

Research Paper

CHANGING LAND USE PATTERN: A CASE STUDY OF KHED TAHSIL OF THE PUNE DISTRICT, MAHARASHTRA STATE

Dr. Virendra Nagarale,
Reader and HOD,
S.N.D.T. Women's University,
Pune -38

Mrs. Ratnaprabha S. Jadhav,
Assistant Professor,
C.T. Bora College, Shirur,
Dist.-Pune

ABSTRACT

Land use is the application of human controls in a systematic manner, indicating an intimate relationship between prevailing ecological conditions and man (Morepatil, 1995). The study of land use change is of vital importance for future land use planning and development of the area. Therefore the study of land use and its change has been carried out by many researchers and geographers at national and international level. Present work focuses on the assessment of the relationship between population growth and land use change, urbanization growth and general land use change over five decades (1960-61 to 2009-10) in a Khed tahsil of Pune district.

The land use of any area doesn't remain static, but it is an ever changing phenomenon. The study area has also been experiencing the dynamic land use change due to high population growth in Chakan, Khed and Alandi urban areas, expansion of Chakan MIDC, development of road transportation, acquisition of land for SEZ, market facilities etc. It has been observed that growth of population is increased 2.07 times while urbanization is increased 17.85 % during 1971 to 2001. Forest area has decreased by 0.96 % since 1970-71 to 2000-01. It had only 14.61 % area under forest in 2001. Cultivable waste land (6.21 %) and Fallow land (0.43%) have increased during 1990-91 to 2000-01. Land put to non-agricultural use, barren and non cultivable land and net sown area have declined by 0.07%, 3.04% and 4.75 % respectively during the span of five decades. Thus land use is of prime importance study area.

Introduction:

Land use is the surface utilization of all developed and vacant land on a specific point at given time and space (Mandal, 1982). Physical as well as non-physical factors determine the land use of any area. Population growth and urbanization growth are the non-physical determinants of the land use. Hence for the present study it has been attempted to study the land use and changes in it at Tahsil level for the period of 1960-61 to 2009-10 by taking into account the population and urbanization growth.

Objective:

The objective of this present study is to assess land use change over five decades (1960-61 to 2009-10) and its relation to population and urbanization growth on land use changes in Khed tahsil of Pune district particularly in the period from 1961 to 2010.

The Study Area:

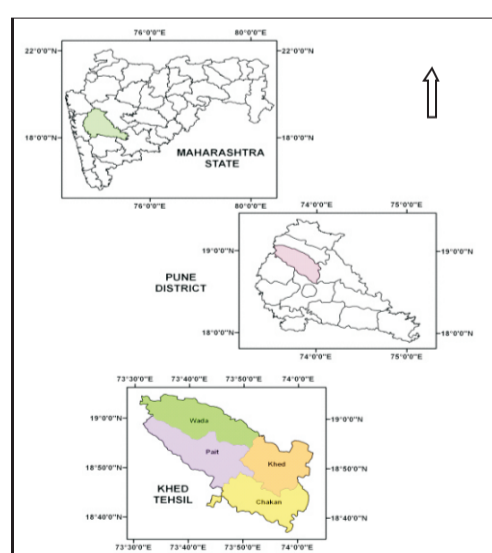


Fig. 1

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Location of study area is shown in fig 1. Khed tahsil is one of the tahsils of Pune district consisting of four agriculture revenues, 188 villages and only 3 towns. It lies entirely in the Bhima and Bhama basins which is between 18°37'06"N to 19°04'51" N latitudes and 73° 31' 24" E to 74°02'46"E longitudes. The geographical area of the study region is 1423.12 sq. kms. This tahsil situated on the north and northwest side of Pune district and it is bounded on the north by Ambegaon, on the south by Haveli, on the east by Shirur, by Maval tahsil and Thane district towards the west. It experiences typical monsoon type of climate with cool, hot and rainy season. Geologically the entire study area is underlined by basalt rock and horizontally bedded lava flows commonly referred as "Deccan Trap". The medium black soil, red and yellow soil appears in this region.

Materials & Methods:

An attempt is made to examine the changes that have occurred in land use during the last 50 years (1960-61 to 2009-10). For the present study data of six major categories of land use have been analyzed. The main body of the data used in this study is obtained from secondary source that is socio-economic abstract of the Pune district and Khed Tahsil Office. The data about population and urbanization is obtained from District Census Handbooks, Pune. Statistical tools like percentage, average etc. have been used in the study. The data of population, urbanization and landuse pattern is represented by using simple line graph and multiple bar graphs.

Results and Discussion:

Growth of Population and Urbanization:

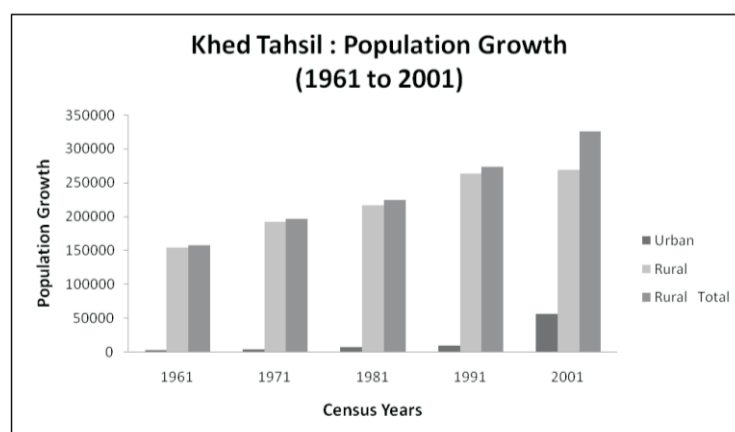
Mohammad Noor (1973) explained the increasing pressure of population is one of the cultural causes of land use change . Table No.1 shows the population of Khed tahsil and its variation at each census from 1961 to 2001. The population has gradually increased from 1961 to 2001. During this period population increased by 1,68,421 in the study region with an average of 20.04 % decadal growth. It is clear that population is growing at a rapid rate in the decade 1961-71 and 1981-1991, but there is decrease in growth rate of

Khed Tahsil: Growth in Population, Density & Urbanization (From 1961 to 2001)

Census Year	Population		Total	Decadal Growth (%)	Population Density		Urbanization	
	Rural	Urban			Density (Sq.k.m)	Decadal Density Growth (Sq.k.m)	(%)	Decadal Growth (%)
1961	154041	3187	157228	---	110	----	2.03	----
1971	192292	4788	197080	25.35	138	28	2.43	+0.4
1981	216840	7523	224363	13.84	158	20	3.25	+ 0.92
1991	263306	10249	273555	21.93	192	34	3.75	+ 0.38
2001	268768	56881	325649	19.04	229	37	17.46	+ 13.71

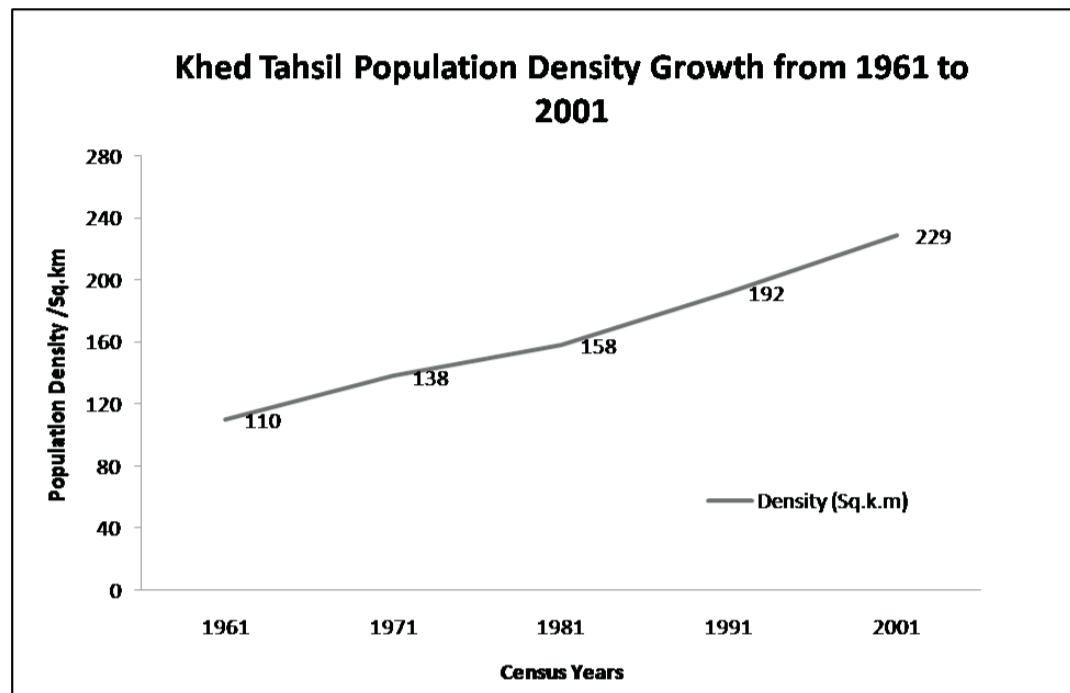
Table 1 (Source: Pune District Handbook and Researcher 1965-66,1972-73,1982-83,1995-96, 2006-07.)

population in 1971-1981 and 1991 -2001. Population of Khed tahsil has grown 2.07 times from 1961 to 2001. The problem of over population is the worldwide phenomena. Rapid population growth has resulted the depletion of natural resources all over the world. Since land and other resources are fixed and cannot be expanded, the ever increasing population is creating continuous pressure on the available resources (Sharma, 2007). According to 2001 census the population of Khed tahsil was 3.25 lakh, spread over its area of 1423.13 sq. km. giving the overall density of 229 persons per sq.km. The density of population during the study period increased by 119 persons per sq.km.(Table 1. and Graph 2).



Graph 1.

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The high decadal growth in population density is observed in decade 1991 to 2001. As per 2001 population census, Alandi, Chakan, Rajgurunagar, Mendankarwadi had more than 1000 persons density in 2001. The high density is mainly observed in the parts of the Khed tahsil where the industrial development, improvements in transportation network, urbanization, availability of Chaskaman and Bhama Askhed irrigation projects and agricultural development are the important factors of that influence the density of study area.

Mohamed Ait BELAID, Baharin (2003) explanation on the effects of urbanization on urban rural landuse changes can be applied to this study area. In study area, Chakan has not only M.I.D.C. area and a big onion market, but also has a [Special Economic Zone](#) (SEZ). Network of road transportation is well developed at Rajgurunagar, Chakan, Alandi, Pait and Pimpalgaon Tarfe Khed. The proposed Pune International Airport is going to be constructed near Chakan circle. As a result, a number of small scale industries are located in Chakan and surrounding areas. Alandi is a pilgrimage centre, a municipal council and well connected to Pimpri-Chinchwad Cantonment area by road ways. The maximum urbanization is observed in the areas where the road network is more developed such as Rajgurunagar, Chakan, Alandi Municipal Council, Mendankarwadi, Nanekarwadi and Kharabwadi. As a result of it, urbanization in Khed tahsil increased from 2.03 % to 17.46 % during 1961 to 2001 and it is shown in Table No.1 and Graph No.2. During the study period, urbanization increased by 15.43 %. It increased maximum in decade 1991 to 2001. As a result the migration of rural population is more in this urbanized area.

Land use Pattern

Land use is a primary indicator of the extent and degree to which man has modified the land resources. It is the application of human controls in a systematic manner, indicating an intimate relationship between prevailing ecological conditions and man (Vink, 1975). The land of the study area is grouped into six major categories viz. (1) Forest (2) Land put to non-agricultural uses (3) Barren and non-cultivable land (4) Fallow Land (5) Net Sown Area and (6) Cultivable Waste Land. The table no. 2 shows the trends of these landuse categories in the study area.

Forest:

Forest is not only essential for their products, but also their role in maintaining the significant ecological equilibrium in the region (Suryawanshi, 2010). For maintaining the balance of the environment at least 33 % of total geographical area should be under forest. But Khed tahsil had only 13.39 % area under forest in the first decade (1960-61 to 1970-71) and 14.61 % area in 2000-01. It indicates that there is slight and continuous increase by 1.22 % during these four decades. The area under forest decreased by 1.58 % from 2000-01 to 2009-10 due to the industrial development and Innercon Wind Mill Project in Pait Circle.

Land put to non-agricultural uses:

This category includes the land occupied by the buildings, roads, railways, factories, villages, towns, water bodies, playground etc. It occupied 1.52 % of the total area of the Khed tahsil in 1960-61. Land under this category was 1.52 % in 1960-61 and only 0.94 % in 1970-71. It means during first decade area under this category is decreased by 0.58 %. The proportion decreased to 0.98% in 1980-81, but after 1981, it started rising and reached to 2.59 % in 2010. During the study period the total increase in this area is 1.07 %. This change is due to rising population, development of road network and increase in built up area.

Barren and non-cultivable land:

Barren and non-cultivable land includes outcrops of hills and mountains. This land is associated with poor soils, heavy rainfall and instance erosion (Vaidhya, 1997). Out of the total geographical area, the study area had 8.52% and 5.48% area in 1960-61 and 2000-01. Area under this category was decreased upto 5.14 % in 2009-10. During these five decades it has rapidly decreased by 3.38% in the study area. The arable land is occupied by backwater of Chaskaman and Bhama-

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Khed Tahsil: Landuse Pattern in % (1960-61 to 2009-10)

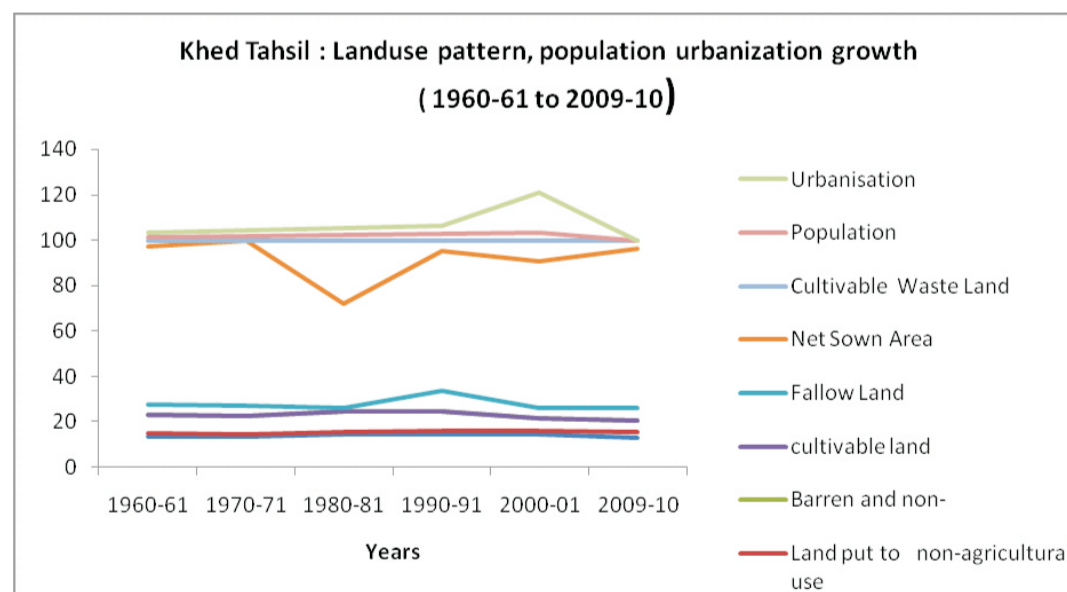
Sr. No	Landuse Categories	1960-61	1970-71	1980-81	1990-91	2000-01	2009-10
1	Forest	13.39	13.39	14.56	14.52	14.62	13.03
2	Land put to non-agricultural use	1.53	0.96	0.98	1.34	1.45	2.59
3	Barren and non-cultivable land	8.52	8.41	9.35	8.98	5.48	5.14
4	Fallow Land	4.37	4.33	1.53	8.88	4.82	5.43
5	Net Sown Area	69.5	72.91	45.85	61.53	64.73	70.36
6	Cultivable Waste Land	2.69	--	27.73	4.75	8.90	3.45
Total		100	100	100	100	100	100

Table No.2 (Source: Pune District Socio-Economic Abstract, 1963-64, 1983-84, 1992-93 & 2003-04 and Khed Tahsil Office)

Trends in General Landuse Pattern in Khed Tahsil (From 1960-61 to 2000-01)

Sr. No	Land use Categories	1960-61 to 1970-71	1970-71 to 1980-81	1980-81 to 1990-91	1990-91 to 2000-01	2000-01 to 2009-10	1960-61 to 2009-10
1	Forest	0.0	+1.17	+0.04	+0.1	-1.59	-0.36
2	Land put to non-agricultural use	-0.57	+0.02	+0.36	+0.11	+1.14	+1.06
3	Barren and non-cultivable land	-0.11	+0.94	-0.37	-3.5	-0.34	-3.38
4	Fallow Land	-0.04	-2.8	+7.35	-4.06	+0.61	+1.06
5	Net Sown Area	+3.41	-27.06	+15.68	+3.20	+5.63	+0.86
6	Cultivable Waste Land	2.69	27.73	-22.98	4.15	-5.45	+0.76

Table No.3 (Source: Researcher)



N.B. Land use pattern , urbanization in %, Population in Lakh

Graph no. 3

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Fallow Land:

The term fallow is applied to the lands not under cultivation at the time of reporting but has been sown in the past (Morepatil). Fallow land has increased from 4.37 % to 4.8 % during 1960-61 to 2000-01 (Table No. 3 and graph No.3). In the decade 1980-81 to 1990-91, the fallow land was increased with a high rate of 7.35 % and in the last two decades the fallow land increased with a low rate. The highest percentage of fallow land was 8.8 % in 1990-91. After 1990 the fallow land is reduced till 2009-10 because such land is utilized for the extension the Chakan MIDC, for the construction of warehouses and residential purpose in Chakan and Khed Circle and for the agricultural activities in Pait and Wada Circle.

Net sown area:

Net sown area refers to that part of the cultivated land on which sowing is actually done at least once during a year (Dhian,1991). The net sown area includes the land actually under the food, cash and fodder crops. Area under this category was 69.5 % and 72.91% respectively in the year 1960-61 and 1970-71. The notable decrease of 27.73 % due to severe drought and it was observed in the decade 1970-71 to 1980-81 that was 27.73% due to severe drought condition. There is a sharp change in 1990-91. The net sown area has increased by 5.63 % due to the intensive cultivation in the decade 2000-01 to 2009-10. In spite of growth of population and urbanization, the net sown area has gone up.

Cultivable Waste Land:

Cultivable waste land refers to the potential land over which cultivation can be extended with some effort. Due to these negative factors, this category of land has become un-economic and un-productive (Dhian Kaur, 1991). These lands can be brought under cultivation if they are provided with cultivable facilities (Rayamane, 2001). The cultivable waste land comprised 2.69% of the total area of the Khed tahsil. It was increased upto 8.90% during 2000-01. The tahsil had considerably high proportion of its area under cultivable waste land in 1980-81, it was 27.73 %. During these five decades, there is a lot of fluctuations in cultivable waste land.

Conclusion:

It is concluded that the growth of population and urbanization is continuously and steadily increasing in the study area. The population increased 2.07 times during 1961 to 2001. The average decadal population growth from 1961 to 2001 was 20.04%. The density of population increased from 112 persons per sq. km to 229 persons per sq. km. To reduce the high pressure of population on land, the decentralization of small scale industries is essential in this study area.

All the urban facilities like transport, daily market, educational and medical facilities are available at Rajgurunagar and therefore rural people are attracted in this urban area. Chakan M.I.D.C., Special Economic Zone (SEZ) and onion market have become the attraction for rural people. As a result, the migration of the rural population is high in this area. It increased the urbanization percentage by 2.03 to 17.46% during the study period. It has been observed that the general causes of spatial and temporal land use are growing population and urbanization.

Population and urbanization growth make the negative changes in forest and barren and non-cultivable land. The actual area under forest is very less as compared to the expected (33.33%) area. There is slight and continuous decrease in the area under forest that is 0.36 % during these five decades. For maintaining the environmental balance the area under forest should be increased.

The positive changes are observed in fallow land, land put to non-agricultural use, net sown area, cultivable waste land during the study period. Fallow land area is increased by 1.06 % during the study area. It is because of the availability of employment in small scale industries and the expansion of Chakan MIDC and SEZ area. Area under land put to non-agricultural use is increased by 1.06 % during the study period. It is observed that in urban area farmers utilized their land for building construction to earn stable income. The overall increase in net sown area is only 0.86 % and it is mostly in the urban and highly populated area particularly such as Chakan, Rajgurunagar, Alandi and the surrounding villages.

Cultivable waste land is used for the warehouses in the villages nearby Chakan, MIDC area and the villages near the SEZ area. Therefore, the cultivable waste land is increased by 0.76 % from 1960-61 to 2009-10. Most of the land use changes are observed in the villages which are located near the Rajgurunagar, Chakan industrial zone and in Alandi Municipal Council.

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