

# Chapter 2

## PHYSICAL CHARACTERISTICS

### 1.1 Landuse

#### Landuse Categories

Landuse depicts the use and pattern of land in the district. Hence, the landuse map acts as the most important map for planning and site allocation. Landuse pattern in different Taluka of the district has been shown in **Annexure 1**, Table 18. The landuse pattern in Pune district is described as below:

#### i Forests

The Landuse and Landcover Map of MRSAC, Nagpur (2001-02) show that the total land under forest is 3648 sq.km, which is 23.32% of the district (Table-III). Hilly portion of Western side of the district is covered by the forestland and includes Taluka Junnar, Ambegaon, Khed, Maval, Mulshi, Bhore and Velhe. Small patches of forestland are also found in Taluka Purandhar and Haveli. The Taluka Shirur and Daund are having negligible forest cover, whereas Taluka Baramati and Indapur has no forest cover. Major portion of Taluka Mulshi, Velhe and Bhore is covered by forestland. The talukawise village locations under different forest types are shown at **Annexure 1**, Table 31.

**Table I. Types of Forests and Land under Forest in Pune District**

Sr.No	Forest type	Area (sq.km.)
1.	Closed forest	1054.69
2.	Open forest	497.53
3.	Degraded forest	2095.77

Since no demarcated information of reserve forest could be available from source department, the area of reserve forest is earmarked from the SOI Toposheet No. 47E, 47I, 47J, 47N, 47F, 47O. It might be possible that, exact area of reserve forest may not match with the boundary of reserve forest, which is shown on the map. The total reserved forest in the district is 1598 sq.km (i.e. 10.21%) and major area falls in Taluka Khed, Maval, Ambegaon and Junnar. Details of talukawise area of reserve forest are given in below Table IV.

**Table II. Talukawise Area of Reserved forest in Pune District**

Sr.No	Taluka	Area (sq.km)	Sr.No	Taluka	Area (sq.km)
1.	Ambegaon	237.19	7.	Pune-City	4.34
2.	Daund	49.59	8.	Khed	310.33
3.	Bhor	143.65	9.	Purandhar	90.75
4.	Haveli	80.4	10.	Shirur	32.85
5.	Junnar	220.79	11.	Velhe	83.41
6.	Mulshi	75.48	12.	Maval	269.16
					<b>Total-1597.94</b>

According to the Conservator of Forest, Pune Circle, total area under forestland in the district is 1600.39 sq. km i.e. 10.22% (Excluding sanctuary areas). For the administrative purpose the forest area of Pune District is divided in three divisions viz. Pune, Junnar and Bhor. The details thereof are as below (Table V).

**Table III. The division wise details of forestland in Pune District**

Administrative division	Reserve forest	Protected forest	Unclassed forest	Total	% to district
Pune Division	604.10	0.030	87.38	691.51	4.42
Junnar division	547.44	--	27.22	574.66	3.67
Bhor sub-division	188.25	0.097	145.88	334.22	2.13
<b>Total</b>	<b>1339.79</b>	<b>0.127</b>	<b>260.48</b>	<b>1600.39</b>	
<b>% To district</b>	<b>8.56</b>	<b>0</b>	<b>1.66</b>		<b>10.22</b>

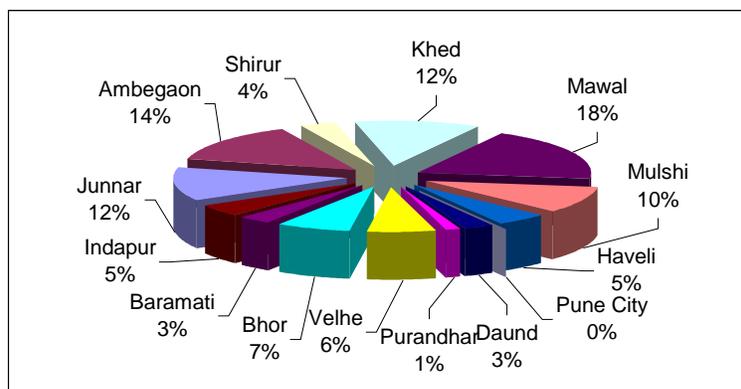
*Note: Areas in Sq.km.*

*Source: Conservator of Forest Department-Pune Circle, Pune (2003)*

In the district, certain reserve forest area is also under the jurisdiction of revenue department. Similarly there are private forests, which becomes as reserve forest as per the provision of Private forest (Acquisition) Act, 1975. These areas are not included in above Table.

As per the District Superintendent, Agriculture Department, Pune, the land under forest cover is 1,717.08 sq.km. The Fig 18 shows percent distribution of forests land in each taluka.

**Figure 1. Taluka wise distribution of forests land (%) in Pune district**



*Source: District Superintendent, Agriculture Office, Pune (2002).*

## ii Agriculture

Agriculture potential of a district primarily depends on nature and thickness of soil, terrain of land and amount and duration of rainfall. The mountainous terrain on the Western part of the district, the slopes at the base of the Sahyadrian ranges, the extensive plateau areas without a thick soil cover and lateritic soils have restricted the area under cultivation. Even the area that is cultivated suffers from infertile soil and deficiency of moisture as a large part of the Eastern portion of the district receives rainfall less than 500 mm. About 27% of the land in the district is under cultivation. The remaining area is either covered with forest, left fallow or classified as culturable waste.

The talukawise area under different landuse is shown in **Annexure 1**: Table 18. The table shows the area under Forest land is 1,71,708 ha, Barren and unculturable land – 1,04,226 ha, Land put to agricultural uses-62,938 ha, Culturable wasteland- 32,918 ha, Permanent pasture and other grazing land-65,577 ha, Land under miscellaneous tree crop-3,483 ha etc.

The land capability classes have been described under section 2.4.1. For land capability classification, the criterion used is as per the Agriculture Handbook. According to the classification the land in Pune district falls under Class-II, Class-III, Class-IV Class-VI and Class-VII (Table IX).

In the district, the area under cultivation during the *rabi* season is maximum for wheat i.e. 71,793 ha. Other crops include Gram - 43,680 ha, Safflower - 19,428 ha and for Jowar - 16,832 ha. During the *rabi* season, maximum land under cultivation is in Taluka Shirur, Junnar and Baramati i.e. 38,924 ha, 31,538 ha and 38,752 ha, respectively. The talukawise details are shown at **Annexure 1**: Table 19.

During *kharif* season, maximum cultivation area is in Taluka Khed (40,289ha) and Junnar (35,638 ha). In the district, during *kharif* season, the major crops grown are Rice (61,674 ha), Sugarcane (47,631 ha) and Groundnut (47,799 ha) whereas area under Cotton is Low (376 ha). The talukawise details are shown in **Annexure 1**: Table 20.

The total land brought under the horticulture in the district during the year 1990 to 2000 is 333.87 sq. km. Most of this area is located in Taluka Shirur (33.46 sq. km.), Indapur (38.52 sq. km.), Baramati (32.96 sq. km.) and Purandhar (35.43 sq. km.). The predominant horticultural plantations carried out during this period include Mango (149.94 sq. km.), Chikku (33.92 sq. km.), Pomogranate (31.34 sq. km.) and Custard Apple (35.89 sq. km.). The other plantations include Cashewnut, Orange, Tamarind, Lemon, Bor etc.

The maximum floriculture cultivation is in Purandhar Taluka (about 736 ha). Total area under floriculture in the district is about 2771 ha.

## iii Wastelands

Wastelands are the patches of land, which are not under productive use owing to some natural and external causes such as water logging, very high erosion, deposition of salts, very low or negligible soil cover, etc.

In Pune district, large portion of land, i.e. about 42.78% of the total area, is under wasteland category as per forest dept. Pune. Where as actual waste land area based on MRSAC Landuse map show area of 38.32% in the district. The taluka wise distribution of wastelands is shown in **Annexure 1**: Table 18.

### 1.1.1 Landuse Map

The Landuse Map (**Map No. 6**) gives an idea about the availability of land for industrial siting and the present use of that land. It tells about the environmentally sensitive areas viz. reserved forests, plantations, water bodies, wetlands, etc.

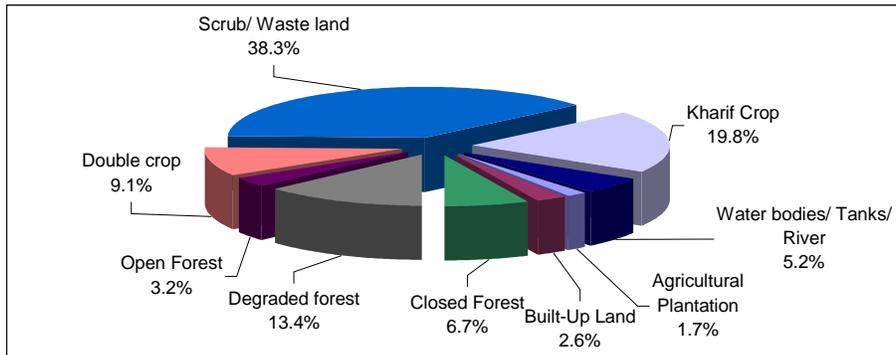
The landuse map has been prepared by MRSAC, Nagpur, based on satellite imagery (IRS-IC/ID, Sensor-LISS-III, Path row 95-59, 95-60, 96-60, Season: Kharif, Rabi and Summer 2001-02). This map shows the real landuse, which is in existence, whereas the legal landuse may be different. Also, the forest areas shown by the Forest Department, an authentic body defining forest areas may not match with the forest in the real landuse map prepared by MRSAC. The landuse distribution of the Pune District according to MRSAC, Nagpur is shown in below Table VI and its percentage in below Figure 19.

**Table IV. Landuse Distribution of the Pune district (Area in km<sup>2</sup>)**

Sr.No.	Landuse Pattern	Total Area
1.	Built-Up Land	401.63
2.	Closed Forest	1054.69
3.	Degraded forest	2095.77
4.	Open Forest	497.53
5.	Double crop	1422.57
6.	Agricultural Plantation	264.59
7.	Single Crop	3092.20
8.	Scrub/ Waste land	5995.39
9.	Water bodies/ Tanks/ River	815.63
	<b>Total</b>	<b>15640</b>

*Source: Landuse map - MRSAC, Nagpur (Based on satellite imagery 2001-02)*

**Figure 2. Distribution of Landuse (%) in Pune district**



*Source: Landuse map - MRSAC, Nagpur (Based on satellite imagery 2001-02)*

Pune District is having major portion of wasteland/Scrub land (i.e. 5995.39 sq.km.) which is spread in the Taluka Indapur, Baramati, Purandhar, Shirur and Haveli. Except Pune city and Haveli Taluka, land under residential and nonagricultural use is insignificant. The small patches of built-up/ settlement land is scattered in Taluka Baramati, Maval, Khed and Shirur.

The land under Double and Kharif crop is about 4514.779 sq. km. (i.e 28.9%) and is spread in all Taluka except Pune city. Also the small area of agricultural plantation (264.59 sq.km.) is spread in Taluka Haveli, Baramati, Daund, Junnar, Ambegaon and Indapur.

District is well served by rivers and the stream. Most of the waterbodies are found in the Western hilly areas of the district.

## 1.2 Physiography and Slope

### 1.2.1 Physiography

The district shows three distinct geographical patterns described as below.

#### i. The Hilly Area on the West

The district has 15 to 30 km strip of Sahyadri Mountains towards West known as "Ghatmatha". The peak of the Sahyadri Mountain is at Bhimashankar, Tal. Khed (1,420m above MSL). The famous tourist places "Lonavala" and "Khandala" are located in this physiographic area. Altitude of this area ranges between 500 and 1500 m above MSL.



Plate 1. Hills of Maval

#### ii. The Hilly and Undulating Area

Towards East of "Ghatmatha", 15-30 km belt is known as "Maval" which is hilly and undulating. A strip on the West of Taluka Junnar, Ambegaon, Khed, Bhore and Western & Central part of Taluka Maval, Mulshi and Velhe comes under this region. The altitude of this region ranges in between 100 and 500 m above MSL.

#### iii. The Eastern Plateau

On the East of 'Maval', remaining belt of plain is called "Desh". This area covers basins of the river Bhima and its tributaries. Central and Western part of the Taluka Junnar & Khed, half Eastern part of the Taluka Ambegaon, Eastern zone of Taluka Velhe, Mulshi, Bhore and Western part of the Taluka Haveli falls in this area. The area of Shirur, Daund, Baramati and Indapur Taluka is mostly plains.

### 1.2.2 Slope Map

The Slope Map (Map No. 7) has been prepared by MRSAC based on satellite imageries. Based on slope intensity, the district is classified into the following 6 zones: very steeply sloping (slope >50%), steeply sloping (30 to 50%), moderately steeply sloping (15 to 30%), moderately sloping (8 to 15%), gently sloping (3 to 8%) and very gently sloping (1 to 3%).

Based on the map, category wise areas have been shown in the Table VII below:

Table V. Area wise slope categories of Pune district

Slope Category	Area		Locations in the District
	sq.km.	%	
Very steeply sloping (slope >50%)	104.55	0.66	Very steep slopes occur in small parts of the Sahyadri hill ranges to the West of the district. The ridge area of Maval, Mulshi, Khed, Ambegaon and Junnar. Also a small narrow stretch in Taluka Velhe, Bhore and Junnar
Steeply sloping	2892.03	18.48	A major portion of the hill ranges in the Taluka

Slope Category	Area		Locations in the District
	sq.km.	%	
(30 to 50%)			Bhor, Velhe, Mulshi, Khed and Ambegaon have steep slopes
Moderately steeply sloping (15 to 30%)	424.94	2.71	Mulshi and Maval Taluka having major stretches of Moderately steeply sloping. Small patches are also scattered in Taluka Haveli, Pune-City, Ambegaon, Junnar and Shirur.
Moderately sloping (8 to 15%)	4482.04	28.65	Moderate slopes area are scattered in all the taluka. This cover major area of Taluka Purandhar, Baramati, Daund, Indapur, Shirur, Haveli and Junnar
Gently sloping (3 to 8%)	2811.29	17.92	Gently sloping area is scattered in all taluka of the district. It covers major portion of Taluka Indapur, Shirur, Khed and Ambegaon
Very gently sloping (1 to 3%)	4916.09	31.62	Very gently sloping area are scattered in all taluka of the District. This covers the major area of the Taluka Baramati, Indapur, Daund, Haveli, Pune-City and Junnar.

*Source: Slope Map, MRSAC-Nagpur*

## 1.3 Soil

### 1.3.1 Soil Types

On the basis of soil depth, drain, soil characteristics, slope etc. following soil types are identified in the district and shown in the Map No. 8. Table VIII shows the soil types and its location in the district.

**Table VI. Soil types and Geomorphology within Pune district**

Sr. No.	Soil Type	Locations in The District
1	Deep, Moderately Well drained, strongly calcareous, fine soils on gently sloping plains and valleys with moderate erosion.	Narrow stretches are spread in Taluka Ambegaon, Khed, Maval, Mulshi, Velhe, Haveli, Bhore, Purandhar, Baramati and Indapur along the river banks.
2	Slightly deep, well drained, fine, calcareous soils on very gently sloping lands with mesas and buttes with moderate erosion	Except Maval and Mulshi Taluka remaining all Taluka have this soil coverage. Which include major portion of Taluka Indapur, Baramati, Purandhar, Pune-City, Haveli, Daund and Shirur. A narrow stretches on the eastern side are spread in Taluka Junnar, Khed, Ambegaon and Velhe.
3	Very deep, well drained, loamy soils on gently sloping narrow valleys with moderate erosion	Patches are spread in Taluka Mulshi, Bhore and Velhe
4	Shallow well drained, clayey soils on gently sloping lands with mesas and buttes with moderate erosion and slight stoniness	Major portion of the district is covered by this type of soil. This include major portion of Taluka Maval, Khed, Mulshi, Velhe, Bhore, Purandhar Haveli and Daund. Small stretches are spread in Taluka Pune-City, Indapur, Baramati, Ambegaon, Shirur and Junnar.
5	Shallow, well drained, clayey soils on gently sloping land with moderate erosion.	Stretches are spread in Taluka Ambegaon, Junnar, Maval, Shirur, Haveli, Purandhar, Baramati, Daund, Khed and Indapur.

**Source:** Based on Soil Map, MRSAC-Nagpur

### Soil Type Map (Map No. 8).

The Soil Map is prepared based on the data obtained from the National Bureau of Soil Survey and Landuse Planning, Nagpur. The five major types of soil are found in the district:

- 1 Deep, Moderately Well drained, strongly calcareous, fine soils on gently sloping plains and valleys with moderate erosion.
- 2 Slightly deep, well drained, fine, calcareous soils on very gently sloping lands with mesas and buttes with moderate erosion
- 3 Very deep, well drained, loamy soils on gently sloping narrow valleys with moderate erosion
- 4 Shallow well drained, clayey soils on gently sloping lands with mesas and buttes with moderate erosion and slight stoniness
- 5 Shallow, well drained, clayey soils on gently sloping land with moderate erosion.

## 1.4 Land Capability

### 1.4.1 Land Capability

Land capability classification depicts the capability of the soil for producing crops on sustained basis. The soil that is not useful for crops can be used for grasses and forestry or for recreation or urban / industrial development. The soil resource interpretation (Land Evaluation) is based on the land capability classification and precedes land use planning. Land evaluation is made taking in account the following parameters for different land capability classes:

- |  |                     |
|--|---------------------|
| i. Surface form                                | ii. Parent Material |
| iii. Particle size classes                     | iv. Soil Erosion    |
| v. Soil Depth                                  | vi. Surface Texture |
| vii. Soil Drainage                             | viii. Slope, and    |
| ix. Surface stoniness, Salinity and Alkalinity |                     |

With available data from office of Soil survey and Testing department, Pune, the land capability class, its description; location in Taluka and its agricultural capability is shown in below Table IX.

**Table VII. Land Capability Class (es) and its locations in Pune District**

Land Cap. Class	Description	Locations in the district	Agricultural capability
I	More than 100 cm deep, 0 % to 15% slope, none to slight erosion; very deep soil.	--	--
II	50 to 100 cm or more than 100 cm deep, 1% to 3% slope, slight to moderate erosion, very deep, deep soil	Maval, Mulshi, Bhor, Haveli, Baramati, Indapur, Shirur, Khed, Junnar	Cultivable
III	25 to 50 cm deep, 1% to 3% or 3% to 5% slope, moderate to severe erosion, well drained, moderately deep.	Junnar, Ambegaon, Shirur, Haveli, Bhor, Baramati, Indapur, Daund	Cultivable
IV	7.5 to 25 cm deep, 3% to 5% and 5% to 3% slope, severe to very severe erosion, excessively drained light texture, shallow soil.	Junnar, Ambegaon, Khed, Shirur, Maval, Haveli, Purandhar, Baramati, Indapur, Daund	Cultivable
VI	0 to 7.5 cm and 7.5 to 25 cm deep, 5% to 8% and 8% to 5% slope, coarse texture, very severe erosion, very shallow soil	Junnar, Ambegaon, Khed, Shirur, Maval, Haveli, Bhor, Purandhar, Baramati, Indapur, Daund	Un-Cultivable
VII	0 to 7.5 cm and 7.5 to 25 cm deep, more than 5% slope, very severe erosion, coarse texture, strong erosion, very shallow soil	Khed, Maval, Mulshi, Haveli, Daund, Purandhar, Velhe, Bhor	Un-Cultivable

**Note:** ‘ – ‘ Not Available

**Source:** Soil Survey and Soil Testing Department (2002).