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in Madhya Pradesh, India**

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## Abstract

The present paper analysis social class disparities or inequalities in human development in Madhya Pradesh, India. The analysis reveals that within state and within district disparity in human development by social class and residence, as measured by a modified human development index, is very substantial in the state and reduction in this disparity or inequality is critical to human progress in the state. The analysis calls for strengthening human capabilities in the state through creating, supporting and sustaining institutions to accelerate human progress in the state.

## Key Words

Madhya Pradesh, India, Human Development, Human Development Index, Decomposition, Social Class, Scheduled Castes, Scheduled Tribes

## Introduction

Madhya Pradesh was the first state in India to prepare sub-national human development report in 1995 to chart human progress at district level. The 1995 Report has been followed by similar reports in 1998, 2002 and 2007 (Government of Madhya Pradesh, 1995; 1998; 2002; 2007). An integral feature of these reports is the estimation of human development index (HDI) for constituent districts which are based on the approach popularised by United Nations but use different set of indicators, the choice of which is largely influenced by the availability of information at the district level.

Madhya Pradesh human development reports provide estimates of HDI for the districts of the state but, interestingly, not for the state as a whole. Estimates of HDI for Madhya Pradesh are prepared by the Government of India along with other states of the country (Government of India, 2002). According to these estimates, HDI in Madhya Pradesh increased from 0.245 in 1981 to 0.328 in 1991 and to 0.394 in 2001 (Table 1). Madhya Pradesh is one of the three states of India which have been able to improve their rank in HDI vis-a-vis other states of the country. It may however be noted that despite these improvements, the state of human development in Madhya Pradesh remains amongst the poorest in the country. Moreover, the pace of human progress appears to have slowed down during the 1990s. As a result, the gap in human progress in Madhya Pradesh and India appears to have widened in recent years. Estimates prepared by the Government of India also suggest that the rural-urban gap in human development in Madhya Pradesh appears to have widened over time. The HDI in the rural areas of the state increased from 0.209 in 1981 to 0.282 in 1991 whereas the HDI in urban areas increased from 0.395 to 0.491 during this period; separate estimates for rural and urban areas for the year 2001 are not available (Government of India, 2002).

Table 1  
Human Development Index in Madhya Pradesh and India

Year	Human Development Index		Rank of Madhya Pradesh among 15 major states of India
	Madhya Pradesh	India	
1981	0.245	0.302	14
1991	0.328	0.381	13
2001	0.394	0.472	12

Source: Government of India (2002)

At the same time, little is known about social class and rural urban disparities in human development within the state. This is so when social class and residence disparities in all aspects of social and economic development in Madhya Pradesh are well known for their strength and these disparities. More than 35 per cent of the state population was classified as Scheduled Castes and Scheduled Tribes at the 2001 population who are widely recognised as the most vulnerable groups of the society. There has however been little attempt to highlight social class and rural-urban inequalities in human progress in the state.

The aim of this paper is to highlight the social class and rural-urban disparities in human progress in Madhya Pradesh and in its constituent districts by preparing consistent estimates of human development index. The consistency in the estimates of human development index is ensured through using the same set of indicators and same data set to measure different dimensions of human development. Estimates of the human development indices so obtained have then been used to analyse the social class inequality in human in human progress in the state. The analysis presented in this paper suggests that social class and rural-urban inequality in human development in the state and in its constituent districts are very strong and have persisted over time. As such, any discussion on the state of human development in the state is of little value in the absence of any discussion about social class and rural-urban disparities.

### The Human Development Index

Human development is described as the expansion of the capabilities of an average individual and, therefore, necessary for human progress. According to Sen (1984, 1985, 1990, 1999), capability is the ability and the potential to do and to be. Human development is thus broadening of the set of valuable beings and doings an individual can achieve and the freedom to achieve valuable doings and beings. Capability gives the combinations of functioning achievable by an individual. It is this set of functionings that reflects the freedom of an individual to make choices of possible livings. Capabilities include endowments, individual capacity and social opportunity. The three components of capability are complementary. They reinforce each other. Measuring and monitoring human development requires measuring and monitoring the three components of human capability. The human development index is the most widely used indicator of human capability. It was first used by the United Nations to shift the focus of development economics from national income accounting to people centred policies (Haq, 1995). The index and its three constituent indices are estimated in a manner that they vary from a minimum value of zero to a maximum value of one (Government of India, 2002; Government of Madhya Pradesh, 2002; United Nations, 1996). Any country, state or district can be classified as very poor, poor, average, good and very good in terms of human progress on the basis of the human development index. Human progress is termed as very poor if the human development index is less than 0.2; it is termed as poor if the human development index ranges between 0.2 to 0.4; average if the index varies between 0.4 to 0.6; good if the index ranges between 0.6 to 0.8 and very good if the human development index is more than 0.8.

Although the human development index is now used universally to measure and monitor human progress, it has also been criticized on a number of grounds. One argument is that the index does not include any ecological considerations and focusses exclusively on national performance and ranking without paying much attention to development from a global perspective (Sagar and Najam, 1998). The index has also been termed as "redundant" and a "reinvention of the wheel", measuring aspects of development that have already been exhaustively studied (McGillivray, 1991; Srinivasan, 1994). It has also been argued that the conventional human development index gives an inappropriate treatment to income, lacking year-to-year comparability, and assessing development differently in different groups of countries (McGillivray and White, 2006). Some researchers has questioned the methodology of calculating the index and argued that the way scores in each of the three components are bounded

between zero and one, the rich countries cannot effectively improve their rank in certain categories, even though there remains a lot of scope for economic growth and longevity (Caplan, 2009). It has also been argued that the index adds little to the value of individual measures composing it; as a means to provide legitimacy to arbitrary weighting of a few aspects of social development; as a number producing a relative ranking which is useless for inter-temporal comparisons, and difficult to compare a country's progress or regression because the index for a country in a given year depends on the levels of, say, life expectancy or gross domestic product per capita of other countries in that year (Rao, 1991; McGillivray, 1991; Hopkins, 1991; Granados, 1995).

On a completely different reasoning, it is argued that the conventional human development index is based on the wisdom that provision of material amenities alone would bring about human progress. If human development, in the true sense, embraces both material and moral development and well-being, then human development efforts should not end up in amelioration of material deprivations alone. It must undertake to bring about spiritual and moral development to assist the biped to become truly human (Basu, 2005).

Because of these and many other criticism of the simple human development index, a few authors have also proposed alternative approaches to measure human progress to address some of the shortcomings of the conventional human development index (Nurbakhsh, 1998). However, no development index other than, perhaps, gross domestic product per capita, has been used so extensively - or effectively, in development discourse as the human development index.

Questions have also been raised about the rationale of simple averaging of the three components of the human development index. There have been attempts to evolve a more rational approach of combining the three components of the index through the application of principal components analysis technique, although it was found that the results based on the principal component analysis are very similar to those based on the simple averaging process (Biswas and Caliendo, 2001; Lai, 2003).

Aggregate statistics like the human development index are most suited for descriptive purposes such as rank-ordering of the geopolitical units and gauging the progress in human development over time in the same geopolitical unit. These statistics are however less useful for analytical purposes. One reason is that different components of the human development index are generally imperfectly correlated and so it is difficult to examine possible causal interrelationships among different components (the endogeneity problem). Similarly, it is difficult to properly interpret the causal relationships that are exogenous to the human development index. Finally, inclusion of income as a factor in the calculation of the human development index means that the human development index of any geopolitical or administrative unit will be less sensitive to the well-being of the least-advantaged members of the unit. (Hicks and Streeten, 1979; Sagar and Najam, 1998; Silber, 1983; Dreeze and Sen, 1989; Moon, 1991; Moon and Dixon, 1985; Morris, 1979; Nissan, 1993; Sahn and Stifel, 2000).

Two ways have been suggested to circumvent these problems. The first is to exclude income component from the construction of any index designed to measure human development. There are more than one ways to do this. One way is to use the index like the physical quality of life index in place of the conventional human development index (Morris, 1979). The other is to construct the modified human development index that takes into consideration education and health components of the conventional human

development index but excludes the economic component (Ramirez, Ranis and Stewart, 1998). A more rational approach, on the other hand, is to examine the three indexes that constitute the conventional human development index separately instead of combining them into one index.

Despite all these limitations, the human development index is now used universally to measure human progress and monitor development. Every year, United Nations member states are listed and ranked according to the computed human development index. If the rank of a country in the human development index is high, it is used as a means of national aggrandizement; alternatively, if the rank is low, it is used to highlight national insufficiencies. The index has also been used to measure the impact of economic policies on the quality of life (Davis and Quinlivan, 2006).

## Methodology and Data Source

We use information available through 2001 population census to measure human progress in Madhya Pradesh and to highlight inter-district, social class and residence disparities. The approach of measuring human progress comprises of estimating the conventional human development index for the state and for its constituent districts by social class and residence. It is well known that the conventional human development index measures human progress on a three dimensional scale - the dimension of standard of living; the dimension of health and longevity; and the dimension of knowledge and education. The three dimensions of the human development index are related to the three dimensions of the capabilities framework propounded by Sen - the dimension of endowments, the dimension of capacity and the dimension of opportunity, respectively. In the conventional human development index, the dimension of standard of living is captured through per capita income in absolute or in purchasing power parity terms; the dimension of health and longevity is captured through the expectation of life at birth; and the dimension of opportunity is captured through adult literacy and gross enrolment ratio. There are however, other indicators also to measure the three dimensions of the conventional human development index. In fact, use of an indicator depends upon the availability of the information related to the indicator.

Information available from the 2001 population census permits estimation of the expectation of life at birth to capture progress on the dimension of health and longevity. Similarly, information required for estimating the adult literacy rate and the proportion of children in school is also available through the 2001 population census. However, estimates of income per capita are not available through the 2001 population census to measure the progress on the dimension of standard of living. The Government of Madhya Pradesh has recently prepared estimates of district domestic product and income per capita for the districts of the state at current and fixed prices but these estimates are not available by social class and rural-urban residence to permit analysis of social class and rural-urban inequalities in human progress (Government of Madhya Pradesh, 2009).

In the absence of the information about per capita income, an alternative is to find out surrogates of per capita income which varies across the districts of the state in the same manner as the per capita income. Information on two such variables is available from the 2001 census. The first is the availability of six household assets - radio/transistor, television, telephone, bicycle, scooter/motorcycle/moped, and car/jeep/van while the second is the use of banking facilities. It is argued that assets that

a household possesses, or to which, it has an access, can be related to household or individual income in the sense that the latter may be conceptualised as returns to these assets. In this view, income of a household or an individual reflects the assets it commands and the returns, it is able to earn on these assets. Assets may also be important to the household in their own right. Having a sufficient level of household assets also offers security. Households having assets can insure themselves against shocks and gain easier access to credit. Assets also capture long term dynamics of household economics much better than the measure of income at one or two points in time. In addition, assets can, in principle, be considered in a range of different dimensions of the capital including the social capital. In addition to the return in terms of income, assets are also likely to be important to households and individuals in their own right; representing wealth and status, economic and social security and easier access to credit. Deprivation of key assets may therefore be thought of a good indicator of ill-being in its own right. Indicators of deprivation of assets aim to measure living standards directly by looking at 'enforced lack' of a set of material goods or social activities. By enforced lack, we mean the items that a household or an individual would like to have but cannot afford because of the lack of either resources or opportunities or different choices and preferences. In this way, assets-based indicators also take into account the role of preferences and choices of the households and the individuals which are important dimensions of the standard of living.

Table 2

Results of the regression of logarithm of real per capita net domestic product on proportion of asset less households and proportion of households not using banking facilities, Madhya Pradesh, 2000-01

Variables in regression	B	SE(B)	t	p	
Constant	4.718	0.120	39.164	0.000	
Proportion of asset less households	-0.469	0.134	-0.448	-3.509	0.001
Proportion of households not using banking facilities	-0.699	0.210	-0.425	-3.330	0.002
F = 49.095, p=0.000			R <sup>2</sup> = 0.700		

Source: Author's calculations

Another variable that may reflect the standard of living in economic terms is the use of banking facilities. Banking facilities are primarily used for deposits and credits (Thapa, 1995). In this sense, use of banking facilities may be related to access to resources - the higher is the use of banking facilities, the greater is the access to resources and hence better is the standard of living.

It is reasonable to question whether the six household assets and the use of banking services for which information is available through the 2001 population census can be used to measure the standard of living for the purpose of estimating the human development index. In order to justify our argument, we have regressed the proportion

of asset less households (p) and the proportion of households not using the banking services (b) on the per capita net domestic product at constant (1999-2000) prices (PCI) using the district level data according to the following model

$$\log(\text{PCI}) = \alpha + \beta p + \gamma b + \epsilon$$

Results of the regression analysis are given in table 2. The model explains very close to 70 per cent of the inter-district variation in the real per capita income and both the regression coefficient are statistically significant. The regression analysis, thus, justifies the use of the proportion of asset less households and the proportion of households not using banking services, or, equivalently, the proportion of households having at least one of the six household assets and the proportion of households using banking services as indicators of the standard of living. This means that the standard of living can be captured through the unweighted average of the proportion of having at least one of the six household assets, and the proportion of households using banking facilities.

The indicator set used in the present paper for estimating the human development index and measuring human progress in Madhya Pradesh and its constituent districts by social class and rural-urban residence now comprises of the following five indicators grouped in three dimensions:

- |                         |   |
|-------------------------|---|
| Standard of living      | 1) proportion of households having at least one of the six household assets - radio/transistor, television, telephone, bicycle, scooter/motorcycle/moped, and car/jeep/van (a), |
|                         | 2) proportion of households using banking facilities (u)  |
| Health and longevity    | 3) expectation of life at birth (e)   |
| Knowledge and education | 4) adult (15+) literacy rate (l), and   |
|                         | 5) school enrolment ratio (s)   |

and the human development index (hdi) is defined as

$$\text{hdi} = [(a_n + u_n)/2 + e_n + ((2/3)l_n + (1/3)s_n)]/3$$

where  $a_n$ , etc. are the normalised values of a, etc. obtained in the following manner:

$$a_n = (a_{\text{obs}} - a_{\text{min}})/(a_{\text{max}} - a_{\text{min}}),$$

$a_{\text{obs}}$  is the observed value of a and  $a_{\text{min}}$  and  $a_{\text{max}}$  are minimum and maximum permissible values of a. In the present case, the permissible minimum and maximum values in case of four variables (other than expectation of life at birth) are 0 and 100. On the other hand, the minimum and maximum permissible values of expectation of life at birth are 25 years and 85 years respectively.

With the above formulation, the human development index ranges between 0 and 1; the higher is the value of the index, more advanced in human development or progress. On the basis of the human development index, human progress in any country or state of geo-political unit may be termed as extremely poor if the hdi is less than 0.20; poor if hdi ranges between 0.20 and 0.40; average if hdi ranges between 0.40 and 0.60; good if hdi ranges between 0.60 and 0.80 and very good if the hdi ranges between 0.80 through 1.00.

## Human Development in Madhya Pradesh

State level estimates of the five indicators used in calculating the human development index are given in table 3 which suggests that social class and rural-urban differentials in all the five indicators used in development of the human development index are quite strong and appear to have persisted over time. It is also clear that among different social class, human progress is the poorest in Scheduled Tribes. It appears that most of the dividends of social and economic development continue to get concentrated largely in the urban areas so that the combined effect of social class and rural-urban inequality is that human progress is the poorest in Scheduled Tribes living in the rural areas but the best in non Scheduled Castes/Tribes in the urban areas.

Information available through the 2001 population census suggests that the human development index in Madhya Pradesh was around 0.53 circa 2001 (Table 4) which implies that human progress in the state can at best be characterised as average. The index is estimated to be substantially higher in urban (0.68) than in rural (0.47) areas. Similarly, the index has been found to be the highest in non Scheduled Castes/Tribes (0.60) but the least in Scheduled Tribes (0.36). The index has also been found to be quite low in Scheduled Castes (0.47) also. These variations in the human development index reflect the wide social class and rural-urban disparity in the human progress in Madhya Pradesh.

Inter-district variations in the human development index are revealing. Estimates of the human development index by social class and by rural-urban residence have been given in appendix table for each of the 45 districts of the state as they existed at the 2001 population census while summary measures of inter-district variations are shown in table 4. The human development index has been found to be the highest in district Indore (0.69) but the least in district Jhabua (0.37). Jhabua and Barwani are the only two districts in the state where the human development index has been estimated to be less than 0.40 indicating less than average human progress. In most of the districts (38), human progress has been average with hdi ranging between 0.40 to 0.60. There are only 5 districts where human progress can be termed as good as hdi ranged between 0.60 to 0.70.

Although, our estimates of human development index for the districts of the state are not strictly comparable to estimates prepared by the Government of Madhya Pradesh because of different set of indicators, different data set used for estimation and different reference year, yet the two estimates show very similar pattern. According to the estimates prepared by the Government of Madhya Pradesh, the human development index is also the highest in district Indore and lowest district Jhabua (Government of Madhya Pradesh, 2007). These estimates suggest that human development was good in 11 but average in 33 districts and there was no district where the human progress was either very good or very poor.

Inter-district variations in human development index by social groups are essentially different. In case of Scheduled Castes, there was no district where the index was good or very good. It was poor in 13 districts and average in 32 districts. In case of Scheduled Tribes, the human progress appears to be poor in 35 districts and average in only 10 districts. By contrast, in the non Scheduled Castes/Tribes was average in 28 districts but good in 17 districts. These observations confirm the Scheduled Tribes in the state lag behind other social groups as far as human development and human progress is concerned.

Table 3  
Variables used in the calculation of human development index

Variable	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Asset less households (per cent)	42.15	47.11	65.68	32.81	50.46	53.38	68.09	41.38	17.99	26.61	36.19	14.84
Households not using banking facilities (per cent)	72.08	80.31	86.47	64.96	78.9	84.07	87.9	73.13	52.26	68.01	69.05	47.82
Expectation of life at birth (years)	55.76	52.92	50.27	58.44	54.34	51.83	50.06	57.1	60.65	56.9	54.02	61.79
Adult literacy rate (per cent)	60.39	52.63	35.13	69.25	53.21	48.68	33.81	62.28	78.18	63.9	52.69	81.89
Children 6-14 years in school (per cent)	70.95	71.54	51.08	77.83	67.41	70.03	50.19	74.96	81.88	76.33	64.62	84.18

Source: Author's calculations

Table 4  
Human development index in Madhya Pradesh

Summary measures of inter-district variation	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Madhya Pradesh	0.53	0.44	0.36	0.59	0.47	0.42	0.34	0.54	0.68	0.52	0.53	0.70
Summary measures of inter-district variations												
Minimum	0.37	0.36	0.23	0.47	0.34	0.34	0.23	0.43	0.59	0.46	0.34	0.62
Q1	0.48	0.43	0.31	0.54	0.44	0.40	0.30	0.50	0.64	0.54	0.44	0.68
Median	0.52	0.48	0.36	0.60	0.48	0.44	0.33	0.55	0.67	0.57	0.50	0.70
Q3	0.55	0.51	0.39	0.63	0.51	0.47	0.38	0.58	0.69	0.61	0.55	0.72
Maximum	0.68	0.60	0.52	0.73	0.58	0.57	0.46	0.68	0.73	0.68	0.63	0.77
IQR	0.07	0.08	0.08	0.09	0.07	0.08	0.08	0.08	0.05	0.07	0.11	0.03

Source: Author's calculations

Table 5  
Indices of Standard of living, health and longevity and Knowledge and education in Madhya Pradesh  
and summary measures of inter-district variations

Summary measures of inter-district variation	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Madhya Pradesh												
Standard of living index	0.43	0.36	0.24	0.51	0.35	0.31	0.22	0.43	0.65	0.53	0.47	0.69
Health index	0.51	0.47	0.42	0.56	0.49	0.45	0.42	0.54	0.59	0.53	0.48	0.61
Education index	0.64	0.59	0.40	0.72	0.58	0.56	0.39	0.67	0.79	0.68	0.57	0.83
Summary measures of inter-district variations												
Standard of living index												
Minimum	0.19	0.22	0.15	0.26	0.17	0.18	0.15	0.23	0.51	0.39	0.26	0.54
Q1	0.37	0.31	0.21	0.43	0.32	0.28	0.19	0.39	0.59	0.45	0.39	0.63
Median	0.41	0.35	0.24	0.49	0.34	0.31	0.22	0.43	0.62	0.50	0.45	0.66
Q3	0.46	0.39	0.28	0.55	0.40	0.36	0.26	0.47	0.66	0.57	0.52	0.70
Maximum	0.65	0.53	0.49	0.72	0.50	0.42	0.34	0.65	0.73	0.69	0.59	0.79
IQR	0.10	0.09	0.08	0.13	0.08	0.08	0.07	0.09	0.07	0.12	0.12	0.08
Health index												
Minimum	0.40	0.34	0.21	0.45	0.37	0.33	0.16	0.41	0.50	0.43	0.31	0.52
Q1	0.47	0.42	0.35	0.52	0.45	0.41	0.34	0.49	0.56	0.49	0.40	0.59
Median	0.51	0.46	0.42	0.56	0.49	0.46	0.41	0.54	0.59	0.53	0.48	0.61
Q3	0.55	0.51	0.47	0.60	0.53	0.50	0.46	0.58	0.61	0.56	0.53	0.63
Maximum	0.65	0.61	0.56	0.67	0.63	0.61	0.54	0.67	0.66	0.62	0.59	0.67
IQR	0.08	0.09	0.12	0.08	0.09	0.10	0.11	0.08	0.05	0.07	0.13	0.05

Summary measures of inter-district variation	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Education index												
Minimum	0.36	0.41	0.20	0.55	0.31	0.36	0.19	0.51	0.66	0.52	0.35	0.70
Q1	0.60	0.53	0.36	0.69	0.54	0.50	0.32	0.62	0.75	0.64	0.47	0.80
Median	0.64	0.60	0.41	0.73	0.59	0.55	0.40	0.68	0.79	0.68	0.54	0.82
Q3	0.70	0.65	0.49	0.75	0.63	0.63	0.45	0.72	0.81	0.72	0.65	0.85
Maximum	0.78	0.80	0.64	0.83	0.77	0.79	0.63	0.80	0.86	0.87	0.78	0.88
IQR	0.10	0.12	0.13	0.06	0.09	0.13	0.13	0.09	0.06	0.08	0.18	0.05

Source: Author's calculations

Table 6  
Decomposition of inequality in human development index

Index	Total			Rural			Urban		
	MLD	Between district component	Within district component	MLD	Between district component	Within district component	MLD	Between district component	Within district component
Human development index	0.023	34.45	65.55	0.021	31.12	68.88	0.004	29.12	70.88
Standard of living index	0.050	42.26	57.74	0.045	37.59	62.41	0.004	73.11	26.89
Health index	0.007	82.14	17.86	0.008	72.11	27.89	0.002	83.11	16.89
Education index	0.037	29.35	70.65	0.038	35.16	64.84	0.008	13.26	86.74

Source: Author's calculations

The rural-urban gap in human progress in the districts of the state is also significant. The human development index has been found to be higher in urban than in the rural areas in all districts and in all population groups, although the rural-urban gap in the human development index varies widely across districts and across social classes within districts. This means that there are district specific factors that influence human progress differentially in the rural and urban areas within districts. At the same time there are factors that contribute to rural urban gap in human development index across the districts.

The human development index is the simple average of the indices of standard of living, health and longevity and knowledge and education. As such, social class, rural-urban and inter-district variation in the human development index is the result of social class, rural-urban and inter-district variations in the three indices that constitute the human development index. Table 5 presents the values of the indices of standard of living, health and education by social class and by rural urban residence along with summary measures of inter-district variations in these indices. The situation appears to be relatively the poorest in case of standard of living and relatively the best in case of education in all social classes as well as in the total population and in rural areas. In the urban areas, on the other hand, the index of health and longevity is relatively the poorest among the three indices in case of total population and in non Scheduled Castes/Tribes but in case of Scheduled Castes and Scheduled Tribes, the situation remains relatively the poorest in the dimension of standard of living. It is also clear from the table that substantial rural-urban gap persists in all the three dimensions of human development.

### Decomposition of Disparities in Human Development

The observed inter-district disparities in the human development index and the indices of standard of living, health and longevity and education are the result within district social class disparities and between district disparities. It is possible to decompose the observed inter-district disparity in human development into within district social class disparity or inequality and between district disparity to examine how the two contribute to the over all inter-district disparity or inequality in human development. In order to do so, we apply the technique of subgroup decomposition to the human development index in Madhya Pradesh in the inter-district context. This involves calculating two components of aggregate inter-district inequality or disparity in human development index: a weighted average within district inequality known as the 'within-district' component; and a 'between district' component which captures the inequality or disparity due to variations in average human development index across districts. One way to do this is the age-old analysis of variance procedure. The other way that we adopt here is to estimate an inequality index which has the convenient property that the overall inequality can be decomposed into within-group and between-group components. We attempt to capture the 'within-district' inequality in the human development index in terms of variation across social classes - Scheduled Castes, Scheduled Tribes and non Scheduled Castes/Tribes. The most common type of inequality indexes used for the decomposition of inequality or disparity according to a partition of aggregate population into a set of mutually exclusive and exhaustive subgroups (districts in the present case) are the entropy class of inequality measures popularised by Theil (1967, 1972) and later explored in more detail by Bounguignon (1979), Shorrocks (1980, 1984, 1988), Cowell and Jenkins (1995) and Foster and

Shneyerov (2000). We use the single parameter entropy index for measuring the spatial inequality in the human development index as well as in the three indexes that constitute the human development index and decomposing total inequality into within group (district) inequality and between group (district) inequality.

The methodology essentially comprises of estimating the mean logarithmic deviation which is the special case of single parameter entropy family with  $c=0$  (Shorrocks and Wan, 2005). The mean logarithmic deviation is defined as

$$E_0(Y) = (1/n) \sum_{i \in N} \ln(\mu / y_i)$$

where  $\mu$  is the human development index for the state as a whole while  $y_i$  is the human development index for the sub-group  $I$  of the population. Now suppose that the set of geographical entities  $N$  is partitioned into  $m$  proper sub-groups  $N_k$  ( $k = 1, 2, \dots, m$ ) with respective human development index vector  $Y_k$ , mean human development index  $\mu_k$ , population sizes  $n_k$  and population shares  $v_k = n_k/n$ . Then, it can be shown (Shorrocks and Wan, 2005) that

$$E_0(Y) = \sum_{k=1}^m v_k E_0(Y_k) + \sum_{k=1}^m v_k \ln(\mu / \mu_k) = W + B$$

Here  $W$  is the weighted average of human development index in different social classes within the district. It is traditionally referred to as the 'within district' component of the spatial inequality. On the other hand,  $B$  is 'between districts' component of the spatial inequality or disparity. It is obtained by replacing the human development index of each social class within the district by the average human development index of the respective district. In this way, the overall spatial inequality in the human development index in the state can be expressed as the exact sum of the inequality in the human development index across social classes within the district and the inequality in the human development index which is due purely to differences in human development across districts.

Results of the analysis are presented in table 6. In case of the human development index, almost two-third of the total disparity or inequality (measured in terms of mean logarithmic deviation) is accounted by the within district component while around one third is accounted by the between district component. In the urban areas, within district component account for more than 70 per cent of the observed inequality or disparity in the human development index. This shows that within district social class disparity or inequality in the human development index is very high as compared to between district disparity or inequality. This observation again indicates that the dividends of social and economic progress are not being shared equally by different social classes and Scheduled Tribes and Scheduled Castes continue to remain deprived of the benefits of these dividends. The within district social class disparity of substantial magnitude also indicates towards some type of exclusion of Scheduled Castes and Scheduled Tribes from the main stream social and economic production activities. This exclusion may be the result of factors exogenous as well as endogenous to the social and economic production system that constitute the basis for social and economic progress. Exogenous factors are primarily related to life style culture and tradition while endogenous factors may be related to the demands of the social and economic production processes which lead to the marginalisation of people.

The relative contribution of within district and between district components of the spatial inequality in the three dimensions of human development is different and quite interesting. In case of the standard of living index, there is a small difference between the within district and between district components for the combined rural and urban population. However, in the rural areas, the within district component is nearly twice the between district component whereas in the urban areas, the between district component is nearly twice the within district component. On the other hand, nearly all inequality or disparity in the health index is due to between district component whereas, in case of education index, the prime contributor is again the within district component. A very high contribution of between district component of health inequality is a reflection of the fact that inter-district variations in the health status of the population (measured in terms of the expectation of life at birth) are more prominent than the within district social class variations. On the other hand, the strong within district component of the inequality in education index again reflects the dominance of social class inequality in educational achievement within the district as compared to inter-district variation in educational performance measured in terms of adult literacy rate and school enrolment ratio.

The decomposition of the disparity in the human development index highlights the within district social class and rural-urban inequality or disparity in human progress. In order to analyse social class and residence effects on the human development index, we have applied the mean polish technique (Selvin, 2004). Mean polish technique is similar to median polish technique (Tukey, 1977) with the only difference that median is replaced by mean. Mean or median polish is an exploratory data analysis technique for examining the significance of the various factors in a multi-factor model. It is a robust method for computing additive decomposition of a two-way table. An additive decomposition of a two way table  $Z$ , having  $r$  rows and  $c$  columns, is a vector  $x$  of row effects, vector  $y$  of column effects, a table  $R$  of residuals and mean or median  $\mu$  such that

$$Z_{jk} = \mu + x_j + y_k + R_{jk} \text{ for all } j \text{ and } k.$$

The method of mean or median polish is more robust than the conventional analysis of variance method. It makes no assumption about the distribution or structure of the data. It is model free exploratory data analysis procedure. It remains effective even when the tabulated data are rates or counts or any other kind of value classified in a two way table.

Application of mean polish technique to state level human development indices by social class and residence suggests that, for the state as a whole, the common value or the grand mean of the human development index (HDI) is estimated to be 0.52 which is very close to HDI for the combined population (0.53). The HDI in the rural areas is estimated to be lower by 0.08 points from this grand mean which reflects the effect of living in the rural areas on the human development index. Similarly, HDI in Scheduled Tribes is estimated to be lower by about 0.10 points from the grand mean which reflects the effect of belonging to Scheduled Tribes on the human development index. On the other hand, HDI in Scheduled Castes is estimated to be around 0.01 points lower whereas HDI in non-Scheduled Castes/Tribes is estimated to be higher by 0.11 points from the grand mean. Application of polish mean technique thus permits decomposition of HDI of a population groups into grand mean, social class effects and residence effects. For example, and HDI of 0.343 in Scheduled Tribes living in the rural areas of the state can be decomposed in the following manner:

$$0.343 = 0.520 + (-0.079) + (-0.095) + 0.004$$

Observed value      Grand median      Residence effect      Social class effect      Residual effect

On the other hand, an HDI of 0.709 in non Scheduled Castes/Tribes in the urban areas can be decomposed as

$$0.709 = 0.520 + 0.079 + 0.105 + 0.005$$

Observed value      Grand median      Residence effect      Social class effect      Residual effect

Similarly, an HDI of 0.439 for Scheduled Castes in the rural areas can be decomposed as

$$0.439 = 0.520 + (-0.079) + (-0.011) + 0.008$$

Observed value      Grand median      Residence effect      Social class effect      Residual effect

It is also possible to analyse how social class and residence impact upon disparities in human development within the district or the state. For example, HDI in non Scheduled Castes/Tribes living in urban areas of the state is estimated to be 0.709 which is the highest in the state while HDI in Scheduled Tribes living in rural areas is estimated to be 0.343 which is the lowest in the state. The within state disparity in HDI (measured in terms of the difference between highest and lowest HDI) is therefore 0.366 points. This gap may be decomposed into a gap in social class effect of around 0.200 points, a gap in residence effect of around 0.158 points and a very small residual effect 0.008 points (Table 7). Residuals in the polish mean exercise are actually interaction effects which are not accounted by the additive model. This exercise suggests that very low level of human development in Scheduled Tribes living in the rural areas of the state appears to be the result of both social class effect as well as residence effect. The social class effect of human development is a reflection of exclusion or marginalisation of a particular class - Scheduled Tribes in the present case - from the main stream social and economic development activities whereas the residence effect is a reflection of the rural-urban gap in conditions that determine the level of human development. Our analysis suggests that both marginalisation or exclusion of Scheduled Tribes from mainstream development activities and rural-urban disparity in development contribute to low levels of human development in Scheduled Tribes.

Results of the decomposition of within district disparity in the human development index for the 45 districts of the state are presented in table 7. The within district disparity in HDI, measured in terms of the difference between the highest and the lowest HDI in the district has been found to be the highest in district Gwalior (0.478) - 0.733 in non Scheduled Castes/Tribes in the urban areas compared to only 0.255 in Scheduled Tribes in the rural areas of the district. Both social class and residence effects contribute almost equally to the observed disparity in HDI within the district and there is a large interaction effect that contributes to further increase in this disparity. In 10 other districts of the state also, within district disparity in HDI has been found to be very high - at least 0.4 and. By contrast, within district disparity in HDI has been found to be the minimum in district Shajapur (0.227) - 0.691 in non Scheduled Castes/Tribes in urban areas and 0.464 in Scheduled Tribes in rural areas. There are seven other districts where the within district disparity in HDI has been found to be less than 0.300.

Table 7  
Decomposition of within state/district disparity in human development index  
in Madhya Pradesh

State/district	Within state/district disparity in HDI	Residence effects	Social class effects	Residual
Madhya Pradesh	0.366	0.158	0.200	0.008
Sheopur	0.397	0.166	0.223	0.009
Morena	0.371	0.173	0.145	0.053
Bhind	0.249	0.089	0.138	0.023
Gwalior	0.478	0.221	0.210	0.047
Datia	0.419	0.164	0.228	0.026
Shivpuri	0.415	0.136	0.282	-0.004
Guna	0.384	0.144	0.230	0.010
Tikamgarh	0.349	0.110	0.246	-0.006
Chhatarpur	0.393	0.164	0.215	0.013
Panna	0.402	0.128	0.262	0.012
Sagar	0.408	0.197	0.193	0.018
Damoh	0.369	0.163	0.206	0.000
Satna	0.394	0.078	0.304	0.011
Rewa	0.386	0.073	0.304	0.009
Umaria	0.345	0.124	0.218	0.003
Shahdol	0.358	0.170	0.188	-0.000
Sidhi	0.386	0.164	0.230	-0.009
Neemuch	0.388	0.126	0.269	-0.007
Mandsaur	0.324	0.092	0.232	0.001
Ratlam	0.362	0.151	0.217	-0.006
Ujjain	0.271	0.124	0.156	-0.009
Shajapur	0.227	0.096	0.119	0.012
Dewas	0.400	0.139	0.257	0.004
Jhabua	0.459	0.188	0.297	-0.026
Dhar	0.310	0.063	0.249	-0.002
Indore	0.398	0.144	0.243	0.011
West Nimar	0.324	0.102	0.217	0.005
Barwani	0.389	0.150	0.232	0.007
East Nimar	0.361	0.136	0.216	0.008
Rajgarh	0.249	0.150	0.074	0.024
Vidisha	0.400	0.177	0.206	0.018
Bhopal	0.406	0.222	0.160	0.023
Sehore	0.350	0.160	0.184	0.007
Raisen	0.274	0.080	0.201	-0.007
Betul	0.370	0.135	0.224	0.011
Harda	0.424	0.128	0.295	0.001
Hoshangabad	0.346	0.183	0.161	0.002
Katni	0.421	0.155	0.262	0.003

State/district	Within state/district disparity in HDI	Residence effects	Social class effects	Residual
Jabalpur	0.380	0.176	0.192	0.012
Narsimhapur	0.276	0.094	0.175	0.008
Dindori	0.276	0.185	0.110	-0.019
Mandla	0.329	0.194	0.125	0.010
Chhindwara	0.336	0.150	0.172	0.014
Seoni	0.297	0.167	0.109	0.021
Balaghat	0.288	0.139	0.134	0.015

Source: Author's calculations

Remarks: With state/district disparity in the human development index is the difference between the highest and the lowest HDI in the district

## Conclusions

The most critical challenge to human progress in Madhya Pradesh appears to be reduction in social class and rural urban inequalities in human development. The persistence of residence, social class and inter-district disparities in human development, as revealed in the present analysis suggests that the current approach to human development in the state has contributed little to human progress, especially in terms of reduction in inter-district, social class and rural urban disparities. Persistence of these disparities or inequalities also suggests that the state somewhere lacks political commitment, administrative capacity and organisational efficiency in evolving policies and programmes in meeting specific human development needs of different population groups, especially Scheduled Tribes which constitute at least one fifth of the state population. Social class and rural urban disparities in human development persist in all districts of the state irrespective of the level of social and economic development. It is obvious that there is a need to evolve an alternate philosophy of human development as the existing approach to human progress is found wanting in the state.

How can the human development processes be given a push so as to accelerate human progress in the state? The present analysis suggests that significant achievements in terms of human progress in Madhya Pradesh may be achieved simply by reducing social class, residence and inter-district disparities in human development. One approach to reducing disparities in human development is through creating, strengthening and sustaining institutions for human capacity building, especially at the local level, the interface with the people. Institutions can make great difference in capabilities expansion and hence in human development at least in three contexts. First, institutions might enhance the pro-poor orientation of social and economic development processes, thus directly aiding the most deprived and marginalised population groups. Second, institutions might contribute to the evolution of development policies that foster the general interest, with no special concern for the poor and the marginalised ones. Third, institutions, especially institutions of higher education and research are necessary for developing new technologies for the economic and social production system and for providing thoroughly trained and skilled manpower necessary for enhancing productivity.

Institutions can be grouped into four categories- state or public institutions, social institutions, market institutions and political institutions. State institutions are central, state and local government organizations oriented and committed towards human development and welfare. Social institutions include religious and cultural organizations, non-government organizations as well as non-market organizations. Markets, on the other hand, are institutions created by conscious design and governed by well defined sets of rules. They govern production of goods and services. Although, in theory, markets are equal opportunity institutions, in practice, they provide different opportunity to different people. Finally, political institutions encompass the 'constitutional' element of the polity and may be distinguished from public policy and political events, both of which are generally more evanescent.

One common theme across all institutions that is relevant to human development is decentralization (Klugman 1994). A shift from a highly centralized institutional settings of production of goods and services to a decentralized institutional setup in which local people actively participate in the productive activity and where local level forces dominate the economic and social production system, is widely regarded as essential for local capacity building, individual capabilities expansion and hence for human development. It is also well known that a decentralised economic and social production system provides better opportunities for the people to participate in the production processes than a centralised system.

Madhya Pradesh was the first state in India to implement the 73<sup>rd</sup> and 74<sup>th</sup> amendments of the Indian Constitution which was a serious attempt to seek the participation of people in the development processes through democratically elected people's representatives. There had been a sincere attempt, at least at the political level, to promote decentralization and popular participation in governance through Panchayat Raj institutions and through the introduction of the district governance model which was an attempt to decentralize the development planning process and the key was to empower the District Planning Committee by introducing the system of preparing district development plans. A range of administrative powers were delegated to the District Planning Committee (Government of Madhya Pradesh, no date). There were also efforts to promote popular participation in the existing public institutions, especially in health and education. These included constitution of Rogi Kalyan Samiti in every public hospital and Participatory Management Committee in every graduate and post graduate college. The logic of the decentralization efforts was to bring the development decision-making nearer to the people. It was expected that democratically elected people's organizations like Gram Panchayat would play a proactive role in all matters related to development at the local level. It was also conceived that the process of institutional strengthening at the local level would revive popular involvement in the decision-making processes at the local level thereby improving the local capacity and capability for action. There are, however, little indication that the decentralization process has resulted in any significant decentralization of the social and economic production system. Government efforts towards decentralization and people's participation in governance have not been able to include the excluded in the economic and social production system (Sah, 2004). The poor and the deprived continue to remain marginalised not only in the economy but also in the politics which has a direct bearing on human progress.

The state can make significant achievements in human progress through empowering Panchayats - the democratically constituted and constitutionally legal organizations of the people. This, however, requires strong political commitment and a long term development policy which is currently missing in the state.

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Appendix Table  
Human development index by social class and rural-urban residence in districts of Madhya Pradesh

District	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Balaghat	0.401	0.376	0.241	0.474	0.366	0.365	0.233	0.437	0.590	0.460	0.402	0.614
Barwani	0.509	0.395	0.363	0.529	0.478	0.385	0.314	0.496	0.623	0.442	0.626	0.646
Betul	0.580	0.440	0.563	0.600	0.559	0.430	0.504	0.578	0.647	0.479	0.602	0.668
Bhind	0.622	0.484	0.386	0.655	0.495	0.440	0.284	0.530	0.705	0.525	0.632	0.724
Bhopal	0.551	0.424	0.399	0.579	0.521	0.409	0.368	0.547	0.666	0.513	0.575	0.686
Chhatarpur	0.472	0.408	0.265	0.522	0.440	0.396	0.258	0.490	0.634	0.498	0.381	0.656
Chhindwara	0.471	0.393	0.290	0.517	0.429	0.382	0.280	0.474	0.623	0.459	0.426	0.642
Damoh	0.493	0.417	0.334	0.524	0.468	0.402	0.328	0.496	0.617	0.509	0.396	0.644
Datia	0.490	0.388	0.334	0.519	0.445	0.374	0.324	0.471	0.654	0.477	0.478	0.673
Dewas	0.464	0.363	0.328	0.518	0.438	0.357	0.323	0.488	0.654	0.427	0.435	0.692
Dhar	0.512	0.393	0.346	0.558	0.453	0.357	0.324	0.498	0.668	0.491	0.595	0.697
Dindori	0.476	0.356	0.339	0.524	0.439	0.333	0.328	0.484	0.648	0.470	0.511	0.675
East Nimar	0.528	0.377	0.331	0.592	0.498	0.369	0.326	0.564	0.648	0.420	0.387	0.681
Guna	0.541	0.364	0.346	0.597	0.519	0.359	0.343	0.576	0.658	0.405	0.386	0.693
Gwalior	0.474	0.428	0.330	0.566	0.445	0.407	0.320	0.530	0.632	0.506	0.434	0.697
Harda	0.499	0.438	0.354	0.598	0.439	0.402	0.337	0.517	0.690	0.534	0.504	0.727
Hoshangabad	0.452	0.380	0.300	0.522	0.418	0.360	0.292	0.483	0.649	0.497	0.430	0.678
Indore	0.587	0.492	0.351	0.622	0.546	0.467	0.332	0.583	0.698	0.570	0.468	0.718
Jabalpur	0.583	0.461	0.410	0.605	0.559	0.456	0.405	0.581	0.690	0.522	0.457	0.698
Jhabua	0.550	0.486	0.352	0.634	0.490	0.470	0.339	0.588	0.692	0.565	0.527	0.705
Katni	0.603	0.473	0.534	0.635	0.540	0.457	0.504	0.573	0.703	0.540	0.599	0.722
Mandla	0.595	0.465	0.508	0.621	0.577	0.462	0.498	0.605	0.675	0.508	0.598	0.682

District	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Mandsaur	0.534	0.427	0.343	0.602	0.483	0.411	0.322	0.556	0.666	0.496	0.494	0.695
Morena	0.368	0.553	0.285	0.687	0.335	0.538	0.278	0.640	0.694	0.577	0.506	0.755
Narsimhapur	0.492	0.502	0.346	0.635	0.464	0.503	0.341	0.618	0.633	0.501	0.422	0.674
Neemuch	0.685	0.541	0.475	0.719	0.572	0.483	0.385	0.635	0.731	0.574	0.601	0.747
Panna	0.507	0.480	0.351	0.595	0.481	0.478	0.346	0.570	0.657	0.520	0.454	0.680
Raisen	0.390	0.487	0.276	0.576	0.348	0.484	0.269	0.519	0.632	0.479	0.445	0.667
Rajgarh	0.504	0.475	0.308	0.595	0.452	0.463	0.299	0.553	0.657	0.532	0.474	0.670
Ratlam	0.495	0.399	0.411	0.512	0.464	0.395	0.390	0.480	0.639	0.450	0.554	0.656
Rewa	0.486	0.355	0.296	0.524	0.447	0.338	0.282	0.485	0.629	0.453	0.510	0.645
Sagar	0.644	0.491	0.533	0.661	0.475	0.398	0.321	0.500	0.684	0.529	0.599	0.695
Satna	0.536	0.417	0.391	0.582	0.506	0.405	0.378	0.554	0.673	0.517	0.570	0.692
Sehore	0.534	0.419	0.402	0.585	0.512	0.414	0.397	0.567	0.636	0.489	0.451	0.658
Seoni	0.544	0.537	0.354	0.664	0.503	0.513	0.336	0.636	0.712	0.594	0.654	0.732
Shahdol	0.524	0.459	0.315	0.631	0.481	0.448	0.304	0.599	0.687	0.527	0.477	0.714
Shajapur	0.561	0.445	0.406	0.610	0.503	0.403	0.371	0.556	0.692	0.546	0.654	0.709
Sheopur	0.479	0.384	0.301	0.544	0.432	0.362	0.290	0.492	0.674	0.489	0.413	0.710
Shivpuri	0.602	0.486	0.399	0.653	0.482	0.408	0.347	0.542	0.708	0.553	0.553	0.726
Sidhi	0.568	0.449	0.453	0.606	0.548	0.439	0.445	0.586	0.677	0.511	0.551	0.698
Tikamgarh	0.408	0.417	0.329	0.478	0.398	0.411	0.327	0.456	0.618	0.581	0.455	0.652
Ujjain	0.447	0.478	0.320	0.552	0.421	0.454	0.314	0.512	0.685	0.590	0.574	0.705
Umaria	0.542	0.524	0.380	0.628	0.493	0.498	0.358	0.582	0.696	0.585	0.606	0.719
Vidisha	0.515	0.483	0.395	0.577	0.494	0.472	0.388	0.552	0.702	0.571	0.651	0.717
West Nimar	0.54	0.508	0.393	0.577	0.521	0.492	0.377	0.558	0.679	0.591	0.569	0.705

District	Total				Rural				Urban			
	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST	Total	SC	ST	Non SC/ST
Human progress across districts												
Very poor												
Poor	2	13	35		4	15	40					
Average	38	32	10	28	41	30	5	40	1	45	33	
Good	5			17				5	44		8	45
Very good												

Source: Author's calculations