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Essay

Environmental Justice: an ecossocial health approach

ABSTRACT

The paper addresses the risk of contemporary technologies in the light of our current technological paradigm, its perception and tolerability, as well as its unequal distribution across society. The fundamental hypothesis, which emphasizes Environmental Justice, refers to hazards that are disproportionately or unjustly distributed across more socially and economically vulnerable groups, which are generally the poor and the minorities affected by the environmental risks posed by modernity. Therefore, vulnerability and the different levels of deprivation act as drivers of the different levels of health across population groups. Although Environmental Justice has initially been observed as a grassroots movement in the United States, its principles showed compatibility with global and local geographical scales. Therefore, the aim of the study was to understand how the risks of contemporary technologies unequally affect the population under the perspective of Environmental Justice.

DESCRIPTORS: Social Justice. Social Inequity. Environmental Risks. Social Vulnerability. Environmental Health.

INTRODUCTION

Humanity has throughout its history been exposed to many different kinds of danger. Danger sometimes caused by uncontrollable forces such natural disasters – earthquakes, volcanic eruptions, hurricanes – or wars, facts of daily life; in addition to danger resulting from voluntary forces, such as those caused by one's life style. However, these events were not labeled as risks, they were called dangers, fatalities, hazards or difficulties, and this was because the term *risk* was not part of the vocabulary of the Indo-European languages, and its meaning came into being in the 16th and 17th centuries at the time of the formation of the Nation-States.[28]

Risk is considered a way man has of establishing a relationship with the future[28] expressed by the possibility of a certain threat taking place, causing damage to human beings and to their well being.[26] Moreover, risk can be defined according to: the extent people are exposed to it, the features of the exposed populations, its consequences and the nature of the threat – physical, chemical, or biological agent, or a combination of conditions which can be potential causes of damage.[13]

The existence of *risk* is based on the existence of individuals, organizations and societies[24] and the term has been widely debated due to labor accidents, increased pollution, global warming, among other factors. The occurrence of these *risks* can bring about a number of consequences to the individual, such as stress, harm, disease, death, damage to property, in addition to consequences to the environment, such as the decrease of fauna and flora, pollution and environmental imbalance.[26] Due to all of this, issues such as public safety, risk management and risk communication have surfaced, as has increased the intolerance rate towards risk.

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The distribution of risk across society can be compared to the distribution of wealth across the same society. Therefore, conflicts generated by poverty are replaced by problems and conflicts caused by the generation and distribution of risks, it is what Beck[4] describes as a transition from a class-based society to a risk-based society. This transition means that the nature of risk increases in complexity; it is a product of the development of science and technology. The issues related to developing and applying technology are therefore being replaced by issues related to the political and scientific management of risks.[4]

The secondary effect of this phenomenon is the socialization of the destruction of and threats to nature, in addition to an increase in contradiction, and of economic, social and political conflicts: natural conditions of life are transformed into medical, social or economic threats to human beings, creating new challenges to social and political institutions of global industrialized society.[4]

Risks, as do the acts of man, occur in a geographical space and, in the same way, this space acts as a means for them to occur.[23] The creation of this space adds value and meanings to the use of land, and this use represents a physical form of the social world and the basis for regulatory practices, which are translated in the way land is used and occupied.[15,23,27] Geographical space is seen as an actor and as a product of society and it mirrors inequalities, among which we find the different exposure rates to environmental risks across each layer of society – social, cultural, ethnical, among others.

In the space society builds, many pollutants may be found, and they are generated by chemical sources, such as those derived from combustion (CO, NO_2), pesticides, or by biological sources such as viruses and bacteria, or even by physical sources such as noise, and ionizing and non-ionizing radiation.

Just as proximity to certain elements can bring positive results and represent an increase in life quality, proximity to pollution-generating elements can have adverse effects, and are usually avoided because they have negative impacts on the individual and on property since they cause hazards. Therefore, the positioning of man in the social and geographical space is a source of increased or reduced safety.

In view of the above, this paper aimed at understanding how contemporary technological risks unequally affect the population in the light of Environmental Justice. In the same line, this paper discusses the Environmental Justice topic as an important approach to ecosocial studies in the field of public health.

Initially, we carried out a reference search on the on-line databases listed by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* [Capes Coordination for the Improvement of Higher Education Personnel], from 1990 to 2007, using the following keywords: "Justiça Ambiental" or "Environmental Justice". In Brazil, however due to the novel nature of the field, we found there lacks empirical research on Environmental Justice, thus only theoretical studies were retrieved.

MEANINGS ATTACHED TO *RISK*

The rate of acceptance of a certain risk depends on the benefit in question, in addition to the number of individuals involved in the process (number of individuals exposed). Slovic[25] believes that risks are inherently subjective and depend on individual judgment, and are influenced by a number of social, psychological and cultural factors.

Modern society tends to accept risks that have lesser consequences and have a greater probability of taking place (e.g. car accidents), instead of risks representing greater consequences and lower probability (e.g. nuclear power plant accidents). The different perception society has of risks is a phenomenon called the social amplification of risk.[12]

For this reason, a study on a certain risk must define the kind, the number and the quality of the factors that influence the opinion of individuals and the assessment of risk within their values, motivation, goals and benefits. These factors contribute to understanding, acceptability and controversies, and can be used as a risk management tool.[18]

Therefore, it is important that the government considers society's perception of risk, because values such as equality and catastrophe potential can be included in analyzing policies and decision-making, in addition to the technical and scientific aspects, which are already taken into account, but which only consider economic advantages and cost-effectiveness.

From all of this, many questions arise: does the population in question have free access to information on the risks it is likely to be exposed to? Do the populations affected have the right to make and to change the course of the policies they are subject to? Are the risks involved equally distributed across society and space? Or do only some layers of society benefit from or are burned with a certain risk?

SPATIAL SEGREGATION AND RISKS

The positioning of objects, events and activity across space, including the positioning of environmental risks, are essentially represented by the class structure of a given collectivity.[24] Consequently, unequal distribution of pollution and environmental destruction across space have been the focus of increased interest and manifestations all over the world.

The spatial organization of cities attracts and also increases poverty, seeing that geographical space plays an active role in this, so does economy, culture and social institutions. Therefore, urban space is occupied differently according to the classes society is divided in.[22] Areas where risk factors are found are not chosen by the high-income layers of society, thus, such areas are occupied by lower-income populations.[31] Therefore, income is a factor that influences the position of people across space, to the extent that the lower-income population, when compared to the higher-income population, due to the lack of alternatives, is subject to reside in dangerous locations which are more exposed to risks.

In this case, hazardous locations can be compared to Harvey's[11] externalities, which are a byproduct of urban activity, having effects on other elements and directly or indirectly affect the well being of individuals. These externalities, together with the logic of the real estate market and of land income, naturalize the fact that, for instance, poor neighborhoods develop in the vicinity of pollution industries, and that these locations are the ones public policies neglect most.[1]

According to Soja,[27] a more profound segmentation and fragmentation is taking place in society, with an increase in the value attached to higher qualified and higher paid workers, in detriment to lower qualified and lower paid workers. Therefore, residential segregation and socioeconomic vulnerability are increasingly more marked.

The rate of socioeconomic vulnerability is usually associated to the differential exposure to risk and expresses the higher or lower susceptibility of people, places, infrastructure or ecosystems have of being affected by a certain kind of harm, which can be associated to individual, political and institutional, and social factor, or to a combination of these factors.[1] History shows that the distribution of risk across society has a pattern similar to the distribution of wealth across the system of classes, however this relationship holds an inverse proportion, in other words, more risks to the poorer.[4] Consequently, to address vulnerability one needs to develop a methodology that adopts investigation and assessment strategies based on spatial distribution. This spatial distribution enables one to contextualize one's scientific analysis and to have access to social, economic and ethical dimensions that pervade the environmental issue.

Although we know very little about the interaction between social and environmental risks and health, researchers have been studying how socioeconomic conditions affect the health and well being of populations and how they can be spatially represented. Segregation exposes communities to environmental risks that amplify individual and collective vulnerability to the toxic effects of pollutants. This dynamic can perhaps explain in part the current disparities in the level of health.[17]

The government has an essential role in issues pertaining inequality and vulnerability, because where the economic logic – based on efficiency and profitability – overshadows the logic of public service, social and environmental conditions of the land are left unregulated enough so as to enable inequalities to take place.[30]

The State, therefore, acts in a selective way in regard to the many players in the economy, by means of distributing infrastructure spatially and by selecting what benefits a certain sector of the economy or the population, that is, the State has the word on positioning institutions and the population across the territory. One way of making this happen, for example, are city-zoning laws determining the use and density of the territory in different city areas.[23]

THE ENVIRONMENTAL JUSTICE MOVEMENT

The Environmental Justice movement is a result of the increasing inequalities across society and has been attracting the attention to the role public policies can play, together with the role of market forces and other, in creating or aggravating risk-related inequalities.[16] This movement focuses on the distribution of environmental risks across social layers. The central assumption recorded in the Environmental Justice literature emphasizes how health-related dangers caused by environmental risks are unequally distributed among the most vulnerable social groups, which are usually the poor and the minorities.[5]

Clayton[6] provides three main reasons to explain why justice (fairness) has become a relevant topic in the last few years: the perception that natural resources are not renewable, increased awareness on the part of society about its responsibility over the destructive impact society has on the environment, and finally, the unequal distribution of environmental risks related to specific groups with consolidated identities (income, culture or ethnicity). The latter reason is the main focus of Environmental Justice-related topics.

Environmental Justice movements were initially organized in the United States resulting from an initiative of U.S. citizens after the Love Canal chemical disaster in Niagara (New York) in 1978, when the people residing in a low-income neighborhood discovered they sat on top of a drained canal where toxic waste had been buried. Movements such as these were carried out based on a common argument: environmental burdens, such as proximity to hazardous locations, tend to be unequally distributed to the poor and minorities in general.

After this fact, the US General Accounting Office conducted a survey and showed that the spatial distribution of hazardous chemical waste dumps and high polluting industries, overlapped and coincided with the spatial distribution of poor ethnic groups in the United States.[1]

In the southeastern region of the United States, four hazardous waste dumps were found, three of which were located in Afro-American communities, despite the fact that the black population only represents one fifth of the population in the region.

In California, the area occupied by the Hispanic community East of Los Angeles and Kettleman (rural community 95% of which are Hispanic) have also been chosen as targets. The same can be said about the indigenous populations: more than 36 indigenous reserves were chosen as locations for waste dumps and incinerators. In 1991, the Choctaws in Philadelphia were able to stop a project to place a 188-hectare waste dump in their land.[1]

Pressured by the movements, the U.S. federal government and a number of state legislatures established policies aimed at protecting rights such as the right to information on facilities that exist or will be built at a certain location *(the Right to know Act)*, information on the procedures for cleaning contaminated areas (the Clean-up Act), and the creation of funds to help the communities affected by providing them with financial means to hire technical and procedural services.[1]

Although the Environmental Justice movement firstly started as a grassroots movement in the United States, its principles were, from the outset, immediately compatible, in the long run, with ecological and sustainability movements taking place in all geographical scales: both globally and locally.[29]

The Environmental Justice movements stresses the lack of responsibility undertaken by the State and the political and economic mechanisms that make certain subjects more vulnerable than others, seeing that one of the most common definitions of vulnerability emphasize social subjects instead of emphasizing the processes that make them vulnerable. An alternative would be to define as vulnerable individuals who are victims of unequal exposure, to define and stop decision-making processes which pose risk to the unprotected population, – such as decisions on the location of equipment that employs: technology which is hazardous to health and the environment, unequal market dynamics, among others.[1]

Studies on Environmental Justice began with earlier studies on inequality and researchers started to gather case-based evidence to document injustice. After two decades of research, the studies in the field have faced methodological problems concerning how to quantify data (indicators) that empirically mirror vulnerability based on the economic well being of groups or communities located near to toxic and hazardous sources.[32]

The indicators should be able to mirror economic, organizational and social opportunities of individuals in participating in the distribution of resources, both as a single individual and as a group, for instance, measuring how unemployment and income levels influence the amount of resources acquired in households.[32] Information obtained in government surveys, such as studies of samples and census, are tools that can be used to asses and compare the income of groups in regions that have similar features.

According to Clayton[6], Environmental Justice can adopt the following forms:

- equity – certain groups of people or countries use more natural resources than others which are more affected by pollution. This happens due to the latter's lack of political and fighting power. The pursuit of equity aims at ensuring that no group suffers the effects of environmental degradation unequally.

- procedural issues – refer to the opportunity given to all the parties involved to participate in decision-making processes, and this does not usually take place in environmental regulations. The parties involved are not usually given the opportunity to express their opinion, and in most cases are completely stripped of social power, despite being the ones who are directly affected by all the adverse effects.

The Environmental Justice movement has been increasingly attracting more attention of academia, because it involves the inter-relations of geographical space and it is aimed at promoting equity and justice. Some of the definitions of Environmental Justice include the following principles:

"Environmental Justice is based on the principle that people have the right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. Environmental Justice is the equal and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits" (Commonwealth of Massachusetts p.2).[2]

Porto[21] defines Environmental Justice as:

"A set of principles and practices that ensure that no social group, whether ethnical, racial, related to class or gender, is burdened with an unequal share of the negative environmental consequences resulting from economic operations, political decisions or government programs; or excluded from the lack or omission of said policies, ensuring, therefore, both fair and equitable access to the environmental resources of their country, in addition to having full access to any relevant information concerning them."

From the definitions above, one notices how Harvey's[11] negative externalities are present to promote and sustain urban spatial segregation, because they are allocated to the poorest and to the areas where the poor reside.

Porto[21] emphasizes that major investments and businesses take all the resources available in a certain area and concentrate income and power in the hands of a few. At the same time they harm the health and integrity of the inhabitants and ecosystems in that area.

ENVIRONMENTAL JUSTICE IN BRAZIL

In Brazil, in addition to unemployment, lack of social protection and precarious employment, a large share of the population finds itself unequally exposed to environmental risks, whether at the workplace, at home, or in the environment in general. However, the Environmental Justice issue is still in its infancy in Brazil, because risk exposure cases are not well known or disclosed, and they are likely to become a chronic and unsolvable problem. Due to the wide range of social inequalities in the country, unequal exposure to risk is overcast by extreme poverty and the terrible living conditions associated to it.

The first time Environmental Justice was published in Brazil was through a collection entitled *"Sindicalismo e Justiça Ambiental"* [Trade Union Movement and Environmental Justice] which was published in 2000 by the *Central Única dos Trabalhadores* in Rio de Janeiro, Southeast Brazil. The goal was to promote a debate around the responsibility and the role of workers and their unions in fighting for a sustainable environment and life quality for all the people living in this environment, in addition to promoting a general understanding that environmental resources belong to the community whose ways of using and managing them belong to scoiety.[1]

In 2001 the *Colóquio Internacional sobre Justiça Ambiental, Trabalho e Cidadania*, [International Colloquium on Environmental Justice, Work and Citizenship] took place at the Universidade Federal Fluminense in Niterói, in the state of Rio de Janeiro. This was one of the first initiatives in Brazil to discuss theoretical issues and political implications related to the Environmental Justice proposition, by providing the background to and assessing the cases of environmental injustice in the country, the experience of trade unions, and defining an agenda, in addition to establishing national and international partnerships and coalitions.

The *Rede Brasileira de Justiça Ambiental* [the Brazilian Environmental Justice Network] was created on the occasion aiming at stopping the fragmentation and isolation of several existing movements, pressuring government entities and organizations to disclose information to society, supporting research activities on Environmental Justice, developing scientific cooperation, exchange of information on environmental norms and standards.[1]

STUDIES ON ENVIRONMENTAL JUSTICE

There are many studies on the unequal distribution of positive and negative phenomena associated to cultural, ethnic and social groups, however not all of them touch on the Environmental Justice topic in an explicit fashion. The Chicago School, in the early 20th century, was the first to demonstrate associations between spatial patterns of cities and their social order, what was then called human ecology.[20]

Human ecology has a social focus, which is expressed by ecological patterns, and it employs terms such as community, division and specialization of activities, concentration of activities, dominance, ecological distribution, among which are included the concepts of mobility, segregation, dispersion, centralization, among others. This approach served as a basis to interpret the spatial distribution of prostitution, suicide, segregation of groups, ghettos, crime, among others.[20]

It was only in the last few decades that studies started to show concern with the environment and the risks caused by pollutants and their distribution across society. One of the first studies that pointed out environmental inequalities establishing a relationship between environmental risks, income and vulnerable groups was carried out by Mccaull in1976, cited in Touché,[29] showing the disparities in air pollution based on maps of the Washington urban area. The study found that the black and the poor and those in sub-housing conditions or residing in low-income districts are more exposed to bad-quality air.

Vogt & Sorensen[32] studied exposure prevalence and the characteristics of eight communities in the vicinity of military facilities storing U.S. chemical weapons and ammunition. The results showed that the percentage rate of the black population residing in these areas was higher than the average rate of the black population in the respective states where these populations lived.

In North Carolina (United States), Wing et al[33] studied the localization and concentration of pollutants and offensive odors produced by swine rearing in relation to racial and economic features of the population and of the water in neighboring areas. There was 7.2 times more emissions in the three top quintiles of the non-white population when compared to the lower quintiles. The high amount of emissions is higher still in areas with high poverty rates and higher rates of non-white population.

Based on dispersion models, Dolinoy & Miranda[8] developed methods to estimate pollution emissions from a significant industry in Durham County, North Carolina. The multivariate analysis showed income and race-related among those residing at the locations which were more affected by pollution, when compared to the less exposed population.

Harner et al[10] developed and tested measurements, which could be applied to any city in the United States, to assess Environmental Justice in cities in Colorado, based on statistic tests. Among the sources of environmental threats addressed in the study were underground toxic waste dumps, storage and depots. Among the demographic variables used to measure Environmental Justice were average family income, rate of non-whites and rate of population below the poverty line. The indicators assess areas that can be more vulnerable to toxic threats than others, and show the subordination of poorer and minority populations to highly toxic areas.

Based on the racial and socioeconomic characteristics of Maryland census tracts, Apelberg et al[3] assessed the disparities in the estimated risk of cancer according to exposure to toxic air released by pollution sources across social and ethnical layers of society. Census tracts in quartiles with a higher rate of blacks presented a risk rate three times higher than the lower quartiles (CI 95% 2.0;5.0); on the other hand, the risk rate decreased as the rate of whites increased ($p<0.001$). Census tracts in the lower socioeconomic level quartiles presented 10 to 100 times higher probability of facing high-risk rates than those in upper quartiles.

Gouldson[9] assessed the variation of socioeconomic characteristics of communities in the United States and in the European Union where oil refineries were located. To that end, data on unemployment, per capita income and population density were used. This enabled assessing whether pollution emissions from refineries were higher in poorer areas. The results showed that there was a correlation between higher level of pollution emissions from refineries located in low-income areas and high-unemployment rate areas.

The city of Pueblo in Colorado (United States) was studied based on the use of heavy metals and the distribution of the population.[7] Samples of the soil from different parts of the city were collected to assess the concentration of the following heavy metals: arsenic (As), cadmium (Cd), mercury (Hg) and lead (Pb). The communities were also categorized according to socioeconomic and demographic features. The study found that high concentrations of lead and cadmium were present in low-income communities in which blacks and Hispanics lived.

FINAL REMARKS

This paper aimed at discussing how the paradigm of contemporary society and the risks this society creates can affect society itself in an unequal way. To what extent today's economic model based on consumerism and immediatism will be able to ensure a safe future and life quality to the generations to come? The population is crying for justice in all senses of the term, it perceives the impact caused by development, and still the great majority only has a minor participation.

The distribution of risk factors across the population, not only socially, but also geographically, is central to the Environmental Justice issue and makes it a significant methodological proposal for geographical-based studies, above all with the aid of the new tools available in geographic information systems. Environmental Justice is a new approach to scientific studies, to those who seek to improve the quality of life and to promote a fair and sustainable society. To this end, this paper attempted to present a few studies already carried out in other countries in order to encourage similar studies be applied in Brazil.

Geographical-based studies concerning health can represent a significant potential to renew and expand their social scope if these studies sympathize with the needs of the poor and outcast populations. In the same fashion, social movements would also be able to renew and expand the scope of their fight by adopting and addressing the Environmental Justice issue.

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