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Demography and Development in Madhya Pradesh-A District Level Analysis

Introduction

MADHYA PRADESH is one of those states of the country where both demographic situation and level of social and economic development remains far from satisfactory. During the decade 1981-91, the average annual population growth rate in the state had been of the order of 2.38 per cent per year. This growth rate was second highest in the country, next only to Rajasthan. Even, more alarmingly and unlike Rajasthan, the average annual population growth rate in the state has shown an increasing trend. This pattern of rapid population growth in the state is largely the result of a persistent high fertility and high mortality situation that prevails in the state. According to the estimates based on the Sample Registration System, Madhya Pradesh has the dubious distinction of having highest crude death rate and highest infant mortality rates in the country around the year 1996. On the other hand. the crude birth rate in the state is third highest, next only to Uttar Pradesh and Rajasthan.

The scenario in terms of social and economic progress is also no better in the state. According to the information available, the state ranks twelfth in terms of per-capita income amongst the fifteen major states of the country: in terms of registered industries per lakh population and in terms of literacy, it ranks eleventh whereas in terms of proportion of net sown area irrigated, it ranks thirteen (Government of Madhya Pradesh. 1997). The state is rich in natural resources but this natural wealth could not be utilized for the social and economic development of the state. Whatever social and economic progress that has taken place in the state during the 50 years period since independence.

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it has literally been confined to regions surrounding the traditional growth centers and administrative headquarters. Large tracts of rural population of the state are still devoid of even the basic minimum services and facilities in the critical areas of health, education and sanitation. During rains, a substantial proportion of the rural areas of the state remain cut off from the rest of the country for want of all weather transport and communication facilities. The state has highest proportion of tribal population in the country. The peculiar nature of life style and living patterns of tribal population adds another dimension to the process of social and economic development in the state.

Is there any relationship between the poor level of social and economic development and poor demographic situation in the state? We attempt to explore this relationship on the basis of district level information on demographic situation and development scenario in the state. In order to explore this relationship, we first rank the districts according to the demographic situation and according to the level of social and economic development and then attempt to establish the relationship between the rank of a district in terms of the demographic situation with the rank of that district in terms of the level of social and economic development.

Methodology

Analysis of the relationship between social and economic development and demographic situation is compounded by the fact that there is no single measure of social and economic development. Similarly, there is no single index that can effectively capture demographic situation. Both social and economic development and demographic situations are actually multidimensional processes and each dimension of development as well as demographic change has its own specific determinants.

In view of the multidimensional nature of both social and economic development and demographic situation, a multi-indicator approach has been adopted for capturing both social and economic progress and demographic situation in a district. The social and economic development in a district has been captured through a set of eighteen indicators grouped into six dimensions of social and economic development: (1) Population structure and distribution; (2) Status of women; (3) Agriculture and irrigation; (4) Industrialization and urbanization; (5) Social development; and (6) Infrastructure development. The list of indicators used in the analysis along with data source and the reference date for each indicator is given in the Appendix.

The demographic situation, on the other hand, has been captured through a set of six indicators, three of which are related to fertility and three to mortality. Indicators related to fertility are total marital fertility rate, the ratio of total fertility rate to total marital fertility rate which is also known as the index of fertility inhibiting effect of marriage (C_m) according to the terminology of Bongaarts (Bongaarts, 1978) and contraceptive prevalence rate. Total marital fertility rate and fertility inhibiting effect of marriage, in

combination, determine the level of total fertility rate which, in turn, determine the birth rate. Moreover, the level of total marital fertility rate also reflects the extent of fertility regulation within the institution of marriage—higher is fertility regulation lower is the total marital fertility and vice versa. The index C_{m} , reflects the effect of female mean age at marriage on fertility—higher is the female mean age at marriage lower is the index C_{m} , and vice versa. Lastly, the indicators used for measuring the mortality situation are expectation of life at birth, infant mortality rate and maternal mortality ratio.

A ranking approach has been used in this analysis to analyze the association between the demographic situation and the level of social and economic development. Essential features of this approach are as under:

1. Each of the 45 districts of the state were first ranked according to the level of specific indicators of social and economic development and the level of indicators of demographic situation. The ranking is done in a descending order meaning that the district having the best situation among the 45 districts was given the rank of one while the district having the worst situation among the 45 districts was given the rank of 45. In other words, the lower is the rank of a district the poorer is the situation of that district in comparison to other districts of the state and vice versa. Two or more districts having same level for any specific variable were given the same rank.
2. Ranks obtained by each district were added to obtain the total rank score of a district in each of the six dimensions of social and economic development. This total rank score was divided by the number of indicators in the dimension to obtain average rank of the district. These average rank scores served as index of the level of social and economic development in a given district relative to the level of social and economic development in other districts.
3. Spearman rank order correlation coefficients were calculated to analyze the relationship between demographic situation and the level of social and economic development across the districts of the state. Rank order correlation coefficients were calculated separately for each demographic indicator with the six dimensions of development as well as 18 indicators of social and economic development used in the analysis.

The rank order correlation coefficient is preferred to the more commonly used product moment correlation coefficients because the rank order correlation coefficient does not depend upon the normality assumption for making exact tests. Moreover, the ranking exercise eliminates the distortions in the data set arising out of the presence of extreme values and outliers. In this sense, the rank order correlation coefficient is more robust than the product moment correlation coefficient.

Data Sources

The data used in the analysis have been taken from a number of sources. Information related to social and economic development has been derived primarily from the statistics maintained by the government of Madhya Pradesh for each of its 45 districts (Government of Madhya Pradesh. 1996). Moreover, information available through the 1991 population census has also been used to assess the level of social and economic development. Details regarding the definition of the indicators used in the analysis and the sources for information on different indicators of social and economic development are given in the Appendix.

It may be pointed out here that one of the major problems in analyzing the relationship between social and economic development and demographic situation at the district level is the paucity of district level information on demographic situation. The Civil Registration System in the state is too poor to provide any reasonable assessment of demographic situation either at the district or at the state level. The Sample Registration System, on the other hand, provides estimates of basic demographic indicators at the state level only. The Registrar General of India has recently estimated demographic indicators for the districts of the state on the basis of the 1991 population census (Government of India. 1996). Rajan has also prepared estimates of infant and child mortality for the districts of the state on the basis of information available from the 1991 population census (Rajan, 1998). District level estimates of fertility and infant, child and maternal mortality and contraceptive prevalence rate have also been prepared by Chaurasia on the basis of the information generated through the Madhya Pradesh Target Couple Survey which was carried out by the Government of Madhya Pradesh in the year 1996 (Chaurasia, 1996) while district level estimates of expectation of life at birth have been prepared by the Government of Madhya Pradesh under its Madhya Pradesh Human Development Report Project (Government of Madhya Pradesh. 1999). In this analysis, estimates of total fertility rate and total marital fertility rate used are those derived by the Registrar General of India whereas estimates of infant mortality rate are taken from Rajan (1998). Estimates of maternal mortality ratio and contraceptive prevalence rate, on the other hand are prepared by the author (Ranjan. 1999). Finally, estimates of expectation of life at birth are taken from the Madhya Pradesh Human Development Report 1998 (Government of Madhya Pradesh. 1999).

Social and Economic Development and Demographic Situation in Madhya Pradesh

Table 1 summarizes information on the levels of social and economic development in Madhya Pradesh and in India as a whole on the 18 indicators of social and economic development used in this analysis. For each indicator, rank of Madhya Pradesh amongst

TABLE 1: DEVELOPMENT SCENARIO IN MADHYA PRADESH AS COMPARED TO INDIA

<i>Dimension and variables</i>	<i>India</i>	<i>MP</i>	
		<i>Level</i>	<i>Rank</i>
I. Population Structure and Distribution			
Population density. 1991 (Persons per sq km)	273	149	14
Proportion of Scheduled Caste population. 1991 (Per cent)	16.48	14.55	11
Proportion of Scheduled Tribe population. 1991 (Per cent)	8.08	23.27	1
II. Status of Women			
Sex ratio. 1991 (Females per 1000 males)	927	931	7
Labour force sex ratio. 1991 (Females, per 1000 males)	NA	529	NA
Female literacy rate. 1991 (Per cent)	39.19	28.85	12
III. Agriculture			
Per capita net sown area. 1989-90 (Hector)	1.26	1.49	8
Per capita net sown area irrigated. 1989-90 (Per cent)	33.1	18.9	13
Value of agriculture produce at current prices. 1992-93	NA	5708	NA
IV. Industrialization and Urbanization			
Proportion of urban population. 1991 (Per cent)	26	23	12
Industries per lakh population. 1990	2444	1452	11
Per capita electricity consumption. 1992-93 (Kwh)	254	254	8
V. Social Development			
Population below poverty line. 1987-88 (Per cent)	29.9	36.7	13
Work participation rate. 1991 (Per cent)	37.50	42.82	4
Literacy rate. 1991 (Per cent)	52.21	44.20	11
VI. Infrastructure			
Proportion of villages having medical facility	NA	8.87	NA
Proportion of villages having communication facility	NA	19.70	NA
Proportion of villages connected with pucca roads	NA	22.45	NA

fifteen major states of the country having a population of more than 15 million at the time of 1991 population census is also given in the table. It may be seen from the Table that out of the thirteen indicators for which national level estimates are available, Madhya Pradesh ranks in bottom third in eight variables. If the proportion of tribal population is also taken as a deterrent to social and economic progress than the number of variables in which the state ranks in bottom third amongst the major states of the country increases to nine. Poor level of social and economic development in the state, as compared to other states of the country is very much clear from the Table.

The demographic scenario of the state is even worse. The state ranks in bottom third in all the six indicators of demographic situation used in the analysis as may be seen from Table 2. In all the three indicators of fertility, Madhya Pradesh ranks in bottom third among the major states of the country. The same is true in case of mortality

TABLE 2: DEMOGRAPHIC SITUATION IN MADHYA PRADESH AS COMPARED TO INDIA

<i>Indicator</i>	<i>India</i>	<i>MP</i>	
		<i>Level</i>	<i>Rank</i>
Total marital fertility rate. 1992	5.1	5.5	13
Fertility inhibiting effect of marriage. 1990-92	0.706	0.800	12
Contraceptives prevalence rate. 1990-92	40.6	36.5	11
Infant mortality rate. 1995	74	99	14
Maternal mortality ratio. 1995	408	498	13
Expectation of life at birth. 1989-93	59.4	54.0	15

Sources: Government of India (1996).
 Government of Madhya Pradesh and International Institute for Population Sciences (1995).
 Chaurasia (1996).

indicators. Information contained in the table clearly shows that Madhya Pradesh continues to be in the early stages of demographic transition.

The above brief review of level of social and economic development and demographic situation in Madhya Pradesh and its comparison with the country as a whole as well as with other major states of the country is sufficient enough to conclude that Madhya Pradesh may be regarded as one of the backward states of the country in terms of both demography and development. However, because of the vastness and diversity in the society and economy of the state, any state level analysis of population and development related issue inhibits the strong and persisting inequalities and disparities that are prevalent within the state. To understand the dynamics of population and social and economic development in the state, a district level analysis of both demographic situation and level of social and economic development is necessary.

Social and Economic Situation in the Districts of Madhya Pradesh

Rank of each the 45 districts of the state in respect of 18 indicators of social and economic development situation used in the analysis are given in Table 3. Average rank of each district in the six dimensions of social and economic development and in respect of four indicators of demographic situation are given in Table 4. On the basis of average rank score in each of the six dimensions of social and economic development, the districts were classified into five categories; very good with average rank score ranging from 1 to 9: good with average rank score ranging from 10 to 18: average with average rank score ranging from 19 to 27: poor with average rank score ranging from 28 to 36 and very poor with average rank score ranging from 37 to 45. Results of this classification procedure are given in Table 3.

Table 3 suggests that the rank of the districts of the state vary widely across different dimensions of social and economic development. There is no district in the state which may be ranked as very good or good in all the six dimensions of social and economic

TABLE 3: INTER-DISTRICT VARIATIONS IN THE LEVEL OF SOCIAL AND ECONOMIC DEVELOPMENT IN MADHYA PRADESH

<i>Level</i>	<i>Dimension of social and economic development</i>					
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
Very good	Jhabua	Balaghat	Narsimhapur	Indore		Morena
	Dhar	Durg Rajnandgaon Raipur Betui	Hoshangabad	Bhopal Ujjain Durg Dewas Gwalior Jabalpur Mandsaur		East Nimar Gwalior West Nimar Indore Tikamgarh
Good	West Nimar	Seoni	Datia	East Nimar	Durg	Datia
	Jabalpur	Bilaspur	Sehore	Ratlam	Mandsaur	Mandsaur
	Ratlam	Mandia	Mandsaur	Raipur	Raipur	Bhind
	Raigarh	East Nimar	Shajapur	Hoshangabad	Ujjain	Durg
	Durg	Chhindwara	Morena	Dhar	Ratlam	Balaghat
	Balaghat	Mandsaur	Shivpuri	Bhind	Narsimhapur	Jhabua
	Mandia	Ratlam	Tikamgarh	Satna	Rajnandgaon	Bhopal
	Shahdol	Raigarh	Ujjain	Chhindwara	Balaghat	Chhatarpur
	Bastar	West Nimar	Raipur	Sagar	Shajapur	Raigarh
	Surguja	Dhar	Raisen	Raisen		
	Raipur		Gwalior			
	East Nimar		Ratlam			
	Rewa					
	Rajnandgaon					
Chhindwara						
Average	Sidhi	Ujjain	Indore	Shajapur	Bilaspur	Dhar
	Betui	Jabalpur	Vidisha	Narsimhapur	Dhar	Ujjain
	Bilaspur	Narsimhapur	Dewas	Datia	Chhindwara	Hoshangaba
	Seoni	Rewa	East Nimar	Morena	Dewas	Satna
	Bhopal	Satna	Bhind	Shahdol	Gwalior	Ratlam
	Satna	Jhabua	Chhindwara	Bilaspur	Bastar	Damoh
	Indore	Dewas	Chhatarpur	West Nimar	Raigarh	Jabalpur
	Narsimhapur	Indore	Balaghat	Sehore	Bhind	Raipur
	Dewas	Hoshangabad	Guna	Rewa	Sehore	Narsimhapu
	Mandsaur	Sagar	Bhopal	Damoh	Betui	Shivpuri
	Hoshangabad	Damoh	Durg	Betui	Indore	Panna
		Bhopal	Raigarh		Satna	Sidhi
		Shahdol	West Nimar		Datia	Rewa
			Seoni		East Nimar	
		Sagar		Shivpuri		
				Tikamgarh		
				Jabalpur		
				Morena		
				Mandla		

Table 3 (contd. on p. 32)

32 Table 3 (contd. from p. 31)

					Bhopal	
					Guna	
					Panna	
					Rewa	
					Sagar	
					Hosangabad	
					Chhatarpur	
					Sehore	
					Shahdol	
Poor	Gwalior	Shajapur	Raigarh	Gna	Raigarh	Shahdol
	Rajgarh	Sehore	Damoh	Rajgarh	Damoh	Sagar
	Raisen	Surguja	Betui	Rajnandga	Jhabua	Surguja
	Bhind	Rajgarh	Bilaspur	Vidisha	West	Chhindwara
	Sagar	Sidhi	Panna	Balaghat	Vidisha	Betui
	Morena	Gwalior	Bastar	Chhatarpur	Raisen	Vidisha
	Tikamgarh	Raisen	Rajnandgao	Rajnandga	Sidhi	Sehore
	Guna	Vidisha	Satna	Jhabua	Surguja	Dewas
	Ujjain	Panna	Jabalpur	Shivpuri		Guna
	Damoh	Tikamgarh	Mandia			Shajapur
	Shajapur	Chhatarpur	Rewa			Mandia
	Datia	Bhind	Jhabua			Rajnandgaon
	Sehore					Raisen
	Vidisha					
	Shivpuri					
	Panna					
	Chhatarpur					
Very Poor		Datia	Surguja	Tikamgarh		Seoni
		Guna	Sidhi	Seoni		Bilaspur
		Shivpuri	Shahdol	Surguja		Bastar
		Morena		Sidhi		Raigarh
				Bastar		
				Panna		
				Mandia		

development. Similarly, there is no district which may be ranked as very poor or poor in all the six dimensions. There are only three districts—Durg, Gwalior and Indore— which are ranked very good in at least two dimensions of social and economic development while there are only 17 districts which are ranked as very good in only one dimension of development. The remaining 25 districts are not ranked very good in any of the six dimensions of social and economic development. On the other hand, Ratlam is the only district of the state which can be ranked as good in five of the six dimensions of social and economic development while Mandasaur and Ratlam districts are ranked good in 4 of the six dimensions. Moreover, only 6 districts of the state are ranked as good in 3 dimensions. ^

On the other hand, there are three districts in the state—Rajgarh, Surguja and Vidisha—which are ranked poor to very poor in five of the six development dimensions whereas

districts East Nimar, Panna, Raisen and Sidhi are ranked poor to very poor in four of the six development dimensions. In addition, 10 districts are ranked poor to very poor in three dimensions: 10 districts in two dimensions and 7 districts in one dimension of development. Finally, there are 11 districts which are not ranked either poor or very poor in any of the six dimensions of development. These districts are Bhopal, Chhindwara, Dhar, Durg, East Nimar, Hoshangabad, Indore, Mandasaur, Narsimhapur, Raipur and Ratlam.

The ranking of districts on different dimensions of social and economic development clearly suggests that the pattern of social and economic development in the state is not uniform. There is not a single district in the state which has high ranking in all the dimensions of development. Similarly, there is not a single district in the state which has low rankings in all development dimensions. There are a number of districts in the state which are having high rankings in one or two dimensions of development and low rankings in other dimensions. It is because of this reason that highest average rank score for all the dimensions of social and economic development combined is only 12—in district Durg—which is substantially lower than the theoretically best rank score of one. Similarly, the poorest rank score has been found to be 31 in districts Sidhi and Surguja which is well above the theoretically poorest rank score of 45. Obviously, the process of social and economic development in the state lacks spontaneity and comprehensiveness. It is normative in nature and ad hoc in coverage with the result that it does not appear to address the felt needs of the district.

Demographic Situation in the Districts of Madhya Pradesh

In terms of demographic scenario, the situation across the districts of the state is similar to social and economic development scenario. The ranking of districts is not the same in different demographic indicators used in the analysis. There is no district in the state which ranks first in all the six demographic indicators. Similarly, there is no district which ranks poorest in all the six demographic indicators used in the analysis. It is however possible to analyze the relative position of districts in terms of transition in different demographic indicators by grouping the rank of the districts as very good, good, average, poor and very poor according to the classification adopted in the previous section. Results of this grouping exercise are given in Table 4. There are only two districts in the state—Indore and Durg—which are ranked very good to good in all the six demographic indicators. In addition, eight districts—Bilaspur, Dewas, Mandla, Raigarh, Raipur, Rajnandgaon, Seoni and Ujjain—are ranked very good to good in five of the six demographic indicators. Districts Bhopal, Gwalior, and Ratlam, on the other hand are ranked very good to good in four demographic indicators: districts Bastar, East Nimar, Morena, Narsimhrpur, Shajapur and Surguja in three demographic indicators: districts Balaghat, Betui, Bhind, Chhindwara, Datia, Dhar, Hoshangabad, Jabalpur and

TABLE 4: INTER-DISTRICT VARIATIONS IN DEMOGRAPHIC SITUATION IN MADHYA PRADESH

<i>Level</i>	<i>Indicator</i>					
	<i>TMFR</i>	<i>Cm</i>	<i>CPR</i>	<i>IMP</i>	<i>MMR</i>	<i>E(0)</i>
Very good	Balaghat	Balaghat	Chhindwara	Bastar	Bhopal	Bastar
	Bilaspur	Bastar	Durg	Bhopal	Durg	Bhopal
	Indore	Betui	East Nimar	Dhar	Gwalior	Bilaspur
	Mandia	Bhopal	Gwalior	Durg	Indore	Dhar
	Mandsaur	Bilaspur	Indore	Gwalior	Mandsaur	Durg
	Narsimhapur	Chhindwara	Narsimhapur	Indore	Raigarh	Gwalior
	Rainandgaon	Durg	Ratlam	Mandia	Rainandgaon	Indore
	Surguia	Indore	Seoni	Raigarh	Shajapur	Mandia
	Ujjain	Raipur	Tikamgarh	Surguia	Ujjain	Surguia
Good	Datia	East Nimar	Betui	Bhind	Bhind	Dewas
	Dewas	Hoshangabad	Damoh	Bilaspur	Bilaspur	East Nimar
	Durg	Jabalpur	Datia	Dewas	Dewas	Morena
	Jabalpur	Jhabua	Dewas	Mandsaur	Hoshangabad	Raigarh
	Raigarh	Mandia	Mandia	Morena	Morena	Raipur
	Raipur	Narsimhapur	Mandsaur	Raipur	Raigarh	Rainandgaon
	Ratlam	Rainandgaon	Raigarh	Rainandgaon	Raipur	Seoni
	Seoni	Seoni	Shore	Ratlam	Seoni	Ujjain
	Shahdol	West Nimar	Shajapur	Ujjain	West Nimar	
	Shajapur					
Average	Bastar	Damoh	Bastar	Balaghat	Bastar	Bhind
	Damoh	Dewas	Bhopal	Chhindwara	Betui	Chhindwara
	Dhar	Dhar	Dhar	Damoh	Damoh	Hoshangabad
	Gwalior	Gwalior	Hoshangabad	East Nimar	Datia	Jabalpur
	Hoshangabad	Raigarh	Jabalpur	Hoshangabad	Dhar	Mandsaur
	Raigarh	Ratlam	Raipur	Jabalpur	Mandia	Ratlam
	Shore	Sagar	Rainandgaon	Seoni	Ratlam	Shajapur
	Shivpuri	Surguia	Sagar	Shajapur	Surguia	Sidhi
West Nimar	Ujjain	West Nimar	Sidhi	Vidisha	West Nimar	
Poor	Bhind	Chhatarnur	Balaghat	Datia	Balaghat	Balaghat
	Bhopal	Datia	Guna	Narsimhapur	East Nimar	Damoh
	Chhatarnur	Guna	Morena	Raisen	Chhindwara	Datia
	Panna	Mandsaur	Panna	Raigarh	Jabalpur	Narsimhapur
	Rewa	Raisen	Raigarh	Sagar	Jhabua	Raigarh
	Sagar	Shore	Raisen	Shore	Narsimhapur	Raisen
	Satna	Shivpuri	Shivpuri	Shahdol	Rewa	Sagar
	Vidisha	Vidisha	Surguia	Vidisha	Shore	Shahdol
West Nimar				Shahdol	Vidisha	
Very poor	Betui	Bhind	Bhind	Betui	Chhatarnur	Betui
	Chhindwara	Morena	Bilaspur	Chhatarnur	Guna	Chhatarnur
	East Nimar	Panna	Chhatarnur	Guna	Panna	Guna
	Guna	Raigarh	Jhabua	Jhabua	Raisen	Jhabua
	Jhabua	Rewa	Rewa	Panna	Sagar	Panna
	Morena^	Satna	Satna	Rewa	Satna	Rewa
	Raisen	Shajapur	Shahdol	Satna	Shivpuri	Satna
	Sidhi	Sidhi	Sidhi	Shivpuri	Sidhi	Shivpuri
	Tikamgarh	Tikamgarh	Vidisha	Tikamgarh	Tikamgarh	Tikamgarh

West Nimar in two demographic indicators; and Damoh, Jhabua, Rajgarh, Sehore and Tikamgarh in one demographic indicator only. Finally, there are nine districts—Chhatarpur, Guna, Panna, Raisen, Rewa, Satna, Shivpuri, Sidhi and Vidisha—which are not ranked very good or good in any of the six demographic indicators used in this analysis. Incidentally, six of these nine districts—Chhatarpur, Guna, Panna, Raisen, Rewa and Satna—are ranked poor to very poor in all the six demographic indicators while Shivpuri and Vidisha are ranked poor to very poor in five indicators and district Sidhi in four indicators. Other districts which are ranked poor to very poor in four of the six demographic indicators are Rajgarh, Sagar, Sehore and Shahdol. Moreover, districts Betui, Bind, Datia and Morena are ranked poor to very poor in three demographic indicators while Balaghat, Chhindwara, East Nimar and Narsimhapur are ranked poor to very poor in two indicators. On the other hand, districts Bilaspur, Damoh, Jabalpur, Mandasaur, Shajapur, Surguja and West Nimar are ranked poor to very poor in one demographic indicator.

Interestingly, there are six districts in the state which are ranked very good in one or more than one of the demographic indicators used in this analysis but, at the same time, very poor in other demographic indicators. District Betui, for example, is ranked very good in terms of the index of fertility inhibiting effects of marriage but very poor in terms of total marital fertility rate, infant mortality rate and expectation of life at birth. A similar situation exists in Bilaspur, Chhindwara, East Nimar, Shajapur and Tikamgarh districts. This pattern of ranking in different demographic indicators in these districts clearly indicates that there are factors specific to these districts which influence the scenario in reference to one demographic indicator but not in reference to other indicators. Little is however currently known about these district specific factors.

Correlation Analysis

The Spearman's rank order correlation coefficient has been calculated in order to explore whether ranking of a district in different demographic indicators is related to the ranking of that district in different dimensions of social and economic development as well as to the ranking in specific social and economic development indicators. Findings of the correlation analysis are given in Tables 5 and 6. In Table 5 rank Spearman's order correlation coefficients between the six demographic indicators and six dimensions of social and economic development are given while in Table 6 rank order correlation coefficients of the six demographic indicators with the 18 social and economic indicators used in the analysis are presented.

It may be seen from Table 5 that out of the 36 correlation coefficients presented in the Table. 20 are statistically significant. This suggests that there is a strong direct relationship between the ranking of a district in terms of social and economic development and the ranking of the district in terms of different demographic indicators. It may also

TABLE 5: SPEARMAN RANK ORDER CORRELATION COEFFICIENTS BETWEEN DEMOGRAPHIC INDICATORS AND DIMENSIONS OF DEVELOPMENT

<i>Dimensions of development</i>	<i>Demographi indicators</i>					
	<i>TMFR</i>	<i>C_m</i>	<i>CPR</i>	<i>IMR</i>	<i>MMR</i>	<i>Eo</i>
I	0.196	0.507***	0.089	0.430**	0.153	0.491**
II	0.425**	0.717***	0.401**	0.361*	0.317*	0.447**
III	0.087	-0.092	0.419**	-0.015	0.210	-0.024
IV	0.188	0.209	0.379*	0.366*	0.450**	0.394**
V	0.515***	0.426**	0.538***	0.425**	0.468**	0.460**
VI	0.097	-0.016	0.196	0.144	0.171	0.096

* Significant at $P = .05$

** Significant at $P = .01$

*** Significant at $P = .001$

Remarks: For composition of different dimensions of

TABLE 6: SPEARMAN RANK ORDER CORRELATION COEFFICIENTS INDICATORS AND INDICATORS OF SOCIAL AND ECONOMIC DEVELOPMENT

<i>Indicators of social and development</i>	<i>Demographi indicators</i>				
<i>TMFR</i>	<i>C_m</i>	<i>CPR</i>	<i>IMR</i>	<i>MMR</i>	<i>Eo</i>
DEN 0.145	0.036	0.156	0.244	0.357**	0.264
SCP 0.119	0.492**	-0.006	0.287	0.046	0.362*
STP 0.011	0.419**	-0.044	0.135	-0.153	0.211
PSR 0.406**	0.568***	0.142	0.330*	0.231	0.407**
LFS 0.315	0.481**	0.210	0.161	0.117	0.247
FLT 0.280	0.557***	0.508***	0.292	0.384*	0.358*
PNS -0.220	-0.206	0.066	-0.319*	-0.098	-0.302*
IRR 0.109	-0.019	0.274	0.032	0.242	0.031
VAP 0.067	0.141	0.482**	0.207	0.271	0.207
URB 0.03	0.106	0.309*	0.179	0.314*	0.213
IND 0.307*	0.366*	0.400**	0.451**	0.486**	0.498***
ELE 0.141	0.085	0.305*	0.262	0.319*	0.272
POV 0.064	-0.371*	0.054	-0.009	0.057	-0.067
WPR 0.374*	0.476**	0.236	0.193	0.159	0.269
TLR 0.309	0.450**	0.437**	0.306*	0.428**	0.342*
MED 0.019	0.148	0.403**	0.126	0.242	0.135
COM -0.137	-0.113	0.058	0.101	0.102	0.077
ROA -0.164	-0.052	-0.024	0.092	0.077	0.055

* Significant at $P = .05$

** Significant at $P = .01$

*** Significant at $P = .001$

Remarks: For definition of social and economic development indicators, please see Appendix.

be seen from the Table that the rank order correlation coefficients of development dimension II and development dimension V with all the demographic indicators are statistically significant. This observation indicates that progress of a district in terms of development dimension II and development dimension V may have a significant influence on demographic transition in that district. The development dimension II is composed of the indicators related to the status of women while the development dimension V is composed of indicators related to social development. This shows that concentrating on social development and reduction of social and economic disparities with a focus on addressing women's issues is crucial in hastening the pace of demographic transition in the districts of the state.

Interestingly, the rank order correlation coefficient of the development dimension VI—the dimension related to infrastructure development—has not been found to be statistically significant with any of the six demographic indicators. Similarly, the rank order correlation coefficient of the development dimension III—the dimension related to agriculture development—has been found to be statistically significant with the contraceptive prevalence rate only. This indicates that progress in agriculture and progress in infrastructure may not lead to improvement in demographic situation if this progress is not associated with a parallel progress in literacy, especially of females. creation of more employment opportunities and reducing income and entitlement disparities.

In Table 6. rank order correlation coefficients of specific indicators of social and economic development with the six demographic indicators are presented. Industries per one lakh population and total literacy rate are the only development indicators which have been found to be statistically significantly correlated with all the six demographic indicators in terms their ranks. In addition, female literacy rate has been statistically significantly related with four demographic indicators while proportion of scheduled caste population, labour force sex ratio, per capita net sown area. proportion of population urban and work participation rate have been found to be statistically significantly correlated with two demographic indicators. The correlation coefficients presented in the Table again support the conjecture that progress in the areas of literacy, especially female literacy, reducing poverty through generating employment opportunities is the key to hastening the pace of demographic transition in a given district of the state. In those districts of the state which are comparatively advanced in these areas of social and economic development, the demographic transition as reflected by the six demographic indicators is also comparatively advanced and vice versa.

Conclusions

The present analysis of inter-district variations in social and economic development and demographic situation clearly indicates that there exists a strong link between the social and economic progress and demographic transition across the districts of the state.

The analysis also suggests that improving the capacity and quality of the people with a focus on women is crucial in hastening the pace of demographic transition. This implies that any policy towards population control in the state must take into consideration the disparities in social and economic development. Mere focusing on the promotion of family planning and creation of additional health care facilities, it is doubted, may not be effective enough to hasten demographic transition in the state and in controlling population growth. It is important that wider dimensions of reproductive and health seeking behaviour of the people are effectively addressed through a people centred development approach.

Another important finding of the present analysis is that a unified approach or a unified strategy for social and economic development as well as for demographic transition may not work in the state because of some very strong and diverse inter-district disparities in social and economic development as well as in demographic situation. Since reducing these inter-district disparities in demographic and development may probably be feasible yet for optimal strategy for rapid social and economic progress and demographic transition in Madhya Pradesh, appears necessary on the basis of the findings of the present analysis that a district-based approach of development planning and a district specific approach towards demographic transition and population control is evolved and implemented.

References

- Bongaarts, J.. 1978. A framework for analyzing proximate determinants of fertility. *Population and Development Review*. 4(1): 105-132.
- Chaurasia, A. R.. 1996. *Madhya Pradesh Target Couple Survey 1996: Fertility, Child and Maternal Mortality, Family Planning*. Bhopal. Government of Madhya Pradesh. Rajiv Gandhi Mission for Elimination of Iodine deficiency Disorders.
- Government of India. 1996. *Sample Registration System*. New Delhi. Registrar General. Government of Madhya Pradesh. 1999. *Madhya Pradesh Human Development Report* Bhopal. Directorate of Institutional Finance.
- Government of Madhya Pradesh. 1996a. *Inter-state Indicators of Social and Economic Development*. Bhopal Directorate of Economics and Statistics.
- Government of Madhya Pradesh. 1996b. *District Level Indicators of Social and Economic Development*. Bhopal. Directorate of Economics and Statistics.
- Government of Madhya Pradesh and International Institute for Population Sciences. 1995. *National Family Health Survey Madhya Pradesh 1992*. Bhopal. Department of Economics and Statistics and Bombay. International Institute for Population sciences.
- Rajan, I. S.. 1998. Infant and child mortality estimates for districts of India as per 1991 Census. *Economic and Political Weekly*. May 9
- Ranjan, A.. 1999. Maternal Mortality in Madhya Pradesh. *Journal of Family Welfare*. 44(4).

(Indicators of social and economic development and demographic situation used in the analysis. reference date and source of information.)

APPENDIX TABLE 1: SOCIAL AND ECONOMIC DEVELOPMENT

Dimension I: Population distribution and structure

1. Population Density (DEN): Population per square kilometer. Taken from 1991 population census. Refers to the year 1991.
2. Scheduled Caste Population (SCP): Proportion of population classified as scheduled caste. Taken from 1991 population census. Refers to the year 1991.
3. Scheduled Tribe Population (STP): Proportion of population classified as tribal. Taken from 1991 population census. Refers to the year 1991.

Dimension II: Women s status

1. Sex Ratio of Population (SRP): Number of females per 1000 males. Taken from 1991 population census. Refers to the year 1991.
2. Labour Force Sex Ratio (LFS): Number of female workers per 1000 male workers. Taken from 1991 population census. Refers to the year 1991.
3. Female Literacy Rate (FLT): Proportion of females above six years of age who can read and write with understanding. Taken from 1991 population census. Refers to the year 1991.

Dimension III: Agriculture

1. Per Capita Net Sown Area (PNS): Taken from Government of Madhya Pradesh development data base. Refers to the year 1993-94.
2. Proportion of Net Sown Area Irrigated (IRR): Taken from Government of Madhya Pradesh development database. Refers to the year 1993-94.
3. Value of Agricultural Produce at Current Prices (VAP): Taken from Government of Madhya Pradesh development database. Refers to the year 1992-93.

Dimension IV: Industrialization and urbanization

1. Proportion of Population Living in Urban Areas (URB): Taken from 1991 population census. Refers to the year 1991.
2. Registered Industries per One lakh Population (IND): Taken from Government of Madhya Pradesh development database. Refers to the year 1993.
3. Per Capita Electricity Consumption (ELE): Taken from Government of Madhya Pradesh development database. Refers to the year 1993-94.

Dimension V: Soda] development

1. Proportion of Ponulation Below Poverty Line (POV): Taken from Madhya Pradesh Human Development Report 1998. Refers to the year 1993-94.

Appendix Table 1 (*conld. from p. 39*)

2. Work Participation Rate (WPR): Taken from 1991 population census. Refers to the year 1991.
3. Total Literacy Rate (TLR): Proportion of population above 6 years of age who can read and write with understanding. Taken from 1991 population census. Refers to the year 1991.

Dimension VI: Infrastructure

1. Proportion of Villages having a Medical Facility (MED): Taken from 1991 population census. Refers to the year 1991.
2. Proportion of villages having communication facility (COM): Taken from 1991 population census. Refers to the year 1991.
3. Proportion of Villages connected through all weather Roads (ROD): Taken from 1991 population census. Refers to the year 1991.

APPENDIX TABLE 2: DEMOGRAPHIC INDICATORS

1. Total Marital Fertility Rate (TMFR): Estimates prepared by Registrar General of India. Refers to the year 1991.
2. Index of Fertility Inhibiting Effects of Marriage (C^{\wedge}): Ratio of total fertility rate to total marital fertility rate. Derived from estimates prepared by the Registrar General of India. Refers to the year 1991.
3. Contraceptive Prevalence Rate (CPR): Estimates prepared by the Government of Madhya Pradesh on the basis of Madhya Pradesh Target Couple Survey. Refers to the year 1996.
4. Infant Mortality Rate (IMR): Estimates prepared by Rajan (1998). Refers to the year 1991.
5. Maternal Mortality Ratio (MMR): Estimates prepared by Ranjan (1999). Refers to the period 1995-96.
6. Expectation of Life at Birth (Ey): Taken from Madhya Pradesh Human Development Report 1998. Refers to the year 1991.