

Density in Urban Area

Understanding the Advantages of Density to Improve Low-Income Settlements

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Introduction

In the past 20 years, world population has grown from approximately 4.2 billion to 5.7 billion people, with an increasing number of people living in urban areas or cities (The Habitat Agenda, 1996)

Since the end of the 19th century, urban centers have been constantly growing. The lack of housing, land and housing policies generated by this intense process of urbanization has created a huge gap between the supply and the demand, especially in developing countries. Consistent with the data, more than 1 billion people are without decent living conditions, and if no serious action is taken, this number should reach 2 billion over the next 30 years (The Challenge of Slums, 2003). In order to be closer to work and other facilities that those urban areas can provide (health care centers, hospitals, schools ...), people end up living in illegal, precarious and informal settlements, on public or private land in the absence of infrastructure or technical support and with a lack of access to basic services.

According to “The Habitat Agenda”, everybody has the right to have equal access to adequate shelter, without any kind of discrimination. This means living in healthy, safe and sustainable human settlements with water supply, food, clothes, sanitation and basic services. It also signifies adequate privacy, space, physical accessibility, security, lighting, heating, ventilation, affordable basic infrastructure, accessible location with regard to work and basic facilities. With this in mind, urban planners, designers and all the decision makers must take

every advantage of what the land and resources offer, in order to sustain and improve development of human settlements.

The objective of this paper is to identify how to use and redevelop the density in urban development's to upgrade the current lifestyles in low-income settlements. The report recognizes that perceptions of density often vary from country to country, depending on specific cultural, social, environmental and economic factors. It will establish general guidelines and recommendations to aid in designing density criteria by illustrating options in examples provided. Urban density is a very complex subject so this report will develop only a few points, even if in reality we cannot put the others aside, such as the financial aspect.

I Urban Density

1. Definition and generality

In view of this increasing number of people in cities, density management is the key to shelter and living improvement. Density is expressed in the number of people living per unit area or volume. *"It is one of the most important indicators and design parameters in the field of housing and human settlement planning"* (Claudio Acioly et al. 1996).

Density can also be expressed in different levels:

- Low density < 70 inhab/ha
- Medium density = approximately 180 inhab/ha
- High density = approximately 600 inhab/ha
- Extremely high density = approximately 1 000 inhab/ha

(NB: This paper will refer to high density).

The concentration of people in one area carries enormous advantages by creating economic activities as well as social and environmental opportunities. For instance, history shows that it is difficult to separate the economic success of a city from its urbanization.

As the following data will show, the most successful cities economically, commercially and financially, are always the ones with large concentrations of people. Conversely, despite their density, cities like Manila (Capital of the Philippines), or Phnom Penh (Capital of Cambodia), remain some of least developed cities due to lack of planning and urban design.

Cities	Density People/km ²	Population People	Superficies Km ²
Paris	20 807	2 193 030	105,40
Manila	18 725,2	11 553 427	617
Barcelona	17 566,76	1 645 908	100,4
New York	10 292	8 143 200	1214
Phnom Penh	4 572,41	1 326 000	290

2. Low or High density?

Urban density is a very specific measurement of the population of an urbanized area, excluding non-urban land-uses. Non-urban uses include regional open space, agriculture and water-bodies. Density directly affects urban design planning by having an impact on the relationship between public and private spaces and the supply of all the different services it can provide.

Higher density areas usually tend to have a better utilization of infrastructure, land and transport connection and these provide a higher level of access to business, employees and markets, minimizing public investment. In the case of good urban planning high density also allows people to be free in their movements, from one city side to another and for a better mix of land use. In this way, higher social contact is created for a more lively environment but can also coincide with a lack of big green or recreational spaces.

Conversely, since the services and provisions are based on the number of people to be served, lower densities, by the spread of the people, have to run longer infrastructure, increasing the cost per consumer of land, transportation, maintenance and services. Because of that, they are often associated with higher incomes. The degree of interaction between people is lower but the advantages are larger spaces for recreation and the cleaner air.

It is important to clarify the difference between high-density and overcrowded. Overcrowded defines too many people living or working in an area (from the neighbourhood level to the smaller scale as a room). A negative effect of extreme density can be more disease and unhealthy sanitation conditions, with higher mortality, and increased violence and crime rates.

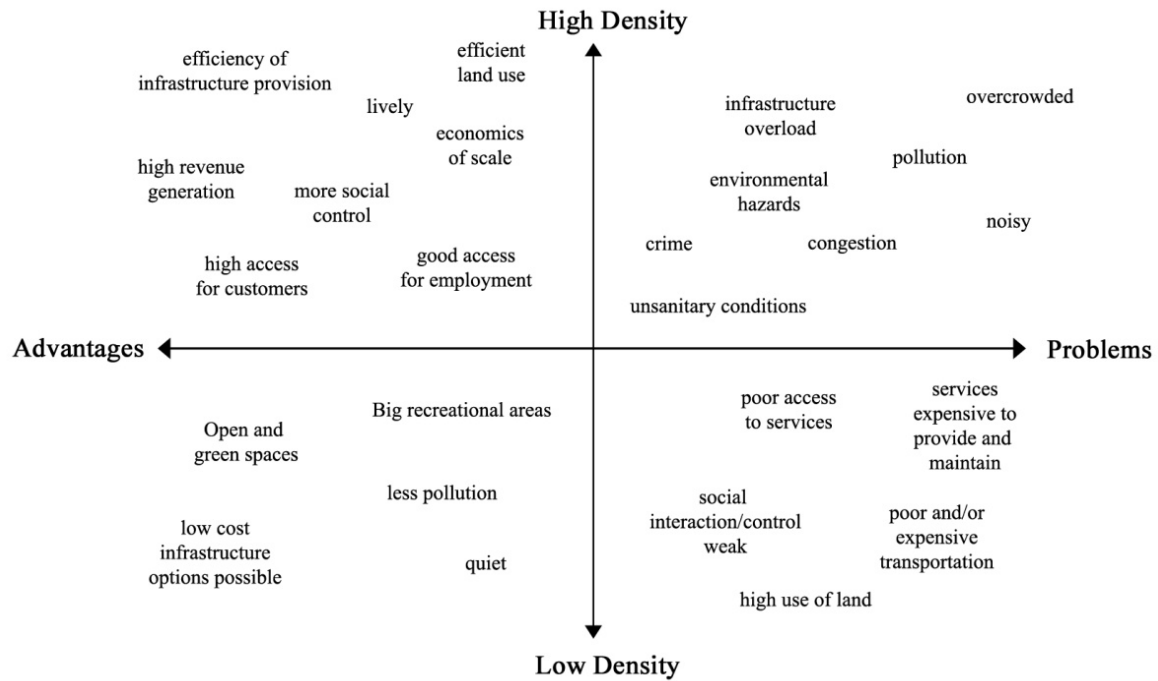


Figure based on Claudio Acioly et al. 1996 : Advantages and Disadvantages of High vs Low Density

II Upgrading of Low-Income Settlements

1. Densify Low Income Settlements

Many low income settlements in large cities can be described as overcrowded areas where people live in inadequate infrastructure, with informal markets and activities, and are affected by poverty, health problems, stress, violence and discrimination.

Most likely, the housing density is very high, reducing the space for recreational areas, public or green spaces and leading to narrow streets where the sanitation and drainage is very low or inexistent. Because of unplanned sites and bad management, the result is an inefficient infrastructure.

The most common situation where density is considered being efficient and sustainable is when urban design is planned, with a combination of regulations and negotiations. This is proven even if density values and perception varies from one country to another, also within a city, according to the influences of external factors.

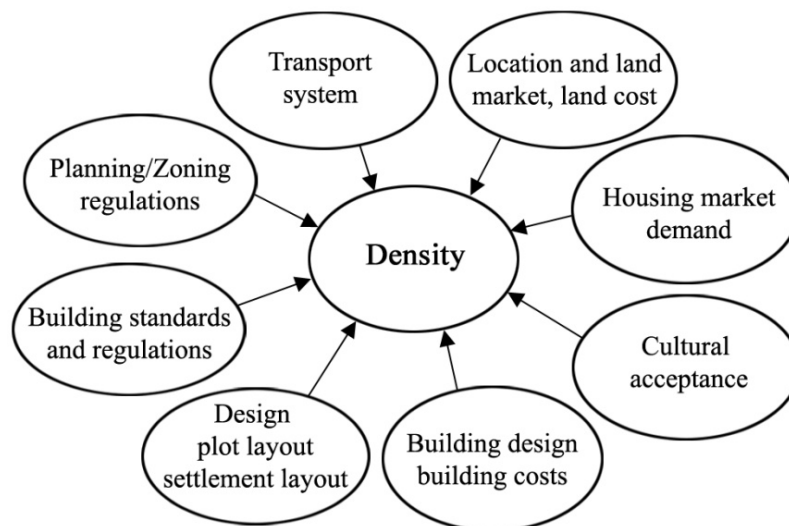


Figure: From Claudio Acioly et al. 1996 : External Factors Influencing

In general, high density is a success when provision and maintenance of infrastructure are well-organized. It should be the result of a design process dealing with the cultural heritage of the city and the people, working dynamically with the measures, sizes, standards and housing typologies according to environmental suitability. The financial aspect should be aimed at the optimization of infrastructure and services, but land should be taken into account, if at a lower level.

Governments often promote or support the replacement of high density informal settlements with high-rise buildings because it can achieve high densities while conforming to local building by-laws and promote a modern city image (Arif Hasan, 2010).

But such solutions are usually inadequate, not taking into account the people's needs. Density doesn't mean high-rise apartments. A master-plan with regulations will provide a better city even with a high density.

2. Guidelines for Design Criteria

Housing layout is a result of a design action that has to provide optimal land utilization and infrastructure distribution in order to reduce the costs.

The percentage of land allocated for residential use and public space requires a level and standard of services to be organized. This balance between the private and public domains have to be in relation with the cultural and environmental aspect in order to be an acceptable and appropriate solution.

Whatever the cultural acceptance, Caminos and Goethe have defined 3 classes of land and established an average in the use of land as follows:

- Public land: 20 to 25% for roads and public open spaces
- Semi-public land: 15 to 18% for the institution land (schools ...)
- Private land: 55 to 62% for occupants

The dimension (size, width, length or depth, shapes of plots ...) and the regulations in the different spaces will significantly affect ultimate density and define the outcome of the urban environment and the achievement of efficient utilization of land and infrastructure.

Based on those ideas, it will be recommended to:

- Create appropriate regulations to maintain the good quality of life and the sustainability of the land. In this way, the government can have direct control over a settlement's development.
- Combine vertical and horizontal densification processes to diversify land use and be successful in their applications.
- Balance between the open and occupied spaces.
- Create roads in correlation with the estimated density of pedestrian, private vehicle and public traffic.
- Avoid too narrow streets which imply climatic impacts and often bad cultural acceptance.
- Always keep in mind the culture, the history and the need of the people to create an acceptable density.
- Establish different sizes of plots according to the target groups, according everyone's needs are different.

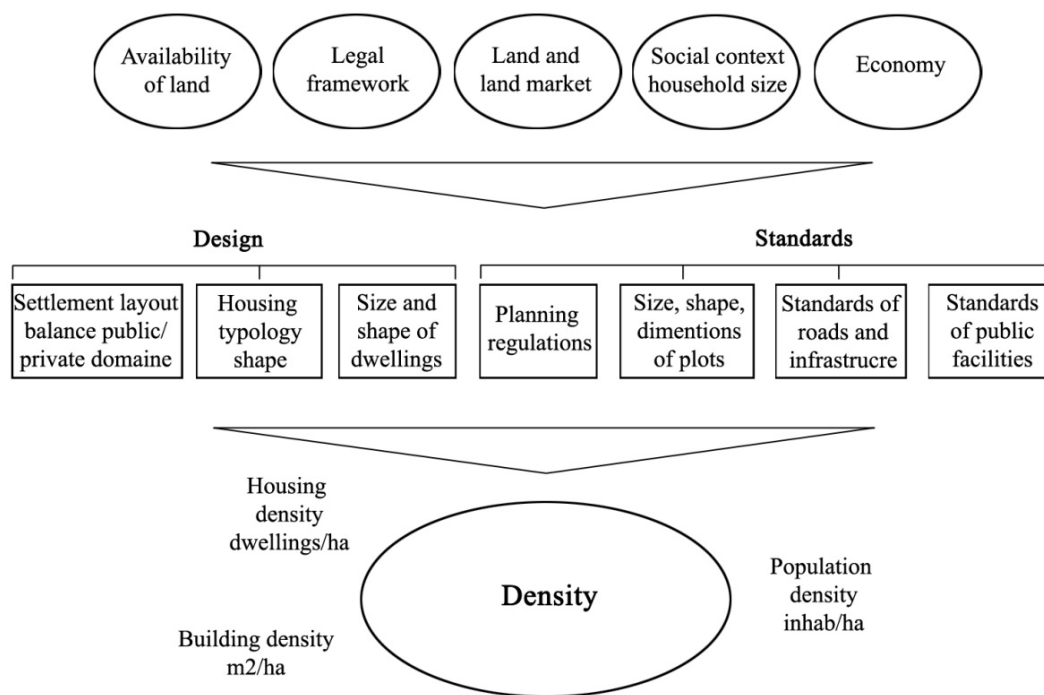


Figure: From Claudio Acioly et al. 1996 : Design and Standard Issues Affecting density

III Examples of Upgrading Through Density

1. At City Level

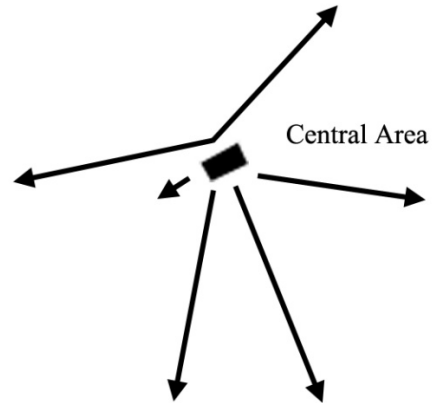
During the last fifty years, Brazil, as many countries, has known a rapid urbanization. One of the best examples of density being used for urban development might be Curitiba, today the capital of the Brazilian state Parana. Facing an important rural exodus in the fifties, the city wanted to avoid a rapid growth that was poorly organized.

Due to a master plan voted on 1966, the municipality initiated an excellent urban plan of expansion of the city, by creating five transport axes to attract residential and commercial constructions to be built along. The main objective was to allow easier movement of its habitants and those in the neighbourhood communities throughout the city.

The structure of those axes, from south-west to north-east, is the key of the success. Each axis is composed of:

- Two way roads to slow flow of traffic (*cf: red and blue lines*)
- One exclusive lane for vehicles providing public transportation (*cf: big red line*)
- Two parallel roads, each moving in one direction (one going to and the other coming from the central area) both for the flow of high speed traffic. (*cf: two smalls red lines*)

Furthermore, this general configuration is grafted by lines that connect neighbourhoods to the periphery.



Images and schemes from IPPUC (Instituto de Pesquisa e Planejamento Urbano de Curitiba) showing the structure of the axes

The project also intends to associate economic growth, social development and environmental protection in a sustainable way and it is a success, according to the data. Currently, 3 595 662 habitants are living in the urban area, compared to 361 309 in 1960 (Prefecture Municipal de Curitiba), and more than 85% of the habitants are using public transport, 1.9 million of passengers per day.

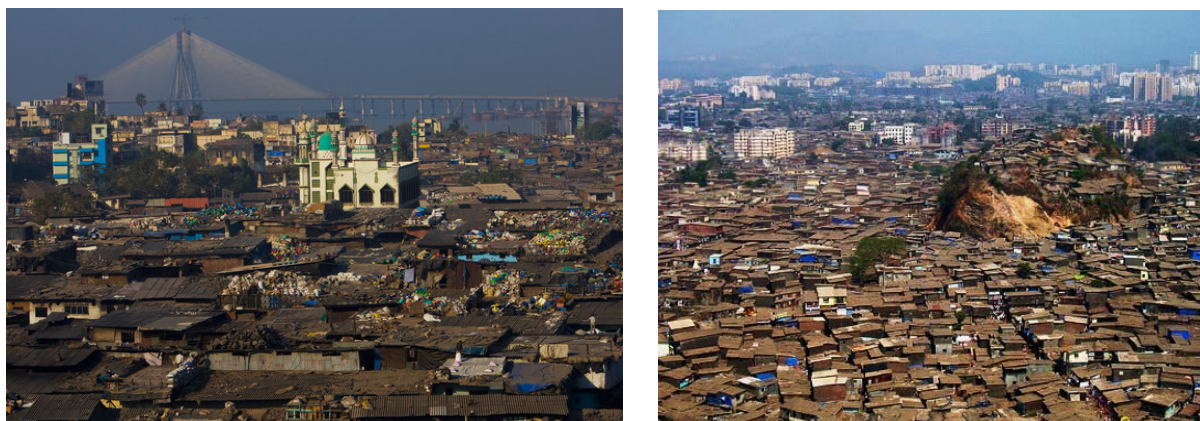
During the last few years, the Municipality of Curitiba has been recognized with:

- ONV's Environmental prizes in 1990
- Ecologic Capital of Brazil, at the Global ECO conference in 1992
- The city's most innovative in the world, at the 2nd World Summit of mayors and planners held in Istanbul in June 1996.

2. At Neighbourhood Scale

Becoming the economic and commercial capital of India, Bombay, or Mumbai, is today one of the most populous cities in the world. Also capital of the Indian state of Maharashtra, it attracts migrants from all regions of the country due to its high standard of living, compared with the rest of the countryside. According to the United Nations, it is the seventh largest city in the world with the fifth fastest rate of population growth, 12 million people in 2001 compared to 16 million habitants in 2006.

Moreover, over half the population lives in deplorable conditions of poverty or overcrowded slums (Akie Takeuchi et al. 2006), but Bombay is differentiated because the slums are centrally located rather than being relegated to the periphery of the city, like most of the other third world cities.



Images that reveal the slums in the heart of the city

Facing this situation, the MMRDA (Mumbai Metropolitan Region Development Authority) had implemented, in 1985-94, an Urban Development Project which aims to create a new land infrastructure services. *“It involves the construction and financing of about 85,000 serviced residential, commercial and small industrial plots, which include community facilities, core housing, and house expansion loans on about 13 sites in the Bombay Metropolitan Region”* (World Bank, 2010).

In parallel, in the middle of the nineties, the state government of Maharashtra introduced an innovative strategy of slum redevelopment, based in two prevalent conventional strategies:

- Slum clearance
- Slum upgrading

The idea is to demolish and rebuild on the same site, or upgrade the existing neighbourhood, at a higher density.

This project is comprised of approximately 35 000 slum households or 300 ha of slums areas. It includes the provision of tenure, the improvement of infrastructure, urban services and community facilities. It provides to upgrade household’s infrastructure such as water supply and storm water drainage, and provide equipment and civil works to improve the maintenance of roads, drains and services, and the collection and disposal of refuse.

Finally, technical assistance, training and coordinating agencies are implemented.

This project is still relevant, and allows those people to integrate the society step by step instead of relocating them at the peripheries of the city, causing even more damages.

Conclusion

To conclude, the need for housing, improvements to shelter and the eradication of poverty are some of the most challenging problems today, due to increasing urbanization which affects most of the principal cities in the world.

It is because the demand is urgent, that we have to act while thinking about the consequences of our acts. Density should be used as a design tool, together with planning and regulations which will provide efficient and different uses of land, where everybody should be able to find their place. Upgrading slum areas has to be part of the process instead of being set aside, if the city wants to raise the economic, commercial, financial (...) level to become a sustainable and developed city, at the same time being careful that the upgrading is culturally acceptable by the inhabitants.

In the future, we will only see more urbanized land, so now is the time to think about the situation in a bigger level to respond correctly to people's needs at the smaller scale. The effect will be sustainable housing development and a city where people will have a chance to integrate into the community and society life and have access to efficient services, decent public and private areas, giving them lot of opportunities for healthy growth.

These cities will result in a better city, the city of tomorrow.

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