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Pattern of Regional Disparities in Socio-economic Development in India: District Level Analysis

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Abstract The study assesses the pattern of disparities in socio-economic development at the district level in India applying the Wroclow Taxonomic technique (following Ewusi. Social Indicators Research 3(1) 75–110, 1976, and Arief. Social Indicators Research 11(3) 259–267, 1982) based upon optimal combination of selected socio-economic development indicators. In order to get a clear picture of regional socio-economic disparities in India, the level of development is assessed separately for agriculture, industrial and infrastructural sectors and the districts are classified into four development categories according to the values of the constructed development index. For bringing about uniform regional development and improving the quality-of-life, model districts for disadvantaged districts have been identified and potential targets for various social amenities have been estimated. An attempt has also been made to compare the levels of socio-economic development among various regions in India. The constructed socio-economic development index shows that India's Southern region is far more and symmetrically developed in comparison of Central and Northern regions. The results show that wide disparities in the level of socio-economic development exist among different districts within and between different regions of India. The level of development in infrastructural service sector is found to be positively and statistically significantly associated with the overall socio-economic development indicating that the growth and progress of the sectors have been going hand in hand in the country. The results show that in Northern and Central regions of India the level of industrial development does not significantly influence the agricultural and overall socio-economic development while agricultural development influences overall socio-economic development. The study suggests that low developed districts require improvement in most of the indicators for enhancing their levels of overall socio-economic development.

Keywords Regional socio-economic disparities · Developmental indicators · Model district · Potential targets · India

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1 Introduction

Socio-economic development is a multi-dimensional process which improves the quality-of-life of the people. It requires the satisfaction of economic, social, political and cultural rights, equitable distribution of development benefits and opportunities, dignified living environment, gender equality and empowerment of the poor and marginalised, i.e., "upward movement of the entire social system" as defined by Gunnar Myrdal (1972) in his pioneering work "The Asian Drama: An Inquiry into the Poverty of Nations". Black (1966) has appropriately conceptualized the development as the attainment of a number of ideals such as "a rise in productivity, social-economic equalization, modern knowledge, improved institutions and attitudes and a rationally co-ordinated system of policy measures that can remove the host of undesirable conditions in the social system that have perpetuated a state of underdevelopment". The development programmes have been taken up in India in a planned way through various Five-Years Plans with the main aim of attainment of higher standard of living for the general masses by providing basic necessities of life as well as effecting improvement in their social and economic well-being. A major objective of the development programmes lunched in India is to bring the balanced regional development. In order to achieve the goal, the economic planning in the country has traditionally been focused upon the need to provide special support to the disadvantaged areas. Although resource transfers are being executed in the underdeveloped regions through a number of instruments like subsidies and grants via a series of various programmes such as the Backward Regions Grant Fund (BRGF), Border Area Development Programme (BADP), Hill Area Development Programme (HADP), the Integrated Action Plan (IAP) for Left Wing Extremism (LWE) affected districts, Bharat Nirman, Sarva Shiksha Abhiyan and National Rural Health Mission, there is ample evidence that the regional disparities within the country in terms of socio-economic development are not reducing over time, which creates socio-economic exclusion for economically marginalized (e.g., Minocha 1983; Mathur 1983; Kurian 2000, 2007).

The theory of spatial polarization and the notion of 'growth poles', as formulated by Perroux (1955), imply that the free workings of market mechanisms in capitalist societies accentuate regional imbalances, so that rich regions get richer and poor ones poorer. In this way spatial polarization of development creates economic inequalities, which are accompanied by social inequalities. These represent a touch-paper for social tensions and conflicts and political instability. The theory of spatial polarization appears to have occupied a pivotal position in the Indian context as well. It is now well known that India has transformed its self from a low-income developing country to the middle-income developing country but persistently excluded groups remain outside the trajectory of its economic growth. As noticed by the Government of India (GoI) in *Economic Survey* (2012) that in making the development process inclusive, the challenge is to formulate policies and programmes to bridge regional socio-economic disparities in as effective and sustainable a manner as feasible. The identification of regional disparities at micro level and measuring regional growth patterns is an important factor affecting policy formulation. It has been emphasized by Planning Commission (2011) in the approach paper for India's 12th Five-Year Plan (2012–2017), with an appropriate title: "Faster, Sustainable and More Inclusive Growth" and dealt in great details in its Chapter 11: 'Social and Regional Equity', that the development of physical infrastructure coupled with opportunities for education and skill development can generate significant improvements in livelihood and incomes and result in better sharing of the fruits of economic growth with low developed areas.

Inclusive development, as envisioned in economic planning in India, incorporates the vital objective of reduction of inter-state, intra-regional and inter-section disparities. The information at the national or state level on overall socio-economic development offers no sufficient clue for effective human efforts because in India, the regions differ with respect to their needs and resource endowments (e.g., Dasgupta 1971; Choudhury 1992; Sarker 1994). In the Indian context, it is rightly argued by Wanmali and Islam (1995) that a study at the district level will be more useful to formulate district specific development policies. Since there has been a growing consensus about the need of district-level economic planning and policies formulation, it would be of interest to measure the level of socio-economic development at the district level.

From the relevant literature, it has been observed that there are some studies (e.g., Narain et al. 2003, 2009, 2012) which measure the level of socio-economic development at the district level for the states located in South parts of India. However, there is a dearth of in-depth analysis of socio-economic development for the states located in North parts of India and inter-regional comparison. Realizing the seriousness and importance of the problem of regional socio-economic disparities, the study measures and compares the levels of socio-economic development of different regions of India (i.e., North, South and Central parts of India) at the district level and classifies the districts based on the levels of their development. The main objective of the study is to measure the level of development in agriculture, industry, infrastructural facilities and overall socio-economic fields by constructing a composite index of development from the key parameters which have an intrinsic bearing on socio-economic development at the district level in India. The study appraises and ranks precisely the districts of the different regions of the country, according to their levels of socio-economic development. It is followed by throwing light on the association between different sectors of the economy. In this way by estimating the potential targets for various development indicators for the low developed districts, the study suggests the improvements needed in different indicators for enhancing the level of socio-economic development. It is hoped that the results of the study would be useful for regional planning in India.

The rest of the study is organised as follows. Section 2 briefly reviews the socio-economic development profile of Haryana, Madhya Pradesh and Kerala states. Some properties of good socio-economic development indicators are discussed in Sect. 3. The choices of socio-economic developmental indicators for ranking the districts are provided in Sect. 4. Section 5 reviews some of the techniques available for analysing socio-economic indicators. Section 6 gives justification for the use of Wroclow Taxonomic Technique for more detailed analysis. The empirical results are presented and discussed in Sect. 7. Section 8 summarizes the main findings and offers their policy implications.

2 Socio-Economic Development Profiles of Selected Regions of India

Keeping in view that a detailed analysis of the particular region's available resources and a set of inferences about the expected levels of development efficiency remain as indispensable instruments of successful regional development planning, we now briefly review the socio-economic development profiles of India's different regions selected for the study. These are: Haryana (North region), Madhya Pradesh (Central region), and Kerala (Southern region). These states are representatives of the different regions of India. These states are selected on the basis of their location and by satisfying data availability constraints at the district level.

2.1 Haryana

Haryana state is predominantly rural and agrarian. The advent of 'Green Revolution' and commendable progress of industrial front have certainly increased the state's total production in the farm sector and manufactured goods but there is no indication that these achievements have been able to reduce substantially the level of disparities in socio-economic development among different districts. If the large parts of the populations are left behind, even if only in relative terms, the viability of the sustainable development in the state may be threatened (World Bank 2006).

Presently, there are 21 districts in Haryana. The state total population is estimated at 253.53 lack with a density of 573 people per square km. The growth of population from 2001 to 2011 is of order of 19.9 %. Currently, the estimated annual birth rate of the state is 22.7 per thousand, and the crude death rate is 6.6. The progress of the state in reducing child mortality and improvement of maternal health is slow. For instance, the infant mortality rate has worsened from 69 per thousand in 1990 to 70 per thousand in 1994 before come down slightly to 51 per thousand in 2009–2010. The maternal mortality ratio (deaths per 100,000 live births) which improved slightly from 108.39 in 1990 to 105 in 1996–1997 has worsened to 136 in 1997–1998 and further to 186 during 2002–2004. During 2007–2009, the ratio has controlled slightly to 153 per lack live births, perhaps due to various healthcare facilities being provided free of cost to the pregnant women by the state government to promote institutional deliveries. Percentage of live births where the mothers received medical attention at delivery either at government hospitals or at private hospitals has improved from 55 for urban and 24.4 for rural areas in 2004–2005 to 77.1 for urban and 44.2 for rural areas in 2009–2010. Similarly, the proportion of deliveries attended by skilled personnel has improved from 31.5 % in 1992–1993 to 53.2 % in 2007–2008. As the proportion of births attended by skilled health personnel has been continuously increasing thereby reducing the chances of occurrence of maternal deaths.

The gender ratio of Haryana has improved from 819 in 2001 to 877 in 2011, an increase of 58 points. However, the situation is still worst in comparison to the all India average of 940. To improve the gender ratio at par with the national average a series of gender-sensitive policies for inspiring people and changing their mindset is urgently called for. The strict enforcement of Pre-Natal Diagnostic Techniques Act and creating a mass movement against female foeticide may give a new thrust to the save girl child programme. However, the life expectancy of female reported at 66.3 years, has outstripped that of male, 65.9 years. The number of estimated AIDS deaths has reduced from 994 in 2006–2007 to 973 in 2009-10 while the cumulative number of people living with HIV/AIDS has increased from 1,594 in 2009–2010 to 2368 in 2011–2012, 48.56 % increase within a time span of 2 years. Therefore, it is imperative that the present trend is arrested and preferably reversed. The extension of comprehensive correct knowledge of HIV/AIDS is highly desirable. Malaria incidence rate in the state has controlled from 1.79 % in 2006–2007 to 0.81 % in 2010–2011 and associated death rate has set to nil.

Haryana has been successful in getting children into primary school. The literacy rate at the state has improved from 57.2 % in 2001 to 76.64 % in 2011 and is slightly above the all India level of 74 %. Likewise, the pupil-teacher ratio at the high school level estimated at 26 is below the country at large, 30. However, the gross enrolment ratio of 6–13 years children is 83.4 % which is below the national average reported at 99.8 %. According to National Sample Survey (NSS) 66th round data, the unemployment rates (per 1000) in the state are 18 in rural areas and 25 in urban areas. The Poverty Headcount Ratio (percentage of population below the national poverty line) in rural and urban areas has declined from

40 and 24.2 % in 1993–1994 to 24.8 and 22.4 % in 2004–2005, respectively. The key social sector development programmes undertaken at the state include: (1) The Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), and (2) Indira Awas Yojana (IAY). The MNREGA aims at enhancing the livelihood security of people in rural areas by guaranteeing hundred days of wage-employment in a financial year to a rural household whose adult members volunteer to do unskilled manual work. The chief aim of IAY is "to provide assistance for construction/up-gradation of dwelling units to the Below Poverty Line (BPL) rural households, with special emphasis on vulnerable groups such as scheduled castes (SCs) and freed bonded labour categories".

For the social protection of non-working elderly the state has been successfully running social pension schemes which provide cash transfers to the elderly without requiring prior contributions or withdrawing from the labour force. In addition, there are social safety nets like social pension for special vulnerable groups: the disabled, widows, blind, deaf, handicapped and mentally retarded persons. These programmes are significant steps in improving the lives of Haryana's people—a life with access to adequate food and income, to basic education and health services, to clean water and sanitation, and to empowerment for women. For instance, the shares of SCs and women in employment under MNREGA during 2010–2011 are 48.93 and 35.62 %. The share of IAY in total houses constructed during 2010–2011 is 0.66 %.

The number of hospitals operating in Haryana has increased from 785 in 1966–1967 to 3,214 in 2009–2010. Similarly, the number of beds available in hospitals has gone up from 4,584 to 10,006 during the same period. The state percentage of households with access to improved sources of drinking water for urban and rural areas is 97.8 and 96.6 during 2008–2009 respectively. However, in case of percentage of households with access to improved sanitation the situation is worst, 86.8 and 53.7 during the same period and areas. To put an end to open defecation and ensured total sanitation in villages, the faster progress in the total sanitation campaign like the Nirmal Gram Puraskars and Nirmal Bharat is the need of the hour. The telephone density of the state population is 146 % for urban and 55 % for rural areas. Regarding developing global partnership for development, the state has more than 1,000 projects with foreign technical/financial collaboration. With regard to cooperation with the private sector, make available the efficiency of the private sector, Haryana has made substantial progress in recent years. Under a public–private partnership program, the special attention is being paid by the state government for improvement/extension of the basic infrastructure of power, road and transport.

With per capita income of Rs 94,680 during 2010–2011, Haryana occupies the 2nd position after Goa (state of West India) in the country. According to India's Human Development Report (2011), the Human Development Index (consisting of three dimensions of human development—consumption expenditure (as a proxy for income), education and health) for Haryana has slightly risen from 0.501 in 1999–2000 to 0.552 in 2008–2009 while the overall ranking of the state has slipped back from 7 to 9 out of 23 states during the same period (GoI 2011a). Gender disparity in primary and secondary education is set to disappear. In terms of gender parity index, it is observed that Haryana has already achieved the parity in favour of girls in the primary grade of education with the value of index stood at 1.07 in 2007–2008 and nearly on track in achieving the same for secondary grade of education, 0.95. Women's share in wage employment is yet to improve. Percentage share of females in wage employment in the non-agriculture sector has gone up from 10.3 in 2004–2005 to 13.4 in 2009–2010, but it is still below the national average of 18.6 during both periods.

The progress of the state in combating the incidence of crimes is unsatisfactory. The number of crimes which declined from 20,748 in 1967-67 to 18,935 in 1970 has again jumped up to 33,239 in 1980. After taking a dip in 1990 the crime incidence has been continued to rise, increased from 28,481 in 1990 to 38,782 in 2000, 42,690 in 2005 and further to 56,257 in 2009. Among districts, the situation is worst in Gurgaon which accounted for 11 % of total crimes happened in the state in 2009–2010. To stabilize crime various crime combating strategies and operations need to be launched.

Haryana's economy has undergone the significant structural transformation and the share of the service sector in employment and income has improved considerably. For instance, in 2011–2012, the sectoral composition of the state gross domestic product (SGDP) was: agriculture and allied sector (16.3 %), industry (29.1 %), and service (54.6 %) while the corresponding figures for 1999–2000 were reported at 31.9, 30, and 38.1 % respectively. Agriculture sector still continues to occupy a significant position in the state economy. However, the share of this sector in the state gross domestic product has been continuously declining, dwindled from 60.7 % in 1969–1970 to 16.3 % in 2011–2012. The shrinking share of the agriculture sector in the state GDP implies that income inequality is widening as about 65 % of the population lives in rural areas and vast majority of the rural poorest households depends on farming as their primary source of income and food. By providing income and upholding the human right to food, farming establishes a resilient rural sector as a basis for a relatively egalitarian distribution of income and production in the state. The average monthly per capita expenditure in urban and rural areas is Rs 2,310 and Rs 1,510, of which food shares are 43 and 54 %, respectively. The rural people have a significantly higher share of food in total consumer expenditure as food is the primary need for survival and takes up a larger proportion of overall expenditure in the poorer sections of population.

In Haryana, milk is one of the most important foods—it is the major source of protein and vitamins for the population. The per capita availability of milk has increased from 586 g per day in 1991–1992 to 662 g per day in 2009–2010. Haryana ranks second, next to Punjab state (944 g per day), in the country against the national average of 273 g per day in 2009–2010. The per capita food grain production is estimated at 624 kg per year for the same period. To meet twin objectives of price stability and ensuring availability of essential commodities like food grains at easily affordable price especially to the poor the state has operationalized the targeted public distribution system. As malnourishment of children is an important indicator of food insecurity, prevalence of underweight children under 3 years of age shows that Haryana is going slow in eliminating the effect of malnourishment. Millennium development goals India country report (2011) indicates that the percentage of underweight children which declined from 31 % in 1992–1993 to 29.9 % in 1998–1999 has again worsened to 38.2 % in 2005–2006. So, faster improvement in child survival is needed (GoI 2011b).

In all, 87 % of Haryana's land area is culturable of which 81 % is irrigated. About 79 % of the cultivable area is shown more than once in 2011–2012. The cross cropped area of the state is 6,351 thousand hectare (ha). The percentage of forest to the total geographic area is 3.53. The cultivable land per agricultural worker in the state is about 1.38 ha which is higher than the all India level of 1.12 ha. The principal crops grown in the state are: wheat, rice, bajra, cotton, sugarcane, and mustard. The wheat and rice crops have grater versatility. The yields of wheat (4,390 kg/ha) and rice (3008 kg/ha) are above the all India averages of wheat (2,907 kg/ha) and rice (2,125 kg/ha) in 2008–2009. In 2008–2009, the agriculture & allied activities registered impressive growth rate of 7.3 % while for the manufacturing sector the growth rate is recorded at 2.6 %. Moreover, rapidly increasing

share of the service sector is also responsible for a decline in the share of the agriculture sector in the state GDP.

2.2 Madhya Pradesh

Madhya Pradesh is a state in the central India. The state is predominantly rural and agrarian, endowed with rich and diverse forest resources. According to India State Hunger Index compiled by the International Food Policy Research Institute, the malnutrition situation in Madhya Pradesh is extremely alarming. The growth of population from 2001 to 2011 is of the order of 20.3 %. The estimated annual birth rate at the state level is 27.3, and the crude death rate is 8.3 in 2010. The literacy rate at the state level is about 70.6 % which is much below than the all India level of 74 %. The life expectancy is reported at 58 years during 2002–2006. About 80 % of its population live in rural areas. In all, 43.7 % of the land area is cultivable of which only 16.6 % is irrigated. About 18 % cultivated area is sown more than once. The principal crops are rice, wheat, and pulses. The productivities of both rice and wheat are less than the all India average.

2.3 Kerala

Kerala state is located in the Southern part of India. The main food crop of the state is rice. According to 2011 Population Census, the population of Kerala is about 3.34 crores. The crude birth and death rates are 14.8 and 7 respectively. The infant mortality rate in the state is 13. The life expectancy of the people of the state is about 71.4 years for males and about 76.3 years for females. Literacy rate in the state is about 93.9 % as against 74 % at all India level. The growth rate of population from 2001 to 2011 in the state is about 4.9 % whereas it is about 17.6 % at all India level during the same period.

An inter-regional comparison brings out that health-wise, Kerala is the best performer and Madhya Pradesh is the worst in terms of life expectancy at birth (both male and female) during 2002–2006. Infant Mortality Rate in 2010 is also the lowest in Kerala and highest in Madhya Pradesh. The unemployment rate (per 1000) according to usual status as per the NSS 66th round 2009–2010 among the major states is highest in Kerala, 75 in rural areas and 73 in urban areas. In case of Human Development Index, Kerala ranks first while Haryana and Madhya Pradesh occupy 9th and 20th position in 2007-08 respectively. We now discuss some properties of good socio-economic development indicators.

3 Some Properties of Good Socio-Economic Development Indicators

Drewnowski (1972) defines the socio-economic indicators as observable and measureable phenomena which contain information about the degree of satisfaction of human needs. A survey of literature provides following main properties of good socio-economic development indicators. Firstly, as argued by McGranahanan (1972) that a good indicator must be relevant to the process or component of development and should be as much as possible representative of the component of development it reflects. Secondly, an indicator should be comprehensive in the sense that it should reflect as many aspects of the component of development, which it represents, as possible. For example, crop productivity per worker is influenced by and reflects a country's level of technology and experience and it in turn influences a number of factors such as total income in the farm sector.

Thirdly, a good socio-economic indicator should have the same direction of change as the process being measured, in our case, socio-economic development. As argued by Drewnowski (1972) that the direction of change of these values should confirm to the direction of change of the magnitude of the welfare which is supposed to be measured. Accordingly, only variables that are positively correlated with development should be chosen as indicators. However, Ewusi (1976) argues that other variables that are negatively related to development can be chosen as indicators, so long as the indicator deteriorates progressively with economic development.

Fourthly, as argued by Adei (1973) and Drewnowski (1972) that socio-economic indicator should be quantifiable. With respect to the quantitative indicators, Drewnowski has suggested a fifth characteristic. He says "to obtain a meaningful measure of welfare it is necessary to have not only the numerical value of the indicator but also a point of reference against which the value of the indicator can be assessed. For example, the amount of calorie intake per day is not very illuminating if we do not know the minimum intake necessary for the population to survive. A good indicator, according to this principle, must be scaled, "A minimum level of satisfaction of human needs has to be established in terms of the numerical value of each indicator." This property that each indicator must be scaled is very desirable but often not too practicable. It is not always possible to establish the critical minimum level of indicators such as the crude labour force participation rate. What is necessary though is that the analyst can and should make some normative statements by making longitudinal or spatial comparison of the variable.

Sixthly, Adei (1973) has identified another property of socio-economic indicators as being restricted or unrestricted. He defines an unrestricted indicator as a variable that can assume any numerical value, and a restricted indicator as a variable over which a limit is placed on its maximum value. Thus variables which are expressed in percentages such as the literacy rate would be considered as restricted variables, while variables like per capital income which can assume any value are described as unrestricted. He advocates the use of unrestricted indicators, even though in practice, as happens in our subsequent analysis, we find that one has to use both restricted and unrestricted indicators. Moreover, both restricted and unrestricted indicators have their advantages and disadvantages. Finally, as suggested by Moser (1972) that socio-economic development indicators should relate to outputs rather than inputs of development programmes. Whether one will be able to choose indicators which satisfy this and all the other criteria specified above depends critically on the availability of data. Next we list the various socio-economic indicators used for measuring the level of development and ranking the districts.

4 Choices of Socio-Economic Developmental Indicators for Ranking the Districts

Inspired by the idea that well-being cannot be fully captured by monetary indicators, the most frequently used composite index of development is the physical quality-of-life index with the three variables: (1) infant survival rate, (2) adult literacy rate, and (3) life expectancy (Morris 1979; Majumder et al. 1995). However, it is generally believed that socio-economic development should be measured on the basis of a large number of attributes as is relevant and feasible (see e.g., Slottje 1991; Hirschberg et al. 1991; Sen 1985,1987; Maasoumi 1986; Atkinson and Bourguignon 1982; Kolm 1977). Therefore, we attempt to widen the scope of the physical quality-of-life measure by incorporating variables from various groups of socio-economic characteristics of people. Each district faces situational factors unique to it as well as administrative and financial factors common to all the districts. Indicators common to all

the districts have been included in the study for assessing the level of the socio-economic development. The forty three selected variables are listed below:

4.1 Agriculture

1. Percentage net area sown
2. Per cultivator net area shown
3. Percentage area sown more than once
4. Productivity of wheat (kg/ha)
5. Productivity of rice (kg/ha)
6. Milk production (litre/capita/annum)
7. Percentage area under fruits and vegetables
8. Number of tractors (per 1,000 ha of net area shown)
9. Number of tube-wells and pumping sets for irrigation (per 1,000 ha of net area shown)
10. Percentage of net area irrigated
11. Number of livestock (per 100 persons)
12. Number of poultry (per 1,000 persons)
13. Number of veterinary institutions (per 10,000 livestock)
14. Farmers' membership of cooperative societies (per 1,000 persons)
15. No. of regulated markets (per lack hectare net sown area)
16. Capacity of state owned ware houses (kg/capita)
17. Percentage Area under commercial crops
18. Gross value of agricultural output (Rs/ha)
19. Cereals production (kg/capita)
20. Agricultural gross value added (Rs/capita)
21. Fertilizer applied (kg/ha)

4.2 Infrastructural Facilities

22. Literacy rate in male
23. Literacy rate in female
24. Literacy rate in SC population
25. Number of primary schools (per lack persons)
26. Gender ratio (0–6 year children)
27. Population density (per sq. km.)
28. Decadal growth rate of population (2001–2011)
29. Number of health institutions (per lack persons)
30. Number of beds available in health institutions (per lack persons)
31. Percentage problem villages
32. Percentage urbanization
33. Number of post-offices (per lack persons)
34. Number of vehicles (per 1,000 persons)
35. Length of roads (in km. per 100 sq. km. area)
36. No. of shops, commercial establishments, hotels and restaurants (per lack persons)
37. No. of peoples working in shops, commercial establishments, hotels and restaurants (per lack persons)
38. Number of banks (per lack persons)

4.3 Industry

39. Number of registered factories (per lack persons)
40. Number of registered factories (per 100 square km. area)
41. Number of worker employed in factories (per 10,000 persons)
42. Per capita value added by manufacturing industry (Rs)
43. Number of power connections (per ten persons)

A total of forty three developmental indicators have been included in the statistical analysis. These indicators may not form an all inclusive list but these are the major interacting components of socio-economic development of each district and are solely selected by data availability constraints. Out of forty three, twenty one indicators are directly concerned with the development in agricultural sector. Five indicators depict the progress of development in industrial sector and rest seventeen indicators present the level of development in infrastructural services.

Some indicators may be correlated. For example, area under irrigation and productivity of wheat crop may be positively correlated. However, as argued by United Nations Research Institute for Social Development (UNRISD 1970) that variables with high inter-correlations with other development variables are better than those with low correlations.

5 Choices of Methods of Analysis

As we have noted above that socio-economic development is a multi-dimensional process and it cannot be fully evaluated by a single indicator. Moreover, a number of indicators when analyzed individually do not provide an integrated and easily comprehensible picture of the reality. It necessitates for construction of a composite index of socio-economic development based upon optimal combination of different developmental indicators. There are several methods (e.g., principal component analysis, multiple factor analysis, aggregation method, monetary index, ratio index and ranking method) for combining the effect of various indicators. While one cannot deny usefulness of these methods but most of these methods are having their own limitations. A brief review of some most widely used methods of analysis of quality-of-life is in order.

5.1 Principal Component Analysis

A survey of literature on measurement of the level of socio-economic development indicates that the majority of studies has been used principal component analysis approach. As pointed out by Bhatia and Rai (2004) this method is generally based on restrictive assumptions regarding the developmental indicators, i.e., the variable indicators are linearly related. When non-linearity is present, the component analysis is not appropriate. Since this method measures variances, it is determined by the scaling of the variables, and really only makes sense if the variables are on comparable scales. 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.

5.2 Multiple Factor Analysis

This method deals with data table in which a set of individuals is described by several sets of variables. The main advantage of this method is that the 'factor loading' can be used as

weights for combining the effect of various socio-economic indicators. This method avoids, to some extent, the arbitrariness in choosing weights. The main limitation of this method is that 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.

5.3 Monetary Index

In this method, the socio-economic 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 urbanization, population density, gender ratio, education level, etc. cannot be converted into monetary values.

5.4 Aggregation Method

This method uses a simple addition of the values of the socio-economic developmental indicators as a composite index of development. This is not suitable as the composite index of development obtained by use of this method depends on the unit in which the data are recorded.

5.5 Ranking Method

In this method, each unit is allotted ranks based on different socio-economic developmental indicators. Sum of ranks for all the socio-economic indicators of the unit is taken as the composite index of development. This method is not appropriate because ranking procedure does not take into account the magnitude of differences between indicators and units.

6 Wroclow Taxonomic Method

The major limitation arises from the assumptions made about the developmental indicators themselves and their weightage in the aggregate index. To overcome this problem, the composite index of development is constructed applying Wroclow Taxonomic Method developed by Florek et al. (1952) to obtain a statistical method of determining homogenous units or types of things in an n-dimensional vectorial space. In 1967, the method of taxonomy was proposed to United Nation Educational Scientific and Cultural Organisation (UNESCO) as a means of ranking and comparing countries' development by Professor Zygmunt Hellwig (1967) of the Wroclaw School of Economics. According to Harbison et al. (1968) it "provides a useful tool for interpolation of statistical data, sets up a measure of social and economic maturity and introduces a concept of the pattern of development which may prove to be very useful in planning". A description of this method is also presented in Frederick et al. (1970). Gostowski (1970) argues that the taxonomic distance is a more sensitive and valid measure of development levels, because it takes account of the dispersion among component indicators, i.e., structural similarities among districts.

Therefore, it may be used as a similarity measure in establishing development models. Other examples of its uses include those by Harbison et al. (1968), Land (1975), Ewusi (1976), Arief (1982), Narain et al. (2003, 2009, 2012) and Bhatia and Rai (2004). A brief introduction of Wroclow Taxonomic method used in the study is in order.

6.1 Measuring the Level of Development

Let $[X_{ij}]$ be the data matrix giving the values of the variables of i_{th} district and the j_{th} indicator $i = 1, 2,\ldots, n$ (No. of districts) and $j = 1, 2,\ldots, k$ (No. of indicators).

Every district is represented by a vector in a k-dimensional space. Since the units of measurement of the variables considered are not uniform, for combined analysis $[X_{ij}]$ is transformed to the matrix of standardized indicators $[Z_{ij}]$ as follows:

$$[Z_{ij}] = \frac{X_{ij} - \bar{X}_j}{\sigma_j} \tag{1}$$

where

$$\bar{X}_j = \frac{\sum_{i=1}^{N} X_{ij}}{N} \text{ and } \sigma_j = \left(\sum_{i=1}^{N} (X_{ij} - \bar{X}_j)^2\right)^{1/2}.$$

From $[Z_{ij}]$, identify the optimal value of each indicator. Let it be denoted by Z_{0j}. The optimal value will be either the maximum value or minimum value of the indicator depending upon the direction of the impact of an indicator on the level of development. For example, increase in literacy rate would positively affect the development, while higher population density may adversely affect the development. For obtaining the pattern of development C_i of the ith district, first calculate square of the deviation of the individual value of a transformed variate from the best value. In other words, calculate P_{ij} as:

$$P_{ij} = \left(Z_{ij} - Z_{oj}\right)^2 \tag{2}$$

For each i and j

Pattern of development is given by

$$C_i = \left[\sum_{j=1}^{k} P_i/(cv_j)\right]^{1/2} \tag{3}$$

where (cv_j) = coefficient of variation of the jth indicator in X_{ij}.

Composite index 'measure of development' (D_i) is given by

$$D_i = C_i/C \tag{4}$$

where

$$C = \overline{C} + 3\sigma C_i$$

where

$$\bar{C} = \frac{\sum_{i=1}^{N} C_i}{N} \quad \text{and} \quad \sigma C_i = \left(\sum_{i=1}^{N} (C_i - \bar{C})^2\right)^{1/2}$$

The closer D_i is to 0 the more developed is the district, and the closer to unity, the less developed the district. The following inequality holds in the majority of cases: $0 < D_i < 1$.

6.2 Estimation of Developmental Distances between Pairs of Districts

For identifying the model district and fixing the potential targets of developmental indicators for low developed districts, the developmental distance between pairs of districts is calculated. The developmental distance between districts i and p is given by d_{ip} as follows:

$$d_{ip} = \left[\sum_{j=1}^{k} (Z_{ij} - Z_{pj})^2\right]^{1/2} \tag{5}$$

where $i = 1,2,3,\ldots. n$ and $p = 1,2,3, n$.

Here following relationships are apparent: $d_{ii} = 0$, $d_{ip} = d_{pi}$, and $d_{ip} \leq d_{ij} + d_{pj}$.

These relationships produce the following symmetric matrix which is called the distance matrix:

$$d_{ip} = \begin{bmatrix} d_{11} & d_{12} & \cdots & d_{1n} \\ d_{21} & d_{22} & \cdots & d_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ d_{n1} & d_{n2} & \cdots & d_{nn} \end{bmatrix}.$$

From the above distance matrix, find out the minimum distance for each row. Denote the minimum distance for row i as d_i. Obtain the critical distance (CD) as follows:

$$CD = \overline{d} + 2\sigma d_i \tag{6}$$

where $\overline{d}$ = mean of d_i and σ = standard deviation.

6.3 Identification of Model Districts and Potential Targets of Developmental Indicators

The critical distance (Eq. 6) is used to identify the model districts. Model district for district 'A' will be those districts whose composite index (Eq. 4) of development is less than that of district 'A' and whose developmental distance (Eq. 5) from district 'A' is less than or equal to critical distance. Thus model districts will be better developed as compared to district 'A'. The best value of each developmental indicator of the model districts is taken up as the potential target of that indicator for district 'A'.

The main weakness of the taxonomic technique used in the study is that of weighting. Each variable carries equal weight to every other in the construction of the composite index of the levels of living. The selection of indicators and weights for aggregating the measure of development can change the final conclusion.

The data for the year 2008–2009 on all the forty three variables mentioned above have been obtained from *Economic Survey,* Ministry of Finance, Government of India, New Delhi; *Statistical Abstract of Haryana* 2009–2010, and *Economic Survey of Haryana* 2011–2012, Department of Economic and Statistical Analysis, Government of Haryana, Panchkula. A total of 80 districts in the three states are included in the study.

6.4 Different Stages of Development

A simple ranking of districts on the basis of the composite indices would be sufficient for classificatory proposes. A suitable fractile classification of the districts from the assumed distribution of the mean of the composite indices will provide a meaningful characterization of different stages of development. The factile groups are used to classify the various stages of development. For relative comparison of different districts with respect to socio-economic development, it appears quite appropriate to assume that the districts having composite indices less than or equal to (Mean − SD) are highly developed and are classified in stage-IV of the development and the districts having composite indices greater than or equal to (Mean + SD) are low developed and are classified in stage-I of development. In the same way, districts with composite indices lying in between (Mean) and (Mean − SD) are high middle level developed and districts having composite indices in between (Mean) and (Mean + SD) are low middle level developed. High middle and low middle level developed districts are classified respectively as in stage-III and stage-II of development. The least developed district is defined as a hypothetical district which has the highest composite index (Eq. 4).

For example, based on the above assumption, in case of overall socio-economic development in Haryana state, districts having the composite indices less than or equal to 0.70 are highly developed and put in stage-IV of development and districts having composite indices greater than or equal to 0.85 would be called low developed and these are classified in stage-I of development. Districts having composite indices in between 0.70 and 0.77 are described as high middle level developed and these are classified in stage-III of development and districts with composite indices in between 0.77 and 0.85 are low middle level developed and these are classified in stage-II of development.

7 Empirical Results and Discussions

7.1 The Level of Development

Table 1 below presents the composite indices of development (Eq. 4), ordinal rank of different districts and stages of development of all 21 districts of Haryana state for agriculture, infrastructural services, industry and overall socio-economic sectors. It is evident from Table 1 that in case of agricultural development, the district of Kurukshetra ranks first and the district of Mewat is ranked last. Column 3 of Table 1 depicts that the value of composite indices of agricultural development varies from 0.46 to 0.82. As regards of infrastructural services, the district of Panchkula is found to occupy the first position, and the district of Mewat is again on the last place. It may be seen from Column 6 of Table 1 that the composite indices of infrastructural services vary from 0.44 to 0.90. In the development of the industrial sector, the district of Gurgaon is top followed by Faridabad and Palwal which take second and third positions respectively. Kaithal and Bhiwani are at the bottom of ranking scale. The high industrial development in districts of Gurgaon, Faridabad and Palwal may partially be attributable to their close proximity to the national capital, Delhi.

A cursory look at Column 9 of Table 1 reveals that the composite indices of industrial development vary from 0.18 to 0.68. It may be noted here that greatest regional disparity exists in industrial development. It calls for widespread diffusion of manufacturing industries. For overall socio-economic development, the district of Yamunanagar ranks

Table 1 Haryana: composite index of development (CI), rank of districts and stages of development

S. no.	District	Agricultural development			Infrastructural services development			Industrial development			Socio-economic development		
		C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.
1	Yamunanagar	0.581	7	III	0.613	2	III	0.390	4	IV	0.671	1	IV
2	Kurukshetra	0.463	1	IV	0.671	9	III	0.643	15	II	0.686	2	IV
3	Panchkula	0.813	20	I	0.442	1	IV	0.575	9	II	0.702	3	III
4	Karnal	0.469	3	IV	0.709	11	II	0.596	11	II	0.711	4	III
5	Hisar	0.610	8	III	0.638	5	III	0.641	14	II	0.717	5	III
6	Panipat	0.621	9	III	0.656	8	III	0.401	5	III	0.717	6	III
7	Palwal	0.637	11	III	0.653	7	III	0.303	3	IV	0.717	7	III
8	Sirsa	0.499	4	IV	0.753	15	II	0.644	16	II	0.756	8	III
9	Fatehabad	0.464	2	IV	0.766	17	II	0.668	18	II	0.756	9	III
10	Faridabad	0.751	16	II	0.639	6	III	0.220	2	IV	0.757	10	III
11	Ambala	0.753	17	II	0.634	4	III	0.572	8	II	0.773	11	III
12	Jind	0.559	6	III	0.750	14	II	0.659	17	II	0.775	12	III
13	Bhiwani	0.764	18	II	0.630	3	III	0.681	20	II	0.784	13	II
14	Sonipat	0.627	10	III	0.749	13	II	0.541	7	III	0.791	14	II
15	Rohtak	0.723	14	II	0.689	10	III	0.592	10	II	0.794	15	II
16	Kaithal	0.536	5	III	0.787	18	II	0.684	21	II	0.795	16	II
17	Gurgaon	0.742	15	II	0.715	12	II	0.189	1	IV	0.801	17	II
18	Rewari	0.669	12	II	0.762	16	II	0.602	12	II	0.820	18	II
19	Mahendragarh	0.716	13	II	0.830	20	I	0.678	19	II	0.890	19	I
20	Jhajjar	0.771	19	I	0.826	19	I	0.533	6	III	0.900	20	I
21	Mewat	0.821	21	I	0.902	21	I	0.611	13	II	0.975	21	I

SD = stage of development, I = low developed, II = low middle developed, III = high middle developed, and IV = high developed

Source: Author's own calculation

first and Mewat is at the last place. The values of measure of development for socio-economic field vary from 0.67 to 0.98.

A brief perusal of Table 1 shows that the districts of Kurukshetra, Fatehabad, Karnal, Sirsa and Kaithal are found to occupy the first five positions in the state in respect of agricultural development. Similarly, Yamunanagar, Kurukshetra, Panchkula, Karnal and Hisar are found to be on the first five places in overall socio-economic development. Five lowest developed districts in the agriculture sector are: Palwal, Panchkula, Jhajjar, Bhiwani, and Ambala. Likewise, Mewat, Jhajjar, Mahendragarh, Rewari and Gurgaon are found to occupy the last five positions in overall-socio economic development. From the above discussion, it may be concluded that the development of the agricultural sector has a great influence on the overall socio-economic development in Haryana.

It is evident from the information presented in the last Column of Table 1 that Yamunanagar (0.671) and Kurukshetra (0.686) are enjoying the status of the socio-economically highly developed districts. The districts of Panchkula (0.702), Karnal (0.711), Hisar (0.717), Panipat (0.717), Palwal (0.717), Sirsa (0.756), Fatehabad (0.756), Faridabad (0.757), Ambala (0.773) and Jind (0.775) are fall into high-medium developed category. Bhiwani (0.784), Sonipat (0.791), Rohtak (0.794), Kaithal (0.795), Gurgaon (0.801) and Rewari (0.820) are fall into 2nd stage of socio-economic development whereas Mahendragarh (0.890), Jhajjar (0.900) and Mewat (0.975) are put in category I of low developed districts.

The composite indices of development (Eq. 4), ordinal rank of different districts and stages of development of all 45 districts of Madhya Pradesh state (Central region) for agriculture, infrastructural services, industry and overall socio-economic sectors are presented in Table 2. It is evident from Table 2 that out of 45 districts of the state, the district of Hoshangabad is ranked first and the district of Mandala is ranked last in agricultural development. The values of composite indices vary from 0.59 to 0.91. Moreover, nine districts, namely Sehore, Gwalior, Hoshangabad, Dhar, Indore, Narsinghpur, Mandsaur, Ratlam and Shajapur are found to be highly developed. Similarly, eight districts, namely, Mandala, Shahdole, Siddhi, Jabalpur, Sarguja, Jhabua, Seoni and Panna are found to be low developed. Thirteen districts, namely Datia, Ujjain, Dewas, Khargone, Morena, Tikamgarh, Khandwa, Raipur, Chhindwara, Shivpuri, Bhind, Raisen and Vidisha are classified as medium level developed districts. The remaining fifteen districts, viz. Chhatarpur, Durg, Rajgarh, Raigarh, Betul, Balaghat, Damoh, Sagar, Bilaspur, Rajanandgaon, Guna, Satna, Bastar, Rewa and Bhopal are in the developing stage, category III.

In the case of infrastructural facilities, the district of Sagar is found to have the first rank in Madhya Pradesh state whereas the district of Sidhi is ranked at the last position. The composite indices vary from 0.34 to 0.82. Eight districts, namely Sagar, Indore, Gwalior, Bhopal, Ratlam, Mandsaur, Ujjain, and Jabalpur are highly developed. On the other hand, five districts, namely Tikamgarh, Damoh, Rewa, Panna and Sidhi are found to be low developed. Eleven districts, namely Khargone, Khandwa, Chhindwara, Bastar, Durg, Dhar, Hoshangabad, Sehore, Raipur, Vidisha and Raigarh are middle level developed.

The remaining 21 districts, viz. Bilaspur, Dewas, Shajapur, Chhatarpur, Datia, Rajgarh, Shivpuri, Satna, Guna, Sarguja, Raisen, Narsinghpur, Betul, Shahdole, Balaghat, Seoni, Mandala, Morena, Bhind, Rajanandgaon and Jhabua are at developing stage.

With regard to industrial development, the district of Raisen is ranked first and the district of Bastar is ranked last. The composite indices vary from 0.65 to 0.92. Three districts, namely Raisen, Indore and Bhopal are found to have high development index. Nine districts, namely Ujjain, Gwalior, Jabalpur, Dewas, Ratlam, Khandwa, Durg, Mandsaur and Hoshangabad are found to be medium level developed. The remaining 33 districts are at the developing stage.

In case of overall socio-economic development, the district of Raisen occupies the first place in Madhya Pradesh state and the district of Sidhi is found to be at the last position. The composite indices vary from 0.67 to 0.92. A look at Column 2 of Table 2 reveals that six districts, namely Raisen, Indore, Gwalior, Ujjain, Bhopal and Ratlam are found to be better developed in comparison to other districts of the state. These districts are put in the category I of high developed districts. Similarly, five districts, namely Panna, Shahdole, Jhabua, Mandala and Sidhi are found to be low developed. While, fifteen districts, namely Mandsaur, Sagar, Hoshangabad, Dhar, Khandwa, Dewas, Sehore, Khargone, Narsinghpur, Chhindwara, Raipur, Shajapur, Jabalpur, Durg and Datia are classified as medium level developed districts. The remaining 19 districts are found to be in developing stage.

The composite indices of development (Eq. 4) along with the ordinal rank of different districts and stages of development of all 14 districts of Kerala state (Southern region) for agriculture, infrastructural services, industry and overall socio-economic sector are given in Table 3. The table shows that in case of agricultural development, the district of Palakkad is ranked first and the district of Thiruvananthapuram is ranked last. The composite indices of development vary from 0.71 to 0.91.

In case of infrastructural facilities, the district of Thrissur is found to occupy the first position and the district of Wayanad is on the last place. The composite indices of infrastructural development vary from 0.24 to 0.81. As regards industrial development, the

Table 2 Madhya Pradesh: composite index of development (CI), rank of districts and stages of development

S. no.	District	Agricultural development			Infrastructural services development			Industrial development			Socio-economic development		
		C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.
1	Raisen	0.73	21	III	0.87	31	II	0.34	1	IV	0.67	1	IV
2	Indore	0.62	3	IV	0.74	3	IV	0.68	2	IV	0.74	2	IV
3	Gwalior	0.61	2	IV	0.74	2	IV	0.75	5	III	0.77	3	IV
4	Ujjain	0.68	11	III	0.79	7	IV	0.74	4	III	0.8	4	IV
5	Bhopal	0.83	37	II	0.74	4	IV	0.71	3	IV	0.80	5	IV
6	Ratlam	0.65	8	IV	0.77	5	IV	0.77	8	III	0.80	6	IV
7	Mandsaur	0.64	5	IV	0.78	6	IV	0.78	15	III	0.81	7	III
8	Sagar	0.79	32	II	0.65	1	IV	0.79	20	II	0.81	8	III
9	Hoshangabad	0.59	1	IV	0.84	15	III	0.78	14	III	0.82	9	III
10	Dhar	0.66	9	IV	0.83	14	III	0.78	11	III	0.82	10	III
11	Khandwa	0.70	16	III	0.81	12	III	0.77	10	III	0.83	11	III
12	Dewas	0.69	13	III	0.85	20	II	0.76	7	III	0.83	12	III
13	Sehore	0.64	4	IV	0.84	17	III	0.80	22	II	0.84	13	III
14	Khargone	0.69	15	III	0.80	9	III	0.80	24	II	0.84	14	III
15	Narsinghpur	0.64	6	IV	0.87	30	II	0.78	13	III	0.84	15	III
16	Chhindwara	0.72	20	III	0.81	10	III	0.79	18	II	0.84	16	III
17	Raipur	0.71	17	II	0.84	19	III	0.78	12	III	0.84	17	III
18	Shajapur	0.65	7	IV	0.85	22	II	0.79	21	II	0.84	18	III
19	Jabalpur	0.86	42	I	0.79	8	IV	0.75	06	III	0.85	19	III
20	Durg	0.78	27	II	0.82	13	III	0.77	9	III	0.85	20	III
21	Datia	0.67	10	III	0.86	28	II	0.79	17	II	0.85	21	III
22	Rajgarh	0.78	25	II	0.86	25	II	0.79	16	II	0.87	22	II
23	Vidisha	0.74	22	III	0.84	17	II	0.80	28	II	0.87	23	II
24	Shivpuri	0.72	18	III	0.86	26	II	0.81	37	II	0.87	24	II
25	Raigarh	0.78	24	II	0.84	18	III	0.80	29	II	0.87	25	II
26	Chhatarpur	0.75	23	II	0.85	21	II	0.81	39	II	0.87	26	II
27	Bilaspur	0.79	31	II	0.84	17	III	0.80	22	II	0.87	27	II
28	Morena	0.69	14	III	0.89	37	II	0.81	40	II	0.87	28	II
29	Bhind	0.72	19	III	0.89	37	II	0.81	30	II	0.87	29	II
30	Satna	0.81	34	II	0.86	29	II	0.79	19	II	0.88	30	II
31	Tikamgarh	0.69	12	III	0.90	42	I	0.82	42	II	0.88	31	II
32	Bastar	0.82	35	II	0.81	11	III	0.82	45	II	0.88	32	II
33	Betul	0.78	29	II	0.87	32	II	0.82	33	II	0.88	33	II
34	Guna	0.80	33	II	0.86	27	II	0.81	34	II	0.88	34	II
35	Balaghat	0.78	26	II	0.88	35	II	0.81	35	II	0.89	35	II
36	Damoh	0.78	28	II	0.90	41	I	0.80	25	II	0.89	36	II
37	Rajanandgaon	0.79	30	II	0.89	40	II	0.80	26	II	0.89	37	II
38	Sarguja	0.86	41	I	0.86	23	II	0.81	38	II	0.90	38	II
39	Seoni	0.85	39	I	0.88	13	II	0.81	32	II	0.90	39	II
40	Rewa	0.83	36	II	0.91	44	I	0.80	23	II	0.90	40	II

Table 2 continued

S. no.	District	Agricultural development			Infrastructural services development			Industrial development			Socio-economic development		
		C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.
41	Panna	0.84	38	I	0.91	43	I	0.81	36	II	0.91	41	I
42	Shahdole	0.91	44	I	0.87	33	II	0.81	31	II	0.91	42	I
43	Jhabua	0.86	40	I	0.89	39	II	0.82	43	II	0.91	43	I
44	Mandala	0.91	45	I	0.88	36	II	0.82	44	II	0.92	44	I
45	Sidhi	0.87	43	I	0.92	45	I	0.82	41	II	0.92	45	I

Source: Based on data available in Narain et al. (2003)

Table 3 Kerala: composite index of development (CI), rank of districts and stages of development

S. no.	District	Agricultural development			Infrastructural services development			Industrial development			Socio-economic development		
		C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.	C.I.	Rank	S.D.
1	Thrissur	0.83	9	II	0.24	1	IV	0.52	4	III	0.6	1	IV
2	Kollam	0.77	3	III	0.39	6	III	0.4	2	IV	0.6	2	IV
3	Kannur	0.77	5	III	0.35	3	III	0.67	10	II	0.62	3	IV
4	Kottayam	0.76	2	III	0.47	8	III	0.62	8	II	0.67	4	III
5	Alappuzha	0.89	11	I	0.38	5	III	0.57	6	III	0.68	5	III
6	Kozhikode	0.89	12	I	0.36	4	III	0.6	7	III	0.68	6	III
7	Pathanamthitta	0.9	13	I	0.34	2	III	0.72	11	II	0.69	7	III
8	Thiruvananthapuram	0.91	14	I	0.4	7	III	0.43	3	IV	0.7	8	III
9	Malappuram	0.78	6	III	0.53	9	II	0.67	9	II	0.72	9	II
10	Ernakulam	0.82	8	III	0.56	10	II	0.4	1	IV	0.73	10	II
11	Palakkad	0.71	1	IV	0.65	11	II	0.54	5	III	0.75	11	II
12	Kasaragod	0.8	7	III	0.68	12	II	0.8	14	I	0.83	12	I
13	Idukki	0.77	4	III	0.72	13	I	0.77	13	I	0.85	13	I
14	Wayanad	0.83	10	II	0.81	14	I	0.73	12	II	0.92	14	I

Source: Based on data available in Narain et al. (2005)

district of Ernakulam is on the first place and Kasaragod is on the last position. The composite indices of industrial development vary from 0.40 to 0.80.

A glance at Column 2 of Table 3 reveals that in case of overall socio-economic development, Thrissur is on the first position and Wayanad is on the last place. The composite indices of overall socio-economic development of Kerala state vary from 0.60 to 0.92.

7.2 Relative Shares of Area and Population Under Different Stages of Development

An important policy issue in district level analysis is to identify those contiguous districts exhibiting similar development profiles so as they can be classified into districts at different levels of developments. Table 4 presents the number of districts lying in different stages of development, devised on the basis of the measure of development (Eq. 4), with respect to

Table 4 Haryana: number of districts, percentage area and population under different stages of development

Stages of development	Number of districts	Area (%)	Population (%)
Agriculture development			
High (≤0.529)	4	24.94	18.57
High middle (0.530–0.647)	7	35.71	35.83
Low middle (0.648–0.764)	7	30.29	35.32
Low (CI ≥ 0.765)	3	9.06	10.28
Infrastructural facilities			
High (≤0.607)	1	1.30	2.20
High middle (0.608–0.705)	9	42.76	46.50
Low middle (0.706–0.803)	8	43.74	39.59
Low (CI ≥ 0.804)	3	12.19	11.71
Industrial development			
High (≤0.470)	4	11.44	21.96
High middle (0.471–0.601)	3	12.22	14.36
Low middle (0.602–0.735)	14	76.34	63.68
Low (≥0.736)	0	0	0
Socio-economic development			
High (≤0.805)	2	7.78	8.59
High middle (0.806–0.854)	10	49.26	49.52
Low middle (0.855–0.902)	6	30.77	30.18
Low (≥0.903)	3	12.19	11.71

Source: Author's own calculation

agricultural sector, infrastructural facilities, industrial sector and overall socio-economic field along with their relative share in the Haryana's total area and population.

In case of agricultural development, four out of 21 districts are found to be in high developed category. These districts cover 25 % of area and 19 % population of the state. Seven districts covering about 36 % of both area and population are observed to be in high middle level developed category. Equal no. of districts, namely Rewari, Mahendragarh, Rohtak, Gurgaon, Faridabad, Ambala and Bhiwani are found to be in low middle level developed category. These districts occupy about 30 % of area and 35 % of population. Three districts are found to be in low developed category. These districts account for about 9 % area and 10 % population of the state. Out of these three low developed districts, two districts, namely Mewat and Mahendragarh have low level of agricultural mechanization.

Mewat and Jhajjar both have inadequate irrigation facilities which affect the wheat productivity adversely. Other major causes of these districts farm sector backwardness include: (1) low livestock density, (2) low farm produce regulated markets, (3) low crop density, (4) poor dose of fertilizer, and (5) low area under commercial crops. Mewat has lagged far behind in per capita milk availability as well. Action is required to be taken in these districts for improving the level of development in the agriculture sector.

Availability of adequate infrastructural facilities plays a vital role in enhancing the level of development of different sectors of the economy. One out of 21 districts of the state is found to have high level of these facilities. The district is having about one % area and two % population of the state. Nine districts are observed to have high middle level

infrastructural facilities. About 43 % of area and 47 % of population of the state are covered by these districts. Eight districts with 44 % of area and 40 % of population of the state are having a low middle level of these facilities.

Three districts, namely Mahendragarh (0. 830), Jhajjar (0.826) and Mewat (0.902) are found in the low developed category. For enhancing the level of their overall socio-economic development, faster development of infrastructural services such as educational institutions, heath facilities, urbanization and banking facilities should be created in these districts.

With regard to industrial development, four districts having the area of about 11 % and population about 22 % are found to be in high developed category. Three districts with area of about 12 % and population of about 14 % are in high middle level developed category. Remaining 14 districts with area of as much as 76 % and population of 64 % are in a low middle developed group. In order to foster the industrial development of these districts, government should be focused on improvement in infrastructural facilities like electrical reticulation, power supply, water, roads, bridges, educational and health facilities.

With respect to overall socio-economic development of Haryana states, two districts having 8 % area and 9 % population of the state are observed to have high level development. Ten districts are having with middle level development. These districts cover about 49 % area and 50 % population of the state. Six districts with 31 % area and 30 % population of the state are found in low middle level developed stage. Three districts, viz. Mewat, Palwal and Rewari having 12 % of both area and population of the state are in low developed category. The districts of Mewat and Mehendragarh are having mostly rural population. The improvement in the level of development can be made by adopting the policies directed towards rural development. The districts of Jhajjar and Mewat are found to be low developed in agriculture sector as well. Special attention should be taken to develop the cooperative societies and regulated farm produce markets in these districts.

Table 5 presents the classification of districts of Madhya Pradesh state lying in different stages of development along with the percentage of area and population. In case of agricultural sector, nine districts, covering together about 13 % area and 17 % population are better developed as compared to other districts of the state. The districts classified as high middle cover the area of about 29 % and population of about 30 %. The majority of population is in agriculturally low middle level developed area. Twenty one percent of the state's area, having eighteen % of total population, is agriculturally low developed. Similarly, in case of infrastructural development only 19 % of the state's total population is enjoying highly developed infrastructural facilities. While about 38 % of Madhya Pradesh population is still living in low middle infrastructure areas.

In case of industrial development, 69 % of the state's total area is classified as low-middle developed. Only six % area is industrially developed. It implies that industrial development is highly unequal across Madhya Pradesh districts. The same is true for overall socio-economic development of the state. For example, 37 % of the population is living in low-middle developed stage and 15 % is characterized as low developed.

Table 6 gives the classification of districts of Kerala state lying in different stages of development along with the percentage of area and population. As regards agricultural development, district of Palakkad is better developed as compared to other districts of the state. Palakkad district covers about 11 % area and 8 % population. Seven districts, namely Kottayam, Idukki, Kannur, Kollam, Malappuram, Kasaragod and Ernakulam are high middle level developed. These districts together cover the area of about 53 % and population of about 51 %. The districts of Thrissur and Wayanad are low-middle level

Table 5 Madhya Pradesh: number of districts, percentage area and population under different stages of development

Stages of development	Number of districts	Area (%)	Population (%)
Agriculture development			
High (≤0.664)	9	13.5	16.7
High middle (0.665–0.747)	13	28.9	29.8
Low middle (0.748–0.832)	15	36.6	35.4
Low (CI ≥ 0.833)	8	21	18.1
Infrastructural facilities			
High (≤0.787)	8	12	19.4
High middle (0.788–0.839)	11	36.6	34.1
Low middle (0.840–0.894)	21	43.2	38.2
Low (CI ≥ 0.895)	5	8.2	8.3
Industrial development			
High (≤0.707)	3	6.3	12.4
High middle (0.708–0.780)	12	24.2	30
Low middle (0.781–0.852)	30	69.5	57.6
Low (≥0.853)	0	0	0
Socio-economic development			
High (≤0.701)	6	13.7	18.7
High middle (0.702–0.775)	15	25.2	29.3
Low middle (0.776–0.849)	19	42	36.6
Low (≥0.850)	5	19.1	15.4

Source: Author's own calculation

developed. Four districts, namely Alappuzha, Kozhikode, Pathanamthitta and Thiruvananthapuram covering about 22 % area and 29 % population are low developed. Great care should be taken to implement the special developmental programmes in these districts for enhancing the level of agricultural development.

With respect to infrastructural facilities, Thrissur district is highly developed. The area and population covered by the district are 7.9 and 9.4 % respectively. On the other hand, two districts, namely Idukki and Wayanad are low developed. The area and population covered by these districts are about 17.2 and 5.6 % respectively. Seven districts, namely Pathanamthitta, Kannur, Kozhikode, Alappuzha, Kollam, Thiruvananthapuram and Kottayam are middle level developed. The area and population covered by these districts are 42.5 and 50.8 % respectively. The remaining four districts are at developing stage. The area and population covered by these districts are 32.4 and 34.2 % respectively.

In case of industrial development, three districts, namely Kollam, Ernakulam and Thiruvananthapuram are found to have a high development index. These districts cover about 18.5 % area and 27.5 % population. Four districts, namely Thrissur, Palakkad, Alappuzha and Kozhikode covering about 29.4 % area and 33.5 % population are found to be medium level developed. Two districts, namely Kasaragod and Idukki are low developed. These districts cover about 16.8 % area and 7.2 % population. Special programmes for enhancing the level of industrial development should be encouraged in these districts. The remaining 5 districts covering about 35.3 % area and 31.8 % population are at the developing stage.

Table 6 Kerala: number of districts, percentage area and population under different stages of development

Stages of development	Number of districts	Area (%)	Population (%)
Agriculture development			
High (≤0.755)	1	11.6	8.4
High middle (0.756–0.816)	7	52.5	50.5
Low middle (0.817–0.877)	2	13.5	11.8
Low (CI ≥0.878)	4	22.4	29.3
Infrastructural facilities			
High (≤0.321)	1	7.9	9.4
High middle (0.322–0.491)	7	42.5	50.8
Low middle (0.492–0.660)	4	32.4	34.2
Low (CI ≥0.661)	2	17.2	5.6
Industrial development			
High (≤0.407)	3	18.5	27.5
High middle (0.408–0.602)	4	29.4	33.5
Low middle (0.603–0.735)	5	35.3	31.8
Low (≥0.736)	2	16.8	7.2
Socio-economic development			
High (≤0.623)	3	22.2	25.1
High middle (0.624–0.716)	5	28.2	35.2
Low middle (0.717–0.810)	3	27.2	30.2
Low (≥0.811)	3	22.4	9.5

Source: Author's own calculation

With regard to overall socio-economic development, three districts, namely Thrissur, Kollam and Kannur are found to be better developed in comparison to other districts of the state. These districts are put in the category I of high developed districts. The area and population covered by these districts are 22.2 and 25.1 % respectively. Similarly, three districts, namely Kasaragod, Idukki and Wayanad are found to be low developed. The area and population covered by these districts are 22.4 and 9.5 % respectively. It may be seen from Table 6 that the population density of these districts is quite low as compared to other districts of the state. Five districts, namely Kottayam, Alappuzha, Kozhikode, Pathanamthitta and Thiruvananthapuram covering about 28.2 % area and 35.2 % population of the state are classified as medium level developed districts. It may be seen that high developed districts of Kerala state are more thickly populated as compared to medium or low developed districts. The remaining three districts covering about 27.2 % area and 30.2 % population are found to be in developing stage. We now investigate the association between developments of various sectors of different states economies.

7.3 Inter-Relationship Among Different Sectors of Indian Economy

For inclusive development, it is quite essential and important that all the sectors of the economy should flourish together. The Pearson bivariate correlation coefficients between the development of agricultural sector, infrastructural facilities, industrial development and overall socio-economic development for Haryana state are given in Table 7. Table 7

Table 7 Pearson correlation coefficients between developmental indices of various sectors of Haryana's economy

S. no.	Factors	Agricultural development	Infrastructural facilities	Industrial development	Socio-economic development
1	Agricultural development	1	−0.105	−0.270	0.510*
2	Infrastructural facilities		1	0.267	0.784**
3	Industrial development			1	0.195
4	Socio-economic development				1

* and ** indicate correlation is significant at 0.05 and 0.01 levels, respectively. Number of observations = 21

Source: Author's own calculation

displays that infrastructural facilities play a statistically significant role in enhancing the level of socio-economic development in the state, estimated correlation coefficient is 0.78.

The correlation coefficient between agricultural and overall socio-economic development is found to be positive and statistically significant at five % level. It indicates that overall socio-economic development is highly associated with the development of agriculture sector. In fact the districts which are agriculturally advanced are found to have high level of overall socio-economic development. In other words, agricultural and overall socioeconomic developments are going hand-in-hand in Haryana.

The association between industrial development and the overall socio-economic development is rather weak and insignificant. Similarly, agricultural and industrial developments are not found to be statistically significantly associated in the state. These results are in line with the finding of Narain et al. (2003) for Karnataka (state located in Southern India).

The Pearson correlation coefficients between agricultural, industrial, infrastructural facilities and socio-economic developments of different districts of Madhya Pradesh states are given in Table 8. Infrastructural facilities are found to be associated with agricultural development. Overall socio-economic development is found to be highly influenced by the agricultural development, infrastructural facilities and industrial development in the state. The development of infrastructural facilities is not associated with industrial development but it is affecting the agricultural development in the positive direction.

Table 9 presents the Pearson correlation coefficients between agricultural, industrial, infrastructural facilities and socio-economic developments in Kerala state. The correlation coefficients between the socio-economic development and infrastructural facilities such as health services, education system, communication, construction of road and road transport etc. as well as between industrial and socio-economic development are observed to be quite high and these are statistically significant. We now present a comparative analysis on the socio-economic development of India's different regions.

7.4 Inter-Regional Comparison of Levels of Socio-Economic Development in India[1]

A scrutiny of results presented in Tables 1, 2 and 3 reveals that in case of overall socio-economic development the Southern region (Kerala) is better developed in comparison of Northern and Central regions, as its values of the composite indices are quite low. In

[1] The author is grateful to an anonymous referee of the journal for bringing this point to his attention

Table 8 Pearson correlation coefficients between developmental indices of various sectors of Madhya Pradesh's economy

S. no.	Factors	Agricultural development	Infrastructural facilities	Industrial development	Socio-economic development
1	Agricultural development	1	0.315*	0.192	0.612**
2	Infrastructural facilities		1	0.186	0.613**
3	Industrial development			1	0.801**
4	Socio-economic development				1

* and ** indicate correlation is significant at 0.05 and 0.01 levels, respectively. Number of observations = 45

Source: Author's own calculation

Table 9 Pearson correlation coefficients between developmental indices of various sectors of Kerala's economy

S. no.	Factors	Agricultural development	Infrastructural facilities	Industrial development	Socio-economic development
1	Agricultural development	1	−0.421	−0.099	−0.109
2	Infrastructural facilities		1	0.436	0.935**
3	Industrial development			1	0.556*
4	Socio-economic development				1

* and ** indicate correlation is significant at the 0.05 and 0.01 levels, respectively. Number of observations = 14

Source: Author's own calculation

respect of overall socio-economic development, the average value of composite index for Kerala is 0.717 compared to a value of 0.776 for Haryana and 0.853 for Madhya Pradesh. It may be noted here that in Southern region the infrastructure facilities are also better developed as compared to Northern and Central regions. The average values of the composite indices of industrial development are: 0.491 for Kerala, 0.841 for Madhya Pradesh, and 0.705 in case of Haryana. However, Southern region is agriculturally low developed as compared to Northern and Central regions. It may be concluded that there is a great disparity in the levels of development, especially between Kerala, on the one hand, and the other regions, on the other hand. Northern region is the second most developed. Furthermore, the pattern of development, specifically in case of industrial development, is relatively symmetrical in Southern part of India. In case of Madhya Pradesh, the average value of composite index of overall socio-economic development is quite high, i.e., a low level development which is accompanied by a high level asymmetry. This finding support the hypothesis of low-level asymmetry development processes that take place in Southern and Northern regions of India.

An international comparison of pattern of development brings out that asymmetry of socio-economic development in India is far below the Ghana as reported in Ewusi (1976). Furthermore, India's level of socio-economic development is better as compared to Malaysia, reported in Arief (1982).

7.5 Model Districts and Potential Targets of Developmental Indicators for Low Developed Districts

An important aspect of the study is to investigate the extent of improvement needed in developmental indicators for bringing out improvement in the level of development of low developed districts. This information is vital for efficient allocation of resources for enhancement of the level of development of backward regions. For estimation of potential targets of developmental indicators for low developed districts, model districts are identified on the basis of composite index (Eq. 4) of overall socio-economic development and the developmental distance (Eq. 5) between different districts. The best value of different indicators among the model districts is taken as the potential target of the low developed districts. The model districts are listed in Table 10. It may be seen from Table 10 that the districts of Yamunanagar, Kurukshetra and Kaithal are found to be model districts for socio-economic development for most of the low developed districts in Haryana state.

The model districts for low developed districts of Madhya Pradesh state are identified and given in Table 11. It may be seen from the table that the districts of Betul, Raigarh, Balaghat, Chhindwara, Rajanandgaon and Dhar are model districts for most of the low developed districts. In comparison to low developed districts, model districts are better developed.

List of model districts for low developed districts of Kerala is given in Table 12. It is observed that the districts of Kollam, Pathanamthitta, Kottayam and Kannur are model districts in socio-economic development for most of the low developed districts.

The best values of developmental indicators of model districts will be taken as potential targets for low developed districts. Improvements needed in various developmental indicators for low developed districts along with present value of the developmental indicators

Table 10 Haryana: model districts for low developed districts

S. no.	Low developed districts	Model districts
1	Mewat	Kaithal, Jind, Hisar, Bhiwani, Palwal
2	Jhajjar	Yamunanagar, Kurukshetra, Kaithal, Karnal, Panipat, Sonipat, Jind, Fatehabad, Hisar, Bhiwani, Palwal
3	Mahendragarh	Ambala, Yamunanagar, Kurukshetra, Kaithal, Karnal, Panipat, Sonipat, Jind, Sirsa, Hisar, Bhiwani, Rohtak, Rewari, Palwal

Source: Author's own calculation

Table 11 Madhya Pradesh: model districts for low developed districts

S. no.	Low developed districts	Model districts
1	Panna	Betul, Rajgarh, Balaghat, Chhindwara, Rajanandgaon, Satna, Chhattarpur, Damoh, Tikamgarh
2	Mandala	Betul, Raigarh, Balaghat, Chhindwara, Rajanandgaon
3	Shahdole	Betul, Guna, Shivpuri, Satna, Chhattarpur, Damoh
4	Sidhi	Betul, Guna, Shivpuri, Satna, Chhattarpur, Damoh
5	Jhabua	Dhar, Khargone

Source: Author's own calculation

Table 12 Kerala: model districts for low developed districts

S. no.	Low developed districts	Model districts
1	Wayanad	Kollam, Pathanamthitta, Kottayam, Kannur
2	Idukki	Pathanamthitta, Kottayam, Kannur
3	Kasaragod	Kollam, Pathanamthitta, Alappuzha, Kottayam, Malappuram, Kannur

Source: Author's own calculation

(in parentheses) for Haryana are given in Table 13. A glance at Table 13 makes it clear that the values of potential targets are higher than the present attainments in almost all the indicators. For example, in Mewat district, the population density and last decadal population growth rate are considerably above the state averages which need to be checked. In this district, the development of commercial establishments, banks, shops and manufacturing industry is poor which calls for conditions to attract private sector investment. Nonetheless, Mewat has been successful in improving the gender ratio and literacy in SC population, and its present achievements in these dimensions are better than the potential targets. However, female literacy rate is extremely low. Proper medical facilities are not also available in the district. Even, development of transportation system and roads length is not satisfactory. These infrastructural deficiencies require immediate government actions.

It is contented here that in Jhajjar district the last decadal growth rate of population is sizably below the state average and its potential target. In this district, other developmental necessities which required government special attention include: (1) development of warehouses, (2) irrigation facilities, (3) livestock improvement, (4) expansion of area under commercial crops, and (5) development of regulated farm produce markets. In the district of Mahendragarh, the government should be focused on: (a) assured power supply, (b) establishment of industries, (c) opening banks branches, (d) extension of roads, (e) urbanization, (f) farm mechanization, and (g) saving the girl child.

In low developed districts, appropriate action is needed to attain the potential targets and improve the level of development. A further scrutiny of data presented in Table 13 brings out that all dimensions of low developed districts are not low developed, but some dimensions are high or middle level developed. This finding suggests that in order to bring out improvement in socio-economic development in low developed districts area and dimension specific policies are needed.

The potential targets (in parentheses) for low developed districts of Madhya Pradesh state along with present value of the developmental indicators are given in Table 14. It may be seen that the values of the potential targets are very high for all indicators. Suitable action as indicated below is needed to achieve the potential targets and enhance the level of socio-economic development of low developed districts. The low developed districts are backward in agricultural and industrial developments. The productivities of wheat and rice are very low due to shortage of irrigation facilities and non-availability of fertilizer. Transport and communication systems are poor and medical facilities are insufficient to meet the needs of local people in these districts. Literacy rate is very poor. Steps should be taken to improve the irrigation facilities and also to provide fertilizer and other important inputs for high crop yield. Action is needed to improve the transport and medical facilities in low developed districts. Immediate action is required to enhance the level of literacy rate in these districts, proper educational system should be developed and the people should be

Table 13 Haryana: estimates of potential targets and actual achievements in low developed districts

S. no.	Developmental indicators	Low developed districts		
		Mewat	Jhajjar	Mahendragarh
1	Percentage net area sown	89 (72)	94 (85)	94 (78)
2	Per cultivator net area shown	1.35 (0.67)	2.3 (1.01)	1.1 (0.82)
3	Percentage area sown more than once	96 (61)	83 (46)	100 (68)
4	Productivity of wheat (kg/ha)	5,014 (3,816)	5,014 (4,347)	5,014 (4,673)
5	Productivity of rice (kg/ha)	2,752 (2,257)	4,341 (981)	3,437 (2,144)
6	Milk production (litre/capita/annum)	319 (145)	321 (251)	321 (306)
7	Percentage area under fruits and vegetables	0.014 (0.018)*	0.031 (0.007)	0.049 (0.004)
8	Number of tractors (per 1,000 ha of net area shown)	138 (41)	138 (99)	138 (34)
9	Number of tube-wells and pumping sets for irrigations (per 1,000 ha of net area shown)	292 (114)	318 (181)	318 (172)
10	Percentage of net area irrigated	100 (64)	100 (75)	100 (81)
11	Number of livestock (per 100 persons)	52 (42)	54 (36)	54 (42)
12	Number of poultry (per 1,000 persons)	3,184 (114)	3,384 (147)	3,384 (429)
13	Number of veterinary institutions (per 10,000 livestock)	3 (2)	3 (4)*	4 (3)
14	Farmers' membership of cooperative societies (per lack farmers)	218 (10)	680 (122)	680 (149)
15	No. of regulated markets (per lack hectare net sown area)	4 (4)	6 (1)	6 (3)
16	Capacity of state owned ware houses (kg/capita)	107 (28)	630 (16)	628 (53)
17	Percentage area under commercial crops	34 (18)	34 (17)	35 (38)*
18	Gross value of agricultural output (Rs/ha)	105,772 (72,071)	147,102(58,946)	147,102 (56,437)
19	Cereals production (kg/capita)	52(42)	54(36)	54 (42)
20	Agricultural gross value added (Rs/capita)	25,341(9,019)	38,990 (15,839)	38,990 (10,746)
21	Fertilizer applied (kg/ha)	220 (144)	369 (82)	369 (101)
22	Literacy rate in male (%)	87 (73)	89 (89)	93 (91)
23	Literacy rate in female (%)	65 (38)	72 (71)	77 (65)
24	Literacy rate in SC population (%)	56 (64)*	63 (63)	69 (64)
25	Number of primary schools (per lack persons)	90 (51)	90 (65)	90 (79)
26	Gender ratio (0–6 year children)	862 (903)*	862 (774)	862 (778)
27	Population density (per sq. km.)	463 (729)	303 (522)	303 (485)
28	Decadal growth rate of population (2001–2011)	13 (38)	12 (9)*	12 (13)
29	Number of health institutions (per lack persons)	17 (10)	17(16)	17 (15)
30	Number of beds available in health institutions (per lack persons)	58 (16)	58 (41)	159 (35)
31	Percentage problem villages	3 (76)	3 (33)	3 (48)
32	Percentage urbanization	32 (11)	46 (25)	46 (14)

Table 13 continued

S. no.	Developmental indicators	Low developed districts		
		Mewat	Jhajjar	Mahendragarh
33	Number of post-offices (per lack persons)	14 (4)	14 (15)*	14 (13)
34	Number of vehicles (per 1000 persons)	181 (55)	677 (144)	677 (131)
35	Length of roads (in km. per 100 sq. km. area)	65 (47)	74 (60)	74 (53)
36	No. of shops, commercial establishments, hotels and restaurants (per lack persons)	662 (4)	1,922 (463)	2,706 (615)
37	No. of peoples working in shops, commercial establishments, hotels and restaurants	979 (16)	1,085 (161)	5,369 (158)
38	Number of banks (per lack persons)	7(3)	9 (7)	12 (6)
39	Number of registered factories (per lack persons)	66 (0.18)	105 (49)	105 (7)
40	Number of registered factories (per 100 square km. area)	50 (0.11)	72 (26)	72 (3)
41	Number of worker employed in factories (per 10,000 persons)	573 (1)	573 (259)	573 (46)
42	Per capita value added by manufacturing industry (Rs)	32,460 (500)	32,460 (6069)	32,460 (100)
43	Number of power connections (per ten persons)	698 (435)	698 (286)	698 (175)

* Indicates that actual achievement is better than potential target. Figures in parentheses are the actual values of the developmental indicators

Source: Author's own calculation

encouraged for taking formal and non-formal education. Job opportunities may be created in these districts for improving the quality-of-life. For controlling the high growth rate of population, proper health clinic centres and better medical facilities should be provided.

Potential targets (in parentheses) and actual achievements of various indicators in respect of low developed districts of Kerala state are given in Table 15. It may be seen from the table that the districts of Idukki and Kasaragod are low developed in industrial sector and over-all socio-economic field. Immediate action is required to improve the level of development in the industrial sector. Wayanad district is low developed in socio-economic field and infrastructural facilities. In low developed districts, productivity of some of the crops is found to be low. Action is needed to enhance the productivity of crops. For example, fertilizer application should be enhanced.

8 Conclusions and Policy Implications

In the study, we have measured the development levels of different districts of India applying the composite index based upon optimum combination of selected socio-economic development indicators. The association between developments of different sectors of the economy is assessed and the districts of different regions are ranked precisely according to their levels of socio-economic development. The level of development is

Table 14 Madhya Pradesh: estimates of potential targets and actual achievements in low developed districts

S. no.	Developmental indicators	Low developed districts				
		Panna	Mandala	Shahdole	Sidhi	Jhabua
1	Food production (kg. per person)	222(318)	132 (318)	158 (318)	171 (285)	192 (249)
2	Productivity of wheat (kg/ha)	110 (210)	60 (170)	80 (170)	90 (200)	200 (210)
3	Productivity of rice (kg/ha)	19 (62)	3 (44)	7 (44)	13 (40)	16 (33)
4	Percentage net area sown	34 (67)	33 (61)	34 (59)	36 (57)	53 (61)
5	Percentage net area irrigated	19 (62)	3 (44)	7 (44)	13 (40)	16 (33)
6	Cooperative societies (per lakh cultivator)	65 (87)	22 (49)	29 (87)	31 (87)	19 (41)
7	No. of cows (per thousand person)	19 (62)	3 (44)	7 (44)	13 (40)	106 (117)
8	No. of buffaloes (per thousand person)	19 (62)	3 (44)	7 (44)	13 (40)	16 (33)
9	No. of factories (per lakh population)	2 (16)	5 (16)	7 (17)	2 (17)	6 (30)
10	Percentage of net area irrigated	19 (62)	3 (44)	7 (44)	13 (40)	16 (33)
11	Percentage village electrified	97 (99)	92 (99)	91 (99)	98 (99)	97 (99)
12	Primary health centre (per lakh population)	3 (6)	5 (6)	4 (6)	3 (5)	4 (5)
13	Length of roads (km./sq. km. area)	13 (30)	19 (23)	16 (30)	20 (30)	26 (29)
14	Registered vehicles (000' population)	6 (24)	5 (20)	11 (24)	9 (24)	6 (19)
15	Literacy level (%)	34 (53)	37 (53)	35 (53)	29 (46)	19 (36)
16	Primary schools (per lakh population)	109 (140)	163 (170)	100 (141)	86 (108)	111 (113)
17	Persons employed (per 000' registered persons)	9 (11)	3 (8)	8 (11)	3 (25)	42 (46)
18	Main workers (%)	35 (49)	47 (49)	38 (49)	38 (42)	39 (41)
19	Population growth rate (2001–2011)	27 (19)	24 (19)	30 (19)	39 (24)	42 (24)
20	No. of problem villages	872 (766)	2,053 (1,284)	1,953 (954)	1,623 (954)	2,326 (1,415)

Figures in parentheses are the potential values of the developmental indicators

Source: Based on Narain et al. (2003)

Table 15 Kerala: estimates of potential targets and actual achievements in low developed districts

S. no.	Developmental indicators	Low developed districts		
		Wayanad	Idukki	Kasaragod
1	Percentage net area sown	0.54 (0.78)	0.44 (0.78)	0.68 (0.78)
2	Percentage area sown more than once	0.74 (0.74)	0.23 (0.31)	0.14 (0.38)
3	Productivity of rice	36 (37)	34 (37)	31 (48)
4	Productivity of coconut	47 (59)	40 (59)	73 (73)
5	Productivity of arecanut	45 (104)	94 (104)	200 ()
6	Productivity of tapioca	34 (34)	32 (34)	24 (30)
7	Productivity of raw cashewnut	88 (94)	60 (94)	103 (103)
8	Productivity of black pepper	29 (39)	55 (55)	29 (39)
9	Productivity of banana	68 (89)	85 (89)	101 (101)
10	Productivity of cocoa	37 (64)	53 (64)	23 (128)
11	Fertilizer consumption	118 (244)	207 (244)	27 (244)
12	Number of livestock population	153 (228)	326 (326)	202 (228)
13	Main workers (%)	43 (43)	35 (39)	27 (39)
14	Number of industrial cooperative societies	165 (165)	41 (147)	43 (147)
15	Number of small scale industries	44 (249)	84 (249)	67 (249)
16	Number of medium and large scale industries	5 (34)	27 (34)	2 (34)
17	Number of handloom cooperative societies	4 (75)	10 (75)	8 (75)
18	Number of registered factories	14 (191)	32 (191)	27 (198)
19	Literacy rate (%)	86 (95)	89 (95)	85 (95)
20	Number of schools	29 (72)	47 (72)	53 (89)
21	Number of retail medical shops	15 (50)	22 (50)	24 (59)
22	Per capita income (00)	222 (235)	282 (282)	212 (235)
23	Number of foreign tourists (00)	6 (176)	269 (269)	7 (211)
24	Number of domestic tourists (000)	205 (311)	384 (354)	135 (311)

Figures in parentheses are the potential values of the developmental indicators

Source: Narain et al. (2005)

assessed separately for agriculture, industrial, infrastructural and overall socio-economic fields. All 80 districts of the selected states have been included in the study and classified into four development categories according to the values of the composite indices. A comprehensive agenda for socio-economic development of backward districts and other policy measures that need to be undertaken in various regions of India for bringing out uniform regional development are provided.

The constructed socio-economic development index shows that India's Southern region has been highly and symmetrically developed in comparison of Central and Northern regions. An international comparison of pattern of development brings out that asymmetry of socio-economic development in India is far below the Ghana. Furthermore, India's level of socio-economic development is better as compared to Malaysia.

The results show that wide disparities in the level of socio-economic development exist among different districts within and between different regions of India. The level of development in infrastructural service sector is found to be positively and statistically significantly associated with the overall socio-economic development indicating that the growth and progress of these sectors have been going hand in hand in the country. The

results show that in Northern and Central regions of India the level of industrial development does not significantly influence the agricultural and overall socio-economic development while agricultural development influences overall socio-economic development. Asymmetry is found to be higher in low level developed regions.

In case of Haryana state, the regional pattern of industrial development is found to be highly skewed in favour of the national capital region. It is noticed that industrial development does not have a significant bearing on overall socio-economic development in the state. Low developed districts are poorly developed in agriculture and infrastructural facilities as well.

For bringing about uniform regional development, model districts have been identified and potential targets for various development indicators have been estimated for low developed districts. Action should be taken to enhance the agricultural production in relatively less developed districts by providing more irrigation facilities, the chemical fertilizer and other modern techniques of cultivation. Improvement in basic infrastructural facilities like health, education, power, irrigation and transport in low developed districts is a prerequisite to improve the quality-of-life of the people and to usher in sustainable socio-economic development in those districts. Job opportunities should be created in backward districts for socio-economic upliftment of the rural people. The efforts are needed for availability of proper medical facilities and urbanization. The policy implication from our study is clear. That if the government wants an equitable distribution of development facilities, attention should be focused on the districts whose development has lagged far behind that of model districts. It is observed that all dimensions of low developed districts are not low developed, but some dimensions are high or middle level developed. To speed up the process of equitable socio-economic development, concrete area and dimension specific policy actions are urgently called for. This will require concerted efforts on the part of states governments and the centre. The determination on the part of government, the ruling elite and the people at large is even more important. The analysis described in the study is necessarily confined. Further work is needed in order to carry out comparisons over different time periods. In this way, it may be possible to assess more precisely the progress of particular districts or villages. As noted by Arief (1982) that comparative studies such as this are primarily directed towards hypothesis generating objectives rather than to hypothesis testing and are suggested as an additional tool for regional planning.

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