Research Article

LEVEL OF DEVELOPMENT IN CHANDRAPUR DISTRICT: A BLOCK LEVEL STUDY

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A R T I C L E I N F O	A B S T R A C T
	The main objective of this study is to find out level of development in chandrapur district particularly related to agriculture, human resource and infrastructure sector. This paper analysed the level of development of the blocks. 15 blocks of Chandrapur district with respect to 12 development indicators were evaluated on the basis of a composite index. The composite index on principal component analysis was employed. The level of development was obtained for agricultural, human resource and infrastructural sector. Among 15 blocks, the blocks which stood best in agricultural sector were Sindewahi and Nagbhid. Jiwati stood last in agricultural sector with rank of 15. In Human Resource sector, the block standing best was Warora with an overall rank of 1 and Jiwati with a ranking of 15 showed poorest performance. Similarly in infrastructural sector Warora stood best with an overall rank of 1 whereas, Rajura with a ranking of 15 stood last in infrastructural. A comparative analysis of developmental indices revealed that Chandrapur block is high developed block. Middle developed blocks were Warora, Bramhapuri, Nagbhid, Sindewahi, Bhadravati, Mul and Ballarpur. Chimur, Gondpipri, Korpana and Sawali blocks were developing and Jiwati, Pombhurna and Rajura were low level developed blocks.

INTRODUCTION

Growing regional disparity is a challenge to the Planner. Chandrapur is a big district in Maharashtra state. In this district there are 15 Talukas and 7 revenue sub divisions. In this district Scheduled caste and Scheduled Tribe population is 15.8% and 17.7 % respectively. About 79 % population is depending on Agriculture which shows main source of income of this district is Agriculture. Forest is covered by around 42.3 % of total geographical area of the district. District human development index is 0.752 which shows the category of this district is medium development in Human development index in Maharashtra as per 2012 human development report of Maharashtra.

Level of development at block level is estimated. Sector wise development indices calculated. Composite index is calculated on the basis of indicators. Many Authors used various methods to compute composite index. Nagar and Basu (2002) developed composite index, obtained as weighted average of the principal components of the casual variables as an estimator of latent variable. Morris D. Morris (1979) proposed the physical quality of life index as a function of life expectancy at age one, infant mortality rate and literacy rate. Ancuța Simona *et. al.* (2012) in their paper demonstrated the usefulness of principal component analysis in agriculture by downsizing data.

Development indicators

To assess the level of development 12 indicators have been selected. Out of twelve indicators, 4 are related to development of agricultural sector, 5 are education and health related indicators included in human resource and remaining 3 indicators are related to progress of infrastructural sector. These 12 indicators are given below:

1. Percentage of Net Irrigated Area.
2. Numbers of agriculture pump sets per thousand hectors of net sown area.
3. Fertilizer consumption per hector of gross cropped area in kg
4. Amount of bank credit per hector of gross cropped area
5. Number of dispensaries per lakh population5
6. Number of bed in medical institutions per ten thousand populations
7. Number of Primary Schools per lakh Population
8. Number of Secondary Schools per lakh Population
9. Percentage of literates
10. Number of Post offices per lakh population
11. Number of Bank offices per ten thousand population
12. Road length per100 sq km of Geographical area (in Km)

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DATA AND METHODOLOGY

In this study Principal component analysis method is used. It is assumed that variable indicators are linearly related. Principal component analysis is used to construct composite index. Source of data is district socio-economic review-2020 of Chandrapur District Published by District Statistical office. The principle component variables are independent and uncorrelated. The objective of principle component analysis is to reduce the dimensionality of the data set but retain most of the original variability in the data. The principal components are evaluated using the Eigen vectors obtained from correlation matrix of variables and standardized value of variables to be used in construction.

Standardized value of variables obtained from transforming casual variable.

$$X_k = \frac{x_k - \bar{x}_k}{S_{x_k}}$$

Where $\bar{x}_k$= arithmetic mean
S_j= Standard deviation of observation on x_k

R be Correlation matrix. Compute the characteristic root
$\lambda_1 > \lambda_2 > \ldots \ldots > \lambda_k$

Corresponding to each value of λ, solve the matrix equation
$(R - \lambda I)\alpha = 0$

Here I is a the identity matrix
For the K x 1 Characteristic vector α subject to the condition that

$\alpha'\alpha=1$
The principal components were obtained using the formula given below:

First principal component is obtain as
$P_1 = \alpha_{11}X_1 + \cdots + \alpha_{1K}X_K$

Using the elements of the Eigen vector α_1 corresponding to the root λ_1 of R

Similarly second principal component is obtain as
$P_2 = \alpha_{21}X_1 + \cdots + \alpha_{2K}X_K$

Using the elements of the Eigen vector α_2 corresponding to the root λ_2 of R. Remaining principal components P_3 to P_k using the elements of the Eigen vector α1 corresponding to the root λ_3 to λ_k of R. The estimator of composite index is obtained as the weighted average of the principal components: thus

$$H = \frac{\lambda_1 P_1 + \cdots + \lambda_K P_K}{\lambda_1 + \cdots + \lambda_K}$$

Where the weights are the Eigen roots of R and here we attach the highest weight to the first principal component P_1 because it accounts for the largest proportion of total variation in all casual variables. Similarly the second principal component P_2 accounts for the second largest proportion of total variation in all casual variables therefore the second largest weight λ_2 is attached to P_2 and so on. Principal component analysis was carried out using SPSS Software. Higher value of indicator of the index indicates higher development in the sector. Lower values indicate lover development.

Ranking method

Based on the composite index ranks have been given. The higher rank is regarded as best followed by the decreasing order of preference. Classification of development of blocks is based on mean and Standard Deviation of composite indices.

RESULTS AND DISCUSSION

Composite index finding has been obtained for agricultural sector, human resource and infrastructure sector. The evaluation indices of development and rankings for all blocks of Chandrapur district for three sectors are given in the Table 1, Table 2 and Table 3.

Table 1 Rank and composite index for Agricultural sector

Sr. No.	Names of Taluka	Agriculture sector composite index	Rank
1	Warora	-0.04	8
2	Chimur	0.04	7
3	Nagbhid	0.67	2
4	Bramhapuri	0.54	3
5	Sawali	0.54	4
6	Sindewahi	1.18	1
7	Bhadravati	-0.23	10
8	Chandrapur	-0.12	9
9	Mul	0.20	5
10	Pombhurna	-0.26	11
11	Ballarpur	0.13	6
12	Korpana	-0.37	12
13	Rajura	-0.50	13
14	Gondpipri	-0.52	14
15	Jiwati	-1.23	15

Table 1 presents the composite indices and ranks of various blocks in Chandrapur District. Sindewahi is at the top of the rank order while Jiwati is at the bottom of all the blocks of the district. In the top order Sindewahi is followed by Nagbhid, Bramhapuri and Sawali blocks whose index value is lower than the Sindewahi. Jivati including Gondpipri and Rajura blocks are lagging much behind if we compare them with Sindewahi, Nagbhid, Bramhapuri and Sawali blocks.

Table 2 Ranks and composite index for Human Resource

Sr. No.	Names of Blocks	Human Resource Composite index	Rank
1	Warora	0.44	2
2	Chimur	-0.11	10
3	Nagbhid	-0.11	9
4	Bramhapuri	0.27	5
5	Sawali	-0.47	12
6	Sindewahi	-0.05	7
7	Bhadravati	0.38	4
8	Chandrapur	1.95	1
9	Mul	-0.41	11
10	Pombhurna	-0.69	14
11	Ballarpur	0.41	3
12	Korpana	0.10	6
13	Rajura	-0.08	8
14	Gondpipri	-0.49	13
15	Jiwati	-1.14	15

Based on the human resource index value the blocks are ranked which is shown in Table 2. Both education and health are important component of human capital. Chandrapur block is at the top of the rank order followed by Warora, Ballarpur, Bhadravati and Bramhapuri blocks. Similarly at the bottom of rank order is Jiwati preceded by Pombhurna, Gondpipri and Sawali. Jiwati block is lagging much behind if we compare with Chandrapur block.

Table 3 Ranks and composite index for Infrastructure Sector

Sr. No.	Name of Blocks	Infrastructure composite index	Rank
1	Warora	0.94	1
2	Chimur	-0.35	11
3	Nagbhid	0.47	5
4	Bramhapuri	0.32	6
5	Sawali	-0.25	9
6	Sindewahi	-0.37	12
7	Bhadravati	0.48	4
8	Chandrapur	-0.01	8
9	Mul	0.61	3
10	Pombhurna	-0.66	13
11	Ballarpur	-0.27	10
12	Korpana	0.05	7
13	Rajura	-0.91	15
14	Gondpipri	0.77	2
15	Jiwati	-0.82	14

The ranking of blocks based on infrastructure index is shown in Table No.3. In the rank order the top four districts are Warora followed by Gondpipri, Mul and Bhadravati and at the bottom is Rajura preceded by Jiwati, Pombhurna and Sindewahi. Indices value is varies from 0.94 to -0.91.

Table 4 Total Variance Explained in Agricultural sector

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1.868	46.693	46.693
2	1.256	31.409	78.103
3	.564	14.103	92.205
4	.312	7.795	100.000
Extraction Method: Principal Component Analysis.			

Table 5 Total Variance Explained in Human resource

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.305	66.093	66.093
2	1.006	20.119	86.213
3	.556	11.129	97.342
4	.076	1.528	98.870
5	.056	1.130	100.000
Extraction Method: Principal Component Analysis.			

Table 6 Total Variance Explained for infrastructure sector

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1.159	38.637	38.637
2	.952	31.740	70.377
3	.889	29.623	100.000
Extraction Method: Principal Component Analysis.			

In above table No. 4, 5 and 6 shows that principal components are generated against the variables. Second column represents the Eigen value of correlation matrix. Third and fourth column shows the percentage of variance and cumulative percentage of variance explained by these components. Eigenvalues are used to construct composite index.

Table 7 Comparative categorization of the blocks

Sr. No.	Name of Blocks	categorization
1	Chandrapur	High Developed
2	Warora	Middle developed
3	Bramhapuri	Middle developed
4	Nagbhid	Middle developed
5	Sindewahi	Middle developed
6	Bhadravati	Middle developed
7	Mul	Middle developed
8	Ballarpur	Middle developed
9	Sawali	Developing
10	Korpana	Developing
11	Gondpipri	Developing
12	Chimur	Developing
13	Rajura	Low developed
14	Pombhurna	Low developed
15	Jiwati	Low developed

Table No. 7 shows the Comparative categorization of the blocks. This table shows that Chandrapur is high developed block. Warora, Bramhapuri Nagbhid, Sindewahi, Bhadravati, Mul and Ballarpur are middle developed. Chimur, Gondpipri Korpana and Sawali are developing blocks and Jiwati, Pombhurna and Rajura are low developed blocks.

DISCUSSION

It is important to measure the level of development. The individual ranking of each block gives us a clear idea about the overall development of each block in Chandrapur District. There is wide disparity among all blocks. Some are high developed blocks and some are low developed blocks. Finding is supported by past studies. The 'level of development was examined separately for agricultural, infrastructural and overall socio-economic sectors. The state of Punjab was ranked first and Bihar was ranked last in overall socio-economic development. Wide disparities in the level of development among different states have been observed[1]. There is considerable change in ranks of the district and reveal the correct picture of the disparities in the level of development amongst various districts [4].

The relative variations and changes in ranks of different districts have been computed during the period under consideration. Evidence shows existence of high and persistent inter-state disparity in agriculture in the state over the years. The transformation of some districts from the level of relatively underperformer to the rank of better performer and vice versa has been witnessed and explained. The study has shown that development of agriculture in Uttar Pradesh over the year has remained polarised in Western region followed by Central region. Bundelkhand region has been the least developed over the periods 1990-1991 to 2008-09. The disparity existing in agricultural development is high and alarming[5]. It is found in the agricultural sector, that the districts of Nalbari, Darrang and Udalguri are high developed districts. The districts of Sonitpur, Tinisukia, Dima-Hasao, Karbi-Anglong are low developed districts. The remaining are middle developed and developing districts.it was found that the entire area of the district is not backward. Some parts of the district are low developed whereas other parts are well developed or average developed[6].

Three blocks namely Jiwati, Pombhurna and Rajura are found to be low developed in all over categorization of blocks. It may be seen from the above table that the present status of low developed blocks are extremely low as compared to Chandrapur, Warora and Bramhapuri blocks. Various reason may be for low level of development like Migration of labour, dependency on agriculture and forestry and any other reasons. For improving the level of development of low developed blocks special attention must be given in agricultural, human resource and industrial sector. So that status of development may be changed. Action is required to enhance the productivity of this area. Irrigated area required to increase. Bank credit should be given to the farmer.

CONCLUSION

Wide disparity in level of development has been observed in different blocks. Out of 15 blocks Sindewahi is found to be the high developed block in agriculture. Jiwati was on the last place in the Chandrapur district with respect to development in agriculture. With respect to human resource development, the Chandrapur, Warora, Ballarpur, Bhdarvati and Bramhapuri are found to be better developed as compared to other blocks. The Jiwati, Pombhurna, Gondpipari and Sawali are low developed. Infrastructural facility are better in warora. Jiwati and Rajura blocks are of poor facilities. The level of development has been categorized in four stages as high developed, middle level developed, developing and low developed. One block found to be high developed. Seven blocks are middle level developed, four are developing and three are low developed blocks. Wide disparities among the different blocks were found in agriculture, human resource and Infrastructural sectors.

The plan should be implemented considering the taluka as a factor of development. Various schemes should be formed according to the need of the people and availability of natural resources. To reduce the disparity more weightage may be given to develop the backword blocks.

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