CHAPTER III
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CHAPTER-III
GENERAL LANDUSE PATTERN

3.1 Introduction

The general landuse of any region is influenced by numerous factors. Physical and socio-economic factors play a major role in shaping the general landuse. The spatial variation in general landuse is the result of man-environmental relationship. Therefore, the study of general landuse pattern of Baramati tahsil was selected to examine both temporal and spatial landuse. This chapter is devoted to the study of spatio-temporal analysis of general landuse in study region. The general landuse pattern has been classified as, net sown area, land not available for cultivation, cultivable waste, and forest cover. The data regarding crops has been obtained for 1991 and 2001. The obtained data was converted into percentage to total geographical area. Further, these have been used for showing the spatial distribution with suitable cartographic maps. A Compound bar diagram exhibits the temporal variation of land classification for a period of forty years in the study area. This percentage was then categorized into various groups, and then the volumes of change were computed and are shown in figures and interpreted in the text. The description of each land classification has been supplemented by numerous spot-inquiries, besides information embodied in the relative District Census Handbook, District Gazetteer and District Socio-Economic Review of Pune District.

3.2 Classification of General Landuse

Land can be divided into different categories according to a set of factors. It is controlled by climatic factors, soil characteristics, slope of land, and degree of erosion, water supply, drainage and similar environmental conditions. In past, several attempts have made in different countries to classify general landuses from different viewpoints by employing various methods. Stamp (1968) was regarded as a pioneer in the field of land classification. In his book, “The Land of Britain : Its Use and Misuse” he has classified land into six categories, namely Forest and woodland, Arable land, Meadow land and Permanent grass, Heath and moorland, Gardens, Orchards, nurseries and unproductive land like land under buildings, mines and wastelands. Internationally, landuse has been classified into nine categories such as, (a) Settlement and non-agricultural use, (b) Horticulture, (c) Trees and permanent crops, (d) Cropland, (e) Improved permanent pastures, (f) Improved grazing land, (g) Woodland, (h) Swamps
and marshes and (i) Unproductive land. Landuse types have been grouped on the basis of land capability, local relief, climate, soils and vegetation cover. In this category landuse is divided into two in the United States of America such as (a) land capable of carrying various crops or grass in rotation or permanent and (b) Land suitable for economic uses, grazing or afforestation. The National Resource Planning Board of the United States of America has classified the land into four categories, namely (a) Land classification in terms of inherent characteristics, (b) Land classification in terms of present day use, (c) Land classification in terms of recommended uses, and (d) Land classification in terms of programme implementation. Land classification in the Union of Soviet Socialist Republics has been categorized into six types such as (a) Land belonging to the urban-rural localities of the industrial and transport department, (b) Arable land, and perennial plantation, (c) Natural grasslands, (d) Forests, (e) Bogs and peats and (f) Unsuitable land. A.K. Phibrick (1980) has classified land of China into categories such as (a) Agricultural land, 60 percent or more under cultivation, (b) Agricultural land, at least 20 percent under cultivation, (c) Advancing agriculture and afforestation, (d) Upland with some cultivation and patches of forests, (e) Natural forest, (f) Steppes and desert, grazing land, some cultivation and patches of forests and (g) Major drought prone areas.

The National Atlas Organization, Kolkata in 1957 classified land into eight categories : (a) Forest, (b) Scrub, (c) Arable land with trees, (d) Plantation, (e) Pasture, (f) Wasteland, (g) Alpine grass and scrub and (h) Glaciated region. The Damodar valley region has been classified into ten major categories, (a) Field crops, (b) Orchards, (c) Dense forests, (d) Light forests, (e) Non-agricultural land, (f) Unproductive land, (g) Water bodies, (h) Culturable waste, (i) Village and (j) City and towns. Before 1951, landuse statistics collected by Ministry of Agriculture, Government of India were arranged into six categories: (a) Total geographical area, (b) Area under forests, (c) Area not available for cultivation, (d) Current fallow land, (e) Other uncultivated land and (f) Net sown area. E. Ahmad in 1954 has classified rural landuse into eleven categories, namely, (a) Single cropped land (b) Double cropped land (c) Triple cropped land (d) Fallow land (e) Land under grove and orchards (f) Land under scrubs and grasses (g) Land permanently under water (h) Built-up land (i) Land under transport and communication (j) Barren land and (k) Forests. Land Record Department, Government of India has officially classified land under following twelve categories such as : (a) Reported area for land cultivation purposes (b) Forests (c) Barren and uncultivable land (d) Land put to non-agricultural uses which is again classified into types such as: (i)
Culturable waste (ii) Permanent pasture and other grazing land. (e) Land under miscellaneous trees, crops and groves not included in net area sown which is of two types (i) Current fallows (ii) Other follow land (f) Net sown area (g) Area sown more than once and (h) Total cropped area. These twelve categories are finally grouped into five classes such as: (a) Net sown area (b) Land not available for cultivation (c) Cultivable waste (d) Fallow land and (e) Forest land. For the present study these five categories have been studied by assessing temporal and spatial landuse in the study area.

3.3 Temporal Variation in Landuse

The general landuse of any area undergoes changes in any given period of time. The temporal variation in landuse pattern of study area has studied for the period of forty years (1960-61 to 2000-01) to find out the trend in general landuse and to identify possible causes responsible for these changes. The temporal variation in general landuse for the study area is given in Table-3.1 and Fig.3.1.

Table- 3.1: Temporal Variation in General Landuse Pattern

<table>
<thead>
<tr>
<th>Landuse Types</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Sown Area</td>
<td>70.91</td>
</tr>
<tr>
<td>Land not available</td>
<td>11.22</td>
</tr>
<tr>
<td>for Cultivation</td>
<td></td>
</tr>
<tr>
<td>Cultivable Waste</td>
<td>1.08</td>
</tr>
<tr>
<td>Fallow Land</td>
<td>11.65</td>
</tr>
<tr>
<td>Forest</td>
<td>5.14</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: i) Socio-economic Abstract, Pune District
Note: Area is given percentage

It is found that net sown area is steadily increasing since from 1960-61 to 2000-01 as indicated in Fig.3.1. In 1960-61 the total net sown area was registered as 98000 hectares accounting for 70.91 percent. After forty years i.e. in 2000-01 it was recorded as 104106 hectares (i.e. 75.30 percent). The highest net sown area in Baramati tahasil was recorded in 2000-01 as 104106 hectares accounting for 75.30 percent. This increase may be attributed to increasing awareness of improved agricultural techniques and introduction of the use of new improved seeds by farmers. From 1970-71 to 1990-91 later decades, net sown area shows decline trend.
Temporal Variation in General Landuse Pattern

Fig. 3.1
There is an average 6.13 percent increase except for the decade 1990-91 to 2000-01. This significant increase in net sown area may be due to more land under trees and shrubs, brought subsequently under cultivation. Other types of land previously considered cultivable waste is being used by the farmers for cultivation for growing crops. Moreover, increasing awareness, and mounting pressure of population on land use pattern has brought this land under cultivation. The land which not available for cultivation has steadily declined from 1960-61 to 2000-01 in the study region. The total decline during the study period is 1.33 percent (Temporal Variation in General Landuse Pattern, Table 3.1). There is a slight decline during the last decade. The land not available for cultivation has been decreasing due to the increase in the land under cultivation. Fig 3.1 shows the temporal variations in land out of non-agricultural uses and barren and uncultivated land.

Non-agricultural land has been substantially decreased for the period 1960-61 to 2000-01 (1.33 percent). The land that was put under non-agricultural use has been brought under cultivation in the study area whereas barren and uncultivated land has not been brought under cultivation due to the ‘barad’ soil. This soil contains less humus and naturally it is less fertile. This indicates that there is a tendency of farmers to bring more land under cultivation hence; cultivable waste has been increased in the study region. The cultivable waste includes such sub-types as permanent pasture and other grazing land, miscellaneous tree crops and groves not included in net sown area and cultivable waste. The trend of increase in the cultivable waste is shown in Fig 3.1 and table 3.1 (Temporal Variation in General Landuse). The fallow land includes permanent fallow, current fallow and other fallow. The permanent fallow means the land kept uncultivated for the period of more than five years. It includes land under permanent pasture, other fodder land, miscellaneous trees and bushes. Current fallow land includes the land, which is kept uncultivated during the one agricultural year or even less than that. The reason behind this is due to lack of capital, natural calamity like drought or to regain the soil fertility by keeping it uncultivated. Other fallow includes the land kept uncultivated for the period of 2 to 5 years due to various reasons like non-availability of capital, lack of agricultural knowledge, indebtedness of farmers etc. Fallow land in Baramati tahsil covers 9783 hectares having 7.08 percent (2000-01). In 1960-61, this land was 16100 hectares accounting for 11.65 percent. During the study period, from 1960-61 to 2000-01 the fallow land shows fluctuations (Temporal Variation in General Landuse Pattern, Fig. 3.1). It reveals up and down trends. Initially, fallow land was 11.65
percent in 1960-61 and it has steadily decreased in later two decades. It was decreased upto 2.89 percent in 1980-81. Between 1980-81 and 1990-91, this land has increased by 11.72 percent in 1990-91 then fall down to 7.54 percent in 2000-01. This indicates the change in the area under this category as; farmers want to use every piece of land for growing crops in study region. Baramati tahsil has 4929 hectares land under forest accounting for 3.56 percent to total geographical area (2000-01). Forest shows decreasing trend from 1960-61 to 2000-01 (1.57 percent).

### 3.4 Spatial Variations in Landuse Pattern

The spatial variation in general landuse of the study area is the result of socio-economic, physical and cultural environment, amount of rainfall and its distribution. The spatial variation is studied for five categories, namely, i) Net Sown Area, ii) Land Not Available for Cultivation - a) Land Put to Non Agricultural Use b) Barren and Uncultivated Land, iii) Cultivable Waste - a) Permanent pasture and grazing land b) Land under miscellaneous trees, iv) Fallow Land - a) Permanent fallow, b) Other fallow, c) Current fallow, v) Forest. The above mentioned landuse categories have been used to examine the spatial pattern of landuse in the study area. The percent of each landuse type has been calculated to total geographical area of the Baramati tahsil. The area and percentage of landuse types has given in Table 3.2 (Appendix-A and B).

**Table-3.2: General Landuse (1990-91 to 2000-01)**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Types of Landuse</th>
<th>Years</th>
<th>Volume of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1990-91</td>
<td>2000-01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area (Hectares)</td>
<td>Percent</td>
</tr>
<tr>
<td>1</td>
<td>Net Sown Area</td>
<td>95600</td>
<td>69.18</td>
</tr>
<tr>
<td>2</td>
<td>Area not available For Cultivation</td>
<td>14400</td>
<td>10.41</td>
</tr>
<tr>
<td>3</td>
<td>Cultivable waste</td>
<td>2500</td>
<td>1.81</td>
</tr>
<tr>
<td>4</td>
<td>Forest</td>
<td>5500</td>
<td>3.98</td>
</tr>
<tr>
<td>5</td>
<td>Fallow Land</td>
<td>20200</td>
<td>14.62</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>138200</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Land Revenue Record, Baramati Tahsil, Baramati
Fig. 3.2 General Landuse of Baramati Tahsil (2001)
3.4.1 Net Sown Area

The net sown area is steadily increasing since 1990-91 to 2000-01 (Net Sown Area, Fig. 3.3). It is seen from fig. 3.3 that 69.18 percent (95600 hectares) area was under cultivation in 1990-91 and it has been stepped to 75.30 percent (104106 hectares) area under cultivation in 2000-01, registering an increase by 6.12 percent. This increase may be attributed to increasing awareness of improved agricultural techniques and introduction of the use of new improved seeds by farmers. Fig.3.3 shows spatial distribution of net sown area in the study region. In 1990-91, net sown area in the study area shows steady decline towards northern parts due to lack of irrigation. It is obvious from Fig. 3.3/A that in the south and north-west part villages have dominant net sown area due to irrigation facility, fertile soil and transport facilities in the region (Net Sown Area, Fig. 3.3/A). The highest net sown area is recorded at Ghadgewadi (more than 94 percent) in south-east part in study region due to deep black soil and irrigation facility whereas the lowest net sown area has been identified at Vadhane village (39 percent). 75 to 90 percent area under net sown is found in forty-two villages of three patches have been identified in south-east, south-west and north-west parts of the study region. In this region, soil is found deep black and plain topography with gentle slopes. Increased irrigation percent has added the crop cultivation.

Fifty-two villages of three extensive patches have been identified in east, south-west and third in central parts ranging between 60 to 75 percent net sown area on medium relief. Another two isolated patches are concentrated in north-east, and west parts ranging between 45 to 60 percent under net sown area consist of nine villages. Four villages have been identified less than 45 percent net sown area in northern parts in Baramati tahsil. The spatial distribution of net sown area for 2000-2001 is shown in Fig. 3.3/B. In 2000-01 the highest net sown area is observed at Ghadgewadi (98 percent) in the south-east and the lowest at Modhave and Katphal (47 percent) in west and east. There are eleven villages having more than 90 percent net sown area. These villages are spread into three patches concentrated in the south on deep and fertile soil and also in the east on coarse shallow soil. Sixty-two villages having 75 to 90 percent net sown area have found distributed all over the study region. Thirty-three, villages having 60 to 75 percent net sown area are found in patchy pattern. Two major patches are found in east and west parts.
Fig. 3.3 Net Sown Area & Area not Avail. For Cultivation
Eleven villages in the north-east and north-west part having net sown area between 45 to 60 percent appearing in isolation. The study area shows an increase of 6.12 percent net sown area during two decades: 1990-91 to 2000-01.

The volume of change more than 30 percent net sown area nineteen villages in the study region (Volume of Change, Fig. 3.3/C). This significant increase in net sown area may be due to more land under trees and shrubs, brought subsequently under cultivation. Therefore, other types of land have continuously declined from 1990-91 to 2000-01 (Volume of Change, Fig. 3.3/C). Other types of land previously considered cultivable waste is being used by the farmers for cultivation for growing crops. Moreover, increasing awareness, and mounting pressure of population on landuse pattern has brought this land under cultivation. Sixty villages have substantially increased net sown area by more than 15 to 30 percent. These villages consist of four patches that lie in south, north-west, north-east and central parts in Baramati tahsil.

3.4.2 Land not Available for Cultivation

This category is subdivided into two types namely, Land put to non-agricultural uses and Barren and Uncultivated land. The land put to non-agricultural use include land under settlement/ gaonthan, roads, railways, streams, canals and rivers. Barren and uncultivated land consisting of land of rock exposure, small hillocks and mountains and potkharaha. ‘Potkharaha’ is a rural term applied to land having inherent bad quality and it requires huge cost for bringing it under cultivation. Baramati tahsil covers 10.41 percent (14400 hectares) area under land not available for cultivation in 1990-91 and 9.88 percent (13665 hectares) in 2000-01. This land is marked by gradual decrease from the north to the south. Village Shirsuphal has found 33 percent while Hol and Wanewadi have 1 percent land not available for cultivation in the study region. Shirsuphal is located at extreme north and Hol and Wanewadi in the south-west part in the study area (Land not available for cultivation of the study area, Fig. 3.3/A). Less than 10 percent of land is not available for cultivation is in the central, south-west and eastern parts of the study region. Six villages fall in the range of 20 to 30 percent of land not available for cultivation in the study area. Thirty-one villages fall in the range of 10 to 20 percent of land not available for cultivation in the study area. This region is marked out in the north-east, west, and south-east parts in the study region.
Land not available for cultivation in 2000-01 is displayed in Fig. 3.3/B. There are two villages in the study area, in which more than 30 percent land is not available for cultivation and these villages located Modhave (44 percent) in the west and Rui village (31 percent) in the east. Seven villages have land not available for cultivation between 20 and 30 percent. Thirty-five villages having 10 to 20 percent land not available for cultivation and seventy-two villages less than 10 percent land not available for cultivation is in the north, south and north-west parts of the study region. The land not available for cultivation indicates decreasing trend in fifty-six villages whereas fourteen villages have increasing trend and no change for 10 villages. Vadhan village has recorded highest decline of 28 percent during the study period. Modhave village has witnessed highest increase under land not available for cultivation (25 percent) in west part (Volume of Change, Fig. 3.3/C). This land unlike fallow in study area has declined in Baramati tahsil. This tract is hilly, not suitable for cultivation by the prevalent techniques of agricultural practices.

3.4.3 Cultivable Waste

The cultivable wasteland includes other uncultivated lands including fallow land. This category is divided into three namely, permanent pastures and other grazing miscellaneous tree crops and groves and culturable waste. The permanent pastures and grazing lands include all land, are under grass-cover, government and private land or permanent pastures which are kept reserved as a village common grazing ground or vast tract of protected land, not open for free grazing and unreserved grass lands. Total area under cultivable waste has 1.81 percent (2500 hectares) for 1990-91 (Table 3.2). All villages have been identified under cultivable waste of less than 10 percent are distributed scatterly within the region (Cultivable Waste of the study area, Fig.3.4/A). The land under cultivable waste in Baramati tahsil covered on 2.36 percent (5765 hectares) in 2000-2001. The distribution under cultivable waste in 2000-2001 in study region reveals two major patches in north and north-east highest recorded cultivable waste (28 percent) in northern part Karkhel Village in Baramati tahsil. The cultivable waste having 10 to 20 percent land is found in seven villages (Cultivable Waste of the study area, Fig. 3.4/B). These villages are confined to two patches in north and north-east parts. One hundred seven villages of study area have cultivable waste less than 10 percent in study area.
The area under cultivable waste land in tahsil registered increased (2.36 percent) during study period. The permanent pasture and grazing lands include grass cover both government and private, or permanent pasture which kept reserved as a village common grazing ground or vast tract of protected land, not open for free grazing and unreserved grass lands. The miscellaneous tree crops and groves include land under grasses, bamboo, bushes and other groves which are not included under orchard or forest are included in this category and the land not cultivated during the preceding five years is called cultivable waste.

### 3.4.4 Fallow Land

The fallow land is divided into three sub-types such as (a) Permanent fallow, (b) Current fallow and (c) Other fallow. The permanent fallow means the land kept uncultivated for the period of five years or more. The land includes land under permanent pasture, other fodder lands miscellaneous trees and bushes. Current fallow land is kept cultivated during one agricultural year or even less than that due to insufficient capital, drought occurrence or to regain soil fertility. Other fallow land means the land kept uncultivated for 2 to 5 years due to non-availability of capital, lack of agricultural knowledge, indebtedness of farmers etc. Fig. 3.4 represents spatial distribution of fallow land in Baramati tahsil accounting for 14.62 percent (20200 hectares) in 1990-91. The concentration of this land lie is south and east parts in study area (Fallow land of the study area, Fig. 3.4/A). The highest fallow land was recorded at Karanjepul (55 percent) lying in south-west and lowest was recorded at Waki, Pawanewadi and Yelewasti in west and south having 3 percent land in this category. The total area under fallow land accounting 2000-2001 for 7.08 percent in Baramati tahsil. This fallow land is well distributed all over the study region. The highest fallow land is found at Murti village of 27 percent in west (Fallow land of the study area, Fig.3.4/B).

### 3.4.5 Forest Land

Forest cover in Baramati tahsil for 1990-1991 was 3.98 percent (5500 hectares) to total area. This has declined to 3.57 percent (4929 hectares) in 2000-2001. The total decline is 0.41 percent. Supe lying in north-west part in study area has highest percent under forest in 1990 (30 percent). This fact suggests that forest land has been brought under cultivation. Moreover, there is loss of forest by various human interference (Forest Land of the study area, Fig. 3.5/A).
Fig. 3.4 Cultivable Waste & Fallow Land in Study Area
Fig. 3.5 Forest Land in Study Area
Choudharwadi (22 percent) under forest are located in south-west parts in Baramati tahsil. Ten villages have 20 to 30 percent forest cover in study region. Less than 10 percent forestland has been identified in One hundred five villages. Forest cover is declining slowly (3.57 percent) in 2000-2001. Supe (29 percent), Deulwadi (25 percent) and Choudharwadi (21 percent) having more than 20 percent under forest land in study region (Forest Land of the study area, Fig. 3.5/B). Volume of change is located by Chopdaj village (19 percent) south-west part in study area (Volume of change, Fig. 3.5/C).

3.5 Conclusion

The discussion in above mentioned text indicates spatio-temporal distribution of general landuse for Baramati tahsil. 1971 to 1991 later decades, net sown area shows decline trend. There is an average 6.13 percent increase except for the year 1991 to 2001. This significant increase in net sown area may be due to more land under trees and shrubs, brought subsequently under cultivation. Other types of land previously considered cultivable waste is being used by the farmers for cultivation for growing crops. Moreover, increasing awareness, and mounting pressure of population on landuse pattern has brought this land under cultivation. The net sown area is steadily increasing since 1990-91 to 2000-01. It is seen from 69.18 percent (95600 hectares) area was under cultivation in 1990-91 and it has been stepped to 75.30 percent (104106 hectares) area under cultivation in 2000-01, registering an increase by 6.12 percent. This increase may be attributed to increasing awareness of improved agricultural techniques and introduction of the use of new improved seeds by farmers. The highest net sown area is recorded at Ghadgewadi (more than 94 percent) in south-east part in study region due to deep black soil and irrigation facility whereas lowest has identified at Vadhane village (39 percent). Non-agricultural land has been substantially decreased for the period 1961 to 2001 (1.33 percent). More land that in the past has been put to non-agricultural use brought under cultivation in the study area whereas barren and uncultivated land could not be brought under cultivation being ‘barad’ soils. This soil is very poor in humus and naturally it is less fertile. Cultivable waste has increase in study region. The general trend of declining fallow land towards north due to existence of fertile soil rising for cultivation. Forest cover is declining slowly (0.41 percent). All the categories in the general landuse have direct impact on the area net sown and hence this distribution is of prime importance.