current economic situation in Brazil, is related to agribusiness export, particularly to the production of rural commodities. Among them, we highlight the monocultures of soybean, of trees such as eucalyptus and pine, sugar cane to produce ethanol (biofuel), shrimp farming and ranching. Since 2008 Brazil has become the biggest pesticide consumer in the world, which has produced as a reaction a national campaign against pesticides (or agrotoxics), organized by several organizations engaged in agroecology and agrarian reform.

The second, of particular relevance to many countries in Central and Andean America, refers to both the mining of metals, oil extraction, and processing industries for the production of commodities such as petroleum products, steel, aluminum, and gold. Both mining and associated industries have a high environmental impact, affecting the health of ecosystems, workers, and people in the impacted regions. There are many other groups complaining against damage by mining and the transport of iron ore, such as Justiça nos Trilhos (justice in the railways) in northern Brazil which itself is part of the Brazilian EJ movement. This type of conflict has increased its importance in the Latin American context, since corporate investments in this sector have been increasing significantly since the 1990s. Currently, the mining sector is responsible for a significant part of the export agenda of most countries in the region. In these contexts, national states have acted primarily to ensure the continuity or expansion of enterprises of interest to state, national or multinational corporate groups while neglecting social appeals for measures that guarantee sustainability and environmental justice in enterprises (Araujo and Fernandes 2016).

For this reason, extractivism and the production of agricultural and metallic commodities now play a strategic role in the Brazilian economy. Data from the State of Commodities Dependence report of the United Nations Conference on Trade and Development (UNCTAD 2015) indicate that in 2013, 65% of Brazilian exports depended on commodity production [corresponding to about 7% of gross domestic product (GDP) for that year]. Of these, food production accounted for 52%, minerals, metals and precious stones, 28%, fuels 14%, and other products of agricultural origin 6%. Of note were the export of iron ore

(21%), agrofuels (11%), and crude oil (11%). This production was exported mainly to China, the European Union, the United States, other countries of South America and Japan (69% of all commodities Brazilian exports).

Contrary to the expansion of the primary sector and the service sector in the Brazilian economy, there was a contraction in the manufacturing industry in the 1990s. This trend has intensified in recent decades, which has led many authors to affirm a scenario of reprimarization of the country's economy (Oreiro and Feijó 2010; Salama 2016). This phenomenon is related to the deepening of the liberalization policies and the opening of the internal market to imported products implemented by successive governments since 1988, and the political option to expand the country's specialization as an exporter of agricultural and mineral products. One consequence of reprimarization is the decrease in jobs for skilled labor and the opening of jobs sectors that tend to offer lower wages and more precarious working conditions (Carvalho and Carvalho 2011).

The third group of conflicts stems from energy production and large infrastructure enterprises. Among them, we highlight dams and hydroelectric power plants, oil and oil derivatives industry, thermoelectric power plants, nuclear power plants (present only in Argentina, Brazil and Mexico, but with plans in several other countries, such as Chile, Venezuela, and Ecuador), waterways and highways and transposition and integration of watersheds. It is interesting to note that even technologies and manufacturing processes involving alternatives considered cleaner or sustainable (such as biofuel and wind power production) can give rise to environmental conflicts involving land disputes (through the scale-up of monocultures such as sugar cane and wind farms) and possible environmental impacts. Important social movements have arisen in Brazil linked to this group of conflicts, such as the MAB (Movimento dos Atingidos por Barragens, or movement of people affected by dams, in English), which is particularly advanced in terms of alternative proposals related to energy sovereignty, agrarian reform, and the democratization of energy production and consumption.

Finally, typically, urban environmental conflicts involve mainly problems in regions that American theorist Bullard (1994) calls "sacrifice zones", i.e., areas where excluded and discriminated populations are forced to live and work in hazardous or degrading conditions, with lack of sanitation or exposed to greater pollution risks—or even flooding or major impacts as a result of earthquakes or major industrial accidents. This phenomenon lies behind the statistics of important technological and "natural" disasters that mark the vulnerability of Latin American populations in many countries. An expansive portion of the Brazilian population is urban and lives in slums and places without appropriate urban infrastructure, frequently in areas at risk of flooding, and exposure to garbage sites, industrial pollution, and major accidents. Despite that, many environmental conflicts within urban areas remain unnamed as environmental injustice problems. However, the social movements for sanitation, against pollution, the right to housing and other social services are present in different cities. They are classic examples of EJ movements and their voices are amplifying in Brazil.

Another conflict results from the expansion of financial capital by way of global investments and events in different countries and cities. These include protests against the privatization of public spaces and resources for large sporting events such as the World Cup and the Olympic Games, and the unfulfilled promises of social, environmental, and urban mobility improvements. On the contrary, real estate speculation and progressively elitist modes of transport accelerate processes of gentrification, marginalizing poorer populations and forming new sacrifice zones. In Rio de Janeiro, for example, there was a militarization of life in places near the competition areas and an increase in police violence in the slums and other peripheral areas, where paramilitary or drug-trafficking groups were expelled. Such movements unite with others able to articulate with global movements for environmental justice, fighting, for example, for quality public transport, bicycle paths, and the establishment of automobile-free zones.

Materials and methods: the construction and some outcomes of the Brazilian map

The map of conflicts related to environmental injustices and health in Brazil started in 2008 with the aim of systematizing emblematic cases of environmental conflicts in all regions of Brazil. It is important to understand the difference between a conflict and an environmental injustice. Conflicts presuppose the existence of movements of organization and resistance on the part of affected communities and their allies although in an initial phase. On the other hand, a situation of environmental injustice can remain socially invisible until there is some type of resistance and mobilization.

The privileged sources of information for the construction of the cases is based on, to a large extent, the experience of RBJA, its affiliated entities, discussions via email between its members, as well as existing working groups (WGs). Among them, we highlight the chemical, the mining and steel industry, and the environmental racism WGs, the latter had started an initial survey of the map of environmental racism in Brazil which gave fundamental support for the map of conflicts. In addition, the construction of the cases incorporated the experience of several partners, such as academic groups, NGOs, and other

entities that have been working together with EJ movements in the country. Another important source was justice and the Federal or State public prosecutor's office when they involved information on ongoing lawsuits or proceedings.

Currently, there are approximately 570 cases of conflicts that have been available to the public since 2010 through a web portal with a georeferenced system that uses the Google maps platform, where access to various information is possible, such as: type of population affected (indigenous, peasants, quilombolas, urban workers, etc.), economic sectors, environmental risks, and health problems. The main information is an analytical and narrative text describing the conflict from the perspective of the affected populations, as well as allied academic groups and social movements, ending up with a chronology of the conflict and analyzing their interrelations with global processes, the national development model, the strategies of social and economic reproduction of the agents involved, their political and discursive strategies of struggle for understanding the various dimensions of the disputes that occur in each case.

The search for a conflict begins with the identification of its absence in the database from complaints received through the contact form of the map website; indications of researchers or militants linked to conflicts and the monitoring of news, alternative media and social movements' websites. After the research team and the coordination group define the relevance of the conflict as emblematic based on criteria such as the severity of denouncements and threats, the extent of the territory and populations affected, and the EJOs and social movements involved. Then, one researcher assumes the task to organize the available sources of information, such as studies, institutional and academic reports, lawsuits documents, interviews, videos, news, blogs, social networks, documents elaborated by the groups involved in the conflict, etc. Then, the researcher constructs an account of that case and a chronology that summarizes it. This material is registered and categorized into a digital form from a standardized typology built up collectively with some members of RBJA at an initial phase.

The case is then revised twice. In the first revision, the text is analyzed from its formal aspects, writing, clarity, and cohesion. In the second, which we call a political review, the consistency of information is analyzed, considering the various dimensions of disputes or whether there is coherence between the material and political objectives of social and EJ movements. We guide the research by the ethical imperative of not causing damage to EJ movements, affected communities or any of their members. Any influence of our work in the field of environmental conflict must be positive for the involved populations, who are usually in a vulnerable context and party to asymmetries of power and resources that characterize environmental injustices.

Finally, each case is georeferenced and inserted in the platform that is available on the web by a specialized team of the Institute of Communication and Scientific Information and Technology in Health (ICICT) of Fiocruz. Periodically, we analyze inserted cases to identify possible updates that should be made in the reports.

Next, we highlight some relevant results of the Brazilian map of conflicts. We identified that rural and traditional populations are the main affected group in our map. In a universe of 570 cases, 32% involved family farmers, 29% indigenous people, 22% quilombolas, and 16% artisanal fishermen. They are located mainly in the Northeast (32%) and North (26%) regions, where they are most representative.

Most of the conflicts were directly or indirectly associated with the advancement of agribusiness (monocultures: 38%, livestock: 16%, logging: 15% and fishing or shrimp farming: 6%) and mining (18%). About 4% of the cases were related to chemical and petroleum industries. The relevance of agribusiness, mining and infrastructure works such as dams, railways, and highways explains the high incidence of rural and traditional populations living in areas furthest from metropolitan regions.

Referring to environmental impacts and risks, the most significant is the disruption of traditional relations of populations involved with their territories referred not only to livelihood activities but also cultural and spiritual ones. In approximately 80% of cases, they face constraints on their productive activities or traditional forms of ecosystem exploitation. In some cases, these practices become completely unfeasible. In 46% of cases, disputes involve the legal recognition of this territoriality. The same percentage was found for cases in which there is resistance to the advance of deforestation, which indicates that traditional interactions of affected groups presuppose the vitality of ecosystems against the predatory exploitation of common goods. On average, 30% of the cases involve the fight against pollution, and in 16% of cases, soil erosion is the main consequence of productive activities.

In terms of health problems, at least 50% of the evaluated cases involved some form of violence, including assassinations and different types of threats due to repression direct or indirectly linked with state, corporate, or other economic agents. This statistic is important, given that Brazil is among the most violent place for environmental defenders, according to Global Witness (2014). One could argue if it is correct to classify violence under health impacts. However, we assumed a widened vision of health that encompasses a physical as well as psychological, social, ecological, and spiritual dimensions. In other words,

a comprehensive vision of health as dignity that relates not only to illness and death, but also to life, nature, culture, and fundamental human rights (Porto et al. 2017).

In 43% of cases, the disruption of the traditional forms of subsistence led to food insecurity, which in 13% of cases led to malnutrition. In 38% of cases, there was an increase in chronic and non-communicable diseases associated with changes in lifestyle or precarious living and working conditions. Communicable diseases, especially linked to demographic and ecological changes, accounted for about 16% of the cases.

Discussion: understanding Brazilian conflicts and the different spatial scales of environmental justice movements

The analysis of ongoing environmental conflicts in Brazil shows how they put in dispute different dimensions related to human, territorial, and health rights: the ownership, possession or usufruct of the land; the exploitation of common properties and goods in the territories; the power to define the rules of access, uses and limits of relations with nature; legislation and administrative procedures that regulate (or fail to regulate) the ownership or management of common property; legitimate conceptions and discourses about relationships with nature and responsibilities regarding environmental impacts or loss of vitality of ecosystems; ways of coping with the consequences on human health.

In these contexts, the state has an ambiguous role: while under neoliberal principles, it promotes the conditions that make feasible economic projects or policies that generate environmental conflicts, it also establishes the procedures that will guide the actions of social groups and the arenas where the disputes will occur. Legislative power in Brazil is strongly influenced by corporate interests, especially from agribusiness, mining, and infrastructure works. Thus, on the one hand, it is a space for frequent disputes regarding the establishment of regulatory frameworks that recognize different territorialities and relations that people and communities establish with the ecosystems that make up their territories. On the other hand, the State continues to pass laws that reinforce economic interests and commodification of common goods.

Governmental and institutional power plays a key role in formulating and implementing public policies that can promote or mitigate environmental injustice. It is the place where the defense of environment and sustainability of ecosystems and territories can be achieved through policies to protect the rights of vulnerable social groups and the environmental licensing process of potentially dangerous enterprises. However, at the same time, the state often encourages programs and procedural changes that undermine such policies. This is the reason why we consider governmental action and public policies as possible causes of environmental conflict.

The various judicial bodies have a strategic role in these contexts: first, due to the growing disputes in the justice and tribunals, and attempts to criminalize social and EJ movements involved and second, due to the role of the public prosecutors' office and public defenders in the defense of human or collective rights which aim to balance the existing asymmetry of power among social agents.

Nevertheless, there are times when disputes involve the legitimation of claims or projects of social agents. In this way, the media and the academic field play important roles both in establishing legitimacy and in challenging it. They are symbolic disputes that occur mainly through discursive strategies and manipulation of asymmetries in the social distribution of knowledge and information. At such times, shared knowledge production and popular education networks become strategic, especially when technical-scientific language is used by hegemonic groups to make invisible the local and traditional knowledges of those who primarily suffer the effects of development policies and economic investments.

The role of research groups has been important in most of the conflicts analyzed. It is common that in Brazilian environmental conflicts, the state appropriates and uses a technical discourse (both legal and scientific) to subsidize and justify its decisions when they clearly favor an economic project to the detriment of environmental sustainability or human and social rights of affected communities. This is only possible with the active participation of researchers and academics who act as state consultants or for private groups. There is a partnership between state, capital, and the proponents of a supposedly neutral technical-scientific knowledge which in practice privileges the dimensions of reality that justify the ventures to the detriment of others that would put them in check. This kind of manipulation of the uncertainties of knowledge and the complexity of reality is very common in environmental licensing processes or in the context of lawsuits.

A very important strategy in these contexts is a privileged adoption of the principle of prevention to the detriment of the precautionary principle to ensure that the uncertainties associated with the risk analysis of a technology or a socially and environmentally impacting enterprise do not suspend its licensing. That is, when there is a high degree of uncertainty regarding the social and environmental sustainability of an enterprise, the precautionary principle should guide its non-licensing to avoid irreparable damage to the environment or to society. However, the principle of prevention is more limited, since it guides non-licensing only when there is measurable

evidence of these risks. In the cases analyzed, many social agents use the uncertainties about the environmental risks associated with the ventures to justify their licensing, manipulating socially and politically the limits of sciences.

Another strategy commonly used is the devaluation of the situated knowledge of the people living in the affected communities, disqualifying them a priori as non-scientific, instead of taking their complaints as evidences of the need to re-analyze the projects. A third common strategy in these contexts is the disqualification of credentials, and even criminalization, of researchers who propose to build knowledge and counter reports in partnership with affected communities.

Since its launch in 2010, we have presented the conflict map before diverse audiences in Brazil, some formed mostly by academics or lawmakers, but often where people involved with environmental conflicts and social movements that supported them were the majority. Invariably, the presented data and narratives from the map generated two types of reaction. The first was the astonishment related to the extent of environmental conflicts in the national territory and the multiplicity of disputes they involve. Few people were aware of how numerous and how extensive are the territories, where the mobilized populations around the conflicts live.

Another common reaction, particularly among human rights actors, is the understanding that, although populations are distinct as well as involved in productive processes, the justifications and strategies of pressure on affected populations across locations are very similar. The populations are culturally different and the territories are ecologically diverse, but the antagonists and the State act hegemonically under a single rationality: that of commodification and exploitation of common goods in the global market, almost always in the name of "progress".

Life, health, well-being, "buen vivir" or the Andean Sumak Kawsay, cosmovisions or lifestyles can be relevant concepts for those who suffer the impacts of the hegemonic development model, but these are not part of the grammar of hegemonic discourses except as sophistry. However, when a development project becomes feasible, communities often find themselves involved in processes that undermine any way of life that is not driven by market exchanges. The dimensions of the economy that are outside the formal circuits of economic exchange are disregarded and often considered unfeasible by the productive activities that are implanted in the traditional territories or in their surroundings.

By learning about the struggles that take place in other territories, the discourses that were mobilized to convince the peoples living there in the name of "economic progress", and the practices used by the State and corporate/industrial/elite interests to exert pressure on the resistances, the violence and the negative consequences of environmental degradation and de(re)territorialization processes, many people can recognize themselves and design similar situations involving ongoing proposals in their own territories. The sharing of experiences and struggles has an educational dimension that can contribute to strengthening the position of those who has previously been reticent to engage in active resistance due to isolation or powerlessness. Through knowing the struggles and consequences of similar projects, they can take this experience away to their communities and to strengthen their own discourses against such projects based on concrete examples of documented damage to economic, productive activities from the atlas (Menezes and Rocha 2016).

Often, resistance and shared experiences are most effectively assimilated by those who may suffer the consequences of certain ventures when embodied in the figure of a leadership from another territory, for example, who live similar situation. In this way, maps like the Brazilian one or the international Atlas of Environmental Justice created within the EJOLT project (Temper et al. 2015) can serve as a guide that points out who are the strategic people and organizations involved in a conflict. They allow communities to identify potential political partners and initiate a process of mobilization.

Such strategies are particularly effective for populations that are at an early stage of a potential environmental conflict. For example, when an enterprise is still, a proposed project being evaluated by environmental agencies. However, what about communities already suffering the consequences of a new economic activity in their territories that is producing environmental injustices? For this, more than an instrument of alert and articulation for the construction of mobilizations and resistances, the map is constituted as an instrument of denunciation and of amplification of its own struggles in face of the impacts and violations of human rights that have already occurred. It acts as a space that contributes to breaking with the discursive and social barriers built by local businessmen and politicians in the defense of their interests. It becomes an instrument that can contribute to make struggles that until then had a local character, a national or international public concern. More than a repository of the experiences of others, it becomes an instrument of legitimation and diffusion of the struggle itself.

However, also considering the dimension of knowledge sharing that we have mentioned before, when we know the struggles of communities involved in similar situations, we can rethink strategies and mobilizations based on the cases of successes and articulations that have worked in other contexts. Of course, there is no guarantee that something that worked in one territory will have the same results in others. Despite their global determinants related to material

demands, commodity markets, among others, the development of environmental conflicts has very local roots. The interests of big players of the global market can trigger processes that disorganize the territories, yet it is through the relationships established within a specific territory and at the interface of various levels of the Nation-State that will determine the paths of resistance and the extent of both the impacts as of possible conquests. Nevertheless, maps such as the Brazilian one act as spaces for sharing potentialities and possible alternatives for the struggle of peoples in defending their common goods and rights.

The global dimension of the economic and political processes behind the ventures that generate environmental conflicts and the growing articulation among peoples and communities involved with resistances in affected territories means the struggles are not restricted to the local or even to the national scale. In many cases, it is necessary to build international alliances to resist against projects of certain economic groups that act globally. These multiscale connections play a central role in understand the potential of international EJ movements (Martinez-Alier et al. 2016).

In this sense, conflicts are part of a process of preserving certain lifestyles rooted in relationships with ecosystems as well as relations between various local social groups that can express issues of concern that transcend national borders. The defense of a sacred river for an indigenous group against a hydroelectric power plant can take the form of resistance against dams when they are articulated nationally as organized social movements. This is the case of the aforementioned movement of people affected by dams (MAB). It can also be part of the international fight for the preservation of tribal territories and water when it becomes part of international movements, for example, in the case of International Rivers. By becoming symbolic or emblematic and known internationally, on the one hand, local struggles lose some of their uniqueness. Local discourse and framing can become co-opted or overshadowed by the framing of the trans-local actors, including well-meaning international EJOs or researchers. However, on the other hand, they gain in dissemination and in the capacity to generate damages to the images of multinational economic groups. Communities that previously were seen as mere "local obstacles" to be removed in the name of a development project are then considered as real threats to the competitiveness of these groups, and this calls for new strategies to deal with EJOs and affected communities.

A Brazilian example of the extent of damages produced by these international articulations on the image of economic groups that act as global players occurred in the confrontation of eucalyptus plantation and pulp manufacturing. From 1990 and 2000, constant mobilizations against the Aracruz Celulose company in the State of Espírito Santo involved the quilombola communities of Sapê do Norte, the indigenous communities Tupinikim and Guarani-Mbyá; and in southern Bahia mobilizations involved the indigenous communities of Pataxó, peasants and quilombolas who were fighting against Veracel, a subsidiary of the Votorantim group and a joint venture with the Swedish-Finnish company Stora Enso. The mobilizations were based on connections with EJOs linked to RBJA and with the support of national and international articulations such as the Missionary Indigenous Council (CIMI), Via Campesina, the Brazilian Network Alert against the Green Desert and the world rainforest movement (WRM). Local leaderships have been able to break social isolation and bring their denunciations to the whole world through strategies with important social impacts that could not be ignored by hegemonic and corporate media. Some examples were the land occupation of the companies, or financing international trips of local leaders to present their struggles in Global North forums. It is worthwhile to mention that some of the companies in this case were Northern which helped amplify the pressure.

Such mobilizations caused extensive damages to the global image of these companies, in addition to financial losses. The business viability went through the merger of both business groups under a new name that was unrelated to the original companies and could theoretically serve to rebuild the new group's image as socially and environmentally responsible. The creation of the Fibria company was both a strategy of economic strengthening and greenwashing, since, in practice, the way the new company operates does not differ substantially from the old ones. Perhaps, the main difference lies in new investments in community-driven projects that can contribute to an attempt to "green" its image built around its business.

Maps that speak and tell stories of conflicts and struggles amplify these damages by breaking with hegemonic public images of economic sectors and powerful companies. Many environmental justice struggles have an impact on corporate media, systematizing and making available an enormous amount of sparse information, and bring such experiences to the attention of other groups and EJOs facing similar problems. We understand, therefore, that the role of projects such as the Brazilian map has relationships with countless communities and EJOs present in many cultures around the world. To the extent that maps of environmental conflicts of different spatial scales become the repository of the past struggle stories, they contribute to the mobilization of present struggles. Obviously, this helps to democratize resources and information, since many vulnerable communities affected by environmental injustices do not have the same capacity with words, especially technical-scientific and legal discourses, as well as the use of information and geo-referencing technologies. In this

way, maps can join other forms of expression and mobilization.

Conclusions

By joining social justice and human rights to environmental and health protection, environmental justice movements carry with them the potential for communication between different people, countryside and urban languages and cultures that make up the rich and multiple diversities, not only of Latin America but in the world. Thus, this helps to operationalize possible dialogues that may build new commitments and dreams of a counter-hegemonic globalization towards a socially fair and environmentally sustainable world.

According to these ideas, there are different important roles in constructing and using maps of environmental conflicts. Inventories and maps like the Brazilian one are important tools to fight against injustice and racism, as they increase the visibility of populations whose lives are threatened. The proposal of the Brazilian map is not only a platform, but it also works as a shield, insofar as it is possible in an economic world of violence against the poor and discriminated populations by environmental racism. It demonstrates solidarity between academic groups and non-governmental organizations with the demands of social movements and populations affected by economic operations or the failure of public policies and institutions.

In this way, we understand that there is only the possibility of building a democratic, egalitarian and sustainable society, or in the words of Santos (2007), a post-capitalist, post-colonial and post-abyssal society, insofar as the various social and environmental justice movements do not neglect the existence of societies rooted in non-Western cultures. These have lived out of capitalist and Eurocentric models of society with universal cosmopolitan pretensions, and their counterhegemonic practices and worldviews have much to contribute to deepening the struggles for a fairer and more environmentally balanced society. Proposals such as *buen vivir* (Acosta 2010) and economic degrowth (D'Alisa et al. 2014) may not necessarily be part of the same language or struggles, since they seek to build societies based on different worldviews.

However, the recognition that the various localized struggles can be strengthened politically through dialogue and can result in overcoming the incompleteness that exists in any world view in building up other futures. Common objectives, above epistemic or cultural differences, constitute themselves as meeting points of knowledges and practices of various anti-hegemonic movements that can challenge the current social and ecological crisis. Challenges have simultaneously communication, epistemological, and political dimensions that should be worked together. In addition, maps such as the Brazilian and the EJatlas ones are good tools to face these challenges.

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