J. Ind. Soc. Agril. Statist.
61(2), 2007 : 216-226

Statistical Evaluation of Social Development at District Level

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SUMMARY

Special programmes of socio-economic development have been launched in the country for improving the quality of life of people. The level of socio-economic development was estimated for different districts in the States of Andhra Pradesh, Assam, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh (including Chhattisgarh), Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh (including Uttaranchal) from the period 1991 to 2005. The status of development in agriculture sector and infrastructural facilities was evaluated for different districts. The evaluation of industrial development was also undertaken in some of the states. About 282 districts belonging to these states were covered in the study. The status of development had been worked out on the basis of a number of developmental indicators. The level of development was estimated with the help of composite index based on optimum combination of all the developmental indicators. The districts falling in different stages of development such as high level developed, middle level developed and low level developed have been identified for all the states covered in the study. Association among the levels of development in agricultural sector and overall socio-economic sector had been worked out. For enhancing the level of development of low developed districts, model districts had been identified and potential targets of important developmental indicators had been estimated.

Key words: Developmental indicators, Composite Index, Socio-economic development.

1. INTRODUCTION

Developmental programmes have been taken up in the country in a planned way through various Five Year Plans with the main objective of enhancing the quality of life of people by providing the basic necessities as well as improving their social and economic well-being. The green revolution in agricultural sector and commendable progress in industrial front have certainly increased the total production in agriculture and manufactured goods, but there is no indication that these activities have been able to reduce substantially the level of regional disparities in terms of development. For focusing 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 the problem of estimation of level of development, the Indian Society of Agricultural Statistics conducted a series of research investigations in this direction. The level of socio-economic development was estimated for different states for the year 1971-72 and 1981-82 by Narain *et al.* (1991). The study revealed that there were wide disparities in the level of development among different states. For making deeper analysis on the estimation of level of development, the data mostly pertaining to the year 1991-92 were analyzed at the district level. Studies regarding evaluation of status of development at district level have so far been completed for the states of Orissa (Narain *et al.* 1992, 1993, 2005), Andhra Pradesh (Narain *et al.* 1994), Kerala (Narain *et al.* 1994, 2005), Uttar Pradesh (Narain *et al.* 1995, 2001), Maharashtra (Narain *et al.* 1996), Karnataka (Narain *et al.* 1997, 2003), Tamil Nadu, (Narain *et al.* 2000), States of Southern Region (Narain

This paper was presented by Dr. V.K. Bhatia during the International Conference on Statistics and Informatics in Agricultural Research held during 27-30 December, 2006 at New Delhi on the occasion of the Diamond Jubilee Celebration of the Indian Society of Agricultural Statistics, New Delhi.

et al. 1999), Madhya Pradesh (Narain *et al.* 2003), Assam (Rai and Bhatia 2004), Hilly States (Narain *et al.* 2004), Jammu & Kashmir (Narain *et al.* 2005). It was found that entire parts of the low developed districts are not backward but there are some parts which are also better developed. The results obtained in these studies are reviewed and summarized in the present investigation.

2. DEVELOPMENTAL INDICATORS

Social development is not pre-determined but it is a continuous process of improvement of level of living. The level of development cannot be fully estimated by a single indicator. Moreover, a number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of reality and thus need to be analysed together. Districts have been taken as the unit of analysis. A total of 282 districts belonging to the states of Andhra Pradesh, Assam, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh (including Chhattisgarh), Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh (including Uttaranchal) have been included in the study. It would be quite useful to measure the level of development at district level, since there has been a growing consensus about the need of district level planning in the country. Knowledge of level of development at district level will help in identifying where a given district stands in relation to others. Each district faces situational factors of development unique to it as well as common administrative and financial factors. The developmental indicators common to all the districts in a State have been included in the study. Some of the developmental indicators used for estimation of level of development are given in Appendix-I.

3. METHOD OF ANALYSIS

Development is a multi-dimensional process which is continuous in nature. There are several methods for estimating the level of development but most of them are having their own limitations. The major limitation arises from the assumptions made about the developmental indicators themselves and their weightage in aggregate index. Limitations of some of the methods for combining the effect of various indicators are presented here.

3.1 Limitations of Old Methods

3.1.1 Principal Component Analysis

Mostly 'factor analysis' approach is used. The method is generally based on restrictive assumptions regarding the developmental indicators. It assumes that the variable indicators are linearly related. When non-linearity is present, the component analysis is not appropriate. Further, one cannot assign any special meaning to the transformed variables with respect to socio-economic development. They are artificial orthogonal variables not directly identifiable with a particular economic situation.

3.1.2 Multiple Factor Analysis

The main advantage of this method is that the 'factor loading' can be used as weights for combining the effect of various indicators. This method avoids, to some extent the arbitrariness in choosing weights but it does not serve the purpose to arrive at a meaningful and comparable composite index of development when the indicators are presented in different scale of measurements.

3.1.3 Aggregation Method

Simple addition of the values of the developmental indicators is taken as composite index of development. The method is not suitable as the composite index of development obtained by use of the method depends on the unit in which the data are recorded.

3.1.4 Monetary Index

Developmental indicators are converted into monetary values and total of these values is taken as the composite index of development. Monetary values of developmental indicators may change from place to place and from time to time. In this way this method affects the composite index adversely. One more difficulty may also come in this method because all the indicators cannot be converted into monetary values. Indicators like 'death rate', 'birth rate', 'sex ratio', literacy rate' etc. cannot be converted into monetary values.

3.1.5 Ratio Index

Developmental Indicators are transformed as ratio in the following manner

$$Y_i = \frac{X_{(max)} - X_i}{X_{(max)} - X_{(min)}}$$

Sum total of Y_i is taken as the Composite Index of Development.

The method uses Range Value in the denominator, which is based on only two observations. Other information is not utilized in this method.

3.1.6 Ranking Method

Each unit is allotted ranks based on different developmental indicators. Sum of ranks for all the indicators of the unit is taken as the composite index of development. Ranking procedure does not take into account the magnitude of differences between indicators and units.

3.2 Proposed Method of Estimation of Composite Index of Development

Keeping in view the limitations of the above methods, the following statistical procedure for estimation of composite index of development is adopted in the study.

Let $[X_{ij}]$ be the data matrix.

$i = 1, 2, ..., n$ (Number of area unit)

$j = 1, 2, ..., k$ (Number of indicators)

Since $[X_{ij}]$ come from different population distributions and they might be recorded in different units of measurement, they are not quite suitable for simple addition for obtaining the composite index. Therefore, $[X_{ij}]$ are transformed to $[Z_{ij}]$ as follows.

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

where

$\bar{X}_j$ = mean of the jth indicator

S_j = standard deviation of the jth indicator

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

From $[Z_{ij}]$, identify the best value of each indicator. Let it be denoted by Z_{oj}. The best value will be either the maximum value or 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, calculate P_{ij} as follows.

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

Pattern of development C_i is given as

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

where $(C.V.)_j$ is the coefficient of variation of the jth indicator in X_{ij}.

Composite Index D_i is given by

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

where

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

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

S_{Di} = 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.

The distance between districts i & p is given by d_{ip}, where

$$d_{ip} = \left[\sum_{j=1}^{k} (z_{ij} - z_{pj})^2\right]^{1/2} \quad i = 1, 2, ..., n;\ p = 1, 2, ..., n$$

Here

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

Now d_{ip} can be written as

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

Find out the minimum distance for each row. Let the minimum distance for row i is d_i.

Obtain the critical distance (C.D.) as follows

$$C.D. = \bar{d} + 2\ sd$$

where

$\bar{d}$ = mean of d_i and

sd = standard deviation of d_i

Model districts will be identified as follows:

"Model Districts with respect to District 'A' will be those districts whose composite index is less than that of District 'A' and whose developmental distance from

Table 1. Number of developmental indicators used and estimation of best developed districts

States	No. of Districts	No. of Developmental Indicators	Year of Study	Best Developed District	
				Agr. Dev.	S.E. Dev.
Andhra Pradesh	22	30	1999	Guntur	West Godavari
Assam	23	48	2004	Nagaon	Sonitpur
J & K	14	29	2005	Kathua	Kathua
Karnataka	20	30	1999	Shimoga	Mysore
Kerala	14	30	1999	Alappuzha	Thrissur
Madhya Pradesh	45	47	2002	Hoshangabad	Raisen
Maharashtra	29	43	1996	Chandrapur	Pune
Orissa	30	29	2005	Bargarh	Bargarh
Tamil Nadu	22	30	1999	Madurai	Tiruneveli Kattabomman
Uttar Pradesh	63	38	1995	Bulandshahar	Ghaziabad

District 'A' is less than or equal to Critical Distance (C.D.). Thus Model Districts will be better developed as compared to District 'A'.

The best value of each developmental indicator of the model districts will be the potential target for District 'A'.

For classificatory purposes, a simple ranking of the district indices will suffice. 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 composite indices. For relative comparison, it appears to assume that the districts having the composite index ≤ (Mean – SD) are leveled as high developed, districts having the composite index in between (Mean ± SD) are middle level developed and districts having composite index > (Mean + SD) are low level developed.

The quality framework for composite indices is given in the Appendix-II.

4. RESULTS AND DISCUSSION

The composite indices of development in respect of agricultural, infrastructural and socio-economic sectors have been calculated for 282 districts belonging to the states given in Table 1. It would be of interest to examine the level of development separately for different states.

Andhra Pradesh

Twenty two districts and thirty developmental indicators important for the State were included in the study. The district of Guntur was found to occupy the first place in agricultural development whereas the district of West Godavari was on the first position in respect of overall socio-economic development. The composite indices varied from 0.47 to 0.87 in agricultural sector and from 0.61 to 0.89 in socio-economic field. An important aspect of the study was to find out the number of districts falling under different stages of development. In agricultural sector, out of 22 districts, seven districts were better developed in comparison to other districts of the State. Ten districts were medium level developed and five districts were low level developed. In case of socio-economic development, four districts were high level developed, nine districts were in the category of middle level and remaining nine districts belonged to the low level developed category. Most of the low developed districts belonged to Telangana region of the State and literacy rate in these districts particularly among the rural population was very poor. The developmental indicators like productivity of crops, population growth, credit facilities, transport system etc. required improvement in the low developed districts. The districts of Guntur, Nellore, Chittoor and Nizamabad were found to be model districts for most of the low developed districts. The correlation coefficients between the agricultural development and socio-economic development as well as between infrastructural facilities and socio-economic development were quite high and statistically highly significant. Both agricultural development and

infrastructural facilities were influencing the socio-economic development in the positive direction.

Assam

Twenty three districts of the State and forty eight developmental indicators were included in the study. In agricultural development, the district of Nagaon was found to be on the first place in the State. The composite index of development varied from 0.46 to 0.97. In overall socio-economic development, the district of Sonitpur occupied the first position and the composite indices varied from 0.72 to 0.99. Both in agricultural and socio-economic developments, three districts were found to be highly developed, seventeen districts were middle level developed and three districts were low level developed. Agricultural development and infrastructural facilities were highly associated with overall socio-economic development. The districts of N.C. Hills, Hailakandi and Tinsukia were low developed in overall socio-economic development. These districts were also found to be low developed in agricultural development. The districts of Karimganj, Golaghat, Barpeta and Morigaon were found to be model districts for the low developed districts. For enhancing the level of development of low developed districts, large improvements were required in the developmental indicators pertaining to agricultural sector and infrastructural facilities.

Jammu & Kashmir

Composite indices of development based on 29 developmental indicators important for the State were obtained for all the fourteen districts of the State. The district of Kathua was ranked first in respect of agricultural development and the composite indices varied from 0.72 to 0.95. In socio-economic development also the district of Kathua occupied the first position in the State. The composite indices varied from 0.55 to 0.89. In case of agricultural development, three districts were high level developed, nine districts were middle level developed and the remaining two districts were low level developed. In socio-economic development, two districts were high level developed, ten districts were middle level developed and two districts were low level developed. The district of Kupwara and Kargil were found to be low developed in socio-economic sector because of poor infrastructural facilities. Literacy rates in these districts were very low and it should be improved. Infrastructural facilities were found to influence the socio-economic development in the positive direction.

Karnataka

Twenty districts of the State and thirty important developmental indicators were included in the study. In agricultural development, the district of Shimoga was ranked first and the composite indices varied from 0.44 to 0.79. In case of socio-economic development, the district of Mysore occupied the first position in the State and the composite indices varied from 0.62 to 0.90. In agricultural development, twelve districts of the State were high level developed and the rest eight districts were middle level developed whereas in socio-economic development four districts were high level developed, ten districts were middle level developed and the remaining six districts were low level developed. The districts of Shimoga, Mysore and Kolar were found to be the model districts for low developed districts. Literacy rate in the low developed districts was poor which should be improved. Livestock production in the low developed districts was poor. Communication system and credit facilities should be improved in the low developed districts. Agricultural development and infrastructural facilities were found to be positively associated with socio-economic development.

Kerala

Fourteen districts of the State and 30 important developmental indicators were included in the study. The district of Alappuzha was ranked first in agricultural development and the composite indices varied from 0.62 to 0.94. In case of socio-economic development, the district of Thrissur occupied the first position in the State and the composite indices varied from 0.64 to 0.87. In case of agricultural development, four districts were in high level developed category, seven districts were in middle level developed and the remaining three districts were in low developed category. In overall socio-economic development, eleven districts were in high level developed category, one district was in middle level and the remaining two districts were low level developed category. The districts of Idukki and Wayanad were found

to be low developed. These districts required improvement in developmental indicators like credit facilities, transport system, agricultural development and livestock production. Agricultural development was found to be positively associated with overall socio-economic development. Infrastructural facilities were also influencing the socio-economic development in positive direction.

Madhya Pradesh

Forty five districts belonging to the states of Madhya Pradesh and Chhattisgarh and 47 important developmental indicators were included in the study. The district of Hoshangabad was ranked first in agricultural development. The composite indices varied from 0.59 to 0.91. In case of socio-economic development, the district of Raisen occupied the first place in the State and the composite indices varied from 0.67 to 0.92. In agricultural development, nine districts were categorized in the high level developed group, twenty eight districts were in middle level developed category and the remaining eight districts were in the low developed category. In socio-economic development, ten districts were in high level developed category, twenty seven districts were in middle level developed category and the remaining eight districts were in the category of low developed districts. Model districts for low developed districts were identified and the potential targets of important developmental indicators were estimated. The low developed districts required improvements of various dimensions in most of the developmental indicators. Positive association between agricultural development and overall socio-economic development was observed. Infrastructural facilities were also influencing the socio-economic development in the positive direction.

Maharashtra

Twenty nine districts of the State and 43 developmental indicators were included in the study. In agricultural development, the district of Chandrapur was ranked first. The composite indices varied from 0.74 to 0.97. In case of socio-economic development, the district of Pune occupied the first position in the State. The composite indices varied from 0.67 to 0.98. In agricultural development, fifteen districts were found to be in the high developed category. Twelve districts were in middle level developed category and two districts were low developed. With respect to overall socio-economic development, eight districts were in high level developed category, ten districts were in middle developed group and the remaining eleven districts were found to be low developed. Low developed districts cover about 36 per cent area and 27 per cent population of the State. These districts required improvement in almost all the important developmental indicators. Both agricultural development and infrastructural facilities were found to influence the overall socio-economic development in the positive direction.

Orissa

Thirty districts of the State and 29 developmental indicators were included in the analysis. The district of Bargarh was found to occupy the first rank both in agricultural and socio-economic development. In agricultural development, composite indices varied from 0.44 to 0.96 and in socio-economic development, they varied from 0.51 to 1.03. In agricultural sector, four districts were classified in high developed category, twenty three districts were in middle level developed category and the remaining three districts were in low developed group. In case of socio-economic development, three districts were found to be in high developed category, twenty two districts were in middle level developed category and the remaining five districts were in low developed group. The low developed districts covered the area of about 13 per cent and the population of about 19 per cent of the State. The districts of Bolangir, Kendrapara and Sonepur were identified as model districts for most of the low developed districts. Literacy rate in the low developed districts was found to be poor. Infrastructural facilities in respect of road transport and communication systems should be enhanced in the low developed districts. Developmental programmes suitable for small and marginal farmers and SC/ST communities should be undertaken in the less developed districts. Both agricultural development and infrastructural facilities were found to influence the socio-economic development in the positive direction.

Tamil Nadu

Twenty two districts of the State and 30 important developmental indicators were included in the study. The district of Madurai was ranked first in agricultural development and the composite indices varied from 0.60 to 0.98. In case of socio-economic development, the district of Tiruneveli Kattabomman was found to occupy the first position in the State. The composite indices varied from 0.60 to 0.84. In agricultural sector, seven districts were classified in high developed group, thirteen districts were in middle level developed and the remaining two districts were low developed. With respect to overall socio-economic development, three districts were high level developed, eighteen districts were middle level developed and one district was low level developed. Major improvements in agricultural development and infrastructural facilities were required in low developed district. Socio-economic development was positively affected by the agricultural development and infrastructural facilities.

Uttar Pradesh

Sixty three districts of the State and 38 developmental indicators were included in the analysis. Out of 63 districts, 19 districts came from Eastern region, 8 districts came from Hilly region, 5 districts came from Bundelkhand region, 21 districts came from Western region and 10 districts came from Central region of the State. In agricultural development, the district of Bulandshahar was ranked first and the composite indices varied from 0.65 to 0.99. In case of socio-economic development, the district of Ghaziabad was ranked first in the State and composite indices varied from 0.71 to 0.97. In agricultural sector, 28 districts were classified in high level developed category, 21 districts were in middle level and 14 districts were in low developed category. Out of 28 high level developed districts, 20 districts were from Western region, 5 districts were from Central region, 2 districts were from Eastern region and one district was from Hilly region. Out of 14 low developed districts, 4 districts were from Eastern region, 6 districts were from Hilly region, 3 districts were from Bundelkhand region and one district was from Central region. In case of socio-economic development, 6 districts were high level developed, 34 districts were middle level developed and 23 districts were low level developed. Thirteen districts from the Eastern region, four districts from Hilly region, three districts from Bundelkhand region and three districts from Central region were classified in low developed category. In most of the low developed districts, major improvements were required in enhancement of cropping intensity, proper use of fertilizers, increase in agricultural mandis, increase in milch animals and veterinary hospitals, flood protection measures, medical facilities and enhancement of level of literacy. At the district level, both agricultural development and infrastructural facilities were found to be associated with the socio-economic development in the positive direction.

Combined Analysis

The level of development of 282 districts belonging to the States of Andhra Pradesh, Assam, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh was estimated. The data were analyzed separately for different states. The number of districts falling in high, middle and low developed categories for different states is given in Table 2 separately for agricultural and socio-economic development. It may be seen from this table that in agricultural sector, out of 282 districts, 92 districts (33%) are high level developed and 42 districts (15%) are low level developed. The remaining 52% districts are middle level developed. In case of socio-economic development, 54 districts (19%) are high level developed, 70 districts (25%) are low level developed and 56% districts are middle level developed. For enhancing the level of development of low developed districts, potential targets of important developmental indicators were also estimated. At the aggregate level, correlation coefficient between agricultural development and socio-economic development was 0.67 which is statistically highly significant. This indicates that agricultural development is highly associated with socio-economic development in the positive direction in the States covered under the study. In almost all the states, infrastructural facilities were found to be positively associated with the socio-economic development.

Table 2. Number of districts falling under different stages of development

States	No. of Dis-tricts	Sector of Development	Districts in Difference Stages of Development					
			High		Medium		Low	
			No.	%age	No.	%age	No.	%age
Andhra Pradesh	22	Agriculture	07	32	10	45	05	23
		Socio-economic	04	18	09	41	09	41
Assam	23	Agriculture	03	13	17	74	03	13
		Socio-economic	03	13	17	74	03	13
J & K	14	Agriculture	03	21	09	65	02	14
		Socio-economic.	02	14	10	72	02	14
Karnataka	20	Agriculture	12	60	08	40	—	—
		Socio-economic	04	20	10	50	06	30
Kerala	14	Agriculture	04	29	07	50	03	21
		Socio-economic	11	79	01	7	02	14
Madhya Pradesh	45	Agriculture	09	20	28	62	08	18
		Socio-economic	10	22	27	60	08	18
Maharashtra	29	Agriculture	15	52	12	41	02	07
		Socio-economic	08	28	10	34	11	38
Orissa	30	Agriculture	04	13	23	77	03	10
		Socio-economic	03	10	22	73	05	17
Tamil Nadu	22	Agriculture	07	32	13	59	02	09
		Socio-economic	03	14	18	82	01	04
Uttar Pradesh	63	Agriculture	28	44	21	33	14	23
		Socio-economic	06	10	34	54	23	36
Total	282	Agriculture	92	33	148	52	42	15
		Socio-economic	54	19	158	56	70	25

CONCLUSIONS

The broad conclusions emerging from the study were as follows:

1. With respect to socio-economic development, about 19 per cent districts were found to be better developed in comparison with other districts. About 25 per cent districts were low developed.
2. The situation regarding the agricultural development is slightly different. About one-third districts were better developed and only 15 per cent districts were low developed.
3. The agricultural development and infrastructural facilities were found to be positively associated with the socio-economic development in almost all the states.
4. Wide disparities in the level of development among different districts were observed.
5. In order to reduce the disparities in development among different districts, potential targets of various important developmental indicators were estimated for low developed districts. These districts required improvements of various dimensions in different indicators for enhancing the level of development.
6. It would be useful to examine and evaluate the level of development at a lower level say tehsil or block level for making location specific recommendations as entire parts of low developed districts were not low developed but some parts were also better developed.

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Regional Dimensions of India's Economic Development. *Proceedings of Seminar held on April 22-24, 1982 sponsored by Planning Commission, Govt. of India and State Planning Institute, Govt. of U.P.*

Appendix-I : Developmental Indicators

1. Percentage forest area
2. Percentage area not available for cultivation
3. Percentage uncultivated land
4. Percentage net area sown
5. Area sown more than once
6. Area under HYV of paddy
7. Fertilizer consumption
8. Area irrigated
9. Irrigation potential created
10. Number of seedling planted under social forestry
11. Fish production
12. Number of cattle
13. Number of buffaloes
14. Number of sheep
15. Number of goats
16. Number of pigs
17. Area under silk worm
18. Production of silk worm
19. Number of trainees in handloom training centre
20. Production of cloth
21. Number of weavers engaged whole time
22. Distribution of registered factories
23. Number of small scale industries
24. Registered area under tea
25. Number of motor vehicles on road
26. Road length per '00 sq. km. of area
27. Number of employment exchange
28. Registration of employment exchange
29. Number of hospitals
30. Number of beds in hospitals
31. Immunization performance
32. Number of teachers in primary schools
33. Total literacy rate
34. Female literacy rate
35. Incidence of crime reported
36. Per capita gross domestic product
37. Total allocation for DRDA
38. Percentage of expenditure over total finance available
39. Number of habitations providing with drinking water
40. Flood affected area
41. Total value damaged due to flood
42. Sex ratio
43. Population density per sq. km.
44. Decadal growth rate of population (1991-2001)
45. Number of male workers
46. Number of female workers
47. Percentage of SC population
48. Percentage of ST population

These indicators may not form an all inclusive list but these are the major interacting components of socio-economic development.

Appendix-II

Quality Framework for Composite Indices

The determination of quality framework for composite indices is not an easy task. Quality depends on elementary data used to build up the composite indices and the quality of procedure used to do it. Quality is usually defined as 'fitness for use' in terms of users' need. In the past, quality was equated with accuracy. It is now generally felt that there are other important dimensions of quality. Even if data are accurate, they cannot be said to be of good quality if they are produced too late to be useful or if they cannot easily be accessed or if they appear to conflict with other data. Thus quality is viewed as a multi faceted concept. The basic data should be checked on the following aspects.

1. **Relevance**: Are the data what the user expects? It depends upon both the coverage of the required topics and the use of appropriate concepts.
2. **Accuracy**: Are the figures reliable? Accuracy is generally defined by the closeness between the values produced and the (unknown) true values.
3. **Comparability**: Are the data in all necessary respects comparable across the districts/states?
4. **Completeness**: Are the domains for which the data are available reflecting the needs expressed by the users?
5. **Coherence**: Are the data coherent with other data? The coherence of data products reflects the degree to which they are logically connected and mutually consistent.
6. **Timeliness and punctuality**: Does the user receive the data in time and according to prescribed date?
7. **Accessibility and clarity**: Are the data accessible and understandable? The accessibility of data reflect how readily the data can be located and accessed from the original sources.

In the case of estimates based on sample surveys, the major sources of error include coverage, sampling method, non-response, processing and problems in dissemination.

Both elements i.e. procurement of basic data and formulation of composite index are equally important. The application of the most advanced approaches to the development of composite indices based on inaccurate or incoherent data would not produce high quality results. Similarly, a composite index which combines very good basic data but uses poor procedures would produce unreliable and unstable results. Composite index is formed by combining individual indicators and it measures multi-dimensional concepts which can not be captured by a single indicator alone. The advantages and disadvantages of composite index 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.