# Urban Regeneration and Sustainable Design - In Bangalore

**Sharanabasappa A Patil[1], Jagadeesh Chandra[2] and Lavanya Vikram[3]**

[1]*First Year Student of M.Arch, Landscape Architecture School of Architecture,*
*MSRIT MSR Nagar, MSRIT Post, Bangalore -560054*
[2]*Head of the Department School of Architecture, MSRIT MSR Nagar, MSRIT Post, Bangalore -560054*
[3]*School of Architecture, MSRIT MSR Nagar, MSRIT Post, Bangalore -560054*
*E-mail: [1]sharanapatil3@gmail.com, [2]bsjchandra@gmail.com, [3]lavanyavikram2013@gmail.com*

**Abstract—***Cities are at the forefront of global socio-economic change and rapid urbanization is a socioeconomic phenomenon of the 20th century. Half of the world's population now lives in urban areas and the other half increasingly depends upon cities for economic, social, cultural and political sustenance. Urbanization is occurring at an accelerating pace in developing countries, accompanied by the creation of some very large urban aggregations and megacities. Urbanization is now commonly regarded as one of the most important social processes and has enormous impact on the environment at local, regional and global scales. Urbanization is a process of sustainable densification with respect to urban environment and eventually upgrades a city into a metropolis. Urbanization results in major irreversible changes in production and consumption styles impacting the carrying capacity of the earth significantly. A city devours acres of land and materials for infrastructure like highways, water supply and power. It intensifies traffic problems on commuting roads from a city's central location to suburban areas. Hence, it is important to study the rapid urban change that is likely to take place in developing countries that are least equipped with the means to invest in basic urban infrastructure—water, sanitation, housing—and are unable to provide vital economic opportunities for urban residents. It is surprising to note that urbanization process is being viewed through a 'sustainability' lens only lately.*

## 1. INTRODUCTION

Change is the most permanent thing in the world. It could be physical, environmental, economical or any other type. Regeneration stands for the change and is also a process. In other words urban regeneration means physical, economical, social and environmental change in a city/ town/ area. Regeneration basically covers these four aspects, covering everything of an area - such as community, crime, infrastructure, employment, health, literacy etc. Each aspect is interrelated with another and has its own direct or indirect impact on other aspects. So, regeneration does not include any single or individual aspect or person but it includes all the aspects and everyone who lives in that particular area, which should be taken care of for the sustainable development.

The definition of urban regeneration is based mainly on following themes:

The relationship between the physical condition evident in urban areas and the nature of the social and political response

The need to attend to matters of housing and health in urban areas;

The desirability of linking social improvement with economic progress;

The containment of urban growth;

The changing role and nature of urban policy.

Bangalore is the capital city of Karnataka State, India. It is positioned at 12.97° N 77.56° E and covers an area of 2,190 square kilometers (850 sq mi). It is also called Green City. Bangalore is one of the fastest growing city of India. With the introduction of information technology in the city, it has assumed an international character. IT professionals not only from the various parts of India, but also that of the world, are migrating to the city.
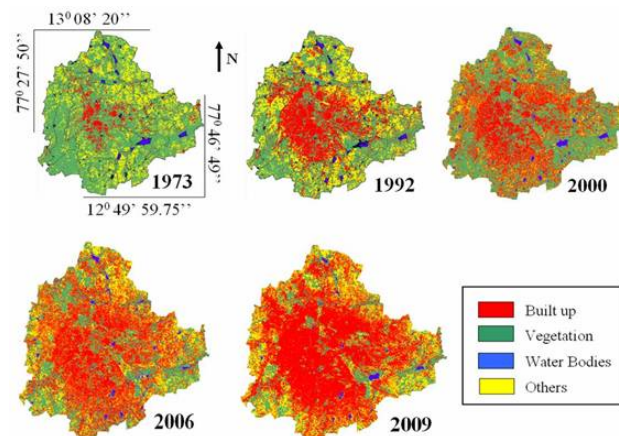


**Fig. 1: Indicating the effects of urbanization from 1973 to 2009**

This has led to outburst of population in Bangalore. Although Bangalore is walking the path of urbanization, the development of infrastructure and buildings has happened at the cost of felling of trees and by losing the essence of being a Green City. This makes it essential to look into the possibilities of regenerating urban areas and develop sustainable design.

## 2. MATERIAL AND METHODS

### 2.1 Literature Review

Ever since sustainable urban development became the catchword in most international discussions, several approaches to its assessment have sprung up. To assess urban sustainability, indicators are crucial for target setting, performance reviews and facilitating communication among policy makers, experts and public. A wide range of indicators are therefore in use across the diversity of different cities and regions, which vary according to particular needs and goals. In the context of rapid urbanization in developing countries, it is essential to apply the concept of sustainability in policy and planning decisions. However, the criteria for sustainability differ between developed and developing countries. These differences prohibit us from transferring the models of sustainability from advanced societies to those which lag behind. In such a scenario, different indicators are to be developed to assess urban sustainability. These indicators play an important role in turning data into relevant information for policy makers and help in decision-making. They also help in simplifying complex information. The indicators are GDP (Gross Domestic Product) to assess economic development of the country and rise in carbon emissions to estimate environment conditions.

Bangalore's growth dates back to 1980s after information technology became prominent and fuelled in part by a strong in-flow of migrants. Bangalore has a land area of 850 sq. mi. and uses much of its land for housing, industry and parks. The Bangalore Urban Agglomeration has grown faster between the years 1981 and 2011. During the last decade, Bangalore's population grew by 65.2 per cent. A key feature of population growth in Bangalore is that most of the growth is taking place in the surrounding areas and is not very structured. Bangalore, the residential areas comprise around 43 per cent. The green cover per person in Bangalore (2.55)

### 2.2 Assessing Indicators for Bangalore

Economic sustainability: Income and growth show good performance; while on infrastructure front, the performance is poor. The per capita water use for Bangalore is 129 l. Mobility patterns and policies play a significant role in deciding the quality of urban environment. A high dependency of personal transport negatively affects parameters such as air quality, noise, and livability. On the other hand, the density of public transport network plays a very important role in the sustainable mobility of a city. For Bangalore, the accessibility

of public transportation infrastructure is 46 per cent and hence the automobile ownership (no/family) is very high (1.7).

Environmental and Physical Sustainability: Urbanization in Bangalore has led to higher income-generating opportunities resulting in higher resource use. Infrastructure and public services (including environmental protection) do not match this growth that has resulted in a decline in urban environmental quality. Since Bangalore is densely populated, air pollution is a critical issue due to the impacts that pollutant concentrations have on the health of their inhabitants. Fine particulate matter (PM10) concentrations are 90 in Bangalore. Bangalore shows lower $CO_2$ per capita emission (0.5/cap). Waste is one of the key evaluation parameters of environmental sustainability since it plays a significant role in living and environmental protection. It also impacts significantly other parameters such as saving of non-renewable raw materials protection of soil and water production sources. Bangalore's household production of waste is 266.5 kg/cap/year. In Bangalore, there is a well-functioning waste management system which recycles 80 per cent of waste. A part of the remaining waste is incinerated with energy recovery and the balance goes to landfills.



**Fig. 2: Indicating green Bangalore**



**Fig. 2: indicating urbanized Bangalore**

## 3. PROPOSAL

Bangalore can walk the path of sustainability by adopting measures from household level to policy making level. Some of the considerations that can be made at policy level can be listed as below

### 3.1 Greenbelt Land

Remove allocations of greenbelt land for housing from development plans where the allocations are not consistent with sustainability objectives. Retain the general presumption against development on greenbelts and designated green belts.

### 3.2 City Center

Development authority to designate urban green space in development plans. Action to be taken to clean up land and bring all contaminated land back into beneficial use. Policy to be introduced stating that no land should be left vacant and should instead be utilized to grow vegetation by the site owners. This will bring in awareness among the public about the importance of greening Bangalore.

### 3.3 Infrastructure and Development

Control the environmental impact of transport. Control the effect of transport on air quality. Plan for sustainable transport system. Create comprehensive green pedestrian routes around and/or across Bangalore. Give priority to the needs of pedestrians and cyclists in urban development and highway projects. All future developmental projects should prioritize walking, cycling and public transport. Set a maximum standard of one car parking space per dwelling for all urban residential development. Impose tougher restrictions on the use of private cars, such as car parking charges and road pricing. Encourage patterns of developments, which reduce the need to travel by car. Use public, less polluting and more energy efficient modes of travel. Campaign for and promote public transports.

### 3.4 Waste management

Reduce the amount of untreated waste disposed to landfill and ensure that landfill practices conform to acceptable standards. Minimize waste by reusing, recycling, re-selling, recovering usable materials or generating energy from waste. Develop options for process improvements and minimization initiatives, recycling and assessing the efficiency of all aspects of waste management services. Increase the use of renewable energy. Reduce energy use and produce a renewable source of energy. Urban water resource management.

### 3.5 Urban Planning

Produce an integrated spatial master plan for area regeneration schemes. Adopt an integrated approach to design-led regeneration of different types of urban neighborhood. Design regeneration projects within a national urban design framework that is based on key design principles, land use planning, public funding guidance, and best practice guidelines. Control urban sprawl.

## 4. CONCLUSION

Comprehensive and integrated vision and action leads to the resolution of urban problems and seeks to bring about a lasting improvement in the economic, physical, social and environmental condition of an area resulting in urban regeneration and sustainable design.

## 5. ACKNOWLEDGEMENT

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