



SPATIO-TEMPORAL CHANGING PATTERN OF LANDUSE IN PUNE METROPOLITAN REGION(PMR) AFTER THE ESTABLISHMENT OF INFORMATION TECHNOLOGY (IT) INDUSTRY.

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Abstract:

The development of IT industry is bringing the world very close and responsible for the development of the region. Pune is one of the cities in India where the first IT Park was developed. These new types of industries not only changing the face of urban areas but also the fringe areas. The industrial development is the major factor for the growth of PMR. The topic is chosen to identify the landuse changes and search the relationship between the two. Several industries like Infosys, IBM, Kanby are growing in the fringe zone of the city, due to which agricultural area is converted into settlement and industrial sheds and The prices of land have gone high due to expansion of IT industries. The secondary information collected from Municipal Corporation offices of PMC and PCMC, Census District Handbook to find out the change in landuse pattern in PMR. It will not the overstatement that the IT industry has been caused to changed the landuse pattern in and around the areas of IT parks

Introduction:

The growth of IT industry has been observed since last two decades therefore the landuse pattern has been changed in PMR. Such changes observed especially in the last two decades. Over the years the fringe villages areas have been included in the PMR area due to the increasing population and industrial development. Future growth of PMC will be mainly governed by existing and future transport corridors, industrial developments in and around PMC and the expansion of Central Business District (CBD). Spatial growth of PMC will taken place to the surrounding areas as these are emerging as of the employment nodes. Few areas in PMC area will be commercially develop overcrowded and the out migration is expected in these areas towards fringe areas. This out migration is observed because of the IT industrial development in the fringe areas invite the new constructions and commercial buildings with the desire amenities of It employees.

Objectives:

- 1) To find out the change in landuse pattern before and after development plan prepared by The Pune Development Plan committee.
- 2) To search the correlation of spatio temporal change of PMR before and after Information Technology (IT) industry.

The Study Area:

Pune is one of the emerging IT industrial hub which attracting the skilled people from all over India and inviting foreign companies to invest in IT sector. Pune city lies between 18° 25' north to 18° 37' north latitude and 73° 44' east to 73° 57' east longitude. Industrial and IT hub, mild climate are the reasons that people desire to come and settle which increases the population resulted in increasing size of the city.

Database and Methodology

This study is based on Secondary data. The data used for this work is obtained from Pune and Pimpri Chinchwad Municipal Corporation Offices and District Census Handbook 2001. The spatial growth and the changed landuse pattern of PMC and PCMC is mainly observed from the Development

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Plan of 1987-2001 and 1986-87, 1997-98 respectively.

Results and Discussion:

General introduction of PMR:

Pune Metropolitan Region (PMR) consists of Pune Municipal Corporation (PMC), Pimpri Chinchwad Municipal Corporation (PCMC), Pune Cantonment Board (PCB), and Khadki Cantonment Board (KCB), Dehu Cantonment Board (DCB) and villages having area of 1,340 Km² in Haveli Tehsil of Pune district according to 2001 census. (Fig. No. 2.01. 2.03)

IT Parks in Pune:

Maharashtra Industrial Development Corporation (MIDC) has built five sophisticated IT parks in Pune:

1. Pune Infotech Park, Hinjawadi, Phase I (150acre)
2. Pune Infotech Park, Hinjawadi, Phase II (500acre)
3. Pune Infotech Park, Hinjawadi, Phase III (850acre)
4. Talawade Software Park (187.5 acre)
5. Kharadi Knowledge Park (675 acre)

Spatial growth of Pune:

PCMC MIDC is fully developed and will continue to attract PMC citizens for jobs. Hinjawadi Phase I and II are attracting major investments while Phase III and IV are in the planning stage. After establish of IT, the space encircled by PMC, PCMC and Khadki was having rural area, has been allotted to IT and thus the townships like Hinjawadi IT Park I and II have been emerged within the period of 10-15 years. All these existing and future industrial developments are well connected with PMC through old and new NH-4 and Mumbai-Pune expressway through city roads such as Pashan Road, Sus Road (SH-57), Baner Road, Karve Road and Sinhagad Road. For future expansion of PMC in the west, north west, and north, Baner, Balewadi, Sutarwadi, Pashan, and Aundh would be the residential area.

Table No.1 Spatial growth of Pune city and Pune urban areas

Sr. No.	Year	Area (Km ²)		Reason for expansion
		Pune City	Urban Area	
1	1817	5.0	N.A.	N.A.
2	1860	7.6	34.71	Formation of Pune Municipality, establishment of Pune and Khadki cantonments.
3	1940	18.84	81.95	Establishment of Dehuroad cantonment
4	1950	125.75	188.86	Pune Municipal Corporation formed
5	1970	138.76	266.88	Pimpri - Chinchwad Municipal Council established
6	1982	146.00	314.11	Pimpri - Chinchwad Municipal Corporation formed
7	1997	430.00	669.3	Merging of 38 & 18 fringe villages in to Pune and Pimpri Chinchwad Corporations respectively.

Source: PMC, CDP 2006-2012)

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Pune is defined as a metropolitan city occupied area of 669.3 Km² with the population of 31 lakh in 2011. In 2001 the large proportion of the total population was from the age group of 24-35. This may be due to the immigration. The increasing IT industries providing the opportunities to the skilled people so it can be said that the migration to Pune will be continue. The natural growth is low and migration is the significant factor for the increasing population.

In the period of 15 years, the 38 fringe villages included in PMC and 18 villages merge into PCMC area and the total urban areas have been almost doubled i.e. 669.3 Km² The process of merging villages in the fringe zone continues to expand the urban area upto 669.3 Km² in which Pune city has occupied to be 430 Km² and PCMC has occupied 171.51 Km² The population growth was so high that areal expansion of PMR continues till recent past. (Table No.01)

Change in landuse:

It is important to observed change in urban landuse as well as rural landuse in the surrounding villages due to the rapid growth of the city. The Pune Development Plan committee has prepared the draft plans from time to time to minimize environmental degradation. However some changes have been made due to increasing demand and socio-political pressure.

Table No. 02. Landuse change in Pune Metropolitan Region

Sr. No.	Landuse category	Area under each category (%)	
		1967	1998
1	Settlements	17.33	41
2	Agriculture	61.26	42.11
3	Watersheets	2.25	2.25
4	Hills and Forest	7.64	7.64
5	Grassland and scrub	11.52	7
Total		100	100

(Source: PMC CDP 2006-2012)

The Development Plan prepared for PMR in 1967, in which 61.26% area of total land was under agriculture, 17.43% under settlement, 11.52 % areas under grasslands and scrub. In 1998 the area under agriculture has been decreased but the land under settlements increased tremendously and it reached to 41% .The landuse of water sheets and hills and forests was same in 1967 and 1998. The land under agriculture has been decreased and the lands under settlements have been doubled. (Table No.02)

Most of the vacant lands close to the roads have been used for residential purpose or construction. The open lands are converted into Malls, hotels, shopping complex. The outskirts area of the city turned into big townships, new colonies, institutions and apartment complexes. Presently the land values are increasing not only in the city areas but also in the fringe areas because of the great demand of houses.

Table No.03. Landuse pattern of PMC area

Sr. No.	Landuse Pattern	1987 DP	2001 DP	Total	1987 DP	2001 DP	Total
		Area Km ²	Area Km ²	Area Km ²	%	%	%
1	Residential	50.58	53.16	103.74	36.55	50.35	42.52
2	Commercial	2.35	1.57	3.93	1.7	1.49	1.61
3	Industrial	7.26	2.62	9.88	5.25	2.48	4.05
4	Public and semipublic	15.22	1.45	16.67	11	1.37	6.83
5	Public utilities	1.38	-	1.38	1	-	0.57
6	Transport	22	9.81	31.81	15.9	9.29	13.04
7	Reserve forest and Agriculture	2.35	26.7	29.05	1.7	25.29	11.91
8	Water bodies	12.04	2.48	14.52	8.7	2.35	5.95
9	Hills and Hill slopes	12.45	-	12.45	9	-	5.10
10	Recreational	12.73	7.79	20.52	9.2	7.38	8.41
Total		138.38	105.6	243.96	100	100	100

(Source: PMC CDP 2006-2012)

In 1987 the total land under PMC limit was 146 Km² In 2001, 23 neighboring villages merged in PMC area and the total area has become 430 Km² The landuse pattern shows that around 43% of the area was residential, 2% is under commercial zone, 4% under industrial zone and 16% under public or semipublic and recreational use (Census 2001). As per 1987 Development Plan (DP), the residential zone was 36.56% which increased to 50.35%. The area under industrial use decline from 5.25% to 2.48 %.

The landuse pattern of PMC according to the development plan is depicted in the table (Table No.03) shows clearly that maximum area is devoted to residential purpose. The both city development plans 1987 and 2001 have acted and added residential areas in the metropolitan region by 103.74 Km² It is also worth seen that area covered by hills and hill slopes is maintained to just 5% of the area. The area devoted to public utility is very small that is 0.57% as 2001 development plan could not add any area. The development plan of PMC in 1987 and 2001 is shown the changes.

At the time of Development Plan prepared in 1987, the total area under PMC was 138.38 Km², in which the addition of 105.58 Km² was in the developed plan prepared in 2001. The data shows that nearly about 40% is the residential area. In 1987 the area under industries 5 % and in the new plan only 2.5% area was given to industries. The less area was reserved for commercial, public and semipublic and transportation.

The area under reserved forest and agriculture 5% area is under water bodies which are not sufficient for the growing number of population. The increasing population is responsible for the increasing number of vehicles, only 13% area is under transportation.

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The eye catching change in landuse is observed in residential area. In the 1987 DP, it was 50.58 Km² which has been doubled in Development Plan 2001, i.e. 103.74 Km² Compare to commercial purposes there is less development in industrial area.

Table No.04. Landuse pattern of PCMC area.

Sr. No	Landuse Pattern	Old area (Sq.km) 1986-87	New area (Km ²) 1997-98	Total Area (Km ²)	Old Area %	New Area %	Total Area %
1	Residence	10.1	22.3	32.4	11.74	26.39	19.05
2	Commercial	0.4	0.2	0.6	0.46	0.24	0.35
3	Industrial	10.9	0.8	11.7	12.67	0.95	6.86
4	Public & Semi Public	0.9	0.8	1.7	1.05	0.95	0.96
5	Public Utilities	0.4	0.4	0.8	0.46	0.47	0.47
6	Transportation	4.2	2.4	6.6	4.88	7.81	3.87
7	Garden	0.7	0.01	0.71	0.82	0.01	0.42
8	Water bodies	1.9	0.8	2.7	2.22	0.95	1.58
9	Agriculture	26.3	33.3	59.6	30.58	39.4	34.95
10	Quarry	0.2	1.1	1.3	0.24	1.3	0.76
11	Vacant	30	19.2	49.2	34.88	22.72	28.85
12	Forest	0	2.5	2.5	0	2.96	1.47
13	Software Park	0	0.7	0.7	0	0.83	0.41
Total		86	84.51	170.51	100	104.98	100

(Source: PCMC, CDP 2006-2012)

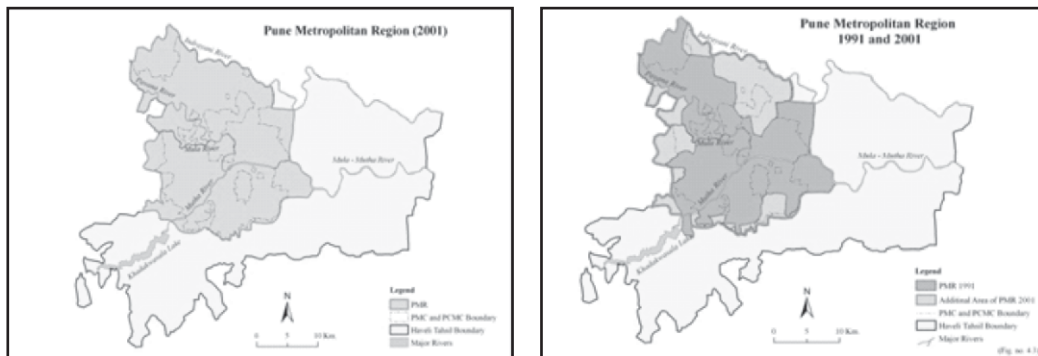
In 1986 after the PCMC was formed the total area was 86 Km². In 1997 the inclusion of 84.51 Km² areas of 18 villages merged into old PCMC. The total area is 170.51 Km² In the new extended area 26% area is under settlement which is doubled than the previous plan. PCMC area is developed and established because of the industrial development. But in the new plan it is only 0.9% which is only 10% of the previous plan.

In the old plan there was no land for forest and Software Technology (ST) Park. But in new plan 2.96% area is under forest and 0.83% area is for ST Park. The area under transportation has been increased from 4.8% to 7.8%. (Fig. No. 04) Though the area is industrially developed 33% area is

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under agriculture and 19% area is vacant. The highest proportion of land is under agriculture and residential and very less, only 1% area is allotted for industrial use.

IT industries have been started establishing after 1990 hence it can be said that IT industries are the major factor for the development of the region and increasing the size of total PMR (Table No.04). It was expected to have population of PMR to be 42 lakhs however in reality it exploded to 50 lakh(Census2011).



Conclusion:

- 1) The change in land use mainly in residential purpose has been increased in the 2001 Development Plan than the 1987 Development Plan.
- 2) The agriculture area has been decreased. Open lands converted into construction of big townships, malls, shopping complex, multiplex etc.
- 3) IT employees have sufficient purchasing power to buy luxurious flats and apartments. It can be stated here that the boom for construction industry may be significantly due to IT employees migrated from different states.

IT is a fact that the growth of the city and changes in the functional zones etc. have not been caused entirely due to IT industry. However it may not be overstatement to state that such changes are observed mainly after introduction of IT industry in Pune and hence the significantly associated with it.

The data regarding area under various urban functions and the land use change in the development plans shows the change in land use. The growth of IT industries increased the demand of houses and infrastructure facilities due to which the more area was brought under the residential and other services. So it can be said that the growth of IT industry is the major reason of increase in land use.

References:

1) **Census District Handbook 2001**

2) PCMC (2006): "Pimpri-Chichwad Development Plan 2006-2012", JNNURM Vol. 1.

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