



# THE PLANNING STRATEGIES FOR URBAN LAND USE PATTERN: A CASE STUDY OF PUNE CITY, INDIA

Mrs. Rupali P Zope<sup>1</sup>

Assistant Professor, Civil Engineering Department, Symbiosis Institute of Technology, Pune<sup>1</sup>

**Abstract:** Urbanization, one of the important factors in the development of the countries, has really crated some negative impacts on the cities. The rapid and haphazard growth of the major cities in India generates numerous problems in the country. The further growth incorporates the haphazardly developed areas into the city leading to the imbalanced land use pattern. The growth of the cities normally extends more to the fringe areas and it creates the unplanned development of the cities. The development of the cities in the concentric pattern or radial pattern had raised the challenges for the planning of the cities. Pune, the cultural and education centre of Maharashtra, is also facing the problems. In the same context, because of the imbalance land use pattern, Pune city is facing problems of unequal distribution of physical and social infrastructure in the city.

**Keywords:** Urbanization, land use pattern, metropolitan cities, population growth.

## I. INTRODUCTION

The Challenges of Urbanization in India are unprecedented in scale and significance. It can be better understood by the proportion of population in India and the lack of social and physical infrastructure required to cater the needs of the target. The increasing number of slum pockets revels the imbalance effectively. In order to ensure competitiveness of our cities and ensure basic services to our citizens, urgent steps are required to harness the opportunity of scale of urbanization presents. Also, the efforts should be taken to avoid urban decay. The fast growing metropolitan cities in India has contributed negatively in the development process through different issues. Lopsided pattern of urbanisation and inadequate investments has led to serious deficiencies in urban infrastructure and services like housing, transport, water supply, sanitation and social infrastructure especially in small and medium size cities. This paper concentrates on one of such issues of land use. For the same, one of the fast developing Metro cities, Pune has been taken for case study. The future growth of any city normally extends towards fringe areas and it incorporates haphazardly developed areas into the city area. Also, the radial growing pattern of land use of the city and the supporting transport systems raises the problem of the “Ineffective Land Use Pattern” for the sustainable development of the city. The radial development of land use pattern results into the loss the green land section of the city. For the current research work, use of the spatial data parameters is considered as base for the development of Pune. Pune is predominantly ruled and developed by Maratha emperor as their capital and the city had commercial importance from those decades and further it has turned to be “Educational and Cultural Centre” for the country. Proximity to the commercial centre of India i.e. Mumbai has ultimately forced the Pune city to IT hub centre for the country. While this transformation, the haphazard development of the city radial in all directions created immense pressure on the provision of infrastructure. Several research works done in this area has given recommendations through different policies for the land use pattern through land reservations. But these recommendations feasibility with rapid growth of population needs to be analysed.

## II. AREA OF STUDY: PUNE CITY

Pune is the 8<sup>th</sup> largest metropolitan city of India and one of the most fast growing cities in India. From being known as a military cantonment, Pune has gradually evolved into a dynamic city of academic, cultural and economic importance, and to a business centre with a burgeoning software industry. Pune (180° 31' N, 730° 51' E) is a plateau city situated near the western margin of the Deccan plateau. It lays on the leeward side of the Sahyadri i.e. the Western

Ghats and is hardly 50 km from the crest of the Ghat country. It is 100 km east from the Konkan i.e. the west coast. It is almost 160 kms southeast of Mumbai, by road. It is situated at a height of 560m above the mean sea level, near the confluence of Mula and Mutha rivers. Two more rivers, Pavana and Indrayani transverse the northwestern outskirts of the urban area. Mula-Mutha later empty into the Bhima River. In a sense, the city is located in the upper Bhima basin. The city is surrounded by hills on the east and the south. The Sinhagad-Katraj-Dive ghat range is the southern boundary of the urban area. With the rapid urbanization, the city is facing lots of problems of social as well as physical infrastructure. The development pattern in the city is creating many problems for the future expansions. This research will focus on the land use pattern with growing population and the role of planning polices for the city.

### III. LANDUSE WITH GROWING POPULATION

Population Growth Trend and Spatial Distribution: The population of Pune city as per provisional figures of Census India, 2011 is more than 3 million. There is a growth of more than six times in the city’s population in the last 60 years, from 0.48 million in 1951 to 3.11 million in 2011; the decadal population and growth rate are given in the following table.

Table I: Demographic projections of the Pune city.  
Source: Census of India & Provisional figures of Census India, 2011

Year	Total population	Decadal change	Decadal growth rate
1951	488419	-	-
1961	606777	118358	24.23%
1971	856105	249328	41.09%
1981	1203363	347258	40.56%
1991	1691430	488067	40.56%
2001	2538473	847043	50.08%
2011	3115431	576958	22.73%

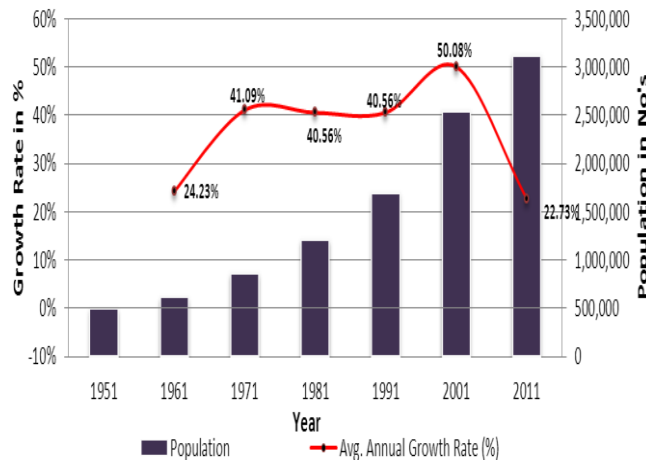


Fig. 1 : Demographic growth trend of Pune city from 1951-2011  
Source: Census of India & Provisional figures of Census India, 2011

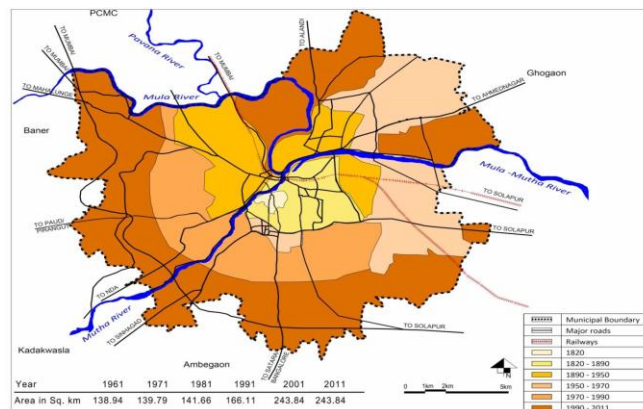
The graph of demographic growth trend of Pune city is showing steep decline from 50.08% decadal growth rate in 1991-2001 to 22.73% decadal growth rate in 2001-11 which may be due to the development of Pimpri-Chinchwad Municipal corporation (PCMC) as an industrial centre; Pimpri-Chinchwad may be considered as an emerging counter magnet to Pune city. The average decadal growth rate from 1951 to 2011 is 36.54%. Rapid growth of the city is mainly attributed to industrialization of PMC/PCMC after 1960 and expansion of information technology (IT) industry in the last decade.

IV. SPATIAL GROWTH PATTERN OF THE CITY

Development of Pune as a city commenced from 1818, with the city area being just 5 sq. km. In 1987 (when the last Development Plan was prepared), the area of Pune city was 146.11 sq.km; with the addition of adjacent villages in 1997, the current area of PMC jurisdiction is 243.96 sq km. The old Development Plan was revised in 1987. For the newly added areas, the PMC has prepared a separate new Development Plan. From a small area around Kasba Peth, Pune has grown dramatically; in 1958, small pockets of land in parts of the villages of Katraj, Dhankavadi, Lohagaon, Dapodi, etc. were added increasing the area within PMC’s jurisdiction. The last such annexation took place in 1997 wherein 23 villages with an area of 97.84 sq. km. were added to Pune city. As a result, the PMC area increased from 146 sq.km. to 430 sq.km. The new PMC area is now more than double the Chennai Municipal Corporation’s area. The chronological increase in the Pune Municipal Area has been given in table.

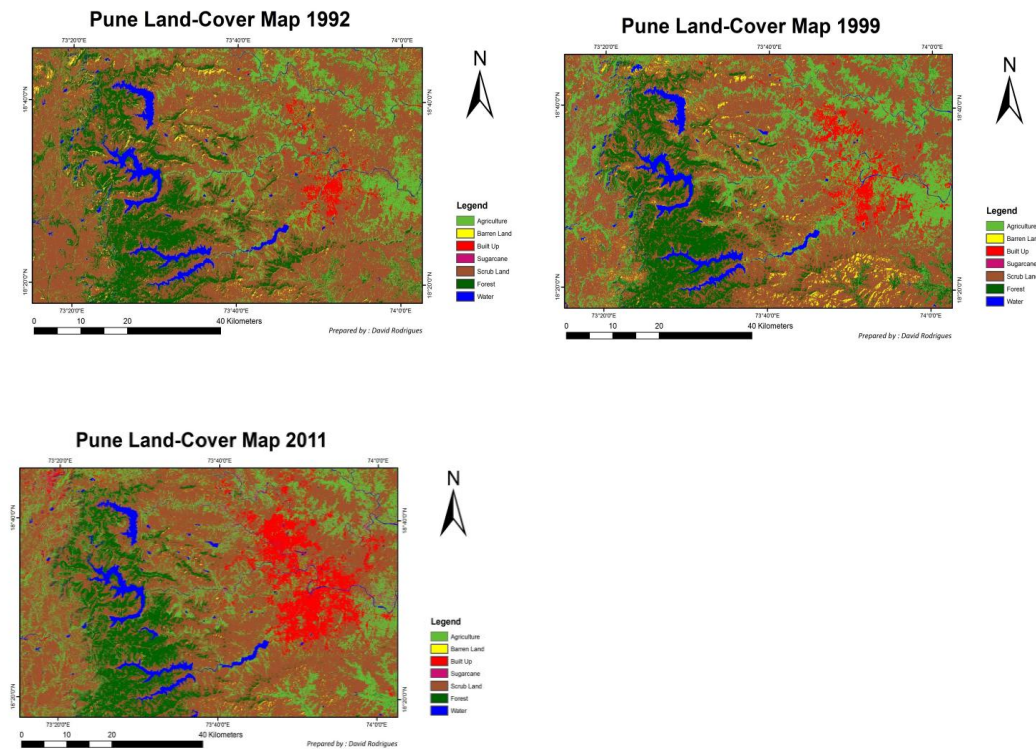
Table No. II Chronological Development of the area.  
 Source:Pune Development Plan Report.

Sr. No.	Year	Area (km <sup>2</sup> )	Sr. No.	Year	Area (km <sup>2</sup> )
1	1818	5.0	8	1975	138.90
2	1857	7.74	9	1981	145.92
3	1889	9.86	10	1985	146.95
4	1890	18.04	11	1997	138.38
5	1931	18.79	12	2001	243.96
6	1935	19.05	13	2011	430 (plus 23 villages)
7	1958	138.05			



Map No I: Chronological Development of Pune from 1820 -2011  
 Source: Town Planning Department, Pune- 2011

Above map shows the chronological development of the city from 5.0 m<sup>2</sup> to 430 m<sup>2</sup> of the Pune city.



Map No.II: Land-cover Maps of Pune City.

All the above satellite images show the increased built up area of the city in the red colour. The development of the built up area as per the third satellite image of 2011 reveals increase in built up area and decrease in the agricultural area. Most of the agricultural area at the outer periphery of the city has been converted into the non agricultural area by the real estate developers.

**V. LAND UTILIZATION AND LAND USE OF THE CITY AS PER PLANNING POLICIES**

The first town planning scheme was prepared for Shivaji Nagar in 1918 and a Master plan was prepared in 1952 for the Pune city. The first Development Plan (DP), for PMC was prepared in 1966 (10 year horizon till 1976) in accordance with the new legislation that is the Maharashtra Town and Country Planning Act, 1966. Revision was made in 1982 which was sanctioned by the Government of Maharashtra in 1987. The second DP was prepared for horizon of 20 year (to be valid till 2007) for PMC area of 138.36 sq. km. In 2001, PMC jurisdiction was extended by merging 23 neighbouring villages (in parts) and DP was exclusively prepared for this fringe area for a horizon of 20 years (valid till 2021). The combined percentage distribution for various land utilization categories is presented in the following Figure.

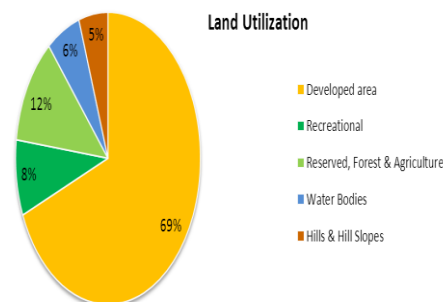


Fig. III : Land Utilization - PMC (1987 DP +2001 DP)  
Source: DP 1987; City sanitation plan, PMC

As per the development plan prepared in 2001, the residential land use has increased to 50%. Considering the growing demand of housing, the newly added areas have been utilized for residential use. Following chart shows the land use classification of PMC as per development plan 2001.

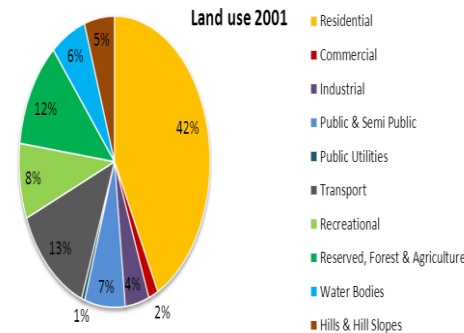


Fig. II : Land use Distribution – Pune City  
Source: DP 1987; City sanitation plan, PMC

With this increased pressure on the land use characteristic of the city, the city is facing different types of threats for the future development.

## VI. PLANNING STRATEGIES FOR PUNE CITY

To overcome all the problems encountered in development process, several fields are identified as follows:

- Lack of proper planning increases encroachments on hill tops and slopes and illegal construction on agricultural land.
- Driving forces such as economic activities, guiding and controlling future development of the city.
- Identification of potential areas for undertaking urban redevelopment projects.
- Population pressure due to migration has led to the haphazard development and varied infrastructure growth.
- Physical development and growth, both, in residential and industrial areas, is haphazard and uncontrolled. Fringe areas need to be developed to avoid ill organised growth.
- IT development in the city is not matching the rapid residential development, with increased migrants for education and employment to the city; demand for rental housing is high.
- Congested core area with limited scope of land reservation and population density in the core areas is very high.
- Unequal distribution of social infrastructure and land allocation.
- Increase in traffic congestion, speed reduction, environmental pollution and degradation in the quality of life, urban congestion due to unprecedented growth in motorized vehicles which is further aggravated by the interstate truck movement that cuts through the Pune City.

With all these issues, there are other numbers of issues which are inter-related to the above stated problems in the effective land use pattern.

## VII. RECOMMENDATION

With all the above stated issues, the Pune city is having a potential to be a World class city which can play a major role in the economic development of the country. For the same, following recommendations can be implemented.

- Developing compatible and integrated land use plan.
- Variable FSI in city limits average up to 3FSI.
- Equitable social infrastructure.
- Redevelopment/renewal of core city by framework of impact analysis and reporting when applying for building or redevelopment permission.
- Providing zones & policies for informal sector commercial activities.
- Integrate land use and transport planning.
- Effective traffic and transportation system.
- Effective planning and management of water demand system.
- Good co-ordination between PMC and public partnership development like township project.

### VIII. CONCLUSION

For the survival of Pune as a Metropolitan city, the sustainable development of the city through the effective land use pattern is really a challenge in front of the governing and implementation systems. The complete balanced development in the physical and social infrastructure of the city will be further a great help for increasing the economic base of the city. Also, provision of potable water supply, solid waste management, sanitation, mass transportation system should be the priorities for the planning agencies.

### REFERENCES

- [1] Tanvi Kulkarni [2008] "JNNURM: Works, Achievements and Problems in Pune."
- [2] PMC [2013] "Draft Development Plan for Old Pune City".
- [3] Revised Action Plan For Control Of Air Pollution In Pune (PDF). Census of India, Government of India (2001) Maharashtra Pollution Control Board, Retrieved on 2008-12-29.
- [4] Census of India, (2011) <http://www.censusindia.net>.
- [5] Prenzel, B. (2004) "Remote sensing-based quantification of land-cover and land-use change for planning" *Progress in Planning*, v.61, pp.281–299.
- [6] Sulochana Shekhar. "Changing Space of Pune – A GIS perspective GIS@ development Map World Form, Hyderabad, India." Paper Ref NO: MWF PN 116.
- [7] Vaidya, C., (2009) "URBAN ISSUES, REFORMS AND WAY FORWARD IN INDIA" 2009-DEA.