CHAPTER- IV

GENERAL LANDUSE AND AGRICULTURAL LANDUSE
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GENERAL LANDUSE AND AGRICULTURE LANDUSE

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GENERAL LAND USE AND AGRICULTURAL LAND USE

SECTION-I GENERAL LANDUSE

4.1 INTRODUCTION

The agro-based industries were depends upon the raw material came from agriculture. Hence the study of general landuse, agricultural landuse of cropping pattern is necessary. They form the base of agro-based industries. Therefore here we should through these aspects.

In previous chapter location, physiograpy, geology, minerals, drainage, climate, soil types, natural vegetation, irrigation, population, settlement, agricultural implements, animal resources, improved seeds, chemical fertilizers, agricultural credits and finance, electricity, marketing, transport and communication these factors are analyzed. This chapter is divided into two parts.

The first part deals with the general landuse, classification of landluse pattern and landuse efficiency. The second part deals with the tahsilwise industrial cropping pattern with conclusion.

Landuse is the human use of land. Landuse involves the management and modification of natural environment to wilderness into built environment such as fields, pastures and settlements.

It has also been defined as “the arrangements, activities and inputs people undertake in a certain land cover type to produces, change or maintain it.” (FAO, 1997; FAO /UNEP.1999). Landuse practices vary considerably across the world.

The United Nations’ Food and Agricultural Organization Water Development Division explains that “landuse concerns the products and / or benefits obtained from use of the land as well as the land management actions (activities) carried out by humans to produce those products and benefits.
Landuse means the surface utilization of all development and vacant land on a specific point at a given time and space. This leads one back to the village farm and farmers, to the fields, gardens, pastures, fallow land, forests and to the isolated farmstead’s as a geography deals with the spatial relationship between these aspects and planning. It is due to the landuse changes to meet the variable demands of the land by the society in its new ways and condition of the life.

The demand for the new uses of land may be stimulated by a technological change or by change in size, compositions and requirements of a concerning community. Some changes are short lived while others represent a more constant demand. The study of landuse is of pivotal importance in the point of view of planning and development.

4.2 GENERAL LANDUSE

Landuse of a region is a combined result of the natural setup and human dynamism within socio-economic set up and technological development. A physical limitation of the site finds a direct expression in landuse. Landuse pattern is to understand geographical adjustment of agricultural resources. Many geographers are trying to give the definition of land use. Some of these are following:- land use is also related to conservation of land from major use to another general use.

Land use means surface utilization of all developed and vacant land for a specific point at a given time and space. (Foreman T.W. (1968). Land use means optimum use of every piece of land. (Mandal R.B). Land use is the function of four variables land, water, air and man. Land use means use actually made of any parcel of land. (Ghrpure V.T. 2005).

Land use is an important aspect of studies in agricultural geography and for making of the study of land use; it is classified into different categories. Land classification is based largely on quantity and intensity of the use of land (Ali Mohamad 1978). Census of India has classified land utilization in nine different categories, but in the preset study they have been grouped into five major relatively significant categories.
4.3 CLASSIFICATION OF LAND

Landuse is the geographical concept since it involves specific areas. The landuse study in its spatial context is essential to understand the regional zones of the areas of optimum landuse, degraded areas etc. The utilization of land for different purposes indicates an intimate relationship between prevailing ecological conditions and man.

The efficient use of land depends on the capacity of man to utilize the land and manage it in proper perspective. In view of the predominant agrarian nature of the study region’ such studies are the subjects of supreme importance. It is also important to the study of industrial location and its development.

The importance of landuse studies is increasing with continuous increasing population. Industrial areas should be properly selected in the proximity of resources availability. In the study area most of the agro-based industries are concentrated in the irrigated tract.

The landuse of a region is always characterized by the spatial and temporal variations and is profoundly influenced by physio-socio-economic factors. As such some changes in general landuse have been observed during the period under investigation.

The landuse pattern of the study area is divided into five major categories such as forest, land not available for cultivation, other uncultivable land, fallow land and net area sown. Table 4.1 reveals the trends of these categories in the Kolhapur district.

4.4 LANDUSE PATTERN

The general landuse pattern of the Kolhapur district is differing from the state’s general landuse because of the location and physical setting of the study area. The existing landuse pattern is as shown in map 4.1 and 4.2 has the result of the process of land exploitation within the frame of physical and socio-economic complex and modified because of the expansion of irrigation and growth of population.
Nearly 35.77 per cent to 87.94 per cent to the geographical area is under cultivation because of the varied physical features. Gadhinglaj was the highest (89 %) in respect of agricultural land whereas Radhanagri (39 %) tahsils was lowest in agricultural land in Kolhapur district during 2002-2003. Table 4.1 indicates tahsilwise trends in general landuse in Kolhapur district during 1985-86 to 2002-2003, for this seventeen years period are consider to find out the spatio temporal changes there in.

4.4.1 AREA UNDER FOREST

This category includes all areas actually under forests whether state owned or private and classed or administered as forest under any legal enactment dealing with forests.

Forest occupies about 18.05 per cent of the total geographical area of the district; being higher than the average of Maharashtra which is 16.95 per cent. During 1985-86 nearly 1, 43,382 hectares of land was under forest I entire study region. It was decreased from 1, 43,382 hectares to 1, 40,100 hectares during the period of investigation. It means that the forest area has not shown very high decreases from 1985-86 to 2002-03. Table 4.1 clearly indicates that there is variation in forest area from tahsil to tahsil due to variation in rainfall distribution, soil and physiography. In the study area out of twelve tahsils of the district Gadhinglaj, Hatkanangale, Kagal, Shirol and Karveer were having 1.20 to 3.78 per cent of their geographical area under forest.
Map. No. 4.1
### Table No. 4.1

Kolhapur District: Tahsilwise Trends in General Landuse

(Area in hectares)

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<th>Sr.No.</th>
<th>Tahsils</th>
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<th>Land not available for cultivation</th>
<th>Other uncultivable land(excluding fallow land)</th>
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Source: Compiled by Author
Out of the total geographical area 15 to 30 per cent geographical area was found under forest in Panahala, Shahuwadi, Ajara, Chandgad and Radhanagri tahsils during 2002-2003. Above 30 per cent geographical area was noticed in Bhudargad and Gadhinglaj tahsils during 2002-2003 (Map 4.3 A).

Below 1 per cent negative change in forest area was recorded in Kagal, Bhudargad, Panhala, Rahanagri and Shirol tahsils. Above 1 per cent negative change in forest area was recorded in Shahuwadi and Ajara tahsils. Below 1 per cent positive change in the forest area was recorded in Gadhinglaj, Karveer and Hatkangale tahsils during the period of investigation. Above 1 per cent positive change in forest area was recorded in Gaganbavda and Chandagad tahsils between 1985-86 to 2002-03 (Map 4.3 B).

### 4.4.2 AREA NOT AVAILABLE FOR CULTIVATION

This category include (a) The land put to non-agricultural uses and (b) Barren and uncultivable land. The western part of the district is a rugged tract of hills and valleys. These consist of the Sahyadri range and series of six valleys with lines of hills which runs north-east and east.

The sides of these hills are bare and ending in broad table lands. In the other hand the populations of the district were increased by the consequence 29.8 per cent populations lived in urban areas of the study area. Where need of infrastructural facilities were increased. For the fulfillment of these the area under this category especially area of the land put non-agricultural uses was increased by 0.38 per cent. This category shows close association with other uncultivable land. But which cannot be brought under cultivation unless at a very heavy cost. The distributional pattern under this category is exhibited in map 4.4 A. about 10.07 per cent of the district belongs to this category which is as equal as to Maharashtra whose average is about 10.08 per cent. The change in this category shown in Map 4.4 B exhibits the increase by 1.23 percent in the study region. The increase in this category is due to infrastructural development like roads, settlements, industries and reservoirs for irrigation purposes etc.
Kolhapur District Volume of change in area Under Forest 1985-86 to 2002-03
(B)

Legend:
Forest in %
- Above +1 %
- Below +1 %
- Above -1 %
- Below -1 %

Map. No. 4.3 (B)
Out of the total geographical area below 5 per cent area was found under this category in Gaganbavada tahsil during 2002-2003. While 5 to 10 per cent geographical area was found under this category in Gadninglaj, Ajara, Bhudargad, Kagal, Panhala, Shirol and Hatkanangale tahsil during 2002-2003. Above 10 per cent area was recorded under this category in Chandgad, Karveer, and Shahuwadi and Rahanagari during the period of investigation (Map 4.4 A).

Both positive and negative changes in land not available for cultivation took place in this group during the period of investigation. The decrease in this category is confined to the Middle Eastern tahsils of the district. Below 1 per cent negative change in this category was recorded in Hatkanangale, Panhala, Kagal, Gadninglaj and Ajara. Whereas, above 1 per cent negative change in this category was recorded in the tahsil Gaganbavada during 1985-86 to 2002-03. Below 1 per cent positive change in land not available for cultivation was recorded in Shahuwadi and Bhudargad. 1 per cent to 2 per cent positive change was recorded in Karveer tahsil. Whereas, above 2 per cent positive change was recorded in Shirol, Radhanagari, Chandgad (6.85%) tahsil from 1985-86 to 2002-2003 (Map 4.4 B).

4.4.3 OTHER UNCULTIVATED LAND

Other uncultivated land excluding fallow land consist of three types of land viz. (a) cultivable waste (b) permanent pasture land and (c) land under miscellaneous tree, crops etc. of the three sub categories that constitute the uncultivated land, the parcel under three crops is rather negligible, though this could be treated as sown as much as the land carrying crops. The land permanent pastures are the ones marked grazing grounds owned in common by the village community or recorded as ‘gairan’ (literally meaning the land for the cow) which is also used for grazing cattle during the monsoons and because a desolate rock waste during the dry summer. Plateaus and hilly dissected areas with higher rainfall are the sites of such pastures. This potential land can brought under agriculture. About 9.79 per cent geographical area of the district belongs to this category which is little more of the Maharashtra state average of about 7.84 per cent.
Kolhapur District
Land Not Available For Cultivation
2002-03
(A)

Legend:
Cultivation in %
- Above 10%
- 5-10%
- Below 5%

Map. No. 4.4 (A)
Kolhapur District
Volume of Change in Land Not Available For Cultivation
1985-86 to 2002-03
(B)

Legend:
Cultivation in %
- Above - 2%
- 1 to 2 %
- Below +1%
- Above - 1%
- Below - 1%

Map. No. 4.4 (B)
Kolhapur District
Volume of Change in Other Uncultivable Land
1985-86 to 2002-03
(B)

Map. No. 4.5 (B)
During 2002-2003 out of the total geographical area below 5 per cent as found under this category in Bhudargad, Chandgad, Kagal and Gadhinlag tahsil whereas 5 per cent to 10 percent area was recorded under this category in Shirol and Hatkanangale tahsils. While 10 per cent to 15 per cent area under this category was recorded in Ajara, Panhala and Karveer tahsils during 2002-2003 (Map 4.5 A).

Whereas above 15 per cent area under this category was found in the Radhanagari, Shahuwadi and Gaganbavada tahsils of the district during 2002-2003 (Map 4.5 A). Most of the tahsils in the district have recorded lot of volume of change in other uncultivated land from 1985-86 to 2002-2003.

It is mainly due to the proportion of this category had gone to either non-agricultural land or agricultural land and particularly, permanent pastures and grazing lands could bring under cultivation or other uses.

Below 3 per cent negative change was recorded in this category in Shirol, Gaganbavada, Gadhinlag, Radhanagari and Bhuargad tahsils. Whereas at 3 per cent to 6 per cent negative change was recorded in Kagal and Shahuwadi tahsils while more than 6 per cent negative change was recorded in Hatkanangale and Chandgad tahsils during the period of investigation. Below 3 per cent positive change was recorded by the Karveer tahsil whereas above 3 per cent positive change was recorded in Panhala and Ajara from the period 1985-86 to 2002-2003.(Map 4.5 B).

**4.4.4 FALLOW LAND**

The fallow land should be a part of the land under cultivation. To distinguish the left fallow as a phase of crop rotation system, the term current fallow is used. Other fallow includes the land left idle for more than two years, temporarily given up because of depletion of its fertility. They largely found due to inadequate water supply or excess of moisture supply, extensive holdings and heavy clayey difficult for tilling at proper time. Sometime some land is kept behind to increase its fertility.
Kolhapur District Fallow Land
2002-03
(A)

Map. No. 4.6 (A)
Kolhapur District
Volume of Change in Fallow Land
1985-86 to 2002-03
(B)

Legend:
Fallow Land in %
- Above + 4%
- + 2 to + 4%
- Below + 2%
- Above - 4%
- 2% to - 4%
- Below -2%

Map. No.4.6 (B)
The study region has 3.47 per cent land under fallow (26935 hectares.) of the total geographical area during 2002-2003. (Table No. 4.1). Maharashtra state has left 7.98 per cent (24, 55,000 hectares) geographical area under this category.

Out of the total geographical below 2 per cent area was recorded under fallow land in Kagal, Shirol, Gadhinglaj, Gaganbavada and Hatkanangale tahsils.

Whereas 2 per cent to 4 per cent fallow land was found in Karveer, Shahuwadi, Chandgad and Radhanagari tahsils. While 4 per cent to 6 per cent land was recorded under fallow land in Kagal, Shirol, Gadhinglaj, Gaganbavada and Hatkanangale tahsils. Whereas 2 per cent to 4 per cent fallow land was experienced in Shahuwadi, Shirol and Chandgad tahsils. Whereas above 4 per cent negative change in the fallow land was recorded in Gaganbavada (-10.99 %) tahsil.

While studying the Table 4.1 and Map 4.6 B both negative and positive changes were recorded in the study area during the investigation. Below 2 per cent negative change has been noted in the Karveer tahsil, 2 to 4 per cent negative change in the follow land was experienced in Shahuwadi, Shirol and Chandgad tahsils. Whereas above 4 per cent negative change in the fallow land was recorded in Gaganbavada (-10.99 %) tahsil.

On the other hand below 2 per cent positive change was recorded in the Kagal, Hatkanangale, Panhala, Gadhinglaj and Rahanagari tahsils. Ajara thasil was recorded volume of change between 2 to 4 per cent while Bhudargad tahsil was recorded above 4 per cent positive change during the period of investigation from 1985-86 to 2002-2003 in these tahsils (Map 4.6 B).

In Ajara tahsil the proportion of current fallow was increased by 0.50 per cent and 3.29 per cent of other fallow land during the period of investigation due to the hilly terrain and shifting of farming practices in the area, whereas in Bhudargad tahsil the proportion of current fallow was decreased by -3 per cent and increased the land of other fallow by + 8.30 per cent during the period of investigation. Once the area under cultivation was went temporarily out of cultivation since during the period of investigation from 1985-86 to 2002-2003.
4.4.5 NET SOWN AREA

This category consists of net area sown with crops and orchards, area sown more than once being counted only once. Table 3.1 indicates that net sown area occupies the largest share of the total geographical area of the region 58.62 percent and it is marginally more than the state average of net sown area which is about 57.15 percent during 2002-2003.

There is a significant contrast in the regional distribution of net sown area in the study region as shown in the Map 4.7 A. some aspects play major role in on the net sown area among them physical setting of study region, distribution of rainfall, soil types and socio-economic condition of the farmers and the new techniques adopted by them and its transformation.

Therefore the net sown area being different in tahsil to tahsil in the study region. Out of the geographical area below 40 per cent geographical area was found under net sown areas in Radahanagari and Gaganbavada tahsils on the other hand 40 per cent to 80 per cent geographical area was recorded as net sown area in Bhudargad, Shahuwadi, Panhala, Chandgad, Ajara and Karveer tahsils during 2002-2003. These tahsils have tremendous development and socio-economic transformation in agricultural practices since the beginning of industrial and development in corporate sector of the district.

There is the negative and positive changes in net sown area were recorded in the study region during the period of investigation. Below 4 percent negative change in this category was took place in Karveer (-4.44%), Radhanagari (-2.29%) and Bhudargad (-3.4%) tahsils. While above 4 percent negative changes were in net sown area was found in Ajara (-4.13%) and Panhala (-4.98%) during the period of investigation. Below 4 per cent positive change in net sown area was found in Shirol (0.13%), Gadhinglaj (0.32%), and Chandgad (3.84%) tahsils in the study region. While 4 per cent to 8 per cent positive change in the net sown area was recorded in Kagal (6.13%) and Hatkanangale (6.79%)
Kolhapur District Netsown Area
2002-03

Legend:
Netsown area in %
- Above 80%
- 40 - 80%
- Below 40%

Map. No. 4.7 (A)
Map. No.4.7 (B)
And above 8 per cent change in this category was recorded in Shahuwadi (10.05%) and Gaganbavada (12.64%) tahsils during the period of investigation (Map 4.7 B).

4.5 LANDUSE EFFICIENCY

The proportion of the potential land was decreased from 12.36 per cent to 9.79 per cent between 1985-1986 to 2002-2003. It means that there is scope for the extension of cultivable land, in the other hand the proportion of fallow land in the study area was decreased marginally from 3.65 percent to 3.47 per cent and the net area sown increased marginally from 56.68 per cent to 58.62 percent form 1985-86 to 2002-03. While observing these changes it would be said that there is scope for the extension of cultivable land or potential land.

On the other land there should be problem of overuse of net sown area; low productivity and damage of crops are taxing on rural population in the study region. 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 land use efficiency means the intensity of cropping. It is obtained from the gross cropped area. The index of landuse efficiency is obtained by the using the following formula.

$$\text{Index of land use} = \frac{\text{Gross cropped area}}{\text{Net sown area}} \times 100$$

The table 3.2 indicates that region’s average gross cropped area and net sown area during 1985-86 to 2002-03. The index of land use efficiency is 126.48 during 2002-03. The index of land use efficiency is increased from 112.92 to 126.48 during 1985-86 to 2002-03. Below 120 per cent index of landuse efficiency was recorded in Gadlinglj, Panhala, Chandgad, Kagal, Shirol and Shahuwadi tahsils. Whereas 120 per cent to 140 per cent index of landuse efficiency was recorded in Radhanagari, Hatkanangale, Bhudargad and Karveer tahsils. On the other hand 140 per cent to 180 per cent index of landuse efficiency was recorded in only one in Ajara tahsils and above 180
**Table No. 4.2**

**KOLHAPUR DISTRICT: LANDUSE Efficency**

(Area in hectare)

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Tahsil</th>
<th>Gross cropped area</th>
<th>Net sown area</th>
<th>Index of landuse efficiency 1985-86</th>
<th>Gross cropped area</th>
<th>Net sown area</th>
<th>Index of landuse efficiency 2002-2003</th>
<th>Volume of change in percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shahuwadi</td>
<td>39453</td>
<td>36940</td>
<td>106.80</td>
<td>56007</td>
<td>47426</td>
<td>118.09</td>
<td>+11.29</td>
</tr>
<tr>
<td>2</td>
<td>Panhala</td>
<td>34823</td>
<td>32205</td>
<td>108.13</td>
<td>33672</td>
<td>29374</td>
<td>114.63</td>
<td>+6.50</td>
</tr>
<tr>
<td>3</td>
<td>Hatkanangale</td>
<td>56155</td>
<td>44858</td>
<td>125.18</td>
<td>60005</td>
<td>48992</td>
<td>122.48</td>
<td>-2.70</td>
</tr>
<tr>
<td>4</td>
<td>Shirol</td>
<td>48338</td>
<td>41608</td>
<td>116.17</td>
<td>48631</td>
<td>41667</td>
<td>116.71</td>
<td>+0.54</td>
</tr>
<tr>
<td>5</td>
<td>Karveer</td>
<td>53544</td>
<td>48119</td>
<td>111.27</td>
<td>63369</td>
<td>47152</td>
<td>134.39</td>
<td>+23.12</td>
</tr>
<tr>
<td>6</td>
<td>Gaganbavada</td>
<td>6961</td>
<td>6902</td>
<td>100.85</td>
<td>31545</td>
<td>10471</td>
<td>301.26</td>
<td>+200.41</td>
</tr>
<tr>
<td>7</td>
<td>Radhanagari</td>
<td>35425</td>
<td>33967</td>
<td>104.29</td>
<td>38824</td>
<td>31921</td>
<td>121.62</td>
<td>+17.33</td>
</tr>
<tr>
<td>8</td>
<td>Kagal</td>
<td>51061</td>
<td>43465</td>
<td>117.48</td>
<td>54555</td>
<td>46819</td>
<td>116.52</td>
<td>-0.96</td>
</tr>
<tr>
<td>9</td>
<td>Bhudargad</td>
<td>32245</td>
<td>29196</td>
<td>110.44</td>
<td>35322</td>
<td>26912</td>
<td>131.25</td>
<td>+20.81</td>
</tr>
<tr>
<td>10</td>
<td>Ajara</td>
<td>36810</td>
<td>32975</td>
<td>111.63</td>
<td>46353</td>
<td>30708</td>
<td>150.95</td>
<td>+39.32</td>
</tr>
<tr>
<td>11</td>
<td>Gadhinlaj</td>
<td>54434</td>
<td>42158</td>
<td>129.12</td>
<td>47671</td>
<td>42312</td>
<td>112.66</td>
<td>-16.46</td>
</tr>
<tr>
<td>12</td>
<td>Chandgad</td>
<td>47646</td>
<td>47625</td>
<td>100.04</td>
<td>59622</td>
<td>51331</td>
<td>116.15</td>
<td>+16.11</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>496895</td>
<td>440018</td>
<td>112.92</td>
<td>575576</td>
<td>455085</td>
<td>126.48</td>
<td>+13.56</td>
</tr>
</tbody>
</table>

*Source: Computed by Author*
per cent index of landuse efficiency was recorded in Gaganbavada tahsil (301.26%) during 2002-2003 (Table No.4.2).

Both negative and positive changes were recorded in landuse efficiency in the study region. Below 15 percent negative change in landuse efficiency was recorded in Kagal and Hatkanangale tahsils while above 15 per cent negative change in this category was recorded in Gadchinglaj tahsil during the period of investigation. Whereas below 15 per cent change in index of landuse efficiency was recorded in Shirol, Panhala and Shahuwadi tahsils. While 15 per cent to 30 per cent change in this category was noted in the Chandgad, Radhanagri, Bhudargad and Karveer tahsil of the study region. While 30 per cent to 60 per cent change in landuse efficiency was recorded in Ajara tahsil whereas above 60 per cent change was recorded in only one and it is noted 200.41 percent in the Gaganbavada tahsil of the study region during 1985-86 to2002-03 (Table No.4.2).

SECTON-II AGRICULTURAL LANDUSE

4.6 CHANGEGING CROPPING PATTERN

Cropping pattern simply means the proportion of area under different crops at a point of time, whereas changes in cropping pattern refer to change in proportion of area under different crops at two different times. Such changes, though governed by ecological situation, socio-economic and technological factors also determine which of the feasible crops the farmers’ will choose. In case of irrigated crops, the choices are directly governed by the specific purpose for which the irrigated crops are to be grown and these are also conditioned by the geographical factors and modified by the emergent, social and economic circumstances.

The choice for the growing a particular crop in a particular region is an outcome of these factors:  i) the general agricultural conditions, particularly the soils, climate, water supply and sub-soil water table, etc. ii) aim of agricultural production, scale of production, size of holdings; techniques of agriculture and changes in market prices. In areas of scanty rainfall, where there is high uncertainty of monsoons, there is to be found a greater dependency on millets, jowar, bajara and ragi etc. on the other hand, areas with assured rainfall or those having irrigation facilities are devoted to rice,
Sugarcane and tobacco. A black soil favours the cultivation of cotton and wheat, while lateritic attracts plantation crops. The size of the farm also affects the cropping pattern. The Changes in the market prices, rent interests, wages, and availabilities or otherwise of means of transport and distance from the market also affects the cropping pattern.

Personal factors relating to the cultivators also influences cropping pattern. Under these are included the requirements for home and family consumption, meting cash requirements of the family or for selling in the market, for meeting the feed and fodder needs of the years, for maintaining soil fertility by sowing crops that fallow in proper rotation or for green manuring; for seed purposes and outside stimuli etc.

The Government policy also affects the cropping pattern. Policies relating to priorities given to various crops, exports, taxes, supply of credits and the development of the backward regions determine the nature of the crops and the area under them. New technology has also affected the change in the cropping pattern.

Investigating belongs to study of changes in cropping assumes special importance in taking knowledge of soil-climatic factors and the crops that could be grown within a particular environment. Impact of changes in technological, economic and institutional factors can be felt only when the existing cropping pattern under goes a change. Generally the farmers 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 dictate by price factors in adjusting hectarage allocation.

A review of changes in cropping pattern in Kolhapur district during the 1985-86 to 1997-2002 is briefly presented in table 4.3. The quinquennial average area under different industrial crops and the relative share of each crop in gross cropped area has been deployed for the study of cropping pattern.

### 4.6.1 CHANGES IN CROPPING PATTERN 1985-86 TO 1989-90

The position in 1985-86 to 1989-90 was that out of gross cropped area (4,63,290 hectares) 1,08,638 hectares (23.45%) were under rice, 45,495 hectares (9.82 %) under jowar, 20,539 hectares ( 4.43 % ) were under other cereals, 12,493 hectares were under wheat ( 2.69 % ) and 2,04,054 hectares were under total cereals ( 44.04 % ) during
first quinquennium. Total oil seeds occupied 63,510 hectares (13.71%), out of that ground

Table No. 4.3
KOLHAPUR DISTRICT: CHANGING CROPPING PATTERN
(Area in hectares)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>108638 (23.45)</td>
<td>106492 (22.12)</td>
<td>110679 (20.26)</td>
<td>106546 (18.53)</td>
</tr>
<tr>
<td>Wheat</td>
<td>12493 (2.69)</td>
<td>5265 (1.10)</td>
<td>7362 (1.35)</td>
<td>8510 (1.48)</td>
</tr>
<tr>
<td>Jowar</td>
<td>45495 (9.82)</td>
<td>38896 (8.08)</td>
<td>28956 (5.30)</td>
<td>22835 (4.00)</td>
</tr>
<tr>
<td>Bajara</td>
<td>502 (0.11)</td>
<td>350 (0.07)</td>
<td>161 (0.03)</td>
<td>76 (0.01)</td>
</tr>
<tr>
<td>Maize</td>
<td>1347 (0.29)</td>
<td>3488 (0.72)</td>
<td>5085 (0.93)</td>
<td>6181 (1.07)</td>
</tr>
<tr>
<td>Other Cereals</td>
<td>20539 (4.43)</td>
<td>1621 (0.34)</td>
<td>2887 (0.53)</td>
<td>1969 (0.34)</td>
</tr>
<tr>
<td>Total Cereals</td>
<td>204054 (44.04)</td>
<td>182381 (37.88)</td>
<td>182270 (33.37)</td>
<td>174375 (30.33)</td>
</tr>
<tr>
<td>Total Pulses</td>
<td>28088 (6.06)</td>
<td>20199 (4.20)</td>
<td>23815 (4.36)</td>
<td>29668 (5.16)</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>51149 (11.04)</td>
<td>72290 (15.01)</td>
<td>95245 (17.44)</td>
<td>102734 (17.87)</td>
</tr>
<tr>
<td>Total Condiments and Spices</td>
<td>6424 (1.39)</td>
<td>5522 (1.15)</td>
<td>6174 (1.13)</td>
<td>5434 (0.95)</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>4580 (1.00)</td>
<td>5118 (1.06)</td>
<td>11364 (2.10)</td>
<td>20898 (3.63)</td>
</tr>
<tr>
<td>Total Fibers</td>
<td>255 (0.05)</td>
<td>228 (0.05)</td>
<td>264 (0.04)</td>
<td>531 (0.09)</td>
</tr>
<tr>
<td>Groundnut</td>
<td>56761 (12.25)</td>
<td>55516 (11.53)</td>
<td>62329 (11.41)</td>
<td>68697 (11.95)</td>
</tr>
<tr>
<td>Total Oilseeds</td>
<td>63510 (13.71)</td>
<td>87571 (18.20)</td>
<td>121649 (22.27)</td>
<td>134097 (23.32)</td>
</tr>
<tr>
<td>Total Drugs and Narcotics</td>
<td>5571 (1.20)</td>
<td>5223 (1.08)</td>
<td>3402 (0.62)</td>
<td>5210 (0.91)</td>
</tr>
<tr>
<td>Fodder Crops</td>
<td>99659 (21.51)</td>
<td>102905 (21.37)</td>
<td>101854 (18.65)</td>
<td>101639 (17.68)</td>
</tr>
<tr>
<td>Miscellaneous Non-food Crops</td>
<td>-</td>
<td>5 (0.00)</td>
<td>108 (0.02)</td>
<td>348 (0.06)</td>
</tr>
<tr>
<td>Total Gross Cropped Area</td>
<td>463290 (100)</td>
<td>481442 (100)</td>
<td>546145 (100)</td>
<td>574934 (100)</td>
</tr>
</tbody>
</table>

(Figures in the parenthesis are the percentages to the total Gross Cropped Area.)

Occupied 56,761 hectares (12.25%). Sugarcane has 51,149 hectares area (11.04%). Nearly 28,088 hectares areas (6.06%) were occupied by total pulses. It means that rice,
groundnut, sugarcane, jowar and pulses are important crops of the study region. Below 4.83 % area were under bajara, maize and other cereals. Only 3.64 % areas were under total condiments and spices, fruits and vegetables, total fibers, total drugs and narcotics. Fodder crops were having 99,659 hectares (21.51%) area during this quinquennium.

4.6.2 CHANGES IN CROPPING PATTERN 1990-91 TO 1994-95 :

The gross cropped area increased from 4.63 lakh hectares to 5.46 lakh hectares during the first to second quinquennium. The area under rice decreased with 2146 hectares. Its share in gross cropped area also decreased by -1.33 %. The area under wheat decreased with 7228 hectares and its share in gross cropped area decreased -1.59 %. The jowar registered the decreasing trend with 6599 hectares and its share of gross cropped area was decreased by -1.74 %. The minor millets like bajara, maize and other cereals have shown decreasing trend during these quinquenniums. The table 4.3 shows that the total cereals were decreased with 21,673 hectares and the share of gross cropped area has decreased by -6.16 %. It means that the decreasing trend has been registered by all cereals in the study region.

All the pulses have showed downward shift from 6.06 % to 4.20 %. The area under groundnut have showed decreasing trend with 1,245 hectares but total oil seeds shows increasing trend with 24,061 hectares and its share of gross cropped area was increased by 4.49 %. Sugarcane is the cash crop in the study region its cropped area was increased with 21,141 hectares and its share of gross cropped area was increased by 3.97 %.

The remaining crops like total condiments and spices, total fibers, total drugs and narcotics were shown negative change in the share of gross cropped area in the study region. The positive change was recorded by the fruits and vegetables during the period of first and second quinquennium. The fodder crops have registered very marginal negative change with -0.14 % in its area.

4.6.3 CHANGES IN CROPPING PATTERN 1995-96 to 1999-2000

During this quinquennium the gross cropped area increased from 4.81 lakh hectares to 5.46 lakh hectares. The area under total cereals decreased from 37.88 per cent to 33.37 per cent, crops like rice, jowar, and bajara has shown decrease in their area
during this quinquennium. The area under wheat, maize and other cereals shows upward shifts during this quinquennium. The area under total pulses increased marginally.

The phenomenal growth in the area under sugarcane was recorded from 72,290 (15.01%) to 95,245 hectares (17.44%) from second to third quinquennium. Nearly 1/5 area was under this cash crop in the study region. This is increased due to the availability of perennial source of irrigation, fertile soils and impetus provided by the sugar factories and co-operative credit societies.

In the case of oil seeds, groundnut has shown negative change in its area while the area under total oil seeds was increased from 87,571 hectares (18.20%) to 1,21,649 hectares (22.27%) during this quinquennium.

The proportion of area under total condiments and spices, total fibers, total drugs and narcotics was decreased during this quinquennium. The area under fruits and vegetables was doubled. The area under fodder crops decreased by 1051 hectares and its share to gross cropped area was 18.65%.

4.6.4 CHANGES IN CROPPING PATTERN 2000 TO 2001

The gross cropped area still increased from 5.46 lakh hectares to 5.74 lakh hectares from third quinquennium to the current year. Area under rice, jowar, bajara and other cereals showed decrease in their area in this period. Only wheat and maize crops has showed the marginal increase in its area. Whereas total area under cereals was decreased constantly from first quinquenium up to this year. It means say that the farmers were favors and taking cash crops in their fields. When the facilities are developed and provided to them by the agro-based industries like sugar factories and the co-operatives.

Therefore the area under sugarcane was increased from 95,245 hectares (17.44%) to 1,02,734 hectares (17.87%) and is constant to gross cropped area of the study region. The area under pulses has increased from 23,815 hectares (4.36%) to 29,668 hectares (5.16%) over the third quinquenium to the year 2000-2002. The crops like total condiments and spices are negligible in the study region it shows the decreasing trend and very minute proportion of the area under this category. The fruits and vegetables have taking in the study region especially in the close vicinity of the city areas where there
assured and perennial irrigation facilities available. That’s why the area under fruits and vegetables were increased over the third quinquennium. There is no remarkable area under fiber crops in the study region.

The position of the oilseeds is constant increasing but still it is marginal sign of increasing. The groundnut is the remarkable oilseed crop in the study region and it has keep constant position but very stagnant growth of its area from the beginning of the first quinquennium upto this year. Crops like total drugs and narcotics, fodder crops have showed decreasing trend in their area from the beginning of the investigating period.

The variety of crops was grown in the study region. The food grains constitute a major produce of agricultural land (35.49 %). The main foodgrains grown are rice (18.53 %), jowar (4.00%), and wheat (1.48 %) and pulses (5.16 %). When we include sugarcane, fruits and vegetables, condiments and spices, the total food crops has occupy about 57.94 % during the year 2000-2001 to 2001-2002 (Table No 4.3). Among the non-food crops groundnut shares (11.95 %) and total oilseeds having 23.32 percent share to total gross cropped area of the study region.

4.7 TAHSILWISE TRENDS IN AREA UNDER DIFFERENT INDUSTRIAL CROPS IN KOLHAPUR

Despite technological achievement and conquest over nature, the agricultural pattern is closely controlled by the physical factors. In fact, terrain, topography, slope, altitude, climate (temperature, rainfall, humidity, fog, forest, winds, and sunshine), soils, surface drainage and underground water table are quite vital determinants of agricultural activities and cropping patterns. Though there are numerous socio-cultural, economic, political, technological and infrastructural factors which also determines the agricultural land use, cropping pattern and agricultural process of those factors land tenancy, system of ownership, size of holdings, availability of labour, capital, religion, level of technological development, accessibility to the market, irrigation facilities, agricultural research and extension service, price incentives, government plans and international policies have a close impact on agricultural activities.

An attempt is made to study the existing overall cropping pattern of the region and changes there in during the period of 1985-86 to 2001-2002. Table No 4.4
shows that the region is a food grains oriented region, as they have occupied 36.44 per cent of the gross cropped area of the region during 1997-2002 and the share of food crops was 81.07 per cent. Among the rice is the important food grain that has exhibit 19.35 per cent of the gross cropped area of the region fallowed by total pulses (4.70 %) and jowar (4.64%). If the groundnut counted as a cash crop then the share of the sugarcane and groundnut together have 29.33 percent. Sugar cane alone occupied 17.80 percent to the gross cropped area of the study region it means that the rice, sugarcane and groundnut are the dominant crops in the study region.

Substantially changes have been occurred in the cropping pattern of the region due the physical and non-physical factors. These determinants were differs the cropping pattern of the study region. Therefore the detail analysis of each crop and its spatial analysis based on quinquennium averages from 1985-86 to 2001-2002 and changes there in are necessary to study and therefore it is as fallows.

**RICE**

Rice is the staple food crop of the region. It grows in every tahsil of the region. Being a tropical monsoon crop, rice requires temperature of $21^0$ Celsius during sowing and $37^0$ Celsius during its harvesting. It requires high rainfall or assured irrigation facilities. Rice occupies about 19.35 per cent of total cropped area and having more variations at tahsil level. The south-western hilly tract, particularly Bhudargad, Radhanagari and Karveer has high proportion of rice (above 25 %), the north-western and southern tahsil like Panhala, Shahuwadi, Ajara, Chandgad, Gaganbavada, Kagal and Gadhinglaj are having moderate (15 to25 %) proportion. It is due to high rainfall and undulating topography, whereas very low share (below 15%) of rice crop is confined in Shirol and Hatkangale tahsil (Map 4.8 A).

Below 2 per cent negative change was recorded in its area in Shirol, Gadhingalaj and Bhudargad tahsil. Whereas 2 to 4 per cent negative change was recorded in Ajara, Hatkangale and Radhanagari tahsil. While 4 to 6 percent negative change was recorded in the area under rice cropping in tahsil like Gaganbavada and Panhala tahsil of the study region. The high negative change that is 6 to 8 percent in its area was recorded in tahsil like Kagal and Shahuwadi. Very high negative change that is more than 8 per cent was recorded in the tahsil Chandgad. Only one that is Karveer tahsil has showed
<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Name of the tahsil</th>
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(Note: Data is rounded to the nearest whole number and percentages.)
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<th>Year and volume of change in %</th>
<th>Sugar cane</th>
<th>Total Condi. And spices</th>
<th>Fruits and veg.</th>
<th>Ground nut</th>
<th>Total oil seeds</th>
<th>Total drugs and Narcotics</th>
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Kolhapur District Rice Cropping
1997 - 2002

Legend:
Rice Cropping in %
- > 25%
- 15 - 25%
- < 15%

Map. No. 4.8 (A)
Map. No. 4.8 (B)
Positive change and it is below 3 per cent in the area under rice cropping in 1985-90 to 1997-2002 (Map 4.8 B).

**WHEAT**

Wheat is a rabbi crop and it requires winter temperature between 10° to 15° Celsius. It can be grown in areas where rainfall is less than 500 mm. with the help of irrigation. As such, in the region the post monsoon rainfall is not sufficient for optimum production. Therefore it is extent to which irrigation can be provided to this crop which determines its areal extent and yield capacity.

Wheat occupies only 4.64 per cent of the gross cropped area of the study region as against 3.69 per cent of the state level. Wheat is produced in every tahsil of the study region. But it is taken substantially in north-eastern, central and eastern tahsils of the study region. The central tahsils have moderate proportion of area under this crop. Owing to the less suitable ecological conditions, wheat cultivation is insignificant in south-western tahsils of the study region.

During 1997-2002 below 1 per cent cropped area was found under wheat in Gaganbavada, Chandgad, Bhudargad, Radhanagari and Gadlinglaj tasil of the study region. About 1 to 2 per cent cropped areas was recorded under wheat in Hatkangale, Kagal, Karveer and Ajara tahsil. On the other hand above 2 per cent was experienced in Shirol, Panhala and Shahuwadi tahsil during 1997-2002 (Map 4.9 A).

Both negative and positive changes were recorded in the area under wheat cropping in study region during the period of investigation. Below 2 per cent negative change was recorded in Kagal, Karveer and Ajara tahsil in the study region. More than 2 per cent change was recorded in tahsils like Gadlinglaj, Shirol, Bhudargad, and Hatkangale tahsil of the study region. Below 0.50 per cent positive change was recorded in Panhala, Gadlinglaj and Shahuwadi tahsils. Whereas more than 0.50 per cent positive change was recorded by the Chandgad and Radhanagari tahsil during the period of investigation (Map 4.9 B).
Kolhapur District Wheat Cropping 1997-2002 (A)

Legend:
Wheat Cropping in %
- > 2%
- 1 to 2%
- < 1%

Map. No. 4.9 (A)
Kolhapur District
Volume of Change in Wheat Cropping
1985-90 to 1997-2002

Legend:
Wheat Cropping in %
- + 0.50%
- 0.50%
> -2%
-2%
JOWAR

Jowar is the most largely grown cereal in the study region. It is grown both in kharif and rabbi season. It is staple food crop in the study region and also as a fodder. The spatial pattern of jowar is a reflection of topography, climate and irrigation facilities. Jowar shares about 4.64 per cent of the gross cropped area of the study region. During the study period it has lost 5.24 per cent of its area under cultivation.

During 1997-2002 out of the total gross cropped area below 2 per cent was found in Gaganbavada, Radhanagari Chandgad and Bhudargad tahsil in the study region. These tahsils have hilly tract and undulating topography and unfavorable condition of climate therefore the area under jowar is limited (Map 4.10 A). This is mainly due to adverse ecological condition prevailing in these tahsils.

There were 2 to 4 per cent area was under jowar in Shahuwadi, Ajara, Karveer and Shirol during the period of investigation. Whereas 4 to 6 per cent area was observed under jowar in Panhala and Gadhingalaj tahsil of the study region. Tahsil Kagal has between 6 to 8 per cent area under jowar. The Hatkangale is the only and one tahsil who have having above 8 per cent area under jowar cultivation in 1997-2002. The area under jowar is mainly lost in the Hatkangale, Shirol, and Gadhinglaj and Kagal tahsil in the study region during the period of investigation. The increasing irrigation facilities caused shifting the farmers from jowar cultivation to sugarcane cultivation.

Both the negative and positive changes have been occurred in an area under jowar cultivation during the period of investigation in the study region. Below 1 per cent negative change was recorded in area under jowar in Gaganbavada and Chandgad tahsil in the study region. Whereas 1 to 4 per cent negative change in area under jowar was experienced in Bhudargad, Radhanagari, Ajara and Panhala tahsil of the study region. While 4 to 8 per cent negative change was noted in the Karveer and Kagal tahsil. Above 8 per cent negative change in area under jowar was found in Gadhhiglaj, Shirol and Hatkangale tahsil of the study region (Map 4.10 B). Only one tahsil have recorded and is very little change in the area under jowar in Shahuwadi tahsil of the study region and it is noted bellow 0.50 per cent during 1997-2002 (Map 4.10 B).
OTHER CEREALS

Other cereals were not significant in the study region. This category has recorded only 0.44 per cent area of the gross cropped area in the study region. Nearly half of the tahsils of the study region has area under this category. Some of the tahsils situated in the hilly tract of the study region has taken very rare proportion of the hill millets and which were ripe in kharif season.

TOTAL CEREALS

Nearly 30 per cent of the gross cropped area was under total cereals in the study region. During the period of investigation table shows that the majority of the tahsils have lost their area under total cereals. More than half of the tahsils of the study region recorded a tremendous decrease in the area under total cereals. It is seen in Gaganbavada, Kagal, Chandgad, Gadhinglaj and Shirol tahsil of the study region. These tahsils were distinctly irrigated but now the farmers of these tahsils have shift cereals by cash crops like sugarcane in the study area.

Below 10 per cent change in the area under total cereals was recorded in Shirol tahsil. Whereas 10 to 25 per cent change was recorded in area under cereals in Hatkangale tahsil of the study region. While 25 to 40 per cent change was noted in the central zone of the study region among them Gadhinglaj, Gaganbavada, Kagal, Karveer, Chandgad, Panhala, Shahuwadi and Ajara are major tahsils. Above 40 per cent change in the area under total cereals was recorded in the Radhanagri and Bhudargad tahsils of the district (Map 4.11 A).

During 1985 to 2002 noon of the tahsil in the study region has recorded a positive change in the area under total cereals. Below 5 per cent negative change was recorded in the area under total cereals in Radhanagari and Karveer tahsil. Tahsils like Shahuwadi, Ajara and Panhala was recorded 5 to 10 per cent negative change in the area under total cereals. While 10 to 15 per cent change in the area under total cereals was recorded in Bhadargad, Shirol, Gadhinglaj, Kagal and Chandgad tahsil. Above 15 per cent negative change was noted in area under total cereals in Gaganbavada and Hatkangale tahsil of the study region during the period 1985 to 2002 (Map 4.11 B).
Kolhapur District Total Cereals 1997-2002

(A)

Legend:
Cereals in %
- Above 40%
- 25 to 40%
- 10 to 25%
- 10 to 25%
- < 10%

Map. No. 4.11 (A)
Kolhapur District
Volume of Change in Total Cereals
1985-90 to 1997-2002
(B)

Legend:
Cereals in %
- Above - 15%
- 10 to - 15%
- 5 to - 10%
- < - 5%

Map. No. 4.11 (B)
SUGARCANE

There has been a vast change in agricultural practices during the last twenty-five years. Some of the changes have resulted from the innovations introduced in the field of agriculture. The upper Krishna basin is known as ‘Sugar Bowl’ of Maharashtra since long, wherein, Kolhapur, one of the leading and well-known markets of jaggery in India is located. In an overview, increasing acreage under sugarcane and the springing up of sugar refineries. Sugarcane has not only changed the crop pattern, agricultural productivity and the landscape in western Maharashtra. It has introduced new dimensions in the politics of the state by creating a powerful pressure group of ‘bagaitdars’ the sugarcane planters and sugar co-operative societies. The entire economic and political structure of the Western Maharashtra revolves around these co-operatives.

Sugarcane, a premier cash crop of the study region occupied 17.80 per cent of the total cropped area (3.16% state) and uses 78.18 per cent of gross cropped area irrigated, while ranking first among irrigated crops. However, its spatial distribution differs largely throughout the region. The area under sugarcane was increased in each tahsil during the period under investigation, but the remarkable increase in its area under cultivation where there is the irrigation facilities are comparatively more developed. Tahsils like Gaganbavda, Panhala, Kagal, Bhudargad and Shahuwadi have recorded tremendous increase in the area under sugarcane in the study region during the period of investigation (Table No. 4.3). It happens due to the alluvial tract, close vicinity of sugar factories and market, well developed network of transportation and other contributory factories which have stimulated the extension of cane cultivation in this part of the region.

During 1985 to 2002 below 10 per cent gross cropped area was found under sugarcane in Ajara and Gadhinglaj tahsils. Whereas 10 to 20 per cent gross cropped area was recorded under sugarcane Chandgad, Shahuwadi, Bhudargad, Kagal and Radhanagri tahsil. Above 20 per cent area was found in Hatkangale, Panhala, Karveer, Gaganbavada and Shirol tahsils during 1985-2002 (Map 4.12).
Kolhapur District Sugarcane Cropping
1997-2002

Legend:
Sugarcane in %
- Above 20%
- 10 to 20%
- Below 10%

Map. No. 4.12 (A)
Kolhapur District
Volume of Change in Sugarcane Cropping
1985-90 to 1997-2002
(B)

Legend:
Sugarcane in %
- > 12%
- 8 to 12%
- 4 to 8%
- < 4%

Map. No. 4.12 (B)
Only positive changes in area under sugarcane were recorded in study area. Below 4 per cent change in area under sugarcane was found in Karveer, Gadhinglaj, and Chandgad and Ajara tahsils in the study area. Whereas 4 to 8 per cent change in sugarcane area was took place in Radhanagri, Hatkanagle and Shirol tahsils. While 8 to 12 per cent change was recorded in area under sugarcane in Shahuwadi, Bhudargad, Kagal and Panhala tahsils of the study region. Above 12 per cent change in the area under sugarcane was found in Gaganbavada tahsil during 1985-2002 (Map 4.13). Area under irrigation was increased during the period of investigation, therefore sugarcane area showed positive change in all tahsils of the study region. Sugarcane alone share above 3/4th of the irrigated land in the study region. It ranks first among irrigated crops in all the tahsils.

GROUNDNUT

Groundnut (Bhuimug) requires temperature of 20 to 250 c and 5 to 8 months to grow fully. About 750 to 850 mm of rainfall may be considered necessary, though it is grown in areas receiving rainfall below 500 mm. it thrives best in alluvial black soils and though it grows in other soils as ‘Chunkhad’, it then requires liberal manuring. It is sown in June and harvested in January. After the south-west monsoon has ceased in November and December, it requires four to five watering. Almost all classes eat it parched. Edible oil is pressed from the nuts which are first mixed with kardai (Safflower).

The area under groundnut is about 11.53 per cent of the gross cropped area of the study region during the period of investigation. But during the period of investigation its volume of change is about -0.72 per cent. The significant proportion of cultivated land under this crop is confined (7 to 14 %) to the central part of the region (Map 4.13 A). The spatial distribution of area under groundnut differs from tahsil to tahsils. Below 7 per cent gross cropped area under groundnut was noted in Gaganbavada, Radhanagri and Shirol tahsils of the study region. Whereas 7 to 14 per cent area under groundnut was recorded in Panhala, Shahuwadi, Bhudargad, Ajara, Karveer, Chandgad and Hatkangale tahsils of the study region during the period of investigation. Above 14 per cent area under groundnut was found in Kagal and Gadhingalaj tahsils of the study region.
Kolhapur District
Volume of Change in Groundnut Cropping
1985-90 to 1997-2002
(B)
Both negative as well as positive changes were noted under gross cropped area of the
groundnut. Below 4 per cent negative change was noted in area under groundnut in
Radhanagri, Kagal, Panhala and Gadhinglaj. While above 4 per cent negative change was
recorded in the area under groundnut in Shirol and Hatkangale tahsils of the study region.
The edible oil seed like groundnut was replaced by the cash crops like sugarcane; wheat
and fruits in the study region. Most of the tahsils in the study region has recorded positive
change in the area under groundnut. The area under groundnut was increased during the
period of investigation. Below 4 per cent positive change was recorded in Bhudargad,
Karveer, Ajara and Gaganbavada. Whereas above 4 per cent positive change in the area
under groundnut of gross cropped area was noted in Shahuwadi and Chandgad tahsils of
the study region (Map 4.13 B). The area under groundnut has decreased particularly in
Hatkangale, Shirol, Gadhinglaj, Panhala and Kagal tahsils very noteworthy in the study
area.

**OIL SEEDS**

Oil seeds grown in the region includes grounds, castor, seasamum,
safflower seeds etc. which together constitute about 22.83 per cent of the gross cropped
area of the district (11.27 % state). The area under oil seeds has increased 102 per cent
during study period.

The area under oil seeds increased, below 15 per cent in Gaganbavada,
Rahanagari, Bhudargad, Panala and Shahuwadi tahsils of the study region. While the
moderate (15-30 %) change were recorded in the area under oil seeds in Ajara,
Chandgad, Karveer and Kagal tahsil. Above 30 per cent area under total oil seeds was
noted in Gadhingalaj, Hatkangale and Shirol tahsils of the study area. The regions
average was noted 22.83 per cent under this edible oil seeds (Map 4.14 A).

The regions as a whole have recorded only positive change under oil
seeds. An increase below 5 per cent was noted in Radhanagri, Bavada, Bhudargad,
Panhala and Ajara tahsils. While 5 to 10 per cent change in the area under oil seeds was
recorded Karveer and Shahuwadi.
Kolhapur District Oilseeds Cropping
1997-2002
(A)

Legend:
Oilseeds in %
- > 30%
- 15 - 30%
- < 15%

Map. No. 4.14 (A)
Kolhapur District
Volume of Change in Oilseeds Cropping
1985-90 to 1997-2002
(B)

Legend:
Oilseeds in %
> 15%
10 to 15%
5 to 10%
< 5%

Map. No. 4.14 (B)
Above 15 per cent change in the area under oil seeds was recorded only in Shirol tahsil of the study region during the period of investigation (Map 4.14 B).

**Pulses**

Pulses are important in the cropping pattern of the study region. They are grown in both rabbi and kharif season occupying about 4.70 per cent of the gross cropped area (16.68 % state). The region produces varieties of pulses. However principal pulses are gram, mung, tur, udid, kulthi, wal, math, arhar and watana etc. they are mainly practiced as an intern cropping and are largely rain fed. The variation in cultivation of pulses is largely influenced by agro-climatic conditions. It varies from 0.75 per cent in western tahsils to 7.65 per cent in semi-arid eastern tahsils (Map 4.15 A).

Below 2 per cent area was found under pulses in Gaganbavada, Chandgad and Radhanagari tahsils, while 2 to 4 per cent area was found under cultivation of pulses in Bhudargad, Shahuwadi and Karveer tahsils in the study region. There were 4 to 6 per cent area was registered under pulses in Ajara and Panhala tahsil. Above 6 per area under pulses was found in Gadchinglaj, Kagal, Shirol and Hatkangale tahsils of the study region during the period under investigation.

Both negative as well as positive changes have been found under the area of pulses in the study region (Map 4.15 B). Below 2 per cent negative change was recorded in the area under pulses in Karveer, Ajara, Radhanagari and Hatkanagale tahsils of the study region. Above 2 per cent negative change was registered in Kagal and Shirol tahsils of the study region. The positive change in the volume of cropping of pulses was recorded nearly half of the tahsils in the study region.

Below 1 per cent change in the volume of cropping under pulses was found in Chandgad, Bavada and Shahuwadi tahsils whereas 1 per cent positive change was recorded in Gadchinglaj, Bhudargad and Panhala tahsils during the period of investigation.

The area under pulses has decreased by 22.44 per cent during the period of investigation. Such decline is mostly related to the adoption of HYV of jowar, rice and
Map. No. 4.15 (A)
Kolhapur District
Volume of Change in Total Pulses Cropping
1985-90 to 1997-2002

Map. No. 4.15 (B)
Wheat and sugarcane replacing pulses. Such decline is mostly notable in the eastern irrigated tahsils like Shirol (-12.85%), Kagal (-3.01) and Hatkangale (-1.95) and Radhanagari (-1.85 5%) in the study region during the period of investigation.

**GRAM**

Gram is important industrial crop which provides raw material to dal mills. It is eaten raw, but also made in dal and eaten boiled in a variety of ways, and its flour is used in many sweetmeats. It is an important crop for livestock. It also constitutes important chain in rotation system of crops from the point of view of soil management. Gram is a cold-weather crop. Gram a rabbi crop is generally a rain fed crop and rarely needs supplemental irrigation. It is generally sown in the end of September and in the beginning of October and takes about five months to harvest.

It shares about 2.28 per cent of dross cropped area of the study region (3.60 % state average). Generally it is taken in each tahsil of the study region as little as some proportion, though it is significant in Shirol, Hatkangale and Kagal tahsils of the study region. The area under gram is varies from tahsil to tahsils of the study region.

Out of the total gross cropped area below 1 per cent area was recorded in Chandgad, Gaganbavda and Radhanagari tahsils of the study region while 1 to 2 per cent area was found in Shahuwadi, Karveer, Bhudargad and Panhala tahsil. Whereas 2 to 3 per cent area was noted in Ajara and Gadhinglaj tahsils and above 3 per cent area under gram was recorded in Hatkangale, Kagal and Shirol tahsils during 1997-2002 (Map 4.16 A).

Both positive and negative changes in area under gram were recorded in the study region. Below 1 per cent negative change in area under gram was recorded in Shahuwadi, Panhala and Hatkangale. Above 1 per cent negative change in its area was recorded in Ajara and Radhanagri tahsils of the study region. Below 1 per cent positive change was confined in Chandgad, Gaganbavada and Karveer tahsil of the study region. Whereas 1 to 2 per cent change in its area notable in Bhudargad and Gadhinglaj tahsils. Above 2 per cent positive change in its area was recorded in Shirol and Kagal tahsils of the study region during 1985-90 to 1997-2002 (Map 4.16 B).
Kolhapur District
Volume of Change in Gram Cropping
1985-90 to 1997-2002
(B)

Legend:
Gram in %
- > 2 %
- 1 to 2 %
- + < 1 %
- -> 1 %
- - < 1 %

Map. No. 4.16 (B)
Though the insignificant proportion of area under gram was observed in western tahsils of the district where the tendency of the farmers to grow the other cash crops like sugarcane.

**CONDIMENTS AND SPICES**

This group of crops includes chillies, turmeric, ginger, onion, garlic, coriander and other spices. Its share is about 1.06 per cent of gross cropped area (0.68 % state) of the study region. However, they are important as they contribute to the economy of the peasantry. Chillies were taken in an area of 5122 hectares of the gross cropped area of the study region. It has taken leadly in Gadhinglaj, Chandgad, Kagal, Karveer and Ajara tahsils. ‘Shankeswharee’ chillies of Gadhinglaj are famous even outside the state.

Out of the gross cropped area, below 0.50 per cent area was found under total condiments and spices in Bavada, Shahuwadi, Radhanagri, Bhudargad, and Hatkanangle tahsils of the study region during 1997-2002. There were 0.50 to 1 per cent area was found under this category of crops in Shirol and Panala tahsils of the study region. It has 1 to 1.50 per cent area been found under this category of crops in Karveer, Kagal and Ajara tahsils of the study region. Above 1.50 per cent area was noted under this category in Chandgad and Gadhinglaj tahsils of the study region during the period of investigation (Map 4.17 A). Average area of the study region of this category is about 1.06 per cent.

Both, positive as well as negative changes of the area under this category were recorded during the period of investigation. Below 0.50 per cent negative change was recorded in Bavada, Panala, Bhudargad and Radhanagri tahsils of the study region. There was 0.50 to 1 per cent negative change was recorded in Gadhinglaj, Kagal and Hatkangale tahsils of the study region. Above 1 per cent negative change was recorded in Shirol tahsil of the study region. Below 0.50 percent positive change was noted in Shahuwadi, Ajara and Karveer tahsil. Above 0.50 per cent change was noted in Chandgad tahsil of the study region during 1997-2002 (Map 4.17 B). Average change of the study region was 0.33 per cent during the period of investigation.
Kolhapur District
Volume of Change in Condiments & Spices Cropping
1985-90 to 1997-2002

Legend:
Condiments & Spices in %
Above 0.50%  
Below 0.50%  
> - 1%  
0.50 to - 1%  
< - 0.50%

Map. No. 4.17 (B)
FRUITS AND VEGETABLES

Varieties of fruits and vegetables are grown in the study region together sharing about 1.94 per cent of the gross cropped area (3.76 % state) during 1997-2002. There were bulbs vegetables are grown in the study region. However, they are known as root crops, among them potato, carrot, onion, garlic, radish, sweet potato are taken for the need of the peasantry. Some of them are eaten either raw or roasted chiefly on fast days.

There were thirteen fruit vegetables are grown in the study region. There were types of cucumbers, pumpkin (red), bottle gourd, snake gourd, brinjal, tomato etc. taken in the study region. The pod vegetables like okra, French bean, cluster bean, dubble bean, pavata, hudga, shevaga are grown in the study region. There were varities of fruit trees are grown in the study region. However, mango, pineapple, jujube, tamarind, pomegranate, wood apple, bananas, lime, cocoanut, orange, guava, phanas, ramphal and sitaphal are impotant in the study region. Except there were many types of flowers are grown in the study region.

The area under vegetables and fruits varies from tahsil to tahsils in the study region. Out of the gross cropped area below 2 per cent area was recorded in Shahuwadi, Panala, Karveer, Kagal and Hatkanagale tahsils while 2 to 5 per cent area was found in Bhudargad, Shirol, Gadhinglaj, Radhanagri and Ajara tahsils. Above 5 per cent area was noted in Chandgad and Gaganbavada tahsils of the study region during 1997-2002 (Map 4.18 A).

Only one tahsil has recorded negative change in the area under fruits and vegetables that is Chandgad and it is 0.11 per cent. The remaining tahsils have recorded positive change in its area under fruits and vegetables. Below 1 per cent change in the area under this category was recorded in Shirol and Shahuwadi tahsils. There were 1 to 2 per cent change in its area under fruits and vegetables was noted in Hatkanagale, Karveer, Panala and Kagal tahsil, whereas 2 to 3 per cent change was noted in Radhanagri and Ajara tahsils of the study region. Above 4 per cent change was recorded in the area under fruits and vegetables in Gaganbavada tahsils of the study region during 1997-2002 (Map 4.18 B).
Kolhapur District
Fruits & Vegetables Cropping
1997-2002
(A)

Legend:
Fruits & Vegetables in %
- Above 5%
- 2 to 5%
- Below 2%

Map. No. 4.18 (A)
Kolhapur District
Volume of Change in Fruits & Vegetables Cropping
1985-90 to 1997-2002
(B)

Map. No. 4.18 (B)
SUMMARY

There were many changes took place in the landuse pattern of the study region during the period of investigation. The net sown area of the district was increased from 440018 to 455085 hectares. Table 4.1 indicates tahsil wise trends in general landuse of the study region. Nearly 35.77 to 87.94 per cent of the total geographical area is under cultivation. It differs from tahsil to tahsils because of the varied factors affecting on them.

The area under forest was loosed by 2.28 per cent from 1985-86 to 2002-2003 in the study region. The tahsils situated in the western part of the study region have lost the area under forest. The proper area under forest was recorded in Bhudargad and Gadhinglaj tahsils of the study region.

The area of the land not available for cultivation in the study region is about 10.07 per cent. This is an equal to Maharashtra state. Land not available for cultivation was recorded in Radhanagri, Shahuwadi, Chandgad and Karveer tahsils in the study region.

The study region has 3.47 per cent land as fallow land. Bhudargad, Panala and Ajara tahsils have more than 5 per cent fallow land. Gaganbavada tahsils have only 1.33 per cent fallow land. Remaining tahsils have moderate proportion of fallow land.

There was 58.62 per cent area recorded as net area sown of the study region. Gadhinglaj tahsil has recorded highest net sown area (87.94 %) of its gross cropped area fallowed by Kagal, Shirol and Hatkangale tahsils of the study region. Radhanagri tahsil has recorded very least net sown of the study region.

The landuse efficiency of the district was increase from 112.92 to 126.48 times during 1985-86 to 2002-2003. Every tahsils has increased its landuse efficiency except Hatkangale and Kagal tahsil of the district.

Cropping pattern of the district has been changed during the period of the investigation. The dominance of the rice was seen followed by oilseeds particularly groundnut, sugarcane and jowar crops of the study region. The gross cropped area increased from the beginning of the 1st quinquennium upto 2000-2002. The decreasing
trend has been shown by all cereals in the study region. Sugarcane is the cash crop, it has shown increasing trend from I\textsuperscript{st} to II\textsuperscript{nd} quinquennium. The remaining crops have shown negative change in its area except fruits and vegetables it has recorded positive change its area.

The area under total cereals decreased from 37.88 per cent to 33.37 per cent II\textsuperscript{nd} to III\textsuperscript{rd} quinquennium. Share of the sugarcane to the gross cropped area was 17.44 per cent it has increased by 31.75 per cent during II\textsuperscript{nd} to III\textsuperscript{rd} quinquennium. The area under groundnut was decreased but area under total oil seeds increased by 138.31 per cent in this quinquennium. The area under fruits and vegetables are doubled. The share of the remaining crops was decreased among them total condiments and spices, total fibers, drugs and narcotics. Fodder crops had shown decreasing trend during this quinquennium.

The gross cropped area still increased from I\textsuperscript{st} quinquennium to 2001-2002. The decreasing trend has been shown by the cereals except wheat and maize during this period. Farmers in the study area were thinking about cultivation of the sugarcane. The area under sugarcane was increased fallowed by pulses, fruits and vegetables, oil seeds. The fiber crops in the study region are on its vanishing stage fallowed by total drugs and narcotics.

Now the increasing trend of sugarcane, groundnut, fruits and vegetables in the study region is favorable for the functioning of the agro-based industries.

From 1985-86 to 2001-2002 there is the decreasing trend in the area under total cereals. The total cereals have been shared by 31.74 per cent among them 19.35 per cent acquired by rice fallowed by jowar, wheat and maize of the gross cropped area.

Tahsils of the western hilly portion of the study region are having an area under rice. Rice being taken as a food crop in Bhudargad, Radhanagari, Karveer, Panala, Shahuwadi, Chandgad, Ajara and Gaganbavada tahsils of the study region. It has shown decreasing trend in every tahsil except Karveer tahsils.

Jowar has acquired 4.64 per cent area of the gross cropped area of the study region. Hatkangale (13.71\%) is the leading tahsil who have an area under jowar
fallowed by Kagal, and Gadhinglaj, remaining tahsils have very little area under jowar. Jowar has shown that the decreasing trend in its area in the study region during 1985-86 to 2001-2002.

Wheat has taken on 1.39 per cent area gross cropped of the study region. Total pulses have 4.70 per cent area of the gross cropped area of the study region. Though the area under pulses was decreased by 1.36 per cent at the time of 1985-86 it has been taken on area about 6.06 per cent of gross cropped area. Gram has an area about 2.28 per cent of the gross cropped area during 2001-2002. The area under total pulses was constantly decreased in the study region.

Sugarcane is a cash crop; therefore farmers have taken it effectively on the area of about 17.80 per cent of gross cropped area in the study region. Sugar industries have given incentives to the farmers in the study region. Every tahsil has taken sugarcane as a cash crop therefore every tahsil has an area under sugarcane. However, it is leadely taken in Shirol, Karveer, Hatkangale, Kagal, Panala, Radhanagari and Gaganbavada tahsils of the study region.

Total oilseeds have an area about 22.83 per cent of the gross cropped area of the study region during 2002-2002. It has an area about 13.71 per cent in 1985-86. It has taken in Hatkangale, Shirol, Gadhinglaj, Kagal, Karveer and Chandgad tahsils.

The area under groundnut is about 11.53 per cent of the gross cropped area of the study region. It was 12.25 per cent in 1985-86. It has decreased by 0.72 per cent. It has taken in Gadhinglaj, Kagal, Hatkangale, Karveer, Chandgad and Ajara tahsils of the study region.

Fodders are taken over an area about 18.09 per cent of the gross cropped area of 1997-2002. It was decreases about 3.42 per cent from 21.51 per cent of 1985-90. It is largely taken in Shahuwadi, Chandgad, Ajara, Radhanagri, Gadhinglaj, Kagal, Bhudargad and Karveer tahsils of the study region.

The study region is agriculturally developed. Therefore overall situation is favorable for the setting of the agro-based industries in the study region.
REFERENCES


