

SETTING UP INDICATORS TO ASSESS THE ENVIRONMENTAL QUALITY OF CITIES

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1 INTRODUCTION

Since early times, when humans started to rule over space to ensure their own survival, they have changed their environment. Their intellectual development, along with the advances of food-production and house-building techniques was the first evidence of the social organization and construction of towns (BENEVOLO, 2009). The development of towns drew more and more residents after better living conditions, on account of the offering of services, job opportunities and leisure. This way many countryside workers migrated into urban centers which went through constant changes in consolidated areas and in the untouched environment.

In the past, cities used to meet the primary needs of their residents. Now they are part of their daily lives and influence the way people live, their health and their well-being (CABRAL E MIRANDA, 2001). Romero et al (2005, p.1) ponder about urban growth linked to the environmental quality control of cities: “How can social production tie up to spatial production in the quest for a sustainable and egalitarian society? How can one measure and monitor quality?”.

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This way, this work aims to analyze the indicators to understand the urban space, its evils and virtues, and outline theoretical and practical guidelines to lay the groundwork for environmental quality assessment in the city and landscape planning focusing on the well-being of residents and on the harmony of the urban ecosystem. Silveira and Romero (2005, p.1) say that “using structural indicators is meant to provide information on the several phenomena relating to the urban sustainability, thus simplifying and translating complex systems and facilitating the decision-making process”.

Indicators synthesize the phenomena occurring in the cities and in the environment, placing them in time and space and pointing out at issues or qualities to ground the decision-making in managing cities (MAGALHÃES, 2007). Magalhães (2007, p.172) says “the valuation of indicators in deploying public policies is the result of its applicability to the signaling of development, in all its facets, like economic growth, human well-being and environmental quality”.

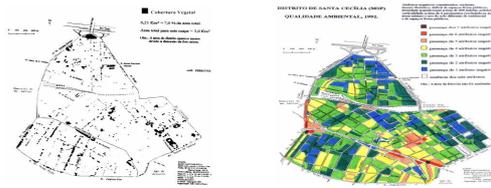
2 METHODOLOGY

The cornerstone in the development of this summary is the bibliographic research involving reading, screening, keeping file records and organization. Likewise, we used the observational and historical methods. The former contributes to knowledge production from empirical phenomena. The latter enables us to analyze the influence past events and facts play on the contemporaneous society (FACHIN, 2006).

3 DEVELOPMENT

Among the performed researches on the indicators to assess the urban environmental quality, one should note João Carlos Nucci's, described in his book “Environmental Quality and Urban Growth”, in which he explains natural and anthropic factors influencing the urban ecosystem. Each studied indicator results in a thematic letter, and the final product – the Environmental Quality Letter (Figure 01) – stems from the overlapping of those results.

Figure 01: Vegetation cover Letter and the Environmental Quality Letter for the village of Santa Cecília.



Source: NUCCI, 2008.

3.1 Climate and Air Pollution

Urbanization affects climate with the rise in temperature, the reduction of solar radiation caused by the shadowing of buildings, pollution, the quality and speed of winds, the relative air humidity, fog and rains. (NUCCI, 2008)

The major source of pollution today comes from the use of cars which are increasingly more numerous in cities. This can be explained by the lack of proper mobility structure in public transportation means. (CABRAL E MIRANDA, 2001; NUCCI, 2008)

As per Cabral e Miranda (2001), pollution sources can be classified as either mobile (transportation, etc.) or fixed (industries, agricultural production, etc.). Air pollution changes the climate, causes respiratory diseases in city residents who breathe in contaminated air every day and, as a result, public expenses increase with the treatment of resulting illnesses (NUCCI, 2008).

3.2 The Water

The misuse of soil in cities brings about floods. River lowlands are occupied, streams are turned into canals, city garbage is dumped improperly on the streets and canals. Besides, the growing paving of the soil makes it waterproof, making it harder for rain water to drain down (NUCCI, 2008). Water is a natural asset. It is key to life and must be preserved by raising the awareness of residents into adopting balanced and waste-free consumption habits.

3.3 Liquid and Solid Wastes

City wastes affect most of Brazilian cities having no selective garbage collection in place with the integrated management of wastes and the proper disposal of debris. These debris can be either liquid or solid; household, industrial or hospital. As per Batata (2003), solid debris are produced by human activities and vary according to population density, income, life standard, industrial activity, degree of consumption and durability of goods.

Nucci (2008) says that today people in cities are faced with uncovered sewage streams, waste dumping into the streams and canals crossing the cities. This is a serious situation because it affects the environment and people's health, as it promotes the reproduction of insects and rodents, the worsening of floods, the devaluation of areas, an unpleasant aesthetics, among other issues of major concern in today's society.

It is imperative that an environmental education program be associated into public policies to reverse this condition, by deploying a selective garbage collection routine and by raising people's awareness of the overconsumption of products that are disposed of on a constant basis. Batata (2003) says a few Brazilian cities and towns have decided on the Integrated Management of Urban Solid Waste as an attempt to reverse this scenario of urban cleaning.

3.4 Sound and Visual Pollution

According to Nucci (2008), the urban centers have a number of sources of noises from land transportation, civil construction works, airports, industrial activities, household appliances and the very human behavior.

The WHO establishes 55db as the maximum level of noise one can withstand to lead a healthy life. In São Paulo's traffic corridors, the noise level can reach 90db, affecting people's health (sleep disturbances, stress, increased cardiac problems, etc.). One solution could be avoiding the mix of the household use with industrial use, for example, by means of the urban legislation and compliance control in these areas. (NUCCI, 2008)

About visual pollution, posters and billboards are often seen throughout the cities as well as electrical wiring showing on the light poles.

3.5 The Vegetation Cover

The vegetation cover is a key characteristic, although very much neglected in cities today. The planning of landscapes with nature improves the microclimate of the air and people's life quality. (NUCCI, 2008)

The vegetation cover is also linked to the types of surfaces (horizontal and vertical) used both on the floor and walls, as for example asphalt and concrete, cobblestones joined with sand, bars covered with plants, plants on slab roofs, vegetation connected to the ground, plants

covering outside walls, etc. These surfaces contribute to a higher or lower permeability. (NUCCI, 2008)

As per Nucci (2008, p.28), “household landscape design alone is not enough to work out the ecological issues in big cities. To achieve that, putting up big parks, planting trees alongside river borders and public streets are necessary”.

3.6 Green Areas

Para Oliveira (1988), the higher the rate of green areas in the cities, the higher the thermal exchange between these areas and lower the air temperature in the urban space. Lamberts (1997) understands that climate factors impact the environment intrinsically and the action of the climate variable directly impact buildings. Abbud (2006) says that landscape design is key to bring closer together people leading an hectic life and who are often times confined in their own homes to keep safer, giving more life quality to children, teens and adults.

WHO suggests 12m² of green area per resident as the minimal ideal area to promote environmental and social well being. The planting of trees mitigates the weaknesses of the urban environment, turning hostile sites into inviting areas for users. The effectiveness of tree planting in the city depends on the choice of species that best suit each area and on the proper maintenance of the vegetation (MASCARÓ, 2005).

It is important assessing the influence reach of green areas over built areas, that is, the integration between the different uses and subsequent advantage taken by society (NUCCI, 2008).

3.7 Free Spaces and Leisure

As decades went by, the number of working hours decreased. People were given more time to enjoy a variety of activities, depending on the life style and age group of each subject. (NUCCI, 2008).

Resting and leisure times are referred to in the Universal Declaration of Human Rights (UDHR, 1948). It says humans must rest from everyday work and go on vacation. This way, city planning includes areas for city parks, squares, stadiums, libraries, theaters, and other sites for people to go to on their free time. The variety of the areas intended for city residents' interaction. This is key to ensure the democratization of these areas so that people of all social

classes, social groups, genders and ages have the chance to choose which one suits them best. (NUCCI, 2008)

Free sites are a variety of areas having both an aesthetic and leisure focus, integrating the different uses and playing a strong ecological role (CAVALHEIRO e DEL PICCHIA, 1992). Fontes e Shimbo (2003) support these sites must be planned and monitored by means of quality, quantity and distribution, considering the hierarchy of zones and their scales and potential of use.

3.8 Verticalization

Verticalization is linked to urban crowding and the support capacity of the already-built areas that are going vertical. Not all infrastructure is able to withstand this process due to overuse of streets and water and sewage systems, for example), not to mention the services and green areas required on each site. The increase of the vertical surface also affects climate (winds and rise in temperature) causing an excessive shading on other buildings and also on the streets. (NUCCI, 2008)

As per Nucci (2008), the concentration of people in centers can be positive, provided that there is a culture of abandoning these areas in Brazilian cities, in spite of their having the required infrastructure for urban crowding with buildings going more vertical. On the other hand, the growth of cities increases the expenses with water, sewage, lighting and paving facilities and other infrastructure for the proper inhabiting of the site while reducing the building-free spaces and reducing natural environments.

The solution is linked to urban planning with the ideal distribution for the use of soil, where vertical and horizontal built areas must be integrated into green and building-free areas.

3.9 Populational Density

City verticalization causes a rise in the population density. When this is high, it can adversely affect the well-being of residents who have to withstand noises, smells, crowds, etc., which impacts their health. (NUCCI, 2008)

As per Andrews (1976, apud Nucci), researchers do not consider population density an issue per se, except when city residents feel pressed and can not get away from city crowding.

3.10 Systemic View

The systemic view reflects the interaction between the analyzed results, that is, the consequence one has on one another. For example, the verticalization causes city crowding, a rise in noises and wastes, overloads the sewage system, causes vertical barriers that change the wind dynamics, affecting residents' life quality. Uncontrolled paving and urbanization change the microclimate and waterproof the soil, causing floods and making social interaction harder for residents (NUCCI, 2008).

3.11 Limits to Growth

To what extent can a city grow while keeping quality? What is the limit for urban growth? For Munford (1965, apud Nucci, 2008), the Greek city represents the ideal in terms of size and structure and says that Rome's dismantling was the result of the overgrowth of the city. As per Nucci (2008, p.12):

Air, water, space, power (food and heat), shelter and waste disposal, considered as the 'the new rarities and around which an intense fight develops' (Lefebvre, 1969), are biological needs of the urban ecosystem influencing the quality of the environment and can be factors limiting urbanization (NUCCI, 2008, p.12).

For Argan (1992, apud Nucci, 2008) economic expenditures of bigger cities tend to be higher than those of small ones. The problem is that big cities often times are not synonymous for development. Conversely, many of them segregate social classes even further and fail to solve the urban chaos.

3.12 Assignment of Cultural Heritage Status

Considering a site a cultural heritage must be considered for keeping the site's history. It is often controversial because it involves, often times, families owning properties who are not willing to protect them. Likewise, real estate speculation has a great influence on the properties that have been listed, as they are often located in expensive areas of the cities (NUCCI, 2008).

3.13 Accessibility

The debate over the accessibility in cities is quite broad. It involves access to services (schools, grocery stores, hospitals, etc.) and to the city's facilities and the proper construction of sidewalks to ensure safety to people having impaired mobility. As per França (2005, p.2):

(...) one of the government's primary duty, supported by the City Bylaws, is to ensure that every citizen have access to services, to urban facilities and to every and any improvement performed by the public administration. That calls for initiatives that inform and point at the actual state of the city and the degree of exclusion of the city by its users (FRANÇA 2005, p.2).

Silva (2008) states that commuting of pedestrians must be considered to facilitate and broaden the public space so as to encompass all uses. There are a number of recurrent issues on the sidewalks of Brazilian cities and towns which, as Coelho (2001, apud Silva, 2008) points out, have been strongly influenced by the historical process of city development and by people's behavior.

3.14 Transportation Systems

The transportation enables haigher accessibility to places. However, it increases conurbations in the vicinity of the included areas, causing traffic jams and air pollution – common issues in urban center these days (CABRAL E MIRANDA, 2001).

Cabral e Miranda (2001, p.1299) say that “while urban development stimulates urban development, the transportation system adversely affects the environment, playing the role of both a bad actor and a hero in the city”.

Proper urban development must be integrated into the mobility system and to the city planning, to prevent technology from compromising the life quality of residents. The traffic of cars is not the sole factor depleting cities. Nevertheless, it is part of the urban environment and has the capacity to improve or worsen the site's environmental quality (CABRAL E MIRANDA, 2001).

4 FINAL REMARKS

The reclassification of cities and their growth can be positive when they use tools such as the analysis and application of the urban environmental quality indicators systematically. All indicators that have been pointed out are critical to the balance of the environment and the well-being of humans.

Qualifying the urban space socially and environmentally is key for the well-being of society and to make a city sustainable. This way, this research aims to stir the current debate on the the social role cities play and how they interact with humans and the environment. It encourages citizens' participation in the debates and in the practices relating to the landscape planning of cities, improving the feeling of belonging and the identity with the city that is not approached in a segregated fashion, but as a system that works in an integration between buildings, people and nature.

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