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2004

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Please refer to this article as appearing in Indian Journal of Applied Economics, Vol. 2, No. 1, 2005

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Acknowledgement is due to Prof. Ashok Mathur and Dr. Dipa Mukherjee for their valuable comments on the first draft. I am grateful to the participants of a seminar at Vidyasagar Univesity, Midnapore, WB for their comments during a presentation of this topic. Comments to the author are welcome at meriju@rediffmail.com

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Abstract

Development literature in the past decade has become more people centric with human development being projected as one of the 'ends' of development planning. The present paper tries to explore the trends, patterns and regional dimension of human development (HD) in India through construction of alternate HD indices. The association between HD indices and conventional measures like per capita income has been explored. Substantial inter-regional disparity in HD is observed. Probable reasons for such disparity have been inquired. Suggested policies to enhance HD include greater role of the State in provisioning of social infrastructure, especially to the hitherto marginalized groups.

1. Introduction

Development economics in recent years have become more people centric than before. It has rediscovered that human beings are both the means and the end of economic development process, and without *Human Development* (HD) that process becomes a hollow rhetoric. The maze of technical concepts and growth centric approach to development ruled the roost for the most of post war period. Only from the eighties onwards, we started to recognize that human needs and capabilities are necessary ingredients for success of any growth strategy. The pioneering work of Mahbub ul Haq and Paul Streeten under the aegis of UNDP finally institutionalised the importance of HD and the Human Development Reports brought out annually by UNDP reflects the condition of human being in different parts of the world. It has come to be recognised that improvements of human beings – their capabilities, skills and opportunities – are important targets by themselves. Moreover, this has substantial 'spill

over' effects as greater capabilities lead to higher productivity levels, increased income levels, and wider scope for further human capital formation. Thus uplifting of a single generation of citizen propels all future generations on to a higher growth trajectory. The 'trickle down' effects also are significant as better living standards lead to greater care for the environment & resources, a healthy & democratic civic society, and a lower discrimination based on gender, race and caste. These multiple roles of HD have catapulted it to centre-stage of research and discussion in recent years. As it has come to stay in limelight for a considerable time, techniques have been developed to objectively measure levels of HD and facilitate comparison across space and time.

The importance of HD is much more pronounced in a developing nation like India. Here development would mean improving the condition of human life – an end in itself – and the growth of income or spread of industries or the expansion of agriculture are to be seen as only means towards that end. More than fifty years ago, on an August night, our premier Prime Minister had called for "the ending of poverty and ignorance and disease and inequality of opportunity". These were the 'tasks' that faced a nascent nation burdened with ages of deprivation, inequality and low human standards. After five decades of measuring our success by the GNP growth, we must go back to those 'tasks' that were laid down for us and examine what we have achieved in reality. In this paper, we make an effort to trace the trend and regional issues related to human development in India over the period 1971-2001. The paper is divided into eight sections. In the next section, we discuss the methodology used for the study. The third section deals with the trends exhibited by HD at the National as well as Regional level during the period 1971-2001. The fourth and fifth sections analyse those trends in light of regional disparity in development levels. The sixth and seventh sections briefly visit some of the correlates and impacts of HD. A short summary as well as Policy suggestions is provided in the last section.

2. Methodology

Any study that attempts to study human development, over so vast a space as of India must be careful about, and give serious thoughts to, two very important aspects. They are: (a) Choice of variables or indicators, and, (b) The method of combining them into indices.

Both of them must be discussed in some detail.

Conventional indicators of development proper measure the end result of development process, namely - income generation, capital formation, or sectoral transition. But HD should include both capabilities in non-economic and economic domain. The general trend has been to include Health and Education as the two other capabilities that should supplement purchasing power in measuring HD. This approach has been taken by UNDP and has been followed by most of the researchers. But if we are to segregate between social capabilities from economic capabilities and explore how far the former enhances economic benefits, then the HDI should not include income capabilities. Consequently, in this paper we have developed two alternate measures of HD – Social Development Index (SDI – reflecting education and health conditions), and the conventional HDI (which includes income capability also). However, this is done at the second stage only. At the first stage, indices are prepared for Educational Development (EDI) and Health/Medical Development (MDI). Then, SDI is prepared from EDI and MDI while HDI is prepared from EDI, MDI and Per capita NSDP (PCNSDP).[1]

The second major methodological issue to be discussed is the method of combining the indicators to arrive at composite score. After grouping the variables under the sub-components already discussed, we have to construct composite indices representing EDI, MDI, SDI and HDI for the states of India, as well as the National level for each of the 30 years. The conventional measure of HDI (and its variants as evolved by various researchers over the years) uses subjective method of combining the indicators using an a-priori

weightage scheme. This method suffers from the problem of value-judgement whereby education, health and income are given equal weightage in the preparation of HDI. Even within educational attainment index, literacy and enrolment are combined in pre-fixed ratios. While the weightage scheme is (and has been) subject to various criticisms, the one that appeals most is that it does not take into account the real data. A situation where the observations are similar in educational attainments but disperse in health achievements should attach more importance to the later compared to the former while combining them so that the combined index brings out the disparity among the observations up to the maximum extent possible. This is generally done using Factor Analysis. Factor Analysis tries to find out the fundamental, or latent, 'Factor' within each cluster or group. Thus, each group would be combined into a 'factor' by linear combination of the variables of that group. This factor captures the essence or profile of that particular group and can then be used as a new variable representing a particular set of variables, or, in broader terms, a particular aspect of the data.

The most commonly and frequently used method of Factor Analysis nowadays is the Principal Component (PC) Method.[2] This method is considered better than giving weightages based on individual value-judgement, and is both popular and widely used by researchers.[3] A variant of this PC Method (Modified PC analysis – MODPCA) presumes that variables that significantly affect spatial spread of facilities have the tendency to be unevenly distributed over space (and time).[4] Consequently, they have high dispersion or variance and must also be given higher weightages while constructing the composite index. This can be done by finding out such a composite factor that would maximize the Sum of Squared Projections of the variables - the variables retaining their variance and not being transformed to have equal standard deviation through normalization.

In the present study, we accept the reality that variables measuring HD are widely dispersed over space (and time) and there is marked inequality among regions regarding their HD

levels. Consequently, MODPCA is used to construct the composite indices by finding out such a ' Weight' vector that maximizes the sum of squared projection of the transformed data matrix - after transforming them by dividing by mean.[5]

EDI and MDI are thus prepared using the MODPCA method. Index of social development level is prepared by using MODPCA on the individual indicators of EDI and MDI to give us SDI. First index of HD (HDI1) is then prepared by using MODPCA on the individual indicators of EDI & MDI and PCNSDP (PCGDP at national level). HDI2 is prepared by using the conventional (or revised UNDP) method of weightage. Thus, total 4 indices are prepared by using MODPCA: EDI, MDI, SDI, and HDI1. The process of combining has been done using the whole data set, i.e. for 16 States for all the 30 years. This implies that the standardization has been done using the same scale and the composite scores thus prepared are comparable among themselves. To derive HD indices for All India, the weight vector used for the states were used as weights on indicators for India. In almost all cases, the First Principal Component is able to explain more than 70% of the variation in the data matrix.

Let us then venture into study of HD in India using these indices.

3. Trends in Levels of Human Development in India

There has been a sustained rise in the parameters measuring level of development, both at the National and at the state level during the 30 years of study. If we look at National data (Table 1), we find that both the components of HD – EDI and HDI have shown a continuous rise during 1971-2001. The factor scores have increased by greater proportion for EDI compared to MDI. Consequently, SDI, HDI1 and HDI2 have also shown a sustained rise during this period. The rise in PCGDP has by far outstripped the social indices, and as a result, rise in HDI have been greater compared to those related to social sectors only. This indicates that the improvement as reflected by aggregate income level in India has not been matched by

improvement in human capabilities. This does not augur well for sustainability of the development process.

However, this rise in HD indicators has not been smooth or stable over the years. We can segment the study period into 6 quinquenna to examine this trend. Taking three yearly averages, scores of the indices for the 7 time-points – 1971, 1976, 1981, 1986, 1991, 1996 and 2001 are constructed. These scores are used in subsequent analysis (Table 2). This will also enable us to explore the post-reform dynamics by studying the 1991-96 and 1996-2001 periods.[6]

It is observed that EDI increased during the first and the third quinquenna, but declined during the second and the fourth one. During the '90s however, it has improved remarkably. On the other hand, MDI exhibited a steady rise during the first five periods, but during 1996-2001, it dropped by almost 6% annually. As a result, the improvement rates (since all our measures except PCNSDP are indices, we refrain from using the term 'Growth Rate') of SDI, HDI1 and HDI2 have been erratic over the six periods, though they have been positive all through. More or less similar trends are observed for the major states also.

Thus, it can be commented that the period 1971-2001 has experienced a steady improvement of human development levels in both the nation as a whole and the major states. However, one has to keep in mind that the improvement seems impressive more because the initial levels were too low. While it must be accepted that we have come a long way compared to from where we started, the absolute levels are still not satisfactory, especially if compared to international standards. For example, over the 30-year period 1971-2001, EDI, MDI, SDI and HDI1 have increased in India by 45-65 %, and HDI2 have increased by 107%. On the other hand, during the 30-year period of 1960-1990, HDI (as measured by UNDP method)

increased by 225% in Botswana, 160% in China and S. Korea, and over 140% in Malaysia. The Human Development Report 2003 (UNDP 2003) ranks India at 127 among 175 nations, just after Morocco and before Ghana, with a score of 0.590, compared to the highest score of 0.944 achieved by Norway. There has been only 42% improvement in HDI over 1975-2001 period in India, compared to 74 per cent in Nepal, more than 49 percent in Egypt & Bangladesh, and 47 per cent in Indonesia. This matter has to be noted with caution.

4. Regional Disparity in Human Development

One of the major concerns of economic planners in India has been the regional inequality in the fruits of development. There had been a huge gap between active and vibrant regions and the hinterland during the pre-independence period in terms of availability of facilities and this manifested itself in the form of unequal levels of development – both economic and human. On attaining independence, our proclaimed objective was to bring about regional equality in growth and development even at the cost of efficiency and aggregate growth. It is necessary to examine whether that intention has fully materialised.

a) Hierarchy of the states

Let us now examine the relative position of the states regarding different development indices (Table 3a and IIIb). It can be seen that the hierarchy has remained fairly similar over time – with the same states retaining the top and bottom positions. Delhi captures the top-most position for all the three development parameters for most of the years. This may have been caused by simultaneous working of different factors like - its small geographical size, its importance as the National Capital City and the huge capital expenditure incurred to modernize, develop and promote the National Capital Territory and make it comparable with other international cities. Among the other states, Kerala, Maharashtra and Himachal Pradesh put up consistently good performance regarding social and human development indicators. However, Kerala has not been able to convert its social development into economic progress

as indicated by its low PCNSDP rank. On the other hand, Gujarat, in spite of its having low HD ranks, have consistently good ranking in PCNSDP.

If we look more closely, a regional pattern emerges from the hierarchy of the states. It seems that the Northern, and Eastern states are persistently doing poorly in terms of HDI, whereas the Southern states (except Andhra Pradesh) are doing well along with the Western states. This clearly reflects a regional pattern with the Eastern, Northern and Central regions performing poorly with only West Bengal reaching close to the national average level of human development. This regional disparity is of grave concern. The only consolation is that when we look at the improvement rates, it seems that there is a tendency for the erstwhile lagging regions to slowly catch up with the other advanced regions of our country, which is heartening and desired.

b) Regional Disparity and Convergence - Divergence theory

Table 4 shows the inter-state variation in the different indicators of HD for the 1971-2001 period. It is observed that substantial variation exists in the level of HD among the states, measured by the Coefficient of Variation (CV). The variation is higher in EDI compared to MDI, and in HDI compared to SDI. This is caused by the relatively higher variation in PCNSDP compared to the humane indices.

More important than the levels of variation are the trends exhibited by the variation, i.e. whether the distribution is showing greater equality or otherwise over time. This has been done in economic literature using the two tests - σ test and β test. The former uses any rise (or fall) in CV as an indicator of rising (or falling) inequality. The later finds out the association between growth rates of indicators and their base levels. If the association is

positive, β test would conclude that higher initial levels lead to higher growth rate and hence Divergence in development levels. A negative association would indicate Convergence.

Various researchers have studied the trends in Inter-State variation in economic development and tried to find out whether the inequalities have widened over time. Many of them have commented that the pattern has followed the much-discussed 'Inverted-U' relatio nship, whereby the variation (measured mostly by coefficient of variation) has increased during the immediate period following development efforts (Williamson 1965, 1968). However, as the development results started to 'spread' and 'trickle down', the vari ation started to decline. Others however have refuted the existence of such a relationship in India and have shown that the relationship is in fact an 'Upright-U' one.[7] They point out that there had been a decline in the inter-state differences during the Fifties and the early and middle Sixties, but thereafter the differences increased noticeably. Let us now investigate this issue for the HD indices using the present framework (Table 5).

σ test: The experience of the states seems to be somewhat varied, along with an overall declining trend, if the σ test is used. Disparity in EDI declined consistently during 1971-1996 period but increased during 1996-2001 period. On the other hand, variation in MDI exhibits an alternate rise-fall cycle. When the composite indices are studied, it is observed that variation in all the three indicators - SDI, HDI1 and HDI2 - across states declined steadily during 1971-2001. Only HDI1 has shown a diverging tendency during 1996-2001.

β test: For conducting the β test the average annual improvement rates in each quinquenna have been regressed on the initial level with the states as observations. It is observed that EDI, MDI, SDI and HDI1 has shown converging tendencies all throughout (except divergence in HDI1 during 1971-76 period). Only during the 1991-96 period, i.e. the immediate post reform era, HDI2 has shown a diverging tendency. If we look at PCNSDP,

we find that while during 1976-81 period there was some converging tendencies, diverging tendencies have been experienced thereafter. During the 1996-2001 period, we can again trace a hint of stability in regional distribution of PCNSDP.

Broadly speaking, it can thus be concluded that variation in human development indicators have shown a steadily declining trend. However, the regional disparity seems to have increased in the immediate post-reform period for HDI1, a major cause of which is further slowing down of already poorly performing states. In fact, the difference between the average level of the better-off states and that of the worse-off states have widened during the immediate post-reform period. Though the situation has been reconciled to some extent in the next quinquenna, it remains a perennial source of concern.

5. Intra-state Variation in Levels of Human Development

It has been so far indicated that inter-state differences in HD is a major characteristic of development experience in India. Let us come down one further level and look at Intra-state variations in development. For this purpose, index of human development is prepared for the Districts of the 16 states for 3 time points - 1971, 1981, and 1991.[8] However, due to non-availability of comparable estimates of domestic products at the district level, we cannot prepare HDI1 and HDI2 for them. Thus, this part of the analysis is based on District level scores of SDI. Intra-state variation for a particular state is then measured by the CV obtained from the district scores of that state while their mean gives the Average level of development. Table 6 gives the Average level and Coefficient of Variation across districts exhibited by SDI for the states for the three years.

It can be noted that the intra-state variation is substantially high in many states. Highest intra-state disparity was observed in Rajasthan in 1971, and in Uttar Pradesh in 1981 and 1991. It is also to be noted that the intra-state disparity is high in some states where the average level

itself is low, e.g. Rajasthan, Uttar Pradesh, and Madhya Pradesh. This is of major significance since one can easily apprehend how far underdeveloped some of the districts in those states are. This also implies that these states are not only suffering from low average level of human development, but also that there are only a few isolated pockets of development in those states while the rest of the districts are lagging far behind. Moreover, it can also be seen that intra-state variation seems to be low in the advanced states (i.e. states with high average value of the indicators). This implies that those developed states have managed to improve their average level not by concentrating on a few isolated regions but by spreading the facilities more evenly across space. It thus comes out that the inequality is low at the upper end of development.

To test whether the inequality follows any pattern, especially to check whether the intra-state variation depends on the average level itself, the mean level and the coefficient of variation were subjected to Correlation Analysis. It was observed that that the Correlation Coefficients were small and insignificant and there seems to be no linear association between the average level and intra-state disparity.

This issue was further investigated with the help of 'Scatter Plots' to form an idea about the nature of the association. A loose Inverted-U shaped relation between the Coefficient of Variation and the Average level of the States may be inferred. This supports the often-discussed Kuznets' hypothesis that the inequality is low at lower ends of development level, increases as development proceeds, and then again decreases at upper levels of development.

6. Human Development in India – Some Correlates

We may seek to identify various possible correlates of social and human development in India. This will be helpful in understanding the reasons behind regional dissimilarity in social and human development in India and formulating policies for removal of such disparity.

Development of the social and human standards crucially depends on the infrastructure available (mostly provided by the State) for social services. Composite indices of educational, health and aggregate social infrastructure were prepared for an earlier study (Majumder, 2003). It is observed that the levels of HD in the states and districts are significantly positive associated with these infrastructural availability indices (Table 7). This implies that the regional disparity in availability of schooling, medical and health facilities are a major reason behind lopsided social and human development in the states of India. This also underlines the need for the State to ensure better and more evenly spaced out facilities.

7. Impact of Human Development

What are the most visible impacts of HD? If we consider HD as 'means' for attaining 'ends', then the most natural impact of human development would be on economic well being of the people. We find this to be true. The association between HDI and SDI on one hand, and economic indicators like PCNSDP, Monthly Private Consumption Expenditure (MPCE), Private Final Consumption Expenditure on Food (PFCEF) on the other, are observed to be significantly positive (Table 8). Though the relation with HDI may be questioned on the basis of circularity (since HDI contains PCNSDP), that between purely non-economic factor SDI and the economic well being levels is remarkable.

However, one of the major impacts of HD is to make people more capable in a holistic sense. Improvements in health, education and earning capabilities have greater marginal benefit for the poor and the excluded. Thus, a rise in overall level of HD is expected to lead to a more equal distribution of economic opportunities along with the rise in its average level. To explore this issue, the association of economic inequality (as given by the Gini coefficient of MPCE) and incidence of poverty with HD levels is examined. It is observed that for most of

the periods, this association is significantly negative. This indicates that with rising social and human development levels, one takes long strides in attaining egalitarianism as well. However, for 2001 the association between HD levels and consumption Gini is observed to be positive, indicating rising economic inequality in the states with high HD levels. The post reform changes in structure and nature of capabilities demanded may have caused a substantial portion of people to be excluded from economic processes even in the developed states. Given that the inequality among the states (and also that within the states) are quite substantial even in 2001, this is of serious concern as the benefits of five decades of planned development may be undermined. The excluded mass of people will become desperate to snatch the right to acquire capabilities and improve their living standards, and the elite will be equally desperate to hold on to their privilege. This is a fertile ground for civic unrest and it is not surprising that the extremist activities in India are emerging in vast tracts of relatively backward areas like Central Indian plains, Telengana and North-eastern region. This issue requires greater attention of both academicians and policy makers.

8. Summary Findings and Policy Issues

The major findings can be summarized as:

1. The levels of HD in India and its constituent states have increased substantially during the three decades of the present study;
2. The improvement rates have been moderate when compared to global experiences;
3. The hierarchical position of the states has remained more or less similar over the period 1971-2001;
4. While educational opportunities have expanded in the post reform period, medical and health standards have deteriorated in this period;
5. Substantial inter-state and intra-state variation in HD levels exists;

6. Regional disparity seems to have declined over the years but has increased for HDI1 in the immediate post reform period;
7. The main cause of rising regional disparity in the immediate post reform period has been the slowing down of the worse-off states and acceleration of the better-off states;
8. This has direct correlation with the withdrawal of the State from provisioning of health and medical facilities in particular and developmental projects in general;
9. The impact of rising HD levels seems to be not only on the aggregate income and consumption levels, but also on the incidence of poverty and intra-state consumption inequality.

What lesson does this hold for policy makers? While the importance of HD is underlined, India must concentrate on its regional and inter-personal disparity and distributional effects. Huge diversity among regions and groups of people create serious inequality among people both across states and within the same state. To resolve these issues, important tools in the hands of the policy makers seems to be provisioning of social infrastructure. In this era of withdrawing state support, a few words in this context are worth mentioning. Social infrastructure provisioning in India has always been burdened with the preconceived notion that these are not profitable activities and the provisioning of those services has to be the responsibility of the State. Theoretically, this is justified by the 'Social Good' character of these services and the related External Economies. However, this method is facing increasing problems because of excess demand, inefficient services, failure of the Government to upgrade technology and inefficient management. The state has had to shoulder the financial burden of providing such services, which have become increasingly costly over time. There has been no effort to recover 'user charges' or even any analysis to gauge the prices that the users are willing to pay. Consequently, these sectors have always been a drain on the public

exchequer. As the resource crunch has become serious in recent times, the allocation of funds to these sectors has slowed down and the State is increasingly unable to meet the rising demand for such services. But withdrawal of the State affects the poorer section of the people and not the rich who can afford private purchase of those services. Galbraith's comment about 'Private affluence amid public squalor' is most appropriate to describe the situation. As a result, human development is bound to suffer a setback (At the higher ends of human development levels, availability or otherwise of services does not have much effect as they are already on the higher HD trajectory. But at the lower ends of the scale, huge marginal impacts are evident). Consequently, instead of withdrawing its services in blanket terms, the govt. must adopt a differential price policy. Differential prices must be based on 'Block Tariff' policy, where a subsidized rate is charged for first few units of service (called the 'lifeline' rate) so that the poor can access the service, at least up to the basic minimum necessity level. Beyond that, the rates must be taxed to recoup the subsidy - so that rich or heavy users pay more than the cost. This will make the services sustainable without sacrificing the goals of social equity.

In other words, we must sincerely endeavour to create an environment and policy atmosphere that will uplift and empower the socially marginalized and hitherto excluded mass of people. The real answer lies in adopting a development model based on 'equality of opportunity' and centrality of human beings, where fixation with growth does not overshadow the real people for whom growth is advocated. After 50 years, the struggle for independence is still on.

Notes

[1] The indicators used to construct the indices are as follows. EDI – Literacy percentage and Gross Enrolment Ratio in Primary, Middle and Secondary stages. MDI – Infant Mortality Rate, Crude Birth Rate and Crude Death Rate (after suitably transforming them to reflect positive dimension).

[2] For comparative studies, see Kundu and Raza (1982), Chattopadhyaya and Pal (1972), Chattopadhyaya and Raza (1975) and Kothari (1988).

[3] For a precise analytical study of various methods of construction of composite indices see Kundu, A. (1980) and Kundu and Raza (1982).

[4] In the present case however, there is a-priori logic in favour of this method, as we have already alienated the variables in such a way that indicators reflecting a certain aspect of HD are grouped together. Thus, they are likely to move together rather than astray.

[5] This MODPCA method has been evolved by Amitabh Kundu et al. Refer to Kundu (1980).

[6] It is often argued that the mean used should not be the simple average of the indicators, but an weighted average of them, the weights being either area or population of the observations (districts or states), depending on which factor the indicator was standardized by. However here the purpose is to make the variables scale-free and express them relative to a common factor. Hence simple mean will serve our purpose.

[7] Structural Adjustment Programme was initiated in big way in India in 1991 – generally known as the year of reforms. Post-1991 developments generally are referred to as pos-reforms dynamics.

[8] Mathur (1983) obtained such U-shaped pattern for the 1950-51 - 1975-76 period in India for Aggregate Per Capita State Income, and also for Per Capita State Income from Primary, and Tertiary sectors. For Secondary sector he obtained an Inverted-U shaped pattern. Other studies include Rao (1973), Sampath (1977), Mohapatra (1978) and Nair (1982).

[9] The indicators used for EDI, MDI and SDI are available mostly from the District Census Handbooks, Census of India. Till date, DCHs for 2001 are not available and so we have to be content with 1991 data.

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Table 1

Composite Indices of Development in India - 1971 - 2001

YEAR	EDI	MDI	SDI	HDI1	HDI2
1971	1.856	1.002	1.864	2.003	0.304
1972	1.372	1.546	1.898	2.026	0.330
1973	1.890	1.694	1.919	2.051	0.351
1974	1.278	1.761	1.916	2.044	0.349
1975	1.869	1.827	1.913	2.062	0.357
1976	1.832	1.906	1.940	2.083	0.361
1977	1.892	1.983	1.954	2.112	0.366
1978	2.149	1.071	1.988	2.154	0.379
1979	2.466	1.755	2.069	2.201	0.385
1980	1.662	1.253	2.070	2.215	0.400
1981	1.883	1.006	2.067	2.223	0.418
1982	2.123	1.693	2.130	2.283	0.435
1983	1.606	1.693	2.195	2.363	0.451
1984	2.255	1.828	2.258	2.426	0.462
1985	2.395	1.438	2.305	2.475	0.482
1986	1.605	1.602	2.319	2.495	0.487
1987	1.802	1.744	2.317	2.500	0.488
1988	1.794	1.480	2.310	2.527	0.509
1989	2.553	2.307	2.448	2.669	0.521
1990	1.641	1.256	2.490	2.727	0.537
1991	1.198	1.794	2.509	2.733	0.542
1992	1.426	2.320	2.584	2.818	0.547
1993	2.020	1.501	2.627	2.878	0.561
1994	1.968	1.981	2.677	2.952	0.578
1995	1.912	2.005	2.745	2.997	0.587
1996	1.881	2.124	2.933	3.214	0.621
1997	1.895	2.004	2.956	3.125	0.613
1998	1.978	1.978	2.978	3.217	0.619
1999	2.121	1.856	2.867	3.328	0.631
2000	2.178	1.771	2.931	3.401	0.627
2001	2.677	1.515	2.959	3.310	0.629
Aggregate Improvement Rate					
1971-01	44.2	51.2	58.7	65.3	106.9
Average Decadal Compound Improvement Rate					
1971-81	0.24	0.46	1.07	1.08	2.44
1981-91	-1.08	2.18	1.86	2.05	2.63
1991-01	5.50	-1.90	1.57	1.82	1.51
1971-01	1.51	0.23	1.50	1.65	2.19

Note: EDI, MDI, SDI, and HDI refer to Educational, Medical, Social and Human Development Indices respectively; HDI1 follows PCA Method and HDI2 follows UNDP Method.

Source: Author's calculations.

Table 2

Average Level and Quinquennal Improvement Rates in Development indicators and Per Capita GDP (PCGDP)

Year	3 Year Average Levels						Average Quinquennal Compound Improvement Rate					
	EDI	MDI	SDI	HDI1	HDI2	PC GDP	EDI	MDI	SDI	HDI1	HDI2	PC GDP
1971	1.706	1.414	1.894	2.027	0.328	1519	(Improvement over the previous time point)					
1976	1.804	1.710	1.942	2.091	0.362	1574	1.1	3.9	0.5	0.6	2.0	0.7
1981	1.748	1.480	2.106	2.257	0.418	1696	-0.6	-2.8	1.6	1.5	2.9	1.5
1986	1.770	1.618	2.302	2.485	0.486	1905	0.3	1.8	1.8	1.9	3.1	2.4
1991	1.568	1.836	2.532	2.765	0.542	2238	-2.4	2.6	1.9	2.2	2.2	3.3
1996	1.925	2.053	2.805	3.083	0.600	2710	4.2	2.3	2.1	2.2	2.1	3.9
2001	2.677	1.515	2.959	3.310	0.629	3085	6.8	-5.9	1.1	1.4	1.0	2.6

Note: Same as Table 1.
Source: Same as Table 1.

Table 3a

Rank of the States - Quinquennal Average of Social & Human Development Indicators

	SDI							HDI1						
State	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**
Andhra	13	15	12	11	11	11	8	13	14	12	12	12	12	10
Bihar	14	14	17	17	17	17	16	16	16	17	17	17	17	17
Delhi	1	1	2	2	2	3	1	1	1	1	1	1	1	1
Gujarat	9	7	7	7	6	6	6	9	7	7	7	7	5	5
Haryana	8	10	11	10	10	10	9	7	10	10	8	8	8	8
Himachal	5	5	5	4	4	5	5	6	5	6	5	5	6	6
Karnataka	10	8	9	8	8	7	7	10	9	9	9	9	9	7
Kerala	2	2	1	1	1	1	2	2	2	2	2	2	4	3
Madhya	15	17	16	14	13	13	12	14	17	16	14	14	14	14
Maharastra	4	4	3	5	5	4	3	3	4	4	4	4	2	2
Orissa	16	12	13	13	14	15	15	15	12	13	13	15	15	15
Punjab	6	3	6	6	7	8	10	5	3	3	6	6	7	9
Rajasthan	17	16	15	16	15	14	11	17	15	15	16	13	13	13
Tamilnadu	3	6	4	3	3	2	4	4	6	5	3	3	3	4
Uttar	12	13	14	15	16	16	17	12	13	14	15	16	16	16
W Bengal	7	9	8	9	9	9	14	8	8	8	10	10	10	12
India	11	11	10	12	12	12	13	11	11	11	11	11	11	11

Note: The seven Time points referred to are 1971, 1976, 1981, 1986, 1991, 1996 and 2001.
Source: Same as Table 1

Table 3b

Rank of the States - Quinquennal Average of Human Development Indicators & PCNSDP

	HDI2							PCNSDP						
State	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**
Andhra	11	12	11	12	12	12	13	13	13	11	12	12	12	13
Bihar	17	16	16	16	17	17	17	17	17	17	17	17	17	17
Delhi	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gujarat	10	10	9	9	7	5	5	5	5	5	5	5	5	4
Haryana	5	9	10	7	8	9	10	3	4	4	3	3	4	5
Himachal	4	6	5	6	6	6	6	6	6	6	8	10	10	9
Karnataka	9	8	8	10	10	10	7	11	12	10	9	8	9	11
Kerala	2	2	2	2	2	3	2	10	10	12	11	11	11	10
Madhya	13	15	15	14	14	16	14	12	14	13	16	15	14	14
Maharastra	6	4	3	3	3	2	3	4	3	3	4	4	2	2
Orissa	15	13	14	15	16	15	15	16	16	14	13	16	16	16
Punjab	7	5	4	4	5	6	8	2	2	2	2	2	3	3
Rajasthan	14	14	13	13	13	13	12	14	11	15	14	13	13	12
Tamilnadu	8	7	7	5	4	4	4	8	9	9	10	6	6	8
Uttar	16	17	17	17	15	14	16	15	15	16	15	14	15	15
W Bengal	3	3	6	8	9	8	9	7	7	8	6	7	8	6
India	12	11	12	11	11	11	11	9	8	7	7	9	7	7

Note: The seven Time points referred to are 1971, 1976, 1981, 1986, 1991, 1996 and 2001.
Source: Same as Table 1

Table 4

Inter-State Variation in Composite Indices of Development
Coefficient of Variation (%) 1971 - 2001

YEAR	EDI	MDI	SDI	HDI1	HDI2	PCNSDP
1971	32.4	28.9	22.4	23.9	34.1	38.2
1976	27.4	23.9	22.8	24.2	31.4	41.7
1981	26.7	20.7	20.6	21.8	25.1	41.3
1986	29.1	21.5	18.6	20.0	20.4	44.7
1991	26.1	19.0	17.4	19.1	18.2	45.1
1996	23.7	25.1	15.1	17.8	17.6	45.7
2001	33.3	21.5	13.9	18.9	16.5	45.5

Note: Same as Table 1.
Source: Same as Table 1.

Table 5

Trends in Regional Inequality in Human Development - σ and β tests for Convergence

	Year	EDI	MDI	SDI	HDI1	HDI2	PCNSDP
CV Test or σ Test	**1971-76**	Conv	Conv	*	Div	Conv	Div
	1976-81	Conv	Conv	Conv	Conv	Conv	Conv
	1981-86	Conv	Div	Conv	Conv	Conv	Div
	1986-91	Conv	Conv	Conv	Conv	Conv	Div
	1991-96	Conv	Div	Conv	Conv	Conv	Div
	'96-2001	Div	Conv	Conv	Div	Conv	Div
Correlation Test or β Test	**1971-76**	Conv	Conv	*	Div	Conv	Div
	1976-81	Conv	Conv	Conv	Conv	Conv	Conv
	1981-86	Conv	Conv	Conv	Conv	Conv	Div
	1986-91	Conv	Conv	Conv	Conv	Conv	Div
	1991-96	Conv	Conv	Conv	Conv	Div	Div
	'96-2001	Conv	Conv	Conv	Conv	Conv	Div
Final Conclusion	**1971-76**	Conv	Conv	*	Div	Conv	Div
	1976-81	Conv	Conv	Conv	Conv	Conv	Conv
	1981-86	Conv	*	Conv	Conv	Conv	Div
	1986-91	Conv	Conv	Conv	Conv	Conv	Div
	1991-96	Conv	*	Conv	Conv	*	Div
	'96-2001	*	Conv	Conv	*	Conv	Div

Note: Same as Table 1.
Source: Same as Table 1.

Table 6

Levels and Variation in SDI within the States

	Average of the Districts			CV among the Districts (%)		
State	**1971**	**1981**	**1991**	**1971**	**1981**	**1991**
Andhra Pr.	1.606	1.244	1.215	9	11	28
Bihar	1.330	1.319	1.696	13	13	12
Gujarat	1.741	1.195	1.642	11	22	7
Haryana	1.597	1.199	1.587	5	4	5
Himachal Pr.	1.794	1.444	1.856	12	35	27
Karnataka	1.631	1.620	1.633	10	19	8
Kerala	2.611	2.677	2.126	10	9	7
Madhya Pr.	1.990	1.256	1.395	42	26	9
Maharashtra	1.786	1.368	1.673	15	10	6
Orissa	1.875	1.674	1.388	20	14	10
Punjab	1.706	1.265	1.606	5	4	6
Rajasthan	2.536	1.398	1.907	70	55	18
Tamil Nadu	1.763	1.355	1.697	6	6	5
Uttar Pr.	2.663	1.843	1.694	31	143	97
W. Bengal	2.143	1.374	2.380	26	32	23

Source: Same as Table 1.

Table 7

Association of Human Development Indices with Possible Correlates

Year	Correlates	EDI	MDI	SDI	HDI1	HDI2
	Educational Infrastructure	0.081		0.705**	0.760**	0.639**
1971	**Medical Infrastructure**		0.634**	0.755**	0.814**	0.717**
	Social Infrastructure			0.704**	0.767**	0.657**
	Educational Infrastructure			0.633**	0.704**	0.601*
1976	**Medical Infrastructure**		0.527*	0.821**	0.877**	0.790*
	Social Infrastructure			0.698**	0.767**	0.663**
	Educational Infrastructure	0.231		0.558*	0.661**	0.460
1981	**Medical Infrastructure**		0.655**	0.778**	0.868**	0.724**
	Social Infrastructure			0.716**	0.813**	0.645
	Educational Infrastructure	0.087		0.479	0.620**	0.429
1986	**Medical Infrastructure**		0.160	0.733**	0.835**	0.737**
	Social Infrastructure			0.682**	0.805**	0.668*
	Educational Infrastructure	0.238		0.395	0.552**	0.372
1991	**Medical Infrastructure**		0.458	0.718*	0.795**	0.722**
	Social Infrastructure			0.654**	0.771**	0.650*
	Educational Infrastructure	0.040		0.337	0.476	0.358
1996	**Medical Infrastructure**		0.616**	0.661**	0.719*	0.649**
	Social Infrastructure			0.585*	0.694**	0.593*
	Educational Infrastructure	0.333		0.498*	0.628**	0.417
2001	**Medical Infrastructure**		0.127	0.685**	0.757**	0.681*
	Social Infrastructure			0.677**	0.782**	0.639**

Note: Same as Table 1. ** -Significant at 1%, * - Significant at 5%, Correlations with significance level above 20% are not reported.

Source: Author's calculations.

Table 8

Impact of Human Development on Possible Correlates

Year	Correlates	SDI	HDI1	HDI2
	PCNSDP	0.528*	0.733**	0.671**
	MPCE	0.499*	0.611**	0.532*
1986	**PFCEF**	0.429	0.523*	0.454
	Incidence of Poverty	-0.262	-0.347	-0.396
	Gini Coefficient	-0.247	-0.326	-0.217
	PCNSDP	0.537*	0.760**	0.689**
	MPCE	0.207	0.199	0.084
1991	**PFCEF**	0.236	0.240	0.127
	Incidence of Poverty	-0.349	-0.464	-0.467
	Gini Coefficient	-0.212	-0.287	-0.188
	PCNSDP	0.619**	0.827**	0.783**
	MPCE	0.033	0.021	0.055
1996	**PFCEF**	0.086	0.081	0.010
	Incidence of Poverty	-0.410	-0.511*	-0.539*
	Gini Coefficient	-0.145	-0.210	-0.181
	PCNSDP	0.757**	0.902**	0.823**
	MPCE	0.715**	0.795**	0.698**
2001	**PFCEF**	0.437	0.515*	0.448
	Incidence of Poverty	-0.421	-0.504*	-0.536
	Gini Coefficient	0.418	0.387	0.324

Note: Same as Table 7.

Source: Author's calculations.