

## Population and Environment: selected issues

Urbanization & Environment: trends and  
patterns in contemporary Brazil

Heloisa S.M. Costa e Roberto L.M. Monte-Mór

Migration and the Environment: a view from  
Brazilian Metropolitan Areas

Haroldo da Gama Torres

Population and Water Resources in Brazil

Roberto Luiz do Carmo

Indigenous Lands and Peoples: recognition,  
growth and sustenance

Marta Azevedo e Fany Ricardo

Health Effects of Ambient Levels of Air Pollution

Paulo H. N. Saldiva, Alfésio Luiz Braga e Luiz  
Alberto Amador Pereira

Population and Sustainable Consumption in Brazil

Donald Sawyer

Tourism and Environment in Brazil

Maria Tereza D.P. Luchiari e Célia Serrano

Agrarian Reform, Population and Environment

Juarez Brandão Lopes e Danilo Garcia Prado



## **Migration and the Environment: a view from Brazilian Metropolitan Areas**

Haroldo da Gama Torres

The main hypothesis presented in this paper is that the connection between migration and urban environment should not be considered in an abstract form as if all urban environments and institutional contexts were the same. The interplay between population and environment must be considered in "concrete territories", with all their social and environmental diversity, as well as their institutional complexity.<sup>1</sup> In the case of Brazilian metropolitan areas, we propose that particular land use regulations, as well as public policies - such as transportation and housing - strongly influence the dynamics of urban sprawl and, to some extent, the intensity and direction of the migration process.<sup>2</sup>

Such sprawl is producing an important transformation in land use, inducing the destruction of the natural environment around metropolitan areas and the contamination of water sources and the sea. Poor migrants who move to the least structured suburbs are the first to be affected by the degradation of the environment not only due to exposure to environmental hazards and vectors of contagious diseases, but also because their places of residence are less protected in terms of services and/or construction patterns that avoid such hazards.

Environmental degradation and poverty are now major issues for Latin American urban areas. A recent study from Cepal (2001) shows that there were 211 million poor individuals in the region in 1999.<sup>3</sup> According to the same estimates, urban areas respond for 65% of the poor population, or 134 million in 1999. This proportion has grown since the 70s, producing a trend called the urbanization of poverty (Arriagada, 2000).<sup>4</sup> As a consequence, social and environmental policies capable of ensuring access to proper housing, sanitation and health services - as well as reduction of environmental risks - are essential issues in all Latin American large cities. In other words, urbanization, urban sprawl, and the urban environment must also be among the most important elements of a genuine Latin American environmental agenda.

That claim also represents a change in the general perspective of environment and development initiatives in developing countries, which seem to have a "rural background" in terms of how public policies are conceived and implemented (Clark, 1996; Torres 2002). This phenomenon seems to be connected to the widespread understanding that large cities are not the center of the social problem in such countries. According to the theory of modernization, large cities have been seen as "islands of privilege" (Harrison, 1982: 145) when compared to the countryside. Following this perspective, a recent comparative study by Brouckhoff and Brennan (1998) also supports the case that living

conditions in developing countries are better in large cities than in smaller settlements, although such difference has declined lately. We will try to challenge this argument in view of the case of Brazilian suburban areas.

With this general picture in mind, we discuss in our first section some of the recent demographic trends of the most important metropolitan areas in Brazil, and their consequences for the urban environment. We present population growth rate and distribution in terms of the core city and its suburban areas, their income and sanitation differentials, and their consequences for the environment. In the second section, we discuss this issue from the perspective of the migration process. Finally, we draw some conclusions from the perspective of public policies – particularly zoning, housing and transportation – highlighting the problematic issue of land use in the Brazilian metropolis, and its connection to environment and migration.

## **1. Brazilian urban sprawl**

The post World War II suburban development in the United States was called “urban sprawl”, meaning a form of anti-city development based on the heavy migration of medium- and high-income whites to the American suburbs (Badassare, 1986). Both the social and environmental outcomes of this process have long been debated. On one hand, it seems to have enhanced racial segregation, since most Black communities have been left behind in the inner cities (Massey and Denton, 1993). On the other, it has strongly intensified land use, and most importantly the universal use of the automobile with all its consequences in terms of pollution and impact on consumption patterns (Gans, 1967; Duany, Zyberk and Speck, 2000).

In Brazil and in other Latin American countries different forms of “urban sprawl” are also in place. For instance, not only did the population in the largest metropolitan areas in Brazil double between 1970 and 2000 – confirming the trend of large fast-growing urban areas in the developing countries (United Nations, 1999) – but also the population of their suburban areas has more than tripled (Table 1). In terms of growth rate, suburban towns within metropolitan areas showed a yearly growth of 3.8% between 1970 and 2000, while the capital cities of those regions grew only 1.9% per year, reducing their share in the country’s population.<sup>5</sup> As a consequence of such trends, the nine major metropolitan areas now represent 30.1% of the Brazilian population, while their suburban areas represent 13.1%.<sup>6</sup>

When compared to developed countries, Brazilian urban sprawl has different meanings and social/environmental consequences. In Brazil, suburbs are considered – generally speaking – the place of residence of low-income families. In the Brazilian literature, it is sometimes called “periphery” (*periferia*), which represents both the location of those areas and the social condition of the population living there (Bonduk and Rolnik, 1979). Although this hypothesis has been recently challenged for the case of São Paulo – because of the spread of some wealthy gated communities in the suburbs (Caldeira, 2000) – the aggregate data available confirm that, in all Brazilian metropolitan areas, the population of suburban towns is, on average, much poorer than that of capital cities (Table 2).

**Table 1**  
Population of the Largest Metropolitan Areas in Brazil, 1970-2000

Areas	1970	1980	1991	2000	Rate of growth 1970-2000
Absolute numbers					
Brazil	93,139,037	119,002,706	146,825,475	169,799,170	2.02
All Metropolitan Areas (*)	23,718,998	34,391,318	42,216,015	51,116,441	2.59
Capital cities	16,465,381	22,462,025	26,073,798	28,766,615	1.88
Suburban towns	7,253,617	11,929,293	16,142,217	22,349,826	3.82
Relative Distribution					
Brazil	100.00	100.00	100.00	100.00	
All Metropolitan Areas (*)	25.47	28.90	28.75	30.10	
Capital cities	17.68	18.88	17.76	16.94	
Suburban towns	7.79	10.02	10.99	13.16	

Source: Brazilian Statistical Bureau (IBGE). Demographic Censuses, 1970-2000.

Note: (\*) Including the Metropolitan Areas of Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Rio de Janeiro, São Paulo, Curitiba and Porto Alegre.

**Table 2**  
Average Income of Heads of Household in Brazilian Metropolitan Areas, 2000

Metropolitan Area	Households		Average Income		Income Differential
	Capital City	Suburban	Capital City	Suburban	
Belém	296,352	183,185	859.89	502.54	58.44
Fortaleza	526,079	184,463	846.68	351.55	41.52
Recife	376,022	484,102	1,024.96	557.36	54.38
Salvador	651,293	312,889	893.89	439.67	49.19
Belo Horizonte	628,447	861,602	1,315.86	574.66	43.67
Rio de Janeiro	1,802,347	1,641,567	1,354.31	706.40	52.16
São Paulo	2,985,977	2,389,145	1,479.69	968.31	65.44
Curitiba	471,163	393,690	1,430.96	632.10	44.17
Porto Alegre	440,557	895,744	1,499.61	680.47	45.38
Total	8,178,237	7,346,387	1,309.28	733.81	56.05
<b>All Urban Areas in Brazil</b>	<b>37,334,866</b>		<b>854.08</b>		
- Metropolitan	15,524,624		1,035.55		
- Non-metropolitan	21,810,242		724.76		

Source: IBGE, Demographic Census of 2000.

Note: (\*) In Reais (R\$) of 2000, considering US\$1.0 - R\$1.8 exchange rate.

For the nine metropolitan areas mentioned above, the capital cities presented – for the head of household – an average income of R\$1,309, against R\$734 in suburban towns (2000 census). For all Brazilian urban areas, the average income of head of households was R\$854, while non-metropolitan urban areas featured R\$725. **In other words, metropolitan suburban towns presented in 2000 an average income lower than the Brazilian average, and similar to the non-metropolitan Brazilian average.** The suburbs of São Paulo are the only exception to this case. All other suburban areas presented an average income lower than the Brazilian non-metropolitan average.

**Table 3**  
Sanitation Coverage in Brazilian Metropolitan Areas, 2000

Metropolitan Area	Water network coverage - %		Sewage collection coverage - % (*)		Garbage collection coverage - %	
	Capital City	Suburbs	Capital City	Suburbs	Capital City	Suburbs
Belém	73.58	38.42	25.70	5.11	95.44	72.09
Fortaleza	87.21	57.23	44.40	23.57	95.20	74.15
Recife	87.96	82.18	42.86	27.70	96.22	78.43
Salvador	96.55	72.29	74.65	32.90	93.42	67.59
Belo Horizonte	99.26	88.78	92.32	65.21	98.55	82.10
Rio de Janeiro	97.81	71.78	77.99	49.49	98.87	88.84
São Paulo	98.63	94.10	87.23	72.74	99.20	97.72
Curitiba	98.61	82.57	77.34	35.70	99.54	87.77
Porto Alegre	98.13	78.62	48.11	21.07	99.38	92.75
Total	96.17	81.95	74.88	55.69	98.11	88.98
<b>All Urban Areas in Brazil</b>	<b>89.76</b>		<b>56.02</b>		<b>92.14</b>	
- Metropolitan	89.44		65.80		93.79	
- Non-metropolitan	89.99		50.70		90.97	

Source: IBGE, Demographic Census of 2000.

Note: (\*) Connection to sewage network and/or drainage system.

The average income for the head of household for all 9 suburban towns accounted for only 56.0% of that of capital cities' households in 2000. This income differential ranged from 41.5% in Fortaleza to 65.4% in São Paulo. One can argue that such data represent more clearly the cleavage between the poor North and the rich South in Brazil, instead of the cleavage between suburban towns and capital cities. However, income differentials in central and southern metropolises - such as Belo Horizonte, Porto Alegre and Curitiba - also strike the observer. In summary, this information shows that for all regions those suburban towns that have grown faster since the 70s are the places of residence of poor families, taking the urban Brazilian average as reference.

In other words, there is no "island of privilege" at all in Brazilian contemporary suburbia. If it is the case of generating development initiatives for the countryside, the urban periphery must also clearly be the object of such initiatives. Besides income differential, most of the time those areas also present worse indicators in terms of urban infrastructure, housing and sanitation, both inducing the destruction of the environment of the region and contaminating the local population (Table 3).

In all the metropolitan areas considered above, suburban towns tend to have worse water coverage, sewage and garbage collection than that of capital cities. As a whole, 89.0% of households in suburban towns had garbage collection in 2000, against 98.1% in capital cities; 82.0% had water coverage, against 96.2% in capital cities; and only 55.7% of suburban towns had sewage collection - a coverage level significant lower than that of the capital cities (74.9%). Furthermore, in terms of water provision and garbage collection, those conditions were worse than the average situation in the non-metropolitan urban areas in

2000, which – together with the income data - demonstrate the problematic socioeconomic situation of suburban areas in Brazil.<sup>7</sup>

In summary, the data presented here draw a picture of sanitation crisis and poverty in the fast growing areas of the suburbs of Brazilian metropolitan areas. However, those elements must also be considered in a broader environmental perspective. We consider here five significant environmental dimensions:

- a. Brazilian urban sprawl induces the continuous occupation of areas that are part of very important and threatened environmental systems such as the Atlantic Forest, that still form the greenbelts of the cities of Rio de Janeiro, Sao Paulo, and Curitiba (Dean, 1995). Important coastal areas are also being put at risk by urban sprawl (Belém, Fortaleza, Recife, and Salvador);
- b. The sprawl also induces the contamination of river basins and the sea, since most of the sewage and part of the garbage collected are not treated, nor does land occupation follow the guidelines that protect water sources. The recently published National Sanitation Survey (2000) indicates that only 35% of residential sewage is treated in Brazilian urban areas, a total of 5,1 million cubic meters per day. Most of this treatment happens in the State of São Paulo (40%). Sewage treatment is almost insignificant in the Metropolitan Areas of Belém, Recife, Curitiba and Porto Alegre.<sup>8</sup> Some metropolitan areas such as São Paulo, Recife and Fortaleza have experienced important shortages of water in the past few years. Furthermore, due to the pollution and destruction of water sources, the costs of water treatment and supply will probably increase significantly;
- c. A significant movement of urban sprawl may imply a substantial increase in the already heavy traffic, which leads to larger journeys to work and heavy air pollution. The local government is also required to significantly invest public resources in road construction, which tend to reduce the resources available to other social and environmental objectives;
- d. Since poor suburbs are growing fast and lack public investment, many times those areas often tend to present environmental risks for the urban dweller, for instance risks of floods, landslides or uncontrolled landfill facilities (Torres, 1997; Torres and Marques, 2001);
- e. Lack of proper housing and general urban infrastructure in the suburban areas make their population unable to avoid environmental hazards and vectors of contagious diseases.

In other words, it is important to think about Brazilian suburban areas - or periphery - as a significant unit of analysis for social and environmental policies in Brazil. Not only are they growing fast, but they are also as poor and with worse sanitation than the average non-metropolitan Brazilian areas. Unfortunately, we were not able to adopt here a broader definition of metropolitan areas, including other important settlements such as Campinas, Brasília, Goiânia, Natal, Londrina, etc.<sup>9</sup> Such a definition would likely confirm the argument that the social and

environmental drama of Brazilian suburbia is currently more than just a local problem: it is also an important national issue.

## 2. Migrant living conditions and consumption patterns

Migrants to the metropolitan areas in Brazil have long been defined as those who are capable of improving in socioeconomic terms in their new places of residence, or else they would be expelled to other urban or rural areas of the country (Martine, 1980). This harsh process of "adaptation" seems to still be the case in most of our metropolitan areas. This can be observed, for instance, when we consider migrant's time of residence in metropolitan areas according to house conditions (Table 4), as well as their income and consumption of durable goods (Tables 5).

Upon their arrival, recent migrants – as compared to local residents - pay rent more often, and live in smaller houses with worse sanitation (water and sewage collection) and building conditions (type of walls and number of rooms) (table 4). Such migrants have lower family incomes and the presence of durable goods (water filter, refrigerator and telephone) is less frequent in their households (Table 5). However, those migrants who stay longer tend to approach local residents in terms of average housing conditions, income and number of goods.

**Table 4**  
Migrants to Metropolitan Areas According to Time of  
Residence and Household Conditions, 1998

<b>Time of residence</b>	<b>Water (%)</b>	<b>Sewage (%)</b>	<b>Garbage (%)</b>	<b>Bathroom (%)</b>	<b>Electric power (%)</b>
<b>All Metropolitan Areas</b>					
Less than one year	89.43	75.94	90.03	97.22	99.50
1 year	92.51	77.72	91.25	97.63	99.36
2 years	92.01	75.07	89.18	97.64	99.64
3 years	93.46	76.32	90.46	98.02	99.07
4 years	92.18	74.07	89.84	98.56	99.89
5 years	94.65	79.11	89.23	97.64	99.83
6 years	94.03	79.29	92.00	98.58	99.62
7 years	94.98	77.57	87.75	98.75	99.63
8 years	95.46	78.80	93.23	98.83	99.62
9 years	95.33	79.92	93.41	98.40	99.67
10 years or more	95.82	83.86	94.66	98.70	99.65
<i>Born in the area</i>	<i>95.56</i>	<i>78.61</i>	<i>94.67</i>	<i>98.39</i>	<i>99.73</i>
<b>Metropolitan Area of Sao Paulo</b>					
Migrants from the Northeast	98.80	86.79	97.66	99.90	99.87
Other States	98.98	89.66	98.36	99.80	99.96
Born in the State	99.27	91.32	98.61	99.77	99.90

(continued)



(continued)

<b>Time of residence</b>	<b>Brick walls (%)</b>	<b>Rent (%)</b>	<b>Average number of rooms</b>	<b>Average number of bedrooms</b>
<b>All Metropolitan Areas</b>				
Less than one year	84.85	43.67	5.21	1.98
1 year	89.01	37.00	5.26	1.97
2 years	85.31	28.40	5.26	1.99
3 years	87.14	24.44	5.38	1.97
4 years	88.11	20.04	5.47	2.08
5 years	89.82	22.63	5.38	2.00
6 years	92.26	16.92	5.34	2.07
7 years	92.61	13.73	5.59	2.15
8 years	90.04	13.88	5.37	2.13
9 years	91.34	11.79	5.51	2.18
10 years or more	92.86	10.17	5.93	2.18
<i>Born in the area</i>	<i>94.34</i>	<i>13.23</i>	<i>5.71</i>	<i>2.17</i>
<b>Metropolitan Area of Sao Paulo</b>				
Migrants from the Northeast	96.34	26.19	4.54	1.83
Other States	97.99	19.79	5.49	1.99
Born in the State	98.39	15.71	5.65	2.07

Source: IBGE, 1998 (National Survey of Households – PNAD).

Even for the large group of sometimes ill-treated Northeastern migrants living in the Metropolitan Area of São Paulo, the average housing conditions observed in the area are not much worse than those of the natives of the state and migrants from other states, although they tend not to catch up in terms of family income.

In any case, both the literature and the data presented here give considerable support to the hypothesis that socioeconomic and sanitary conditions of the fast growing metropolitan suburbs are related to the intense migration that happened in those areas within the past 30 years (Cunha, 1994). Most likely, part of the poor newcomers start their lives in the metropolis looking for a house in non-structured places of the suburbs and/or in sub-standard housing areas such as shantytowns (*favelas*), aiming to achieve better housing in the long run (Torres and Marques, 2001).<sup>10</sup> Eventually, some migrants achieve these goals, not necessarily in the area they have first settled. New waves of migrants move into the same suburban area that had been occupied before, or to a new one, in a process also called as “periphery creation” (Kowarick, 1988).

In other words, the problematic environmental condition of Brazilian suburban towns has been presented as connected to the migration movements to those areas (Hogan, 1992; Jacobi, 1994). However, when considering the environmental issue in a broader perspective – including the so-called global environmental issues – the connections between migration and the environment have also to be considered in other different, and sometimes contradictory, dimensions:

**Table 5**  
Migrants to the Metropolitan Areas According to Time of Residence,  
Average Income and Ownership of Durable Goods, 1998

<b>Time of residence</b>	<b>Water filter (%)</b>	<b>Gas stove (%)</b>	<b>Refrigerator (%)</b>	<b>Telephone (%)</b>	<b>Average Family Income (*)</b>
<b>All Metropolitan Areas</b>					
Less than one year	50.46	99.30	88.51	29.58	1092.55
1 year	52.98	99.50	91.09	30.79	1317.22
2 years	52.79	99.86	91.70	33.40	1128.28
3 years	53.66	99.81	91.89	31.88	1114.56
4 years	54.58	99.49	92.93	34.61	1204.41
5 years	60.28	99.62	92.51	32.62	935.51
6 years	53.33	99.54	95.81	39.13	1197.50
7 years	61.05	99.65	94.50	36.83	1227.53
8 years	55.70	99.66	94.77	36.20	1151.29
9 years	53.65	99.53	93.01	42.67	1018.68
10 years or more	61.49	99.66	95.50	48.90	1384.23
<i>Born in the area</i>	65.83	99.71	94.97	43.57	1439.87
<b>Metropolitan Area of São Paulo</b>					
Migrant from the Northeast	58.92	99.95	96.60	32.22	1066.32
Other Migrants	64.77	100.00	97.46	51.54	1679.84
Born in the State of São Paulo	65.56	99.90	98.42	53.24	1877.95

Source: IBGE, 1998 (National Survey of Households - PNAD).

Note: (\*) In reais (R\$) of 1998.

a. It is possible to argue that the rural-urban migration to metropolitan areas may be considered a positive trend in terms of the environment, due to the reduction of population pressure in migrants' areas of origin (World Resources Institute, 1992). Probably, this is the case of the traditional rural-urban migration originating from the dense semi-arid Brazilian Northeastern region toward large cities in the South, particularly São Paulo;

b. Higher sanitary conditions and living standards of a few metropolitan areas (such as São Paulo) - when compared to the interior of the poorer states of the country - may imply better living conditions to some recent migrants, even when they move to more problematic suburbs. However, this is not necessarily true for all Brazilian metropolitan areas, particularly Belém, Fortaleza and Recife;

c. Most likely, the migrant who stays in the metropolis will adopt local consumption patterns. The data presented earlier in this document show that gas stoves and electricity are already universal, even for first-year migrants. The ownership of other durable goods, such as refrigerators, grows steadily with a longer time of residence (Table 5). In other words, long-term rural-urban migration flows are likely to have impact on the consumption of goods, energy and other natural resources;

d. If migrants also adopt the lifestyle of lower fertility rate that predominates in metropolitan areas, in the long run migration will induce a trend of decline in the overall rate of population growth;

e. Recent migrants seem to be more exposed than other urban residents to environmental risks, due to their worse housing conditions and lower ability to avoid such risks (Torres, 1997).

In summary, it does not seem to be possible to produce any coherent synthesis of the overall positive and negative environmental impacts of migration to metropolitan areas. Some of the environmental consequences of migration seem to be obviously positive on a national scale, albeit negative locally. There is also no simple form of coordination between local and national government to produce any kind of meaningful balance between those trends.

Furthermore, migration must not be blamed for the consequences of the urban sprawl. If it is true that the migration process is connected to urban sprawl, they should not be interpreted as the same phenomena. On one hand, migration may happen without urban sprawl, which produces denser urban settlements. On the other, urban sprawl may happen without metropolitan demographic growth, that is, a rearrangement of population distribution over the urban space. In other words, it is not necessarily true that long distance migration *per se* produces the particular land use impact they presently have in the Brazilian suburbs. It happens in a particular context of institutional arrangements and public policies, particularly in terms of land use regulation, transportation and housing policies. We further develop this issue in the next section.

### **3. Public policies, migration and metropolitan environment**

Although the idea of a national migration policy has been abandoned in Brazil since the military dictatorship of the 70s, there is a series of policies that contribute at different levels to the outcomes of the interplay of migration and urban environment.<sup>11</sup> The general background of the discussion proposed in this section is the need to address the issue of a more "sustainable use of the urban space" in terms of public policy interventions (Martine, 2001). Although it is impossible to present here a comprehensive discussion on all urban policies, and their links to migration and the urban environment, we would like to briefly discuss how three different policies - transportation, zoning and housing - could influence a more sustainable use of space in concrete territories and institutional contexts of the complex Brazilian metropolitan areas.

#### *3.1. TRANSPORTATION*

The environmental impacts of transportation technologies are clearly understood at different levels, from global warming to heavy traffic jams and urban pollution (Elsom, 1992). However, transportation policies are also connected

to other different urban environmental elements, including the shape of the city and the occurrence of settlements in distant areas and more remote suburbs.

Most of the tradeoffs between densification and sprawl can be framed in terms of long-term transportation strategies. On one hand, high urban density – many times regarded as a bad environmental characteristic of some urban areas – favors mass transportation systems such as the subway, which significantly reduces traffic jams and air pollution. On the other hand, highway building strongly stimulates urban sprawl (and lower density), with high environmental costs in terms of pollution, more land occupation, and increasing costs for other public policies.

Although much modern environmental planning criticizes high urban density on quite logical technical grounds (Platt, 1994; Spirn, 1995; Roseland, 1997), it is important to make the point that low density seems to be a kind of luxury that most developing metropolises are not ready to afford. This happens because population density can produce considerable economies of scale for different public policies, including education, urban infrastructure, sanitation and public health. It also reduces air pollution and precarious land occupation in the far suburbs. Such a counter-intuitive perspective on environmental planning is not built upon any previous notion of what a city should be, but on what the country's already messy developing metropolises are. In such places, land occupation is not well organized at all, and resources are dramatically scarce.

However, it is very difficult to influence transportation policies in the long term, regardless of their key role for overall metropolitan planning, and their obvious impact on urban density. It mobilizes a complex set of individual and business interests, including developers, construction industry, auto industry, retail, and landowners, as well as the middle and upper classes that demand more urban space and environmental quality.

In summary, it is quite clear that transportation policies – particularly mass transportation – can strongly influence the sustainability of the use of urban space, stimulating or containing urban sprawl. However, the great challenge is to conceive a positive arrangement of political forces that will allow long-term transportation planning to counterbalance urban sprawl, and lead to a better use of urban space, as well as the use of social services and urban infrastructure.

### *3.2. PARKS, ZONING, AND BUILDING NORMS*

The development of parks and conservation areas, zoning policies and the introduction of building norms are among the most important urban environmental policies. Those policies are beneficiary of the glorious traditions of the urban and environmental planning that had in Olmsted (1870) one of its first and more representative thinkers and practitioners. Such policies are clearly connected to the possibility of developing large cities with significant life quality in the developed world (Platt, 1994). By definition, those policies are tailored to coordinate a more sustainable use of the urban space.

However, such policies are not clear-cut. On one hand, very restrictive zoning and building norms make land scarcer, increasing its price. If such a price effect can be affordable in richer areas, this is not necessarily true for the poorer ones.

Most likely, restrictive zoning in one area of a metropolis will induce or redirect migration to other places of the metro region. On the other hand, when restrictive zoning is not well enforced, it may produce other complex unintended consequences in terms of intra-urban demographic responses from local dwellers. For instance, in São Paulo, the law for protection of water source areas – that in the 70s restricted the occupation of almost all the southern region of the metropolitan area – contributed to the extensive occupation of such protected areas by poor households due to the lack of enforcement (Marcondes, 1996).

Frequently, the price effect of the zoning policy is addressed by the taxation of the land. Some legislators try to implement progressive land taxation in order to capture part of the value that landowners get due the valuation of their properties in more preserved areas. However, considering the political power of landlords, the fight for a progressive taxation is far from simple, and may also have cross-border unintended consequences in the fragmented political landscape of Brazilian Metropolitan areas.<sup>12</sup>

Most important, zoning policies – in order to work properly - demand certain preconditions not necessarily present in developing countries. A necessary condition for such policies to work is the stability of the judicial system and the enforcement of property rights, urban norms and regulations. However, general estimates of the population living in informal settlements in developing countries vary from 30% in large Latin American cities to 80% in African ones (Schteingart, 1989; Lim, 1995). In São Paulo, in 1996, 30% of the population was living in census tracts with fewer than 10 square meters of housing space per inhabitant, which indicates that the informality in land property is very high in those places (Torres and Oliveira, 2001). As a consequence, only part of the city can be comparable in any sense to a city of a developed country.

There are different dimensions of illegality, all of them undermining the efficiency of urban environmental policies in the developing metropolis: the invasion of private and public areas such as squares and parks – which is very common in São Paulo (Taschner, 2000); illegal developments on private land that do not follow zoning and building norms; and the general disregard for the rules of zoning and building norms, which bribes and corruption make possible.

Furthermore, the irregularity of land use somehow “justifies” the non-provision of social services (Torres, 2001). It seems to be more difficult to find investments appropriated by their private owners.<sup>13</sup> Lawsuits against public administrators that do not follow the complex set of standard procedures may also happen in regard to land use regulations (Maricato, 1996).

In summary, the background of ill-regulated land use seems to significantly erode the possibilities of traditional urban environmental policies in the large cities of developing countries. It may be true that if those rules were enforced, they would discourage migration, since the costs of housing would increase significantly for newcomers. However, the huge cultural and institutional transformation that such enforcement demands makes it quite a remote possibility in the short term.

Although higher stability in the judicial system and law enforcement are highly desirable long-term institutional goals – with clearly positive environmental impacts - it is useful to reflect on what can be done while it does not come to pass:

- a. Laws and regulations should be simpler in order to stimulate and help their enforcement, curb corruption and reduce overall transactions costs and – probably - the price of land;
- b. The level of standards should be proportional to the institutional capacity of enforcing them. Attained moderate standards are much better than higher but never accomplished ones;<sup>14</sup>
- c. It is important to promote the coordination of land use legislation across different municipalities within the same metropolitan areas, so as to prevent unintended cross-border effects;
- d. The resources and conditions necessary for the maintenance of parks and conservation areas should also follow the creation of those areas. In case such resources are not available, those areas may easily be invaded.

Although such propositions may seem quite frustrating for those who have an advocacy perspective on urban environment, one may not ignore the effective conditions of policymaking in developing countries. The enforcement of laws, regulations and norms should not be taken for granted. In such a context, migration contributes to an endless process of irregular land-use and environment degradation.

### *3.3 HOUSING POLICY*

Another policy that is clearly connected to the sustainable use of the space in urban areas is the housing policy. Such policy – trying to provide affordable housing for poor people – produces important transformations in the landscape and may influence migration movements. The data presented in the first section on the socioeconomic conditions of Brazilian metropolitan areas suggest that effective housing policies are essential. Some estimates of the so-called “housing deficit” present figures of an unattained demand of more than 6 million households in 2000 (FJP, 2000). Of course, poor suburbs of metropolitan areas have to be considered among the most important sites for such policies.

Effective housing policies are very important, not only because of their obvious social impact but also due to a series of positive consequences on health, employment and land regularization. However, in order to account for their demographic and environmental consequences, such policy should also consider other general elements:

- a. Generally speaking, housing policies seem to reduce urban environmental degradation because they increase overall sanitation and housing conditions, as well as regularize invaded public areas. However, depending on the engineering of the project and its institutional framework, it may produce important local environmental impacts in terms of land use and migration;

- b. Most likely, small-scale projects will produce lower environmental impacts and more easily ensure the integration of the population within the metropolis. Whenever possible, new housing should also be close to existing social services, employment, and urban infrastructure, to reduce costs for the population as well as the overall costs for the government in terms of building new schools, roads, etc;
- c. The execution of housing policies should be local to ensure consistency with the policy on land use. When this is not the case, national and state governments should also coordinate their investments locally, in order to reduce possible unintended environmental and/or migration impacts;
- d. The lack of resources should not be considered a definitive impediment for housing policies. If it is true that housing is a very costly social policy, it is also true that alternative policies should also be considered. For instance, land regularization and credit for small improvements in housing (self-construction) may also be regarded as important and less costly alternatives.

It is important to consider that - due to the very low average income in some metropolitan areas - such policies must also be subsidized to ensure that the really needed groups will be targeted. This element, as well as the huge size of the housing deficit, should discourage large-scale housing policies, especially in a context of strong pressure for fiscal stability and budgetary control. However, the size of the budget is not a consistent explanation for the lack of specific policies. We still need to understand why housing policies were so unimportant for the federal government in Brazil in the 90s, while other social policies - such as agrarian reform - flourished.

Probably, it has partially to do with the cost of such policies in view of the size of the housing deficit. However, other political and institutional reasons may also be in place. In an article published in a Brazilian newspaper,<sup>15</sup> the president of the government bank responsible for home financing (Emílio Carazzai, President of *Caixa Econômica Federal*) argues that governmental non-subsidized credit mechanisms are not proper for really needy people (the families that receive fewer than 3 minimum salaries per month, or less than US\$250). Furthermore, the most important subsidized program (*Programa de Arrendamento Residencial* - PAR) did not work well in metropolitan areas due to the lack of land with affordable prices in those areas, according to the rules of the program.

In summary, the need for a comprehensive housing policy in Brazilian metropolitan areas seems quite obvious. Such a policy, however, should be developed without increasing the already significant migration movements and environmental impacts for those areas. Although briefly presented here, these elements point to the need for national funding and local execution. Attention to local conditions of urban infrastructure and social services, as well as land use regulation, is essential to produce real improvement in the sustainability of land use.

## Conclusion

We have attempted to organize this paper around three major issues. Our first point was that the fast growing suburban areas – produced by the particular urban sprawl of contemporary Brazil – are not at all “islands of privilege”, but part of a larger continent of “social and environmental suffering”. We discussed this argument by breaking down socio-demographic data for Brazilian metropolitan areas between the capital city and its suburbs. Suburban areas – or the periphery, as most Brazilians call it – are not only as poor as the non-metropolitan areas, but also most of its sanitation and general environmental conditions are more problematic. It is also important to notice that those areas are still growing very fast, producing a particularly gloomy scenario for urban Brazil at the beginning of the XXI century. As a consequence of this first argument, we also argued that those areas should be the primary focus of social policies in Brazil, as well as of great concern for environmental policies. In other words, we think that it is very important to consider Brazilian suburban areas as a significant unit of analysis for social and environmental policies in Brazil.

The second point we have tried to make is that migration may have mixed environmental consequences on a national scale, reducing population pressure in the areas of migrants’ origin and increasing consumption and the environmental impact in metropolitan areas. Furthermore – locally – the migration process seems to be connected to the problematic social and environmental conditions of large suburban areas. However, we also argued that migration *per se* does not necessarily produce the particular land use degradation they presently seem to produce in Brazilian metropolitan suburbs. Such degradation happens due to particular institutional arrangements and public policies, especially land use regulation, transportation, and housing policies.

For that reason - in the third place – we attempted to discuss such policies from the point of view of migration and environmental dynamics of Brazilian metropolitan areas. The focus of the discussion is the general context of ill regulated land use, undermining the possibilities of traditional environmental policies on Brazilian urban areas. We argued that zoning policies – in order to work properly - demand certain preconditions not necessarily present in developing countries. A necessary condition for such policies to work is the stability of the judicial system and the enforcement of urban norms and regulations. We also argued that, although much of the modern environmental planning criticizes high urban density in quite logical technical grounds (Platt, 1994; Spirn, 1995), low density seems to be a kind of luxury that most developing metropolises are not ready to afford. Population density can produce considerable economies of scale for different public policies, including education, urban infrastructure, sanitation and public health as well as reduce air pollution and precarious land occupation in the distant suburbs.

In the case of Brazilian metropolitan areas, the interplay between migration and urban environment seems to be very complex, and it cannot be fully understood without considering the overall institutional conditions and long-term public policies. This case also demonstrates that the connection between migration and environment should not at all be considered in an abstract form, as if all societies, urban environments, and institutional contexts were one and the same.



## References

- ADR 1997. Asian Development Bank on Megacities. In: *Population and Development Review*, v23, n.2, p. 451-461.
- Arriagada, Camilo 2000. Pobreza en América Latina: Nuevos escenarios e desafíos de políticas para el hábitat urbano. In: CEPAL – *Série Medio Ambiente de Desarrollo*, n. 27.
- Baldassare, Mark 1986. *Trouble in paradise: the suburban transformation of America*. New York: Columbia University Press.
- Bilsborrow, R. E. (ed.) 1998. *Migration, urbanization and development: new direction and issues*. New York: UNFPA and Kluwer Academic Publishers.
- Bonduk, Nabil and Rolnik, Rachel. 1979. *Periferia – Ocupação do Espaço e Reprodução da Força de Trabalho*. São Paulo: Faculdade de Arquitetura e Urbanismo/Universidade de São Paulo/Fundação para a Pesquisa Ambiental.
- Brockerhoff, Martin 1999. Urban growth in developing countries. A review of projections and predictions. In: *Population and Development Review*, v.25, number 4. p.757-778.
- Brockerhoff, Martin and Brennan, H. 1998. The poverty of cities in developing regions. In: *Population and Development Review*, v.24, number 1. p.75-111.
- Caldeira, Teresa, P. 2000. *City of walls: crime, segregation and citizenship in Sao Paulo*. Berkeley: University of California Press.
- Cepal (United Nations Economic Commission for Latin America and the Caribbean) 2001. *Panorama Social de América Latina, 2000-2001*. Santiago: Cepal. [www.cepal.org](http://www.cepal.org)
- Clark, D. 1996. *Urban world/global city*. London: Routledge.
- Cunha, José Marcos Pinto 1994. Mobilidade populacional e expansão urbana: o caso da Região Metropolitana de São Paulo. Campinas: IFCH/UNICAMP (PhD Thesis).
- Dean, Warren 1995. *With broadax and firebrand: the destruction of the Brazilian Atlantic Forest*. New York: Stuart B. Schwartz.
- Duany, Andres; Zyberk E. P. and Speck, J. 2000. *Suburban nation: the rise of the sprawl and the decline of the American Dream*. New York: North Point Press.
- Elsom, Derek M. 1992. *Atmospheric pollution: a global problem*. Cambridge: Blackwell.
- FJP, 2000. *Déficit habitacional no Brasil*. Brasília: Secretaria Nacional de Políticas Urbanas/PNUD. [www.pbqp-h.gov.br/deficit2000/apresentacao.htm](http://www.pbqp-h.gov.br/deficit2000/apresentacao.htm)
- Gans, Herbert J. (1967). *Levittown and America*. New York: Pantheon.
- Gronstein, Marta D. 1987. A cidade clandestina: os ritos e os mitos. O papel da irregularidade na estruturação do espaço urbano no município de São Paulo - 1900-1987. São Paulo: FAU/USP (tese de doutorado).

- Gugler, J. 1996. *The urban transformation of the developing world*. New York: Oxford University Press.
- Habitat, 1996. The Istanbul declaration on urban settlements. In: *Population and Development Review*, v22, n.3, p. 591-594.
- Hardin, G. (1968). The tragedy of the commons. In: *Science* 162, p.1243-8.
- Hardoy, J.E. and Satterthwaite D. 1989. *Squatter citizen: life in the urban third world*. Londres: Earthscan.
- Harrison, Paul 1982. *Inside the Third World*. Harmondsworth: Penguin.
- Head, R.A. (1995). Health-based standards: what role in environmental justice. In: Bryant, B. *Environmental Justice: issues, policies and solutions*. Washington: Island Press, p.45-56.
- Hinchey, M. et. all (1991). *Minorities and the environment: an exploration into the effects of environmental policies, practices and conditions on minority and low income communities*. Albany: The Assembly, State of New York.
- Hogan Daniel et al (2001a). *Migração e Meio Ambiente nas Aglomerações Urbanas*. Campinas: Nepo/Unicamp.
- Hogan Daniel (2001b). Socio-Demographic Dimensions of Sustainability. Campinas-Brazil, Unpublished paper.
- Hogan, Daniel J. et al 2000. Um breve perfil ambiental do estado de São Paulo. In: Hogan, Daniel J. et al (eds). *Migração e ambiente em São Paulo: aspectos relevantes da dinâmica recente*. Campinas: Nepo/Unicamp, p. 275-381.
- Hogan, D.J. (1993). População, Pobreza e Poluição em Cubatão. In: Martine, G. (org.). *População Meio Ambiente e Desenvolvimento: Verdades e Contradições*. Campinas: ABEP/Editora da Unicamp, p.101-32.
- Hogan, D.J. (1992). Migração ambiente e saúde nas cidades brasileiras. In: Hogan, D.J. e Vieira, P.F. (orgs.). *Dilemas sócio-ambientais do desenvolvimento sustentável*. Campinas: Editora da UNICAMP, p.149-70.
- Inforregio, 2000. *The urban audit: toward a benchmark of quality of life in 58 European Cities*. Luxembourg: Office for Official Publications of the European Communities. see [www.inforegio.org](http://www.inforegio.org)
- Jacobi, P. R. (1994). Households and environment in the city of São Paulo: perceptions and solutions. In: *Environment and Urbanization*. Londres: vol.6, nº2, p.87-110.
- Jones, Gavin, W. and Visaria P. (eds.) 1999. *Urbanization in Large Developing Countries: China, Indonesia, Brazil, and India*: London: Oxford University Press.
- Kaplan. Robert D. 1996. *The end of the earth: a journey at the dawn of the 21st century*. New York: Random House.
- Kowarick, Lúcio 1988. *As Lutas sociais: São Paulo Passado e Presente*. Rio de Janeiro: Paz e Terra.

- Lavinas, L and Nabuco, M.R. 1995. Economic crisis and tertiarization in Brazil's metropolitan labour market. In: *International Journal of Urban and Regional Planning*, vol. 19, n.3 p. 358-368.
- Lim, Gill-Chin 1995. Housing policies for urban poor in developing countries. In: Stein, Jay M. *Classic readings in urban planning*. New York: McGraw-Hill, p. 521-537.
- Livi-Bacci, M. and G. De Santis. 1998. *Population and poverty in developing countries*. Oxford, Oxford University Press, International Studies in Demography.
- Marcondes, M.J.A. (1996). *Urbanização e meio ambiente: os mananciais da metrópole paulista*. São Paulo: FAU/USP (tese de doutorado).
- Maricato, Ermínia 1996. *Metrópole na Periferia do Capitalismo: ilegalidade, desigualdade e violência*. São Paulo: HUCITEC.
- Martine, George. 2001. The sustainable use of space: advancing the population/environment agenda. Paper presented at the Cyber Seminars of the Population-Environment Research Network. [www.populationenvironmentresearch.org](http://www.populationenvironmentresearch.org)
- Martine, George, Hakkert, Ralph & Guzman, José Miguel. 2000. Population and development strategies: responding to new challenges. Mexico City: UNFPA Country Support Team for Latin American and Caribbean.
- Martine, George. 1996. *Population and environment in the current development scenario*. Harvard Center for Population and Development Studies, Working Paper Series No. 96.02, Harvard University, Cambridge MA.
- Martine, George 1992. *Processos recentes de concentração e desconcentração urbana no Brasil: determinantes e implicações*. Brasília, ISPN.
- Martine, George 1980. Adaptação dos migrantes ou sobrevivência dos mais fortes? In Moura, H. (ed.) *Migrações Internas: textos selecionados*. Fortaleza: BNB.
- Massey, Douglas S. 1996. "The age of extremes: concentrated affluence and poverty in the 21st century". In: *Demography* 33, n.4, p.395-412.
- Massey, Douglas S. and Denton, Nancy A. (1993). *American apartheid: segregation and the making of the underclass*. Cambridge: Harvard University Press.
- Melo, M.C. 1995. State retreat, governance and metropolitan restructuring in Brazil. In: *International Journal of Urban and Regional Planning*, Vol. 19, n.3 p. 342-357.
- North, Douglas C. 1990. *Institutions, institutional change and economic performance*. New York: Cambridge University Press.
- North, Douglass C. 1981. *Structure and change in economic history*. New York: W.W Norton & Company.
- Olmsted, F.L. 1870. Public parks and the enlargement of towns. Republished by Gates, R.T. and Stout, F. 1996. *The City Reader*. Londres: Routledge, p. 337-344.
- Pick, James B. and Butler, E. W. 1997. *Mexico Megacity*. Boulder: Westview Press.

Platt, R.H. 1994. The Ecological city: introduction and overview. In: Platt, R.H., Rowntree, R.A and Muick, P.C. *The ecological city: preserving and restoring urban biodiversity*. Boston: The University of Massachusetts Press, p.1-20.

Portes, A. 1998. Economic sociology and the sociology of immigration: a conceptual framework. In Portes, A. (ed.). *The economic sociology of immigration: essays on networks, ethnicity, and entrepreneurship*. New York: Russell Sage Foundation.

Portes, A. 1997. Neoliberalism and the sociology of development. In: *Population and Development Review*, v23, n.2, p. 229-260.

Portes, A., Dore-Cabral, C. and Landolt, P. 1997. *The urban Caribbean: transition to the new global economy*. London: John Hopkins University Press.

Roberts, Bryan R. 1994. Urbanization and the environment in developing countries: Latin America in comparative perspective. In: Arizpe, L., Stone, M.P. and Major, D.C. *Population and environment: rethinking the debate*. Boulder: West View Press, p. 303-338.

Roseland, Mark (ed.) 1997. *Eco-city dimensions: healthy communities, healthy planet*. New Heaven: New Society Publishers.

Savich, H.V. 1988. *Post-industrial cities: politics and planning in New York, Paris and London*. Princeton: Princeton University Press.

Savedoff, William D. and Spiller, Pablo T. 1999. *Spilled Water: Institutional Commitment in the Provision of Water Services*. Washington: IADB Publications.

Schteingart, Martha 1989. *Los productores del espacio habitable: estado, empresa y sociedad en la Ciudad de México*. Mexico City: El Colégio de México.

Spirn, A.W. (1995). *O jardim de granito: a natureza no desenho da cidade*. São Paulo: EDUSP.

Stein, M et. all. 1992 *Urban research in the developing world: towards an agenda for the 1990s*. Toronto: University of Toronto, Center for Community Studies.

Taschner, S. 2000. Degradação ambiental em favelas. In: Torres, H.G. and Costa, H. *População e Meio Ambiente: debates e desafios*. São Paulo: Editora do Senac, p. 271-300.

Torres, H.G. 2002. Social Policies for the urban poor: the role of population information systems. Mexico city: UNFPA Country Support Team for Latin America and Caribbean.

Torres, H.G and Marques, E. 2001. Reflexões sobre a hiperperiferia: novas e velhas faces da pobreza no entorno metropolitano. In: *Revista Brasileira de Estudos Urbanos e Regionais*, n.4.

Torres, H.G. and Oliveira, G.C. (2001). Primary education and residential segregation in the Municipality of São Paulo: a study using geographic information systems. Trabalho apresentado no seminário Segregation in the City. Cambridge, USA, Lincoln Institute of Land Police, julho. [www.lincolninst.edu](http://www.lincolninst.edu)

Torres, H.G. (1997). *Desigualdade Ambiental em São Paulo*. Campinas: IFCH/ UNICAMP (tese de doutorado).

United Nations. 1999. *World population prospects: the 1998 Revision*. New York, United Nations, Department of Economic and Social Affairs, Population Division.

United Nations, 1995. *The challenge of urbanization: the world's large cities*. New York: United Nations.

Werna, E. 2000. *Combating Urban Inequalities: Challenges for Managing Cities in the Developing World*. London: Edward Elgar Publishing House.

World Bank 1999. *Entering the 21<sup>st</sup> Century: World Development Report 1999/2000*. Oxford University Press.

World Resources Institute (1992). *Population, poverty and environment stress*. Washington: World Resources Institute.

## Notes

<sup>1</sup> The background for this point is the claim made by Martine (2001) demanding a refocusing of the population and environment debate, moving from the concept of "carrying capacity" - a notion that addresses the limited capacity of natural environments to absorb growing populations - to the idea of "sustainable use of space". Martine (2001: 19) argues that: "the central focus of population/environment linkages could profitably be switched from concern with size and rate of growth of the world population to the sustainable use of space in concrete territories". This general concept was also presented by Hogan (2001b: 17): "It is no longer the population size or growth which will occupy the center of the attention. The prudent husbandry of sustainability implies, for demographic dynamics, a careful adjustment of population *distribution* to a given territory's resource base."

<sup>2</sup> For the purposes of this paper, migration refers to long-distance moves, particularly the ones related to movements from the population living in rural areas or small cities to metropolitan areas. This does not imply ignoring the environmental impact of the general mobility of the population (such as commuting), but rather that we consider it an aspect of the sprawl.

<sup>3</sup> This figure corresponds to 43.8% of the population of the region in the same year. Although this proportion has declined in the 90s, it is still higher than the poverty level of 1980 (40.5%). Furthermore, when considering only the extremely poor - those that cannot meet their basic dietary needs - the figure for 1999 amounts to 89 million people, or 18,5% of the total population.

<sup>4</sup> "The poor population is increasingly settling in large cities and metropolitan areas that lack basic infrastructure and social services. Poverty is also a metropolitan concern, and life in any megacity of a developing country - which means lack of proper housing, inadequate sanitation, heavy traffic congestion, unemployment, violence, pollution and corruption - can be unbearable" (Torres, 2002).

<sup>5</sup> These data do not imply that those cities are internally homogeneous in terms of growth rate and socio-environmental conditions. We adopt here the distinction between capital city and suburban town in order to have comparable data from different censuses.

<sup>6</sup> Looking at the data of the 1991 Census, Martine (1992) argued that the concentration of population in metropolitan areas - that he called the "metropolization" process - took place in the 70s but not in the 80s. However, the data from the 2000 Census shows that "metropolization" still seems to be a major trend in the Brazilian demographic dynamic.

<sup>7</sup> It is important to notice that a significant volume of garbage is not treated. Even in the more developed states, most part of the sewage collected is also launched "in natura" into rivers, lakes and the sea (Hogan et al 2000).

<sup>8</sup> See IBGE ([www.ibge.gov.br](http://www.ibge.gov.br)), Pesquisa Nacional de Saneamento Básico, 2000. See also the newspaper "Zero Hora" (from Porto Alegre) of March 03, 2002, page 31.

<sup>9</sup> The nine areas studied here have been defined as Metropolitan since the 70s. For the last census, the Brazilian Statistical Bureau (IBGE) redefined the concept of Metropolitan Area, with 22 urban agglomerations.

<sup>10</sup> Of course some migrants have enough economic resources and/or social networks in order to start their lives in more appropriate housing conditions.

<sup>11</sup> Regional development policies may have long-term impacts in terms of migration movements. However, we are not going to discuss them here due to their wide scope, which makes almost impossible to clarify in each case their various demographic and environmental aspects.

<sup>12</sup> Only in 2002 was the municipality of Sao Paulo able to implement such ruling.

<sup>13</sup> This is the case of the sanitation segment. This information has been privately provided by the Planning Superintendent of Sabesp, the sanitation company of the State of São Paulo.

<sup>14</sup> "To avoid adding to the backlog of problem housing and neighborhoods, new development must meet basic - but not excessive - compliance standards" (World Bank, 1999: 146).

<sup>15</sup> See Valor Econômico, April 3, 2002, p. A12.