SECTION : IV
A STUDY OF
EDUCATIONAL AND ECONOMIC
DEVELOPMENT AT DISTRICT LEVEL
CHAPTER : XI.

DISTRICTWISE EDUCATIONAL AND ECONOMIC DEVELOPMENT.

So far this research has shown the relationship between educational development in the light of economic growth of the four States under study but the gross development of any nation (say India) may not represent its components parts. For example, the study of Indian Union would not show the real picture of progressive State of Maharashtra or the backwardness of Bihar State. Similarly the study of four States will be incomplete without the study of their districts. Thus, the districts of all the four States have been taken for study. It has brought out very interesting and useful observations.

The districtwise study is also necessary to remove the impression that the entire research is done only at State level and does not go deep. A study is made of the 75 districts (13 districts of Orissa, 19 districts of Gujarat, 26 districts of Maharashtra and 17 districts of Bihar) from the point of view of their educational development and economic growth.

Method Adopted :-

(i) The method adopted for the study is score method which is generally used in Census Reports and in the N.C.E.R.T. publications.

* 1. Census Atlas, Census of India 1961 (a separate Vol. for each State)
(ii). This method is used because it was seen that within one State, there is a wide gap between the levels of progress of districts. This gap demanded the score method rather than the rank method.

How the method is applied :-

The indicators selected for the educational development and economic development are the same as are selected for the state level but these indicators are divided into three sections.

(A) Educational Development
(B) Educational Machinery and Background
(C) Economic Development

(A) EDUCATIONAL DEVELOPMENT :-

The following five (variables) which show the level of educational development are selected.

(1) Enrolment at Elementary level of education
(2) Enrolment at Secondary level of Education
(3) Enrolment at Higher level of education
(4) Girls enrolment at primary level of education
(5) Girls Enrolment at Secondary level of education

(B) EDUCATIONAL BACKGROUND AND MACHINERY :-

The following five variables which show the educational background and availability of educational institutions at district level are selected.
(i) Literacy

(ii) Female Literacy

(iii) Percentage of workers engaged in services

(iv) Availability of secondary schools
      = \frac{\text{total Secondary Schools} \times 100000 \times 1000}{\text{total population} \times \text{total area of the State}}

(v) Availability of Institutions for Higher Education
      = \frac{\text{total colleges} \times 100000 \times 1000}{\text{total population} \times \text{total area of the State}}

(3) ECONOMIC DEVELOPMENT :-

The following five variables which show the level of economic development at district level are selected.

(i) Density

(ii) Urbanisation :- Percentage of urban population to total population of the State.

(iii) Factory Development :- Percentage of Industrial Workers engaged in factories other than household.

(iv) Road Transportation availability of road
      = \frac{\text{total length} \times 100000 \times 1000}{\text{total population} \times \text{total area of the State}}

(v) Rural Electrification :- Percentage of electrified villages to total villages.

HOW THE SCORE IS GIVEN :- (Step - I )

First, one of the 15 indicators is selected for scoring.

Then, 50 score are allotted for the level of development
of the State e.g. X State has 10 per cent urbanisation of its population. Now, one of the districts of that State has 15 per cent Urbanisation so,

\[
\frac{50 \times 15}{10} = 75 \text{ score}
\]

i.e. 75 score is allotted to that district for its level of development in comparison to the State level.

(Step-II) : Thus, each district will obtain scores for the above mentioned 15 variables for its economic educational development. Then score index for all the three sub-section for each district is calculated for the year 1961 and 1971.

(Step-III) : Then, on the basis of educational development, synthetic score index rank is given to each district of the State for the year 1961 and 1971.

(Step-IV) : In the same way, each district also obtained the rank for its educational background and machinery development and economic development on the basis of the synthetic index score obtained for the year 1961 and 1971.

LIMITATIONS : -

(1) This score index can not be applied for comparing the level of development of two inter State districts because each State has its own score mean for its level of development in the field of education and economy also.

(2) The study of 75 districts within the four States shows their own pattern of development. Thus, 75 small separate units are obtained to find out the relationship between educational and economic development.

(3) No district gets zero score.

(4) No district is given more than 100 score for its double or more than double development, than the State mean.
### TABLE 8

<table>
<thead>
<tr>
<th>Districts of Orissa</th>
<th>Educational Development Score out of 400</th>
<th>Rank</th>
<th>Educational Background and Machinery Score out of 400</th>
<th>Rank</th>
<th>Economic Development Score out of 400</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balasore</td>
<td>243.9</td>
<td>2</td>
<td>362.8</td>
<td>1</td>
<td>325.4</td>
<td>5</td>
</tr>
<tr>
<td>Cuttuck</td>
<td>315.6</td>
<td>1</td>
<td>354.6</td>
<td>2</td>
<td>354.6</td>
<td>2</td>
</tr>
<tr>
<td>Puri</td>
<td>247.0</td>
<td>3</td>
<td>333.3</td>
<td>3</td>
<td>362.4</td>
<td>1</td>
</tr>
<tr>
<td>Mayurbhanj</td>
<td>174.8</td>
<td>8</td>
<td>137.3</td>
<td>11</td>
<td>182.7</td>
<td>9</td>
</tr>
<tr>
<td>Bolangir</td>
<td>115.3</td>
<td>11</td>
<td>189.6</td>
<td>9</td>
<td>179.4</td>
<td>10</td>
</tr>
<tr>
<td>Dhenkanal</td>
<td>184.9</td>
<td>7</td>
<td>269.3</td>
<td>5</td>
<td>139.7</td>
<td>8</td>
</tr>
<tr>
<td>Keonjar</td>
<td>145.1</td>
<td>10</td>
<td>213.7</td>
<td>8</td>
<td>234.6</td>
<td>6</td>
</tr>
<tr>
<td>Sambalpur</td>
<td>201.6</td>
<td>6</td>
<td>227.0</td>
<td>7</td>
<td>189.9</td>
<td>7</td>
</tr>
<tr>
<td>Sundergarh</td>
<td>213.1</td>
<td>4</td>
<td>309.8</td>
<td>4</td>
<td>332.7</td>
<td>4</td>
</tr>
<tr>
<td>Ganjam</td>
<td>209.3</td>
<td>5</td>
<td>259.4</td>
<td>6</td>
<td>349.5</td>
<td>3</td>
</tr>
<tr>
<td>Koraput</td>
<td>80.6</td>
<td>12</td>
<td>106.5</td>
<td>13</td>
<td>163.1</td>
<td>12</td>
</tr>
<tr>
<td>Kalbandi</td>
<td>70.3</td>
<td>13</td>
<td>120.9</td>
<td>12</td>
<td>159.4</td>
<td>13</td>
</tr>
<tr>
<td>Phulbani</td>
<td>152.4</td>
<td>9</td>
<td>183.1</td>
<td>10</td>
<td>163.5</td>
<td>11</td>
</tr>
</tbody>
</table>

See Appendix Tables: V, XIII and XXI
Table 120 gives the synthetic index score of educational development, and economic development obtained by each district of Orissa State in 1960-61.

(A) EDUCATIONAL DEVELOPMENT :-

Above Average :- Cuttuck, Balasore, Puri.
Average :- Sundargarh, Ganjam, Sambalpur

Dhenkanal, Mayurbhanj.

Below Average :- Phulbani, Keonjar, Bolangir,

Koraput, Kalhandi.

(see Map 5)

(B) EDUCATIONAL BACKGROUND AND MACHINERY :-

Above Average :- Balasore, Cuttuck, Puri, Sundargarh

Average :- Dhenkanal, Ganjam, Sambalpur, Keonjar.

Below Average :- Bolangir, Phulbani, Mayurbhanj,

Kalhandi, Koraput.

(C) ECONOMICAL DEVELOPMENT :-

Above Average :- Puri, Cuttuck, Ganjam, Sundargarh,

Balasore.

Average :- Koonjar.

Below Average :- Sandeopuri, Dhenkanal, Mayurbhanj,

Bolangir, Koraput, Kalhandi.

(see Map 6)
## Table: 121

**Educational and Economic Development**

**State: Orissa**

<table>
<thead>
<tr>
<th>Districts of Orissa</th>
<th>Educational Development Score Rank out of 500</th>
<th>Educational Background and Machinery Score Rank out of 400</th>
<th>Economic Development Score Rank out of 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balasore</td>
<td>253.2 4</td>
<td>353.2 1</td>
<td>336.4 03</td>
</tr>
<tr>
<td>Cuttuck</td>
<td>275.7 2</td>
<td>317.5 4</td>
<td>341.6 2</td>
</tr>
<tr>
<td>Purii</td>
<td>267.3 3</td>
<td>340.2 2</td>
<td>314.2 4</td>
</tr>
<tr>
<td>Mayurbhanj</td>
<td>157.6 9</td>
<td>193.5 10</td>
<td>177.7 10</td>
</tr>
<tr>
<td>Bolangir</td>
<td>132.4 10</td>
<td>208.2 8</td>
<td>194.2 9</td>
</tr>
<tr>
<td>Dhenkanal</td>
<td>185.8 6</td>
<td>283.7 5</td>
<td>209.4 7</td>
</tr>
<tr>
<td>Keonjhar</td>
<td>163.2 8</td>
<td>202.5 9</td>
<td>197.5 8</td>
</tr>
<tr>
<td>Sambalpur</td>
<td>192.8 5</td>
<td>219.7 7</td>
<td>225.3 6</td>
</tr>
<tr>
<td>Sundargarh</td>
<td>238.1 1</td>
<td>322.1 3</td>
<td>301.9 1</td>
</tr>
<tr>
<td>Ganjam</td>
<td>179.0 7</td>
<td>239.7 6</td>
<td>306.9 5</td>
</tr>
<tr>
<td>Koraput</td>
<td>104.2 12</td>
<td>121.8 13</td>
<td>156.5 13</td>
</tr>
<tr>
<td>Kalhandi</td>
<td>101.7 13</td>
<td>142.5 12</td>
<td>160.7 11</td>
</tr>
<tr>
<td>Phulbani</td>
<td>128.7 11</td>
<td>156.7 11</td>
<td>157.2 12</td>
</tr>
</tbody>
</table>

Source: Appendix Tables: VI, XIV and XXII.
Table 121 gives the synthetic index score of educational development and economic development obtained by each district of Orissa State in 1970-71.

(A) EDUCATIONAL DEVELOPMENT :-

Above Average :- Sundergarh, Cuttuck, Puri, Balasore
Average :- Sambalpur, Dhenkanal, Ganjam, Keonjar
Below Average :- Mayurbhanj, Bolangir, Phulbani, Koraput, Kalhandi. (see Map 7).

(B) EDUCATIONAL BACKGROUND AND MACHINERY :-

Above Average :- Balasore, Puri, Sundergarh, Cuttuck
Average :- Dhenkanal, Ganjam, Sambalpur, Bolangir, Keonjar.
Below Average :- Mayurbhanj, Phulbani, Kalhandi, Koraput

(C) ECONOMICAL DEVELOPMENT :-

Above Average :- Sundergarh, Cuttuck, Balasore, Puri
Average :- Sambalpur, Dhenkanal.
Below Average :- Keonjar, Bolangir, Mayurbhanj, Kalhandi, Phulbani, Koraput.

(See Map. 8)
<table>
<thead>
<tr>
<th>Districts of Gujarat</th>
<th>Educational Development Score Rank out of 500</th>
<th>Educational Background &amp; Machinery Score Rank out of 500</th>
<th>Economic Development Score Rank out of 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamnagar</td>
<td>219.24 9</td>
<td>247.86 7</td>
<td>260.32 7</td>
</tr>
<tr>
<td>Rajkot</td>
<td>326.77 5</td>
<td>324.91 4</td>
<td>328.24 3</td>
</tr>
<tr>
<td>Surendranagar</td>
<td>195.59 10</td>
<td>215.97 11</td>
<td>189.79 14</td>
</tr>
<tr>
<td>Bhavnagar</td>
<td>248.91 7</td>
<td>238.74 8</td>
<td>250.39 9</td>
</tr>
<tr>
<td>Amreli</td>
<td>158.35 13</td>
<td>207.28 12</td>
<td>243.72 10</td>
</tr>
<tr>
<td>Junagadh</td>
<td>137.51 11</td>
<td>222.57 10</td>
<td>253.05 8</td>
</tr>
<tr>
<td>Kutch</td>
<td>178.67 12</td>
<td>198.90 13</td>
<td>187.01 15</td>
</tr>
<tr>
<td>Banaskantha</td>
<td>63.62 16</td>
<td>34.35 16</td>
<td>137.23 17</td>
</tr>
<tr>
<td>Sabarkantha</td>
<td>152.71 14</td>
<td>192.64 14</td>
<td>193.85 13</td>
</tr>
<tr>
<td>Mehsana</td>
<td>227.72 8</td>
<td>262.67 6</td>
<td>260.30 6</td>
</tr>
<tr>
<td>Gandhinagar</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>421.75 1</td>
<td>396.27 1</td>
<td>335.65 2</td>
</tr>
<tr>
<td>Kheda</td>
<td>335.01 4</td>
<td>357.75 2</td>
<td>337.99 1</td>
</tr>
<tr>
<td>Panchmahals</td>
<td>146.60 15</td>
<td>125.21 15</td>
<td>197.03 11</td>
</tr>
<tr>
<td>Vadodara</td>
<td>380.09 2</td>
<td>346.36 3</td>
<td>281.21 4</td>
</tr>
<tr>
<td>Bharuch</td>
<td>265.60 6</td>
<td>275.41 5</td>
<td>195.53 12</td>
</tr>
<tr>
<td>Surat</td>
<td>344.07 3</td>
<td>226.55 9</td>
<td>279.45 5</td>
</tr>
<tr>
<td>Valsad</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dangs</td>
<td>67.22 17</td>
<td>47.27 17</td>
<td>137.56 16</td>
</tr>
<tr>
<td>Gujarat</td>
<td>250.00 -</td>
<td>250.00 -</td>
<td>250.00 -</td>
</tr>
</tbody>
</table>

Sources: See Appendix Tables VII, XV and XXIII.
GUJARAT EDUCATIONAL DEVELOPMENT 1961

MAP : 9

EDUCATIONALLY ADVANCED DISTRICTS
BACKWARD
ECONOMICALLY ADVANCED DISTRICTS

GANDHINAGAR

ECONOMICALLY BACKWARD

GUJARAT
Table 122 gives the synthetic index score of educational development and economic development obtained by each district of Gujarat in 1960-61.

(A) **EDUCATIONAL DEVELOPMENT** :-
- Above Average :- Ahmedabad, Vadodara, Surat, Kheda, Rajkot.
- Average :- Bhuruch, Bhavnagar, Mehsana, Jamnagar.
- Below Average :- Surendranagar, Junagadh, Kutch, Amreli, Saberkantha, Panch Mahals, Banaskantha, The Dangs. (see map. 9).

(B) **EDUCATIONAL BACKGROUND AND MACHINERY** :-
- Above Average :- Ahmedabad, Kheda, Vadodara, Rajkot.
- Average :- Bhuruch, Mehsana, Jamnagar, Bhavnagar, Surat, Junagadh, Surendranagar, Amreli.
- Below Average :- Kutch, Saberkantha, Panch Mahals, Banaskantha, The Dangs.

(C) **ECONOMICAL DEVELOPMENT** :-
- Above Average :- Kheda, Ahmedabad, Rajkot.
- Average :- Vadodara, Surat, Mehsana, Jamnagar, Junagadh, Bhavnagar, Amreli.
- Below Average :- Panch Mahals, Bhuruch, Saberkantha, Surendranagar, Kutch, The Dangs, Banaskantha. (See Map : 10)
TABLE 123

EDUCATIONAL AND ECONOMIC DEVELOPMENT

STATE : GUJARAT  
YEAR : 1970-71

<table>
<thead>
<tr>
<th>Districts of Gujarat</th>
<th>Educational Development</th>
<th>Educational Background and Machinery</th>
<th>Economic Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Score out of 500</td>
<td>Rank</td>
<td>Score out of 500</td>
</tr>
<tr>
<td>Jamnagar</td>
<td>208.66</td>
<td>12</td>
<td>210.92</td>
</tr>
<tr>
<td>Rajkot</td>
<td>293.59</td>
<td>4</td>
<td>283.92</td>
</tr>
<tr>
<td>Surendranagar</td>
<td>134.40</td>
<td>14</td>
<td>198.76</td>
</tr>
<tr>
<td>Bhavnagar</td>
<td>215.21</td>
<td>10</td>
<td>230.16</td>
</tr>
<tr>
<td>Amreli</td>
<td>173.26</td>
<td>15</td>
<td>197.25</td>
</tr>
<tr>
<td>Junagadh</td>
<td>191.10</td>
<td>13</td>
<td>193.44</td>
</tr>
<tr>
<td>Kutch</td>
<td>154.88</td>
<td>16</td>
<td>164.70</td>
</tr>
<tr>
<td>Banaskantha</td>
<td>86.99</td>
<td>19</td>
<td>92.63</td>
</tr>
<tr>
<td>Sabarkantha</td>
<td>214.33</td>
<td>11</td>
<td>264.48</td>
</tr>
<tr>
<td>Mehsana</td>
<td>232.23</td>
<td>7</td>
<td>288.18</td>
</tr>
<tr>
<td>Gandhinagar</td>
<td>215.76</td>
<td>9</td>
<td>390.00</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>383.99</td>
<td>1</td>
<td>403.17</td>
</tr>
<tr>
<td>Kheda</td>
<td>311.98</td>
<td>2</td>
<td>345.30</td>
</tr>
<tr>
<td>Panchmahals</td>
<td>143.41</td>
<td>18</td>
<td>146.13</td>
</tr>
<tr>
<td>Vadodara</td>
<td>299.96</td>
<td>3</td>
<td>345.62</td>
</tr>
<tr>
<td>Bharuch</td>
<td>223.39</td>
<td>8</td>
<td>245.77</td>
</tr>
<tr>
<td>Surat</td>
<td>254.86</td>
<td>6</td>
<td>285.60</td>
</tr>
<tr>
<td>Valsad</td>
<td>279.82</td>
<td>5</td>
<td>314.30</td>
</tr>
<tr>
<td>Dangs</td>
<td>149.16</td>
<td>17</td>
<td>157.92</td>
</tr>
<tr>
<td>Gujarat State</td>
<td>250.00</td>
<td></td>
<td>250.00</td>
</tr>
</tbody>
</table>

Sources : See Appendix Tables : VIII, XVI and XXIV.
GUJARAT STATE

Table 123 gives the synthetic index score of educational development and economic development obtained by each district of Gujarat State in 1970-71.

(A) EDUCATIONAL DEVELOPMENT :

Above Average :- Ahmedabad, Kheda.

Average :- Vadodara, Rajkot, Valsad, Surat, Mehsana, Bhuruch, Gandhinagar, Bhavnagar, Sabarkantha, Jamnagar.

Below Average :- Junagadh, Surendranagar, Amreli, Kutch, The Dangs, Panchmahals, Banaskantha. (See Map.11).

(B) EDUCATIONAL BACKGROUND AND MACHINERY :

Above Average :- Ahmedabad, Gandhinagar, Vadodara, Kheda, Valsad.

Average :- Mehsana, Surat, Rajkot Sabarkantha, Bhuruch, Bhavnagar, Jamnagar.

Below Average :- Surendranagar, Junagadh, Amreli, Kutch, The Dangs, Panchmahals, Banaskantha.

(C) ECONOMICAL DEVELOPMENT :

Above Average :- Ahmedabad, Gandhinagar, Valsad, Kheda, Surat.

Average :- Vadodara, Amreli, Rajkot, Bhavnagar.

Below Average :- Mehsana, Junagadh, Surendranagar, Jamnagar, Bhuruch.

Below Average :- Panchmahals, Sabarkantha, Kutch Banaskantha, The Dangs.

(See Map, 12).
## Table 124

**Educational and Economic Development**

**State: Maharashtra**

**Year: 1960-61**

<table>
<thead>
<tr>
<th>Districts of Maharashtra State</th>
<th>Educational Development Score Rank out of 500</th>
<th>Educational Background &amp; Machinery Score Rank out of 500</th>
<th>Economic Development Score Rank out of 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gr. Bombay</td>
<td>355.96 1</td>
<td>493.91 1</td>
<td>386.97 1</td>
</tr>
<tr>
<td>Thana</td>
<td>201.21 10</td>
<td>182.01 11</td>
<td>265.76 8</td>
</tr>
<tr>
<td>Kolaba</td>
<td>178.56 16</td>
<td>144.83 20</td>
<td>230.95 11</td>
</tr>
<tr>
<td>Ratnagiri</td>
<td>212.96 9</td>
<td>162.33 16</td>
<td>177.24 16</td>
</tr>
<tr>
<td>Nasik</td>
<td>199.70 11</td>
<td>168.40 15</td>
<td>191.85 14</td>
</tr>
<tr>
<td>Dhulia</td>
<td>172.02 17</td>
<td>154.69 17</td>
<td>158.47 20</td>
</tr>
<tr>
<td>Jalgaon</td>
<td>225.77 7</td>
<td>181.50 12</td>
<td>184.50 15</td>
</tr>
<tr>
<td>Ahmednagar</td>
<td>183.98 15</td>
<td>143.32 18</td>
<td>163.86 19</td>
</tr>
<tr>
<td>Poona</td>
<td>252.66 3</td>
<td>312.36 3</td>
<td>278.75 6</td>
</tr>
<tr>
<td>Satara</td>
<td>233.04 4</td>
<td>273.27 6</td>
<td>245.89 10</td>
</tr>
<tr>
<td>Sangli</td>
<td>215.01 8</td>
<td>211.84 9</td>
<td>309.10 4</td>
</tr>
<tr>
<td>Sholapur</td>
<td>191.26 14</td>
<td>170.90 14</td>
<td>197.32 13</td>
</tr>
<tr>
<td>Kolhapur</td>
<td>198.77 12</td>
<td>256.44 7</td>
<td>320.13 3</td>
</tr>
<tr>
<td>Aurangabad</td>
<td>112.29 21</td>
<td>186.21 10</td>
<td>115.96 22</td>
</tr>
<tr>
<td>Parbhani</td>
<td>95.33 25</td>
<td>98.56 25</td>
<td>100.22 25</td>
</tr>
<tr>
<td>Bhir</td>
<td>94.68 26</td>
<td>115.34 23</td>
<td>115.60 23</td>
</tr>
<tr>
<td>Nanded</td>
<td>105.50 24</td>
<td>146.61 19</td>
<td>119.34 21</td>
</tr>
<tr>
<td>Osmanabad</td>
<td>103.13 23</td>
<td>114.41 24</td>
<td>96.25 26</td>
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<tr>
<td>Buldana</td>
<td>170.16 18</td>
<td>173.28 13</td>
<td>200.03 12</td>
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<td>Akola</td>
<td>193.95 13</td>
<td>231.74 8</td>
<td>249.21 9</td>
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<tr>
<td>Amravati</td>
<td>221.13 6</td>
<td>293.40 5</td>
<td>273.60 7</td>
</tr>
<tr>
<td>Yeotmal</td>
<td>145.04 20</td>
<td>142.75 21</td>
<td>172.42 17</td>
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<td>217.14 7</td>
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<td>307.66 5</td>
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<td>321.62 2</td>
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<td>131.84 22</td>
<td>169.64 18</td>
</tr>
<tr>
<td>Chandrapur</td>
<td>110.43 22</td>
<td>97.61 26</td>
<td>114.86 24</td>
</tr>
</tbody>
</table>

State average: 250.00 250.00 250.00

*Sources: See Appendix Tables IX, XVII and XXV.*
Table 124 gives the synthetic index score of educational development and economic development obtained by each district of Maharashtra in 1960-61.

(A) **EDUCATIONAL DEVELOPMENT**

- Above Average: Greater Bombay,
- Average: Nagpur, Poona, Satara, Jalgaon, Amravati, Wardha, Sangli, Ratnagiri, Thana, Nasik
- Below Average: Kolhapur, Akola, Sholapur, Ahmednagar, Kolaba, Dhulia, Buldana, Bhandara, Yetomal, Aurangabad, Chandrapur, Osmanabad, Nanded, Parbhani, Bhir.

(See Map. 13)

(B) **EDUCATIONAL BACKGROUND AND MACHINERY**

- Above Average: Gr. Bombay, Nagpur, Poona, Wardha
- Average: Amravati, Satara, Kolhapur, Akola, Sangli
- Below Average: Aurangabad, Thana, Jalgaon, Buldana, Sholapur, Nasik, Ratnagiri, Dhulia, Ahmednagar, Nanded, Kolaba, Yetomai, Bhandara, Bhir, Osmanabad, Parbhani, Chandrapur.

(C) **ECONOMICAL DEVELOPMENT**

- Above Average: Gr. Bombay, Nagpur, Kolhapur, Sangli, Wardha
- Average: Poona, Amravati, Thana, Akola, Satara, Kolaba, Buldana.
- Below Average: Sholapur, Nasik, Jalgaon, Ratnagiri, Yetomai, Bhandara, Ahmednagar, Dhulia, Nanded, Aurangabad, Bhir, Chandrapur, Parbhani, Osmanabad.

(See Map. 14).
<table>
<thead>
<tr>
<th>Districts of Maharashtra</th>
<th>Educational Development Score Rank out of 500</th>
<th>Educational Background &amp; Machinery Score Rank out of 500</th>
<th>Economic Development Score Rank out of 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bombay</td>
<td>404.93 1</td>
<td>472.78 1</td>
<td>369.59 1</td>
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<td>230.30 9</td>
<td>196.71 12</td>
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<td>Kolaba</td>
<td>175.67 21</td>
<td>190.25 14</td>
<td>275.46 6</td>
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<td>202.93 17</td>
<td>177.39 15</td>
<td>178.87 20</td>
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<td>Nasik</td>
<td>217.76 12</td>
<td>176.58 16</td>
<td>232.34 10</td>
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<tr>
<td>Dumlia</td>
<td>179.24 20</td>
<td>160.87 21</td>
<td>205.64 16</td>
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<tr>
<td>Jalgaon</td>
<td>243.91 8</td>
<td>197.03 11</td>
<td>255.74 8</td>
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<tr>
<td>Ahmednagar</td>
<td>212.99 13</td>
<td>168.89 17</td>
<td>222.07 13</td>
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<tr>
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<td>259.02 6</td>
<td>292.13 4</td>
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<td>249.51 6</td>
<td>290.74 4</td>
<td>222.70 12</td>
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<tr>
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<td>301.33 2</td>
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<tr>
<td>Sholapur</td>
<td>220.87 11</td>
<td>167.61 18</td>
<td>229.18 11</td>
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<tr>
<td>Kolhapur</td>
<td>210.90 14</td>
<td>222.18 9</td>
<td>300.72 3</td>
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<tr>
<td>Aurangabad</td>
<td>197.81 18</td>
<td>157.44 22</td>
<td>165.06 23</td>
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<tr>
<td>Parbhani</td>
<td>137.78 26</td>
<td>114.84 26</td>
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<tr>
<td>Bhir</td>
<td>160.97 25</td>
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<td>Nanded</td>
<td>167.43 24</td>
<td>151.03 23</td>
<td>216.45 14</td>
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<tr>
<td>Osmanabad</td>
<td>206.91 16</td>
<td>163.49 20</td>
<td>173.76 22</td>
</tr>
<tr>
<td>Buldana</td>
<td>210.09 15</td>
<td>218.44 10</td>
<td>185.09 18</td>
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<tr>
<td>Akola</td>
<td>222.74 10</td>
<td>225.78 8</td>
<td>203.29 17</td>
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<tr>
<td>Amravati</td>
<td>278.55 5</td>
<td>252.36 7</td>
<td>214.08 15</td>
</tr>
<tr>
<td>Yeotmal</td>
<td>183.71 19</td>
<td>168.17 19</td>
<td>181.28 19</td>
</tr>
<tr>
<td>Wardha</td>
<td>303.03 3</td>
<td>309.49 3</td>
<td>243.63 9</td>
</tr>
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<td>Nagpur</td>
<td>373.50 2</td>
<td>333.77 2</td>
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<td>Bhandara</td>
<td>173.31 22</td>
<td>193.35 13</td>
<td>174.81 21</td>
</tr>
<tr>
<td>Chandrapur</td>
<td>163.96 23</td>
<td>115.60 25</td>
<td>81.69 26</td>
</tr>
</tbody>
</table>

State average: 250.00 - 250.00 - 250.00 -

Sources: See Appendix Tables X, XVIII and XXVI
MAHARASHTRA STATE

Table 125 gives the synthetic index score of educational development and economic development obtained by each district of Maharashtra State in 1970-71.

(A) EDUCATIONAL DEVELOPMENT

Above Average: Gr. Bombay, Nagpur, Wardha, Poona.
Below Average: Aurangabad, Yetornal, Dhulia, Kolaba Bhandara, Chandrapur, Nanded, Bhir, Parbhani.

(See Map 15)

(B) EDUCATIONAL BACKGROUND AND MACHINERY

Above Average: Gr. Bombay, Nagpur, Wardha.
Average: Satara, Sangli, Poona, Amravati, Akola, Kolhapur, Buldana.
Below Average: Jalgaon, Thana, Bhandara, Kolaba, Ratnagiri, Nasik, Ahmednagar, Sholapur, Yetornal, Osmanabad, Dhulia, Aurangabad, Nanded, Bhir, Chandrapur, Parbhani.

(C) ECONOMICAL DEVELOPMENT

Average: Poona, Thana, Kolaba, Nagpur, Jalgon Wardha, Nasik, Sholapur, Satara, Ahmednagar, Nanded, Amravati, Dhulia, Akola.
Below Average: Buldana, Yetornal, Ratnagiri, Bhandara Osmanabad, Aurangabad, Parbhani Bhir, Chandrapur.

(See Map 16)
<table>
<thead>
<tr>
<th>Districts of Bihar</th>
<th>Educational Development Score Rank out of 500</th>
<th>Educational Background &amp; Machinery Score Rank out of 500</th>
<th>Economic Development Score Rank out of 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champaran</td>
<td>174.64 15</td>
<td>136.91 16</td>
<td>249.97 7</td>
</tr>
<tr>
<td>Saran</td>
<td>231.30 8</td>
<td>214.38 10</td>
<td>248.19 10</td>
</tr>
<tr>
<td>Muzaffarpur</td>
<td>224.93 9</td>
<td>230.14 7</td>
<td>243.11 8</td>
</tr>
<tr>
<td>Darbhanga</td>
<td>197.35 11</td>
<td>214.10 11</td>
<td>237.79 11</td>
</tr>
<tr>
<td>Saharsa</td>
<td>162.22 16</td>
<td>223.92 3</td>
<td>186.29 13</td>
</tr>
<tr>
<td>Purnea</td>
<td>174.90 14</td>
<td>178.35 13</td>
<td>166.61 16</td>
</tr>
<tr>
<td>Shahabad</td>
<td>256.83 6</td>
<td>262.61 4</td>
<td>303.10 3</td>
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<td>Patna</td>
<td>450.10 1</td>
<td>457.12 1</td>
<td>455.72 1</td>
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<tr>
<td>Gaya</td>
<td>207.20 10</td>
<td>204.05 12</td>
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<td>252.78 7</td>
<td>251.27 5</td>
<td>289.42 5</td>
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<td>Bhagalpur</td>
<td>359.43 3</td>
<td>391.19 3</td>
<td>272.50 6</td>
</tr>
<tr>
<td>Palamu</td>
<td>195.43 12</td>
<td>139.87 14</td>
<td>166.72 15</td>
</tr>
<tr>
<td>Hazaribagah</td>
<td>161.13 17</td>
<td>131.45 17</td>
<td>215.43 12</td>
</tr>
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<td>Santthal Paraganas</td>
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<td>128.85 17</td>
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<tr>
<td>Dhanbad</td>
<td>303.33 4</td>
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<td>412.80 2</td>
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<tr>
<td>Ranchi</td>
<td>385.56 2</td>
<td>216.39 9</td>
<td>134.46 14</td>
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<td>Singhbhum</td>
<td>301.77 5</td>
<td>233.40 6</td>
<td>294.74 4</td>
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<tr>
<td>State average.</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
</tr>
</tbody>
</table>

Sources: See Appendix Tables XI, XIX and XXVII
BIHAR
ADMINISTRATIVE DIVISIONS
ECONOMICAL DEVELOPMENT 1961
10 0 20 40 60 Mis.
20 0 20 40 60 Kms.

ECONOMICALLY ADVANCED DISTRICTS
BACKWARD

MAP #18
Table 126 gives the synthetic index score of educational development and economic development obtained by each districts of Bihar State in 1960-61.

(A) EDUCATIONAL DEVELOPMENT :

Above Average :- Patna, Ranchi, Bhagulpur, Dhanbad
                 Singhbhum.

Average :- Shahbad, Monghyr, Saran, Muzafferpur
           Gaya.

Below Average :- Darbhanga, Palamau, Santhal Paraganas,
                 Purnea, Champaran, Saharsa, Hazaribagh.

                (See Map 17)

(B) EDUCATIONAL BACKGROUND AND MACHINERY :

Above Average :- Patna, Dhanbad, Bhagulpur.

Average :- Shahbad, Monghyr, Singhbhum, Muzafferpur,
           Saharsa, Ranchi, Saran, Darbhanga, Gaya.

Below Average :- Purnea, Palamau, Santhal Paraganas,
                 Champaran, Hazaribagh.

(C) ECONOMIC DEVELOPMENT :

Above Average :- Patna, Dhanbad, Shahabad.

Average :- Singhbhum, Monghyr, Bhagulpur,
           Champaran, Muzafferpur, Gaya, Saran
           Parbhanga, Hazaribagh.

Below Average :- Saharsa, Ranchi, Palamau, Purnea,
                 Santhal Paraganas.

                (See Map 18)
### Table: 127

**Educational and Economic Development**

**State: Bihar**

<table>
<thead>
<tr>
<th>Districts of Bihar State</th>
<th>Educational Development Score out of 500</th>
<th>Rank</th>
<th>Educational Back ground &amp; machinery Score out of 500</th>
<th>Rank</th>
<th>Economic Development Score out of 500</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Champaran</td>
<td>170.70</td>
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<td>141.77</td>
<td>16</td>
<td>211.04</td>
<td>11</td>
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<tr>
<td>Saran</td>
<td>218.34</td>
<td>10</td>
<td>216.76</td>
<td>9</td>
<td>285.01</td>
<td>5</td>
</tr>
<tr>
<td>Muzaffarpur</td>
<td>222.53</td>
<td>9</td>
<td>223.46</td>
<td>8</td>
<td>296.75</td>
<td>4</td>
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<tr>
<td>Darbhanga</td>
<td>223.26</td>
<td>8</td>
<td>213.90</td>
<td>10</td>
<td>250.83</td>
<td>10</td>
</tr>
<tr>
<td>Saharsa</td>
<td>159.94</td>
<td>16</td>
<td>202.17</td>
<td>12</td>
<td>187.64</td>
<td>14</td>
</tr>
<tr>
<td>Purba</td>
<td>177.85</td>
<td>14</td>
<td>154.55</td>
<td>13</td>
<td>185.51</td>
<td>15</td>
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<td>5</td>
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<td>3</td>
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<td>1</td>
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<td>11</td>
<td>204.54</td>
<td>11</td>
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<td>9</td>
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<td>236.78</td>
<td>7</td>
<td>279.75</td>
<td>7</td>
</tr>
<tr>
<td>Bhagalpur</td>
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<td>3</td>
<td>363.68</td>
<td>3</td>
<td>232.69</td>
<td>6</td>
</tr>
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<td>13</td>
<td>140.58</td>
<td>17</td>
<td>181.63</td>
<td>17</td>
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<tr>
<td>Hazaribagh</td>
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<td>14</td>
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<td>16</td>
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<td>15</td>
<td>190.87</td>
<td>13</td>
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<td>4</td>
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<td>12</td>
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<tr>
<td>Singhbhum</td>
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<td>4</td>
<td>243.46</td>
<td>6</td>
<td>273.01</td>
<td>8</td>
</tr>
<tr>
<td>State average</td>
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<td>250.00</td>
<td>-</td>
<td>250.00</td>
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</table>

Sources: See Appendix Tables XII, XX and XXVIII
BIHAR
ADMINISTRATIVE DIVISION
EDUCATIONAL DEVELOPMENT 1971
EDUCATIONALLY ADVANCED DISTRICTS
BACKWARD
Table 127 gives the synthetic index score of educational development and economic development obtained by each district of Bihar in 1970-71.

(A) EDUCATIONAL DEVELOPMENT : -

Above Average : - Patna, Ranchi, Bhagalpur, Singhbhum, Dhanbad.

Average : - Monghyr, Shahabad, Darbhunga, Muzzafferpur, Saran, Gaya.

Below Average : - Santhal Paraganas, Palaman, Purnea, Champaran, Saharsa, Hazaribagh.

(See Map 19 )

(B) EDUCATIONAL BACKGROUND AND MACHINERY : -

Above Average : - Patna, Dhanbad, Bhagalpur.

Average : - Ranchi, Shahabd, Singhbhum, Monghyr, Muzzafferpur, Saran, Darbhunga, Gaya, Saharsa.

Below Average : - Purnea, Hazaribagh, Santhal Paraganas, Champaran, Palaman.

(C) ECONOMIC DEVELOPMENT : -

Above Average : - Patna, Dhanbad, Shahabad.

Average : - Muzzafferpur, Saran, Bhagalpur, Monghyr, Singhbhum, Gaya, Darbhunga, Champaran, Ranchi.

Below Average : - Santhal Paraganas, Saharsa, Purnea, Hazaribagh, Palaman.

(See Map 20 )
METHODOLOGY :-

Let \( X \) = Educational Development,
\( Y \) = Educational Machinery and Background
\( Z \) = Economic Development

Then, these three variables have the observations defined as under :-

\[ X_{j,t} \] = Educational Development score for the \( j \)th State in the year \( t \)

\[ Y_{j,t} \] = Educational Machinery-Background Score for the \( j \)th State in the year \( t \).

\[ Z_{j,t} \] = Economic Development Score for \( j \)th State in the year \( t \).

\( j \neq 1, 2, 3, 4 \)

\( j = 1 \Rightarrow \) Orissa State

\( j = 2 \Rightarrow \) Gujarat State

\( j = 3 \Rightarrow \) Maharashtra State

\( j = 4 \Rightarrow \) Bihar State

\( t = 0 \Rightarrow \) Year 1961

\( t = 1 \Rightarrow \) Year 1971

The present research worker wants to study the regression relationships between the variables \( X \) \& \( Z \) and \( Y \) \& \( Z \) respectively.

The bivariate linear regression models for the same can be written as :-
\[
\sum \left( \frac{x}{z} \right) = \beta_0 + \beta_1 z \\
\sum \left( \frac{y}{z} \right) = \delta_0 + \delta_1 z
\]

Where \( \beta_0, \beta_1 \) and \( \delta_0, \delta_1 \) are the respective regression coefficients.

In simplified forms, the above equations can be expressed as under:

(I) Regression Equation of \( X \) on \( Z \):

\[
X - \bar{X} = b_{xy} (Z - \bar{Z})
\]

where \( \bar{X} \) = Mean of \( X \) series \( = \frac{\sum x}{n} \)

\( \bar{Z} \) = Mean of \( Z \) series \( = \frac{\sum z}{n} \)

\( n \) = Number of observations on \( X \) and \( Z \)

\( b_{xz} = \frac{\text{Cov}(X, Z)}{\text{V}(Z)} \) = Regression Coefficient of \( X \) on \( Z \).

(Where \( \text{Cov}(X, Z) = \frac{1}{n} \sum (x_i - \bar{x})(z_i - \bar{z}) \))

(II) Regression Equation of \( Y \) on \( Z \):

\[
Y - \bar{Y} = b_{yz} (Z - \bar{Z})
\]

where \( \bar{Y} \) = Mean of \( Y \) series \( = \frac{\sum y}{n} \)

\( b_{yz} = \frac{\text{Cov}(Y, Z)}{\text{V}(Z)} \)

= Regression Coefficient of \( Y \) on \( Z \).
Where \( \text{Cov}(Y, Z) = \frac{1}{n} \sum (Y - \bar{Y})(Z - \bar{Z}) \)

= Covariance between \( Y \) & \( Z \)

III (Pairwise) Correlation Coefficients:

\[
 r_{xz} = \frac{\text{Cov}(X, Z)}{\sqrt{\text{V}(X)\text{V}(Z)}}
\]

= Correlation Coefficient of \( X \) on \( Z \).

\[
 r_{yz} = \frac{\text{Cov}(Y, Z)}{\sqrt{\text{V}(Y)\text{V}(Z)}}
\]

= Correlation Coefficient of \( Y \) on \( Z \).

Where

\[
\text{V}(X) = \frac{1}{n} \sum (X - \bar{X})^2 = \text{Variance of } X
\]

\[
\text{V}(Y) = \frac{1}{n} \sum (Y - \bar{Y})^2 = \text{Variance of } Y
\]

\[
\text{V}(Z) = \frac{1}{n} \sum (Z - \bar{Z})^2 = \text{Variance of } Z
\]

(IV) Tests of Significance:

(A) Test for population correlation coefficient \( \rho_{xz} \)

Hypothesis: \( H_0: \rho_{xz} = 0 \)

\[
|t_c| = \frac{|r_{xz}|}{\sqrt{\frac{1 - r_{xz}^2}{n - 2}}} \cdot \sqrt{n - 2}
\]

Degree of freedom = \( n - 2 \)
Where \( t_c \) = \( t \) calculated
\( t_T \) = \( t \) tabulated

(B) Test for population Correlation Coefficient \( \rho_{YZ} = 0 \)

Hypothesis -
\[ H_0 : \rho_{YZ} = 0 \]
\[ \left| \frac{t_c}{t_T} \right| = \frac{r_{yz}}{\sqrt{1 - r_{yz}^2}} \cdot \sqrt{n-2} \]

Degree of freedom = \( n - 2 \)

(i) If \( t_c > t_T \) \( \rightarrow \) Reject \( H_0 \) \( \Rightarrow \) \( Y \) and \( Z \) are related.
(ii) If \( t_c < t_T \) \( \rightarrow \) Accept \( H_0 \) \( \Rightarrow \) \( Y \) and \( Z \) are independent.

Note :-
(i) Tests are carried out at 5% and 1% levels of significance.
(ii) \* indicates that the value is significant at 5% level of significance (i.e. Reject \( H_0 \) at 5% level)
(iii) \*\* indicates that the value is (highly) significant of significance (i.e. Reject \( H_0 \) at 1% level)
### TABLE 128
**EDUCATIONAL AND ECONOMIC DEVELOPMENT**

<table>
<thead>
<tr>
<th>STATE</th>
<th>REGRESSION ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1961</td>
</tr>
</tbody>
</table>

#### 1. X: Educational Development

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$\bar{X} = 181.88$</td>
<td>$\bar{X} = 186.9$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$\sigma_x = 67.09$</td>
<td>$\sigma_x = 62.61$</td>
</tr>
<tr>
<td>(iii)</td>
<td>$V(x) = 4501.18$</td>
<td>$V(x) = 3920.09$</td>
</tr>
</tbody>
</table>

#### 2. Y: Educational Machinery and Background

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$\bar{Y} = 236.09$</td>
<td>$\bar{Y} = 238.52$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$\sigma_y = 84.33$</td>
<td>$\sigma_y = 74.84$</td>
</tr>
<tr>
<td>(iii)</td>
<td>$V(y) = 7112.16$</td>
<td>$V(y) = 5601.02$</td>
</tr>
</tbody>
</table>

#### 3. Z: Economic Development

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$\bar{Z} = 245.07$</td>
<td>$\bar{Z} = 243.78$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$\sigma_z = 81.36$</td>
<td>$\sigma_z = 79.21$</td>
</tr>
<tr>
<td>(iii)</td>
<td>$V(z) = 6619.94$</td>
<td>$V(z) = 6273.6$</td>
</tr>
</tbody>
</table>

#### 4. X/Z

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$b_{xz} = 0.2287$</td>
<td>$b_{xz} = 0.7355$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$b_{zx} = 2.9172$</td>
<td>$b_{zx} = 1.1772$</td>
</tr>
<tr>
<td>(iii)</td>
<td>$r_{xz} = 0.8163$</td>
<td>$r_{xz} = 0.9305$</td>
</tr>
<tr>
<td>(iv)</td>
<td>$t_{cal} = 4.2476^{**}$</td>
<td>$t_{cal} = 7.6201^{**}$</td>
</tr>
</tbody>
</table>

#### 5. Y/Z

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$b_{yz} = 0.6736$</td>
<td>$b_{yz} = 0.8356$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$b_{zy} = 1.0936$</td>
<td>$b_{zy} = 0.9356$</td>
</tr>
<tr>
<td>(iii)</td>
<td>$r_{yz} = 0.8583$</td>
<td>$r_{yz} = 0.8842$</td>
</tr>
<tr>
<td>(iv)</td>
<td>$t_{cal} = 5.0179^{**}$</td>
<td>$t_{cal} = 5.6786^{**}$</td>
</tr>
</tbody>
</table>

**Regression Lines:**

(a) $Y_e$

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$X$ on $Z$ : $X = 0.2287Z + 125.8325$</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>$Y$ on $Z$ : $Y = 0.6736Z + 71.01$</td>
<td></td>
</tr>
</tbody>
</table>

Year 1971

<table>
<thead>
<tr>
<th></th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>$X$ on $Z$ : $X = 0.7355Z + 6.50$</td>
</tr>
<tr>
<td>(ii)</td>
<td>$Y$ on $Z$ : $Y = 0.8842Z + 34.817$</td>
</tr>
</tbody>
</table>
TABLE : 129

EDUCATIONAL AND ECONOMIC DEVELOPMENT

STATE : GUJARAT

<table>
<thead>
<tr>
<th>Regression Analysis</th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
</table>

1. X: Educational Development
   (i) $\bar{X} = 230.83$  224.7
   (ii) $\delta_X = 100.19$  69.21
   (iii) $V(\bar{x}) = 10039.15$  4789.6

2. Y: Educational Machinery & Background
   (i) $\bar{Y} = 233.5$  250.6
   (ii) $\delta_Y = 90.28$  82.9
   (iii) $V(\bar{y}) = 849.51$  689.97

3. Z: Economic Development
   (i) $\bar{Z} = 239.31$  249.8
   (ii) $\delta_Z = 60.99$  71.2
   (iii) $V(\bar{z}) = 3720.42$  5083.37

4. X/Z
   (i) $b_{xz} = 1.4268$  0.7959
   (ii) $b_{zx} = 0.5289$  0.8427
   (iii) $r_{xz} = 0.8687$  0.8199
   (iv) $t_{calc} = 6.3227^{**}$  5.9463^{**}

5. Y/Z
   (i) $b_{yz} = 1.3129$  1.0376
   (ii) $b_{zy} = 0.5994$  0.7661
   (iii) $r_{yz} = 0.8871$  0.8916
   (iv) $t_{calc} = 6.9287^{**}$  7.6243^{**}

6. Regression Lines :
   Year 1961
   (i) $X = 1.4268Z + 110.6175$
   (ii) $Y = 1.3129Z + 30.65$

   Year 1971
   (i) $X = 0.7959Z + 23.6223$
   (ii) $Y = 1.0376Z - 8.5939$
### TABLE: 130

**EDUCATIONAL END ECONOMIC DEVELOPMENT**

**STATE: MAHARASHTRA**

**REGRESSION ANALYSIS**

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. X: Educational Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) $\bar{X}$</td>
<td>194.34</td>
<td>226.27</td>
</tr>
<tr>
<td>(ii) $\delta_X$</td>
<td>59.19</td>
<td>62.00</td>
</tr>
<tr>
<td>(iii) $V(X)$</td>
<td>3503.98</td>
<td>3844.56</td>
</tr>
<tr>
<td>2. Y: Educational Machinery and Background</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) $\bar{Y}$</td>
<td>201.05</td>
<td>211.15</td>
</tr>
<tr>
<td>(ii) $\delta_Y$</td>
<td>88.36</td>
<td>76.41</td>
</tr>
<tr>
<td>(iii) $V(Y)$</td>
<td>7803.34</td>
<td>5838.89</td>
</tr>
<tr>
<td>3. Z: Economic Development:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) $\bar{Z}$</td>
<td>210.25</td>
<td>222.6</td>
</tr>
<tr>
<td>(ii) $\delta_Z$</td>
<td>78.58</td>
<td>58.34</td>
</tr>
<tr>
<td>(iii) $V(Z)$</td>
<td>6175.3</td>
<td>3462.63</td>
</tr>
<tr>
<td>4. $D/Z$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) $b_{xz}$</td>
<td>0.6606</td>
<td>0.7346</td>
</tr>
<tr>
<td>(ii) $b_{zx}$</td>
<td>1.1642</td>
<td>0.6616</td>
</tr>
<tr>
<td>(iii) $r_{xz}$</td>
<td>0.8769</td>
<td>0.6972</td>
</tr>
<tr>
<td>(iv) $t_{cal}$</td>
<td>8.5558***</td>
<td>4.56317**</td>
</tr>
<tr>
<td>5. $Y/Z$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) $b_{yz}$</td>
<td>0.9742</td>
<td>0.9573</td>
</tr>
<tr>
<td>(ii) $b_{zy}$</td>
<td>0.7705</td>
<td>0.5677</td>
</tr>
<tr>
<td>(iii) $r_{yz}$</td>
<td>0.8664</td>
<td>0.7372</td>
</tr>
<tr>
<td>(iv) $t_{cal}$</td>
<td>8.1373**</td>
<td>5.1177**</td>
</tr>
</tbody>
</table>

6. **Regression Lines:**

   **Year 1961**
   
   (i) $Y = a + b_{xy}Z = 0.6606 Z + 45.95$
   
   (ii) $X = a + b_{xz}Z = 0.9742 Z - 3.775$

   **Year 1971**
   
   (i) $Z = a + b_{zy}X = 0.7346 Z + 62.75$
   
   (ii) $X = a + b_{xz}Z = 0.9573 Z - 1.949$
TABLE : 131
EDUCATIONAL AND ECONOMIC DEVELOPMENT

STATE : BIHAR

Regression Analysis

<table>
<thead>
<tr>
<th></th>
<th>1961</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. X: Educational Development:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) X</td>
<td>243.89</td>
<td>245.89</td>
</tr>
<tr>
<td>(ii) 6_x</td>
<td>82.14</td>
<td>79.86</td>
</tr>
<tr>
<td>(iii) V_(x)</td>
<td>6746.72</td>
<td>6377.62</td>
</tr>
<tr>
<td>2. Y: Educational Machinery &amp; Background:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Y</td>
<td>237.55</td>
<td>237.37</td>
</tr>
<tr>
<td>(ii) 6_y</td>
<td>94.24</td>
<td>93.56</td>
</tr>
<tr>
<td>(iii) V_(y)</td>
<td>8381.17</td>
<td>8754.49</td>
</tr>
<tr>
<td>3. Z: Economic Development:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Z</td>
<td>252.69</td>
<td>255.95</td>
</tr>
<tr>
<td>(ii) 6_z</td>
<td>80.61</td>
<td>63.93</td>
</tr>
<tr>
<td>(iii) V_(z)</td>
<td>6497.98</td>
<td>4037.04</td>
</tr>
<tr>
<td>4. X / Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) b_xz</td>
<td>0.6496</td>
<td>1.1232</td>
</tr>
<tr>
<td>(ii) b_zx</td>
<td>0.6257</td>
<td>0.7198</td>
</tr>
<tr>
<td>(iii) r_xz</td>
<td>0.6375</td>
<td>0.8991</td>
</tr>
<tr>
<td>(iv) t_cal</td>
<td>2.9466</td>
<td>7.4059**</td>
</tr>
<tr>
<td>5. Y / Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) b_yz</td>
<td>0.9833</td>
<td>1.2735</td>
</tr>
<tr>
<td>(ii) b_zy</td>
<td>0.7194</td>
<td>0.5943</td>
</tr>
<tr>
<td>(iii) r_yz</td>
<td>0.8411</td>
<td>0.8699</td>
</tr>
<tr>
<td>(iv) t_cal</td>
<td>4.3658**</td>
<td>6.3587**</td>
</tr>
<tr>
<td>6. Regression Lines:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1961 (i) XonZ: X</td>
<td>0.6496 Z + 34.74</td>
<td></td>
</tr>
<tr>
<td>(ii) XonZ: Y</td>
<td>0.9833 Z - 10.92</td>
<td></td>
</tr>
<tr>
<td>Year 1971 (i) XonZ: X</td>
<td>1.1232 Z - 41.59</td>
<td></td>
</tr>
<tr>
<td>(ii) XonZ: Y</td>
<td>1.2735 Z - 88.08</td>
<td></td>
</tr>
</tbody>
</table>
CONCLUSIONS :-

The above statistical analysis predicts that:
(i) Educational Development is definitely linearly related with the Economic Development in all the Four States under study for both the years (i.e. 1961 and 1971).
(ii) Educational Machinery and Background are also definitely linearly related with the Economic Development in all the Four States under study for both the years (i.e. 1961 and 1971).