Chapter IV

General Land-use in Marathwada Region

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Chapter IV
General land-use in Marathwada Region

4.1 Introduction:

In the previous chapter the role of non-physical determinants of agriculture such as irrigation, population, livestock, agricultural implements, use of chemical fertilizer's, High varieties seeds, pesticides, credit facilities, marketing and transportation are analysed in detail. This chapter proposes to describe and analyse the general pattern in Marathwada region.

Land is the basic resource of human society. Its utilization shows a reciprocal relationship between the prevailing ecological conditions of a particular region and man. Land 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, gardens, pastures, fallow land, forests and to the isolated farmstead", as geography deals with the spatial relationship between these aspects and planning. This is because land use changes to meet the variable demands of the land by the society in its new ways and conditions of life. The demand 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 lived, whereas others represent a more constant.

In this way, land utilization is the use land use planning has been recently introduced in land utilization studies which means the formulation and administration of land policies aimed at the employment of land resources and the uses for which they are socially, politically and economically best suited. The idea of a landuse hierarchy varies with the production and consumption factors. The production factors are land, transportation facilities and the stage of technological advancement. The consumption factor include the number of people, consumption of goods per person and gross export. The growth of population may change the forest and pasture land into
cropland, including residential and industrial land utilization survey made up to now were mostly concerned with the smaller areas of rural and urban sector.

The study of land utilization has both economic, geographic and demographic dimensions. The geographic aspect consists largely of a survey of the temperature, humidity, topography and soil conditions which influence the utilization of land for crops, pasture or forest. The demographic aspect considers the studies of population distribution, composition, characteristics and trends not only in the area being surveyed, but in the whole country.

4.2 Meaning and importance of landuse:

The difference between land use and land utilization is important. Land use is the use actually made of any parcel of land, house, apartments and industrial location are land use categories, where as the term residential, industrial and agricultural refer to a system of land utilization implying roads, neighbourhood retail and service activities as well as location of industries, and the carrying of agricultural pursuits. In a rural area, tree crop or row crop would identify land use, whereas orcharding, truck farming and grazing indicate a system of land utilization. The term 'Land utilization' is also used for varied utilization of land and soil surveys e.g. land under cultivation, pasture barren, orchard, fallows, waste, culturable waste, settlements forests, waterbodies etc. According to J.L. Buck "Land utilization is the satisfaction, which the farm population derives from the type of agriculture developed, the provision for future production and the contribution to national needs." (Quoted 1951). While the definition given by Salter is as follows: "Land utilization research can be described as dealing with problem situations in which people in a given locality are in the process of transformation from activities with certain land requirements to activities with different land requirement." In this sense land utilization involves an examination of the natural factors affecting both the harnessed and the potential productivity of the land in a changed situation of the locality and its requirements. These factors are the land, temperature, rainfall and soil, which in a configuration together consti-
tute the physical background of agriculture and determine the limits of both the culturability and productivity of the land.

Land utilization mainly deals with the problems related to the society and the region as a whole, rather than a private farmer. Land use is mainly related to the optimum use of the limited land between the alternative major types of land use. In rural areas, the major types of land use is as follows:

1) Agricultural land (a) non-irrigated lands, (b) irrigated lands, (c) dry farming areas. (d) grazing areas. (2) village orchards or forest lands (3) Forest land (a) forest covered (6) forest reclaimed landuse, (c) culturable or recreational landuse. Land utilization is also related to "Conservation of land from one major use to another general use". After reclamation of forest land a question arises as to how the land should be utilized. The rotation of crops and their combination are after all minor problems of land use study. This is because these aspects depend upon personal experience and institution of the farmer who decides which crop should be grown in rotation.

There is an intimate relationship between land economics and land utilization. The efficient use of land depends on the capacity of the man to utilize the land and to manage it. It also depends upon the systems of farming, systems of land tenures and size of the holdings. Whereas, the production efficiency and level of production depend upon the institutional framework and the production function carried on by the farmer.

The man land relationship can be experienced in three different aspects. First, the land and the individual person who uses it, second, the man and his influence on the use of the land as a means of production. In this case institutional infrastructure should be studied for improved land use. The third relationship between land and man can be expressed in terms of man as a social being and the land as an inexhaustible resource.

For human existence, within certain biotic, ecological and economic conditions the utilization of land is of prime importance. It involves a relation ship that exist between the society on the one hand, and cultural advancement, resource planning and carrying capacity of the land on the other.
The intensive use of land depends upon population concentration, economic prosperity through better agricultural production, human establishments, industrial locations, communication and transport lines, while extensive use of the land is related to sparse population, dispersed settlements, the absence of communication lines and the crude forms of transport. However, only the systematic utilization of land can be able to promote economic and cultural advancement. It there is no utilization of land, one cannot think of any progress. Thus the study of land utilization is of immense value in tracing out the past use of land and its future trend. Only through the study of the past land utilization, one can be able to predict its future use and evolve land use planning of a particular region. The changing population and the economic, the biological and the ecological problems are so alarming that the conservation and the best utilization of land becomes a necessity.

4.3 Landuse Classification:

Landuse classification is the systematic arrangement of various classes of land on the basis of certain similar characteristics, mainly to identify and understand their fundamental utilities, intelligently and effectively in satisfying the needs of human society. Thus, land must be carefully utilized, so that it may fulfil our varied needs after its proper allocation. The best use of each parcel of land requires a scientific and methodically appreciable classification of the present landuse. This may help us in investigating the landuse problems and be the basis of planning for the best use of our land after considering the major landuse categories.

The landuse types and its classification must be clearly presented in comparison with other land classification according to productivity index and the yield and quality of crops grown under physically defined system of management or according to storic index based upon soil profile, soil texture and other physical factors combined to control the use capabilities environmental conditions. The increase in population needs additional land for shelter and food produce and requires judicious utilization of our resource. In view of this surging problem, world land use investory survey had been
proposed in the International Geographical congress at Lisbon in April 1949. On this basis landuse survey has been carried out in several countries including Poland, Cyprus, Italy, Jamaica and others. At the second time, the commission met at the International Geographical congress in 1953 and it was proposed to carry out pilot survey in as many parts of the world as possible. L.D. stamp was made the incharge of the Eastern hemisphere and van Valkenburg of the Americas. "An impressive record of pilot survey on different scales of various parts of the world were presented. These commission proposed as simple classification of world landuse along with colour scheme which is mainly suited to local condition. The classification is as follows. World landuse survey was drawn up under the auspices of Unesco. 

1. Settlements and associated non-agricultural land (Dark and lightred)  
2. Horticulture (deep purple).  
3. Tree and perennial crops (light purple).  
4. Crop land continental rotation cropping (dark brown) land rotation (light brown)  
5. Improved permanent pasture (light green)  
6. Unimproved grazing : used (orange) not used (yellow).  
7. Wood lands : dense (dark green) open (median green) scrub (olive green,) swanpy forest (blue green) etc.  
8. Swamps and marshes (blue).  

L.D. stamp had suggested the classification of the land of Britain into categories, for broad national policy of land use planning and conservation of land resources. He had proposed three major categories and 10 type, based on:

(a) The nature of the site (elevation and slope)  
(b) The nature of the soil (its depth, texture and water condition).  
The major categories are as follows.  
(1) Good (2) Medium and (3) Poor  
He suggested following ten sub-types :-
Good quality land:
1. First class land
2. Good general purpose farmland.
3. First class land with grass.
4. Good but heavy land.
5. Medium quality light land.

Medium quality land:
6. Medium quality general
7. Poor quality heavy land.
8. Poor quality mountain and moorland

Poor quality land:
9. Poor quality lightland

J. L. Buck, in his monumental study of land utilization in China\(^\text{12}\), conclude, from a survey of 16,786 farms in 168 localities of eight agricultural region, that for agricultural china there can be no great increase in amount of farm land. He has given seven types of land utilization of china. They are as following:

(i) Arable land (2) Cultivated land (3) Uncultivated land (4) Forest area (5) Land suitable for afforestation (6) Grass land (7) Desert land. In India, landuse categories recognised by different scholars belongs to two different type e.q. town planners and urban geographer. Town planners quite often categories urban landuse as residential, commercial, industrial, transport, communication, public utilities, open space, agricultural, vacant land and water bodies\(^\text{13}\). On the other hand, there are minor differences amongst the urban geographers and most of them classified the urban landuse into the following categories residential, agricultural, open spaces, military lands, parks and burial grounds\(^\text{14}\).

In the light of physioco-socio-economic environment, man determines the uses of land. These are taken into consideration while classifying the land under different categories and sub-categories. The census of India, has classified the land into nine different categories, as forest, barren, cultivable waste, cultivated area etc. But for the present study, they are grouped into five landuse categories viz. (i) Area under forest (2) area not available for
cultivation (3) other unclutivated land excluding fallow land, (4) fallow land and (5) net sown area, because area under other categories are insignificant.

Out of these categories, the first and the second comprises the total non-agricultural land. Third is the potential agricultural land and fourth and fifth constitute the agricultural land.

4.4 Districtwise trends in landuse pattern in marathwada region:

Due to the location and physical setting, the general landuse pattern of the region under study differs from the district to district. The existing pattern of landuse, as shown in map 4.1 appears to have been resulted from a process of land exploitation within the frame of physical socio economic complex and modified by the expansion of irrigation and the growth of population. There is a change in geographical factors in the entire study region. Physiography, soil types, rainfall and geology all these factors played important role in determining the agricultural practices. About 69.34% to 79.30% of the total geographical area is under cultivation because of varied physical features. Agricultural land is largely available (77.09% to 90.11%) in the districts of Nanded, Aurangabad, Latur, Jalna, Beed, Parbhani and Nanded districts.

Districtwise trends in general landuse pattern in marathwada region is shown in table 4.1. With this generalised picture of general landuse pattern of the study region a detailed analysis of the same is given below. For this analysis quanquennial averages for 1970-75 and 1990-95 are used to find but the spatio-temporal changes in. As the Jalna and Latur districts were formed in 1981, respective tahsils data is used for the districts total from 1970-71 to 1980-81. Data of Partur tahsil was substracted from Parbhani district from 1970-71 to 1980-81 and it is added in Jalna district.
MAP NO. 4-1
MARATHWADA REGION

DISTRICTWISE TRENDS
IN
GENERAL LAND-USE
1970-75

INDEX


AREA UNDER FOREST


AREA NOT AVAILABLE FOR CULTIVATION


OTHER UNCULTIVABLE LAND


FALLOW LAND


NET SOWN AREA


KM 25 12.5 0 25 KM
<table>
<thead>
<tr>
<th>Landuse categories</th>
<th>Year</th>
<th>Aurang.</th>
<th>Jalna</th>
<th>Beed</th>
<th>Parbhani</th>
<th>Nanded</th>
<th>Latur</th>
<th>Osm.</th>
<th>Marath. resion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area under forest</td>
<td>1970-75</td>
<td>787</td>
<td>58</td>
<td>320</td>
<td>380</td>
<td>801</td>
<td>01</td>
<td>12</td>
<td>2259</td>
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<tr>
<td></td>
<td>1990-95</td>
<td>713</td>
<td>50</td>
<td>245</td>
<td>367</td>
<td>882</td>
<td>18</td>
<td>10</td>
<td>2285</td>
</tr>
<tr>
<td>Volume of change in %</td>
<td></td>
<td>-0.74%</td>
<td>-0.10%</td>
<td>0.22%</td>
<td>-0.12%</td>
<td>0.79%</td>
<td>0.26%</td>
<td>-0.03%</td>
<td>0.05%</td>
</tr>
<tr>
<td>Area not available for cultiv.</td>
<td>1970-75</td>
<td>536</td>
<td>333</td>
<td>454</td>
<td>476</td>
<td>581</td>
<td>197</td>
<td>195</td>
<td>2772</td>
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<tr>
<td></td>
<td>1990-95</td>
<td>846</td>
<td>290</td>
<td>685</td>
<td>462</td>
<td>465</td>
<td>359</td>
<td>120</td>
<td>3227</td>
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<tr>
<td>value of change in %</td>
<td></td>
<td>(5.32)</td>
<td>(4.31)</td>
<td>(4.06)</td>
<td>(3.43)</td>
<td>(5.62)</td>
<td>(2.95)</td>
<td>(2.60)</td>
<td>(4.30)</td>
</tr>
<tr>
<td>Non Agricultu. land</td>
<td>1970-75</td>
<td>1323</td>
<td>391</td>
<td>674</td>
<td>856</td>
<td>1382</td>
<td>198</td>
<td>207</td>
<td>5031</td>
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<td>1990-95</td>
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<td>829</td>
<td>1347</td>
<td>377</td>
<td>130</td>
<td>5512</td>
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<td></td>
<td></td>
<td>(13.13)</td>
<td>(5.06)</td>
<td>(6.03)</td>
<td>(7.80)</td>
<td>(13.38)</td>
<td>(2.97)</td>
<td>(2.76)</td>
<td>(7.81)</td>
</tr>
<tr>
<td>Uncultiva. land volume of change in %</td>
<td>1970-75</td>
<td>630</td>
<td>360</td>
<td>938</td>
<td>1106</td>
<td>1069</td>
<td>569</td>
<td>609</td>
<td>5281</td>
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<td>1990-95</td>
<td>645</td>
<td>555</td>
<td>855</td>
<td>727</td>
<td>1020</td>
<td>704</td>
<td>610</td>
<td>5116</td>
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<td>Fallow land volume of change in %</td>
<td>1970-75</td>
<td>689</td>
<td>883</td>
<td>1742</td>
<td>907</td>
<td>590</td>
<td>701</td>
<td>800</td>
<td>6312</td>
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<td>1990-95</td>
<td>886</td>
<td>704</td>
<td>1164</td>
<td>917</td>
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<td>640</td>
<td>1223</td>
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<td>(6.84)</td>
<td>(11.43)</td>
<td>(15.60)</td>
<td>(8.27)</td>
<td>(5.71)</td>
<td>(10.50)</td>
<td>(10.69)</td>
<td>(9.80)</td>
</tr>
<tr>
<td>Net sown area volume of change in %</td>
<td>1970-75</td>
<td>7435</td>
<td>6092</td>
<td>7815</td>
<td>8103</td>
<td>7290</td>
<td>5206</td>
<td>5869</td>
<td>47810</td>
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<tr>
<td></td>
<td>1990-95</td>
<td>6987</td>
<td>6127</td>
<td>8220</td>
<td>8499</td>
<td>7296</td>
<td>4953</td>
<td>5522</td>
<td>47604</td>
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<tr>
<td></td>
<td></td>
<td>(73.78)</td>
<td>(78.85)</td>
<td>(69.97)</td>
<td>(73.85)</td>
<td>(70.57)</td>
<td>(78.01)</td>
<td>(78.41)</td>
<td>(74.20)</td>
</tr>
<tr>
<td>Agricultural land volume of change in %</td>
<td>1970-75</td>
<td>8124</td>
<td>6975</td>
<td>9557</td>
<td>9010</td>
<td>7880</td>
<td>5907</td>
<td>6769</td>
<td>54885</td>
</tr>
<tr>
<td></td>
<td>1990-95</td>
<td>7873</td>
<td>6831</td>
<td>9384</td>
<td>9416</td>
<td>7964</td>
<td>5593</td>
<td>6745</td>
<td>53866</td>
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<tr>
<td></td>
<td></td>
<td>(80.62)</td>
<td>(90.28)</td>
<td>(85.57)</td>
<td>(82.12)</td>
<td>(76.27)</td>
<td>(88.51)</td>
<td>(90.43)</td>
<td>(85.18)</td>
</tr>
<tr>
<td>Total Geographical area</td>
<td>1970-75</td>
<td>10077</td>
<td>7726</td>
<td>11169</td>
<td>10972</td>
<td>10331</td>
<td>6674</td>
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<td></td>
<td>1990-95</td>
<td>10077</td>
<td>7726</td>
<td>11169</td>
<td>10972</td>
<td>10331</td>
<td>6674</td>
<td>7485</td>
<td>64434</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
<td>(100)</td>
</tr>
</tbody>
</table>

Source: Computed by the Author.

Figures in the brackets indicates percentages.
1) **Area under forest** :- About 225900 hectares or 3.5% of the geographical area of the Marathwada region was under forest during 1970-75. It increased from 225900 hectares to 228500 hectares from 1970-75 to 1990-95. This shows that there was minor increase (0.05%) in forest area during the period of investigation. Table 4.1 also reveals that there is variation in forest area from district to district. The highest area under forest was experienced in Aurangabad district (7.81%) where as the lowest area under forest was found in Latur district (0.01%) during 1970-75.

Out of the total geographical area below 1% area was under forest in Osmanabad, Latur and Jalna districts while 1% to 4% geographical area was under forest in Beed (2.15%) and Parbhani (3.34%) districts during the last quinquennium. Above 4% geographical area was found in Aurangabad (7.07%) and Nanded (8.54%) districts during 1990-95. Particularly more forest area is found in Khultabad, Dautabad, Kannad tahsils of Aurangabad district and Kinwat and Bhokar tahsils of Nanded districts due to the hilly area and high distribution of rainfall.

The negative below 0.5% changes in forest area was noticed in Osmanabad, Jalna and Parbhani districts where as above 0.5% negative change was experienced in Aurangabad district from 1970-75 to 1990-95. Below 0.5% positive change in forest area was recorded in Beed and Latur districts while above 0.5% positive change in forest area was took place in Nanded district during the period of investigation. Table 4.1 reveals that very minor positive and negative changes were occurred in forest area from first quinquennium to the last quinquennium in the districts of Marathwada region. (Map 4.2B). Forest cover gradually increases from the west to east and from south to north in the study region.

2) **Area not available for cultivation** :- This category includes (a) the land put to non-agricultural uses and (b) barren and uncultivable land. These uses show that these areas will be no more available for crop cultivation. These areas which are not available for crop cultivation show a close association with other unclutivated land and the net sown area in Marathwada
MAP NO. 4.2
MARATHWADA REGION

DISTRICTWISE TRENDS
IN
GENERAL LAND-USE
1990-95

INDEX

- AREA UNDER FOREST
- AREA NOT AVAILABLE FOR CULTIVATION
- OTHER UNCULTIVATED LAND
- FALLOW LAND
- NET SOWN AREA
region. It means if there is a change at all more net sown area will be transferred to this category and this may happen particularly due to increasing urbanisation predominantly the spread of the cities of Aurangabad, Nanded, Latur, Jalna, Beed and Osmanabad. The land under this category cannot be brought under cultivation but for a very high price it can be brought under cultivation.

About 277200 hectares of land was not available for cultivation in marathwada region during 1970-75. During 1990-95 about 322700 hectares of land or 5.01% of the total geographical area came under this category. As mentioned in chapter II region of Ajanta range, Balaghat range, Jintur range, Mahur range are not suitable for the agricultural activities.

Map 4.4 A and B indicates the regional distinction of an area under this category and changes there in. The proportion of area not available for cultivation varies from south to north-east, south is north. The highest percentage (8.40%) under this category was recorded in Aurangabad district where as the lowest percentage (1.6%) under area not available for cultivation was recorded in Osmanabad district during 1970-75. Below 2% area was observed under area not available for cultivation in Osmanabad district while 2% to 4% geographical area was found under this group in Jalna district during 1990-95. Above 4% geographical area was observed under area not available for cultivation in Parbhani (4.21%), Nanded (4.5%), Latur (5.38%), Beed (6.13%) and Aurangabad (8.40%) districts during 1990-95. (Map 4.4 A).

Map 4.4B indicates that below 1% negative change in area not available for cultivation was recorded in parbhani and Jalna districts on the other hand above 1% negative change in this category was noticed in Osmanabad and Nanded districts from 1970-75 to 1990-95. Table 4.1 indicates that below 3% positive change in area not available for cultivation was found in Latur and Beed districts where as above 3% positive change in area not available for cultivation was recorded in Aurangabad district during the period of investigation.
3) **Other uncultivable land (Excluding fallow land)**: Other uncultivated land excluding fallow land consists three types of land viz. (a) culturable waste (b) Permanent pasture and grazing land and (c) land under miscellaneous trees crops etc. In the ensuing discussion they are considered together. This is potential agricultural land which will be available for extention of agriculture but not been cultivated owing to different reasons. During 1970-75 about 528100 hectares land was under this categories. Other uncultivable land was decreased from 528100 heceters to 511600 hectares between 1970-75 to 1990-95.

The spatial distribution of other uncultivated land was shown in map 4.5A. This map shows that area under other uncultivable land varies from district to district. Below 8% geographical area was under other uncultivated land was found in Aurangabad, Jalna, Beed and Parbhani districts while 8% to 10% geographical area was observed under other uncultivated area in Osmanabad and Nanded districts during the last quinquennium. Above 10% area was found under other uncultivated land in Latur district during 1990-95.

Below 1% negative change in other uncultivated land was experienced in Beed and Nanded districts on the other hand above 1% negative change was found in Parbhani (3.45%) district from 1970-75 to 1990-95. Below 1% positive change in other uncultivated land was took place in Osmanabad and Aurangabad districts where as above 1% positive change in this categories was recorded in Latur (2.02%) and Jalna (2.52%) districts during the period of investigation (Map 4.5B).

Negative change in uncultivated land was found in Bhir, Nanded and Parbhani districts due to the proportion of other uncultivated land which has gone to either non-agricultural land or agricultural land and particularly, the permanent pastures and grazing lands are brought under cultivation of other uses.

4) **Fallow land**: The fallow land includes current fallow land and old fallowland and largely found due to inadequate water supply or excess of
moisture supply, extensive holdings and heavy clayey soils difficult for tilling at proper time. Sometimes, they are kept fallow for preserving fertility and to prevent soil exhaustion. Thus, efficiency of fallow land system in preserving fertility and maintaining crop yields to be acknowledged. Taking into consideration the period of fallow, census of India has divided this categories into two types, viz. land kept fallow during one year in called current fallow land and when it kept follow for 1 to 5 years it is called as permanent fallow land. However, in the present study, both the sub-categories are grouped together. The sum total of fallow land and net sown area gives the extent of 'arable land' in contrast to land that is not cultivated at all.

The Marathwada region has significant land under fallow viz. 9.62% (620200 hectares) of the total geographical area during 1990-95. The fallow land is decreased from 631200 hectares to 620200 hectares or 9.80% to 9.62% between 1970-75 to 1990-95 in the study region. Regional disparities in the spatial distributional pattern of fallow lands in Marathwada region is exhibited in Map 4.6A. The proportion of fallow land was very high (above 10%) in Jalna, Latur, Osmanabad and Bhir districts during 1970-75. About 5% to 10% fallow land was Nanded, Aurangabad and Parbhani districts during 1970-75.

Out of the total geographical area below 9% area was found under fallow land in Nanded, parbhani and Aurangabad districts during 1990-95. About 9% to 12% geographical area was under fallow land in Jalna (9.11%), Beed (10.42%) and Latur (9.59%) districts where as above 12% geographical area was under fallow land in Osmanabad (16.34%) district during the last quinquennium (Map. 4.6A).

Below 2% negative change in fallow land was experienced in Latur district while above 2% negative change in fallow land was found in Jalna (2.32%) and Beed (5.18%) districts between 1970-75 and 1990-95. Below 2% positive change in fallow land was observed in Parbhani (0.09%), Nanded (0.76%) and Aurangabad (1.95%) districts where as above 2% positive change in fallow land was noticed in Osmanabad district during the period of inves-
tigation (map 4.6B).

5) Net sown area: - This category and fallow lands together constitute the extent of cropped lands in any region and therefore, is of vital significance in studies relating to agricultural geography. The net sown area is the actual area under crops counting areas sown more than once in the same year only once\(^{14}\) A glance at table 4.1 depicting Marathwada’s general landuse instantly reveals that net sown area occupies the share viz. 73.88% in the region’s geographical area. However, it is higher than Maharashtra’s average of 58.30%.

Net sown area was decreased from 4781000 hectares to 4760400 hectares during the period investigation. Below 70% geographical area was under cultivation in Aurangabad district while 70% to 75% area was net sown area in Nanded, Beed, Osmanabad and Latur during the last quinquennium (1990-95). Above 75% geographical area was net sown area in Parbhani and Jalna districts during 1990-95 (Map 4.7A).

Below 4% negative change in net sown area was found in Latur district where as above 4% negative change in net sown area was experienced in Aurangabad and Osmanabad districts. negative change in net sown area was found in Aurangabad and Osmanabad district due to increase in fallow land during the period of investigation. Below 1% positive change in net sown area was found in Jalna and Nanded districts while above 1% positive change in net sown area was found in parbhani (3.61%) was Beed (3.63%) districts from 1970-75 to 1990-95. In the entire study region 0.32% negative change in net sown area was took place between 1970-75 and 1990-95.

4.5 Districtwise per capita net sown area in the study region:

Table 4.2 gives us idea about districtwise per capita net sown area in marathwada region during the last three decades.
MAP NO. 4.7
MARATHWADA REGION

NET SOWN AREA
1990-95

INDEX

A: ABOVE 75%
B: 70% TO 75%
C: BELOW 70%

VOLUME OF CHANGE IN NET SOWN AREA
1970-75 TO 1990-95

INDEX

A: ABOVE +1%
B: BELOW +1%
C: BELOW -4%
D: ABOVE -4%
R.A: -0.32%

MAP NO. 4.8
MARATHWADA REGION

VOLUME OF CHANGE IN LAND-USE
1970-1995

INDEX

DYNAMIC: ABOVE 5%
SEMIDYNAMIC: 3% TO 5%
STATIC CHANGE: BELOW 3%
Table 4.2. Districtwise per capita net sown area.
Figures of population and net sown area are in 'oo'

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ation</td>
<td>spun</td>
<td>net sown</td>
</tr>
<tr>
<td>Augrang.</td>
<td>12345</td>
<td>5411</td>
<td>0.44</td>
</tr>
<tr>
<td>Jalna</td>
<td>9043</td>
<td>7016</td>
<td>0.78</td>
</tr>
<tr>
<td>Beed</td>
<td>12861</td>
<td>8513</td>
<td>0.66</td>
</tr>
<tr>
<td>Parbhani</td>
<td>13390</td>
<td>9503</td>
<td>0.71</td>
</tr>
<tr>
<td>Nanded</td>
<td>13978</td>
<td>7279</td>
<td>0.52</td>
</tr>
<tr>
<td>Latur</td>
<td>9862</td>
<td>5246</td>
<td>0.53</td>
</tr>
<tr>
<td>Osman.</td>
<td>9105</td>
<td>5689</td>
<td>0.62</td>
</tr>
<tr>
<td>Marathwada</td>
<td>80584</td>
<td>48657</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Source: Computed by the Author

Table 4.2 clearly shows that there was an increase of 1.96% per year in the population of study region during the last three decades. The per capita net sown area was 0.60 hectare in 1971 in the study region. It was decreased from 0.60 hectare to 0.49 in 1981 and 0.37 hectare in 1991. Per capita net sown area varies from district to district. The highest per capita net sown area was found in Jalna (0.78 hect) where as the lowest per capita net sown area was found in Aurangabad (0.44 hectare) district in 1971. In 1981 the highest per capita net sown area was found in Jalna (0.60 hectate) district followed by Beed (0.58 hectate). The lowest per capita net sown area (0.38 hectare) was experienced is latur district. Table 4.2 indicates that per capita net sown area was decreased to greater extent in every district in study region. In that, the per capita net sown area has decreased during the span of three decades to a greater extent. The policy implication of decreasing per capita net sown area is that the pressure of population on land is increasing and ways and
means have to be found out to increase productivity of available land for meeting the growing food needs of the region. It is possible through adopting new farm technology in the entire study region.

4.6 Volume of change in landuse from 1970-75 to 1990-95:

Taking into consideration all the landuse categories it will be useful at this stage to measure the overall volume of change of landuse from 1970-75 and 1990-95. Index of volume of change in landuse is indicated by $A/B$ where 'A' is the summation of differences of percentage of landuse categories of increase and 'B' is that of decrease for the period of investigation. $A$ and $B$ should be same but of opposite signs. This overall volume include the land actually involved in the transfer from category to the other category. Naturally, where this volume is greater we can say that more dynamic conditions exist there.

Table No. 4.3: Volume of change in Landuse.
1970-75 to 1990-95.

<table>
<thead>
<tr>
<th>Name of the district</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurangabad</td>
<td>5.18</td>
</tr>
<tr>
<td>Jalna</td>
<td>2.97</td>
</tr>
<tr>
<td>Beed</td>
<td>5.92</td>
</tr>
<tr>
<td>Parbhani</td>
<td>3.70</td>
</tr>
<tr>
<td>Nanded</td>
<td>1.60</td>
</tr>
<tr>
<td>Latur</td>
<td>4.71</td>
</tr>
<tr>
<td>Osmanabad</td>
<td>5.67</td>
</tr>
</tbody>
</table>

Table 4.3 and Map 4.8 clearly indicates that Osmanabad, Beed and Aurangabad have shown dynamic (above 5%) change in general landuse pattern. Parbhani and Latur districts have shown semi dynamic (3 to 5%) change where as static change was occurred in Nanded (1.6%) and Jalna (2.97%) districts during the period of investigation.

4.7 Landuse efficiency:

The proportion of potential agricultural land (uncultivated land)
decreased from 8.19% to 7.94% between 1970-75 and 1990-95. There is scope for extention of cultivated land by bringing fallow and potential agricultural land under cultivation. Therefore, immediate need is to give more emphasis on intensity of cropping and increasing yield from existing cultivated area. Problem of under use of net sown area, low productivity and risk of crop failure are taxing the rural population, therefore, it is fruitful to investigate the degree of intensity with which the net sown area is utilized.

Landuse efficiency may be defined as the extent to which the net sown area is cropped or resown. The gross cropped area as a percentage of the net sown area gives a measure of landuse efficiency which means the intensity of cropping\(^6\). The index of landuse efficiency is obtained by using the following formula.

\[
\text{Gross cropped area} / \text{Net sown area} \times 100
\]

**Table 4.4 : Statement showing landuse efficiency in Marathwada region.**

<table>
<thead>
<tr>
<th>Name of the district</th>
<th>1970-75</th>
<th>1990-95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross cropped area</td>
<td>Net sown area</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Auranga</td>
<td>7944</td>
<td>7435</td>
</tr>
<tr>
<td>Jalna</td>
<td>6614</td>
<td>6092</td>
</tr>
<tr>
<td>Beed</td>
<td>8186</td>
<td>7815</td>
</tr>
<tr>
<td>Parbhani</td>
<td>8828</td>
<td>8103</td>
</tr>
<tr>
<td>Nanded</td>
<td>7633</td>
<td>7270</td>
</tr>
<tr>
<td>Latur</td>
<td>5498</td>
<td>5206</td>
</tr>
<tr>
<td>Osmanabad</td>
<td>6270</td>
<td>5969</td>
</tr>
<tr>
<td>Marathwada region</td>
<td>50973</td>
<td>47890</td>
</tr>
</tbody>
</table>

Source: Computed by the Author.
Table 4.4 reveals that region's average gross cropped area and net sown area was 60 lakh hectarea and 47.6 lakh hectares respectively during 1990-95. The index of landuse efficiency was 126.19% during 1990-95. Landuse efficiency was increased by 19.75% in the entire study region. During 1970-75 below 105% landuse efficiency was observed in Beed and Nanded districts where as about 105% to 108% landuse efficiency indices was took place in Osmanabad, Latur and Aurangabad district. Above 108% index of landuse efficiency was experienced in Jalna and Parbhani district in the first quinquennium.

Indices of landuse efficiency were increased in every district. Below 125% landuse efficiency index was found in Jalna, Beed and Nanded district while 125% to 135% landuse efficiency index was observed in Osmanabad and Latur districts during 1990-95. Above 135% landuse efficiency index was found in Aurangabad and Parbhani district.

Table 4.4 indicates that landuse efficiency index has shown positive change in every district. below 10% positive change in landuse efficiency index was experienced in Nanded and Beed districts. Where as 10% to 25% positive change in landuse efficiency was found in Jalna (13.32%), Osmanabad and Latur districts. Above 25% positive change in landuse efficiency was occurred in Aurangabad and parbhani districts during the period of investigation.

Variations in landuse efficiency are mainly confined to the irrigational possibilities, pattern of agricultural practices, crops and limitations imposed by the physical environment as the soil types, physiography and nature of rainfall distribution etc. The regional average seems to be big, it is higher than state's average figure of 117.10%. On the strength of percentage the region is divided its three categories viz how intensity, medium intensity and high intensity.

i) **Area's of low intensity (Below 125%)** :- Areas of low intensity are distributed in Jalna, Beed and Nanded districts. Percentage of irrigation, physiography, soil condition, use of chemical fertilizers, pesticides, high yielding
variety seeds all these factors are responsible for low intensity.

ii) Areas of medium intensity (125% to 135%) :- Area's of medium intensity confined to Latur and Osmanabad district. Physiography, soil condition, minor irrigation schemes, use of manure's etc are responsible for the medium intensity in Latur and Osmanabad districts.

iii) Area's of high intensity (Above 135%) :- Area's of high intensity are mainly found in Aurangabad and Parbhani district. Irrigated area, use of chemical fertilizer's, pesticides, improved seed, advanced agricultural techniques are responsible for high intensity.

4.8 Summary :

i) About 0.03% to 0.74% negative change in forest area was experienced in Osmanabad, Jalna, Parbhani and Aurangabad districts during the period of investigation. The area under forest is decreased due to the cutting of trees in the above mentioned district. About 0.26% to 0.79% positive change in area under forest was observed in Latur, Beed and Nanded district.

ii) About 0.13% to 1.12% negative change in area not available for cultivation was experienced in Parbhani, Jalna, Osmanabad and Nanded districts where as 2.07% to 3.08% positive change in area not available for cultivation was experienced in Beed, Latur and Aurangabad districts during the period of investigation.

Below 1% negative change in uncultivated land was noticed in Beed and Nanded districts and above 1% negative change was found in Parbhani (3.45%) district from 1970-75 to 1990-95. About 0.02% to 2.52% positive change in uncultivated area was experienced in Osmanabad, Aurangabad, Latur and Jalna districts during the period under study.

iii) About 0.91% to 5.18% negative change in fallow land was noticed in Latur, Jalna and Beed districts while 0.09% to 5.65% positive change in fallow land was found in Parbhani, Nanded, Aurangabad and Osmanabad. The fallow land was decreased due to the increase in population in Latur, Jalna and Beed districts. Due to increase in population fallowland was brought under cultivation. Fluctuation in rainfall, negligence of the farmers are re-
sponsible for the positive change in Parbhani, Nanded, Osmanabad and Aurangabad districts.

iv) The per capita net sown area has decreased during the span of three decades to a greater extent. The policy implication of decreasing per capita net sown area is that the pressure of population on land is increasing and ways and means have to be found out to increase productivity of available land for meeting the growing food needs of the region. It is possible through new farm technology in the entire study region.

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