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**SOCIAL AND ENVIRONMENTAL ASPECTS OF PERI-URBAN GROWTH
IN LATIN AMERICAN MEGACITIES***

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A. INTRODUCTION

Latin America has been through a significant urban transformation in the last decades. Modest economic growth, high population expansion and massive rural-urban migration resulted in a scenario of urban crisis across the region, with spreading shantytowns, ill-regulated land use, low sanitary conditions and increased poverty. Major metropolitan areas, such as Mexico City, Caracas, Bogota, Rio de Janeiro, Lima and São Paulo, are challenged by violence, poverty, and environmental problems.

General urbanization and economic trends have contributed to making poverty an urban issue. While the poor population has been decreasing in global terms, there is significant evidence that the share of the population living with less than one dollar a day lowered in rural areas but increased in urban ones during 1993-2002 period (Ravallion, Chen and Sangraula, 2007). According to the same sources, this problem is clearly more acute in Latin America, when compared to Eastern Europe, Asia and Africa.

Although population growth rates have been steadily declining in Latin America, according to recent United Nations Population Fund (2007) estimates, urban areas will gain additional 166 million inhabitants in a 30-year period (2000-2030), by the end of which its urban population should total 610 million. Such figures indicate almost all population growth in Latin America will take place in urban areas, and within a region that is already significantly urbanized – these same estimates forecast an urban population growth rate of 1.4 per cent a year between 2000 and 2030. Similar forecasts have been produced by other sources (Montgomery, Stren, Cohen and Holly, 2003).

Even those cities in Latin America that present an overall low population growth rate may undergo a substantial variation in its population from an intra-urban perspective. Some of them, such as Mexico City and São Paulo, are losing population in their most important central areas, while distant suburbs still experience strong demographic increases (Salas, 1994; Torres, 2007). This urban dynamics may become a major challenge for environmental and social policy management, especially in a context of inadequate information systems on urban expansion. Although we do not have comprehensive data to support this trend, peri-urban areas in large and medium cities are likely to have the bulk of Latin American population growth in the coming years, a phenomenon that is also happening across different Asian and African metropolises (Asian Development Bank, 1997).

Peri-urban growth – also referred to as suburban expansion – is not exclusive to Latin America, but rather a challenge to most countries in the developing world. As opposed to the upscale suburbanization of developed countries (Duany, Zyberk and Speck, 2000), most peri-urban growth in Latin America results from massive rural land reclamation by migrants trying to settle in poor tenements. Such areas are not only typically ill regulated and distant from key employment hubs, but also present appalling sanitation conditions and significant environmental problems, including deforestation and pollution of rivers and streams. Metropolitan fragmentation – a characteristic of many metro areas, which lack planning coordination and proper funding for their peri-urban municipalities – adds to the already unacceptable living conditions of the newly arrived.

In view of this unfortunately common scenario, the aim of this paper is to stress the importance of peri-urban growth for the contemporary development agenda. Concern for peri-urban expansion should be in the core of most initiatives conducted in large urban areas of Latin America, ranging from poverty alleviation to environmental sustainability. Although sometimes understood as part of the slum problem (United Nations Human Settlement Program, 2006), it is important to notice that peri-urban expansion differs from it in some of its key features, particularly in regard to the social isolation and environmental degradation experienced by its dwellers, as well as the limited information city officials have about it.

In the first section of this paper, we discuss some of the conceptual issues in place regarding urban phenomena. Next, we describe the most important urban demographic trends in the region, as well as their consequences for the urban environment. The third section presents some of the most important economic and institutional factors that influence such trends, while the fourth outlines some of the outcomes from the perspective of public policies – particularly zoning, housing and transportation – with special focus on the problem of land use and its connection to environment and migration. Finally, we stress the key issue of deficient information on peri-urban expansion, and how international cooperation could help improve this situation.

B. CONCEPTUAL ISSUES

Achieving a precise definition of urban areas inhabited by the poorest social groups is a rather complex task, since a myriad of different concepts are often employed to describe similar – yet not fully equal – situations. Particular neighborhoods inhabited by poor dwellers are described in Latin America – as slums, shantytowns, illegal settlements, ghetto or segregated areas, among others. When considering those same poor areas, but taking into account their particular spatial dimension, a range of other terms are used in the literature to refer to the same phenomenon – namely peri-urban, suburban, periphery, exurban and urban fringe.

One of the most popular (and generic) categories in the field is slum. Slums are regarded as those “settlements in urban areas in which more than 50 per cent of their inhabitants live in inadequate housing and lack basic services” (United Nations Human Settlement Program, 2006:19). In order to assess slum conditions, those authors look at the existence of one in five important housing conditions: durable housing, sufficient floor space, access to treated water, access to sanitation and secured tenure. This definition is quite useful because the slum population can be measured with general census or household survey data. However, it does not consider particular legal aspects related to land property, which makes the slum concept less useful if the approach aims at supporting targeted public interventions.

Some authors prefer more specific denominations, such as shantytowns and illegal settlements. Shantytowns are located in invaded land, while illegal settlements are urban areas legally bought by urban dwellers, but whose development is not fully recognized by the city government (Lim,1995). In this sense, shantytowns refer to a very straightforward dimension related to the invasion of private or public land, a practice that is quite common in countries in which the legal system has difficulty to enforce property rights. Public areas such as squares, parks and even streets are also frequently invaded, especially when the urban infrastructure is not

fully in place. The second form of illegality – referred to as illegal settlements (Lim, 1995) – indicates the general disrespect of zoning and building norms, particularly by private developers, who then sell low cost lots or housing units to recent migrants or ill-educated people unaware of urban regulations. This overall disregard for zoning and building norms is often associated to excessive red tape or even corruption from government officials (Werna, 1998).

We believe that the general concept of slum adopted by the UN-Habitat (United Nations Human Settlement Program, 2006) is less useful for more in-depth policy analysis because shantytowns and illegal settlements issues must be addressed differently by general urban polices. In the first case, policies must consider the issue of land tenure, while in the second they should address the issue of unattained urban regulations. Significant infrastructure problems (such as lack of sanitation) happen both in shantytowns and illegal settlements due to the limited income of the population and the significant difficulties faced by state agencies to provide services in illegally registered and “invaded” land.

There are different dimensions of illegality regarding housing and urban settlements in urban areas of most Latin American countries. The irregularity of land use somehow “justifies” the non-provision of social services (Torres, 2002a). It seems to be more difficult to find proper site location for social equipment in irregular or illegal land. Sometimes the State refrains from investing in such areas due to the risk of having public investment appropriated by their private owners. Lawsuits against public administrators that do not comply with the complex set of standard procedures may also happen in regard to land use regulations.

General estimates of the population living in shantytowns and informal settlements in developing countries vary from 30 per cent in large Latin American cities to 80 per cent in African ones (Schteingart, 1989; Lim, 1995). Estimates for such a population based on the slum concept are also quite similar. The slum population of Latin America and the Caribbean reached 31 per cent of the total urban population in 2005, according to UN-Habitat estimates (2006).

Most shantytowns, illegal settlements or slums are located in peri-urban regions. However, neither slums nor shantytowns are spatial concepts – a dimension that is critical to allow us to better qualify poor urban neighborhoods. In order to address such spatial dimension, we have adopted here the category of peri-urban, although other expressions such as periphery or suburban could also be adopted. Although there is no precise definition of peri-urban areas, there is some common understanding that they are located in-between consolidated urban regions and rural ones. They typically have lower demographic density, worse sanitation indicators, poorer urban infrastructure, and mixed land use (Asian Development Bank, 1997). In Latin America, those areas also tend to be occupied by low-income families (Roberts and Wilson, 2008), even though wealthier enclosed neighborhoods are also spreading across some peri-urban parts (Sabatini, 2004).ⁱ

It is important to notice that peri-urban conditions differ from slums in significant ways. Slum location may have significant impact in the living conditions of its dwellers, and not necessarily all slums are peri-urban. When in peri-urban areas, slums tend to be less consolidated, with worse sanitation conditions, and more of an unknown territory to both the government and the general public, while those close to affluent areas present better general socioeconomic

conditions and access to jobs (Marques and Torres, 2005). Finally, housing in peri-urban areas, whether slums or more affluent sites, are more prone to environmental and sanitation problems.

In most cases, peri-urban areas may also be considered segregated. Spatial segregation is an important sociological concept that expresses the degree of social and spatial separation between different social groups, such as black and white or rich and poor (Massey and Denton, 1993; Mingione, 1999). In spite of the important international intellectual tradition and growing acceptance of this concept in public policy debates in Latin America, we will not address it in this paper because not all segregated areas can be regarded as peri-urban. Thus, our perspective is that peri-urban areas include a special type of segregation – they are located in the urban fringes, home for minorities and low-income families, distant from the main employment centers, with critical infrastructure shortages and environmental problems.

Finally, in spite of its imprecision, it should be noted that the peri-urban concept addresses important dimensions of urban poverty – particularly in relation to their spatial distribution, patterns of segregation, environmental and infrastructure conditions. Peri-urban population and its spatial distribution can be assessed through the usage of intra-urban disaggregated census data. We further discuss this issue below.

C. PERI-URBAN DEMOGRAPHIC FACTS IN LATIN AMERICA

Latin America – already a highly urbanized region – should continue to expand the size of its urban population in the near future (United Nations Population Fund, 2007). As discussed in the previous section, regardless of the conceptual debate around the definition of peri-urban zones, when we consider recent demographic dynamics of cities such as Buenos Aires, Mexico City, Lima and São Paulo, it seems clear that an important share of the future Latin American demographic growth will occur in poor suburbs or peri-urban areas (Roberts and Wilson, 2008; Torres, Alves and Oliveira, 2007). This section focuses on these issues.

1. Latin America's overall urban trends

Latin America is the most urbanized region of the developing world – in 2007, urbanization reached 78 per cent of its total population, according to the United Nations Population Fund (2007). This estimate, however, takes into account the urban-rural definition of each country, which can vary significantly. When we take only those cities with more than 100 thousand inhabitants, their population reached almost 280 million people in 2004, or approximately 49 per cent of the region's total (Table 1).

Table 1
Population and number of cities with more than 100,000 inhabitants per country.
Latin America and the Caribbean, 2004

Countries	Population	% of the national population
Argentina	24108757	61.0%
Bolivia	4101163	43.2%
Brazil	96443516	50.4%
Chile	9739310	58.7%
Colombia	25213312	53.6%
Costa Rica	942318	20.9%
Cuba	4518675	40.0%
Dominican Republic	3780299	41.5%
Ecuador	5785071	42.5%
El Salvador	2634320	37.1%
Guatemala	2131313	16.1%
Haiti	1724414	19.6%
Honduras	1514988	20.2%
Jamaica	866983	32.1%
Mexico	62568921	57.1%
Nicaragua	1522416	26.7%
Panamá	815953	24.7%
Paraguay	2715981	42.4%
Peru	13374268	46.4%
Puerto Rico	1377573	34.4%
Uruguay	1382778	39.5%
Venezuela	11143305	40.2%
Total	278405634	48.8%

Source: UN Statistics Division, 2004.

<http://unstats.un.org/unsd/demographic/sconcerns/densurb/default.htm>

Note:

1. Excluding Bahamas, Guyana and Suriname
2. In the case of Argentina and Mexico, we used data for metropolitan areas

Argentina, Chile, Mexico, Colombia and Brazil have the largest share of their population (over 50 per cent) living in cities with more than 100 thousand inhabitants. Caribbean countries such as Guatemala, Haiti, Honduras, Costa Rica, Panama and Nicaragua, on the other hand, present lower levels of urban concentration – an indication that the intense urbanization process in Latin America is not homogeneous at all. While the urbanization of larger countries is very advanced and concentrated in big cities, smaller countries, especially those located along the Caribbean, present quite a different trend. This evidence also suggests that the traditional rural development strategies proposed by many international advocates will probably have less impact on the largest Latin American countries from now on.

In spite of the critical importance of these issues for the urban agenda of most countries, it should be noted that small cities tend not to suffer much from the peri-urban dimension we want to highlight here. Although there may be variations in terms of housing conditions within a small town, peri-urban growth becomes a more challenging problem when cities start to scale up. Mayors in small towns are usually capable of resorting to their personal networks to gather the

required information on service coverage and inequalities among areas, as well as become aware of key neighborhood demands. In such towns, when accelerated growth is not an issue and the basic sanitation system is already in place, the demand for new urban infrastructure is often quite manageable. Most streets have already been built and paved, and there is no need for major highways or huge urban facilities. Broadly speaking, this kind of city is capable of reasonably managing a moderate level of urban expansion. However, although sensible for the majority of small towns in many Latin American countries (i.e., Southern Brazil, Argentina, Chile), such an argument is not applicable to severely poor areas and/or fast growing frontiers.

City size also varies significantly among Latin American cities with more than 100 thousand inhabitants. Approximately 47 per cent of such cities have a population ranging between 100 and 200 thousand inhabitants, but account for only 14 per cent of the total population of urban areas with more than 100 thousand inhabitants in the region (Table 2). Inversely, a small number of cities (4 per cent) with more than one million inhabitants concentrate the bulk of the population of medium and large urban areas (48 per cent). As a result, although peri-urban problems are also a phenomenon of cities with less than 200 thousand inhabitants, for the moment they tend to be more concentrated on large and very large municipalities and metropolitan areas. It is nevertheless important to notice that the urban population is growing faster in medium than in large cities.ⁱⁱ

Table 2
Population and number of cities with more than 100,000 inhabitants according to type of city.
Latin America and the Caribbean, 2004

Type of city	Distribution of cities		Distribution of the population	
	Number	%	Population	%
100,000 to 199,999	277	46.8%	38252949	13.7%
200,000 to 299,999	112	18.9%	27753610	10.0%
300,000 to 499,999	96	16.2%	36892683	13.3%
500,000 to 999,999	62	10.5%	43088574	15.5%
1,000,000 and more	45	7.6%	132417818	47.6%
Total	592	100.0%	278405634	100.0%

Source: UN Statistics Division, 2004.

<http://unstats.un.org/unsd/demographic/sconcerns/densurb/default.htm>

Note: 1) Excluding Bahamas, Guyana and Suriname
2) In the case of Argentina and Mexico we used data for metropolitan areas

2. Peri-urban demographics

Even when we consider only the most important Latin American metropolitan areas, two major reasons make it difficult to estimate their peri-urban population. The first problem regards the precise definition of what peri-urban really is – there is no consensual indicator to be employed, and several terms are used in the literature to refer to the same phenomenon (see section 1 of this paper).

The second challenge regarding peri-urban population estimates refers to the scale of the spatial unit of analysis. Torres (2002b), for instance, tried to define peri-urban as the municipalities, other than state capitals, of Brazil's most important metropolitan areas. That paper indicated that 43 per cent of the metropolitan population in Brazil lived in such cities in 2000,

which have grown faster in the recent past, are poorer and, more often than not, lack basic sanitation.

However, using city limits to define peri-urban boundaries clearly provides a very rough definition of the phenomenon, and probably substantially underestimates its population, since this kind of area also exists within capital cities. Only an analysis in terms of districts or census tracts for a significant number of metropolitan areas can provide a more appropriate description of the peri-urban population and its distribution. Unfortunately, we do not have the resources to perform such an analysis for most Latin American cities.

In spite of the difficulties to precisely measure the size of the peri-urban population in Latin America, a significant number of both quantitative and qualitative case studies indicate that peri-urban expansion is a key issue for Latin America's development agenda (Stein, 1992; Roberts, 1994; Arriagada and Rodrigues, 2003; Marques and Torres, 2005; Roberts and Wilson, 2008).

The lion's share of Latin American population growth in the near future is most likely to occur in peri-urban areas, particularly due to their fast expansion within urban areas that already present considerable demographic increments. The peri-urban problem is also quite evident for any observer of the metropolitan scene in the region.

3. Peri-urban expansion consequences

Many large Latin American municipalities were already overwhelmed by their traditional roles of providing urban infrastructure, health and education services, land use control, garbage collection and housing. The number and complexity of services provided by municipalities are also growing due to the "worldwide movement to decentralize" (World Bank, 2003: 89).ⁱⁱⁱ

Overall urban expansion and the increase in the number of automobiles also require dramatic investments in transportation infrastructure (highways, tunnels, etc.). As a consequence, the competition for resources between different regions of the city, as well as between different branches of the government, may cause traditional social policies to struggle for funding.

Although policy decentralization is an important issue per se, in our view, the scale of the city is particularly important for peri-urban regions. In larger urban areas, peri-urban growth is less visible because the key sources of information on urban expansion are either real estate records employed for fiscal and tax purposes or other administrative records. Since such records do not include irregular or invaded areas, a significant share of peri-urban dwellers – most of them living in shantytowns and illegal settlements – becomes "invisible" for important urban public policies.^{iv}

This lack of visibility – among other reasons – produces significant consequences for the coverage and quality of social services in poorer areas. When present, services are of inferior quality, which means distant schools, high absenteeism for doctors and teachers allocated to work in such districts, and a significant social abyss between service providers and their customers

(World Bank, 2003: 22). However, invisibility is only one of the many peri-urban issues. The following are also worth mentioning:

- a. A significant share of the peri-urban expansion can be explained by shantytowns and illegal settlements growing in the urban fringes of Latin American cities. Torres, Alves and Oliveira (2007) estimated that illegal occupation accounted for 43 per cent of the population living in peri-urban areas of the city of São Paulo in 2000, which induces further population growth and deforestation. In other Latin American cities, governments have had enormous difficulties to regulate this process, with the exception of Santiago, in Chile, where urban expansion is more organized;^v
- b. The persistent horizontal growth of Latin American cities requires a continuous extension of the network of public services to peri-urban areas, even when the infrastructure already in place in central areas is not used to its full potential;
- c. Generally speaking, peri-urban dwellers are poorer and less educated than the average inhabitant of metropolitan areas, and live far from the most important job hubs. They have worse access to social services, and are served by crowded schools and precarious health care facilities;
- d. This urban sprawl also has significant consequences in terms of transportation. In both developed and developing countries, peri-urban housing means longer journeys, increased demand for transportation investments, increased urban congestion and intense air pollution (Duany, Zyberk and Speck, 2000);
- e. Poor peri-urban areas are also characterized by lack of sanitation and the consequent pollution of rivers and streams, as well as deforestation and destruction of the natural landscapes that still surround metropolitan areas.

It is quite clear that the concentration of social, environmental and legal problems in peri-urban areas make them ill-suited for population growth, where it nevertheless tends to occur at an accelerated pace. In the following section we discuss the reasons behind the current peri-urban expansion trends.

D. WHY IS PERI-URBAN EXPANSION HAPPENING?

Lessons from different Latin American cities indicate that peri-urban growth is not necessarily a consequence of overall population growth. Even when the growth rate is low, many large Latin American cities still present significant peri-urban expansion (Salas, 1994; Torres, 2007). The dynamics that determine peri-urban growth in Latin America are quite complex, and involve a number of dimensions – from land regulation and taxation to infrastructure and housing policies. Private companies also play a significant role in this situation, since they influence both

the offer of housing space and the price of land. As a result, people settle farther away even when vacant areas in more affluent parts of the city are still available.

It is essential to notice that the land market is a major force shaping peri-urban expansion, since it restricts the set of housing possibilities for families based on their available income. In cities whose population includes a substantial share of poor families, the government and/or private companies must develop housing units that cater to their needs, so as to prevent them from finding alternative housing solutions on their own. Needless to say such alternative solutions almost always go directly against city planning guidelines and the general legal framework, not to mention architectural good practices. In many Latin American cities, such as Caracas, Bogota, São Paulo and Tegucigalpa (Pearce-Oroz, 2001), a large number of poor families has moved to unsuitable, risk areas, where their lives are constantly threatened by environmental hazards such as floods or landslides.

In addition to the scarcity of resources for a massive government housing police, the reasons for the unavailability of proper housing for the poor in Latin American countries is also related to economical and institutional dimensions that significantly shape housing markets and the offer of housing units (World Bank, 2003). Among such dimensions, the following should be highlighted:

- a. Credit is a major problem. Macroeconomic instability narrowed credit options in many Latin American countries through the 1980s and 1990s. While it is generally understood that funding for housing projects is a key issue regarding peri-urban improvement, it should be noted that shantytowns are already a reality in many Latin American countries. Land regularization initiatives would therefore be a less expensive way of dealing with those settlements, through which urban infrastructure and property rights could be provided to families that have occupied a plot of land for a longer period. Although those programs have grown in importance in the last decade (Ward, 2006), land regularization projects have suffered many setbacks in the region due to inadequate legislation and delays in the course of the inevitable judicial procedures (Fernandes, 2007).
- b. The offer of private credit is not only constrained by interest rates but also by the legal framework vis-à-vis evictions and repossession of property used as collateral. Such legislation strongly influences banking behavior in providing credit for property acquisition. Without proper legislation, most of the credit for housing in many Latin American countries is provided by government organizations alone, which are by definition limited by fiscal constraints. However, even in well developed housing markets, part of the offer must rely on public subsidies to serve the poorest groups of the population;
- c. General property rights and land tenure legislation also influence the likelihood of land regularization policies. Very costly judicial processes – which often take many years to come to a conclusion – discourage low-income dwellers to defend their rights through the justice system. Again, red tape and corruption are not uncommon in this area;

- d. Urban zoning and building norms tend to artificially influence land availability and price. Zoning restrictions that forbid vertical building, for instance, render important central areas with often low population density and ample infrastructure a very expensive housing option. This kind of building norm, albeit producing highly desirable neighborhoods, such as Vitacura in Santiago, Polanco in Mexico City and Jardins in São Paulo, also induces the horizontal spread of the rest of the city, leading to inevitable peri-urban settlements.

Different institutional reforms are in place in Latin America regarding its housing markets, but whether they will be able to produce significant change in the near future remains to be seen. Most likely, Latin America will still have to deal with peri-urban unregulated growth for quite a significant time. In the following section, we discuss some policies that may help in this regard.

E. PERI-URBAN GROWTH AND PUBLIC POLICIES

While it would be impossible to present here a comprehensive discussion on all urban policies and their relation to peri-urban expansion, we would like to briefly argue how three different policies – namely, zoning, transportation and housing – could influence such an expansion and lead to a more sustainable use of space in the concrete territories and institutional contexts of the complex Latin American metropolitan areas.

1. Parks, zoning and building norms

The development of parks and conservation areas, the establishment of zoning guidelines and the introduction of building norms are among the most important urban environmental policies. These policies benefit from the wonderful traditions of the urban and environmental planning that had in Olmsted (1870) one of their first and most representative thinker and practitioner, and are clearly connected to the possibility of developing large cities with significant life quality in the developed world (Platt, 1994). By definition, these policies are tailored to coordinate a more sustainable use of the urban space.

However, such policies are not clear-cut. On the one hand, very restrictive zoning and building norms turn land scarcer, increasing its price. If such a price effect can be affordable in richer areas, this is not necessarily true for 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 (Henderson, 2004). For instance, in São Paulo, the law ensuring protection of water source areas – that in the 1970s restricted the occupation of almost all the Southern Region of the Metropolitan Area – has contributed to the extensive occupation of such protected areas by poor households due to lack of enforcement (Torres, 2007).

Frequently, the price effect of the zoning policy is addressed by the taxation of land. Some policymakers try to implement progressive land taxation in order to capture part of the value that landowners get as a result of the increased valuation of their properties in more

preserved areas. However, fighting for a progressive taxation in a context of politically powerful landlords is far from simple, and may also have cross-border unforeseen consequences in the fragmented political landscape of many Latin American metropolitan areas. Different municipalities within the same region may tax differently, producing considerable difficulties regarding property taxation. Most important, in order to work properly, zoning policies require certain preconditions not necessarily present in developing countries – for instance, the stability of the judicial system and the enforcement of property rights, urban norms and regulations (North, 1990).

In summary, the background of ill-regulated land use seems to significantly erode the possibilities of traditional urban environmental policies in large cities of developing countries. It may be true that were those rules enforced, they would discourage migration and peri-urban growth, 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 increased stability of the judicial system and law enforcement are highly desirable long-term institutional goals – with clearly positive environmental impacts – it could be 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 transaction costs and – probably – the price of land (World Bank, 1999);
- b. The level of standards should be proportional to the institutional capacity of enforcing them. Attained moderate standards are much better than higher but hardly reachable ones;^{vi}
- 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 required to maintain 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 Latin American countries. The enforcement of laws, regulations and norms should not be taken for granted. In such a context, peri-urban expansion contributes to an endless process of irregular land-use and environment degradation.

2. *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 (Duany, Zyberk and Speck, 2000). On the one hand, high urban density – often regarded as a negative environmental characteristic of some urban areas – favors mass transportation systems such as the subway, which significantly reduce traffic jams and air pollution. Highway building, on the other hand, strongly stimulates urban sprawl (and lower density), with high environmental costs in terms of pollution, extending land occupation and increasing the costs of other public policies.

Although part of the modern environmental planning criticizes high urban density in quite logical technical grounds (Platt, 1994; Spim, 1995; Roseland, 1997), it should be noted 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 (Martine, 2006).

Population density also reduces air pollution and precarious land occupation in the far suburbs. Such a counterintuitive perspective on environmental planning is not built upon any previous notion of what a city should be, but rather on what the already messy developing country metropolises are. In such places, land occupation is not well organized at all, and resources are dramatically limited.

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

In brief, it is quite clear that transportation policies – particularly mass transportation – can strongly influence the sustainable use of urban space, stimulating or refraining peri-urban expansion in the long run. The challenge lies in conceiving a positive arrangement of political forces that will allow long-term transportation planning to counterweight urban sprawl, and lead to a more appropriate use of urban space, social equipment and urban infrastructure.

3. Housing policy

Housing policy is yet another dimension clearly connected to the sustainable use of space in urban areas. Such policy – trying to provide affordable housing for poor people – can engender important transformations in the city landscape, as well as influence intra-urban migration movements. Although the meaning of the so-called “housing deficit” is still the subject of some debate, the unattained housing demand is unquestionably very high in Latin America (Arriagada, 2000). Of course, poor peri-urban areas have to be considered among the most important priorities to be addressed by such policies.

Effective housing policies are very important not only because of their straightforward social impact, but also due to the series of positive outcomes on health, employment, and land regularization. But to account for their demographic and environmental consequences, these policies should also consider other general elements:

- a. Broadly 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 equipment, employment, and urban infrastructure to reduce both the living costs for the population and the overall costs for the government (i.e., building of new schools, roads). On the other hand, well located, smaller projects tend to be quite expensive due to their limited economies of scale and the price of the land;
- 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 must be considered. For instance, land regularization and credit for small home improvements (i.e., self-construction) may be regarded as important and less costly alternatives.

It is important to take into account that – due to the low average family income in some metropolitan areas – such policies must also be partially subsidized to ensure that those who really need support 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. Inaction, however, quite often translates into continuous peri-urban expansion, and the problems thereof.

With the exception of Chile, in most Latin American countries affordable housing for the poor is a distant reality. With expensive housing solutions and very few public housing programs, poor families settle wherever they can (as opposed to where they choose) – which often means shantytowns and illegal settlements located in peri-urban and/or risk areas. The fact that peri-urban land tends to be less expensive and government controls and regulations weaker makes it a more likely location for such settlements. In recent years, significant land price increases in some city centers further enhanced such trend (Torres and Gonçalves, 2007).

In other words, the need for a comprehensive housing policy in Latin American metropolitan areas seems quite obvious when considering the peri-urban phenomenon. Santiago has pioneered actions in this respect, albeit with mixed results (Sabatini, 2004). This policy, however, should be developed without increasing the already significant migration movements and environmental impacts for those areas. Although only briefly presented here, these elements point to the need for national funding and local execution. Attention to the local conditions of urban infrastructure and social services, as well as to land use regulation, is essential to effect real improvement in the sustainability of land use.

F. PERI-URBAN INFORMATION DEFICIT

A major issue regarding peri-urban areas is that the people who decide where and how to provide their public services do not live there. In fact, neither do they necessarily belong to the same ethnic group, nor do they understand local social codes, language, behavior, and values. As a consequence, the lower income population from peri-urban areas may become victims of the prejudices sustained by high- and middle-class public managers, who do not perceive them as preferential subjects for public policies. This hypothesis seems to be more appropriate to specific policies, such as sanitation and urban infrastructure, as well as apply to the regions in which “the inheritance of an institutional culture biased towards inequalities” still persists (Werna, 2000).

In large urban regions, information systems are the best way of providing the lenses through which different areas and social groups are going to be seen, conceived and represented in the policy arena. However, as previously mentioned, many peri-urban areas are not properly registered by government records, making them less visible for public policies. Real estate databases, for instance, which are generally used for fiscal purposes, sometimes become the only consistent source of information to be employed by many Latin American city governments. In such cases, since they do not pay land taxes, residents of invaded areas “do not exist” in the city information system.

Other administrative data – dependent upon information systems on land, education, health, sanitation, etc. – are similarly biased by the particular conditions of data production, or by its institutional features. Four key elements lead to this situation:

- a. The institutional features of different social policies influence the production of administrative data. For example, forms and reports are often an additional burden to school principals that have to manage crowded schools with limited staff, equipment and training. The same is true for the many crowded medical facilities or public offices. As a general rule, this kind of administrative data is of worse quality in peri-urban areas;
- b. Even when a public database is capable of gathering information on peri-urban dwellers, significant amounts of data are likely to be missing from their individual records. Address records tend to be worse because people often misreport it either due to their own low schooling level and/or because the “street” is new (in an invaded area, perhaps) and a zip code has yet to be defined for it;^{vii}
- c. Administrative data production is fragmented between different government branches and levels. Each department and secretariat may have its unique perspective regarding information systems and geographic units for service planning and provision. The education department, for instance, does not necessarily cross its information with other departments, and many times even the geographic units through which data is organized are not compatible. The result is massive miscommunication – while one particular branch of the government may be aware of a certain recent settlement, this information is not necessarily available for the government as a whole;
- d. In Latin America, traditional demographic databases – especially birth records – tend also to underestimate the poorest population, making them invisible for several public policies, and even more so in peri-urban settlements.

As a consequence, census data is particularly important because it comprises the only truly universal database not dependent on one particular public policy, and as such can provide precious information about the people and the areas specific policies are unable to cover. In other words, censuses – especially when they are organized in census tracts and geographic information systems (GIS) – must be regarded as remarkable tools for supporting social policies at the local level. Even though this may seem quite obvious, evidence strikingly shows that such handling of information is not at all present at the local level in some of the most important Latin American metropolitan areas, particularly when it requires more disaggregated formats or the help of GIS tools to be usefully employed.^{viii}

Ongoing peri-urban expansion is therefore happening within an environment that lacks adequate information systems and informed data analyses. In order to significantly reduce inequality in service access, analyses on the most important socio-demographic urban trends must nevertheless be based on highly disaggregated information, more frequently rendered available by GIS and satellite images. In view of that, local managers in Latin America need urgent support to implement information systems capable of coping with the new demand for local disaggregated information.

Systems of this kind allow analysts to reflect on one of the most complex issues of urban administration – the dilemma of “where to act” (Torres, 2002a). Territorially disaggregated information enables analysts to identify both those areas with greater distortions between supply and demand and those that present cumulative negative social indicators, or that are segregated in terms of residence, such as peri-urban expansions.

This problem has been traditionally addressed through political representatives and/or social movements. In this model of demand management, those areas (and groups) that succeed in having their request heard sooner by public authorities become the recipients of public investment. The distribution impact of such a dynamics is obviously strong: those less informed and organized usually have fewer chances of expressing their needs and of reaching different government levels.

With widespread information and more accurate socioeconomic indicators, the general public, government officials and the poor themselves can have access to public policy demands regardless of whether they have been successfully voiced or not – for instance, through public information systems such as the Internet. By doing so, they may help prioritize those policies in a more informed way. Unfortunately, those systems are far from available. As to census data, it tends to become outdated rather quickly, particularly in regard to fast growing areas.

Those social policies indicators needed the most at the local level are generally well known and established in the different social policy fields – i.e., school enrolment (education), sewage coverage (sanitation), infant mortality (health). Teams in each one of these fields are generally aware of those indicators and eventually assess some aspects of their respective policy by using them. This kind of data is rarely available in a disaggregated format, though.

Local social policy managers of peri-urban areas need additional elements of an information systems agenda. Above all, they need to understand the demographic trends that are reshaping the area of influence of the social equipment they oversee. Poor peri-urban settlements and shantytowns are areas that typically present fast demographic expansion. Having detailed information on population growth and distribution at the local level for developing metropolises is therefore essential to provide for people’s needs – for instance, health care facilities, or primary schools. This information is however often unavailable, particularly during inter-census periods.^{ix}

The gap between two censuses is in fact a major problem regarding accurate information. The lack of data on urban areas under strong demographic pressure experienced by local governments may not only be due to poor administrative processes – after all, public policies have not reached such areas yet – but also be a consequence of an information gap, particularly if it occurs in between two censuses. In some cases, demographic projections for small areas can be used to estimate how fast a neighborhood is growing, but these are not very reliable because they tend to be based only on the major components of the demographic dynamics (fertility, mortality and migration). For such projections to be more accurate, they need to be built upon some hypotheses about particular urban trends that depend on major public and private investments, such as new roads and large housing developments.

In our point of view, the best approach to address this situation would be developing early warning indicators, as opposed to generating complex projections for small areas, which demand non-existent local expertise. Such indicators can help local policymakers anticipate situations that otherwise may run completely out of control for both the public administration and the society as a whole (Bnerjee, 1996).^x There is a lot of data being produced daily in a metropolitan area – traffic flows, new housing approvals, garbage collection, areas with delay or default in utilities payment, and civil records, to name but a few – which may be processed and handled as early warning indicators of urban processes that are happening in connection to demographic growth, change in land use, and decay of specific areas.

Analysts may also resort to aerial photographs and satellite images to detect transformations in peri-urban areas (Angel, Sheppard and Civco, 2005). Recent improvements in image quality and new technologies for data handling, such as the so-called “object-based GIS,” are opening new roads in this field, with significant potential in terms of helping governments identify previously undetected urban expansions, as well as produce qualitative information regarding housing density and building patterns (Ehlers, Michel, Bohmann, and Tomowski, 2006).

Such technologies unfortunately remain quite alien for most city governments. Satellite images are costly, and the technology involved is neither simple nor readily available. International organizations could substantially help Latin American governments by supporting them to put in place the technology and satellite images required to allow different cities in developing countries to identify more recent urban expansions.

In a recent field work, for instance, we found municipal officials of a large Latin American city using “Google Earth” website with the purpose of identifying public building coordinates and assessing general urban expansion trends. Albeit quite helpful, the images are not always updated, and unable to provide information on changes over time.

In order to cope with this demand, some organizations are trying to produce data and indicators in regional intra-urban scales. There is a movement towards the development and use of “poverty mapping,” which would allow better policy targeting and rapid food security initiatives (United Nations Environment Program, 1998; CIESIN, 2006). At the same time, public agents, international bodies and professional groups from several countries are focusing on building indicators through GIS tools to act as a basis for regional and urban public policies. Despite these laudable initiatives, there is still an important gap to be fulfilled, particularly when we look at the problem from the point of view of local administrations.

In summary, in order to tackle peri-urban issues, the quality of government information systems and their data on low income settlements must substantially increase. Peri-urban shantytowns and illegal settlements are an uncomfortable reality that many public officers, backed by lousy information systems, insist to ignore. In order to start addressing these issues, it is essential to reduce the existing information gap.

G. CONCLUSION

The image of a “planet of slums” has daunted the imagination of important observers of the international urban scene (Davis, 2006). According to this vision, growing world urbanization would be followed in developing countries by a massive spread of peri-urban slums and shantytowns, within areas fraught with unemployment, violence and despair. Such an apocalyptic perspective raises at least one critical question: is this really a necessary outcome for Latin American cities?

Not quite. Although the idea of an urban crisis seems to be a fact for many Latin American urban areas, there are also some important signs of hope. It is worth mentioning the strong urbanization initiatives in peri-urban Bogota, which have significantly reduced crime and social insecurity; the comprehensive housing program the Chilean government has been implementing since the 1990s; the significant increase in housing solutions provided to low-income families by private companies in Mexico; and the impressive change in Brazilian legal procedures regarding land regularization and property rights (Fernandes, 2007). All these initiatives address different key issues in terms of urban conditions, and are evidence that the region is indeed moving forward.

Significant improvements in peri-urban conditions will most likely depend on a set of coordinated initiatives. In the case of housing programs, for instance, although government funding is essential, particularly for the poorest social groups, unleashing the potential of private markets is also required to provide housing for low-medium income families – a move that is already in place in Chile and Mexico. In order to follow suit, other Latin American countries will also have to review their legal frameworks to enable property to be reclaimed and used as collateral, which Brazil has just started to do. Different urbanization initiatives may also help provide accessibility, security and better environmental conditions that can significantly transform the living conditions of numerous families.

While the challenge is enormous, the signs of change can already be perceived: a combination of three other socioeconomic dimensions is currently contributing to Latin American urban transformation. First, the region has been experiencing the best economic conditions ever to take place within one generation, with significant reduction in income inequalities (Cepal, 2007). Although these may quickly reverse, as the experience of the past has taught, the present improved economic conditions result in better funding for housing policies and the overall capabilities of families to invest in their homes (i.e., by both acquiring property and remodeling existing ones). Second, many Latin American cities – particularly larger ones – are being confronted with urban transition and fertility decline, indicating a less intense overall metropolitan population growth in the near future. Finally, democracy is also a reality for most Latin American countries, and in spite of controversies, it makes governments more aware of the living conditions of their constituents, there including the very poor.

But the way ahead is far from easy. Even though informed housing policies and projects are able to change general social conditions, as in the case of Chile, income inequalities are still the norm, and democracy remains fragile, if not an illusion, in some countries. The information gap regarding peri-urban expansion still persists, and will have to be addressed to allow for broader changes in the peri-urban landscape.

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NOTES

ⁱ Sabatini (2004) argues that although some wealthy enclosed neighborhoods will grow at a small fraction of the peri-urban region, especially in those areas adjacent to previously rich neighborhoods, most of the peri-urban area in Latin American cities will remain poor.

ⁱⁱ United Nations Population Fund, 2007.

ⁱⁱⁱ In Latin America, a number of countries have experienced such changes – albeit at different rates and with different decentralization models (Finot, 2002; 2005)

^{iv} Census data may reduce this kind of problem only when they become available at a highly disaggregated scale (i.e., census tracts) and are entered into a GIS system so as to allow local administrators to identify under-recorded locations. We further discuss this issue at the end of this paper.

^v Peri-urban regulation in Santiago was based on extensive housing programs, a process that is nevertheless followed by other social malaises (Sabatini, 2004).

^{vi} “To avoid adding to the backlog of problem housing and neighborhoods, new developments must meet basic – but not excessive – compliance standards” (World Bank, 1999: 146).

^{vii} Ironically, having a zip code is a form of hidden citizenship not clearly understood by most database practitioners.

^{viii} “In most countries, the needed information is available through completed censuses and surveys, and the amount of work required to compile the information is manageable and affordable (...) New technologies have made it easier and cheaper to process data and understand its spatial implications. If this information exists, why is it so difficult to access? Most cities have local planning offices or economic bureaus whose role is to collect and process statistical information about the city. But the census and survey data routinely collected at the national level are typically not available to local offices, at least not ready in a usable form. In other cases local offices collect basic demographic and production statistics, but these data are transmitted directly to the national capital and are not analyzed locally, either because local economic officers do not have the skills or resources, or because the city’s decision makers do not demand the information” (World Bank, 1999: 138).

^{ix} “Will there be enough land to support urban development? Will the prevailing patterns of population and housing density continue into the future or are there alternatives to urban development that require less land? How can agricultural land surrounding cities be preserved without driving the price of land beyond the low- and middle-income households? (...) The first (impediment to address the issue) is the absence of a workable model with which to understand the land market. The second is the lack of accurate and up-to-date information about urban growth” (Dowall, 1994: 24).

^x “Effective management of regional growth without sacrificing productivity or public health requires a strategic rather than a deterministic approach. It will certainly require new institutional capabilities and management tools. Future institutional responses should include an ‘early warning’ system of continually monitoring and reviewing infrastructure stress and developing strategic capabilities for coping with such stress” (Bnerjee 1996: 62).