Chapter Seven

SPATIAL DISTRIBUTION OF AGRO SERVICE CENTERS AND LEVEL OF AGRICULTURAL DEVELOPMENT

7.1 Introduction

7.2 Correlation Analysis
   7.2.1 Correlation Between Altitude And Number Of Agro Service Centres
   7.2.2 Correlation Between Soil Types And Number Of Agro Service Centres
   7.2.3 Correlation Between Agricultural Workers And Number Of Agro Service Centres
   7.2.4 Correlation Between Net Sown Area And Number Of Agro Service Centres
   7.2.5 Correlation Between Agricultural Implements And Number Of Agro Service Centres

B) LEVEL OF AGRICULTURAL DEVELOPMENT

7.3 Introduction

7.4 Data base and Methodology
   7.5 List of the selected indicators / variables.
   7.6 Distribution of variables/indicators.
      7.6.1 Net sown area. (X1)
      7.6.2 Irrigated area (X2)
      7.6.3 Agricultural implements (X3)
      7.6.4 Agricultural workers (X4)
      7.6.5 Satara District Central co-operative Bank (X5)
      7.6.6 Crop Productivity Yield Index (X6)
         7.6.6.1 Rice (X6a)
         7.6.6.2 Wheat (X6b)
         7.6.6.3 Jowar (X6c)
         7.6.6.4 Sugarcane (X6d)
         7.6.6.5 Groundnut (x6e)
         7.6.6.6 Gram (x6f)

7.7 Levels of Agricultural Development.

7.8 The Spatial Pattern and Level of Agricultural Development

7.9 References
Chapter - Seven

SPATIAL DISTRIBUTION OF AGRO SERVICE CENTERS AND LEVEL OF AGRICULTURAL DEVELOPMENT

A) SPATIAL DISTRIBUTION OF AGRO SERVICE CENTERS

7.1 INTRODUCTION

In this chapter an attempt has been made to study spatial distribution of agro service centers and their relationship with physical and economical factors. These are correlated with the agro service centers in the Satara district. These factors like altitude soil types net sown area irrigated area and farm implements. The total scenario is the out of cumulative effect of all these factors. The environmental factors are also affecting on different categories.

7.2 CORRELATION ANALYSIS

7.2.1 Correlation between Altitudes and Number of Agro Service Centers.

An altitude of an any region plays important role and determine the distribution of Agro Service centres . The map of physical features used for superior position of agro service centers the figure no.1 shows impact of altitude on the distribution of agro service centers in the entire study region. (Fig.No.7.1)

In the region of move altitude that is (Above 1200 mt ) minimum numbers of agro service centers are recorded i.e 541 (M'Shawar 82, Jawali 158, Wai 100, Khandala 192 ) service centers ,17.53% .Agro service centers located in the region of above 1200 mt height i.e. M’ Shwar, Jaweli ,Khandala , Wai as this region belongs from hilly area of Sahyadri mountain ranges with some hills and hillocks less fertile soil, lack of irrigation facilities less number
SATARA DISTRICT
ALTITUDE
AND
AGRO SERVICE CENTRES

Agro Service Centres
- Below 150
- 150 to 300
- Above 300

Index
- Height in Meters
  - Above 1200
  - 900 to 1200
  - 600 to 900
  - Below 600

Fig. No. 7.1
of agricultural workers. This region receives move rain but very less amount of water is absorbed. This region comes under command area of different irrigation projects.

Large numbers of agro service centers are located in the region of height in between 500 to 1200 mt i.e. Patan, Satara, Koregaon, Wai, Karad, Khatav and Man. As this region has irrigation facilities by different sources like irrigation, fertile soil, leveled land, availability of finance and conducive climatic and physiographic conditions. Some part of this region is also in drought conditions even there large number of agro service centers 47.27% Agro Service centres observed in region of 600 to 1200 mt. in study region and 35.20%. Agro Service centres recorded in the areas of height below 600 i.e. in Khandala, Phaltan, Karad and Phaltan. Only Karad (18.21%) and Phaltan taluka recorded (15.78%) Agro Service centre and i.e. is highest number in the district as per the 2010-11 record due to plain topography, alluvial soil medium black soil of Krishna Koyana basin. Total and sugar factories are located in this area out of 10 sugar factories are located in this area out of 10 sugar factories along with sugarcane farmer are cultivating other food crops.

In the taluka like Mahabaleshwar and Jawali there is less number of Agro Service centres. Many factors affecting the number of Agro Service centres in the region of Satara district.

7.2.2 Correlation between soil types and number of Agro Service centres.

Soil types also affecting the distribution of Agro Service centres in the Satara district. In the study region four types of soils are found These are shallow black soil, medium deep black soil, deep black soil, shallow laterite soil, medium deep laterite soil and deep laterite soil. The impact of soil type indirectly in the distribution of Agro Service centres, showing correlation between soil type and Agro Service centres. It is observed that the Western part of Satara district comprised by shallow, medium and deep laterisol mostly in Jawli, Patan and Mahabalershwar talulka. Some part of Satara taluka also the
Fig. No. 7.2

INDEX
- Deep Black Soil
- Medium Black Soil
- Shallow Black Soil
- Deep Laterite Soil
- Medium Laterite Soil
- Shallow Laterite Soil

Agro Service Centres
- Below 150
- 150 to 300
- Above 300
presence of laterite soil along with western margin of Khatav taluka, central part of Man and major part of Phaltan taluka also has laterite soil even though Phaltan recorded second ranking Agro Service centres. (fig Soil Type)

Deep, medium and shallow black soil are distributed in north marginal part of Satara district along with Krishna river basin, south eastern part of Khatav and Man taluka, Karad, Satara, Koregaon, Wai taluka has large number of agro servicer centres.

In the areas of laterite soil less number of Agro Service centres i.e. in Jawali, Mahabaleshwar taluka of the district. (Fig.No.7.2)

7.2.3 Correlation between agricultural workers and number of Agro Service centres.

Agricultural workers affecting the distribution of Agro Service centres in the study area. In the satara district highest number of agricultural workers found in Karad taluka, and Phaltan was second ranking taluka in Satara district.

On the other hand, minimum number of Agro Service centres is found in Jawali and Mahabaleshwar taluka. Along with this Khandala, Wai, Man, Satara and Patan moderate number of Agricultural workers.

In Karad and Phaltan taluka highest number of agricultural labours because of irrigation facilities fertile soil, transport, communication facilities and localized in urban area.
### TABLE NO.VII.I
**SATARA DISTRICT**
**NUMBER OF AGRICULTURAL WORKERS**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of the talukas</th>
<th>No. of ASC’S</th>
<th>No. of Agricultural Worker</th>
<th>Main</th>
<th>Marginal</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.Shwar</td>
<td>82</td>
<td>792</td>
<td>1170</td>
<td>1962</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wai</td>
<td>158</td>
<td>12744</td>
<td>6089</td>
<td>18833</td>
<td>6.70</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Khandala</td>
<td>192</td>
<td>6457</td>
<td>4342</td>
<td>10799</td>
<td>3.84</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Phaltan</td>
<td>487</td>
<td>31964</td>
<td>9921</td>
<td>41885</td>
<td>14.90</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Man</td>
<td>284</td>
<td>15377</td>
<td>6340</td>
<td>21717</td>
<td>7.72</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Khatav</td>
<td>309</td>
<td>19469</td>
<td>10842</td>
<td>30311</td>
<td>10.78</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Koregaon</td>
<td>310</td>
<td>21632</td>
<td>9681</td>
<td>31312</td>
<td>11.14</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Satara</td>
<td>375</td>
<td>16111</td>
<td>9907</td>
<td>26018</td>
<td>9.25</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Jawali</td>
<td>109</td>
<td>4074</td>
<td>4835</td>
<td>8909</td>
<td>3.17</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Patan</td>
<td>218</td>
<td>12923</td>
<td>14034</td>
<td>26957</td>
<td>9.59</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Karad</td>
<td>562</td>
<td>43686</td>
<td>18623</td>
<td>62309</td>
<td>22.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3086</td>
<td>185229</td>
<td>95784</td>
<td>281013</td>
<td>99.95</td>
<td></td>
</tr>
</tbody>
</table>

Source: Socio Economic Abstract 210-2011

Karl Pearson’s rank correlation coefficient method based is on the ranks of given values rather than the actual values. In this method the study of correlation between two variable i.e. agricultural works and Agro Service centres.

Karl Pearson’s Rank correlation coefficient (rs) is calculated by using the following formula

\[
rs = 1 - \frac{6 \sum (R1-R2)^2}{n^3 - n}
\]

Where,

- rs - Rank correlation coefficient
- R1 – Ranks given to first variables
- R2 - Ranks given to second variables
- N – Number of Observations

The scatter diagram shown No. of Agro Service centres on the Y’ axis and Agricultural workers are on the X’ axis. The scatter diagram apparently
had shown the very strong correlation ship in between Agro Service centres and agricultural labours. The agricultural workers perfectly confirm to the Agro Service centres in the respective circles. This fact brings perfect correlation between two factors. The coefficient correlation between the two variables indicated strong positive correlation i.e. where $r = 0.93$ (Fig.No.7.3 A)

**7.2.4 Correlation between net sown area and Agro Service centres.**

The distribution of Agro Service Centres is affected by the net shown areas. In the Satara district Phaltanm, Khatabv, Koregaon, Satara and Karad have highest net sown area consequently large number of Agro Service centres. In the Khandala Man Jawali, Koregaon taluka more net sown area but Agro service centre’s are comparatively less due to irrigation facilities are short.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Taluka</th>
<th>No. of ASC’S</th>
<th>Net Sown Area (Hectors)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.Shwar</td>
<td>82</td>
<td>6468</td>
<td>0.92</td>
</tr>
<tr>
<td>2</td>
<td>Wai</td>
<td>158</td>
<td>50112</td>
<td>7.20</td>
</tr>
<tr>
<td>3</td>
<td>Khandala</td>
<td>192</td>
<td>40903</td>
<td>5.87</td>
</tr>
<tr>
<td>4</td>
<td>Phaltan</td>
<td>487</td>
<td>64419</td>
<td>9.25</td>
</tr>
<tr>
<td>5</td>
<td>Man</td>
<td>284</td>
<td>55851</td>
<td>8.02</td>
</tr>
<tr>
<td>6</td>
<td>Khatav</td>
<td>309</td>
<td>83428</td>
<td>11.99</td>
</tr>
<tr>
<td>7</td>
<td>Koregaon</td>
<td>310</td>
<td>68817</td>
<td>9.89</td>
</tr>
<tr>
<td>8</td>
<td>Satara</td>
<td>375</td>
<td>92158</td>
<td>13.24</td>
</tr>
<tr>
<td>9</td>
<td>Jawali</td>
<td>109</td>
<td>45355</td>
<td>6.51</td>
</tr>
<tr>
<td>10</td>
<td>Patan</td>
<td>218</td>
<td>92950</td>
<td>13.35</td>
</tr>
<tr>
<td>11</td>
<td>Karad</td>
<td>562</td>
<td>95278</td>
<td>13.69</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3086</td>
<td>695739</td>
<td>99.93</td>
</tr>
</tbody>
</table>

Source- Socio Economic Abstract 210-2011

The net sown area and Agro Service centres plotted on the graph. Number of Agro Service centres are on the X axis and Net sown area in hectors are on x axis. The scatter diagram exhibits moderate positive correlation ship between two variables. The Net sown area is perfectly confirming to the Agro Service centres. There is a very slight difference in Net sown area and agro
service centre. This presentation shows moderate positive correlation between two variables. \( r = 0.55 \) (Fig.No.7.3B)

### 7.2.5 Correlation between agricultural implements and number of Agro Service centres.

Agricultural implements are the major tool in the operation of the study region. Agro Service centre’s provides the facilities of repairs and maintenance of agro farm implements. The correlation between agricultural implements and Agro Service centre is very significant.

In the Satara district Karad, Patan, Satara, Khatav, Koregaon ,Man and Phaltan taluka have higher number of agricultural implements.

![Table](image)

One identical feature noticed here that Wai, Phaltan and Khatav taluka have more number of agricultural implements even though they have comparatively less number of agro services centres. Phaltan has more number of Agro Service centres and less number of farm implements due to rural area more and more agricultural operation done by the human powers.
SATARA DISTRICT
CORRELATION BETWEEN AGRICULTURAL WORKERS AND AGRO SERVICE CENTRES

SATARA DISTRICT
CORRELATION BETWEEN AGRICULTURAL IMPLEMENTS AND AGRO SERVICE CENTRES

SATARA DISTRICT
CORRELATION BETWEEN NET SOWN AREA AND AGRO SERVICE CENTRES

Fig. No. 7.3 A, B and C

181
The quantity of the agricultural implements and Agro Service centres plotted on graph. The Agro Service centre’s are shown on the Y’ axis and farm implements are on the X’ axis. The scatter diagram exhibit strong positive relationship in between two variables.

The ranks of Agro Service centres and agricultural implements are remarkable. The high difference in two variables shown by Phaltan i.e. more Agro Service centres and fewer farms implement exactly opposite of this is Patan and Khatav taluka number of Agro Service centres and move farm implements.

There is high degree of positive correlation between two variables (r=0.72) (Fig.No.7.3C)

**B) LEVEL OF AGRICULTURAL DEVELOPMENT**

**7.3 Introduction**

In the Satara district spatial variation in the adoption of improved agricultural practices to ascertain level of agricultural development, The spatial variation is determined with the help of six variables viz. Net soon area, irrigated area, agricultural implements, Agricultural workers Numbered Satara districts central co-operative banks and crop productivity of yield index of Rice, wheat, Jowar, sugarcane, Groundnut and gram crops. Besides this the development of talukas are taken with their respective categories viz high, medium and low on the basis of scores of standard deviation. These analysis have been carried out by transfer and combining the data relate to 11 variables using Z-score to get composite scores. On the basis of composite Score the talukas have been classified into high;, moderate and low development categories. As a result of the analysis shows that the modern technological inputs through agro service centres have reciprocal relationship with agricultural development in the study area.

The growth rates of total food of grain production were less in the last two decades making traditional farming a non viable agricultural activity.
Disparities in productivity across the district and even within crops persist with significant increase in small and marginal land holdings. Agricultural development denotes the equality of agricultural system of the region. It is multidimensional concept which mainly includes development in real strength of cropped area? Farming system and irrigated area, high yielding improved verities of seeds, chemical fertilizers, insecticides and pesticides and specialization and commercialization of agriculture (Mohammed-1986)

The changing scenario of agro-economy drew attention of researcher on diffusion of technological development in agriculture. Major Indian population depends on agricultural produce, so vast rural mass tries to earn their livelihood from agriculture. Fast increasing pressured of growing population on agriculture,, tradition methods of techniques of production cannot crop with growing demand..As a result new techniques and commercial crops are adopted to develop agro-economy.

7.4 Data base and Methodology

The assessment of agriculture development secondary data used for the period 2000-01, collected from District statistical handbook, Socio-Economic abstract of district profile of Satara districts. The crops of the districts are Rice, wheat, Jowar, Sugarcane, Groundnut, and gram.

To determining the level of agricultural development various indicators variable have been used such as Net sown area, Irrigated area, Agricultural Implement Agricultural Workers, Number of SDCC Banks and Crop Productivity Yield index of the different crops.

For calculation overall levels of agricultural development and it's even, distribution the data of all variables indicators have been transformed into Z-score techniques. The formula is

\[
Z\text{-Score (Zi)} = \frac{X_i - \bar{X}}{S.D}
\]
Where,

\[ Z_i \quad - \quad \text{Z-Score For } i^{th} \text{ observation} \]
\[ X_i \quad - \quad \text{Original Value of } i^{th} \text{ observation} \]
\[ \bar{X} \quad - \quad \text{Mean value of } X' \text{ variables} \]
\[ \text{S.D.} \quad - \quad \text{Standard Deviation of } X' \text{ variable} \]

In order to classify taluka according to their levels of development, the composite Z-score have been grouped into high medium and low.

The result of the standard score obtained for different indicators were aggregated by composite standard score (CSS). So that regional disparities in the level of development of the study regions may be obtained on a common sale. The composite Z-score may be algebraically expressed as

\[
\text{CSS} = \frac{\sum Z_{ij}}{N}
\]

Where as ,

CSS - Composite Standard Score
\[ Z_{ij} \quad - \quad \text{Scored of an Indicator J in the Districts.} \]
\[ N \quad - \quad \text{Number of indicators.} \]

In order to classify the talukas according to the magnitude of development the composite score were divided into three classes that are high medium and low.

7.5 List of the selected indicators \ variables.

X1-Percentage of Net sown area to total cropped area
X2- Percentage of Irrigated area to total cropped area
X3- Number of Agricultural Implement
X4-Number of Agricultural Workers,
X5-Number of SDCC Banks
X6-Crop Productivity Yield index of the different crops.
\[ X_{6a} \quad - \quad \text{Rice}, \]
X6b - wheat,
X6c - Jowar,
X6d - Sugarcane,
X6e - Groundnut,
X6f - Gram.

Agricultural development is a multi dimensional activity and key to which is crop productivity as one of the vital aspect of rural development. The objective of agricultural development is usually increased growth of agricultural output to provide the livelihood to growing population.

### TABLE NO. VII.IV
### SATARA DISTRICT
### STANDARD SCORE FOR AGRICULTRAL DEVELOPMENT

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Taluka</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X6A</th>
<th>X6b</th>
<th>X6c</th>
<th>X6d</th>
<th>X6e</th>
<th>X6f</th>
<th>Composite Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.Shwar</td>
<td>-2.18</td>
<td>-2.50</td>
<td>-2.18</td>
<td>-1.48</td>
<td>-0.13</td>
<td>-1.8</td>
<td>-1.5</td>
<td>-0.03</td>
<td>-0.1</td>
<td>-</td>
<td>-</td>
<td>-1.07</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wai</td>
<td>-0.50</td>
<td>-0.12</td>
<td>-0.09</td>
<td>-0.4</td>
<td>-0.05</td>
<td>0.41</td>
<td>0.4</td>
<td>0.04</td>
<td>-0.1</td>
<td>-0.35</td>
<td>0.11</td>
<td>-</td>
<td>-0.45</td>
</tr>
<tr>
<td>3</td>
<td>Khandala</td>
<td>0.00</td>
<td>-0.72</td>
<td>-1.75</td>
<td>-0.92</td>
<td>-0.03</td>
<td>-0.6</td>
<td>0.93</td>
<td>-0.03</td>
<td>0.0</td>
<td>0.14</td>
<td>-0.69</td>
<td>-0.51</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Phaltan</td>
<td>0.04</td>
<td>1.46</td>
<td>-0.05</td>
<td>1.02</td>
<td>0.05</td>
<td>-</td>
<td>3.1</td>
<td>-0.01</td>
<td>-</td>
<td>2.67</td>
<td>1.20</td>
<td>0.86</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Man</td>
<td>-0.28</td>
<td>0.04</td>
<td>0.11</td>
<td>-0.24</td>
<td>-0.03</td>
<td>-</td>
<td>0.1</td>
<td>-0.04</td>
<td>--</td>
<td>-0.70</td>
<td>0.44</td>
<td>-0.05</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Koregaon</td>
<td>0.77</td>
<td>0.19</td>
<td>1.01</td>
<td>0.2</td>
<td>0.01</td>
<td>-</td>
<td>-0.4</td>
<td>0.00</td>
<td>0.0</td>
<td>0.41</td>
<td>-2.05</td>
<td>0.01</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Koregaon</td>
<td>0.21</td>
<td>0.06</td>
<td>-0.01</td>
<td>0.3</td>
<td>0.00</td>
<td>1.30</td>
<td>0.0</td>
<td>0.02</td>
<td>-0.1</td>
<td>0.01</td>
<td>0.51</td>
<td>0.39</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Satara</td>
<td>1.10</td>
<td>0.16</td>
<td>0.81</td>
<td>0.02</td>
<td>0.11</td>
<td>-0.7</td>
<td>-0.8</td>
<td>0.00</td>
<td>-0.1</td>
<td>-0.10</td>
<td>0.26</td>
<td>0.06</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Jawali</td>
<td>-0.68</td>
<td>-0.37</td>
<td>-0.94</td>
<td>-1.04</td>
<td>-0.08</td>
<td>0.64</td>
<td>-1.5</td>
<td>0.01</td>
<td>0.1</td>
<td>-</td>
<td>-0.64</td>
<td>-0.40</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Patan</td>
<td>1.18</td>
<td>0.56</td>
<td>1.15</td>
<td>0.08</td>
<td>0.00</td>
<td>0.08</td>
<td>-0.6</td>
<td>-0.01</td>
<td>-0.1</td>
<td>-</td>
<td>-</td>
<td>0.23</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Karad</td>
<td>1.24</td>
<td>1.23</td>
<td>1.94</td>
<td>2.3</td>
<td>0.18</td>
<td>0.83</td>
<td>2.11</td>
<td>0.04</td>
<td>0.0</td>
<td>-0.00</td>
<td>1.37</td>
<td>1.02</td>
<td>-</td>
</tr>
</tbody>
</table>

Source-Complied by researcher

**7.6 Distribution of variables/indicators.**

**7.6.1 Net sown area. (X1)**

The net sown area can be defined as the total area sown in a year. High net sown area higher will be the crop production and reflected in agricultural development. The top position occupied by the Karad taluka (1.24) evident from table No.2 out of 11 talukas are under this category.
The medium group ranges from 1.00 to 0.00) There are only three talukas under this category Wai (-30), Man (-0.28) and Jawali (-0.68) and only one taluka i.e. Mahabaleshwar are under third category i.e. low development.

7.6.2 Irrigated area (X2)

Irrigation is very vital for any kind of agricultural development and prerequisite for the success of modern technology in agriculture. The need of artificial and additional water supply is always felt in successful farming operation. Irrigation plays significant role in the entire agriculture sector. The changing trends in intensity of irrigation portrays main’s dynamic attempt to overcome environmental limitations to transform the potential of the area into agricultural resource (Singh 1974).The total irrigated area has been calculated as percent of the total sown area and further calculated Z-score of total irrigated (above 0.70)

The high level of irrigation has been observed in Phaltan (1.46), Karad (1.23) Man (0.04), Khatav (0.19), Koregaon (0.06) Satara (0.16) and Patan, Medium level of irrigation has been observed in Wai-(0.12), Khandala (0.72) and Jawali (-0.37). There is only one taluka indicates low level of irrigation i.e. Mahabalewhwar (-2.18).

7.6.3 Agricultural implements (X3)

Advanced agricultural technology is not only the package of Hybrid seeds and other modern inputs, but it also incorporates new agricultural practices. This has made the mechanical power necessary for some operations which is very necessary during scarcity of labours relatively high wages labours particularly during peak season. Agricultural implements development or in other works these are the key to the modern agricultural development. The backwardness of the Indian agricultural implements has been recorded in Karad (1.94), Patan (1.15) Jawali (0.81), Khatav (1.01) and Man (0.110 which ranges above (0.00) which the medium level of agricultural implements shown by Phaltan (-0.05) Wai (00.09), Koregaon (-0.01) Jawali (0.94) and
Mahableshwara land Khandala in lowest category due to barran land, rugged topography, lack of irrigation.

**7.6.4 Agricultural workers (X4)**

Agricultural workers are also important factors for agricultural development like chemical fertilizers, HYV seeds, machineries etc. There are many activities in the field which they perform. The highest number of agricultural labour has been found in Karad taluka (2.3). Other talukas in high category are Phaltan (1.02), Khatav (0.2), Koregaon (0.3) Satara (0.02) and Patan (0.08). The talukas ranging from -0.4), Khandala (-0.92) and Man (-0.24). Mahabaleshwar and Jawali taluka are ranging from below (1.00) category showing lowest level of development in agricultural labours/workers.

**7.6.5 Satara District Central co-operative Bank(X5)**

SDCC Bank plays very important role in the agricultural development. The phenomenal growth in the consumption of chemical fertilizers and other modern inputs can be made possible largely because of liberal provision of credit or loan to the cultivators by the co-operative of government. These Banks provide loan and subsidies to the farmers in terms of cash or machines and tools like tractors and pump sets. With the help of these facilities farmers accelerated the productivity of different crops.

Branches of SDCC Bank not equally distributed in the study regions. The high Z-score of SCCC Banks has been recorded in Phaltan (0.05), Khatav (0.01), Koregaon (0.004) Satara (0.11) Patan (90.08) and Karad (0.18) and medium level (-1.00) recorded in Mahabaleshwar (-0.13), wai 9-0.05) Khandala (-0.03), Man (-0.03) and Jawali (-0.08)

**7.6.6 Crop Productivity Yield Index (X6)**

Agricultural productivity determines the level of agricultural development in any region. It refers to per acre or hectors of yield in a unit (Kgm/quintals) of any crops of field. A farmer adopt each kind of technique to increase the productivity of crop because it leads to over all developments
(social as well as economic) of the farmer. The agricultural productivity yield index and Z-score is calculated for selected crops.

7.6.6.1 Rice (X6a)

Rice is not cultivated in the Phaltan, Man and Khatav taluka as the physiographic and climatic conditions are not suitable for rice crop. The top places in the productivity of rice are secured by Koregaon taluka (1.30). The talukas are under high category Wai (0.41), Jawali (0.64) Patan (0.08) and Karad (0.83) and remaining Mahabaleshwar Khandala, Satara taluka are in medium level category.

7.6.6.2 Wheat (X6b)

Wheat is produced on large scale in Karad taluka. Other taluka are under high category are Phaltan (3.1), Koregaon (0.000) Wai (0.4) Man (0.1). The talukas under medium (-00.00) category are Khandala (-0.3), Khatab (-0.4), Satara (-0.7) and Patan (-0.6) lowest level observed in Mahabaleshwar (-1.5) and Jawali (-1.5)

7.6.6.3 Jowar (X6c)

Jowar is major crop of the district produced everywhere. The taluka under high category above 0.00) are wai (0.04) Khatav (0.00), Koregaon (0.02), Satara (0.00) Jawali (0.01) and Karad (0.04)

The talukas under medium category (-1.00 to .0000) are Mahabaleshwar (-0.03) Khandala (-0.03), Phaltan (-0.01) Man (-0.04) and Patan (0.01). No taluka under low category in the district.

7.6.6.4 Sugarcane (X6d)

Sugarcane is most significant crop cultivated in the study area where irrigation facilities are available. Karad is the climate taluka in the production of sugarcane due to fertile soil, river basin availability irrigation facilities like lift irrigation. Mahabaleshwar, Man and Khatav not indicating the production of sugarcane. High level of has been observed in Wai (0.1) Phaltan (0.0),
Koregaon (0.0), Jawali (0.1) and Karad (0.0). Others talukas are under the category of medium level, i.e. the Khandala (-0.1), Satara (-0.1), Patan (-0.1)

7.6.6.5 Groundnut (x6e)

Mahabaleshwar, Jawalil and Patan talukas are not producing groundnut. High level (above 0.00) has been observed in the Phaltan (2.67), Khandala (0.14), Khatab (0.41) and Karad (0.00)

The medium level is ranging from (-1.00 -0.00). The medium level ranging from (1.00-0.00) observed in (Wai 0.35) Man (-0.70), Satara (-0.10) taluka.

7.6.6.6 Gram (x6f)

Wai (0.11) Phaltan (1.20) man (0.44) Korebgaon (0.51) Satara (0.26) and karad (1.37) talukas are under the high level category. Remaining khandala (-0.69), jawali (0.64) are under medium level. Only one taluka, i.e. Khatav under low level of productivity. The taluka Mahabaleshwar, Patan no production of gram is there.

7.7 Levels of Agricultural Development.

To assess the level of agricultural development in Satara district all the eleven variables have been aggregated. The z-score value of all variable transformed and combined with help of Z-score and composite score was prepared (table-composite value). The composite score ranges from (1.02), highest to -1.07) Mahabaleshwar lowest in Satara district. Karad is the most developed block in Satara district and Mahabaleshwar is at the bottom. On the basis of composited Z-score the talukas have been categorized into two classes viz. high and low which clearly shows the spatial variation in level of agricultural development in Satara district on an average six talukas namely Karad (1.02) Patan (0.23) Phaltan (0.86) Khatav (0.01) Koregaon (0.39) and Satara (0.06) which ranges their composite Z-score above (0.00) are highly developed talukas while remaining 5 talukas are under low categories of development Mahabaleshwar (-1.07), Wai (0.45) Khandala (-0.51), Man (-90.5) Jawali (-0.40)
7.8 The Spatial Pattern and Level of Agricultural Development.

The spatial distribution of variables and agricultural development is not uniform in Satara district. It provides very significant information about level of agricultural development. The study highlights that the majority of district come under high development of agriculture and it located at middle and southern part of study region.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Z-Score</th>
<th>Level of Development</th>
<th>Number of Taluka</th>
<th>Talukas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Above 0.00</td>
<td>High</td>
<td>06</td>
<td>Satara, Patan, Karad, Phaltan, Koregaon, Khatav</td>
</tr>
<tr>
<td>2</td>
<td>Below 0.00</td>
<td>Low</td>
<td>05</td>
<td>M. Shwar, Wai, Khandala, Jawali, Man</td>
</tr>
</tbody>
</table>

Source – Complied by researcher

Agriculture is not developed in Wai, Khandala, Patan, Jawali and Mahabaleshwar due to industrialization, conducive topography and irrigation facilities. For the development there is need of irrigation facilities restrict during the agriculture.

The study highlights the impact of location and Agro Service Centres on agricultural development planning for the study region.

References


8. Negi, B.S, “Practical Geography”.


10. Singh and Dutt, “Practical Geography”.


