

## **Inter-District Variation of Socio-economic Development in Andhra Pradesh**

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### **SUMMARY**

The level of development of different districts of Andhra Pradesh was obtained with the help of composite index based on optimum combination of fifty socio-economic indicators. The district-wise data for the year 2001-02 in respect of these fifty indicators were utilized for 22 districts of the State. The level of development was estimated separately for agricultural sector, infrastructural facilities and overall socio-economic sector. The district of West Godavari was ranked first in overall socio-economic development and the district of Guntur was found on the first position in respect of agricultural development. Wide disparities were observed in the level of development among different districts. Infrastructural facilities were found to be positively associated with the level of developments in agricultural sector and overall socio-economic field. Agricultural development was influencing the overall socio-economic development in the positive direction.

*Key words:* Developmental indicators, Composite index, Potential targets, Model districts.

### **1. INTRODUCTION**

Developmental programmes have been taken up in the country in a planned way through various Five Years Plans for enhancing the quality of life of people by providing basic necessities as well as effecting improvement in their social and economic well being. The green revolution in agricultural sector has enhanced the crop productivities and commendable progress in the industrial front has increased the quantum of manufactured goods but there is no indication that these achievements have been able to reduce substantially the level of regional disparities in terms of socio-economic development. For focussing the attention of scientists, planners, policy makers and administrators on the problems of estimation of level of development, a seminar was organized jointly by Planning Commission, Government of India and State Planning Institute, Government of Uttar Pradesh during April 1982. Realizing the seriousness and importance of estimation of level of development, the Indian Society of Agricultural Statistics conducted a series of research studies in this direction.

The present study is conducted in the State of Andhra Pradesh where the district level data on socio-

economic variables for the year 2001-02 are analyzed for estimating the level of development.

### **2. DEVELOPMENTAL INDICATORS**

Development is a multidimensional process and its impact cannot be fully captured by a single indicator. A number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of reality. Hence, there is a need for building up of a composite index of development based on optimum combination of all the indicators. Each district faces situational factors of development unique to it as well as common administrative and financial factors. Developmental indicators common to all the districts have been included in the analysis. Composite indices of development have been obtained for different districts by using the data on the following developmental indicators.

01. Percentage forest area
02. Percentage net area sown
03. Percentage of net area sown more than once
04. Percentage area irrigated
05. Fertilizer consumption (kg/ha)

06. Cropping intensity
07. Yield rate of rice (kg/ha)
08. Yield rate of groundnut
09. Yield rate of sugarcane
10. Yield rate of cotton
11. Yield rate of chillies
12. Yield rate of total foodgrains
13. Per capita area of operational holdings
14. Number of cattle (per lakh population)
15. Number of buffaloe (per lakh population)
16. Number of sheep (per lakh population)
17. Number of goat (per lakh population)
18. Number of poultry (per lakh population)
19. Production of milk (per lakh population)
20. Production of eggs (per lakh population)
21. Production of meat (per lakh population)
22. Hand operated implements ('000 no.) (per lakh population)
23. Animal operated implements ('000 no.) (per lakh population)
24. Percentage of cultivators
25. Percentage of agricultural labourers
26. Work participation rate
27. Percentage of workers engaged in the non-agricultural activities
28. Percentage of SC population
29. Percentage of ST population
30. Decennial growth rate of population (1991-2001)
31. Sex ratio
32. Population density (No. of persons per square km. of area)
33. Rural literacy rate
34. Total literacy rate (rural + urban)
35. Number of primary schools (per lakh population)
36. Teacher-pupil ratio
37. Drop out rates (Class I-V)
38. Percentage of urban population
39. Annual birth rate
40. Annual death rate
41. Number of PHC and medical dispensaries (per lakh population)
42. Number of doctors (per lakh population)
43. Number of factories (per lakh population)
44. Number of post offices (per lakh population)
45. Road length (per 1000 sq.km. of area)
46. Average population per bank (in '000)
47. Credit/Deposit ratio
48. Number of beneficiaries under WSHP (per lakh population)
49. GDP at current prices
50. GDP at constant prices

A total of 50 developmental indicators have been included in the analysis. These indicators may not form an all inclusive list but these are the major interacting components of development.

### 3. METHOD OF ANALYSIS

There are several statistical methods which are used for estimating the level of development but most of these methods are having their own limitations. The major limitation arises from the assumptions made about the developmental indicators themselves and their weightage in aggregate index. Keeping in view the limitations of different methods in estimating the level of development, the following statistical procedures are used in this study. Variables for different developmental indicators are taken from different population distributions and these are recorded in different units of measurement. The values of the variables are not quite suitable for combined analysis. Hence, the variables are transformed for the combined analysis as given below.

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

For combined analysis  $[X_{ij}]$  is transformed to  $[Z_{ij}]$  as follows:

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

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

$s_j$  = standard deviation of  $j^{\text{th}}$  indicator

$[Z_{ij}]$  is the matrix of standardized indicators.

From  $[Z_{ij}]$ , identify the best value of each indicator. Let it be denoted as  $Z_{oj}$ . 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  $i^{\text{th}}$  district, first calculate  $P_{ij}$  as follows:

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

Pattern of Development is given by

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

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

Composite index of development is given by

$$D_i = C_i / C$$

where

$$C = \bar{C} + 3S_{D_i}$$

$\bar{C}$  = Mean of  $C_i$

$S_{D_i}$  = Standard Deviation of  $C_i$

Smaller value of  $D_i$  will indicate high level of development and higher value of  $D_i$  will indicate low level of development.

For identifying the model districts for low developed districts, the distance between different pairs of districts based on all the indicators is calculated.

The distance between two districts  $i$  and  $p$  is given by  $d_{ip}$  where

$$d_{ip} = \left[ \sum_{j=1}^k (Z_{ij} - Z_{pj})^2 \right]^{1/2}$$

$i = 1, 2, \dots, n$  and  $p = 1, 2, \dots, n$

Here  $d_{ii} = 0$  and  $d_{ip} = d_{pi}$

Now  $d_{ip}$  can be written as

$$d_{ip} = \begin{bmatrix} 0 & d_{12} & \square & d_{1n} \\ d_{21} & 0 & \square & d_{2n} \\ \square & \square & \square & \square \\ d_{n1} & d_{n2} & \square & 0 \end{bmatrix}$$

From the above distance matrix, find out the minimum distance for each row. Let the minimum distance for row  $i$  is given by  $d_i$ .

Obtain the Critical Distance (CD) as follows :

$$CD = \bar{d} + 2S_d$$

where  $\bar{d}$  = Mean of  $d_i$

and  $S_d$  = Standard Deviation of  $d_i$

Model districts will be identified as follows:

Model districts for district A will be those districts whose composite index of development is less than that of district A and the developmental distance of these districts from district A is less than or equal to Critical Distance (CD). Thus, model districts will be better developed in comparison to district A.

The best value of each developmental indicator of the model districts will be taken up as the potential target of that indicator for district A.

The advantages and disadvantages of composite index of development are as follows:

### Advantages

- It can summarize complex or multi-dimensional issues.
- It is easier to interpret.
- It facilitates the task of ranking states/districts/regions etc. on complex issues.
- It can assess the progress of different regions over time.
- It reduces the size of a set of indicators or includes more information within the existing size limit.
- It places performance and progress of different regions at the centre of policy arena.
- It facilitates communication with general public (citizen, media etc.) and promotes accountability.

### Disadvantages

- It may send misleading policy messages if it is poorly constructed.
- It may invite simplistic policy conclusions which may not be possible for adoption.
- It may be misused.
- The selection of indicators and weights for aggregating the composite index can change the final conclusions.
- It may lead to inappropriate conclusions if indicators that are difficult to measure, are ignored.

## 4. RESULTS AND DISCUSSIONS

### 4.1 The Level of Development

The composite indices of development have been worked out for different districts for agricultural sector,

infrastructural facilities and overall socio-economic sector. The districts have been ranked on the basis of developmental indices. The composite indices of development along with the rank of the districts are given in Table 1.

In case of agricultural sector, Guntur was found to be the best developed district in the State whereas the district of Ranga Reddy was on the last place. The composite indices of development varied from 0.60 to 0.87. In case of infrastructural facilities, the district of West Godavari was on the first position and the district of Ranga Reddy was on the last position. The composite indices varied from 0.60 to 1.00. As regards overall socio-economic development, the district of West Godavari was on the first place and the district of Ranga Reddy was on the last place. The composite indices varied from 0.61 to 0.99. Four most developed districts are found to be West Godavari, Karimnagar, East

**Table 1.** Composite Indices of Development (CI) and Rank of District

S.No.	District	Agricultural Sector		Infrastructural Facilities		Socio-economic Sector	
		C.I.	Rank	C.I.	Rank	C.I.	Rank
1	Srikakulam	0.73	11	0.65	6	0.68	7
2	Vizianagaram	0.76	14	0.67	8	0.71	9
3	Visakhapatnam	0.87	21	0.72	12	0.78	18
4	East Godavari	0.65	5	0.64	5	0.66	3
5	West Godavari	0.61	2	0.60	1	0.61	1
6	Krishna	0.64	4	0.75	16	0.73	11
7	Guntur	0.60	1	0.68	10	0.68	6
8	Prakasam	0.71	10	0.75	17	0.75	14
9	Nellore	0.68	6	0.65	7	0.67	5
10	Chittoor	0.77	15	0.63	3	0.69	8
11	Cuddapah	0.80	16	0.73	13	0.77	16
12	Anantpur	0.83	17	0.82	20	0.84	20
13	Kurnool	0.83	18	0.81	19	0.83	19
14	Mahboobnagar	0.84	19	0.86	21	0.87	21
15	Ranga Reddy	0.87	22	1.00	22	0.99	22
16	Medak	0.76	13	0.68	9	0.72	10
17	Nizamabad	0.69	9	0.64	4	0.67	4
18	Adilabad	0.86	20	0.70	11	0.76	15
19	Karimnagar	0.64	3	0.61	2	0.63	2
20	Warangal	0.73	12	0.77	18	0.77	17
21	Khammam	0.69	7	0.74	15	0.74	13
22	Nalgonda	0.69	8	0.74	14	0.74	12

Godavari and Nizamabad and four least developed districts are Ranga Reddy, Mahboobnagar, Anantpur and Kurnool. During 1991-92, four most developed districts were found to be East Godavari, West Godavari, Guntur and Krishna. The districts of Guntur and Krishna have gone down in the relative ranking within a period of 10 years from 1991-92 to 2001-02 mostly due to shortfall in the infrastructural facilities. The districts of Ranga Reddy, Anantpur, Mahboobnagar and Nalgonda were found to be low developed during 1991-92. Most of these districts are still found to be among the low developed districts of the State.

#### 4.2 Different Stages of Development

For classificatory purposes, a simple ranking of the districts on the basis of composite index of development is sufficient. However, a more meaningful characterization of different stages of development would be in terms of suitable fractile classification from the assumed distribution of the mean of the composite indices. For relative comparison, it appears quite valid to assume that the districts having the composite indices less than or equal to (Mean – SD) are in high developed category, the districts having the composite indices in between (Mean – SD) to (Mean) are in high middle level category, the districts having composite indices in between (Mean) to (Mean + SD) are in low middle level developed category and the districts having the composite indices greater than or equal to (Mean +SD) are in low level developed category.

On the basis of above classifications, the districts are put in four stages of development as high, high middle, low middle and low. Table 2 presents the number of districts along with the percentages of area and population lying in different stages of development.

It is observed from the table that in agricultural sector, five districts are in high developed category. These districts cover about 18 per cent area and 29 per cent population of the State. Seven districts having about 32 per cent area and 27 per cent population of the State are lying in high middle developed category. Six districts are found in low middle developed category. These districts are having about 30 per cent area and 26 per cent population of the State. Four districts covering about 19 per cent area and 19 per cent population of the State are lying in low developed category. Immediate actions are required to be taken in these districts for enhancing agricultural development.

Infrastructural facilities are quite important and these are extremely essential for enhancement of level

**Table 2.** Number of Districts, Percentages of Area and Population lying under Different Stages of Development

Stage of Development	Number of Districts	Area (%)	Population (%)
Agricultural Development			
High	5	18.3	28.7
High Middle	7	31.9	27.3
Low Middle	6	30.4	25.5
Low	4	19.4	18.5
Infrastructural Facilities			
High	5	19.5	25.2
High Middle	8	32.5	32.5
Low Middle	7	38.6	32.5
Low	2	9.4	9.8
Socio-economic Development			
High	3	11.0	16.8
High Middle	10	39.5	42.2
Low Middle	5	26.6	21.0
Low	4	22.9	20.0

of development of different sectors of the economy. Five districts of the State are found to have high category of these facilities. These districts cover about 20 per cent area and 25 per cent population of the State. Eight districts covering about 33 per cent area and 33 per cent population of the State are lying in high middle developed category. Seven districts are found in low middle developed category. These districts are having about 39 per cent area and 33 per cent population. Two districts having about 9 per cent area and 10 per cent population are found in low developed category. Immediate improvements in infrastructural facilities are needed in these districts.

With regard to socio-economic development, three districts having about 11 per cent area and 17 per cent population of the State are found to be in high developed category. Ten districts are found to be in high middle developed category. The districts cover about 40 per cent area and 42 per cent population of the State. Five districts having about 27 per cent area and 21 per cent population of the State are found in low middle developed category. Four districts are observed to be in low developed category. These districts are having about 23 per cent

area and 20 per cent population of the State. Population density in the high developed area is generally higher than that in low developed area.

The districts of East Godavari, West Godavari and Karimnagar are found to be in high developed category in agricultural sector, infrastructural facilities and socio-economic sector whereas the districts of Mahboobnagar and Ranga Reddy are in low developed category in all these sectors.

### 4.3 Inter-relationship among Different Sectors of Economy

For proper development and better level of living, it is essential that all the sectors of economy should flourish together. System of education envisages all round development of manpower and human resources required for socio-economic activities. The correlation coefficients between development of different sectors of economy are given in Table 3.

It is observed from Table 3 that the correlation coefficients between the development of infrastructural facilities; and agricultural and socio-economic developments are positive and highly significant which indicates that the infrastructural facilities influence both agricultural development and socio-economic development in the positive direction. In the same way, the correlation coefficient between agricultural development and overall socio-economic development is found to be positive and highly significant. Therefore, the level of development in agricultural sector influences the level of development in overall socio-economic

**Table 3.** Correlation Coefficients

Factors	Agricultural Development ( $D_1$ )	Infrastructural Facilities ( $D_2$ )	Socio-economic Development ( $D_3$ )
Agricultural Development ( $D_1$ )	1	0.607**	0.775**
Infrastructural Facilities ( $D_2$ )		1	0.973**
Socio-economic Development ( $D_3$ )			1

\*\* Correlation coefficient is significant at 0.01 probability level.

sector in the positive direction. The development in overall socio-economic sector depends on both agricultural development and availability of infrastructural facilities.

### 4.4 Potential Targets of Developmental Indicators for Low Developed Districts

It is quite useful and important to examine the extent of improvements needed in different developmental indicators for enhancing the level of development of low developed districts. This will help the planners and administrators to readjust the resources for bringing about uniform regional development. For estimation of potential targets of developmental indicators, it is essential to identify the model districts for low developed districts. In case of overall socio-economic development, four districts namely Anantpur, Kurnool, Mahboobnagar and Ranga Reddy are found to be low developed. Model districts for each of these districts are identified on the basis of composite index of development and distance between these districts with their model districts and are presented in Table 4.

Model districts are better developed in comparison to low developed districts. The districts of Chittoor, Nizamabad, Nellore and Nalgonda are found to be the model districts for all the four low developed districts of the State. The best values of the developmental indicators of model districts are taken as potential targets of low developed districts. The present values of developmental indicators along with the potential targets for the low developed districts are presented in Table 5.

Potential targets are quite high in comparison with the present achievements for most of the indicators. Suitable actions are required for achieving the potential

**Table 4.** Model Districts for Low Developed Districts

S.No.	Low Developed Districts	Model Districts
1	Anantpur	Chittoor, Vizianagaram, Nizamabad, Nellore, Nalgonda
2	Kurnool	Chittoor, Nellore, Nalgonda, Nizamabad
3	Mahboobnagar	Chittoor, Nellore, Nizamabad, Karimnagar, Nalgonda
4	Ranga Reddy	Chittoor, Vizianagaram, Nizamabad, Nalgonda, Nellore

targets. The broad suggestions for improving the level of development of low developed districts are given below:

### Anantpur District

This district is low developed in overall socio-economic development. Irrigation facilities are required to be created in the district and the cultivators should be encouraged to enhance the application of fertilizers. Productivity levels of various crops are quite low. Action is needed to enhance yield rates of different crops by use of irrigation and fertilizers. In some parts of the district due to non-availability of sufficient irrigation facilities, improved dry land farming system should be advocated among the cultivators. Farmers should be motivated for rearing cattle and buffalo. Road transport,

communication system, educational and medical facilities etc. are required for improvements in the district. Immediate actions should be taken for improving these infrastructural facilities.

### Kurnool District

This district is low developed in overall socio-economic development. Irrigation facilities should be enhanced in the district. High yielding dryland farming practices should be advocated among the cultivators. The level of crop productivities is small and it requires improvement by use of irrigation and fertilizers. Farmers should be encouraged to adopt improved animal husbandry practices. Literacy rate is quite low in the district. Suitable actions are required for enhancing the literacy rate and also for improvement in road transport

**Table 5.** Present Value of Developmental Indicators of Low Developed Districts along with Potential Target

S.No.	Developmental Indicators	Low Developed Districts				Potential Target
		Anantpur	Kurnool	Mahboob-nagar	Ranga Reddy	
01	Net area sown (%)	54.7	46.5	44.6	37.1	54.7
02	Area irrigated (%)	13.2	18.2	18.1	23.8	65.8
03	Fertilizer consumption (kg/ha)	30.9	74.1	38.7	161.4	171.4
04	Cropping intensity	0.96	1.11	1.10	1.08	1.48
05	Yield rate of rice	2881	2694	2389	2656	3354
06	Yield rate of groundnut	467	1046	897	1100	2298
07	Yield rate of sugarcane	86673	86979	00	83448	88322
08	Yield rate of cotton	170	178	207	263	279
09	Yield rate of foodgrains	1701	1468	1115	1271	2787
10	No. of cattle (per lakh population)	18.6	15.7	25.5	8.8	30.2
11	No. of buffalo (per lakh population)	8.8	11.9	10.1	5.6	23.3
12	Production of milk (per lakh population)	5.6	6.0	5.3	2.4	14.4
13	Animal operated implements (000 no.) (per lakh population)	16.5	20.4	22.5	6.4	22.5
14	Work participation rate	48.9	49.5	51.8	39.9	52.2
15	Workers in non-agricultural activities (%)	32.3	31.6	26.6	59.8	59.8
16	Total literacy rate	57	54	46	68	74
17	No. of primary school (per lakh population)	88	59	71	49	115
18	No. of doctors (per lakh population)	12.3	16.9	7.5	6.3	17.5
19	No. of factories (per lakh population)	15	23	8	42	42
20	No. of PO (per lakh population)	26	29	24	12	32
21	Road length (per '000 sq.km of area)	34	25	45	46	58
22	No. of beneficiaries under WSHP (per lakh population)	56	46	54	35	76
23	GDP at current prices	165	162	129	205	251
24	GDP at constant prices	107	100	80	132	137

and communication systems. Educational and medical facilities should be enhanced in the district.

### **Mahboobnagar District**

The district is found to be in low developed category in agricultural sector, infrastructural facilities and overall socio-economic field. Improvements are required to be made in the field of irrigation facilities and applications of fertilizers. Action should be taken to popularize the improved animal husbandry practices. Literacy rate is quite low in the district. Suitable actions should be taken for enhancing the literacy rate and also to improve the road transport, communication systems, medical and educational facilities in the district.

### **Ranga Reddy District**

This district is found to be in low developed category in agricultural sector, infrastructural facilities and overall socio-economic sector. High percentages of labour force are engaged in non-agricultural activities. In agricultural sector, as far as possible irrigation facilities should be created. In non-irrigated areas, improved dry land farming system should be adopted. Improved animal husbandry practices should be adopted in the district. The present literacy rate is satisfactory but it needs continuous improvement. Actions should be taken to enhance the facilities for road transport and communication systems. Educational and medical facilities also need improvement in the district.

## **5. CONCLUSIONS**

The broad conclusions emerging from the study are as follows:

- (i) With respect to socio-economic development, the district of East Godavari, West Godavari and Karimnagar are found to be better developed in comparison to other districts of the State. The districts of Anantpur, Kurnool, Mahboobnagar and Ranga Reddy are found to be low developed. Coastal districts are generally found to be better developed.
- (ii) In agricultural sector, five districts namely East Godavari, West Godavari, Krishna, Guntur and Karimnagar are better developed as compared to other districts. Visakhapatnam, Mahboobnagar, Ranga Reddy and Adilabad districts are low developed.

- (iii) Infrastructural facilities in respect of road transport, communication system, availability of educational and medical facilities are found to be better in the districts of East Godavari, West Godavari, Chittoor, Nizamabad and Karimnagar. These facilities are poor in the districts of Mahboobnagar and Ranga Reddy.
- (iv) Infrastructural facilities are found to be very highly associated with both agricultural development and socio-economic development. Agricultural development is found to be positively influencing the overall socio-economic development in the State.
- (v) Wide disparities in the level of development have been observed in different districts.
- (vi) For enhancing the level of development of low developed districts, model districts have been identified and potential targets of important developmental indicators have been estimated.
- (vii) It would be better to examine and evaluate the level of development at smaller level (say tehsil, taluka or block level) for making location specific recommendations for improvement of level of development.

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