

Sustainable Parameters for Latin American Cities

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Abstract: Over the last few decades, Latin American cities have been undergoing a rapid process of population increasing. With scarce investments in infrastructure, they are unable to meet the demands. Some of the consequences of this excessive population growth include a failure of the transport system, inefficient public services, the formation of urban heat islands, among other consequences, all of them contributing to a steep fall in life quality and energy consumption increasing.

Given the precarious conditions observed in large Latin American cities, especially in metropolitan areas, and the disconnection between the urban built and natural environment surrounding them, there is a call for action, from intervention in the territory already consolidated, to the development of future cities through sustainable urban criteria.

This paper presents some parameters to guide contemporary urban design criteria in the planning of sustainable cities. It started from a theoretical approach guided by international authors with different views on such parameters. The methodology is based on a qualitative study considering urban design issues relating to sustainability, such as urban management, adequacy of climate and place, regionalism, physical limitations of the city, the mixed uses, productive city, integration between urban and rural, and no polluting mobility.

Keywords: Sustainable Cities, Sustainable Parameters, Urban Design

1. Introduction

The environmental problem today is a much discussed subject in academic circles. However, this theme is not introduced in the social consciousness as a result of scientific papers, but by the effect of environmental disasters aggravated by the unsustainability of current cities, mainly, in the metropolises of South America. Furthermore, the typical living standards are incompatible with the process of regeneration of the environment, the wide variety of population's consumption patterns of different countries and the increasing rate of social inequality in many of them contributes to the increased awareness of various social sectors on the need for new forms of intervention in the environment.

The possibility of actuation in existing cities and in the formation of new cities more sustainable guides this work, that have the purpose of thinking about urban design environmental parameters. Thus, it is proposed some categories that contribute to the systematization of the study: limiting urban environmental management, network of cities, regionalism, diversity of land use and productive cities. From the analysis of these categories it was searched to implement environmental parameters for urban actions in small and medium cities, and also in the formation of new cities.

The vast majority of developed countries, as much as those in development, are exploring the capacity of their natural resources to the limit. Depending on the level of industrialization of each country there are different problems. In developed countries, the migration of people from urban centres to the outer suburbs, which offer a natural more prosperous environment, has led to an increased use of automobiles, resulting in traffic jams and air pollution. Already

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in Latin American developing countries, environmental and social problems are intensified by the excessive growth of cities, the result of a centralist model of urbanization without accompanying infrastructure to support such increase.

The effects of global climate change brought environmental problems and put in focus the search for new solutions to the urban development process. The rational use of natural resources, consumer awareness, and social and environmental justice began to be treated as guidelines for urban planning, even if sometimes only theoretical.

Urban sprawl without limitation on the territory brings disastrous consequences for the environment, for example the reduction of the surrounding areas for agriculture and natural reserves, and also the intensified and confined use of natural resources without respecting the carrying capacity. Without urban limitation, the disastrous effects can be observed also for the population, such as failure of adequate services and infrastructure of several structural problems such as mobility, access to health and education.

Life in cities is the current preference of the vast majority of the population and cities are seen as centres of knowledge and culture. Thus, it is important to think about these urban agglomerations in a global and sustainable way, especially with regard to planning and urban design. It is believed that urban design can be a key ally to the possibility to plan more sustainable cities, besides the need for an urban management consistent with sustainable urban parameters.

2. The aim of the paper

The Latin American countries have experienced the swelling of their cities. This process guided by a centralist model of urbanization, coupled with a growing shortage of infrastructure and perspectives - as cities move far away from large centers, promotes the emergence of mega cities, full of big problems. The idea in this work is, starting from more sustainable principles, to seek parameters to point out the way to formation of new towns, and the acting in small and medium cities.

3. Methodology

From the theoretical framework relevant to the subject, from theories and information contained in different references on the general problems experienced by cities in the world today - due to lack of actions that are concerned with sustainable development - it was possible to define categories that deal with urban sustainability. From these categories it was developed a qualitative study looking for the determination of relationships among them and with the urban design, covering issues relevant to the development of a sustainable urban design for cities in Latin America.

4. Results and Discussion

It was possible to identify seven major categories that can delimitate the urban design and assist in their preparation. These categories are: urban management (consistent with sustainable development), limitation of the city, regionalism, mixed uses, productive city, integration between urban and rural, and mobility.

4.1. Urban Management

The first raised category was the **promotion of policies and actions** that might be able to generate a sustainability committed to social justice, focusing, therefore, on the rights and

basic needs of citizens. Through public policies and actions it is possible to reduce inequalities and ensure access to urban services. It is expected that a socio-political planning assures a decent income and a sustainable and balanced social and economic development and, in addition, combating speculation and privatization of natural resources. For this, the **society participation in the policy making** and in the oversight of government activities is of paramount importance. The democratic management oriented by sustainability paradigms requires responsible action of social actors.

The planning criteria that seek for sustainable development must be considered as one of the main objectives of the socio-economic balance of society, besides the improvement in quality of life, the management responsible for environmental preservation and rational use of the territory (The European Chart for land management - CEOT/CEMAT, 1983). Furthermore, it is necessary to **strengthen local autonomy** for the municipal power to manage the financial assets of the city, gearing to investments that ensure a **more just and secure city**.

For Rogers (1997), for the city to be sustainable the economic and sociology factors should be interwoven and integrated into urban planning. Moreover, the motivation of citizens and their participation in public decisions and policies must be guaranteed (the sense of belonging and democracy). In this regard, it is necessary to the actuation of technician expertise, and the diffusion of educational activities and the implementation of information tools to empower and enable the society activities with the State.

It is important to promote the citizen participation in shaping the territory seeking from the beginning, the major motivation of actors in policy making and urban areas, allowing greater community awareness about its urban space and educating the population on environmental problems.

4.2. Urban Limitation

It is important to call attention to that environmental impacts are interrelated and urban poor planning, or its lack, as well as an inadequate urban design can bring undesirable consequences in sequence; as, for example, public policies for urban periphery and the designs that emphasise the private automobile. Urban sprawl intensifies the need for automobile use, which increases the demand for infrastructure (roads) and fossil fuels. A lack of limitation may also contribute to urban deforestation, causing erosion and consequent siltation of rivers.

To ensure good governance and a population access to political decisions it is necessary to limit the size of the metropolis (CORBELLA, 1998). It is believed that the city should be limited by legislation to control land speculation. Moreover, the government should encourage investment in different areas, so that from a certain size of the first city the construction of another city should be encouraged. This capacity of the government allows it to act on local issues, focusing on the common good, linking capabilities, and regional and global needs. If, for example, other surrounding areas are encouraged and every city has around it a "green belt" of protected land speculation, used for both food production and for environmental conservation, urban areas will be delimited².

These measures cannot be applied in large cities already moulded, but can be used in small and medium shape cities, preventing them from growing out of control³. The structure in

² The green belt was firstly proposed in 1904 by Howard (HOWARD, 1996).

³ A deep analysis of the unsustainability of megacities was made by NEIRA ALVA (1998).

smaller cities connected together in a network is much more sustainable than large cities. The smaller number of inhabitants, and consequently, infrastructure, facilitates the public administration and increases society control over political power, reducing corruption.

However, it is no use limiting the city area to preserve the soil and facilitating the movement of pedestrian, and then densify it. It is necessary to refer both to limit the area built as well as the population. A small town, but still very dense, continues over-consuming and polluting with the same intensity.

One of the “so called sustainable” principles in recent years, mostly widespread by Rogers, is the formation of dense cities (ROGERS, 1997). However, densification may even represent an attempt to soften the urban and environmental problems caused by the macro scale, but at the same time, it causes new problems such as intense vertical cities, affecting ventilation and natural lighting, and the concentration of air pollution. Furthermore, in the case of the tropical Latin American cities, there is the issue of high temperatures, also improved by the lack of ventilation, allowing heat islands (BARBOSA, DRACH and CORBELLA, 2010).

It is known that large scattered cities generate big problems, but the densification of cities does not guarantee sustainability, although is still an attempt to avoid environmental problems in these cities. From the bioclimatic point of view, in the humid tropics, as stated above, the compact city promotes the formation of heat islands, with the consequent increase in electricity consumption for air conditioning and the production of pollution (BARBOSA, DRACH and CORBELLA, 2010).

Rogers (1997) considered that the "densification" of a city can bring ecological benefits, such as reducing air pollution by cars, that did not need to move large distances, the greater safety of urban centres, the reduction of the city expansion over the natural landscape and the integrated planning, that optimize the use of energy resources and reduce pollution. But if this city offers a quality of life for its city dwellers, it will soon undergo an exponential growth that will take out all the benefits achieved by its promoting big density.

Consequently the problem is not compactness, but the lack of physical limitation. The creation of limited new cities could help curb the population growth and to endorse the healthy migration from the unsustainable megacities. This design conception brings all the possible advantages of compact cities, without the problems caused by macro-scale, and it also promotes a better society participation in the policy decisions. A small city may be socially diverse, in which different social and economic activities can multiply and society could integrate more easily (MOORE, 1998).

It is appropriate that the city to be organised through reduced nodes (districts) to form a circular system that enables interaction between them. Still, resources and services all over the city and its surrounding territory should be redistributed, decentralizing services and urban equipment and creating a network of activities and information to assist in the reduction of dislocations with cars through polycentric neighbourhoods. This organization contributes to solve one of the serious problems of current planning - the linear cities that normally follow a highway. Linear growth can be avoided if other surrounding areas are encouraged. In addition to the internal network of the city neighbourhoods, a network of cities that fosters exchange of resources and services through a polycentric system should be considered.

4.3. Regionalism

The considerations about the natural and urban environment cannot be separated from social and political issues. Cities can be interpreted as parasites that absorb the region resources in order to survive, or can be designed to absorb the population growth and provide opportunities, instead of harming the region future. For this, we need to understand that the Earth is a system that took millions of years to accumulate resources such as fossil fuels and water and that these resources should be used rationally and sustainably.

For many years, especially in the last hundred years, these resources have been extracted and consumed without any criteria and, thus, producing pollution that causes serious environmental problems as acid rain and global warming. Remarkable is the "circular metabolism"⁴ for cities, where consumption is reduced, improving performance and increasing the reuse. Cities today have a 'linear metabolism' in which there is an inflow of resources like energy and food, and the consumption of such materials within the city presents, in sequence, waste production and emission of toxic gases (Figures 1 and 2).

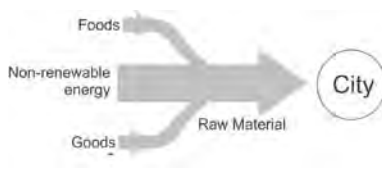


Fig. 1 – Linear Metabolism.

Source: Adopted from Rogers (1997)



Fig. 2 – Circular Metabolism.

The proposal for a "circular metabolism" is based on materials recycling, reducing energy consumption, the conservation of exhaustible energy and the use of renewable energy. These circular processes reduce waste and pollution, and improve the use of resources enabling the better use of consumer goods. To achieve a circular system, the best way is environmental sustainable urban planning. Also, we should promote the solution of environmental problems at every stage of the cycle from the beginning (incomes) to the end (exit of waste). By focusing on the "circular metabolism" through the conservation of energy and materials and by encouraging recycling, urban sustainability is promoting.

Environmental planning establishes a sustainable concept of integration between the built environment (buildings and cities) and the surrounding natural environment (climate, geomorphology, flora and fauna), in order to minimize the negative environmental consequences such as pollution of the environment and excessive production of solid and liquid wastes (HIGUERAS, 2006).

A detailed study of environmental and climatic characteristics of each place is the active part of this process of decision making and concrete proposal of planning. Regionalism is vitally important for a successful environmental planning. It is essential to profit the place weather characteristics to design and build the various components of urban and architectural elements as bioclimatic (CORBELLA and YANNAS, 2009). It must also be considered the issues on the territory that is analysed, about society, about the urban environment in question and also about the urban plans made earlier in the region.

⁴ Concept addressed by Herbert Girardet (1993).

4.4. *Incentives for mixed uses*

The Zoning, heavily used by the modernists, tends to avoid the urban complexity by reducing the cities to simple divisions to obtain a greater ease in their management, from legally and politically point of view. But at the same time it prevents a healthier relationship between man and the environment and his fellows.

The work areas are normally located in urban centres that are deserted and dangerous at night, and housing and leisure are situated in more distant neighbourhoods connected by highways to the city centre. The environmental impact caused by this zoning is much greater than the impact of plans in which work, leisure and residential environments come into close, and often shared, places.

It is necessary to enhance the mixed use to mitigate energy consumption by reducing the distances between activities. This way of planning a city not only diminishes the excessive energy use and pollution, but also reduces the uncertainty in the urban centres for citizens to exercise control over their habitat.

4.5. *Productive Cities - Work and Income*

Another important category for a sustainable urban design is its conception as a productive city (MOORE, 1998). This condition gives characteristics of stability and sustainability to the city: the best way for a human being to settle down in a place is when he gets his livelihood from it.

It is essential that the population produces part of its food and its material needs, because it promotes pertinence as well as lowers transport spending and brokering, and it generates income and employment for the local society. It is important to balance food production and consumption, and also the need for all the cities to produce at least the basic and essential food for the local population. The incentive for production activities and services geared towards the promotion and preservation of the natural environment is an urban strategy that emphasizes both human welfare and nature. In rural areas it is important to enable people to work with agro-ecology and eco-tourism education.

It is essential the promotion of diverse manufactures of the productive cities, following the regional vocations in which different activities will inspire and promote a vital and dynamic community. The planners should understand, with the participation of citizens, the complex relationship between population, services, transportation policy and energy generation, as well as the impacts of these relationships on both the immediate surroundings and on the wider geographical domain.

As a result of the economic restructuration produced by globalization, a reduction of jobs has been produced and, this way, changed the urban landscape with the rise of the informal work. To enable productive cities that create jobs and income it is required: 1- policies for micro and small enterprises; 2- the encouragement of cooperatives in all branches of the system and the multiplication of business incubation; 3 - the training of different actors of society; and 4 - the encouraging the small farmer agriculture.

4.6. *Integration of the natural environment, rural and urban*

Nowadays there is a dichotomy between basic conditions in the city and the countryside, not only for the change in quality, velocity and temperature of the air, but the expectations of

humans, who prefer the city and move to it. The integration of the natural, rural and urban environment is then proposed as an improvement of the environment by introducing natural vegetation and creating regional corridors, and with the same importance in urban areas, promoting the balance between nature and city, preserving the natural cycles and putting green areas into the urban fabric. Thus, it also limited processes of uncontrolled urban sprawl, allowing a urban regeneration ecology.

The urban open spaces are very important because they serve as recreation areas and social use, in addition to provide more pleasant climates. These should be enlarged and properly designed to serve the people and to ease the negative urban environmental conditions. There is a necessity for properly planned urban spaces to allow the meeting and social exchange (VASCONCELLOS and CORBELLA, 2008). Hitherto such spaces, besides an architecture of quality, promote most beautiful cities. The quality of urban life can be encouraged through appropriate urban design, public safety and encouraging healthier environments, ensuring the physical and mental health of residents.

4.7. Mobility

In the traditional system of zoning, the automobile became the most important factor for urban planning. In the distribution of public spaces, all streets and avenues, and many times also parks, are designed to meet the needs of cars and not for pedestrians. The street, which was previously a local of exchange and social gatherings, today has been taken over by cars. To change this picture, besides the planning of mixed neighbourhoods it also must be encouraged public transportation or alternatives as cycling or walking to their own service, that are essential for a sustainable urban planning (CORBELLA, CORNER and BARBOSA, 2008).

The planning of smaller cities requires the end of the dominance of the automobile and the enhancement of pedestrian and public transport alternative. The city must grow through joint centres with mixt activities connected by public transportation with good quality, constituting an agglomeration of neighbourhoods with their own shopping areas and public parks.

5. Considerations and Recommendations

Over the past fifty years all the Latin American countries have experienced the problem of excessive growth of their cities. This swelling generated by similar processes and their problems were magnified by the growing scarcity of infrastructure and perspectives, a phenomenon that is incremented as cities move away from the big cities, and led, and continues to lead, to the formation of mega cities, full of great problems.

The assessment and determination of categories for the achievement of specific cases depend on the physical conditions of the region, the available place and the cultural and socioeconomic characteristics of future inhabitants, and with their participation it will be possible to define the solution of many issues related to sustainable cities. Most of the quantitative problems to be solved for the construction of sustainable cities have no general answers for the fact the solutions depend on the statement of the regional characteristics: the particularities of the region determine the numbers of local individuals who take in each category of analysis. Several factors are involved in these dynamics, and every minimal alteration of each of them may change the whole relationship of the structure.

The possibility of public power to intervene in the cities through policies and actions that promote the common good, paying attention to sustainability issues, makes it the greatest ally

in attempts to introduce strategies that are beginning to be delineated. The categories suggested here for the systematization of the study indicates a strong connection: limiting urban environmental management, network of cities, regionalism, mixed uses, productive cities, relationship between rural and urban mobility. Thus, by pointing out the strategies or environmental parameters for action in urban cities that are designed to be sustainable, the focus is related to finding ways for an effective public involvement.

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