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URBANIZATION SOLUTIONS OF A THIRD WORLD COUNTRY'S METROPOLIS TO ITS SOCIAL/ENVIRONMENTAL CHALLENGES¹

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ABSTRACT: Urbanization has increased its pace over the last 40 years and almost all the planet's population growth until 2030 is expected to happen in developing countries' urban areas.

In Brazil, the largest country in South America, 80% of the population already lives in the cities, a figure that may rise to more than 88% by 2010. Infrastructure problems, as well as urbanization and environmental concerns are becoming central issues to local and central authorities.

This paper will present the case of Curitiba, one of the most prosperous, organized and successful Brazilian large cities. Despite all difficulties related to being located in a developing country, the city has been able to balance its growth with the preservation of the environment, by means of innovative urbanization, educational and environmental actions.

KEY WORDS: urbanization, environment, third world, developing countries.

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INTRODUCTION

Population growth and urbanization, resulting to a great extent from people migrating from rural areas to the cities, have caused significant impact to the quality of life in urban centers, as well as in their physical structure. The metropolises, particularly those located in developing countries, where urbanization is a more recent process, have been struggling to find ways to balance population growth, its social consequences, and those to the environment.

Curitiba, one of the Brazilian large metropolises, with over 2.4 million inhabitants living in its metropolitan area, is renowned for being a pioneer in developing projects and plans that take the environment into consideration. It was one of the first Latin American cities to recycle. It also pioneered the region providing environmental education to the poor and developing a good public transportation system, aimed at reducing the number of cars on the streets.

URBANIZATION

Urbanization emerged with the Industrial Revolution, particularly in the developed countries, which became industrialized first. Only in the second half of the twentieth century, after the Second World War, developing countries were exposed to urbanization, which has intensified over the last 40 years.

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In 1960, one third of the world's population lived in the cities. Now-a-days, almost half of the planet's population concentrates in the cities and, by 2030, residents of urban areas will represent more than 60% of total. Forecasts indicate that 2007 will be the turning point. From then on, more people will be living in the cities than in rural areas, in the world. Most of the urban population growth will take place in poorer countries and will involve poor people moving into the cities, looking for the opportunities they don't have in the rural areas (Almeida, 200?).

The population of the cities in developing countries has almost doubled since 1960, going from 22% to 40% of the total. At the same time, urban population percentage increase in developed countries was only from 61% to 76% (Menezes, 2001).

Urbanization in Brazil

In Brazil, urbanization started in the second half of the twentieth century. After the 1950's, the impacts of industrialization on the country's economy and urbanization became clear. Changes were a consequence of people moving into the cities from rural areas, and of the integration of the country, after better roads and telecommunications infrastructure were put in place (Santos and Bernardes, 200?).

According to Menezes (2001), 84% of Brazil's population lived in rural areas, in 1940. In 1960, that figure had declined to 71.2%. Only 7.7% of the country's population lived in cities larger than 500 thousand people, in 1940. In 1960, that figure had grown to 16.2%.

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Those numbers indicate the beginning of the Brazilian “metropolization”, which happened mainly from the 1960's to the 1980's, in a chaotic way. In 1980, Brazil already had more people living in the cities than in the country. City residents represented 53.6% of the population, among which 31.5% lived in cities that were larger than 500 thousand inhabitants (Santos and Bernardes, 200?).

Urbanization of Curitiba

In the state of Parana, in the south of Brazil, rural migration represented the major reason for the increase in the population of urban centers, following a national trend. The escalation of the price of land in the north of the state, due to the coffee plantation hype, caused smaller producers to sell their properties and abandon the contry area. That started happening in the 1940's, when former farmers and rural workers began to migrate to the cities inthe area or to Curitiba, the capital of the state. As a result, Curitiba became the fastest growing state capital in the whole country, according to the 1950 census. During the second half of the twentieth century and until the 1980's, Curitiba's population doubled every ten years, according to the IBGE (*apud* Menezes, 2001). Table 1 shows the city's population over the time.

Table 1 – Curitiba's population over the years

Year	Population
1950	180,575
1960	361,309
1970	609,026
1980	1,024,975
1990	1,315,035
2000	1,587,000

Source: IBGE (*apud* Menezes, 2001)

From 1970 to 1990, the industrial activity, which had previously been more intense in the country, became another activity of great expansion in the area of Curitiba, requiring manufacturing infra-structure and housing for the workers to be developed (Moura, 2001).

According to Menezes (2001), unsuitable urban policies and the lack of investment on equipment and services to meet the demands of a fast growing population caused deep degradation of the urban environment, in almost all large Brazilian cities. Along with the environment's degradation the social gap between rich and poor also increased over the years.

Need of concern with the environment

Serious socio-environmental problems challenge legislators, local governments, researchers and environmentalists, who struggle to find ways of keeping a healthier balance between

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society and the environment. That happens not only in Brazilian cities, but also in other large metropolises around the world.

Twenty years ago, urban environmental problems were basically those related to air pollution and, eventually, water supply. Now-a-days, the complexity of the environmental issues is growing at an exponential rate, bringing new concerns such as the pollution of rivers and the soil, deforesting, atmosphere heating and garbage disposal, among others. According to Odum (1988), although cities do not take a great extension of the Earth's surface – only 1 to 5% of the globe – they modify the nature of rivers, fields and forests around them to a much larger extent.

After having decided to live in large groups, human beings had to find suitable solutions for housing, employment, health, education, water supply, energy, transportation etc. for the population. However, attempting to create solutions in all those fronts, while the population increases at a fast pace, causes severe damage to the environment (Danni-Oliveira, 2003). The majority of the large cities are now challenged to organize growth and implement projects that help to reduce the negative impacts of population growth on the environment and the quality of life.

THE CITY OF CURITIBA

City values

Curitiba considers its planned development, the environmental education of its people and the preservation of its history as important concepts for the balance between society and the environment. Unfortunately, those projects concentrate on the city of Curitiba, itself. It would be important that they expanded to other municipalities in its metropolitan area, so that a uniform approach could be achieved in the efforts to balance environment and society. Twenty five municipalities have merged to Curitiba over the years, adding up to 2.42 million inhabitants in the metropolitan area.

Urban planning

According to Vicentini (2001), Curitiba was one of the first Brazilian cities to concern itself with the promotion of planned actions to redefine its space, after the change in the city's urban profile.

In the 1940s, a preliminary urban plan became Curitiba's milestone. The renowned French architect and city planner, Alfredo Agache, was hired to develop a urban plan for the city. Agache, who happened to be one of the co-founders of the French Society of Urban Studies, arrived in Curitiba with the objective of establishing a new order to its urban space design.

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According to Menezes (2001), the so-called Agache Plan set a number of priorities, such as sanitation, ease of traffic congestion and the formation of centers to enable the growth of both social life and commerce.

The Agache Plan also established norms and guidelines, which were intended to organize the physical, urban and spatial growth of the city. Traffic and urban functions would be organized, according to the Agache Plan, by means of coordinated activities and a pre-established zoning. According to Hladczuk *et al* (2000), the definition of specialized zones for the city was carried out, in order to allow for the implementation of several functional centers, based on specialized sectors: a military center (the Bacacheri suburb), a sports center (the Taruma suburb), a food supply center (Municipal market), an education center (Politechnical center), an industrial center (the Reboucas suburb), an administrative center (the Civil Center suburb) and some recreation and leisure centers (Barigui Park).

Thorough implementation of the plan was not possible, due to political, economic and legal reasons. However, the philosophy of the Agache plan survived its time and is still present in the city's urbanism. According to Coelho (*apud* Menezes, 2001), "the cultural relevance of the Agache plan is that, in spite of not having been implemented to a great extent and having become obsolete, it introduced urbanism to Curitiba". Danni-Oliveira (2003) stress the fact that the Agache plan contributed for the planning of the city to be retaken in the 1970's, being it the starting point for the development of the Serete Plan that followed, which redefined the functions originally proposed in the Agache Plan.

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Other plans and projects followed, in order to adapt the city to the fast increase in population. In 1955, the first plan for public transportation was presented. The city was split into areas of service concessions that were granted to private transportation companies. According to Moura (2001), the public transportation system is considered the greatest achievement of the city's planning. It is not only very efficiently organized, but also determined a better flow for the traffic in the city.

By the same time, Curitiba introduced its Ordinance Code, which intended to regulate the growth of the city, paying special attention to the environment. The city wanted to grow without degrading it.

In the 1960's, urbanists from the Federal University of Parana sent a proposition of a director plan to the city council. They thought urban development was going too slow and were willing to contribute to the urban planning of the city. According to Oliveira (2001), those architects proposed that the Agache plan were reexamined, and created the Serete Plan. The new plan, in spite of having been inspired on the modernist approach of the Agache Plan, cleverly responded to the criticism towards the functional division of space, so strongly stressed in the Agache Plan and its residential, commercial and industrial districts. Criticism to the lack of personality of those well planned public spaces led to the revitalization of traditional areas of Curitiba and the creation of new meeting points for the citizens (Hladczuk *et al*, 2000).

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Public transportation

The need and challenge of making basic services more accessible to an ever growing population happened in the 1980's. In that period, the local government created the Integrated Network of Public Transportation, which made it possible for the citizens to use the bus system to go almost anywhere in the city by paying just one ticket. Now-a-days, several bus lines serving other cities in the Metropolitan Area are integrated to the capital's transport system, which means residents of those cities also benefit from the broad transportation system of Curitiba. The transportation system is based on major lanes, exclusive to buses, which connect the suburbs to the central area. Those exclusive lanes increase the average speed of the buses, without affecting the passengers' safety. Next to the exclusive bus lanes, there are slow traffic lanes going in both directions and, parallel to this set of exclusive bus lanes and slow traffic lanes, but one block apart to each side, there are fast traffic lanes for private vehicles. According to the city council, there are 34.3 miles of exclusive bus lanes, which cross the city in the North-South and East-West directions. Those two axis are complemented by 168 miles of "feeding" bus lines and 115 miles of inter-suburb round lines, which cover 65% of the urban area, where just one ticket is required for as many connections as needed. The rest of the city is still not part of the integrated system and relies on conventional bus services.

Even with that care for the public transportation, the city has not been able to reduce the high level of motorization (Curitiba has more private cars *per capita* than any other Brazilian city, with the exception of Brasilia, the country's capital), neither control the high number of

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traffic accidents, which cause traffic jams at peak hours (Moura, 2001), besides mutilating and killing citizens.

Concern with the environment

In the 1990's, Curitiba celebrated its 300 years and started emphasizing its concerns with the environment in urban planning. One of the major objectives of the environmental education program of the city is to develop the citizens' consciousness with respect to the environment and their social responsibility. The local government wishes the citizens to gain knowledge, change attitudes, get involved and work, individually and in groups, to find solutions and prevent hazards to the environment. It considers that this will only happen if the environmental issue becomes an overall concern.

Garbage collection and recycling

The city has a garbage recycling program called "Trash that isn't really trash", which tries to show the importance of recycling to the population. In order to reach the whole city, including the poorer suburbs, the local government developed two additional garbage collection services, specially targeted at the socially excluded communities.

One of those projects is the "Green Exchange", which consists on a truck that goes to poor suburbs and exchanges recyclable waste for food that the local government buys from small farm owners in the metropolitan area.

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The other project is “Garbage Purchase”, which stimulates suburb associations to manage big garbage containers close to areas of difficult access by the garbage collection trucks. Through this project, the local authority exchanges recyclable and organic garbage for food. The trash is weighted and the suburb association is paid with food it is in charge of distributing to the most needed families in the area.

According to Azevedo (2001), the programs of selective garbage collection in Curitiba were already responsible for the collection of 19.73% of all the trash generated in the city, in 2000. Programs such as “the trash which isn’t really trash” and the “green exchange” allow for 34,443 tons of paper to be recycled, representing an economy of 10.8 million sq ft of water and avoiding 974 thousand trees to be cut. According to Guimóar (2001), one ton of recyclable paper can prevent 10 to 12 trees from being cut. Paper manufacturing from recycled paper spends 10 to 50% less water than the traditional process, which uses virgin cellulose. Energy requirements are also 50% lower.

Although those figures are still small, if compared to results obtained in some European cities, such as Copenhagen, which recycles 64% of all collected garbage (McDougall, 2000), they show the importance of developing programs of that nature in large cities. If programs like those were not in place, the situation of garbage disposal landfills would be much worse in Curitiba. According to Azevedo (2001), a landfill that had originally been planned to last 11 years, considering the available space and the city’s population would have reached its full capacity in less than 9 years, if the recycling programs were not in place. Ribeiro and

Lima (2000) alert us to the fact that the destination of most solid waste in Brazil is the soil, regardless of it being a pile of unattended trash or a controlled landfill area.

Green areas within the city

Curitiba is also renowned for its green areas. According to the UN, a city should have at least 172 sq ft of green area per inhabitant. In 2000, Curitiba already had around 538 sq ft. In ten years, from 1972 to 1982, 3 forests and 3 parks were created in Curitiba, adding 110 million sq ft of green areas to the city (Oliveira, 2001; Menezes, 2001).

Flood contention

The creation of those forests and parks, in addition to helping to protect the environment and providing leisure options to the population, also represented an attempt to reduce the problem of floods in the city. Projects to prevent floods had been started over 30 years before, in the early 1970's, when the first parks were settled. Parks and forests within the city area are natural solutions that increase the permeability of the soils. In large cities, the natural cycle of the waters is drastically changed, because streets, sidewalks and buildings reduce the infiltration of pluvial water, which is quickly channeled to the rivers when it rains. The inexistence of green areas, capable of retaining the water from the rain, at least for a while, is one of the major causes of floods in urban areas (Oliveira, 2001).

Health and education

The areas of health and education have also been contemplated with innovative projects, in Curitiba. The Mother's Program has the purpose of following up women's pregnancy from the beginning, providing them with all necessary medical assistance and care until the baby is born. According to city council's data, although the infant mortality rate is considerably lower than the national rate, it is still higher than that of many other countries. The 1998 infant mortality rate was 16.3 per 1000, while the maternal mortality rate was 38.3 per 100,000. The Brazilian infant mortality rate, for the same period, was 36.1 per 1000 and the maternal mortality rate was 68.0 per 100,000.

The public education network comprises 122 elementary schools (up to year 8). Some of them are conventional schools; others offer whole day care or education for students with special needs. Schools provide activities with the purpose of forming the citizens of the future. A very innovative project is the Light-house of Knowledge, which consists on small libraries that are built in the suburbs, close to municipal schools. Each of those libraries have approximately 5 thousand books that can be borrowed by students and other citizens living in the neighborhood. The buildings are inspired on a light-house, as a reference to the old light-house and the famous library in the city of Alexandria. As the libraries have a police observation room at the top, they also contribute to the safety of the area. The building has three floors: book shelves are located at the ground level, as well as a few benches for book consultation. Then, there is a mezzanine where the reading room is located and, at the top,

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there is a guard house. At night, the light from the light-house also contributes to the safety of the area.

CURITIBA'S MAJOR PROBLEMS

As it happens to any other large city, Curitiba has its problems, in spite of all the efforts to reduce the negative consequences of its fast growing. Unfortunately, some of them are very difficult to solve in the short run.

All the news about the city being a model city and the international recognition for its achievements end up contributing for the intensification of the migration from other areas and towards Curitiba. In addition to that, incentive programs to the industrial development of the area have brought many factories to the metropolitan area of Curitiba. Several automobile manufacturers and their suppliers have established in the region over the last few years.

Excessive advertisement on the attributes of the city itself and the possibility of work has called the attention of thousands of people who moved to the area, looking for opportunities and a better life. Curitiba has not been able to absorb the great numbers of newcomers. That has contributed to the formation of a poverty belt around the city, including areas of springs and water reservoirs.

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According to Moura (2003), the city's urban space is being occupied in a selective way. As real state is much more expensive in Curitiba, than in the other cities around it, it is chosen by those with better income. The other newcomers have to establish far away from the city, in unplanned suburbs with very poor infra-structure.

There are three new challenges for the city: (1) to control the irregular occupation of areas of environmental preservation; (2) to provide acceptable quality of life to the population that has migrated to irregular areas; and (3) to control violence in those areas, avoiding it to spread to other parts of the city.

Violence is one of the major concerns of the citizens, who feel incapable of protecting themselves. According to the State's Police Department, there is an attempt to reduce violence in the areas of irregular occupation, in Curitiba and its metropolitan area. The problem is only a public safety issue, though. It is a social issue. Definitive results in the safety arena depend on the success of the social insertion programs adopted by the local government.

CONCLUSION

The concern with urban planning associated to the welfare of the citizens and protection of the environment is one of the features of the projects that are implemented by Curitiba, since its population started growing at a faster pace.

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The creation of green areas is one of the strongest examples of that policy. It not only contributes to more leisure possibilities for the population, but also has an important role in the contention of floods, which were very common in the city, in the past. The great volume of green areas, as well as other projects for the preservation of the environment that are developed in Curitiba, such as the “trash that isn’t really trash” and the “green exchange”, make the city well known for its ecological concern.

Another feature that distinguishes the city from other metropolises is its excellent urban transportation system, which makes life easier for its residents. Transportation is fast and people can cross the city and even go to some of the other cities in the metropolitan area paying just one ticket. The public transportation system of Curitiba is one of the most efficient in Brazil and has been awarded many international prizes for its originality.

In spite of the effort of its population and politicians, the city still has many problems to solve, which relate to its fast growth over the last 50 years. Providing infra-structure and solving social problems in the areas of irregular occupation represent some of the greatest challenge of today.

Some projects are being implemented in order to remove families from irregular occupation areas, settling them in other places that are less harmful to the environment and to themselves. It is important that the city provides those migrants who established in the periphery with a better quality of life, so that all of its citizens are given the same

opportunities and services. That will be the only way to keep a balance between society and the environment, in the future.

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