CHAPTER IV

GENERAL LANDUSE PATTERN
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GENERAL LANDUSE PATTERN

4.1 Introduction

There are considerable regional variations in the general land use of area because of landform diversities and rainfall in the study region. It is essential to shift from generalities to particularities in the study region, where agriculture is the only means of livelihood for majority of the people. Such studies are fundamental for future planning.

Studies on land use pattern have received a good deal of attention from Indian geographers in the past and continue to draw their attention. Presently the patterns are being minutely investigated at the regional or micro regional rather than at the national level. In the view of the recent extension of irrigation and other facilities, the North-Western India and some parts of South-India have received comparatively more attention from the research works. In Utter Pradesh and Bihar, research publications on this aspect of agriculture appear to be more numerous than in other part of the country. This is because the abundance of agricultural resources as well as their various use in the region are facilitated by congenial environment and capability of the people to adopt themselves to changes in the environmental determinants. Indian geographers have long been attracted to study the problems of land use in the country with a view to finding out ways and means for scientific utilization of land. Such studies range from inventories of land use surveys to isolated topical or regional descriptive accounts of land use variations both in space and time. A rational assessment of land and its scientific utilization has become important. It is possible only if the whole complex of land use is studied at the district, tahsil or even village level.
by taking into account the local physical and socio-economic conditions (Ali Mohmmed 1978); Land use mapping is important for evolution, management and conservation of natural resources of an area. Land use/land cover inventories form essential component in land resources evolution and environmental studies (NRSA).

Land use is any kind of permanent or cyclic human intervention on the environment to satisfy human needs and the land use capability or land suitability is the potential capability of given tract and to support different types of land utilization under given cultural and socio-economic conditions (Vink A.P.A. 1975). Land is gift given by the nature to the mankind hence it is the basic resource of human society. Land use is the surface utilization of all developed and vacant land on a specific point at a given time and space. This leads one back to the village farm and the farmer to the fields, garden pastures, fallow lands and forests and to the isolated farm steam (Freeman T.W. 1968).

The study of land use in its spatial context is essential to understand the area of optimum land use and degraded areas, the comprehensive study of land use is of immense value to ensure better returns from the land to meet future requirements for food, and industrial raw materials and for successful planning of agricultural growth, organized urbanization, regional development and thereby to accelerate the process of development in the country. It is also useful for planners to evaluates the possibilities and limitations of further spatial development to avoid or restrict undesirable trends of land exploitation to adjust the forms of land use to the land capability and to direct the expansion of intensive land utilization into suitable areas (Nageswar Rao and Vaidyanathan, 1990). Land is necessary for human survival, because it provides mean with living space, with food and with number of raw
materials which are used in the satisfaction of his wants. But as necessary as the land factor may be, man plays an important role in conditioning and transforming his physical environment (Barlowe, R. 1963)

The study of land use is important not only in agriculturally dominated, over populated developing regions but throughout the world because of its relationship with different human phenomena. It’s importance also increased during the population pressure and decreasing man and land ratio, increasing demand for food and raw materials the need for optimum utilization of land in an integrated manner has assumed greater relevance. Therefore, scientific regional, intensive and proper use of every parcel of land has become essential. Lands’ planning on micro level, based on land use surveys is the first step in putting our lands to the maximum use. The nature and intensity of land use is closely related to the technology adopted by man. Extension of agricultural land with the help of technology may cause considerable changes in land use. Geography deals with the spatial relationship between these aspects and planning. This is because land use changes to meet available demands of the land by the society in its new ways and conditions of life. The demands for new uses of land may be inspired by a technological change or by a change in the size composition and requirements of a community. Some changes are short linked whereas other presents a more constant (Jackson J.N; 1963).

The main objective is to highlight the spatiotemporal pattern of land use in the study region. The tahsil is considered as a study unit and the land use categories are based on the census classification. The present chapter deals with the pattern of agricultural/general land use during the period of 1980-81 to 2001.
4.2 **Meaning of Land use**

The study of land use pattern is of prime concern to geographers to know the relationship between man and natural environment (Tripathi and Vishwakarma, 1988). Land use is an important studied particularly relevant to agricultural geography. According to J. L. Buck, Land utilization is the satisfaction which the farm population derives from the type of agriculture; develop the provision for future production and contribution to national needs (Zuated 1951). Land use is also related to conservation of land from one major use to another general use (Nanvati, 1951). Land use is a geographical concept since it involves specific areas. The study of land use forms a significant part of geography and has assumed a place of pride in the field of applied geography. According to Symons (1978) the land use study forms the sphere head for the advance of geography into the applied sciences as maps of land use have been recognized as essential tools of regional planning and development.

According to Lillesand and Kiefer (1987); “The term land use relates to the human activities associated with specific piece of land, factsures present on the earth surface”. Land utilization research can be described as leading with problem situations in which people in a given locality are in the process of transformation from activities with certain land requirement. Jainendra Kumar, (1986) defined land use as, the surface utilization of all developed and vacant land on a specific point, at a given time and space. In short land use is the use made of the land by man, as surveyed and mapped in series of recognized categories. Land use study assumed grater academic and practical significance especially after the brilliant contribution by Baker (1923); in United states of America, stamp L.D. to know the details of the scheme of land use survey in Great Britain readers are advised to consult the account of the history
and evolution of land use survey in Britain as introduced by L. Dudly Stamp in his work entitled. “The land use of Britain- Its use and Misuse”, has been able to generate a good deal of regional and systematic survey of land use of whole of Britain.

Chowdaian (2001) explained that land use and land utilization is not one and the same. Land use is the use actually made of any parcel of land, house, industrial location etc. are land use categories, whereas term residential, industrial, agricultural, refers to land utilization and it mainly deals with the problems related to society and the region as a whole, land utilizations is therefore dynamic concept since it undergoes certain changes due to change in socio-economic conditions, needs and with the adoption of innovation. Therefore, study of land use is a subject of continuous interest.

In India, several geographers have paid attention on different aspects of land use studies at regional, district and micro level. Some of the eminent researchers who have carried out research work on different aspects of land use studies are chatter see (1952), Shaffi (1961, 1966,1968); Prakash Rao (1959); Jasbir Singh (1974) ; Roy(1968) and Mishra (1990);

The study of land utilization is of immense value in tracing out the past use of land its future trend. Only through the study of past land utilization one can be able to predict its future use and evolve land use planning of a particular region.

4.3 Classification of land use

Landuse classifications is the systematic arrangement of land on the basis of certain similar characteristics mainly to identity and understand their fundamental utilities intelligently and effectively. The land use pattern is complex and dynamic. The present pattern of land use
is the result of long continued operations of the whole range of environmental factors but modified study of land utilization in China concludes from a survey of 16786 farms in 168 localities of eight agricultural regions that before agricultural China-there can be no great increase in account of farm land. He has given seven types of land utilization of China.

The land pattern indicates the spatiotemporal sequence of area under different uses. It also indicates that net available land for cultivation which is an important factor since it is the base for agricultural planning (Arsud, 2000).

The international geographical classification of world land use along with color scheme is mainly suited to local condition. The classification is as follows. World land use survey was drawn up under the auspices of UNESCO

1. Settlement and associated non-Agricultural land (Dark and light red)
2. Horticulture (deep purple)
3. Tree and perennial crop (light purple)
4. Crop land: continental rotation cropping (Dark brown) land rotation (light brown).
5. Improved permanent pasture (light green).
6. Unimproved permanent pasture (yellow)
7. Wood lands: dense (dark green) open (medium green) scrub (olive green) swampy forest (blue green)
8. Swamps and marshes (blue)
9. Unproductive land (grey)

Some land is for a specific use depending mostly on the physical characteristics of land to its suitability for particular use is related. Five
major categories of land use are noted in the season and crop report for Maharashtra state which are,

1. Area under forest
2. Land not available for cultivation including
   i) Barren and uncultivated land
   ii) Land put to non agricultural uses
3. Other pastures and grazing land including
   i) Cultivable waste land
   ii) Permanent pasture and grazing land
   iii) Land under miscellaneous tree crops and groves.
4. Fallow lands including
   i) Current fallow
   ii) Other fallow
5. Cropped area including
   i) Net sown area (NSA)
   ii) Area sown more than once
   iii) Gross cropped area (GCA)

Census of India have classified land utilization in nine different categories, but the present study these have been grouped into five major land use categories as the percentage of area under individual categories is relatively insignificant. On the basis of the statistical data abstracted from the sources referred of Sindhurg district may be divided into five major land use categories.

1. Area under forest
2. Area not available for cultivation
3. Other uncultivated land excluding fallow land
4. Fallow land
5. Net sown area, (area under other categories are negligible).
4.4 Tahsil wise trends in General Land use pattern

This chapter examines the general land use pattern of Sindudurg district. Land use statistics for the period 1981 to 2000 have been abstracted from the Socio-Economic Review and District Statistical Abstracts prepared by the Bureau of Economics. Tahsil level statistics have been used for analyzing the distributional patterns of general land use and changes therein. The general land use pattern of the region under study differs from tahsil to tahsil due to the locality and physical condition. The existing pattern of land use is shown in map 4.1. There is change in physiography, soil types, rainfall and geology all these factors played important role in determining the agricultural practices. Data for first quinquennial (1980-85) was obtained tahsil wise. This trend in general land use pattern in Sindudurg District is shown in table 4.1 with this generalized picture for this analysis, quinquennial averages for 1980-85 and 1995-2000 are used to find out the spatio-temporal changes.

The table No. 4.1 brings out the main elements of land utilization in the study region.

4.4.1 Area under Forest

The categories include any land classed or administered as a forest under legal enactment. The area figures under grazing lands or a crop within the forest are also included in the area under forest. It is clear from table 4.1 and map 4.3 area about 33020 hectares or 6.55% of the total geographical area of Sindhudurg District was under forest during 1980-85. Forest area increased from 33020 hectares to 38220 hectares i.e. by 1.07% during the period of investigation. Though the area under forest has increased during the period of investigation it is less than average for Maharashtra (17.3).
Table No. 4.1

Tahsil wise General Land use in Sindhudurg District

<table>
<thead>
<tr>
<th>Landuse</th>
<th>Year</th>
<th>Devgad</th>
<th>Vaibhavwadi</th>
<th>Kankavali</th>
<th>Malvan</th>
<th>Vengurla</th>
<th>Kudal</th>
<th>Sawantwadi</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area under Forest</td>
<td>1980-85</td>
<td>33</td>
<td>85.2</td>
<td>3</td>
<td>6.4</td>
<td>80.6</td>
<td>122</td>
<td>330.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>7.91</td>
<td>11.30</td>
<td>0.47</td>
<td>2.22</td>
<td>9.83</td>
<td>9.09</td>
<td>6.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995-2000</td>
<td>24.8</td>
<td>25.6</td>
<td>90.4</td>
<td>3</td>
<td>8.6</td>
<td>100.8</td>
<td>129</td>
<td>382.2</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>3.18</td>
<td>6.14</td>
<td>11.83</td>
<td>0.48</td>
<td>2.84</td>
<td>12.78</td>
<td>9.60</td>
<td>7.63</td>
</tr>
<tr>
<td>Volume of change</td>
<td>3.18</td>
<td>-1.76</td>
<td>0.52</td>
<td>0.01</td>
<td>0.62</td>
<td>2.94</td>
<td>0.50</td>
<td>1.07</td>
<td></td>
</tr>
</tbody>
</table>

| Area not available for Cultivation | 1980-85       | 228    | 90          | 124.4     | 231.6  | 76.6     | 177   | 396.2      | 1326.8   |
|                                   | %             | 29.05  | 21.58       | 16.50     | 36.57  | 26.61    | 21.60 | 29.54      | 26.28    |
|                                   | 1995-2000     | 334.6  | 83.4        | 125.6     | 223.4  | 78       | 190   | 346.8      | 1381.8   |
|                                   | %             | 43.00  | 20.02       | 16.44     | 36.24  | 25.82    | 24.09 | 25.82      | 27.59    |
| Volume of change                | 13.94         | -1.55  | -0.06       | -0.33     | -0.78  | 2.49     | -3.71 | 1.31       |          |

| Other Uncultivable Waste Land   | 1980-85       | 274    | 206         | 319.6     | 78     | 84.2     | 311   | 349.6      | 1622.4   |
|                                 | %             | 34.92  | 49.4        | 42.39     | 12.31  | 29.25    | 37.95 | 26.07      | 32.21    |
|                                 | 1995-2000     | 64.6   | 5.6         | 266.4     | 135.8  | 63       | 149.2 | 316        | 1050.6   |
|                                 | %             | 8.30   | 13.35       | 34.86     | 22.03  | 20.86    | 18.92 | 23.53      | 20.97    |

| Follow Land                    | 1980-85       | 165    | 10          | 16        | 139    | 15.6     | 31.4  | 203.8      | 580.8    |
|                                 | %             | 21.03  | 2.39        | 2.12      | 21.95  | 5.42     | 3.83  | 15.19      | 11.53    |
|                                 | 1995-2000     | 200.8  | 143.4       | 58        | 51.6   | 25.2     | 114.4 | 276.2      | 869.6    |
|                                 | %             | 25.81  | 34.43       | 7.59      | 8.37   | 8.34     | 14.51 | 20.56      | 17.36    |
| Volume of change                | 4.77          | 32.04  | 5.469       | -13.58    | 2.92   | 10.67    | 5.37  | 5.83       |          |

| Net Sown Area                  | 1980-85       | 117.6  | 78          | 208.6     | 181.6  | 105      | 219.4 | 269.4      | 1179.6   |
|                                 | %             | 14.98  | 18.70       | 27.63     | 28.68  | 36.48    | 26.77 | 20.08      | 23.42    |
|                                 | 1995-2000     | 153.2  | 108.4       | 223.6     | 202.6  | 127.2    | 234   | 274.8      | 1323.8   |
|                                 | %             | 19.69  | 26.03       | 29.26     | 32.86  | 42.11    | 29.68 | 20.46      | 26.43    |
| Volume of change                | 4.70          | 7.32   | 1.59        | 4.18      | 5.63   | 2.90     | 0.37  | 3.01       |          |

| Total Geographical Area        | 1980-85       | 784.6  | 417         | 753.8     | 633.2  | 287.8    | 819.4 | 1341       | 5036.8   |
|                                 | %             | 100    | 100         | 100       | 100    | 100      | 100   | 100        | 100      |
|                                 | 1995-2000     | 778    | 416.4       | 764       | 616.4  | 302      | 788.4 | 1342.8     | 5008     |
|                                 | %             | 100    | 100         | 100       | 100    | 100      | 100   | 100        | 100      |

Source: Socio-Economic Abstract of Sindhudurg District 1981-82 to 2005-06.
Area under forest varies from tahsil to tahsil in the district. Map 4.3A shows that out of the total geographical area less than below 5% area was under forest in Devgad, Malvan, Vengurla tahsils and 5% to 10% geographical area was noticed under forest in Vaibhavwadi and Sawantwadi tahsils during the period 1995-2000. Above to percent geographical area was noticed under forest during the last quinquennial in Kankavali and Kudal tahsils Map 4.3A shows that area under forest varies between 12.78% and 11.83% in Kudal and Kankavali tahsils which has maximum area under forest in study region followed by 9.60% Sawantwadi, 6.14% Vaibhavwadi, 3.18% Devgad and 2.84% in Vengurla tahsils. The lowest area under was in Malvan tahsil i. e. 0.48% in 1995-2000.

Below 2% in forest area was recorded in decline Vaibhavwadi tahsil. From 0 to 2% increase was noticed in Kankavali, Malvan, Vengurla and Sawantwadi tahsils. Above 2% increase was noticed in Devgad and Kudal tahsils each from 1980-85 to 1995-2000 (Map 4.3B). It is low as compared to the state.

4.4.2 Area Not Available For Cultivation

This category includes

i) The land put to non agricultural use
ii) Barren and uncultivable land.

Barren and uncultivable lands are rocky out crops of hills, plateaus, mountains etc. This land can under no conceivable circumstances be brought under cultivation but at a very high cost a very little proportion may be classed as uncultivable. This area which is not available for crop cultivation shows a close association with other uncultivated land and net sown area will be transfer to categories. Area under non agricultural use covers all lands occupied by settlements, roads, rail ways, and beds of
streams, ponds and canals. The western ghats of the study region have relatively higher proportion of these lands mainly due to adverse physiographic conditions like rugged hilly areas, steep slopes; rocky exposures, lateric cap cover and salt affected inter tidal areas.

Out of the total geographical area of Sindhudurg District an average was 27.67% this is more than three times to the average area under this group for the state which is 9.5%. Tahsil wise distributional patterns under this category are exhibited in map 4.4 A. Area belongs to this category which is much higher as compared to state average. Out of the total geographical area below 20% area was found under this category in Kankavali tahsil and 20% to 30% area is observed in Vaibhavwadi, Vengurla, Kudal and Sawantwadi tahsils. There are remarkable variations in the distribution of land under this category, Malavan and Devgad tahsils recorded over 30% of land area under this category during the period of 1999-2000 (map 4.4A).

Volume of change in land not available for cultivation is shown in the map 4.4B. No uniform pattern is observable in change. Over all changes are significant. Below 04% negative change in this category is observed in Vaibhavwadi, Kankavli, Malvan, Vengurla and Sawantwadi tahsils, whereas below 04% positive change in area not available for cultivation was observed in Kudal tahsil during the period of investigation. Above 4% positive change in this land area category is recorded in Devgad tahsil during 1980-85 and 1995-2000 (map 4.4B).

4.4.3 Other Uncultivable Land (Excluding Follow Land)

This category consists of three types of land viz.

a) Cultivable waste land

b) Permanent pasture and grazing land,

c) Land under miscellaneous tree crops and groves.
Cultivable waste land denotes land considered by present judgments as cultivable but actually not cultivated during the current year and last five years or more in succession. Permanent pasture and other grazing land i.e. all grazing lands which may be permanent meadows and village common pasture. Area under miscellaneous trees, crops and groves overcome all cultivable land which is not included in the net area sown but is put to some agricultural use other than seasonal cropping. In the ensuing discussion they are considered together. This is potential agricultural land which will be available for extension of agriculture but not been cultivated owing to different reasons.

Total area under this category amounts 149920 hectares or 31.30% which is much higher than state average of 8% during the first quinquennial and it was decreased up to 105100 hectares in the last quinquennial. Regional distribution under this land use category varies from 8.30% to over 34%. Below ten percent area under this land use category was recorded in Devgad. Tahsil-while 10% to 20% area was registered under this category in Kudal and Vaibhawadi tansils during the periods of 1995-2000 and 20% to 30% area under this land use category was found in Malvan, Sawantwadi and Vengurla tahsils. Over 30% area under this category was observed in Kankavali tahsil during the last quinquennial, map (4.5A).

The spatial distribution of volume change in other uncultivated land as depicted in map 4.5B is very uneven. Below 10% negative change in this land use category took place in Sawantwadi, Kankavali and Vengurla tahsils whereas 10% to 20% negative change in this category was recorded in Kudal tahsil and 20% to 30% negative change was observed in Devgad tahsil. While 30% to 40% negative change recorded in Vabhavwadi tahsil from 1980-85 to1995-2000, whereas below 10%
positive change in this land use category was registered in only Malvan tahsil.

4.4.4 Fallow Land

Term fallow is applied to lands not under cultivation of the time of reporting, but which have been sown in the past. The duration of period for which land remains fallow is different in different parts of the study region. This land use category consists of

i) Current fallow land

ii) Other fallow land

Current fallow means the lands left unsown during the current agricultural year only to regain fertility and also that which remained uncultivated in the short term for want of moisture and economic reasons. Other fallow lands comprise all land which was taken up for a period of not less than one year and not more than five years. However in the present study both the sub-categories are grouped together.

Sindhudurg district has a substantial proportion of fallow land with average of 17.15% cent of the total geographical area. This is more than double of the state of 7.2%. Regional disparities in the spatial distributional pattern of fallow lands in the study region are exhibited in map 4.6A.

During 1980-85 about 55980 hectare of land was under fallow land category, it increased up to 85780 hectares in 1995-2000. Out of total geographical area less than 10% area under this category was registered in Kankavli, Malvan and Vengurla tahsils and 10% to 20% area in this category was found in Kudal tahsil while 20% to 30% area of this land use category was recorded in Devgad and Sawantwadi tahsils during 1995-2000. Above 30% geographical area in this category was seen in Vaibhavwadi tahsil. The percentage of fallow lands in Sindhudurg district
as a whole is considerably high in comparison to national and state averages. Because of the topographic and edaphoclimatic conditions in most part of study region that varkas land is left fallow for four or five years for accumulation of soil which is washed away by heavy rains.

Except Malvan tahsil remaining tahsils showed increase in fallow land in the study region. Below 15% negative change in this land use category took place in Malvan i.e.(13.58%). Zero to five percent positive change in fallow land is seen in Devgad and Vengurla tahsils (table 4.6B), while 5% to 10% positive change in this group of fallow land is experienced in Kankavali and Sawantwadi tahsils from 1980-85 to 1995-2000. About 10% to 15% positive change is observed in Kudal tahsil and above 15% positive change in this land use category is found in Vaibhavwadi i.e. 32.04% which is the highest during the period of investigation (map 4.6B) due to the low proportion of irrigation facilities comparison to the other districts of the state. Sindhudurg district had 11.68% fallow land in 1980-85 which is increased by 5.47% and reached up to 17.15% in 1995-2000.

4.4.5 Net Sown Area

Net sown area is the land which is being actively filled for raising of crops. This land use category and the follow land together constitute the extent of cropped land in the region and therefore are of vital significance in studies relating to agricultural geography. The net area sown is the actual area under crops counting areas sown more than once in the same years only once. Net area sown represents the extent of the cultivated area actually sown during the agricultural year. It may be reoffered to as net cropped area also.

Sindhudurg district in Maharashtra state is one of the poorly cultivated areas with only 132540 hectares or 26.52% of its total
geographical area devoted to crops during 1995-2000. 24.07% area under this land use category to the total geographical area of the district was there during 1980-85, while it was 26.52% in 1995-2000. About 2.45% net sown land has been increased in the district during the period of investigation. Which indicates that overall increase small widespread than decrease. Below 2% positive change in net sown area was recorded in Kankavli, Sawantwadi tahsils and 2% to 4% positive change in this category was observed in Kudal tahsil. About 4% to 6% positive change in net sown area was recorded in Davgad, Malvan and Vengurla tahsils during the period under study (table 4.1 and map 4.7B) over 6% positive change it means highest positive change in net sown area was experienced in Vaibhavwadi tahsil from 1980-85 to 1995-2000. Some fallow and other cultivable waste land was transferred to net sown area during the period of investigation.

It is clearly seen that agriculture in study region is handicapped. Since about 68% of the total geographical area of study region is not used for cultivation owing to dearth of cultivable land. Rugged, terrain, poor soils and scarcity of water supply coupled together with poor technological development have all contributed to this situation. The corresponding percentages for the state and the country as a whole are 56.6% and 45.3% respectively. The percentage of net sown area sown in the Sindhudurg district varies from tahsil to tahsil which is quite evident.

Out of the total geographical area below 20% to 30% area under net sown area in Devgad tahsil, whereas 20% to 30% area under this landuse category was registered in Vaibhavwadi, Kankavli, Kudal and Sawantwadi tahsils in the last two decades. Over 30% area was recorded in this group in Malvan and Vengurla tahsils during 1995-2000. This is higher than the district average of 26.52% map 4.7.
The extent of cultivated area in the study region has changed over the past two decades. About 115180 hectares area in 1980-85, which was rose to about 132540 hectares in 1995-2000. The volume of change in net area sown is depicted in map 4.7b.


General land use from 1980-85 to 1995-2000 was transferred use of land from one category to other categories due to the natural factors as well as man made affords. Index of volume change of land use is indicated by $A/B$ where ‘$A$’ is the summation of differences of percentage of land use categories of increased and ‘$B$’ is that of decreased for the period of investigation. $A$ and $B$ should be same but with apposite signs. Tahsil wise volume of change in land use is given in the following table 4.2.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Index of volume of change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Devgad</td>
<td>26.63</td>
</tr>
<tr>
<td>2</td>
<td>Vaibhavwadi</td>
<td>39.38</td>
</tr>
<tr>
<td>3</td>
<td>Kankavali</td>
<td>7.6</td>
</tr>
<tr>
<td>4</td>
<td>Malvan</td>
<td>13.57</td>
</tr>
<tr>
<td>5</td>
<td>Vengurla</td>
<td>9.18</td>
</tr>
<tr>
<td>6</td>
<td>Kudal</td>
<td>19.03</td>
</tr>
<tr>
<td>7</td>
<td>Sawantwadi</td>
<td>6.26</td>
</tr>
</tbody>
</table>


Table 4.2 indicates that one type of land category transfer to other type of category naturally. Where this volume of change was greater we can say that more dynamic conditions exist there. Map 4.8 reveals that
over 20% i.e. the highest 39.38% volume of change was observed in Vaibhavwadi tahsil followed by Devgad (26.63%). Below 20% change in general land use pattern was observed in Kankavali, Malvan, Kudal, Vengurla and Sawantwadi tahsils during the period of investigation.

4.6 Tahsil wise per capita Net sown Area in Sindhudurg District

Table 4.3 indicates the clear picture about tahsilwise per capita net sown area in Sindhudurg District. In the study region the position of per capita net sown area was very poor comparatively to that of state as well as the whole country. Table 4.3 reveals that per capita net sown area was below 0.150 hectares in Devgad and Vengurla tahsils, where as it was above 0.150 hectares in Kankavali, Malvan, Kudal, and Sawantwadi tahsils that was more than the average of the study region i.e. 0.146 hectares in 1981. About 0.153 hectares area of the district belongs to per capita net sown area in 1991. Maximum 0.208 hectares per capita lands was registered in Kankavali tahsil and below 0.200 hectares per capita land was found in Devgad, Malvan, Vengurla, Kudal and Sawantwadi tahsils during 1995-2000. Above 0.200 hectares per capita land was recorded in Vaibhavwadi and Kankavali tahsils. Table 4.3 indicates that per capita land was over all the district level in slightly increased in Devgad, Vaibhavwadi Kankavali, Malvan, Vengurla tahsils. In remaining two tahsils Kudal and Sawantwadi per capita land has decreased during the period of investigation. Though their is increase in population for last two decades the land under net sown area was also increased specially land under horticulture. It means the Sindhudurg District having very low per capita lands as compared to other districts of the state.
Table No.4.3
Tahsil wise Per Capital Net Sown Area in Sindhudurg District
(Area in Hectares)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Davgad</td>
<td>0.096</td>
<td>0.108</td>
<td>0.112</td>
</tr>
<tr>
<td>2</td>
<td>Vaibhavwadi</td>
<td>-</td>
<td>0.0154</td>
<td>0.280</td>
</tr>
<tr>
<td>3</td>
<td>Kankavali</td>
<td>0.200</td>
<td>0.208</td>
<td>0.213</td>
</tr>
<tr>
<td>4</td>
<td>Malvan</td>
<td>0.153</td>
<td>0.147</td>
<td>0.172</td>
</tr>
<tr>
<td>5</td>
<td>Vangurla</td>
<td>0.125</td>
<td>0.112</td>
<td>0.154</td>
</tr>
<tr>
<td>6</td>
<td>Kudal</td>
<td>0.171</td>
<td>0.165</td>
<td>0.159</td>
</tr>
<tr>
<td>7</td>
<td>Sawantwadi</td>
<td>0.171</td>
<td>0.159</td>
<td>0.131</td>
</tr>
<tr>
<td><strong>District</strong></td>
<td><strong>0.146</strong></td>
<td><strong>0.153</strong></td>
<td><strong>0.162</strong></td>
<td></td>
</tr>
</tbody>
</table>


4.7 Land use Efficiency

Land use efficiency has been defined as the extent to which the net area sown has been cropped. The total cropped area as percentage of net area sown gives a measure of land use efficiency which in other words is the intensity of cropping and refers to the number of crops grown on the same area in only one agricultural year (Singh, 1972). The main purpose of the land use efficiency is to study to examine the regional variations in agricultural efficiency and temporal variations from 1980-85 to 1995-2000. The emphasis is on high-light the basis of agriculture which influences agricultural efficiency. Agricultural efficiency is the level of existing performance of a unit of land which differentiates from one area of combined effect of various factors like physical socio-economic and organizational.

The index of land use efficiency is obtained by using the following
formula.

\[
\text{Index of Land use efficiency} = \frac{\text{Gross cropped area}}{\text{Net sown Area}} \times 100
\]

Tahsil wise land use efficiency calculated for the period of 1980-85 and 1995-200 in the Sindhudurg District is given in the following table

**Table 4.4**

**Land use Efficiency in Sindhudurg District**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Devgad</td>
<td>105.4</td>
<td>106.5</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>Vaibhavwadi</td>
<td>100.0</td>
<td>112.9</td>
<td>12.9</td>
</tr>
<tr>
<td>3</td>
<td>Kankavali</td>
<td>111.2</td>
<td>113.86</td>
<td>2.66</td>
</tr>
<tr>
<td>4</td>
<td>Malvan</td>
<td>116.17</td>
<td>106.12</td>
<td>-10.05</td>
</tr>
<tr>
<td>5</td>
<td>Vengurla</td>
<td>105.34</td>
<td>114.93</td>
<td>9.59</td>
</tr>
<tr>
<td>6</td>
<td>Kudal</td>
<td>102.73</td>
<td>105.21</td>
<td>2.48</td>
</tr>
<tr>
<td>7</td>
<td>Sawantwadi</td>
<td>102.82</td>
<td>108.00</td>
<td>5.18</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>105.24</td>
<td>109.43</td>
<td>4.19</td>
</tr>
</tbody>
</table>


Table 4.5 reveals that land use efficiency in the study region increased from 105.24% cent to 109.43% from 1980-85 to 1995-2000. The study region is divided into three parts on the strength of percentage viz. high land use efficiency, medium land use efficiency and low land use efficiency.

A) **Areas of low Land use Efficiency (Below 105%)**

Area of low land efficiency was recorded in Kudal, Sawantwadi and Vaibhavwadi tahsils during 1980-85. Rugged topography
uncultivable waste land, lack of irrigation facilities, poor soil conditions, low use of chemical fertilizers, pesticides and other natural as well as socio-economical factors are responsible for low efficiency. During 1995-2000 low to high change was recorded in Kudal, Sawantwadi, and Vaibhavawadi tahsils i.e. 2.48%, 5.18% and 12.9% respectively (map 4.9B)

B) Areas of Medium Land use Efficiency – (105% to 110%)

Areas of medium land use efficiency were recorded in Devgad and Vengurla tahsils during 1980-85. Medium land use efficiency to high land use efficiency change occurred in Devgad and Vangurla tahsils, due to physical as well as non-physical determinants of land use efficiency during the period of investigation. About 1.1% to 9.59% positive change in land use efficiency was registered in Devgad and Vengurla tahsils. (map.4.9B) Vengurla tahsils agricultural research centers give guidelines to the farmers and efforts of some primary agricultural societies are responsible factors to increase landuse efficiency.

C) Areas of high landuse efficiency (Above 110%)

High land use efficiency was observed in Kankavali and Malvan tahsils during the period of investigation (map 4.9A). Only Malvan tahsil registered negative change it means the land use efficiency decreased but in Kankavali tahsil positive change in land use efficiency is seen during 1980-85 to 1995-2000 (map 4.9B)

Summary

Forest area increased from 33020 hectares to 38229 hectares or 1.07% during the period of investigation. The area under forest has increase which shows that the effect of Social Forestry Programme on large scale in these tahsils. The average of area under this category is considerably low compared to the state.
Area not available for cultivation was 27.67% of the total geographical area of Sindhudurg district and this is more than three times of the average area of this category of the state i.e. 9.5%. The lowest area under area not available for cultivation to the total geographical area of study region was observed in Kankavali tahsil (16.44%) whereas the highest area under this group was noticed in Malvan tahsil (43%) during 1995-2000.

Total area under other uncultivable land was 149920 hectares or 31.30% which is much higher than the state average of 8% during the first quinquennial and it was decreased up to 105100 hectares in the last quinquennial. Regional distribution under this land use category varies from 8.30% to over 34%. During 1980-85 about 55980 hectares land was under fallow land it was increased up to 85780 hectares from 1980-85 to 1995-2000. The positive change in area under follow land from 4.77% to 32.04% was observed in all tahsils of study region except Malvan tahsil during the investigation period.

About 2.45% net sown land has been increased in the district during the period of 1980-85 to 1995-2000. About 0.37% to 7.32% positive change in net sown area was noticed in all the tahsils of the study region. The study region is agriculturally handicapped due to rugged topography, rough terrain, poor soils, scarcity of water supply which contributed to low net sown area. The highest per capita net sown area was registered in Kankavali tahsil (0.208) hectare while below 0.200 hectare per capita land was found in Devgad, Malvan, Vengurla, Kudal and Sawantwadi tahsils in 2001. Table 4.3 indicate that per capita land was overall the district has slightly increased in Devgad, Vaibhavwadi, Kankavali, Malvan and Vengurla tahsils.

The study regions land-use efficiency was increased from 105.24%
to 109.43% from 1980-85 to 1995-2000. All the tahsils showed positive change in land use efficiency except Malvan tahsil. Below 5% positive change in land use efficiency was noticed in Devgad, Kankavali and Kudal tahsils while above 5% positive change was found the in remaining tahsils during 1980-85 to 1995-2000.
References


5. Baker, 1923


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