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### Developmental dynamics of blocks: A study of Faizabad division in Eastern Uttar Pradesh

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#### Abstract

The development process of any system is dynamic in nature and depends on a large number of parameters. This study attempted to capture latest dynamics of development of blocks of Faizabad division of Eastern Uttar Pradesh in respect of Agriculture and Infrastructure systems. Techniques adopted by Narain *et al.* have been used in addition to Principal Component and Factor Analysis. Ranking of the blocks in respect of performance in Agriculture, General Infrastructure and Industry have been obtained in this study. Ranking seems to very close to ground reality and provides useful information for further planning and corrective measures for future development of blocks of Faizabad division of Eastern Uttar Pradesh.

**Keywords:** Developmental Indicator, composite index, Principal component analysis, Socioeconomic, Factor analysis

#### Introduction

Development is a dynamic concept and has a different meaning for different people. It is used in many disciplines at present. The notion of development in the context of regional development refers to a value positive concept which aims to enhance the levels of living of the people and general conditions of human welfare in a region. Socio-economic developments have become one of the most important glaring and growing problems not only in developing countries but also in the most advanced countries of the World. Since some regions are economically developed but backward socially, whereas some other are developed socially and remained backward economically. Historically, India has been observing inter-state variations as far as the socio-economic, political and geographical aspects are concerned.

Programmes of development have been taken up in the country in a planned way through various Five Year Plans. The Green Revolution in the agriculture sector and commendable progress in the industrial front have certainly increased the overall total production, but there is no indication that these achievements have been able to reduce substantially the regional inequalities in the level of development. Although resource transfers are being executed in backward regions of the country, it has been observed that the regional disparities in terms of socio-economic development are not declining over time.

#### Developmental Indicators

Each district faces situational factors of development unique to it as well as common administrative and financial factors. Factors common to all the districts have been taken as the indicators of development. The composite indices of development for different districts have been obtained by using the data on the following development indicators:-

1. Percentage of agricultural workers
2. Total area sown.
3. Percentage area sown more than once.
4. Percentage area sown under food crops.
5. Application of fertilizer per hectare.
6. Percentage of net area irrigated.
7. Area sown under rice crop.
8. Area sown under wheat crop.
9. Area sown under sugarcane crop.
10. Total number of animals.

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11. Number of crossbred animals.
12. Number of animal dispensaries and hospitals.
13. Population density per square km. of area.
14. Percentage of SC/ST population.
15. Percentage of main workers.
16. Percentage of villages electrified.
17. Road length per 1000 sq.km. of area.
18. Number of medical hospitals per lakh population.
19. Number of beds in hospitals per lakh population.
20. Number of primary health centres per lakh population.
21. Number of junior high schools per lakh population.
22. Number of persons (in '000) per bank.
23. Percentage literacy rate.

A total of twenty-three developmental indicators have been included in the analysis. These indicators are the major interacting components of development. Out of these twenty-three indicators, twelve indicators are directly concerned with the agricultural development and the rest eleven indicators describe the availability of infrastructural facilities in the blocks of districts.

### Method of Analysis

#### Composite Index:

Let  $[X_{ij}]$  be data matrix giving the values of the variables of  $i^{\text{th}}$  district. Where  $i = 1, 2, \dots, n$  (number of districts) and  $j = 1, 2, \dots, k$  (number of indicators).

For combined analysis  $[X_{ij}]$  is transferred to  $[Z_{ij}]$  the matrix of standardized indicators as follows

$$[Z_{ij}] = \frac{X_{ij} - \bar{X}_j}{S_j}$$

Where,  $S_j$  = Standard deviation of  $j^{\text{th}}$  indicator

$\bar{X}_j$  = mean of the  $j^{\text{th}}$  indicator

From  $[Z_{ij}]$ , identify the best value of each indicator. Let it be denoted as  $Z_{0j}$ . The best value will be either the maximum value or the minimum value of the indicator depending upon the direction of the impact of indicator on the level of development. For obtaining the pattern of development  $C_i$  of  $i^{\text{th}}$  districts, first calculate  $P_{ij}$  as follows

$$P_{ij} = (Z_{ij} - Z_{0j})^2$$

The pattern of development is given by

$$C_i = \left[ \sum_{j=1}^k P_{ij} / (CV)_j \right]^{1/2}$$

Where,  $(CV)_j$  = coefficient of variation in  $X_{ij}$  for  $j^{\text{th}}$  indicator.

Composite index of development ( $D_i$ ) is given by

$$D_i = C_i / C \text{ for } i = 1, 2, \dots, n$$

$$C = \bar{C} + 3SD_i$$

Where  $\bar{C}$  = mean of  $C_i$  and

$SD_i$  = Standard deviation of  $C_i$

A smaller value of  $D_i$  will indicate a high level of development and higher value of  $D_i$  will indicate a low level of development.

### Principal component analysis

Principal component analysis (PCA) is a multivariate technique that analyzes a data table in which observations are described by several inter-correlated quantitative dependent variables. Its goal is to extract the important information from the table, to represent it as a set of new orthogonal variables called principal components, and to display the pattern of similarity of the observations and of the variables as points in maps. Mathematically, PCA depends upon the eigen-decomposition of positive semi-definite matrices and upon the singular value decomposition (SVD) of rectangular matrices.

### Goals of PCA

The goals of PCA are to

1. Extract the most important information from the data table;
2. Compress the size of the data set by keeping only this important information;
3. Simplify the description of the data set; and
4. Analyze the structure of the observations and the variables.

### Factor Analysis

Factor analysis is a statistical method used to describe variability among observed variable in terms of a potentially lower number of unobserved variables called factors. The main applications of factor analytic techniques are: (1) to *reduce* the number of variables and (2) to *detect structure* in the relationships between variables, that is to *classify variables*. Therefore, factor analysis is applied as a data reduction or structure detection method (the term *factor analysis* was first introduced by Thurstone, 1931). The topics listed below will describe the principles of factor analysis, and how it can be applied towards these two purposes.

### Results and Discussion

#### The Level of Development

The composite indices of development have been worked out for different blocks of Faizabad division in Eastern Uttar Pradesh separately for agricultural system and infrastructure system. The blocks of districts have been ranked on the basis of development indices. The composite indices of development along with the district ranks are presented in Table 1.

**Table 1:** Ranking of blocks of districts based on composite indices of development in 2012

Districts	Blocks	Agriculture System		Infrastructure System	
		C.I	Rank	C.I.	Rank
Ambedkarnagar	Akbarpur	0.78	1	1.49	15
	Tanda	0.90	2	1.58	35
	Jalalpur	0.97	6	1.54	27
	Katehari	1.08	12	1.58	37
	Ramnagar	1.10	13	1.53	21
	Bhiti	1.11	16	1.56	30
	Bhuskhadi	1.13	18	1.02	1
Jahangirganj	1.20	27	1.61	44	

	Bhiyav	1.20	28	1.47	12
Barabanki	Nindaura	0.92	3	1.51	18
	Fatehpur	0.94	4	1.50	17
	Haidergarh	0.96	5	1.53	20
	Banikodar	0.97	7	1.56	29
	Sidhaur	1.04	8	1.55	28
	Trivediganj	1.05	9	1.53	24
	Banki	1.06	10	1.47	13
	Suratganj	1.08	11	1.58	39
	Ramnagar	1.10	14	1.64	51
	Harakh	1.12	17	1.44	10
	S.Gauspur	1.14	19	1.58	34
	Dewa	1.15	20	1.54	25
	Masauli	1.15	21	1.35	4
	Puredalai	1.24	37	1.64	48
Dariyabad	1.27	42	1.57	32	
Faizabad	Amaniganj	1.16	22	1.53	22
	Mavai	1.16	23	1.54	26
	Tarun	1.17	24	1.42	8
	Maya	1.18	25	1.40	6
	Pura	1.20	29	1.46	11
	Milkipur	1.22	31	1.59	42
	Rudauli	1.22	32	1.47	14
	Bikapur	1.23	35	1.40	7
	Haringtonganj	1.23	36	1.49	16
	Masodha	1.25	38	1.38	5
	Sohawal	1.25	39	1.43	9
Sultanpur	Lumbhua	1.23	33	1.59	41
	Akhand Nagar	1.23	34	1.57	31
	Dostpur	1.26	40	1.71	57
	JaiSinghpur	1.27	41	1.60	43
	Dhanpatganj	1.29	44	1.63	47
	Bhadayeea	1.34	47	1.21	2
	Kadipur	1.36	48	1.21	3
	Kurebhar	1.37	49	1.51	19
	Motigarhpur	1.39	54	1.68	53
	Dubeypur	1.46	58	1.53	23
	Waldi rai	1.49	60	1.58	36
	Kurwar	1.50	57	1.57	33
	P.P. Kamaich	1.55	63	1.62	45
Karaudi Kalan	1.62	64	1.74	59	
Amethi	Salon	1.11	15	1.64	49
	Singhpur	1.19	26	1.67	52
	Tiloi	1.20	30	1.58	38
	Gauriganj	1.28	43	1.63	46
	Jamo	1.31	45	1.69	56
	Bahadurpur	1.34	46	1.78	62
	Musafirkhana	1.37	50	1.69	55
	Shukulbazar	1.37	51	1.64	50
	Bhetua	1.37	52	1.80	64
	Dih	1.38	53	1.74	58
	Jagdishpur	1.40	55	1.75	61
	Chhatoh	1.41	56	1.68	54
	Amethi	1.46	59	1.75	60
	Shahgarh	1.51	61	1.80	65
	Bhadar	1.53	62	1.59	40
Sangrampur	1.67	65	1.80	63	

The results of the composite indices show that the blocks namely Nindaura, Fatehpur, Haidergarh, Banikodar, Sidhaur, Trivediganj and Banki was the most development blocks in the Barabanki district in Agricultural system followed by the blocks Akbarpur, Tanda and Jalalpur in district Ambedkarnagar, while in the Infrastructure development blocks of the Faizabad district Tarun, Mavai, Bikapur, Masodha and Sohawal was topmost development blocks in the district followed by blocks Bhushkhadi, Akbarpur and Bhiyav in the Akbarpur district. Blocks of the district Amethi

was the most backward district in Agriculture and Social system.

In Agriculture development blocks Akbarpur and Tanda in district Ambedkarnagar and blocks Nindaura, Fatehpur and Haidergarh in district Barabanki were found to be in top five blocks, while in infrastructure system block Bhushkhadi in Ambedkarnagar district, block Bhadayeea and Kadipur in district Sultanpur, block Masauli in district Barabanki and block Masodha in district Faizabad were found to be five high developed blocks in Faizabad division.

**Table 2:** Ranking of blocks of districts based on Factor analysis in 2012

Districts	Blocks	Agriculture System		Infrastructure System	
		Factor Score	Rank	Factor Score	Rank
Ambedkarnagar	Akbarpur	8.12	1	3.72	6
	Tanda	3.80	5	0.26	33
	Jalalpur	3.06	9	0.95	26
	Katehari	2.80	10	-0.36	38
	Ramnagar	0.16	33	-1.63	48
	Bhiti	2.45	15	-0.43	39
	Bhuskhadi	1.70	21	8.15	1
	Jahangirganj	0.28	32	-0.98	44
	Bhiyav	0.28	31	2.47	13
Barabanki	Nindaura	4.57	3	2.87	10
	Fatehpur	3.21	6	2.48	12
	Haidergarh	3.95	4	2.17	15
	Banikodar	2.47	14	1.39	20
	Sidhaur	3.20	7	-0.17	36
	Trivediganj	3.16	8	1.38	21
	Banki	1.78	20	1.20	24
	Suratganj	2.09	18	2.99	9
	Ramnagar	2.63	11	-0.69	42
	Harakh	2.06	19	2.85	11
	S.Gauspur	1.39	23	0.51	29
	Dewa	1.37	24	0.99	25
	Masauli	1.67	22	3.97	5
	Puredalai	-2.01	48	0.52	28
	Dariyabad	-0.31	36	-0.75	43
Faizabad	Amaniganj	-3.35	57	2.15	16
	Mavai	-0.31	37	0.27	32
	Tarun	-1.93	46	3.11	8
	Maya	-1.03	42	3.22	7
	Pura	-2.31	50	1.22	23
	Milkipur	-1.13	43	-1.09	46
	Rudauli	-3.33	56	1.60	19
	Bikapur	-2.34	51	2.45	14
	Haringtonganj	-2.48	54	1.66	18
	Masodha	-2.91	55	4.83	2
Sultanpur	Sohawal	-1.13	44	1.78	17
	Lumbhua	-2.00	47	-0.60	41
	Akhand Nagar	-0.32	38	0.29	31
	Dostpur	-0.70	40	-3.48	57
	JaiSinghpur	-2.47	53	-0.22	37
	Dhanpatganj	-2.43	52	-0.59	40
	Bhadayeea	-3.92	59	4.69	3
	Kadipur	-1.59	45	4.12	4
	Kurebhar	-3.87	58	1.35	22
	Motigarhpur	-2.15	49	-2.76	53
	Dubeypur	-4.50	62	0.90	27
	Waldi rai	-6.20	65	0.18	34
	Kurwar	-5.22	63	0.39	30
Amethi	P.P. Kamaich	-4.14	60	-1.29	46
	Karaudi Kalan	-4.43	61	-5.17	63
	Salon	4.67	2	-2.31	52
	Singhpur	2.39	16	-1.31	47
	Tiloi	2.47	13	-2.09	50
	Gauriganj	1.25	25	-2.28	51
	Jamo	0.79	27	-3.21	55
	Bahadurpur	2.62	12	-5.35	64
	Musafirkhana	0.92	26	-3.25	56
	Shukulbazar	0.13	34	-1.94	49
	Bhetua	0.49	29	-5.04	61
	Dih	0.39	30	-4.57	60
	Jagdishpur	-5.27	64	-2.88	54
	Chhatoh	0.68	28	-3.61	58
	Amethi	0.00	35	-4.01	59
	Shahgarh	2.34	17	-5.12	62
	Bhadar	-0.58	39	-0.15	35
Sangrampur	-0.97	41	-5.76	65	

Factor scores of development have been obtained by using factor analysis for different blocks of districts of Faizabad division for the agricultural sector and infrastructural sector. The blocks of the districts have been ranked on the basis of factor scores. Factor scores of development along with the rank of the blocks of districts are given in Table 2.

The perusal of Table 2 showed that the blocks Akbarpur, Tanda and Jalalpur in district Ambedkarnagar and blocks Nindaura, Fatehpur, Haidergarh, Sidhaur and Trivediganj in district Barabanki was the most development blocks in Agriculture system. These blocks were common in top developed blocks by both of the method that is, composite indices and factor analysis respectively, while in Infrastructure development block Akbarpur and Bhuskhadi in district Ambedkarnagar, blocks Tarun, Maya and Masodha in Faizabad district and blocks Bhadayeea and Kadipur in district Sultanpur was topmost developed blocks in districts of Faizabad division.

### Agriculture Development

In Agriculture development the blocks Akbarpur and Tanda in district Ambedkarnagar and blocks Nindaura, Fatehpur and Haidergarh in Barabanki district were found to be in top 5 blocks and blocks Shahgarh, Bhadar and Sangrampur in Amethi districts and blocks P.P. Kamaich and Karaudi Kalan in Sultanpur district were showed low level of development. The results show that blocks of Faizabad and Sultanpur districts found to be moderate blocks in respect of agricultural development. As per the result of factor analysis blocks Akbarpur and Tanda in district Ambedkarnagar, blocks Nindaura and Haidergarh in district Barabanki and block Salon in district Amethi in the top most development blocks Karaudi kalan, Dubeypur, Waldirai and Kurwar in Sultanpur district and block Jagdishpur in district Amethi were low developed blocks.

### Infrastructure Development

The result shows that blocks Bhuskhadi in Ambedkar Nagar district, blocks Bhadayeea and Kadipur in Sultanpur district, block Masodha in district Faizabad and block Masauli in district Barabanki are in top 5 blocks in Faizabad division. Block Sangrampur, Jagdishpur, Shahgarh, Bahadurpur and Bhetua in district Amethi were low developed blocks in Infrastructure development

### Conclusion

The result and discussion carried out in the text of the paper are summarized in the form of conclusions regarding indicators available at District Level are more informative than Block level Indicators. Variables/Indicators like-Production & Productivity of Food grains, the Gross value of agriculture produce, % irrigated area have been found important in this study. These variables are not estimated at Block levels. Barabanki is most Advanced District followed by Ambedkarnagar, Faizabad, Sultanpur and Amethi. A similar result is observed at Block level analysis and observed that advanced districts like Barabanki have a large number of advanced Blocks. Ranking of Blocks by Narain *et al*, seems to be much better than other methods. Faizabad is most Advanced District followed by Ambedkarnagar, Barabanki, Sultanpur and Amethi. A similar result is observed at Block level analysis and observed that advanced districts like Faizabad have a large number of advanced Blocks. This study clearly shows the backward status of Sultanpur and Amethi in respect of Agriculture and Infrastructure.

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