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**Public Health and Environmental (In)Justice in Brazil**

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# Public Health and Environmental (In)Justice in Brazil

## ***1. The field of Public (Collective) Health in Brazil***

Public Health can be defined as a theoretical and operative field that involves different knowledge areas and operational practices simultaneously around health problems of populations (1,2). Its development is intimately connected with the construction of modern societies and democracy, because its central aims are to reduce frequency and duration of diseases, as well as to assist sick people and, consequently, to enlarge longevity and life quality. Besides the development and application of several scientific disciplines, especially the biomedical ones, several public policies, technologies, juridical and institutional frameworks have been developed during the last two centuries since the foundation of modern scientific medicine and the *pasteurian* microbiology.

During the seventies, the Public Health field participated intensively in the struggle for democratization in Brazil and Latin America - where a lot of countries were submitted to military dictatorships - articulating technical, academic and social movements, as well as on national and on international levels. In this process the so called Latin-American Social Medicine was developed, that focused public health problems as major consequences of social, political and economic determinants. For the same reason, in the 80's the Brazilian health movement renamed the field of Public Health to Collective Health and began the political movement for the Brazilian Sanitary Reform. Its major objectives were to build up public policies and actions that assured a better level of assistance and prevention related to the serious health problems which affected especially the poorer and excluded groups. Up to then, the conceptual references and models came mainly from socialist countries and European Welfare States, with special relevance for the Italian experience of Sanitary Reform developed in the seventies. The importance of the labor movement in the Italian model also influenced the creation of Workers' Health area in the Brazilian Public Health, demarcating new possibilities of articulating institutions, technicians and unions, in opposition to the conservative model developed at this time by other Brazilian institutions, which excluded workers' participation. A specific environmental surveillance sector is coming into the Brazilian

health system only in the last years, although the workers' area has been developing actions related to environmental problems since its beginning.

Important political and legal conquests of the Brazilian Collective Health were obtained in the new Federal Constitution of 1988 and the Health's Law of 1990, which configured the public health system (SUS) marked by the principles of universality, equity, decentralization and social control. This last concept propitiated the constitution of health' councils inside all government levels of SUS (federal, state and municipal), impelling a more democratic administration of public policies and resources in the health sector through the participation of organized social movements. Another major point of the Brazilian health movement was the accomplishment of National Health Conferences with a wide participation of social movements, professional and technical groups/institutions in defining main priorities to be pursued by the national health system.

In Latin-American countries, the nineties have been marked by several limitations and existent setbacks mainly resulting from neoliberal policies, economic crises and budget restrictions, affecting social movements and restricting social policies. In spite of this, the Public/Collective Health field has configured in practically the whole country an important institutional, juridical and academic space. Within it new interdisciplinary experiences have been developed between institutions, technical and academic groups with several social movements, as labor unions, residents' associations and other users of public health system.

## **2. Environmental (in)justice and Public Health**

The concept of environmental justice was especially developed in the USA as a consequence of the success from earlier civil rights movements (3). As Bullard pointed out, "*if a community is poor or inhabited largely by people of color, there is a good chance that it receives less protection than a community that is affluent or white*" (4, p.11). And less protection means more risks, such as polluting industries, hazardous waste disposal sites, incinerators and so on. In the USA the initial concept of environmental racism was enlarged later towards the concepts of environmental injustice and justice, through the incorporation of other dimensions, such as class, gender and other forms of social discrimination (4). The declaration for environmental justice, which was presented in the USA in 1991, speaks about the

need for reverting political, economic and cultural oppression that marked five centuries of colonization on the continent. The institutionalization of these movements in the USA can be seen in the constitution of several research groups and centers for environmental justice in universities like Michigan, Louisiana and Clark Atlanta, as well as the Executive Order no. 12898 announced on February, 1994 by President Clinton requiring all federal agencies to work toward ending the disproportionate exposure of minority and low-income populations to environmental harms.

Although the history of the environmental justice movement in the USA was more restrict to some exposed social groups to specific environmental risks, such as black or Native American groups living around hazardous waste disposal sites, in the last years the concept of environmental justice has been incorporated by different international and national movements and sectors, also in other high industrialized countries such as Germany (5). This concept can be understood as similar to the concept of environmental equity, which is more used within the public health field. But in many languages and cultures the word justice – in comparison with equity - is much more direct and easier to be assimilated by different people and social movements, since we take care that its comprehension be not restrictive as a juridical or bureaucratic vision, but in its whole ethical and political dimensions. And the concept of environmental (in)justice can be useful not only for high industrialized countries but also for peripheral ones, where environmental problems have other important dimensions of vulnerability.

The concept of environmental injustice can be defined as *“the mechanism for which unequal societies, from economic and social point of views, destine the largest load of environmental damages of development to the populations of low income, to the discriminated social groups, to the traditional ethnic people, to the labor neighborhoods, to the marginalized and vulnerable populations”*. (6) The concept of environmental justice is understood by a group of principles and practices that assure that any social group, be they ethnic, racial, of class or gender ones, *“support disproportional environmental negative consequences of economic operations, of politics and of federal, regional or local programs, as well as of the absence or omission of such decision processes”* (6). Environmental justice means also assuring a fair and equal access to the environmental resources of a country, as well as a wide access to the most important information

and decisions to all affected groups, which enable the construction of alternative and democratic development models.

The previous definitions can enlarge our comprehension about environmental issues towards an ecosocial approach. On the one hand, productive and economic processes across different time and space scales interact with natural cycles and ecosystems. On the other hand, political and social processes define the distribution of resources and power among several social groups. Ecosystems, environmental and material conditions result from these interactions that can favor or degrade the life support systems, as actually is denominated by ecosystemic approaches (7), to different regions and population groups. In this way, certain social and productive systems can flourish or inhibit the expression of life to certain groups in the present or in the future (next generations), either through inequalities in the distribution of power and wealth, or through the degradation of life support systems.

Great part of public health problems in a country or region can be fundamentally understood as problems of environmental injustice. The dynamics that generate discrimination and poverty come since their beginning from important environmental and consumption characteristics of several areas and specific population groups, determining or conditioning the form that such people get sick and die. This phenomenon can also be quantitatively observed in the analysis of morbidity or mortality pictures of a country or region. This intimate relationship is more visible in the poorest countries with larger levels of income and power concentration. They can be called (semi)peripheral countries, according to the logic of international division of labor present in the economy-world system of global capitalism (8).

The relationship between poverty, malnutrition, lack of basic sanitation and infant mortality is well known (9,10,11); or the relationship between workers' health and work/living conditions in different phases of capitalism evolution (12,13); or still the vulnerability of certain regions, countries and social groups in front of natural or technological disasters, be they flooding, hurricanes or industrial disasters (14,15,16).

A paradigmatic example of industrial disaster occurred in Bhopal, India, in 1984, with more than 2500 deaths only in the first hours after an isocyanate gas release, which was lethal, colorless and scentless. The accident happened in a North

American multinational factory of pesticides, and a slum grew out around the factory with hundreds of thousands of residents. (17,18) A similar case happened in Brazil in the same year with a gasoline release from a pipeline near a slum in Vila Socó, Cubatão/São Paulo. Some people began to store gasoline for selling later, and the force of the fire was so intensive that many bodies were reduced to powder and they could never be found. The vulnerability of this poor population can be revealed in a tragic way: the discussion about the number of victims was controversial, and it varied from 98 deaths, the official number of authorities, to more than 500, estimated number by the public prosecutor's office with help of some local institutions (14).

One of the most outstanding and paradoxical examples of environmental injustice in peripheral societies can be observed with groups who live from seeking urban garbage for recycling, usually in extremely degrading risk situations. At the beginning of the nineties, Brazil produced more than 250 thousand tons of garbage per day, with the following forms of final disposals: 75% were thrown on the open ground in the so called "lixões", without any kind of environmental and hygiene control; 21% to sanitary/controlled waste sites; 3.9% to recycling and composting plants ; and only 0.1% of the garbage was incinerated (19). Brazilian Institutions estimated at the end of the nineties that about 120 thousand people lived from garbage in Brazil, and 45 thousand children circulated or worked in "lixões" , including the search of food (20).

Obviously there are several problems of public health that can reach all population groups, or even those wealthier ones, although in a differentiated way. For instance, only people who can age can develop certain chronic-degenerative diseases. But here the exception also confirms the rule: exposure to dangerous chemical substances happens in a more systematic and serious way with workers or poor residents of polluted areas, as in the proximity of urban or industrial waste sites (21,22). With urbanization and industrialization, this last case is worsening in Brazil, as can be seen on the media with recent cases of contamination in residential areas produced by transnational and national companies in São Paulo, the most industrialized state of Brazil.



### **3. “Old” and modern diseases as problems of environmental injustice**

At the start of the modern era and industrial capitalism, as a consequence of intensive industrialization and urbanization processes, there was an increase of epidemic diseases provoked by bad quality of water and by produced sewer and garbage without adequate sanitary systems. To that were added terrible working and living conditions of working class in the beginning of capitalist era, in a degradation picture well described by Engels in his classic book about the conditions of the working class at this time.

Parallel to the struggles of workers' movements for changing their working and living conditions occurred the evolution of scientific medicine, that could better understand the cycle of several microbiological diseases responsible for many deaths, mainly through epidemic and endemic events. An outstanding example in the construction of modern Public Health was developed by John Snow, in the beginning of XIXth century during a cholera's epidemic. With the foundation of modern Public Health, several preventive and control measures for certain diseases could be developed, such as hygiene campaigns, vaccination and basic sanitation related to water, sewer and garbage.

In modern societies, be they socialist or central capitalist countries, an entire scientific and institutional apparatus of public health was developed to control and prevent a lot of diseases. In this evolution, life expectancy rates were growing and the relevance of different diseases and causes of death were being modified. With social policies that propitiated great improvements in working and living conditions of working classes, with the best control of infectious and parasitic diseases and with a larger life expectancy, in other words, with an older population, such societies saw the growth of other diseases. Examples are the circulatory diseases and cancer, besides external causes provoked mainly by traffic and accidents at work and by urban violence.

Obviously, this change is also a consequence of new risks at work and the general environment, as well as the risks of modern lifestyle. The rich capitalist societies of the XX century produced amounts of garbage, environmental degradation and new technological risks in a speed never seen before in the history of civilization, and for this reason some authors call them “risk societies” (23). However, just as pointed out by the environmental justice movement in the USA, even in the richest

societies risks and benefits are unequally distributed between populations, depending on class, race, ethnic and gender characteristics of these groups.

In industrializing countries, peripheral to the nucleus of central capitalist countries as North America, Europe and Japan, the epidemiological transition doesn't happen automatically. As happened in central countries, the epidemiological transition is influenced by economic, political, cultural and ecological processes that demarcate possibilities as exclusion frontiers of certain groups in accessing resources and services that make possible the control and prevention of several diseases. Therefore, some authors that analyze the epidemiological transition in Brazil comment its complexity as a central characteristic. It combines the persistence or re-emergency of "old" diseases resulting from poverty and precarious sanitary conditions with "modern" diseases, such as cancer, work and traffic accidents, violence, stress, among other (24). In other words, the epidemiological transition analysis in a specific country would only make sense if diseases and death causes for regions can be decomposed by specific population groups, according their class, ethnic and gender characteristics, besides other traditional ones, as age (25).

#### ***4. From what people die in Brazil: relationships between Public Health and Environmental (In)justice***

In this topic we will discuss, in a resumed and exploratory way, the health situation in Brazil and its relationship with the theme of environmental (in)justice. We will use as an example the recent Brazilian mortality picture. The way people die can illustrate how many deaths, which causes would be technically easily recognized and controlled, happen as a result of social inequalities and environmental injustice. The problem is not death itself, since life's cycle includes birth and death and one day all individuals will die, but in the stupid and violent way that it befalls several vulnerable groups.

Table 1 illustrates the principal death causes that happened in Brazil in 1998, according to the international classification of diseases adopted by the World Health Organization (WHO), the ICD10.

**Table 1** - Principal Causes of Death according to ICD10 - BRAZIL - 1998 (26)

<b>Cause - ICD-BR</b>	<b>N.Deaths</b>
<b>TOTAL</b>	929.023
<b>066-072 CIRCULATORY APPAREL DISEASES</b>	256.333
068 ischemic heart diseases	75.745
068.1 infarct	57.940
069 other heart diseases	62.636
<b>103-112 EXTERNAL CAUSES</b>	117.600
103 traffic accidents	30.994
104 falls	4.822
107 Poisoning, intoxication or exposition to toxic chemicals	379
108 voluntarily self provoked lesions	6.985
109 aggressions	41.916
<b>032-052 CANCER</b>	110.765
034 malign stomach cancer	10.709
039 malign cancer of bronchia, trachea and lungs	13.579
<b>073-077 RESPIRATORY ORGAN DISEASES</b>	91.919
074 pneumonia	32.282
<b>001-031 SOME INFECTIOUS AND PARASITIC DISEASES</b>	48.727
003 diarrhea and gastroenteritis	8.066
005-006 tuberculosis	6.029
026 Chagas disease	5.355

#### **4.1. Circulatory System Diseases : Only Richs' Deaths ?**

As we can see in picture 1, circulatory system's diseases are the most frequent cause of mortality in Brazil. This kind of disease reaches mainly older people, and gains in importance more and more with the increase of life expectancy. On the other side, these diseases are frequently associated to many risk factors disseminated in modern societies, as stress, obesity, use of tobacco, sedentariness, consumption of animal fats and disarray of arterial hypertension. Deaths caused by cardiovascular and brainvascular diseases are of great importance in our modern world, being the principal cause of death in USA, Europe and Japan. Therefore, an idea was diffused that such diseases would attack mainly wealthier populations and countries. The data in Brazil reveal that this conception does not tally with the national reality, because even in poor regions this kind of disease acquires great relevance (9). Although this is a complex subject that would need to be better explained, in our opinion it tends to happen because a lot of regions and poor populations had an expressive growth in their life expectation, resulted mainly from successful public health programs against classic infectious and parasitic diseases. At the same time, the permanence of inequalities hindered the access of many people to modern and onerous medical technologies, e.g. check-ups and intensive treatment centers, making them more vulnerable to circulatory diseases.

#### **4.2. Deaths for External Causes: Violence at First Place**

In second place, in absolute number of deaths, we found the external causes. There is a prominence for deaths provoked by aggressions/homicides, with 41.916 cases, followed by traffic accidents, with 30.994 cases. The external causes reach a great number of youths, and for this reason they can still be considered more important than the chronic-degenerative diseases if we use as gravity indicator the index of potential lost years of life, calculated from the difference between life expectancy and the medium age of people who died. Between 1993/95, the estimated number of potential lost years of life for external causes

was 9.369.027 years, almost three times the value for deaths caused by circulatory diseases, and almost six times more than deaths for cancer (9).

Deaths from violence are increasing in Brazil in the last twenty years, and they reach mainly poor young men living in peripheral urban centers or regions with agrarian conflicts. For instance, it is known the extremely low age of victims from violence in marginal activities around urban centers. The homicide rates in male youths from 15 to 19 years escalated from 3.685 to 12.647 between 1979/81 to 1991/93, an increase of almost 250% (9).

Traffic accidents are causes of death mainly for workers and families of low income, and not for middle class car owners. Some studies in Brazil showed that deaths from traffic accidents reach much more pedestrians, motorcyclists and cyclists (27,28). Together these groups surpass 80% of deaths for traffic accidents in several Brazilian cities. An explanatory factor for this phenomenon would be the fact that many popular dwellings are localized in urban peripheries close to high-speed highways and crowded streets, increasing the risks of pedestrians and drivers of cheaper vehicles, as motorcycles and bicycles.

Also related to external causes, it should be observed that deaths by acute intoxication are not well registered in Brazil, being only recognized as deaths which related hazardous substances were clearly identified, as accidental ingestion of insecticides by children at home. For instance, a lot of occupational deaths in rural workers, which are consequences of a pesticide contamination, are not recognized as such by the Brazilian health system (29). These workers frequently don't get to read the pesticide's labels and they don't receive appropriate information - on the danger nor on the use instructions - of these products, and the reuse of pesticide packings for domestic ends in poorest regions still being common. The high number of deaths through falls (4.822) can be attributed in part to working accidents that happen with unqualified workers of building construction, to whom working conditions are strongly precarious (30).

#### ***4.3. Cancer, Environmental Pollution and Uncertainties***

The third most important cause of death in Brazil is cancer. The relationship between cancer and environmental pollution was scientifically proven in the public health field for a long time, e.g. the effect of smoking on lung cancer showed by

epidemiological studies. Unfortunately there are few studies about the relationship between cancer and environmental or occupational contamination in Latin America and in Brazil, which reveals our institutional vulnerability. However the rise of some cancer rates is known as is the growth of exposure to several environmental risk factors, and also the non registration of occupational cancer (31,32). Most of the time, such recognition is a result of a wide mobilization and struggles of workers exposed to certain substances, as in the case of asbestos (33); or still of benzene in metallurgical and chemical workers (34).

Other cases of lack of studies and recognition refers to the residential areas polluted by dangerous wastes, which can be disposed of by municipalities or industries, be at official or still clandestine sites, without any care and without any supervision on the part of competent environmental authorities (21, 35). As the latency period between contamination and the beginning of symptoms can be of several years, many contamination cases that happened in the last years could generate in the future harmful health consequences to exposed populations without no official recognition by the health system. Frequently the places of dangerous waste sites are localized in metropolitan peripheries whose residents are of the low income bracket and where such risks are added to the lack of basic sanitation.

An important element to be considered in the relationship between environmental pollution and cancer is that it is rarely direct and easily established. With the exception of some specific cases, e.g. asbestos, it is very difficult to affirm with a high degree of certainty that a particular contamination will cause a person to develop cancer, or that an individual with cancer had as a predominant cause a certain environmental contamination. Frequently there are multiple causes for cancer, and often the causal relationship can only be done for a population group through epidemiological studies, and not for an individual case. Due to this fact, it is very important to adopt the precautionary principle as base for prevention in regulatory and decision making processes. When epistemological uncertainty of risk from hazardous chemicals contamination is high, risk control and prevention should be done avoiding any kind of exposition, e.g. through the banishment of certain substances, as in the case of asbestos (36).

#### ***4.4. Infectious and Parasitic Diseases: “Old” Diseases and Poverty at Present***

The classic infectious and parasitic diseases possess a more direct and verifiable relationship with the environment, since their causes are frequently related to general home, hygiene, feeding and consumption conditions, as well as to changes in ecosystems caused by human actions (37). Therefore, their relationship with the concept of environmental (in)justice is unequivocal, because the children and adults who die because they lack access to basic services of health and sanitation, for bad quality of consumed water, for living in polluted areas around waste sites, all these people are exactly those belonging to the poorer and discriminated groups of society. Precisely such diseases are considered the most important indicators for the epidemiological transition because their reduction in a country would be perceived as consequence of a large modernization process through, e.g., the improvement of consumption patterns and a wide population access to basic health and sanitation services.

The infectious and parasitic diseases are decreasing significantly in the last decades in Brazil. In 1950 they represented about 36% of death causes, passing for less than 5% in 1995, although the lowest values are definitely in the south and southeast regions, which are the most developed ones (9). This reduction possesses multiple causes, as the improvement of sanitation in the last decades, the efficiency of public health programs related to prevention and control of transmissible diseases, the intense urbanization and the increase of life expectancy, among others.

In spite of this decline, and also considering the fact that Brazil is a tropical country, the numbers of infectious and parasitic diseases in Brazil are comparatively still superior to the industrialized and richer countries: while in England and in Sweden the mortality rates for 100.000 inhabitants were respectively of 5,0 and 8,1 in 1992, the Brazilian rate was of 27,5 in 1994 (9). Besides, some infectious diseases have had special relevance for Public Health in the last years again, in the function of the re-emergence of some diseases considered previously controlled, as cholera and dengue, and the appearance of others previously ignored, as AIDS. (37)

The intestinal infectious diseases are the most important cause of death for parasitic infectious diseases, being also of great relevance to the infant mortality rate in

younger than one year. This fact can be observed in picture 1 through the deaths for diarrhea and gastroenteritis. Here is also observed a decreased tendency related mainly to the increase of coverage in water supply that occurred in the last two decades (9), although not so much as desirable. As we can see in picture 1, two other important causes of death in this group are tuberculosis and Chagas disease, that killed more than 11 thousand people in 1998.

To conclude this topic it is necessary to comment the importance of respiratory organ diseases, that tend to reach especially children and old people as vulnerable groups. The vulnerability of these groups is influenced by limits in accessing health services, malnutrition and general living conditions. Furthermore, atmospheric pollution in metropolitan and high industrialized areas is an extra risk factor, although few studies exist in Brazil that relate respiratory organ diseases with atmospheric pollution. (38) Again, in this case the poorest populations tend to be the most affected ones, living around polluted areas and without access to basic health and sanitation services.

##### ***5. Economic growth with inequalities and formation of peripheries in the base of Brazilian environmental injustice***

As we can see, an expressive segment of mortality causes in Brazil is due to social inequalities of excluded social groups from the benefits of development, relapsing on these same groups are the worst working and living conditions, with implications in several types of diseases. In other words, a subject of environmental injustice.

The Brazilian economic and population growth in the postwar period was marked by social and regional inequalities, and for the high urbanization process. Between 1940 and 1996 the Brazilian population increased 282%, passing from 41 to 157 million inhabitants, with an urbanization index that passed from approximately 25% to almost 80%. This growth occurred mainly between 1960 to 1980, when the cities received about 50 million new inhabitants. Between 1940 and 1980 the number of cities with more than 100 thousand inhabitants passed from 18 to 142, with more than 47 million people living in 10 metropolitan areas of Brazil, with special concentration in the two larger metropolitan areas, São Paulo and Rio de Janeiro. (39) The speed of such growth, added the permanence or even worsening of in-



come concentration, is the source of important environmental, sanitary and health problems in Brazil. (40)

With the economic growth, there were substantial improvements of several social and health indicators as much in the whole country as in all Brazilian regions and states. We can see this evolution in the Brazilian indicators of human development (HDI) and life conditions (LCI) produced in the last three decades and published by institutions involved in their generation (41). These indicators include longevity, income and education dimensions of populations from different levels - municipal districts, regions and the country as a whole - and LCI was built in Brazil adding new dimensions, as dwelling, childhood and education, contributing to a better evaluation about inequalities between municipal districts and regions. The contribution of different components of HDI in Brazil varied during the last three decades. The most important results were the increase of GDP in the 70's, the longevity in the 80's and the education in the 90's. This evolution, however, was differentiated, since education and longevity were much more important factors than per capita income in the poorest states. In 1991, about 80% of Brazilian municipal districts were classified as poor, including 50% of the population, which reveals that the larger municipal districts tend to present better indicators.

A most detailed analysis of the distribution and evolution of life conditions index in Brazilian municipal districts reveals, in larger details, the pattern of inequalities:

- (i) The national **duality** shows the tendency of municipal LCI's in concentrating themselves around two points, what is basically the expression of the Brazilian difference between north-south, since this *bimodality* doesn't appear separately in any region. Besides, the increase of the distance between these two orbits during 1970 and 1991 reveals the increase of differences between municipal districts of northeast and south/southeast regions.
- (ii) The **disparity** shows the enormous difference of LCI's between the 25% poorer municipal districts in relation to the 25% richer ones, and in the southeast this disparity is larger than in the northeast, although this last region concentrates the poorest Brazilian municipal districts.
- (iii) Finally the **inequality** reveals the several forms of economic inequality (family income *per capita*) from different space's decompositions: intra-municipal, inter-municipal and inter-regional. This analysis is of extreme

importance, since it makes it possible to establish a hierarchy of spatial components in understanding inequalities of income's distribution. Here it can be verified that the component of larger importance (70%) refers to the inequality of *per capita* income between families of the same municipal district, followed by inequality between municipal districts of the same state (19%) and between regions (9%). The inequality between states of a same region contributes only 3%. The historical analysis reveals also that inequalities increased between 1970 and 1991, mainly inside each municipal district. The northeast region, besides being the poorest area, possesses the largest inequalities, aggravating its contribution to the group of the poorest municipal districts.

The improvement of these indicators in the last years, as well as other ones referring, for instance, to the increase of linked homes to water and sewers systems, were strongly influenced by urbanization, economic growth and a certain democratization process. They were not, however, resulted from a deeper structural change of Brazilian development model based on social inequalities. The economic growth enriched the country maintaining or even increasing the enormous distance between center and periphery inside the cities and between the regions. In this context, Brazil can be seen as a typical semi-peripheral country, because it reproduces inside cities and between regions similar existent differences in the international level between central/riches and peripheral/poor countries.

As some political economy and geography studies revealed (39, 42), the formation of urban peripheries in peripheral and semi-peripheral countries presented some similar structural elements, although with several differences that correspond to specific economic, cultural and geographical regional dimensions. The dependent and incipient capitalism of those areas, associated to political, economic and cultural mechanisms of income, land and power concentration, generated a demographic growth of workers' families with low remunerations and without any capacity of acquiring any immobile. The offered habitational programs were not capable of reaching the enormous mass of disqualified workers, and a lot of popular dwellings in urban peripheries were built up without an appropriate infrastructure. The other existent alternative for poor people was simply the invasion of public and private lands where the slums were developed in almost the whole national metropolis, frequently in risk areas and without any urban infrastructure.

What seems to be a spontaneous and illegal occupation of peripheries in urban centers without sanitary infrastructure is an intrinsic expression of capitalist development in Brazil: the illegal and the marginal are part of this social system, so much as the corruption and the élite's political game that defines important decision-making processes.

The social movements find in their limitations of the material world essential elements that justify their political struggles, but political élites also find in these same limitations the conditions for populist practices that maintain social exclusion in representative democracies. Without larger processes of social inclusion, through income redistribution, increase of employment and the improvement of educational levels, "modernization" or "social policies" become quickly political populism. For instance, sanitation of poor areas can be followed by the expulsion of excluded masses, who don't have conditions to pay increased tributes for living in better urbanized areas. Then new slums can appear without urban infrastructure, frequently close to risk areas as polluted industrial districts, waste sites or those submitted to "natural" hazards such as flood and dilapidation.

### ***6. Constructing a common agenda between Environmental Justice and Collective Health in Brazil***

We believed that the Public/Collective Health field can play an important role in the construction of an environmental justice movement in Brazil and Latin America. Although health and sanitation problems associated with social inequalities are well recognized as fundamental issues to be faced by the Brazilian society, the agenda of the Brazilian environmental movement still has not prioritized appropriately such subjects, which can be partly explained through the uncritical assimilation of international ecological "green" agenda originated from European and North American countries (43). The construction of a shared agenda between public health and environmental sectors together with several social movements can invigorate alliances between social, technical and academic groups, eventually dispersed in their efforts to analyze and intervene in reality.

In the following topics we illustrate in a summary way some specific groups and social movements that are currently marked by environmental injustices:

\* **Urban workers:** Brazilian workers are a historical and chronic example of environmental injustice. The country possesses an economically active population of more than 75 million, being less than 50% considered employed, that is with legal contract of employment. In fact there is a growing tendency of unemployment and underemployment rates, affecting the organization capacity of labor's movement, which was fundamental in the democratization process that occurred during and after the post military regime in the eighties. Several workers' categories live under serious risk situations, as fatal accidents with disqualified construction workers; contamination by dangerous chemicals as workers that manipulate asbestos and benzene in several industries; e.g., bank, assembly line and supermarket workers are susceptible to the osteopathy lesions from repetitive efforts. In spite of current economic and political crisis that affects union's organization, several workers' movements affected by occupational diseases have been created in the last years, being of great importance for the environmental justice movement in Brazil.

\* **Residents of metropolitan areas:** Brazil developed a radical urbanization process, with current urbanization rates – almost 90% - comparable with many industrialized countries. An expressive portion of this population lives in slums and places without appropriate urban infrastructure, frequently in risk areas of flooding, dilapidating and industrial pollution and major accidents. The social movements for sanitation and humanization of Brazilian slums and the creation of associations organized by residents around hazardous waste sites are proliferating in more industrialized states. They are classic examples of environmental justice movements.

\* **Rural workers and Communities and the Movement of Workers Without Land:** Many rural populations live in countries marked by drought, poverty, malnutrition and lack of water for human consumption. In many cultures there was an amplification and intensification of pesticides in use. The existent big plantations for exportation concentrates income, restricts subsistence family production and expels land workers to cities. They are at the base of many social and environmental injustice problems in Brazil, producing also seasonal workers without any social protection known as "bóia-frias". Through the appeal to the agrarian reform the movement of workers without land became one of the most important Brazilian social movements in the nineties, be in terms of territorial extension or media impact, and its dimension as stakeholder for environmental justice is fundamental.

This movement has also an important role at this time in discussing critically the implementation of transgenic technology in the Brazilian agriculture.

\* **Riverine populations in hydroelectric barrage areas:** the construction of big hydroelectric barrages in an authoritarian way in several Brazilian regions is provoking the destruction of towns and agriculture areas, generating as a reaction a social movement developed by affected groups. Recently this movement is also seeking to influence Brazilian energy policy, in the best sense, to assist the interests of the nation and excluded groups, and not just the interests of private capital.

\* **People of Amazonian Forests:** Forests, indigenous tribes and populations who live from local extractivism, are affected by economic activities as intensive plantation (e.g. soya), mining and wood industries, generating several social movements, frequently articulated with international environmental movements and regional projects of sustainability. Although the Amazonian region has a relatively small contribution to the Brazilian morbi-mortality picture, given its low population density, the Amazonian Forest's issue has an important international repercussion. That occurs due to the discussions about its role for ecological global balance. The Amazon is an ecosystem still relatively preserved, but at the same time with a high destruction rate provoked by the previously mentioned economic activities. In that sense, it is of great importance that from the start these experiences on local environmental sustainability projects can incorporate the concept of environmental justice.

To conclude this article we would like to discuss one more issue. As mentioned before, the example of a group who lives from garbage in Brazil is very emblematic as an environmental injustice problem, representing an environmental paradox in an unequal society such as the Brazilian one. On the one hand, the technical speech tends to value environmental and sanitary dimensions of urban waste, through the need of reducing the amount of garbage and closing inadequate depositions known as "lixões." On the other, a vulnerable and marginalized social group, who lives from the recycling of garbage, has its survival and income alternatives which cannot be obtained in the restricted formal labor market or through insufficient social policies. The dichotomy between a "technician" speech that depreciates and holds invisible the socially excluded groups who live from garbage, and the need of these same groups to assume themselves as social

subjects with the right to survive in healthy conditions, can be surpassed with the help of the environmental justice movement.

The relationship between garbage, work and citizenship together with environmental and public health discussions has been recently connected in Brazil through articulations between recycling workers' associations, environmental, public health and academic institutions and NGO's organized by the National Forum of Garbage & Citizenship (20).

This is a typical and rich example of an environmental justice movement that is happening, although it is not entitled to this name, since this concept is still little spread in the country and within Brazilian social movements. But the diffusion of this concept and its related experiences that are now growing can represent a new political and institutional basis for the necessary integration between social movements, institutions and technical and academic groups. This concept brings together ethical and political imperatives in order to overcome as soon as possible the present violent social inequalities in (semi)peripheral countries as Brazil.

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