ARTÍCULO DE INVESTIGACIÓN

Environmental deterioration and development styles: the case of the northeast and the southeast regions of Brazil

DETERIORO MEDIOAMBIENTAL Y ESTILOS DE DESARROLLO: EL CASO DE LAS REGIONES NORDESTE Y SUDESTE DE BRASIL

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ABSTRACT

This paper work aims to contribute to the debate on the relations between environmental deterioration and development in Latin-American countries. It is argued that depending on the development style a country presents, a pattern of environmental deterioration is corresponded. Two sources of environmental deterioration closely linked to the characteristics of the development style of most Latin-American countries were identified in ECLAC's literature: structural heterogeneity and the type of international insertion. Two regions which present substantive differences in these two aspects were selected: the Northeast (with a high degree of structural heterogeneity and international insertion highly dependent upon natural resources intensive goods) and the Southeast (with inverse characteristics) of Brazil. The indicators chosen were those proposed by the 7th Millennium Development Goal. In general, the results corroborate the expectations of this approach, signaling the importance of the advancement of the understanding of environmental issues in the ambit of the development debate.

Key words: Environmental deterioration, development styles, Brazil.

Jel Codes: O44, Q56.

RESUMEN

Este documento busca contribuir al debate sobre la relación existente entre el deterioro medio ambiental y el desarrollo económico en los países de América Latina. Se argumenta que dependiendo del estilo de desarrollo económico que un país presente, un patrón de deterioro medioambiental le corresponde. Dos fuentes de deterioro medioambiental fuertemente relacionadas con las características presentes en los estilos de desarrollo económico de la mayoría de los países de América Latina fueron identificadas en los estudios realizados por ECLAC, a saber: heterogeneidad estructural y el tipo de inserción internacional. Se establecieron dos regiones que presentaran diferencias significativas en estos dos aspectos, el Nordeste (con un alto grado de heterogeneidad estructural y una alta inserción en los mercados internacionales que depende en gran medida en los bienes intensivos en recursos naturales) y el Sureste (con características inversas) de Brasil. Los indicadores escogidos fueron aquellos propuestos por el séptimo objetivo de desarrollo del milenio. En general, los resultados corroboran las expectativas de este enfoque, evidenciando la importancia en el avance del entendimiento de los problemas ambientales en el ámbito del debate sobre el desarrollo.

Palabras Claves: Deterioro medioambiental, estilos de desarrollo, Brasil

Código JEL: O44, Q56.

1. INTRODUCTION

The discussion on environmental issues has been increasingly disconnected to the discussion on development. When there is a connection between them, it generally happens by approaching the environment as a limitation to development. The deeper and more relevant links between these two fields of human knowledge are yet to be investigated. This paper work seeks to contribute to this research agenda.

More than ever, society is expecting responses to questions of that nature. A new scenario is being established, the so called low carbon economies. Low environmental impact has already become a competitive advantage in many markets. Consumers are more and more prone to acquire low environmental impact goods. There is, thus, a gamut of opportunities in transitioning to a green economy. However, this new scenario also represents a threat to many countries, especially to developing countries. This threat has to do with the possibility of excluding from international markets goods that are considered hazardous to the environment. This is not a fictional possibility. The European Union has planned to establish next year an experimental system of labeling all products in terms of their carbon footprint which may be fully implemented by 2012. This labeling may affect strongly South American exports, which are highly natural resources intensive and are historically linked to deforestation and soil depletion processes. Thus, the environmental issues must be taken seriously and economics has an important role in answering the questions imposed by the new scenario.

The specific purpose of this work is to present a conceptual framework that focuses on the relations between development styles and environmental deterioration and to provide empirical testing of that framework in Brazil.

This paper work is structured in the following way. In the next section, a conceptual framework is presented based on the contributions of the project *Estilos de desarrollo y medio ambiente en America Latina,* coordinated by ECLAC between the mid 1970s and the mid 1980s. This research seems to be the only effort of this nature in linking developmental and environmental dimensions in Latin America. It suggests that development styles and the environment are inextricable spheres, in such a way that development style conditions are conditioned by environmental features. The unwind of this idea culminates in the proposition that the more uneven the distribution of income and the more specialized in natural resources intensive the exports sector is, we may expect greater environmental deterioration, *ceteris paribus*. The uneven distribution of income generates a marginal class in the society (both rural and urban) that deteriorates the environment in their process of fighting misery. The specialization of exports in natural resources intensive goods promotes environmental deterioration through other means, such as depletion of soils, spurious competitiveness and so on.

The third section contains methodological considerations as to how to approach empirically this hypothesis. Two Brazilian regions are selected as samples, the Northeast, characterized by an extremely uneven income distribution and an exports sector highly dependent upon natural resources, and the Southeast, where these characteristics are less prominent.

In the fourth section, the hypothesis that the Northeast has a greater degree on environmental deterioration in relation to the Southeast is confronted empirically. The environmental indicators proposed are those suggested for the monitoring of the advancement towards the achievement of the 7th Millennium Development Goal (Ensure Environmental Sustainability).

The fifth section contains concluding remarks. The main outcome of this effort is that enough evidence is provided that there are relations between development styles and an environmental deterioration pattern. Furthermore, it indicates that there is support to the potential contributions ECLAC's thinking may have to the environmental research and vice versa, especially under the scenario that is being established.

2. CONCEPTUAL FRAMEWORK

ECLAC, with the support of UNEP, developed the project *Estilos de desarrollo y medio ambiente en America Latina* between the mid 1970s and the mid 1980s. This project aimed at investigating the relations between development styles and environmental problems, problems related to the utilization of resources and promoting interest in alternative development styles that involved better environmental conditions and utilization of resources besides improving standards of living in general. The results of this enquiry were compiled in a two-volume book which was coordinated by Osvaldo Sunkel and Nicolo Gligo. This section is extensively based on this work.

2.1. The systemic character of the problem in question

Introducing the environmental dimension in the analysis of development styles represented (and still represents) an innovative initiative. The project *Estilos de desarrollo y medio ambiente en America Latina* brought light to extremely important issues in terms of long run development of countries. Although there were many relevant advances, there was no continuity in the advancement of the understanding of the environmental theme within the scope of development styles. There are

no objective reasons for that. Revisiting these contributions is important once one is seeking to apprehend the environmental issues without leaving the field of development. In the case of Latin America specifically, there has been considerable progress in the thinking[1] about styles of development. Thus, it could be useful to resort to this literature once analyzing the environmental dimension inevitably brings about matters linked to development.

Following Sunkel, Gligo (1980), after the Second World War there was a common belief in Latin America (LA) that promoting economic growth through imports substituting industrialization would generate a process of development. Soon it was realized that development wouldn't happen spontaneously as a natural course of the economic system. It was also necessary for the State to take action especially in the social area. Thus, from the end of the 1950s and the beginning of the 1970s a lot of attention was put into health, education, housing etc. However, all this wasn't enough. It became clear that there were structural deeper problems that were sharply linked to the distribution of wealth (especially land tenure) and power in those societies. So, the political dimension was included as a critical dimension for development. "The variety of economic, social and political dimensions that were incorporated to the interpretation of development gave place to what by the mid of the 1970s was called styles of development."[2] In this sense, the project *Estilos de desarrollo y medio ambiente en America Latina* came to fill a gap: the analysis of styles of development would be incomplete while it didn't involve the environmental dimension.

[1] See, for example, Pinto(1976[2000]).
[2] Sunkel, Gligo (1980), p. 9.

First of all, it is necessary to define development. Following Sunkel, Gligo (1980):

> development is understood as a process of transformation of society characterized by an expansion of its productive capacity, the elevation of average worker productivity and of *per capita* levels of income, changes in the structure of classes and groups and in the social organization, cultural and value transformations and changes in the political and power structures, all of which conduce to an elevation of average standard of living[3].
>
> This definition seeks to assemble feasible processes instead of a normative approach to an ideal development. Thus, there is room for negative features which may generate risks in the future. In this way, it is possible to deal with development styles that are not conductive to economically, socially and environmentally sustainable long run development styles. Also, this definition implies that the development process occurs through ever growing specialization of labor, technical change and demand for energy.
>
> It is appropriate to define style of development at this point. Again, the definition contained in Sunkel is used, Gligo (1980):
>
> (...) a development style constitutes 'the way in which, inside a certain system, human and material resources are organized and assigned with the aim of solving the interrogations in terms of what, for whom and how to produce goods and services', or 'the concrete and dynamic modality adopted by a system in a defined ambit and in a certain historical moment'[4].

[3]Sunkel, Gligo (1980), p. 10.
[4]Sunkel, Gligo (1980), p. 25.

Let us present now the relations between development and the environment.

There is one important link between development and environment that is the interaction between nature and society. At the one hand, the reproduction of social conditions demands the extraction of a certain elements from the nature and this process implies a given technology (or a set of technologies).

On the other hand, the development process itself involves growing demand for those elements which in turn implies the need of technical change. These include processes of artificiality in which men intervene in the ecosystems selecting, adapting and excluding forms of biomass of their interest. Agriculture is the best example of artificiality in the sense that the cultivations grown by humankind went through a long process of development and refinement such that the current form of agriculture is very far away from the original species found in nature. Specialization also takes part in this process once the surpluses obtained permit further artificiality. Maybe the most prominent example of this is the city, i.e., the phenomenon of urbanization, because, besides constituting an artificial environment *per se*, they concentrate activities not directly linked to biological reproduction, such as teaching, building, producing durable and non durable consumer goods etc. Furthermore, it allows further specialization and artificiality process through infrastructure, capital goods, among others.

Although primary activities historically lose ground relatively to other sectors and population migrate increasingly to artificial environments (cities), it is wrong to infer that nature has been becoming less important for societies. Not only because the functioning and maintenance of societies depend on matter and energy provided by nature, but also because there is an intrinsic connection between men and nature. Unders-

tanding this last point demands a definition of environment, which is "the biophysical natural ambit and its successive artificial transformations as well as its spatial development"[5]. This definition implies that nature is not an isolated dimension from society. In fact, they coevolved. This is the key to linking development and the environment: the systemic character of development.

The co-evolution of society and the environment may be seen as follows. At the one hand, the environment conditions the possibilities of development because the availability, kind, form, accessibility and quality of resources, the location, the climate, the relief etc. mould the possible paths of development of a society. On the other hand, the socioeconomic development process, in its turn, modifies the environment because the degree of utilization of resources, the selection and adaptation of biomass, the generation of features that are new to that environment (e.g. air, water and soil

pollutants, residues etc), the changes in the original landscape etc. affect the dynamics of the environment. This duality of the relation society-environment evolves into particular forms in each society and is part of its development style. Thus, societies mold and are molded by (in a dialetic relation with) the environment. From this interaction emerges a system characterized by complexity which shapes the style of development, as above defined.

Albeit these interactions, there is a deeper and more profound interaction between men and nature which deserves a lot more investigation.

Be it society the trigger of changes in the interactions, or be society solely responding to changes in the environment, the social actions are in every way historically and culturally

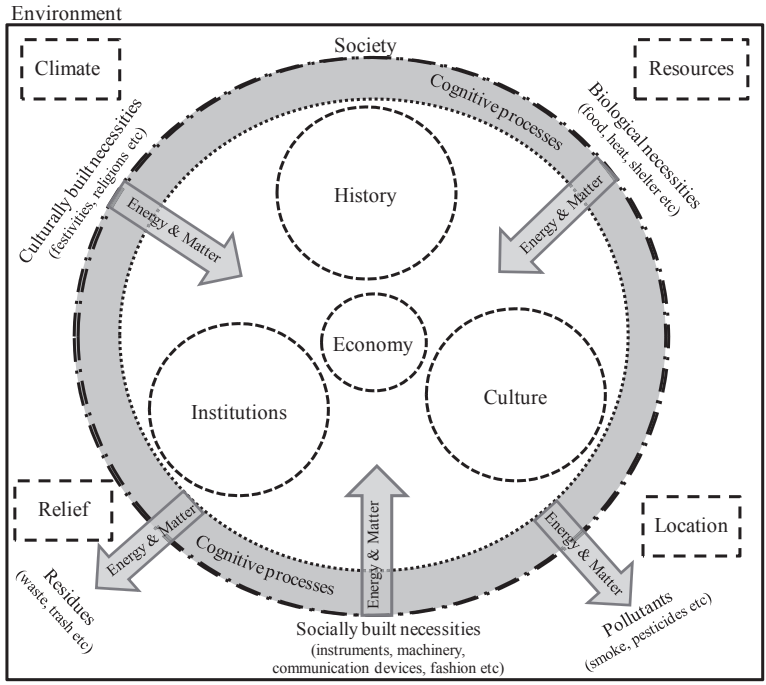
[5]Sunkel, Gligo (1980), p. 13.

conditioned by experience, knowledge and accumulated perceptions with respect to the men-nature interactions[6].

Thus, the characteristics of the environment influence the cognitive processes of men, shaping and molding their perceptions, experiences and knowledge. An easier way of apprehending this aspect is thinking about human action embedded not only in a historical, cultural and institutional but also environmental context. The inverse is also true, i.e. the action men take shape and mold the environment itself and also the historical, cultural and institutional context.

The proposition is represented in the figure below. We can see the environment as the greater contour. The environment has dimensions that affect the possibilities of development of society (climate, characteristics of resources, relief, location etc.) that were indicated in smaller boxes. The physical form with which society and the environment interact is through energy and matter. In the greater circle we can see a representation of society and some of its most prominent dimensions (history, institutions, culture and economy) that strongly condition the development process. The demands of society in relation to the environment were divided into three illustrative categories: biological necessities (related to food, heat, shelter etc.), socially built necessities (such as instruments, machinery, communication devices, fashion items etc.) and culturally built necessities (festivities, religions etc.). All these demand elements from the environment. But there are also fluxes of energy and matter from society to the environment, which are illustrated as residues and pollutants.

[6]Sunkel, Gligo (1980), p. 15.



Source: Prepared by the author.

Figure 1. Environment

However, there is an important dimension that links society to the environment: cognitive processes[7], which are supposed to represent experience, knowledge and accumulated perceptions. All interactions between men and nature imply a cognitive process – be it tacit or not. For example, when economic activities take place, there is a whole set of experience, knowledge and accumulated perceptions – as neoschumpeterian evolutionary approach indicates – involved. These cognitive processes also include experience, knowledge and accu-

[7]This is a term borrowed from psychology. It refers to an operation that affects mental contents.

mulated perceptions in terms of the relation nature-society, such as when, how, how many or which resources will be combined to produce a good, which will possibly generate residues and pollutants that in turn will have a specific destination (be it proper or not).

This way of seeing the men-nature interaction through the channel of cognitive processes has been addressed to in the literature about local, indigenous or traditional knowledge whose importance has been growing exponentially in the field of policies addressing biodiversity[8]. Besides the economic relevance of this knowledge, particularly in the fields of pharmacology and cosmetics, its relevance arises precisely because this kind of knowledge is the result of the interaction of many generations with the environment which, through a long process of trial and error, generated a highly inductive and substantive body of knowledge . In consequence, it involves an apprehension of the complexity of the men-nature interaction, which in many cases translates into knowledge about the limits and responses of nature to human actions. Thus, if societies are to enter a new moment in terms of styles of development consistent with sustainability, they could make use of this kind of knowledge.

We can, thus, see the relation environment-society schematically. It is possible to observe that changes in the environment affect society as well as changes in society affect the environment. Nevertheless these changes are not exogenous generally once the interaction environment-society is ever evolving, i.e. men can interfere in the climate, in the characteristics of the resources and so on, which in turn shape men's future possibilities. Put into other words, the style of

[8]For an analysis of the relations between local knowledge, development and environment, see Gramkow (2011).

development a society builds affects and is affected by its environment. The resulting society-nature relation may not be sustainable, as well as the development style may not be sustainable. Let us see now in more concrete terms how development styles and the environment relate in Latin America.

2.2. Development styles and environmental deterioration in Latin American countries

In the unwind of their history, Latin-American countries have gone through a process of private appropriation of land[9], water and natural resources in general in which the objective was using them as monetary income generating factors. However, it was not an even process. The best land was appropriated by a few and the majority of the population kept inferior land or even no access to land at all. Thus, at the one hand, a distinguished group was formed with the ownership of the best and widest lands, which, therefore, had access to differentiated monetary income. At the other hand, a relevant portion of the population, in order to satisfy their own needs, was driven to overexploit land and incorporate ever marginal and inferior land. The precarious standards of living

of these marginal peasants and their generally high reproduction rates create an abundant rural labor force, whose salaries are extremely low.

A very similar process happens at urban regions too. In effect, as minoritary sectors appropriate themselves of the best urban land, whose influence also allows them to orientate infrastructure in order to favor them even more, the urban population in accelerated growth presents an ever growing

[9]As Dean (1996) points, the processo f colonization was also a process of privatization of land.

demand for space against a limited availability, creating, in the same way as in the rural sector, a differential income of land to privileged landowners[10].

Thus, the group with the highest income levels gets access to the best located urban real estates, while the portion with the lowest income levels is forced to live in marginal areas.

The most important point to the present work is that Sunkel, Gligo (1980) associate this process of uneven appropriation of natural resources – land tenure in particular – to environmental degradation. Thus, in the rural case, the marginal population is forced by their miserable economic condition to deteriorate the environment, expanding de rural frontier through deforestation and jeopardizing the soils through its depletion. In the urban case, the marginal population is driven by their miserable economic condition to deteriorate the environment, establishing precarious residences in critical areas, such as river fronts and slopes, putting in jeopardy not only their own safety and health (once they may undergo floods, contaminations, mudslides etc.) but also the ecological sustainability of the whole population (once, e.g., establishing themselves on watershed areas may compromise water supply).

This process described in Sunkel, Gligo (1980) is very similar to the economic dichotomy identified by Prebisch and Furtado and is the root of the formation of structural heterogeneities, which in turn are at the heart of underdevelopment. The novelty resides in adding the environmental dimension to the analysis.

Moreover, this process of environmental deterioration may be intensified when considering international trade. That is because international trade may be seen as a way of

[10]Sunkel, Gligo (1980), p. 17.

members of one society to appropriate themselves of another society's natural resources. Once natural resources are tradable and, thus, may be consumed by other societies, there is the possibility that one or more societies interact indirectly with many environments.

Since its early days, the history of Latin America is in great measure a succession on interventions of extra regional societies in search for the appropriation of natural (and human) resources susceptible of being exploited economically to obtain products destined to satisfy the demand of these societies and accumulate a financial surplus[11].

The degree to which Latin American societies benefited from these interventions is fundamentally conditioned by the specific kind of mediation established between foreign societies and local resources. This mediation is essential to determine the form and the intensity of the extraction of resources, the employment and the level of labor remuneration, infrastructure, the local acquisition of goods and services, the local taxes paid to the government and the prices and exportation markets. In other words, the use of natural resources and the proportion of the generated surplus that the country retains depend upon the character and the efficiency of the mediation. The reasonable use of the surplus retained and its distribution to society depends upon the character and the efficiency of the national development policy.

The introduction of international trade and, particularly, the nature of the mediation between foreign and local societies in the analysis become extremely relevant for the understanding of the links between development styles and environmental deterioration. This is another important dimension of environment deterioration: it is not only the marginal popu-

[11]Sunkel, Gligo (1980), p. 18.

lation that jeopardizes the environment through the ways we saw above, but the elites may also jeopardize it because of the nature of their international insertion. Put in other words, environmental deterioration also has roots in the specialization of the exports in primary goods or in natural resources intensive goods. Besides all the possible threats ECLAC has historically identified in specializing in natural resources intensive goods (or natural resources themselves) in terms of possibilities of development[12], now it is also argued that this specialization may lead to environmental deterioration, too.

There are innumerable cases in which noble non-renewable natural resources have been and continue being exhausted and renewable natural resources are destroyed and deteriorated (...). This happens especially in cases of extreme specialization and artificialization of agricultural exploitation (...) There is no doubt that the total magnitude of the surpluses obtained through exportation activities and foreign investments and the proportion retained in Latin American countries have not been optimized in the past or in the present. (...) The utilization of the surpluses generated in activities related to the exploitation of natural resources neither is satisfactory.[13].

It is clear from the contributions of the project *Estilos de desarrollo y medio ambiente en America Latina* that the main sources of environmental deterioration in Latin America are related to problems associated with underdevelopment. That is, on the one hand, the uneven social structure produces a relevant portion of the population (rural and urban) that, in search of fulfilling their basic needs, tends to jeopardize the

[12]See for instance the seminal work of Prebisch (1949[1982]) and the most recent ECLAC's report, CEPAL (2010).

[13]Sunkel, Gligo (1980), p. 19.

environment. On the other hand, the high degree of specialization of exports in primary goods and in natural resources intensive goods also tends to jeopardize the environment. Thus, it is quite clear that problems commonly attributed to underdevelopment, i.e. structural heterogeneity manifested in uneven distribution of income and specialization in goods highly dependent upon natural resources, are at the heart not only of social and economic difficulties, but also of environmental deterioration.

There is a third and last source of environmental deterioration identified in the project. It refers to what the authors call transnational style. This source is characterized by the influence of the productive style of the world's most dominant economy since World War II: the United States of America. It contains, thus, a strong component of geopolitics.

During World War II , and especially after it, the United States established themselves as the central and hegemonic capitalist power, and its great companies transformed into transnational companies which started to dominate the world's economy and brought to every country, at greater or smaller scale, the North American production and consumption repertory, their forms of organization, their technology, their commercialization methods and consumer credit, their mass communication media – ultimately, their peculiar style[14].

Not only the USA, but also European countries and Japan - whom more than receptors - are reproducers of that style. The result is the transnational style, which is a component of the development style that surpasses the original national characteristics. Namely, the main characteristics of this style are: wide and extensive use of energy (particularly petro-

[14]Sunkel, Gligo (1980), p. 22.

leum) and land, which were the abundant resources in the USA, and intensive use of capital and labor, which were the scarce resources in the USA. This transnational style is in crisis due, *inter alia*, to the environmental restrictions that have been presenting to its sustainability. Using a more contemporary language, the most discussed issue in the environmental theme is the transition to a low carbon economy. An actual green race is going on in the sense that being competitive already involves and tends to deepen even more a low environmental impact feature. This is a challenge not only for Latin America, but for every country in the world.

Let us turn now to a more precise application of the concepts and ideas developed in the project *Estilos de desarrollo y medio ambiente en America Latina*. In order to do this, we must try to approximate the analysis to the concrete empirical world.

3. METHODOLOGY AND MODEL

The aim of this working paper is to recover the discussion about environmental degradation in the realm of the development debate, particularly in the realm of the development thinking of ECLAC over the last sixty decades. We saw that this objective was pursued in a project developed by ECLAC by the end of the 1970s and the beginning of 1980. Even though there were relevant advancements, there was no continuation of this investigation. This working paper seeks to recover the analysis of development and environment, once more and more there is a comprehension that it necessary to develop a theoretical approach capable of considering these inseparable issues.

3.1. Summing up: main sources of environmental deterioration

As we saw, Sunkel, Gligo (1980) point to three main sources of environmental degradation: (i) uneven income distribution resulting in relevant portions of society that due to their misery are driven to deteriorate the environment; (ii) the kind of international insertion that may result in specialization of exports in natural resources intensive goods whose productive techniques are not socially or environmentally friendly; and (iii) the so called transnational style.

We may propose that, in general, the more uneven the distribution of income in a society is and the more specialized the exports in natural resources intensive goods are, the greater the environmental deterioration will be. These are factors that cause environmental deterioration and their particular relevance to this work is that they are also attributed as relevant sources of under development in LA by ECLAC "s historical literature. Thus, we are dealing with relations between development styles and environmental deterioration.

The last source of environmental deterioration, described above, is extremely relevant, but it is also extremely hard to grasp and measure. It has to do with the appropriateness of extra regional patterns for the region. It is intimately connected to the afore mentioned discussion about cognitive processes.

3.2. Empirical confrontation

What is proposed next is to pick two regions for empirical confrontation of the conceptual framework developed in previous sections. The idea is to choose a region A characterized by high inequality, elevated structural heterogeneity and high

degree of exports specialization in natural resources intensive goods and a region B characterized by lower inequality, relatively homogeneous structure and exports more diversified and less dependent upon natural resources. These contrasts should be evident, while other possible differences shouldn't be so marked, so as to isolate the most the features we are analyzing here. The two regions that fulfill these requirements are the Northeast and the Southeast of Brazil, as regions A and B, respectively. Region A is expected to have a higher degree of environmental deterioration relatively than region B. For environmental deterioration the indicators utilized are those suggested by the Millennium Development Goals methodology.

At the Millennium Summit, the largest gathering of world leaders in history, in September 2000 it the UN Millennium Declaration was adopted by its Parties. Thus, countries committed to make an effort to reduce extreme poverty and accomplishing other targets by 2015. The objectives came to be called Millennium Development Goals (MDG). Eight goals were established and eighteen targets were stipulated in order to reach those goals. Furthermore, there are proposed indicators for each target, so that countries can report their advancements. Concerning our discussion, the seventh goal of the MDG is: to ensure environmental sustainability. It is a relevant fact that environmental sustainability was established as a development goal for UN Parties. The targets and indicators established in order to reach the 7^{th} MDG are meant to reflect environmental sustainability as it is apprehended by UN Parties. In the next figure, we see the goal, targets and indicators.

Table 1

GOAL 7: ENSURE ENVIRONMENTAL SUSTAINABILITY	
TARGET 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	**25.** Proportion of land area covered by forest **26.** Ratio of area protected to maintain biological diversity to surface area **27.** Energy use (kg oil equivalent) per $1 GDP (PPP) **28.** Carbon dioxide emissions per capita and consumption of ozone-depleting CFCs (ODP Tons) **29.** Proportion of population using solid fuels
TARGET 10: Halve, by 2015, the proportion of people without sustainable access to safedrinking water and basic sanitation **TARGET 11:** By 2020. to have achieved a significant improvement in the lives of at least 100 million slum dwellers	**30.** Proportion of population with sustainable access to an improved water source, urban and rural **31.** Proportion of population with access to improved sanitation, urban and rural **32.** proportion of households with access to secure tenure

Source:UN (2003).

They may be used in our investigation as indicators of environmental degradation, because they were agreed upon by every Party (or country member) to the UN. Thus, they should reflect elements of environmental deterioration that supposedly attend to any country's realities, including developing countries'. Moreover, the dimensions these indicators involve were agreed upon by all Parties as appropriate indicators of sustainability; i.e., they are likely to comprehend the most important dimensions of environmental sustainability. Furthermore, they concentrate on bio-physical and infrastructure indicators that are broad aspects of sustainability[15], which should be pursued unreservedly. In other words, regardless of the country, these indicators are desirable targets in terms of environmental performance. Finally, using MDG indicators allows for comparative analysis once it seeks to standardize data on a common language and measurement. However, it should be noted that any set of indicators that is intended to be universal lacks information about local spe-

[15]As suggested by the report Stiglitz, Sen, Fitoussi (2009).

cificities. The benefits of a general analysis may be overcome by the costs of omitting important specific information. This can be especially important when it comes to developing countries and should be apprehended in future investigations. However, MDG indicators are broadly accepted and its data are generally more easily accessed. Let us turn to the analysis *per se* in the next section.

3.1. The northeast and the southeast of Brazil

Brazil is divided into 26 states and the federal district. The states are grouped into five great regions: the South, the Southeast, the Midwest, the Northeast and the North. In the figure below, we can see these divisions and the Northeast and the Southeast are highlighted. It is beyond the scope of this paper to make an extensive description of the Brazilian Northeast and Southeast. However, it is necessary to point to some characteristics that are relevant to this study.

Brazil may not be considered a developed country. Its history and social formation have a lot in common with the other countries in Latin America. One of the most prominent economists in the region, Celso Furtado, has extensively and deeply researched about Latin American and, in particular, Brazil's development process. To what matters for this work, Furtado has pointed in many of his works to social, economic and even environmental problems in the Brazilian Northeast in contrast to the Southeast. In his most prominent work, Economic Formation of Brazil, there is one chapter[16] especially dedicated to analyze the above mentioned process of dichotomy in the Northeast, where there is a dynamic sector specialized in a natural resources intensive exports and a stag-

[16] Furtado (1971), chap. 11.

nant sector linked to subsistence and to the internal market. This is precisely what we discussed before. The Southeast, on the contrary, had some distinguished characteristics and were at the center of Brazil's imports substituting industrialization (ISI), which allowed the region to develop its industry and a more complex and integrated economy. This is not to say that the Southeast is a developed region. It is necessary to alert that the Southeast has a lot of problems, many of them still related to underdevelopment issues.

Source: Prepared by the author.

Figure 2

In more recent works[17], it is still possible to observe that the regional differences between the Northeast and the Southeast persist over time. Northeast is still an extremely uneven region with high degrees of structural heterogeneities and is still highly specialized, in terms of its exports, in natural resources intensive goods. Southeast went through the ISI process, as mentioned, and formed a more complex and with more threads economic system. This was predicted by ECLAC's specialists[18], who argued that the process of underdevelopment tends to reproduce itself over time and not to generate an autonomous convergence process.

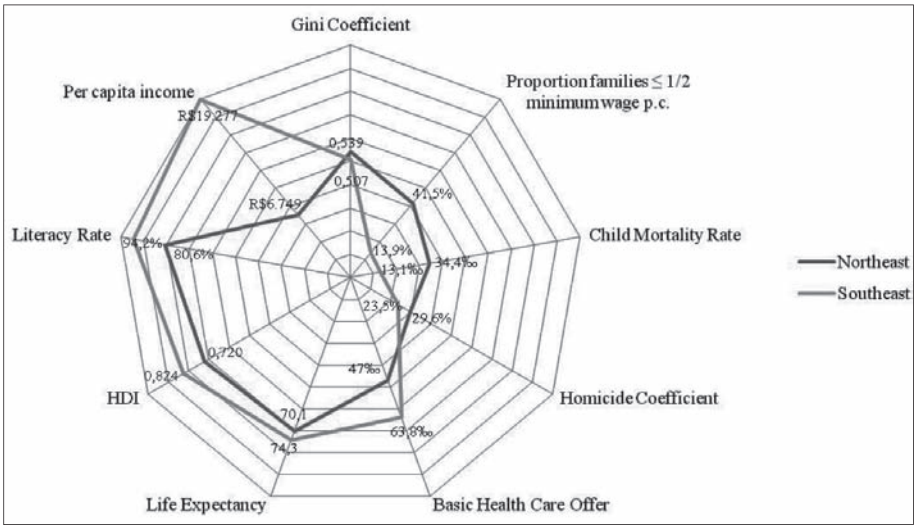
The most important feature of the Northeast relative to the Southeast is that the Northeast sustains a significant higher degree of income distribution concentration (as measured by the Gini coefficient) and presents highly concentrated exports in natural resources intensive goods. The most updated official data[19] is from 2008 and shows the Northeast with a 0,539, above national average, Gini coefficient for income and the Southeast with 0,507, below national average (which is 0,531). As to the composition of the exports, Viana, Fortunato (2007) show that, in 2006, over 60% of Northeast's exports were intensive in natural resources and there are a few items in the exports composition, while in the Southeast this proportion is less than 50% and the exports are more diversified, including, beyond natural resources intensive goods, aircrafts, cars (and its components), nuclear reactors and so on. The analysis of the composition of exports of these two regions permitted to conclude that sectors with higher technological complexity are located in the Southeast, while those

[17] See, e.g. Viana, Fortunato (2007).
[18] See, e.g. Furtado (1971), Prebisch (1949).
[19] IBGE (2010).

with lesser complexity are located in the Northeast. Another important contribution Viana Fortunato (2007) gives is that, in comparison to the composition of exports in 1995, the Southeast presents a more homogenous pattern, once the main products exported in 1995 are the same in 2006. This is not observed in the Northeast, indicating possibly a higher volatility component. Let us now, after this general characterization, turn to traditional development indicators for these two regions.

3.2. Development indicators

In this section we gather some traditional development indicators to further contrast the differences between Brazilian Northeast and Southeast. In 2008, according to IBGE (2010), 41,5% of households in the Northeast received less than half a minimum wage *per capita*. In the Southeast, this proportion drops to 13,9%. According to the same official publication, in 2008 a person who was born in the Northeast had a life expectancy of 70,1 years, while in the Southeast of 74,3. The same pattern is observed when we look at child mortality rate, which, in 2008, was 17,1‰ in the Southeast and 34,4‰ in the Northeast (NE). The literacy rate shows that while in the Southeast (SE) 94,2% of the population can read and write, in the Northeast only 80,6% can. When we look at safety matters, we observe that the mortality rate for homicide is 29,6 in the NE and 23,5 in the SE (per 100.000 habitants). Finally, at the economic dimension, the *per capita* income in the SE (in R$) is 19.277, while in the NE is 6.749. The graph below summarizes these data.



Source: Prepared by the author based on IBGE (2010) and CEPAL/PNUD/OIT (2008) for HDI.

Figure 3

Thus, we observe that there are robust data to support the idea that the Brazilian Northeast has significantly different development characteristics from the Southeast. Particularly, it is possible to conclude that the Northeast still has strong development features linked to structural heterogeneities and an exports sector very dependent upon natural resources intensive goods. The Southeast also presents difficulties in terms of development indicators, but has managed to follow a different path, where the structural heterogeneities are not as pronounced as in the Northeast and its economic system has become more complex with an exports sector more diversified and with a heavier technological component.

4. ENVIRONMENTAL DETERIORATION INDICATORS

As the previous discussion indicates, it is expected that a more uneven social structure and an exports sector more dependent upon natural resources will be related to greater environmental deterioration in a certain region. These sources of environmental deterioration are directly linked to the development style. Thus, we are going to analyze next whether it makes sense to link development and the environment the way Sunkel, Gligo (1980) indicated. In other words, we are analyzing the environmental consequences of adopting specific development styles.

The environmental indicators elected to represent environmental deterioration are those indicated by the 7th MDG (Ensure Environmental Sustainability), as mentioned before. It is important to alert that the available data does not always fit perfectly those indicators. The most recent available data were compiled. Once most indicators refer to stocks, there should not be great impediments in doing this static analysis, although static analyses potentially has limitations.

4.1. Proportion of land area covered by forest

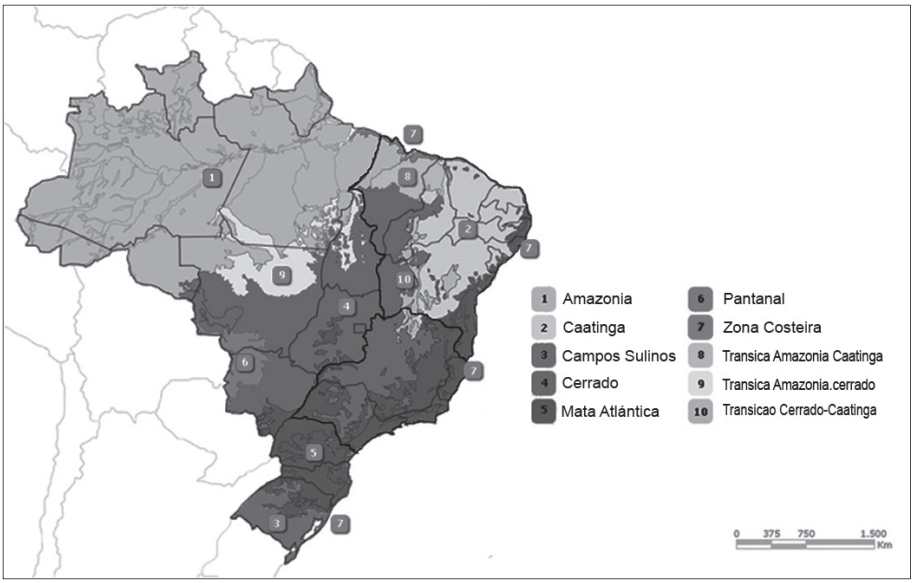
The first indicator is the proportion of land area covered by forest. The deforestation literature suggests that this process should be analyzed by biome, once each biome has its own particularities and dynamics. The Northeast and the Southeast have two biomes[20] in common: the *Cerrado* and the Atlantic Forest. The map below shows Brazil's biomes.

[20] In fact, also the *Caatinga* biome is shared by these two regions. However, only 1,2% of the Southeast area is covered by *Caating*. Thus, we considered the region not representative of the biome.

The Atlantic Forest biome[21] covers about 20% of the Northeast territory, while it covers about 55% of the Southeast territory. Warren Dean is considered one of the greatest specialists in the Atlantic Forest biome. In his renowned book about the biome, Dean (1996), Dean frequently brings to the discussion of the devastation of the biome issues related to development. This is clear in the following passage: "A remarkable feature of this expansion [of the devastation of the biome] is that the benefits for the neoeuropeans, with their extraordinarily spendthrift forms of exploitation of natural resources, were as exiguous as the waste was immense. (...) Where is there rationality in destroying forest resources so as to reach such poor outcome?"[22] This is an extremely important point of view, once it questions the validity of propositions which state that it is necessary to destroy the environment in order to reach the desired process of development. In fact, this kind of proposition is precisely questioned in this work, where we identify an opposite relation: that between underdevelopment and environmental deterioration.

[21]The data of the Atlantic Forest was compiled from: SOS Mata Atlântica / Inpe (2009).

[22]Dean (1996), p. 132.



Source: www.wwf.org.br Northeast and Southeast

Figure 4

The importance of highlighting the Atlantic Forest biome resides in the fact the most of the history of Brazil was geographically concentrated in it. Even nowadays[23] it shelters 70% of Brazilian population and 80% of the country's GDP.

In terms of the proportion of land area covered by forest, and by forest it is meant forest remnants, the Northeast presents 8,4% of its forests preserved while the Southeast presents 12,31%. These data meet our conceptual expectations regarding the relation between development style and environmental deterioration pattern.

The other biome the two regions share is the *Cerrado*. It covers about 30% of the Northeast and 45% of the Southeast territory. There is not an equivalent socio- economic study of

[23] According to Pinto, Brito (2005).

the *Cerrado* as there is of the Atlantic Forest. Thus, we may say that its dynamics are less known. The data[24] show that while the Northeast keeps 74,23% of its *Cerrado* remnants, the Southeast keeps 36,64%. These results do not meet our conceptual expectations.

If we abstract biome differences and suppose that forest dynamics are the same regardless of the biome[25], we reach the result that the Northeast has 50,24% of its territory covered by forest remnants while the Southeast has 23,25%. This result may reflect, partly, the fact that the main biome of the Northeast is the *Caatinga*, which represents around 52% of Northeast's territory. This biome is considered to be highly resilient, which means that it is possible that there may be greater human interference in the *Caatinga,* but deforestation data will not show this.

Even though the results meet our expectations for the Atlantic Forest biome, for *Cerrado* and for the territory as a whole the data do not correspond to the expected outcomes. Once there are two biomes in common and each provided evidence in contrary directions, it is not possible to deduce that this is evidence against the conceptual framework developed in Sunkel, Gligo (1980). Furthermore, there are heterogeneities inside each region that we weren't able to isolate and which may interfere in the results. However, as whole the indicator of the proportion of land area covered by forest cannot sustain the conceptual framework in question.

[24] Data were obtained from the Ministry of the Environment. See MMA/IBAMA/PNUD (2009).

[25] Data for *Caatinga* biome can be found in MMA/IBAMA/PNUD (2010).

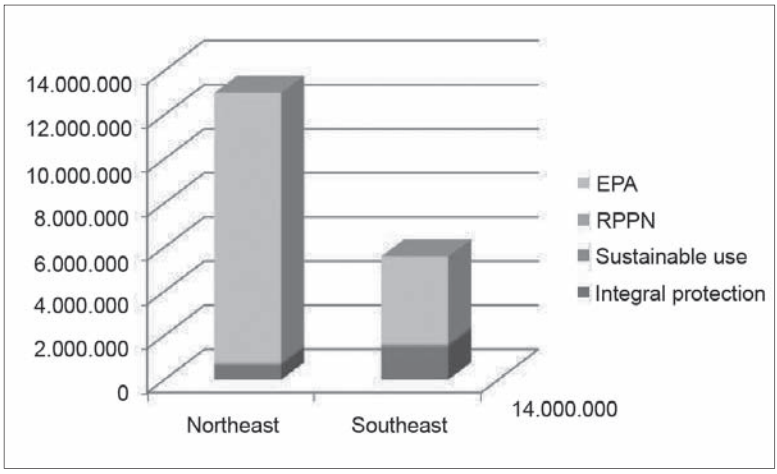
4.2. Ratio of area protected to maintain biological diversity to surface area

According to the UN (2003), this indicator (ratio of area protected to maintain biological diversity to surface area) for environmental deterioration divides itself into two other indicators: terrestrial and marine.

The areas that are specified for environmental conservation purposes in Brazil are the conservation units. There are many types of conservation units, ranging from integral protection, where no human activity may take place (except for research and guided tourism), to sustainable use, where the presence of humans is allowed under certain conditions. All kinds were considered for the elaboration of this indicator. In fact, due to methodological difficulties, it was not possible to elaborate one sole indicator. Thus, we will analyze now the indicators available that are the closest to what the UN (2003) recommends.

In terms of marine protected areas, we find that, according to IBGE (2010), the Southeast has 11.593 km² while the Northeast has 8.887 km². We were not able to put this information in proportion to total surface area, once this data is available at the subnational level. However, it is possible to use the extension of the coast as a proxy of marine surface area, once it is established as the area up to 12 nautical miles (about 22 km) between the coast and the sea. The coast line extension is 3.317 km in the Northeast while it is 1.650 in the Southeast. Thus, it is possible to deduce that the marine surface area is considerably greater in the NE compared to the SE. Consequently, it is safe to sustain that the Southeast has considerably more protected marine areas in relation to the Northeast. This result meets our expectations.

In terms of terrestrial protected areas, we will present three levels of data: municipal, state level and federal. This form of presenting this indicator has methodological motivations. At the state level there are more detailed data available. According to IBGE (2010), we observe the following patterns.

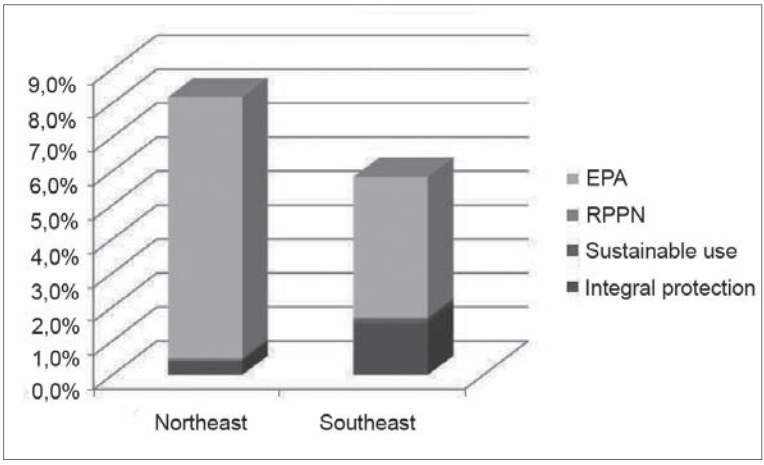


Source: Prepared by the author based on IBGE (2010). The RPPN (Particular Reserve of the Natural Patrimony) are federal level.

Figure 5
Absolute terrestrial protected area at the state level (hectares), 2009

These data inform us both absolutely as well as relatively, that the Northeast has more terrestrial are than the Southeast. However, there is one critical category of sustainable use in the above analysis: the environmental protection area (EPA). The EPA is a category of conservation unit that may include other conservation units. Considering the EPA in the analysis may introduce the problem of double-including the same conservation unit in the total protected territory. This is why it was presented as a separated category from sustainable use.

Although critical, the EPA has an absolute as well as a relative participation significantly higher than other categories. Thus, we can safely infer that, even if there is the double-inclusion, the Northeast has more terrestrial protected areas than the Southeast. It is important to note, however, that the difference, considering all categories, is not extreme, once the NE has about 8% of its terrestrial land protected and the SE has about 6%. Another important point to note is that the SE has significantly more integral protection areas (1,5% of its total territory) than the NE (0,4%).



Source: Prepared by the author based on IBGE (2010). The RPPN (Particular Reserve of the Natural Patrimony) are federal level.

Figure 6
Protected terrestrial area relative to total territory of each region (%), 2009

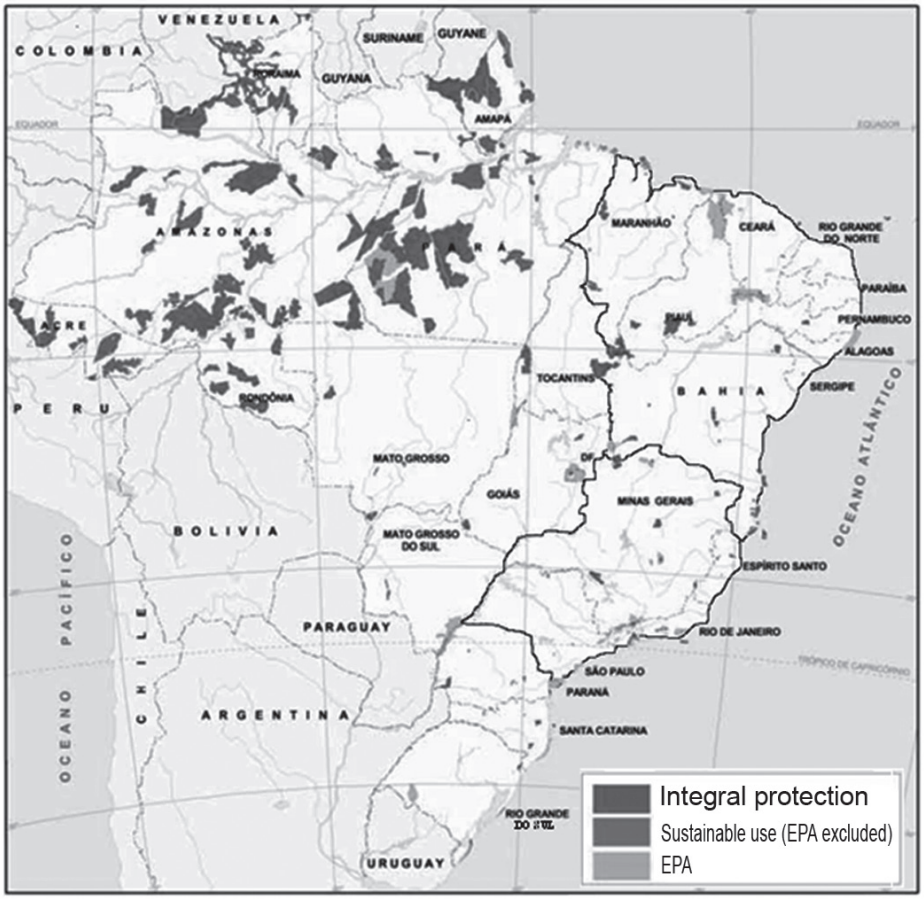
These results are not in tune with our conceptual expectations. However, they must not be taken as representative of the indicator in question (ratio of area protected to maintain biological diversity to surface area), because they lack municipal and federal data. These data are not available in the same

format as those at the state level. In fact, there are only maps that may indicate prevailing patterns. Let us examine them.

This map of the federal conservation units shows that the Northeast has a greater area of federal conservation units both in absolute and in relative terms. This can be an indicator against the validity of the theoretical framework. However, federal policies may not reflect local dynamics. In other words, the NE and the SE are not regions with political autonomy to define federal protected areas. Still, the map for terrestrial protected areas provides evidence against the conceptual framework above mentioned.

The map for municipal conservation units, however, points to a higher concentration of protected areas in the Southeast. Unfortunately, there were methodological difficulties in terms of the availability of the data at the municipal level. Thus, although we may observe a greater number of municipal conservation units, as to the area they cover, there is not enough information. It seems reasonable, however, to infer that at the municipal level the Southeast has more terrestrial protected areas.

It is difficult to reach a consensus as to whether the NE or the SE has managed to establish relatively more protected areas. State-level data indicates that the NE has more of its territory protected, although it is not clear the extent of this difference. The same may be said about federal-level data. Municipal-level data seem to indicate the opposite: that the SE has a higher proportion of its territory protected in relation to the NE. As a result, the direction to which this indicator points is inconclusive. The improvement of the database, so that there is clear and concrete information, is fundamental for the advancement of the comprehension of the behavior of this indicator.



Source: IBGE (2010). Northeast and Southeast highlighted.

Figure 7
Federal conservation units, 2009

Source: IBGE (2010). Northeast and Southeast highlighted.

Figure 8
Municipal conservation units, 2002

Thus, we may conclude the marine ratio of area protected to maintain biological diversity to surface area shows evidence in the direction of our conceptual framework, while terrestrial data cannot provide evidence in any direction due to current available data. As a whole, we may say, thus, that this indicator's outcome is inconclusive.

Another variable that could be analyzed in this subsection is the utilization of water resources. This indicator reflects the

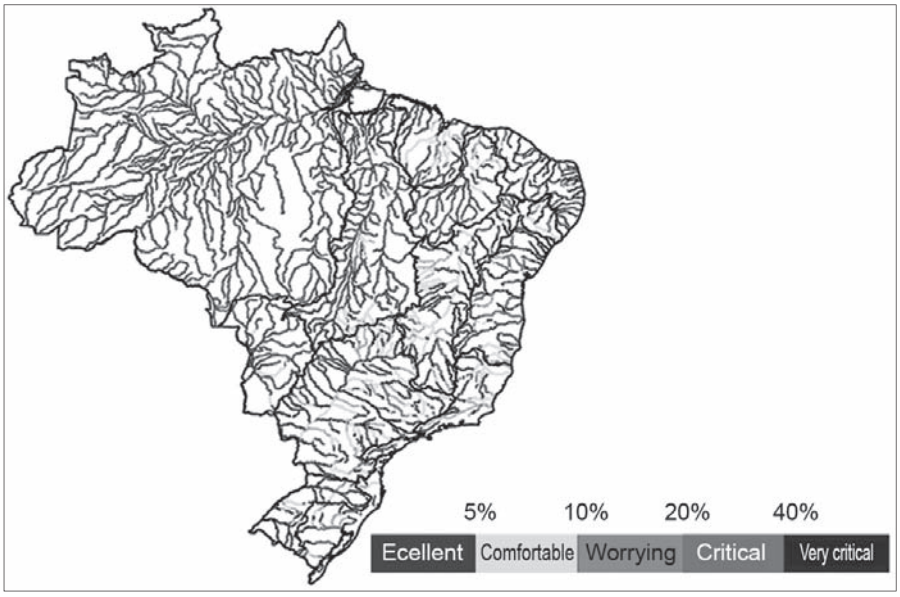
degree to which water resources, which are a basic input for life, are being used. This variable can be thought of as a *proxy* indicator for the first target of the 7th MDG goal (integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources). It has been used in a study coordinated by ECLAC to evaluate the advancements towards the achievement of the 7th MDG in Latin America and the Caribbean[26] and in national reports on the MDG[27].

Because the data are organized by watersheds, it was impossible to obtain specific data for the two regions. However, there is a very illustrative map prepared by the National Water Agency which gives important indications. The map below clearly shows that there is a situation of water demand/availability stress which is extremely critical in the Northeast. The Southeast also presents water demand/availability stress, but to a much lesser extent as compared to the Northeast. Thus, water utilization indicator meets our conceptual expectations.

Another variable that can be thought of as a *proxy* indicator for the first target of the 7th MDG goal (integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources) is the proportions of municipalities that have an advising board on environmental issues. According to IBGE (2010), around 20% of Northeast´s municipalities have an active advising board on environmental issues, while this proportion is around 40% in the Southeast. This variable is in accordance with our conceptual expectations.

[26] See UN (2010).

[27] See Presidência da República (2010).



Source: ANA (2005).

Figure 9
Relation between water demand and water availability

4.3. Energy use (kg equivalent) per $1 GDP (PPP)

This indicator is also referred to as energy intensity. It consists of the level of energy used to produce one unit of the GDP. Once the two regions we are dealing with reside in the same country, so that measured inflation is the same, using energy use (GWh) per R$1 is comparable unit and will be used here.

According to the National Electrical Energy Agency (ANEEL), in 2003 (the most recent data[28] at subnational level), the energetic consumption in the Northeast was 49.896 GWh (Gigawatts per hour) and in the Southeast it was 154.114

[28] See ANEEL (2005).

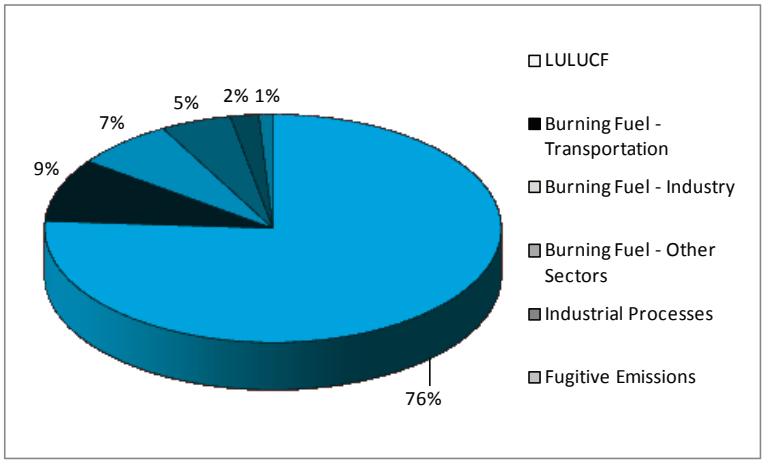
GWh. Using data from Ipeadata[29] (an official source) for the GPD for the same year (2003), the following outcome is generated. The energy intensify in the Northeast is $22,99x10^{-8}$ and in Southeast is $16,2699x10^{-8}$. It is important to highlight that, although in absolute terms the Southeast consumes a lot more energy, the relevant indicator is energy intensity. Thus, we may conclude that this indicator is in accordance with our expectations.

4.4. Carbon dioxide emissions per capita and consumption of ozone-depleting CFCs (ODP tons)

This is an extremely important indicator for it represents a type of environmental deterioration that is generated at the local level but whose effects occur at the global level. Most of the discussion on environmental issues concentrates on this feature, especially in emissions of greenhouse gases (GHG), to the neglect of other extremely relevant environmental dimensions. In terms of carbon dioxide, a recent study[30] coordinated by the World Bank has prepared data for carbon dioxide emissions at the subnational level. It is estimated that the Northeast emits about 123,994 MtCO2 while the Southeast emits around 323,504 MtCO2. In *per capita* terms, using the most up-to-date population data[31] (for the year 2007), we reach the following results: Northeast *per capita* emissions is $24,06x10^{-7}$ MtCO2 while Southeast's is $41,54x10^{-7}$ MtCO2. This constitutes evidence against the conceptual framework developed by Sunkel, Gligo (1980).

[29] http://www.ipeadata.gov.br
[30] See Banco Mundial (2010).
[31] http://www.ipeadata.gov.br

If we look at an alternative indicator, the intensity of carbon, there is evidence in the opposite direction. Although the indicator we will use is the one proposed in UN (2003), i.e. carbon emissions per capita, it is relevant to mention that another commonly used indicator shows a different pattern. The intensity of carbon measures the level of carbon emissions per unit of the GDP. In the Northeast one unit of its GDP emits $35{,}7x10^{-11}$ $MtCO_2$ while in the Southeast one unit of its GDP emits $21{,}5x10^{-11}$ $MtCO_2$. It should be noticed, furthermore, that most of Brazil's emissions concentrate in the land use, land use change and forestry (LULUCF) sector. More precisely, 76% of the country's emissions originate in this sector. This means, in other words, that the absolute majority of the country's emissions concentrate in a sector historically linked to underdevelopment, i.e. agriculture and, above all, cattle raising. We are suggesting that there are indeed links between this kind of environmental deterioration and the development style. These links should be further investigated. Although our regional comparison does not show this link, the national GHG emissions inventory provides strong indicatives that specialization in natural resources intensive goods not only promotes environmental deterioration, but also it is a sector historically linked to undesired development features.



Source: Ministry of Science and Technology - MCT (2009).

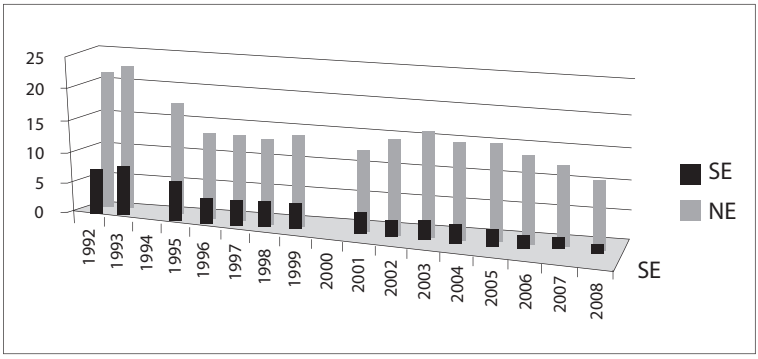
Figure 10
CO2 emissions in Brazil, 2005

Unfortunately, there is no subnational information about the consumption of ozone-depleting substances. This indicator will be, thus, excluded from this analysis.

4.5. Proportion of population using solid fuels

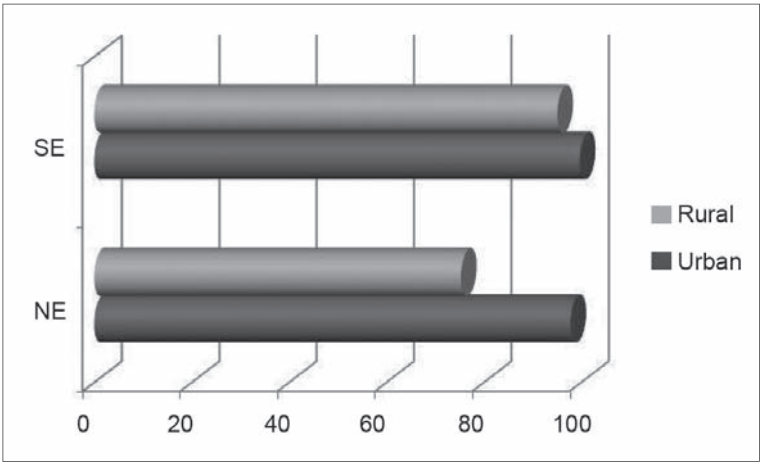
The use of solid fuels in Brazil is concentrated in cooking activities, once it is a tropical country which, thus, does not necessitate heating. We use data from the Global Development Goals - 4th National Monitoring Report[32], launched in March 2010. We may observe that there is a historical clear difference between Northeast's and Southeast's consumption of firewood patterns, such that in the Northeast a significantly higher proportion of the population uses firewood as fuel for cooking. These results show evidence in favor of our theoretical framework.

[32] See Presidência da República (2010).



Source: Prepared by the author based on Presidência da República (2010).

Figure 11
Percentage of residents that predominantly use
firewood as fuel for cooking, 1992-2008



Source: Prepared by the author based on IBGE (2010).

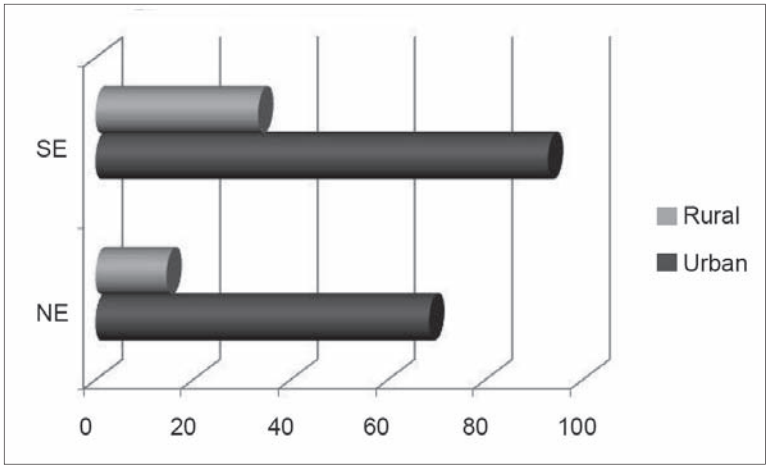
Figure 12
Proportion of rural and urban population with access
to improved water source, 2008

4.6. Proportion of population with sustainable access to improved water source, urban and rural

The data used in this subsection are those contained in IBGE (2010). We observe that both rural and urban population in the Southeast have relatively better access to improved[33] water sources. These data point to the direction suggestion by the conceptual framework proposed in previous sections.

4.7. Proportion of population with access to improved sanitation, urban and rural

The data used in this subsection are those contained in IBGE (2010).



Source: Prepared by the author based on IBGE (2010).

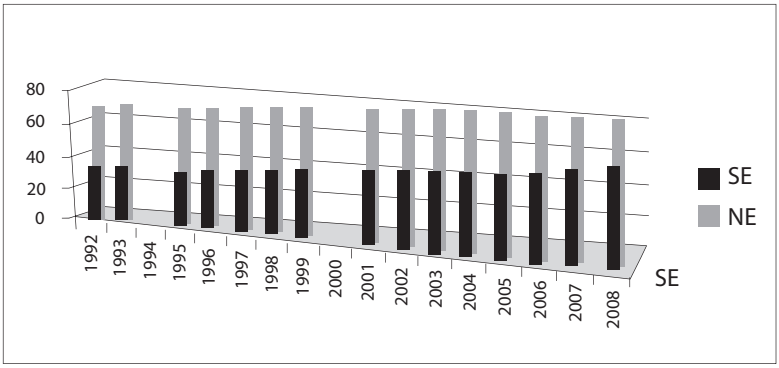
Figure 13
Proportion of rural and urban population with access to improved sanitation, 2008.

[33] Improved water sources included: piped water, well or spring.

The data show that the Northeast provides access to improved[34] sanitation to a smaller proportion of its population as compared to the Southeast. These data confirm our expectations.

4.8. Proportion of households with access to secure tenure

In this subsection the database used is the one contained in Presidência da República (2010).



Source: Prepared by the author based on Presidência da República (2010).

Figure 14
Percentage of residents in adequate housing (%)

These data meet our expectations, because the region with greater structural heterogeneities manifested in an uneven income distribution and higher specialization of its exports in natural resources intensive goods, the Northeast, has presented a worse performance in this environmental deterioration indicator in comparison to a region characterized by lesser

34 Improved sanitation included: collection system and septic tank.

structural heterogeneities manifested in a less uneven income distribution and lesser specialization of its exports in natural resources goods, the Southeast.

4.9. Final considerations on environmental deterioration indicators

The indicators of the advancements towards the achievement of the 7th of the eight Millennium Objetive Goals, Ensure Environmental Sustainability, served as environmental deterioration indicators to our analysis. In the box below, wesummarize the main outcomes of this effort.

We observe that, from the eight indicators, five (energy use, proportion of population using solid fuels, proportion of population with sustainable access to improved water source, proportion of population with access to improved sanitation, proportion of households with access to secure tenure) meet precisely the expectations derived from the conceptual framework developed in section 2.

The second indicator (ratio of area protected to maintain biological diversity to surface area) is inconclusive due to methodological problems that may be solved in future works with the improvement of the database. The first indicator (proportion of land area covered by forest) does not meet those expectations, although there is some evidence for the Atlantic Forest biome. Furthermore, the main biome in the Northeast, *Caatinga*, is considered to have a greater resilience in relation to other biomes, which may mean that there is greater human intervention in the Northeast, but the consequences are less evident. Finally, the fourth indicator is incomplete, because there is data for carbon dioxide emissions per capita, but not for consumption of ozone depleting CFCs. Carbon dioxide emissions per capita do not meet the

expectations, although if we look at the composition of the emissions at the national level, whose 76% come from LU-LUCF sector, we may infer that the connections between this indicator and the conceptual framework exist and should be further explored.

Tabla 2
Box main outcomes

Indicator	Northeast	Southeast	Accordance to the conceptual framework
Proportion of land area covered by forest			
Atlantic Forest	0,7423	0,3664	Yes
Cerrado	0,0840	0,1231	No
Total	0,5054	0,2325	No
Ratio of area protected to main biological diversity to surface area			
Marine	8,887	11,593	Yes
Terrestrial state level	8,2%	5,8%	No
Terrestrial federal level	>	<	No
Terrestrial municipal level	<	>	Yes
Energy use (kg equivalent) per $1 GDP (PPP)	$22{,}99\times10^{-8}$	$16{,}26\times10^{-8}$	No
Carbon dioxide emissions per capita & consumption of ozone-depleting CFCs			
Carbon dioxide emissions per capita	$24{,}06\times10^{-7}$	$41{,}542\times10^{-7}$	No
Consumption of ozone-depleting CFCs	No data	No data	No data
Proportion of population using solid fuels	11,1%	2,9%	Yes
Proportion of population with sustainable access to improved water source			
Urban	97,8%	99,7%	Yes
Rural	75,3%	95,1%	Yes
Proportion of population with access to improved sanitation			Yes
Urban	68,5%	92,9%	Yes
Rural	14,6%	33,4%	Yes
Proportion of household with access to secure ternure			Yes

Source: Prepared by the author.

As a whole, thus the outcomes do provide evidence that it makes sense to further explore the relations between development styles and environmental deterioration. The 7th MDG indicators provide enough evidence in this direction. However, it should be stated that this work is far from exhausting the investigation of all possible interactions and manifestations of these relations. Indeed, this work should be seen as a resumption of the relevance of understanding environmental deterioration as a dimension that is inextricably connected to development styles. This means, among other things, that ECLAC's thinking can benefit from the incorporation of the environmental dimension – and vice versa.

5. CONCLUDING REMARK

This paper work sought to recover the environmental deterioration debate in the ambit of the Latin American development debate. The aim of this work was to verify the existence of empirical support to this kind of analysis. The starting point was a project developed by ECLAC by the end of the 1970s and the mid 1980, *Estilos de Desarrollo y Medio Ambiente en America Latina*. This study provided the conceptual framework for the empirical analysis. The main idea of the study is that the environment is an inseparable dimension of the development style and they relate in a way such that the development style is conditioned by environmental features in a systemic way. The unwind of this idea led to the following proposition (hypothesis): the more uneven the distribution of income and the more specialized in natural resources intensive the exports sector is, the greater the environmental deterioration we may expect, *ceteris paribus*. The uneven distribution of income generates a marginal class in the society (both rural and urban) that deteriorates the environment in their process of fighting misery. The specialization of exports in natural resources intensive goods promotes environmental deterioration through other means, such as depletion of soils, spurious competitiveness and so on.

Two regions that had significant differences in these two features of their development style (uneven income distribution and exports specialization in natural resources intensive goods) were selected: Brazilian Northeast and Southeast. We also observed that these regions differ not only in terms of those two features, but also in relation to other development indicators, as expected. The Northeast is more intensively characterized by undesired development features in relation to the Southeast.

The next step was to investigate the environmental deterioration pattern in each region. The indicators chosen were those proposed to measure the advancements towards the achievement of the 7th MDG Ensure Environmental Sustainability. There are eight indicators, as suggested by UN's handbook for monitoring MDG goals. It was expected, according to the hypothesis, that the Northeast would present a pattern of greater environmental deterioration due to its development style characteristics.

It was found that, in general, the expected differences in environmental deterioration patterns in the two regions were met. From the eight indicators, five (energy use, proportion of population using solid fuels, proportion of population with sustainable access to improved water source, proportion of population with access to improved sanitation, proportion of households with access to secure tenure) pointed precisely to the direction expected, one (ratio of area protected to maintain biological diversity to surface area) was inconclusive due to methodological difficulties and two pointed to the opposite direction. Overall, we may conclude the indicators provide evidence in favor of the conceptual frameworks that relates environment and development styles.

This paper work should be seen as a preliminary effort to a research agenda that seeks to incorporate the environmental debate in the Latin American development discussion. The work brings enough support to the potential contributions ECLAC's thinking may have to the environmental research and vice versa.

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