Chapter IV

General Landuse and Industrial Cropping Pattern

4.1 Introduction
4.2 Meaning and importance of Landuse
4.3 Landuse Classification
4.4 Agricultural Resources as bases for Industrial development
4.5 Districtwise trends in general Landuse pattern
4.6 Districtwise per capital net sown area in study region.
4.8 Landuse efficiency.
4.9 Changing Industrial cropping pattern.
General Landuse and Industrial Cropping Pattern

4.1 Introduction:

Landuse 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 from and the farmer to the fields, gardens and pastures, fallow land, forest and to the isolated farmstead (Freeman 1968) as a geography deals with the special relationship between these aspects and planning. This is because Landuse 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, where as others represent amour constant demand (Jackson, 1963). In this way land utilization is the use made of the land by man as surveyed and mapped in a series of recognized categories. The primary uses of land are for crops Forest, pasture, mining transportation, gardening, residence recreational, industrial, commercial and uncultivable waste, barren and fallow land etc. It is not possible to use land for two or more purpose simultaneously though sometimes even this is possible i.e. the pastured woodland. In most cases the proportion of wasteland is quite large.

The concept of Landuse planning has been recently introduced in land utilization studies which mean the formulation and administration of land polices aimed at the employment of land resources and the uses for which they are socially, politically and economically best suited. With the help of land utilization survey, probable change in the use of land can be estimated in close connection with the institutional social and public expenditure the area. But the regional and national treatment of landau studies receive area attention of the scientist. Thus the study of Land utilization has both economic, Geographic and dimensions.

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. The geographic aspect consists largely of a survey of the
temperature humidity, to topography and soil conditions, which influence the utilization of land for crops, pastures or forest.

Landuse is the latest ramification of the fast growing tree of economic geography. Geographers can present a clear picture of the potential of Landuse conductive to fruitful planning for a massive agricultural turn over.

4.2 Meaning and importance of Landuse:

The difference between Landuse and Land utilization is important. Landuse is the use actually made of any parcel of land. Lease, a permanent and industrial location are Landuse categories, where as the term residential industrial and agricultural refers to a system of land utilization implying roads, neighborhood retail and service activities as well as location of industries and the carrying of agricultural pursuits. In a rural 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, where as orcharding trust farming and grazing indicate a system of land utilization.

Land is the basic resource of human society. Its utilization shows a reciprocal relationship between the prevailing ecological conditions of a particular region and men. The term land utilization is particular region and man. The term 'Land utilization' is also used for varied utilization of land and soil surveys e.g. land under cultivation, pasture barren, orchard, falloffs, waste, cultivable waste, settlements, forests water bodies etc. According to J.L.Buck "Land utilization is the satisfaction which the farm population desires from the type of agriculture developed the provision for future production and the contribution to national needs".

While the definition given by saltier is as follows: "Land utilization research can be described quoted by M.B. Nanavati and J.J. Anjaria, the Indian rural problem vora and com. Publisher ltd. Bombay.

As dealing with problem situations in which people in a given locality are in the process of transformation from activities with certain land requirement to
activities with different land requirements" (Kelso 1964). 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 charged situation 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 constitute the physical background of agriculture and determine the limits of both the culturability and productivity of the land utilization mainly deals with the problems related to the society and the region as a whole rather than a private farmer. Landuse is mainly related to the optimum use of the limited land between the alternative major types of Landuse. In rural areas the major types of Landuse is as follows:

1. Agricultural lands  
   a. Non irrigated lands  
   b. Irrigated land  
   c. Dry farming areas  
   d. Grazing areas  
2. Village orchards or forest lands.
3. Forest lands covered  
4. Forest reclaimed Landuse  
5. Culturable or recreational Landuse.

Land utilization is also related to "Conversion of land from one major use to another general use". Nanavati (1957) 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 Landuse study. This is because these aspects depend upon personal experience and intuition of the farmer who decides which crops should be grown in rotation.

For human existence, with in certain biotic ecological and economic conditions the utilization of land is of prime importance. It involves a relationship 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. If there is no utilization of land the carafe think of any progress. Thus the study of land utilization is of immense value in tracking 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 Landuse planning of a particular region.

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 there fundamental utilize, intelligently and effectively in satisfying. The needs of human society. Thus land must be carefully utilized so that it may fulfill over 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 land use problems and be the basis of investigating the Landuse problems and be the basis of planning for the best use of our land after considering the major Landuse categories.

The comparability of major Landuse categories shows that there is good relationship between forestry and grazing lands with recreation, but there is a very poor correlation between wild life sanctuaries with the agriculture and water reservoirs. 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 storie index. based upon soil profile, soil texture and other physical factors combined to control the use capabilities of particular soil and its productivity under favorable environmental conditions. The use capabilities provide farmers a basis.

For producing over a longer period of time under stated conditions of use on specific parcel or units of land. The increase in population needs additional land for shelter and food produce and requires judicial utilization of our resource. In view of this surging problems. World Landuse inventory survey had been proposed in the international Geographical congress of 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 pretented. These commission proposed a simple classification of world land use along with colour scheme which is mainly suited to local condition. The Classification is as follows.

World land use survey was drawn up under the auspices of uneco. Settlement and associated non-agricultural land (dark and light red).

Horticulture (deep purple)

Trek and Perenital crops(light Purple)

Crop-land continental rotation cropping (dark browk) land rotation (Light brown.)

Improved permanent pasture (light green)

Unimproved graling used(Orange) not used (Yellow)

Wood lands: dues (dark green) open (Medium green) scrub (Olive green).

Swamp forest(blue green) cut forest green(stipple forest with subsidiary cultivation(green) Swamps and marshes (blue) Unproductive land (gray)

L.D. Stamp had suggested the Classification on of the land of Britain into Categories, for broad national policy of Landuse planning and convection of land resources. He had proposed three major categories and 10 types based on a) The nature of the site(elevation and stop) 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.

The ten sub types are

good quality land :

1. First class land.

2. Good general purpose form land.

3. First class land with grass.

4. Good but heavy land.

5. Medium quality light land.
area, etc. But for the present study, they are grouped into five Landuse categories viz. 1) Area under forests 2) Area not available for cultivation 3) other uncultivated land excluding fallow land. 4) Follow land and 5) Net sown area because areas under other categories are insignificant out of these categories, the first and second comprises the total non-agricultural land. Third is the potential agricultural land and fourth and fifth constitute the agricultural land.

4.4 Agricultural Resources as bases for Industrial Development:

It is unrealistic to consider agricultural development and industrialization as separate in compatible they are in fact closely related. Improvement in the Productivity of agriculture is one of the most important means of promoting industrialization. It has seen marked in the economic history of many industrialized countries that improvement in agriculture fostered and to paved the way for the evaluation and growth of industry. "The leading industrialization countries of today were once predominately agricultural, and economic historians, have nautili agricultural, and economic historians have traced the various ways in which a prosperous and expending agriculture formed that basis for the concurrent or subsequent establishment and expansion of Manufacturing."

Only cash crops like sugar cane. Cotton tobacco, Jute, tea Coffee, cocoa, and oil seeds provides sound base for the development of industries. This is the general thinking of the many Industrialists. Even most of the geographers studies have been merely concerned with sugarcane, Jute, Textiles, Cocoa, Tobacco, tea, coffee and oil seed industries.

4.5 District wise Trends in General Landuse in Marathwada Region:

Here an attempt is made to study the Landuse pattern in 1981 and present Landuse and Landuse scope the development of industries in the region in the near future census of India have classified utilization of land in the categories but here two major Landuse have been studied from the view point of
basis for industrial development. There is close relationship between the
Landuse and industrial development. Most of the industrial countries of the world
have predominately agricultural backgrounds and rich in agricultural reasonless.
Their countries lead in the development of industry largely because they
possessed one of the richest agricultural areas. The region where cultivable
area is high. It can extensively used for important industrial crops according to
the suitable climate of the region, which may be provided the scope for a
number of subsidiary industries with the advancement of science and technology
improvement in the Landuse of fallow land. Net sawn area and forest areas
should help in increasing the production of industrial crops, there by providing
more opportunities for the development of certain manufactoring Industries.

Due to the location and physical setting the general Landuse pattern of
the region under study differs from district to district. The existing pattern of
Landuse shown in map 4% appears to have been resulted from a process of
land exploitation with in 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 there actors played
important role in determining the agricultural practices. Total Geographical areas
of Aurangabad district was increased from 1007 hectares to 1010600 Electors
due to included some villages and Hamles from Jalna District. About 76.69% to
71.75% of the total geographical area was under cultivation because of varied
physical features.

District wise trends in general Landuse pattern in Marathawada region is
shown in Table No.4.1 with this generalized pictures of general Landuse pattern
of the study region a detailed analysis of the same is given below.
Medium Quality Land:
6. Medium quality general
7. Poor quality heavy land.
8. Poor quality mountain and moorlands.

Poor quality land:
1. Poorest land.

J.L. Buck in his monumental study of land Utilization in Chaina conclude from a survey of 16786 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:
1. Arable land.
2. Cultivated land.
4. Forest Area.
5. Land suitable.

In India, Landuse categories recognized by different scholas belongs to two different type e.g. town planners and urban geographers. Town planners quite often categories urban Landuse as residential, commercial, Industrial, transport, communication public utilities, open space, agricultural vacant land and water bodies. On the other hand, there are minor disserences amongst the urban Landuse into the following categories, Residential, agricultural, open spaces, military lands, parks and burial grounds.

In the light of physic-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
## Table No. 4.1
Districtwise Land Utilization in Marathwada Region during, 1980-81 and 2004-2005 (Area in 'oo' hectares)

<table>
<thead>
<tr>
<th>District</th>
<th>Year, Total Geo. Area and Volume of Change (VOC)</th>
<th>Area under forest</th>
<th>Area not available for cultivatio n</th>
<th>Other uncultivable Land</th>
<th>Fallow Land</th>
<th>Net Sown area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurangabad</td>
<td>1980-81</td>
<td>810</td>
<td>153</td>
<td>1033</td>
<td>352</td>
<td>7729</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(8.03)</td>
<td>(1.51)</td>
<td>(10.25)</td>
<td>(3.49)</td>
<td>(76.69)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>814</td>
<td>108</td>
<td>530</td>
<td>1402</td>
<td>7252</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(8.05)</td>
<td>(1.06)</td>
<td>(5.24)</td>
<td>(13.87)</td>
<td>(71.75)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.02%</td>
<td>-0.45%</td>
<td>-5.01%</td>
<td>+10.38%</td>
<td>-4.94%</td>
</tr>
<tr>
<td>Jalna</td>
<td>1980-81</td>
<td>61</td>
<td>323</td>
<td>72</td>
<td>120</td>
<td>7151</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(0.78)</td>
<td>(4.18)</td>
<td>(0.93)</td>
<td>(1.55)</td>
<td>(92.54)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>61</td>
<td>342</td>
<td>30</td>
<td>334</td>
<td>6960</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(0.78)</td>
<td>(4.42)</td>
<td>(0.38)</td>
<td>(4.32)</td>
<td>(90.07)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>0.00%</td>
<td>-0.24%</td>
<td>-0.56%</td>
<td>+2.77%</td>
<td>-2.47%</td>
</tr>
<tr>
<td>Beed</td>
<td>1980-81</td>
<td>247</td>
<td>471</td>
<td>657</td>
<td>2719</td>
<td>7082</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(2.21)</td>
<td>(4.20)</td>
<td>(5.83)</td>
<td>(24.34)</td>
<td>(63.40)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>223</td>
<td>423</td>
<td>516</td>
<td>1584</td>
<td>7939</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(2.09)</td>
<td>(3.96)</td>
<td>(4.83)</td>
<td>(14.82)</td>
<td>(74.36)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>0.12%</td>
<td>-0.24%</td>
<td>-1.00%</td>
<td>-9.52%</td>
<td>+10.09%</td>
</tr>
<tr>
<td>Osmanabad</td>
<td>1980-81</td>
<td>06</td>
<td>82</td>
<td>710</td>
<td>486</td>
<td>6069</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(0.08)</td>
<td>(1.11)</td>
<td>(9.65)</td>
<td>(6.60)</td>
<td>(82.53)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>40</td>
<td>40</td>
<td>576</td>
<td>1144</td>
<td>5750</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(0.52)</td>
<td>(0.52)</td>
<td>(7.62)</td>
<td>(15.15)</td>
<td>(76.15)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.44%</td>
<td>-0.59%</td>
<td>-2.03%</td>
<td>+8.55%</td>
<td>-6.387%</td>
</tr>
<tr>
<td>Parbhani</td>
<td>1980-81</td>
<td>333</td>
<td>139</td>
<td>1134</td>
<td>499</td>
<td>8867</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(3.03)</td>
<td>(1.26)</td>
<td>(10.33)</td>
<td>(4.54)</td>
<td>(80.08)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>377</td>
<td>270</td>
<td>986</td>
<td>604</td>
<td>8800</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(3.41)</td>
<td>(2.44)</td>
<td>(8.93)</td>
<td>(15.47)</td>
<td>(79.73)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.38%</td>
<td>+1.18%</td>
<td>-1.4%</td>
<td>+0.93%</td>
<td>-0.35%</td>
</tr>
<tr>
<td>Nanded</td>
<td>1980-81</td>
<td>800</td>
<td>173</td>
<td>1398</td>
<td>487</td>
<td>7473</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(7.74)</td>
<td>(1.67)</td>
<td>(13.53)</td>
<td>(4.31)</td>
<td>(72.33)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>919</td>
<td>324</td>
<td>872</td>
<td>1330</td>
<td>7100</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(8.71)</td>
<td>(3.07)</td>
<td>(8.26)</td>
<td>(12.61)</td>
<td>(67.33)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.97%</td>
<td>+1.4%</td>
<td>-5.27%</td>
<td>+8.3%</td>
<td>-5.0%</td>
</tr>
<tr>
<td>Latur</td>
<td>1980-81</td>
<td>07</td>
<td>74</td>
<td>644</td>
<td>440</td>
<td>5509</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(0.10)</td>
<td>(1.10)</td>
<td>(9.64)</td>
<td>(6.59)</td>
<td>(82.54)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>23</td>
<td>40</td>
<td>483</td>
<td>480</td>
<td>6140</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(0.32)</td>
<td>(0.55)</td>
<td>(6.74)</td>
<td>(6.69)</td>
<td>(85.68)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.22%</td>
<td>-0.55%</td>
<td>-3.10%</td>
<td>+0.10%</td>
<td>+3.14%</td>
</tr>
<tr>
<td>Total Region</td>
<td>1980-81</td>
<td>2264</td>
<td>1415</td>
<td>5103</td>
<td>5103</td>
<td>49880</td>
</tr>
<tr>
<td></td>
<td>1980-81</td>
<td>(3.49)</td>
<td>(4.36)</td>
<td>(7.87)</td>
<td>(7.87)</td>
<td>(76.98)</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>2457</td>
<td>1547</td>
<td>3993</td>
<td>6878</td>
<td>49941</td>
</tr>
<tr>
<td></td>
<td>2004-05</td>
<td>(3.79)</td>
<td>(2.38)</td>
<td>(6.16)</td>
<td>(10.61)</td>
<td>(77.07)</td>
</tr>
<tr>
<td></td>
<td>VOC in %</td>
<td>+0.30%</td>
<td>-1.98%</td>
<td>-1.71%</td>
<td>+4.72%</td>
<td>+0.99%</td>
</tr>
</tbody>
</table>

Source: Agricultural Dept. of Districts of Marathwada Region
1) **Area Under forest:**

About 6481600 hectares or 3.79% of the geographical area of the Marathawada region was under forest during 2004-05. It increased from 6479600 Hectares to 6481600 Hectares during the period of investigation. Tables No.4.1 reveals that there have been variations in forest area from district to district.

In 1980-81 below 1% geographical area was recorded under forest in Jalna, Osmanabad, and Latur district. Where as 1% to 5% forest area was noticed in Beed, Parbhani district. Above 5% geographical area was experienced under forest in Aurangabad and Nanded district during the period 1980-81(map 4.1 A) particularly move forest area is found in Aurangabad and Nanded district. Due to hilly area and high distribution & monsoon.

Below 1% positive change in forest area was found in Aurangabad Osmanabad Parbhani and Latur and below 1% negative change in forest area was recorded in Beed and Nanded district from 1980-81 to 2004-05 map No. 4.1 B.

2) **Area not available for cultivation:**

This category includes as the land put to Non agricultural uses and (b) barrer and uncultivable land. These uses shows that these areas will be no more available for crop cultivation. These areas which not available for crop cultivation show a close association with other uncultivated land and the net sown area in Marathawada 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 urbanization predominately the spread of the cities of district place. The land under this category can not be brought under cultivation but for a very high price it can be brought under cultivation.

Out of the total geographical area below 3% area was found under area not available for cultivation in Aurangabad, Osmanabad, Parbhani, Nanded and Latur district while 3 to 50% geographical area was recorded under area not available for cultivation in Jalna and Beed district during 1980-81.
AREA UNDER FOREST (1983-81 AND 2004-05)
MAP. NO - 4.1A

VOLUME OF CHANGE IN AREA UNDER FOREST
(1980-81 AND 2004-05)
MAP. NO - 4.1B

Above 57%
17% to 57%
Below 17%

Below 17% Positive
Below 17% Negative
AREA NOT AVAILABLE FOR CULTIVATION
(1980-81 AND 2004-05)
MAP.NO-4.2A

VOLUME OF CHANGE IN AREA NOT AVAILABLE FOR CULTIVATION
(1980-81 AND 2004-05)
MAP.NO-4.2B

3% to 5%
Below 3%

Below 0.5% to 1.5% Positive
Below 0.5% Negative
Above 5% Negative
The highest area not available for cultivation was recorded in Beed district 4.20% during 1980-81. Map 4.2 A

Below 0.5% to 1.5% positive change in area not available for cultivation was recorded in Nanded and Parbhani districts where as below 0.5% negative change in area not available for cultivation was recorded in Aurangabad, Jalna Beed, and Latur district from 1980-81 to 2004-05. Above 5% negative change in this categories was noticed in Osmanabad and Latur districts during the period of investigation. Map 4.2 B

3) Other Uncultivable Land:
Other uncultivable land excluding fallow land consists three types of land viz. (A) Cultural waste (B) Permanent pasture and grazing Land and (C) land under miscellaneous trees crops etc.

In the ensuing discussion they are consider together. This is potential agricultural land which will be available for extension of agriculture but not been cultivated owing to difference reasons. During 1980-81 about 510300 Lectures land was found under this categories and it was decreased 399300 Hectares between 1980-81 to 2004-05 in the study region. The special distribution of other uncultivated land was shown in map 4.3 A. This map shows that area under uncultivable land varies from district to district in the study region.

Out of the total geographical area below 2% area was observed under this category in Marathawada region in Jalna district (0.93%) and 2% to 7% other uncultivable land was noticed in Beed district and above 7% other uncultivable land was recorded in Aurangabad, Osmanabad, Parbhani, Nanded and Latur district during the period 1980-81 Map. 4.3 A

Negative changes were experienced in this category in the study region during the period under study. Below 1% negative change in area under uncultivable land was observed in Jalna and Beed district while 1% to 3% negative change in area under uncultivable land was noticed in Osmanabad,
OTHER UNCULTIVABLE LAND (1980-81 AND 2004-05)
MAP.NO- 4.3A

VOLUME OF CHANGE IN OTHER CULTIVABLE LAND
(1980-81 AND 2004-05)
MAP.NO-4.3B

Below 2%
2% to 7%
Above 7%

Below 1% Negative
1% to 3% Negative
Above 3% Negative
Parbhani district and above 3% negative changes in area under uncultivable land was recorded in Aurangabad, Nanded and Latur district in the period of investigation. Map 4.3 B

Negative change in uncultivable land was took place all district due to the proportion of other uncultivable land which has gone to either non agricultural land or agricultural land and particularly, the permanent pastures and grazing lands are brought under cultivation or other uses.

4) Fallow Land:

The fallow land includes current fallow land and largely found due to inadequate water supply or excess of moisture supply extensive holdings and heavy Claire soils difficult for tilling at proper time sometimes they are kept fallow for presetting fertility and to present soil exhaustion. Thus efficiency of fallow land system in presetting fertility and maintain crop yields to be acknowledged. Taking into consideration the period of fallow census of India, has dinned this categories into two types viz. Land kept fallow during one year is called current fallow land and when it kept fallow for 1 to 5 years it is called as 'permanent fallow land'. How ever in the present study both the sub-categories are gripped 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 Marathawada region has significant land under fallow land (7.87%) 510300 Hectares in 1980-81 of the total geographical area, fallow land was increased from 7.87% to 10.61% between 1980-81 to 2004-05. The regional disparity in fallow land is shown in map. 4.4 A.

The proportion of fallow land was very high in Beed district (24.34%) while it was very low in Jalna district (1.55%) during 1980-81. The proportion of fallow land was below 05% in Aurangabad, Jalna, Parbhani, Nanded district. Where as 5% to 7% fallow land was recorded in Osmanabad, Parbhani, Nanded and Latur district above 7% fallow land was recorded in Beed district (24.34%) during 1980-81. Map 4.4 A.
About 4.72% positive change in fallow land was observed in study region from 1980-81 to 2004-05 below 2% positive change was observed in Latur, Parbhani district where as 2% to 5% positive change was observed in Jalna district and above 5% positive change was recorded in Nanded, Osmanabad and Aurangabad district between 1980-81 to 2004-05. There is not negative change in fallow land during the period of investigation. Map. 4.4 B.

5) Net Sown Area:

This category and fallow land together constitute the extent of cropped land 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.18

The net sown area increased from 4988000 hectares to 4994100 hectares between 1980-81 to 2004-05. It means that net sown area increased from 76.98% to 77.07% in the study region. Out of the total geographical area below 70% geographical was found under net sown area in Nanded district whereas 70% to 80% geographical area was observed in under net sown area in Aurangabad, beed, Osmanabad, and Parbhani district. Above 80% geographical area was recorded under net sown area in Latur and Jalna district during 2004-05. (Map 4.7 A)

About 0.09% positive change in net sown area was took place in the study region from 1980-81 to 2004-05. Below 3% negative change in net sown area was noticed in Jalna, Parbhani, districts whereas 3% to 5% negative change in net sown area was recorded in Aurangabad, Nanded, and Latur district. Above 5% negative change was took place in Osmanabad district and positive change was recorded in Beed district (10.09%) during the period of investigation. (Map 4.7 B). Positive change was took place in Beed district due to the increase in population and irrigation facilities.
NET SOWN AREA (1980-81 AND 2004-05)
MAP NO- 4.5A

VOLUME OF CHANGE IN NET SOWN AREA
(1980-81 & 2004-05)
MAP NO-4.5B
**District wise per capita Net sown Area in Marathawada Region:**

Table No. 4.2 indicates that the per capita net sown area was 0.51 hectares in 1981 in the study region. In 2001 it was about 0.42 hectares. It means that 0.9 hectares during the period of twenty years per capita net sown area varies from district to district in the study area decreased per capita net sown area. In 1981 Parbhani district was leading in per capita net sown in the study region. While in 2001 Parbhani, Osmanabad were leading in per capita net sown area in the study region. Table No. 4.2 indicates that per capita net sown area was decreased in the study region. Particularly it was decreased slightly in Jalna, Beed, Latur, Osmanabad district during the span of twenty years during 2001. The highest per capita net sown area was found in Parbhani (0.65 hectares). Where as the lowest per capita net sown area was recorded in Aurangabad (0.26-Hectare) District. Map 4.5 A & B

In fact the per capita net sown area has decreased during the span of three decades to some 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 heads of the region. It is possible through adopting new farm technology in the entire study region.

**Volume of Change in Landuse from 1981-85 to 2000 –2005:**

Taking in to consideration all the Landuse categories is will be useful at this stage to measure the over all volume of change of Landuse from 1980-85 and 2000-2005. 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 includes 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 exists there.
Table 4.2
Districtwise per capita net sown Area in Marathwada Region.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Net sown</td>
<td>Per capita</td>
<td>Population</td>
<td>Net sown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>are in Lead</td>
<td>area in hect.</td>
<td></td>
<td>are in hect.</td>
</tr>
<tr>
<td>1</td>
<td>Aurangabad</td>
<td>1582</td>
<td>815</td>
<td>0.51</td>
<td>2897</td>
</tr>
<tr>
<td>2</td>
<td>Jalna</td>
<td>1365</td>
<td>713</td>
<td>0.52</td>
<td>1613</td>
</tr>
<tr>
<td>3</td>
<td>Parbhani</td>
<td>1491</td>
<td>1006.56</td>
<td>0.67</td>
<td>1528</td>
</tr>
<tr>
<td>4</td>
<td>Nanded</td>
<td>2330</td>
<td>898</td>
<td>0.36</td>
<td>2876</td>
</tr>
<tr>
<td>5</td>
<td>Latur</td>
<td>1677</td>
<td>686.3</td>
<td>0.46</td>
<td>2080</td>
</tr>
<tr>
<td>6</td>
<td>Beed</td>
<td>1822</td>
<td>988</td>
<td>0.54</td>
<td>2161</td>
</tr>
<tr>
<td>7</td>
<td>Osmanabad</td>
<td>1276</td>
<td>720</td>
<td>0.56</td>
<td>1486</td>
</tr>
</tbody>
</table>

Source: Socio-Economic Abstracts of Districts of Marathwada Region

Table No. 4.3 and map 4.8 clearly indicates that Beed district have shown dynamic change above (10.09%) in general land use pattern Aurangabad, Nanded and Osmanabad have shown dynamic change above (10.09%) in general land use pattern Aurangabad, Nanded and Osmanabad have recorded semi dynamic change (4% to 8%) during the period of investigation. Jalna Parbhani and Latur districts have shown static change below (4%) in general land use from 1980-85 to 2000-05.

**Land use Efficiency**:

The proportion of potential geographical land (uncultivated land) from 1.71% to 0.9% transferred to net sown area during the period of investigation in the study region. There is vase scope for extenuation of cultivated land by bringing fallow and potential agricultural land under net sown area.
Table No. 4.3
Volume of Change in Landuse 1980-85 to 2000-05

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>District</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aurangabad</td>
<td>4.94</td>
</tr>
<tr>
<td>2</td>
<td>Jalna</td>
<td>2.47</td>
</tr>
<tr>
<td>3</td>
<td>Parbhani</td>
<td>0.35</td>
</tr>
<tr>
<td>4</td>
<td>Beed</td>
<td>10.09</td>
</tr>
<tr>
<td>5</td>
<td>Nanded</td>
<td>5.0</td>
</tr>
<tr>
<td>6</td>
<td>Latur</td>
<td>3.14</td>
</tr>
<tr>
<td>7</td>
<td>Osmanabad</td>
<td>6.38</td>
</tr>
</tbody>
</table>

Source: Computed by the Author

Therefore, immediate need is to give more emphasis on intensity of cropping and increasing field 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 & intensity with which the net sown area is utilized, Land use 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 land use efficiency, which means the intensity of cropping. The index of land use efficiency is obtained by using the following formula.

\[
\text{Index of land use efficiency} = \frac{\text{Gross cropped area}}{\text{Net sow area}} \times 100
\]
Table No. 4.4
Statement showing Districtwise land use efficiency in Marathwada region.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>District</th>
<th>Gross Crop pc% area in Heat</th>
<th>Net sown Area Culture</th>
<th>Index efficiency of Land use %</th>
<th>Gross propeo area</th>
<th>Net sown area</th>
<th>Index.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aurangabad</td>
<td>8150</td>
<td>7548</td>
<td>107.97</td>
<td>8530</td>
<td>7252</td>
<td>117.62</td>
</tr>
<tr>
<td>2</td>
<td>Jaina</td>
<td>6925</td>
<td>5729</td>
<td>120.08</td>
<td>7300</td>
<td>6960</td>
<td>104.88</td>
</tr>
<tr>
<td>3</td>
<td>Parbhani</td>
<td>9811</td>
<td>8215</td>
<td>119.40</td>
<td>9860</td>
<td>8800</td>
<td>112.04</td>
</tr>
<tr>
<td>4</td>
<td>Beed</td>
<td>9984</td>
<td>8453</td>
<td>118.11</td>
<td>9390</td>
<td>7939</td>
<td>118.27</td>
</tr>
<tr>
<td>5</td>
<td>Nanded</td>
<td>8193</td>
<td>6781</td>
<td>120.82</td>
<td>8290</td>
<td>7100</td>
<td>116.76</td>
</tr>
<tr>
<td>6</td>
<td>Latur</td>
<td>6285</td>
<td>5581</td>
<td>112.61</td>
<td>7630</td>
<td>6140</td>
<td>124.26</td>
</tr>
<tr>
<td>7</td>
<td>Osmanabad</td>
<td>6981</td>
<td>6550</td>
<td>106.58</td>
<td>6960</td>
<td>5750</td>
<td>121.04</td>
</tr>
<tr>
<td>8</td>
<td>Marathwada Region</td>
<td>56329</td>
<td>48857</td>
<td>115.29</td>
<td>57960</td>
<td>49941</td>
<td>116.05</td>
</tr>
</tbody>
</table>

Source: Computed by the Author

Table 4.4 indicates that regions average gross cropped area and net sown area 5632900 hectares and 4994100 hectares respectively during 1980-85 to 2000-2005. The index of land use efficiency was 115.29% in 1980-85 and it was increased 116.05% during 2000-05. It means that land use efficiency index was increased by nominal rates. Below 110% Landuse efficiency Indices was found in Aurangabad and Osmanabad district. 110 to 115% land use efficiency index was recorded in Jaina, Parbhani, Beed, and Latur districts and above 120% Landuse efficiency index was found in Nanded district during the period of 1980-85.

In 2004-05 highest Land use efficiency was found in 1 tur district and lowest land use efficiency was recorded in Jaina district below 105% land use efficiency index was found in Parbhani district and above 115% land use efficiency was recorded in remarkable district of Marathwada region during 2000-2005.

Below 5% negative change in land use efficiency was recorded in Nanded district where as 7.36% negative change in land use efficiency index was found in Parbhani district. Remaining district was recorded positive change in the study region variation in the land use efficiency are mainly confined to the regions where irrational facilities are more pattern of agricultural practices,
Physical and non physical determination of agriculture are also responsible for the variation in land use efficiency. The regional average figure seems to be big. It is higher than other district of state average figure of 116.05% on the strength of percentage the regions is divided on the strength of percentage the region is divided into three categories viz. Low intensity, medium intensity and high intensity.

1) **Areas of low intensity (below 110%)**:

   Areas of low intensity is distributed in Jalna district most of the area is barren in these district soil are poor wells are providing water for irrigation but most of the wells became dry in summer. Season Lense, this district have low intensity of land use efficiency (map 4.8)

2) **Areas of medium intensity (110% to 120%)**:

   Areas of medium intensity is confined to Aurangabad, Parbhani, Beed, and Nanded district. These district having low less irrigation area. Some part of these districts are having high intensity of land use efficiency. Physical and non-physical determinants of agriculture are responsible for the medium Landuse efficiency.

3) **Areas of high intensity(Above 120%)**:

   Areas of high intensity of land use efficiency is found in Latur and Osmanabad district fertility of soil, use of chemical fertilizers, use of high yielding variety seeds and modern agricultural implements are responsible for the high intensity of land use efficiency .

**Changing Industrial Cropping pattern**:

Revient of changes of cropping pattern qujes the shifts in area under different crops over a period of time. The heterogeneity and possibility of crop substitution are the two important characteristics of agricultural land, which deserve special mention in studies pervading to cropping pattern changes. Heterogeneity arises from agro climatic difference existing with the various
regions of the state. The heterogeneity of land also arises due to differences in availability of irrigation facilities among different regions of the state Investigation pertaining to study of changes in cropping pattern assume special importance in taking cognizance of soil climate factors and the crops that could be growth with in a particular environment. Impact of changes in technological, economic and institutional factors can be felt only when the existing cropping pattern undergoes a change.

Generally the farmer have a tendency to stick to a stable cropping pattern under any given agro climatic region and they do not shift much from this position except to the extent dictated by price factors in adjusting a cerate allocation.

The industrial cropping pattern of individual or ground of farmers with in each tahsil determine the aggregate industrial cropping pattern. In allocation of land resource the farmers maximize their expected return. The farmers respond to changes in input casts output prices pattern on a large scale. Lack of sufficient credit facilities, ignorance and uncertain future prospects restrain the farmers from undertaking any significant change in their area allocation. The slower rate of adoption of high yielding varieties programme by small farmers in the district is a sufficient proof of this pattern of behavior. In the long run the changes in cropping pattern do occur In the light of this view the study of change in cropping pattern of the Marathawada region is under taken. Review of changes in aggregate cropping pattern in the study region during the period 1980-81 to 2004-05 is 2004-05 is briefly presented in table No. 4.5. The five-year average area under different crops and the relative share of each crop in gross cropped area has been deployed for the study of cropping pattern. Table no. 4.5 presents these details of the Marathawada region with reference to the time period 19980-81 to 2004-05.
Table 4.5
Changing Industrial Cropping pattern in Marathawada Region
1980-85 to 2000-2005 Area in the Hectare

<table>
<thead>
<tr>
<th>Name of the crop</th>
<th>1980-81 to 84-85</th>
<th>2000-01 to 2004-05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>208815 (-3.86%)</td>
<td>98423 (2.00%)</td>
</tr>
<tr>
<td>Wheat</td>
<td>325654 (-6.06%)</td>
<td>40695 (-0.82%)</td>
</tr>
<tr>
<td>Jawar</td>
<td>1921427 (-35.58%)</td>
<td>1577977 (-32.18%)</td>
</tr>
<tr>
<td>Bajara</td>
<td>357847 (-6.62%)</td>
<td>293191 (-5.97%)</td>
</tr>
<tr>
<td>Other cereals</td>
<td>373645 (-6.92%)</td>
<td>52939 (-1.07%)</td>
</tr>
<tr>
<td>Total cereals</td>
<td>3172388 (-59.01%)</td>
<td>2063225 (-42.04%)</td>
</tr>
<tr>
<td>Gram</td>
<td>132666 (-2.45%)</td>
<td>199270 (-4.06%)</td>
</tr>
<tr>
<td>Mung</td>
<td>239758 (-4.44%)</td>
<td>188642 (-3.84%)</td>
</tr>
<tr>
<td>Tur</td>
<td>265327 (-4.91%)</td>
<td>354561 (-7.23%)</td>
</tr>
<tr>
<td>Other (pulses)</td>
<td>166173 (-3.07%)</td>
<td>22480 (-0.45%)</td>
</tr>
<tr>
<td>Total Pulses</td>
<td>679258 (-14.86%)</td>
<td>764953 (-15.58%)</td>
</tr>
<tr>
<td>Groundnut</td>
<td>159155 (-2.94%)</td>
<td>47012 (-0.95%)</td>
</tr>
<tr>
<td>Other oil seeds</td>
<td>68231 (-1.26%)</td>
<td>327487 (-6.67%)</td>
</tr>
<tr>
<td>Total oil seeds</td>
<td>227386 (-4.2%)</td>
<td>374509 (-7.62%)</td>
</tr>
<tr>
<td>Cotton</td>
<td>710281 (-13.15%)</td>
<td>887700 (-18.10%)</td>
</tr>
<tr>
<td>Other fiber</td>
<td>381510 (-7.06%)</td>
<td>694387 (-14.16%)</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>92653 (-1.71%)</td>
<td>118630 (-2.41%)</td>
</tr>
<tr>
<td>Gross Grouped area</td>
<td>5399142 (-100%)</td>
<td>4903404 (-100%)</td>
</tr>
</tbody>
</table>

Source: Computed by Author
Cropping pattern in 1980-81 to 1984-85:

The position in 1980-81 to 1984-85 was that out of gross cropped area of 5399142 hectares 208815 hectares were under rice, 325654 hectares were under wheat, 1921427 hectares under Jawar 357847 hectares under bajara and 373645 hectares were under other cereals altogether contributing 59.01% of gross cropped area. The area under total pulses was 679258 hectares or 14.86% of the gross cropped area. The area under total oil seeds was 227386 hectares or 4.21 of the gross cropped area.

The area under cotton was 710281 hectares or 13.15% other fiber area under was 381510 hectares or 7.06% and sugarcane area under was 92653 hectares or 1.71% total gross cropped area in the period of 1980-81 to 1984-85.

Cropping pattern in 2000-01 to 2004-05:

In this five year average data is included. In the last five year the gross cropped area registered an decrease of 495738 hectares over the preceding first five year. Area under rice, wheat, Jawar, bajara and other cereals decreased. All the pulse have shown upward shift in their area during the period of last five year. The area under total cereals are decreased 59.01% to 4.024%. Where as the area under pulses are increased 14.86% to 15.58%. Total oil seeds are under are also increased 4.2% to 7.62%. The share of cotton was also increased 13.15% to 18.10% area under sugarcane are increased 1.71% to 2.41% during the period of investigation.

During the entire time period of Twenty years i.e. 1980-81 to 2004-05 the average gross cropped area decreased 495738 hectares. The emerging conclusion is that the share of Jawar area in gross cropped area ranged between 35.58% to 32.18% of gross cropped area where as the relative share of bajara in the gross cropped area ranged 6.62% to 5.97%
4.10 District wise Trends in Area under Different crops in Marathawada Region:

Table No. 4.6 indicates the existing overall agricultural cropping pattern of the region and changes there in during 1980-81 to 2004-05. Cropping pattern means the proportion of area under various crops at a point of time. Out of the total cropped area about 36.46% area was under Jawar cultivation during 1980-81. It is followed by bajara pulses cotton and oil seed.

Rice:

It is not important food crop in the study region. The crop requires hot and humid climate and rainfall above 150 CMS. Moss of the rice is raised with the help of rainfall and irrigation facilities in the study region. Generally it is taken as chariot crop in the study region during 2004-05 out of the total gross cropped area below 1% area was found under rice in Jalna and Beed district. Above 1% gross cropped area was observed under rice in Nanded, Latur, Parbhani, Osmanabad and Aurangabad district. (map 4.7A)

About 0.46% negative change in rice area was took place in the entire study region from 1980-81 to 2004-05. Below 1% negative change in rice area was noticed in Jalna, Beed, Latur, district. Where as above 1% negative change in rice area was recorded in Nanded district. Below 1% positive change in rice area was took place in Parbhani district and Osmanabad district in the period of investigation (map 4.7B)

Rainfall variability is responsible for the negative and positive change in rice area during the period under study. It is possible to increase the rice area in the study region by increasing the rode of irrigation.

Wheat:

Area under wheat increased from 5.74% to 7.52% between 1980-81 to 2004-05.
<table>
<thead>
<tr>
<th>Sr_No</th>
<th>Crops</th>
<th>Years &amp; Volume of change %</th>
<th>Aurangabad</th>
<th>Jalna</th>
<th>Beed</th>
<th>Nanded</th>
<th>Latur</th>
<th>Parbhani</th>
<th>O'bad</th>
<th>Total region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>123000(17.35)</td>
<td>112000(12.59)</td>
<td>2127(0.37)</td>
<td>370(0.14)</td>
<td>8072(1.01)</td>
<td>3500(0.45)</td>
<td>26151(3.51)</td>
<td>25300(2.40)</td>
</tr>
<tr>
<td>1</td>
<td>Rice</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>169000(23.84)</td>
<td>184000(20.68)</td>
<td>29138(5.05)</td>
<td>25525(9.77)</td>
<td>19786(2.48)</td>
<td>40700(5.28)</td>
<td>20807(2.89)</td>
<td>29500(2.80)</td>
</tr>
<tr>
<td>2</td>
<td>Wheat</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>140500(19.82)</td>
<td>190500(21.41)</td>
<td>223312(38.69)</td>
<td>14060(5.38)</td>
<td>367679(45.99)</td>
<td>312500(40.50)</td>
<td>307451(41.27)</td>
<td>228300(21.70)</td>
</tr>
<tr>
<td>3</td>
<td>Jawar</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>13700(1.93)</td>
<td>78500(8.82)</td>
<td>57914(10.03)</td>
<td>1075(0.41)</td>
<td>134824(16.87)</td>
<td>176800(22.91)</td>
<td>541(0.07)</td>
<td>900(0.09)</td>
</tr>
<tr>
<td>4</td>
<td>Bajara</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>2300(0.32)</td>
<td>22600(2.54)</td>
<td>2374(0.41)</td>
<td>N.A (0.0)</td>
<td>15126(1.89)</td>
<td>2100(0.27)</td>
<td>4181(0.56)</td>
<td>1100(0.10)</td>
</tr>
<tr>
<td>5</td>
<td>Other Cereals</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>448500(53.26)</td>
<td>587600(66.04)</td>
<td>334865(54.55)</td>
<td>41030(15.7)</td>
<td>545487(68.24)</td>
<td>535600(69.41)</td>
<td>359131(48.2)</td>
<td>285200(27.09)</td>
</tr>
<tr>
<td>6</td>
<td>Gram</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>3300(0.47)</td>
<td>1700(0.19)</td>
<td>4591(0.80)</td>
<td>6160(2.36)</td>
<td>25188(3.15)</td>
<td>8900(1.15)</td>
<td>15099(2.02)</td>
<td>48500(4.61)</td>
</tr>
<tr>
<td></td>
<td>Mung</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>1500(0.21)</td>
<td>1800(0.20)</td>
<td>-0.01</td>
<td>63043(10.92)</td>
<td>17571(6.72)</td>
<td>-4.20</td>
<td>34384(4.43)</td>
<td>17800(2.31)</td>
</tr>
<tr>
<td>----</td>
<td>--------------</td>
<td>---------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-------</td>
<td>-------------</td>
<td>-----------</td>
<td>------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>8</td>
<td>Tur</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>4700(0.66)</td>
<td>5100(0.57)</td>
<td>-0.09</td>
<td>39630(6.87)</td>
<td>42065(16.10)</td>
<td>+9.23</td>
<td>41789(5.23)</td>
<td>46100(5.97)</td>
</tr>
<tr>
<td>9</td>
<td>Other Pulses</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>6100(0.86)</td>
<td>1240(0.14)</td>
<td>-0.72</td>
<td>9273(1.61)</td>
<td>1761(0.67)</td>
<td>-0.94</td>
<td>45501(5.69)</td>
<td>1800(0.23)</td>
</tr>
<tr>
<td>10</td>
<td>Groundnut</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>98400(13.88)</td>
<td>81700(9.18)</td>
<td>-4.70</td>
<td>10367(1.80)</td>
<td>1660(0.64)</td>
<td>-1.16</td>
<td>9350(1.17)</td>
<td>14200(1.84)</td>
</tr>
<tr>
<td>11</td>
<td>Other Oil Seeds</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>67800(9.56)</td>
<td>93200(10.48)</td>
<td>+0.92</td>
<td>7213(1.25)</td>
<td>1660(0.64)</td>
<td>-0.61</td>
<td>7159(0.90)</td>
<td>5500(0.71)</td>
</tr>
<tr>
<td>12</td>
<td>Cotton</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>166200(23.44)</td>
<td>174900(19.66)</td>
<td>-3.78</td>
<td>17580(3.05)</td>
<td>3320(1.28)</td>
<td>-1.77</td>
<td>16509(2.07)</td>
<td>19700(1.55)</td>
</tr>
<tr>
<td>13</td>
<td>Other fibers</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>52700(7.43)</td>
<td>95000(10.68)</td>
<td>+3.25</td>
<td>110642(19.17)</td>
<td>121940(46.66)</td>
<td>+27.49</td>
<td>32494(4.06)</td>
<td>111060(14.39)</td>
</tr>
<tr>
<td>14</td>
<td>Sugar Cane</td>
<td>1980-81 2004-05 Vol. chan.</td>
<td>10000(1.41)</td>
<td>10500(1.18)</td>
<td>-0.23</td>
<td>2214(0.38)</td>
<td>17531(6.71)</td>
<td>+6.33</td>
<td>37742(4.72)</td>
<td>10500(1.36)</td>
</tr>
<tr>
<td>Total Gross Crop</td>
<td>1980-81 2004-05 Vol.</td>
<td>708900(100)</td>
<td>889640(100)</td>
<td>577219(100)</td>
<td>261312(100)</td>
<td>799406(100)</td>
<td>771560(100)</td>
<td>745015(100)</td>
<td>1052187(100)</td>
<td>538146(100)</td>
</tr>
</tbody>
</table>
AREA UNDER RICE (1980-81 & 2004-05)
MAP NO-4.7A

VOLUME OF CHANGE IN AREA UNDER RICE (1980-81 & 2004-05)
MAP NO- 4.7B
AREA UNDER WHEAT (1980-81 & 2004-05)
MAP NO- 4.8A

VOLUME OF CHANGE IN AREA UNDR WHEAT (1980-81 & 2004-05)
MAP NO-4.8B
It is important crop in Aurangabad, Jalna, Beed, Nanded, Latur and parbhani district out of the total gross cropped area below 3% area was recorded under wheat in Beed, Nanded, Latur and Osmanabad districts and 3% to 6% gross cropped area was observed under wheat in Jalna, district during 1980-81. Above 6% gross cropped area was found under wheat in Aurangabad district(map 4.8 A). There was districtwise variation in wheat area in the study region.

About 1.78% positive change in wheat area was recorded in the study region between 1980-81 and 2004-05 below 2% negative change in wheat area was experienced in Aurangabad district (3.16%) remaining all districts have recorded positive change in area under wheat (map. 4.8B).

**Jawar:**

Jawar is raised in kharif and rabi season. Jawar is dominant food crop in all district of the study region. Out of the total gross cropped area below 20% area was observed under Jawar in Aurangabad, Jalna district. 20% to 30% gross cropped area was recorded under Jawar in Nanded and Parbhani and above 30% gross cropped area was recorded under Jawar in Latur, Osmanabad and Beed district. It means that area under Jawar varies from district to district in the study region. (map 4.9 A).

Below 20% negative change in area under Jawar was took place in Jalna district (33.31%) while above 10 to 20% negative change in Jawar area was experienced in Nanded district (19.57%) and 0 to 10% negative change in Jawar area was observed in Beed (5.49%) Latur (8.70%) Parbhani (5.88%) during the period of investigation. Only Aurangabad (1.59%) and Osmanabad (25.8%) have recorded positive change in area under Jawar in the mention period.(map 4.9 B)

Moderate rainfall black cotton soil and other factors are are responsible for the positive change in Jawar area from 1980-81 to 2004-05.
AREA UNDER JOWAR (1980-81 & 2004-05)
MAP NO- 4.9A

VOLUME OF CHANGE IN AREA UNDER JOWAR
(1980-81 & 2004-05)
MAP NO- 4.9B
Bajara:

It is raised in Khanit season. Bajara is second ranking crop in the food crop of bajara crop in the gross cropped area was 5.43% below 10% in Aurangabad, Jalna, Nanded, Latur, Parbhani and Osmanabad above 10% proportion of bajara crop was found in Beed district(22.91%) during the period 2004-05 map 4.10 A.

Jalna Latur and Parbhani district have recorded negative change in bajara between 1980-81 to 2004-05 below 5% negative change in bajara area was took place in Jalna district 0 to 5% negative change in bajara area was observed in Latur and Parbhani district. Where as below 10% positive change in bajara area was observed in Aurangabad, Beed and Osmanabad district during the period of investigation.(map 4.10 B).

Other cereals:

Other cereals are not important expect Aurangabad district. During 2004-05 the proportion on of other cereals in gross cropped area was below 1% in Marathawada region (0.56%). All districts have negative change in other cereals except Aurangabad and Parbhani district. Aurangabad have recorded 2.22% positive change and Parbhani recorded 0.02% positive change in other cereals.

Total Cereals:

Food crops is major crop in the Marathawada region in the period of research work 46.38% gross cropped area was recorded under total cereals in Marathawada region in 2004-05. All districts were shown negative change in area under total cereals except Aurangabad has shown positive change 2.78% in the period of investigation.

Gram:

It is raised in rabbi season (map 4.11 A) indicates that area under gram varies from district to district in the study region out of the gross cropped area
AREA UNDER GRAM (1980-81&2004-05)
MAP NO-4.11A

VOLUME OF CHANGE IN AREA UNDER GRAM (1980-81&2004-05)
MAP NO-4.11B
below 2% gross cropped area was found under gram in Aurangabad, Beed, district 2%
5%, area was found under gram in Jalna, Nanded, Parbhani district and above 5% area under gram was observed in Latur (14.47%) and Osmanabad (5.62%) during the mention period (map 4.11 a) Hence the due shortage of rainfall in winter season it occupies less area as compared to other crops.

Aurangabad, Beed, Parbhani district have shown negative change in area under gram 0 to 2% negative change was observed in above district during the period of investigation. 0 to 2% positive change was observed in Jalna and Osmanabad district and above 2% to 5% positive change was took place in Nanded and Latur district in the year 2004-05.(map no 4.11 B)

**Mung:**

The proportion of Mung area in the gross cropped area was found below 3.50% below 2% area was found in Aurangabad district 2% to 5% Area was recorded in Beed, Nanded, Latur and Osmanabad district and above 5% area under Mung was took place in Parbhani district during the year 2004-05(map 4.12 A)

Below 1% negative change in mung area was took place in Marathawada region all district have shown negative change in area under mung except Latur and Osmanabad, Latur have 0.66% positive change and Osmanabad 1.31% positive change in area under mung highest negative change in area under mung was took place in Jalna district 4.20% and Lowest negative change in area under mung was recorded in Aurangabad district 0.01% during the period 1980-81 to 2004-05(map 4.12 B)

**Tur:**

Tur is Kharib season crop in 2004-05 area under Tur was recorded 6.65% in Marathawada region.
AREA UNDER MUNG (1980-81&2004-05)
MAP NO-4.12A

VOLUME OF CHANGE IN AREA UNDER MUNG
(1980-81&2004-05)
MAP NO-4.12B
Aurangabad, Nanded, Parbhani have recorded decreased in area under tur and remaining district recorded increased area under tur. There positive and negative change in area under Tur Aurangabad, Nanded and Parbhani was took place negative change (below 1%) and Jalna, Beed, Latur and Osmanabad was recorded positive change in area under tur. The highest positive change was recorded in Osmanabad 9.52% and Jalna 9.23% and lowest positive change was observed in Beed district 0.74% during the period of investigation.

**Groundnut:**

It is ranking first in the oil seeds crops in the study region during 2004-05 below 1% gross cropped area was recorded under groundnut in Marathawada region only Aurangabad district was recorded 9.18% total gross cropped area under groundnut and remaining district was observed below 1% gross cropped area under ground nut in 2004-05.

There was negative and positive change was observed in Marathawada region. Aurangabad district was recorded highest positive change in area under ground nut(4.70%) and lowest positive change was observed in 0.08% in Latur district and negative change was observed only Beed district 0.67% during 2004-05.

**Cotton:**

Cotton has favorable condition in the study region. The proportion of cotton area in the gross cropped area was 17.89% in 2004-05 in Marathawada region. Below 10% area was observed in Latur district and Osmanabad district(5.96% and 0.31% 10% to 20% area under cotton was took place in Aurangabad, Beed, 10.68 and 14.39% and above 20% area under cotton was recorded in Jalna 46.66% Nanded 26.29% Parbhani 23.39% during the year 2004-05(Map 4.13 A)
AREA UNDER COTTON (1980-81&2004-05)
MAP NO- 4.13A

VOLUME OF CHANGE IN AREA UNDER COTTON
(1980-81&2004-05)
MAP NO-4.13B
Below 1% negative change in cotton area was recorded in Parbhani (0.13%) and below 2% positive change in cotton area was recorded in Latur and Osmanabad district. 2 to 10% positive change in cotton area was recorded in Aurangabad district and above 10% positive change in cotton area was recorded in Jalna and Beed district (27.49% and 10.33%) from 1980-81 to 2004-05 (map 4.13B).

**Sugarcane:**

Sugarcane area is recently increasing in the study area during 1980-81 to 2004-05. During 2004-05 the proportion of sugarcane area was below 2.9% in Marathwada region. While below 2% area under sugarcane was recorded in Jalna, Beed, Nanded, district (1.14%, 0.19%, 0.56%) and above 2% area under sugarcane was took place in Latur and Osmanabad district. Latur district was recorded highest area under sugarcane in 2004-05 (map 4.14 A).

Irrigated area has increased to a greater extent in the study region hence all district have shown positive change in sugarcane area from 1980-81 to 2004-05 except Aurangabad and Parbhani district. These districts have shown negative change in area under sugarcane. Below 2% positive change in area under sugarcane was observed in Jalna (1.14%) Beed (0.19%), Nanded (0.56%) above 2% positive change in area under sugarcane was recorded in Latur (3.22%) and Osmanabad (2.98%) Where as Aurangabad was recorded negative change in area under sugarcane (0.19%) and Parbhani (0.37%) during the period of investigation (map 4.14 B).

In Marathwada region sugarcane and cotton is major industrial crop area under these crop area increasing some time and decreasing because of uncertainty of rainfall problems of labor. Sugarcane is a very problematic crop because sugar cane is not give to sugar factory with in time for crushing then average is going down. The sugar factories in Marathwada region are run by political leader. They have not seen well for every farmer. The payment of sugarcane is not given in cash. They give through out the year in small scale.
AREA UNDER SUGARCANE (1980-81 & 2004-05)
MAP NO-4.14A

VOLUME OF CHANGE IN AREA UNDER SUGARCANE (1980-81 & 2004-05)
MAP NO-4.14B
These causes farmers are not getting sugarcane in large scale then they moves
to cotton last five years cotton production is very high in Marathawada region in
company to sugarcane. Marathawada region not give high yielding of industrial
crops.

REFERENCES

1. Freeman T.W.(1968) Geography and planning, Hutechinson university
   Library, London P.-74
   University Library London. P.- 109
3. Kelso M.M. 'scope content and orientation or rural land economics
   Research Today, Land economics Research(Edits Ackerman atlas)
5. Ableiter J.K. 'productivity Rating in the soil survey Report soil science
   proceedings 16 p.p-416-422
6. Steve R.E. (1933) An Indies for rating the agricultural value of soils
   Californian' Agricultural Experiment Station Builetia. 556 Vol. 44 P-3
7. Stamp L.D. (1952) Land of tomorrow, The under Developed worked
   P.205.
   pp.105,107-111.
   pp.105,107-111.
   1937 Chapter VI.

*...*...*...*