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A Comparative Analysis of Birth and Death Rates in Indian States

Introduction

It is said that, 'whenever six economists are gathered there are seven opinions

(Barbara Wootton, 1938), but there is a complete unanimity on the issue that the major obstacle in India's economic development is the rapid increase in its population. As we are getting nearer towards the 21st century an observation made by Keenleyside with regard to population explosion looks like gaining reality. Keenleyside expressed his observation in the following words, "The womb is slower than the bomb but it may prove just as deadly. Suffocation rather than incineration may mark the end of the human story".

Objective, Methodology and Scope of the Study

The purpose of the present paper is to analyse the trend in birth and death rates of India and some of its major states so that it can be ascertained which of the states have a high natural growth rate of population and what steps can be taken in these states to mitigate the sharp rise in natural growth of population. This calls for diagnosing those factors which are responsible for the differentials in birth and death rates among major Indian States.

The major states which are considered in this study for the purpose of demographic analysis are drawn from all parts of the country. Andhra Pradesh (A.P.), Tamil Nadu (T.N.), Kerala, and Karnataka are taken from the southern part,

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Maharashtra and Gujarat are considered from the Western part, Punjab, Haryana and Rajasthan are drawn from the northern part, Uttar Pradesh (U.P.) and Madhya Pradesh (M.P.) are considered from the central part, and, from the eastern part Bihar, Orissa, West Bengal (W.B.) and Assam are taken into account for the purpose of demographic analysis.

It is in place to mention that the trend in the growth of population in developed countries have enabled demographers to classify population pattern of these countries into three stages. Stage-I—corresponds to more or less stable population growth on account of high birth and equally high death rates. Stage-II—is considered as an intermediate stage which marks the beginning of demographic transition i.e. from high birth and death rates to the increasing divergence between high birth rate and falling death rate and then towards growing convergence between low birth and death rates. Finally stage-III—is an outcome of the forces of modernization and development, which tends to narrow down the gap between birth and death rates through a relatively fast decline in the birth than in the death rate.

Our analysis of the trend in birth and death rates too will facilitate to demarcate different stages of demographic transition in India and the various states considered in the study.

Further keeping in view that natural rate of growth of population comes close to 1 percent by the year 2000 A.D., all the 15 states are classified into 'certain', 'likely' and 'unlikely' categories. The classification of states into 3 categories to some extent resembles to the one made by Berelson *et al.* (1979) for 29 developing countries. In our study states under the 'certain' category are those where the recent available CBR is less than 22.5/1000, while states in 'likely' category are those whose current available CBR is less than 25/1000 and the states whose present available birth rate is 25/1000 and above are placed in the 'unlikely' category.

Since natural growth rate of population depend on the difference in the birth rate and death rate therefore simple graphic technique is employed to chart out the trends in birth and death rates of India and its different states. For analysing the factors affecting differentials in birth and death rates among major states of India a regression equation of the type.

$$\log d_i = a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5$$

is used, where,

d_i is the difference in birth and death rates

x_i is a measure of per capita state domestic product

- x_2 represent the poverty ratio
- x_3 shows the life expectancy
- x_4 indicates the mean age at marriage
- x_5 reflect the literacy rate

and b_1, b_2, b_3, b_4, b_5 are respective coefficients associated with the variables x_1, x_2, x_3, x_4 and x_5 respectively. The regression equation is estimated around the years 1970, 1980 and 1990 for which data is available for different variables.

For charting long term trends it is necessary to make certain simplifications on account of changes that occurred during a long period of time. In India for a fairly long period of time certain states were unified as a single state like Punjab and Haryana, Andhra Pradesh and Tamil Nadu, Gujarat and Maharashtra, Bihar and Orissa. In our analysis too the birth and death rates of these states are integrated by taking the weighted average of two states for the period for which unified data is not available for these states. The weight is assigned on the basis of the mid-decade population of the states concerned.

Before proceeding to the analysis part it is in place to mention that the word 'Comparative' in this paper is used in a dual sense. On the one hand it implies the comparison of trends in birth and death rates among major Indian states and on the other hand it also reflect the comparison of the official (i.e. Census) estimates with that of the estimates obtained by the National Family Health Survey (NFHS) regarding two crucial parameters viz., CBR and CDR for the initial years of 1990s. In case of any substantial discrepancy between the two (Census and NFHS) estimates, care is taken in this paper to point out which estimate is more reliable for the purpose of usage.

Comparative Analysis of Birth and Death Rates

Berelson *et al.* (1979) classified 29 developing countries into 4 categories on the basis of whether a particular country is able to come close to a target of CBR of 20/1000 by the year 2000 A.D. and thus to a rate of natural increase of population close to 1 percent, assuming a CDR of 8 to 10 per 1000 at that time. These 4 categories were: certain, probable, likely, and unlikely. India was placed in the third category but now it is definite whether one takes into account NFHS data or the official figures (Table 1), India will be in the fourth category, rather than in the third by the start of 21st century.

From Table 1 it is also obvious that by the year 2000, whatever one follows, whether official or NFHS estimates, India at the most will be close to a target of

25/1000 and 8/1000 in CBR and CDR respectively. It implies that by the start of 21st century India's population will increase at a rate of around 1.7% p.a.

Further if one takes a retrospective view of around 100 years (Fig. 1 and Table A-1, A-2) one can clearly demarcate the III Stages of demographic transition, The first stage ended with the completion of the 1911-20 decade. The second stage started thereafter and it culminated with the close of the 1961-70 decade. The beginning of the 1970s (1971 onwards) mark the start of the IIIrd phase of demographic transition in India, when CBR has shown the tendency to decline along with the DR. The natural rate of increase in population has come down from 2.2% p.a. during the concluding decade of the Und stage to 1.96% p.a. during the first half of 1990s.

TABLE 1: CRUDE BIRTH AND DEATH RATES BY OFFICIAL AND NFHS ESTIMATES
IN INDIA (in Mille)

| <i>Years</i> | <i>Official Rates</i> | | <i>Period</i> | <i>NFHS Figures</i> | |
|--------------|-----------------------|------------|-----------------|------------------------|------------------------|
| | <i>CBR</i> | <i>CDR</i> | | <i>CBR 1990-92</i> | <i>CDR 1991-92</i> |
| 1991 | 30.2 | 9.7 | Year ending '92 | 28.7 | 9.7 |
| 1992 | 29.5 | 9.8 | | | |
| 1993 | 29.2 | 10.1 | | | |
| 1994 | 28.7 | 9.3 | | | |
| 1995 | 28.6 | 9.2 | | | |

Source: Sample Registration System (1993), Mortality and Fertility Indicators, Registrar General, India and NFHS Report for India.

Since IIIrd stage started from the 1970s it can be said that the population control measures undertaken during emergency period and the national population policy (1976) proved beneficial in curtailing the birth rate. The spirit embodied in the national population policy and the effectiveness of population control measures during the emergency period could not be maintained thereafter, hence birth rate could not be reduced to a desired extent and on account of it India in all likelihood will end up 20th century in the category of 'unlikely' country to reach the target of 20/1000 with regard to crude birth rate (CBR).

The position of a country as a whole does not necessarily implies that the position of different states will be the same. Moreover, different states of India differ a lot in physical characteristics therefore demographic situation of states is expected to differ a lot.

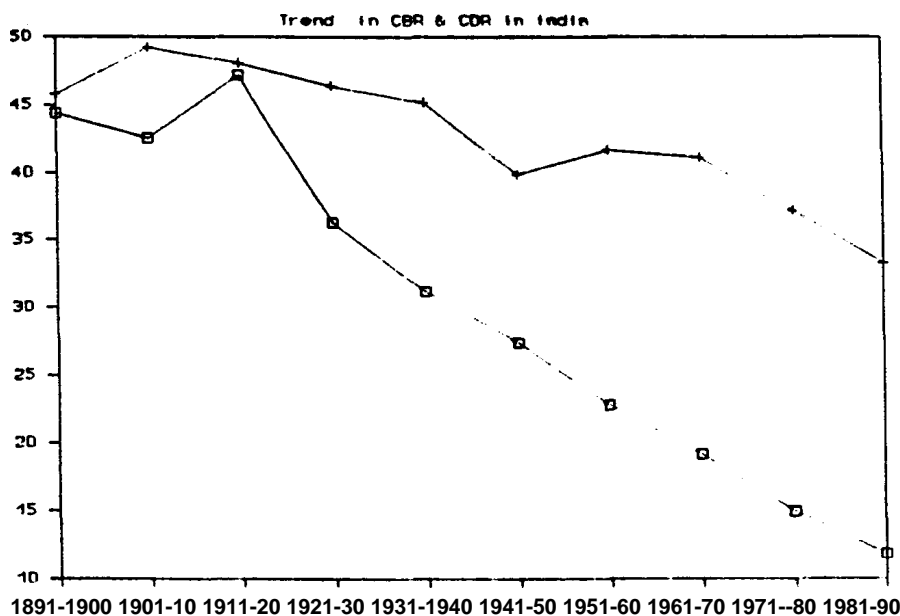


Fig. 1. Trend in CBR and CDR in India

In the southern part of India the 4 states which we have considered for demographic analysis are Kerala, Andhra Pradesh, Tamil Nadu and Karnataka. The current pattern of the birth and death rates of these states is shown in Table 2.

From Table 2 it is obvious that there is not much discrepancy in the official and NFHS data except Tamil Nadu where official figures indicate a CBR of around 20 while NFHS estimates indicate CBR of around 23. However, even this discrepancy is not enough to prevent Tamil Nadu from being included in the category of 'Certain' states because official trend even after 1992 has shown gradual decline. Kerala already has qualified the category of 'Certain' state while Karnataka and Andhra Pradesh whose CBR is a little over 22.5 is placed in the category of 'Likely' states to achieve the target of 20/1000 in CBR by the end of 20th century.

The overall secular trend for the southern states as shown in the Figs. 2A-C clearly reveal all the three stages of demographic transition. All the four southern states were in the first stage until the end of 1911 -20 decade. Stage-II of demographic transition began thereafter. In this stage either there was intermittent rise and fall in birth and death rates or birth rate declined gradually but at a fairly slow rate while the death rate declined more sharply, thus widening the gap between the two

TABLE 2: CRUDE BIRTH AND DEATH RATES IN SOUTHERN STATES OF INDIA
(in Mille)

| States | | Official Estimates | | | | NFHS figures for CBR period is (1990-92) and for CDR period is (1991-92) |
|----------------|-----|--------------------|------|------|------|--|
| | | 1991 | 1992 | 1993 | 1994 | |
| Andhra Pradesh | CBR | 26.0 | 24.5 | 24.3 | 23.7 | 24.2 |
| | CDR | 9.7 | 9.2 | 8.6 | 8.3 | 8.7 |
| Karnataka | CBR | 26.9 | 26.3 | 25.5 | 24.9 | 25.9 |
| | CDR | 9.0 | 8.5 | 8.0 | 8.1 | 7.5 |
| Tamil Nadu | CBR | 20.8 | 20.7 | 19.5 | 19.0 | 23.5 |
| | CDR | 8.8 | 8.4 | 8.2 | 7.9 | 9.7 |
| Kerala | CBR | 18.3 | 17.7 | 17.4 | 17.3 | 19.6 |
| | CDR | 6.0 | 6.3 | 6.0 | 6.0 | 6.2 |

Source: Sample Registration System (1993), Mortality and Fertility Indicators, Registrar General, India and NFHS Report for India.

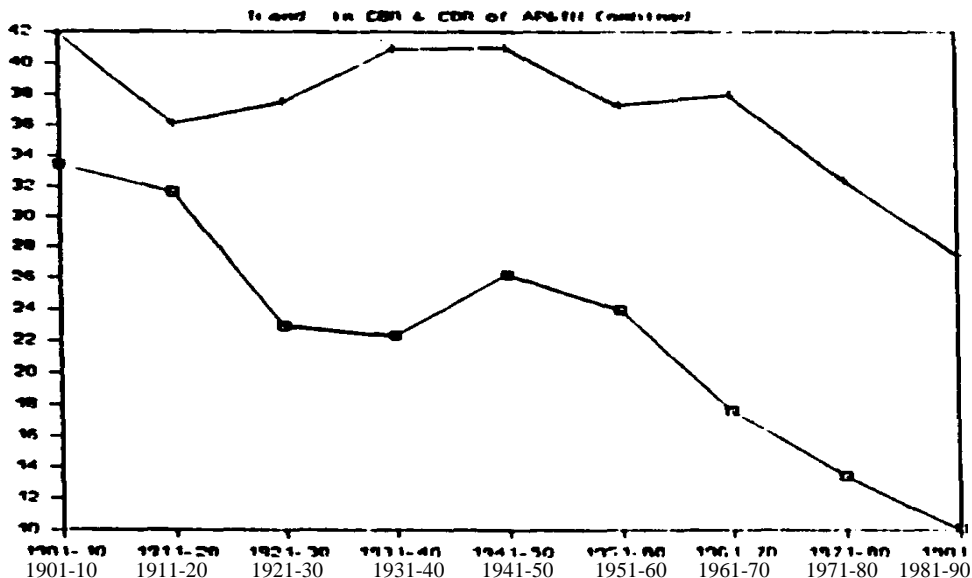


Fig. 2A. Trend in CBR and CDR of AP and TN Combined

parameters. As a consequence average decadal Population growth during this stage remained high, as compared to previous stage (Table 3). This stage culminated by the end

Trend in CBR & CDR in Karnataka

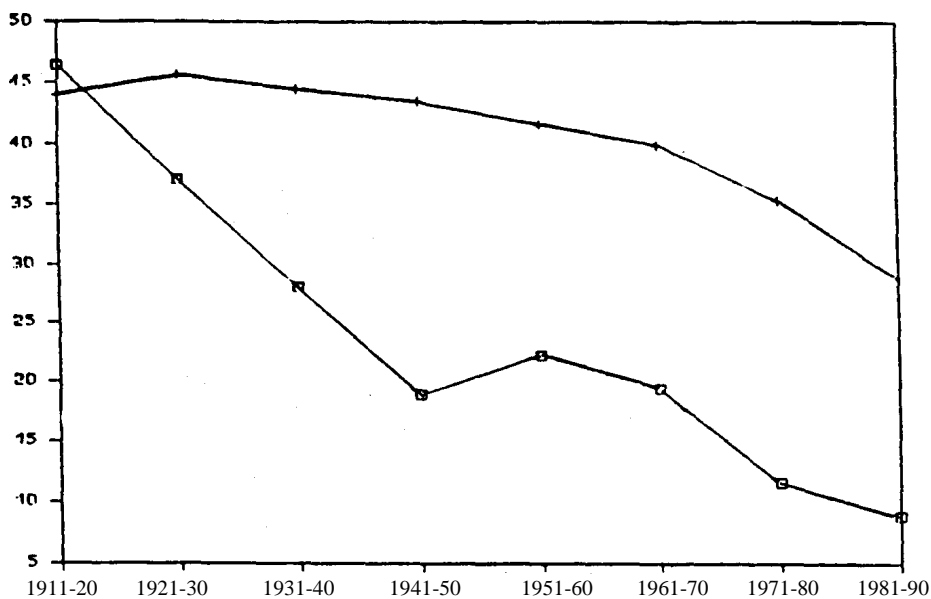


Fig. 2B. Trend in CBR and CDR in Karnataka

Trend in CBR & CDR in Kerala

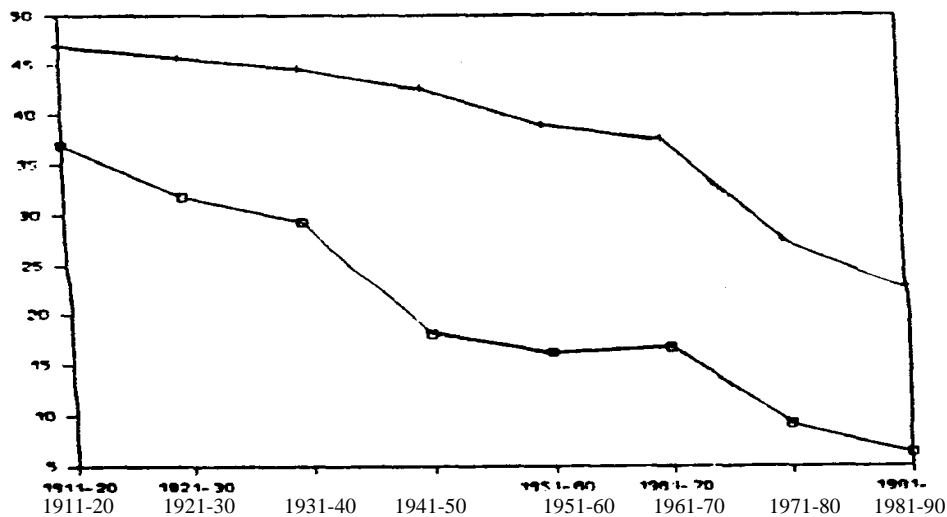


Fig. 2C. Trend in CBR and CDR in Kerala

From then on these states have entered into the IIIrd stage of demographic transition where birth rate fell more sharply as compared to death rate. As a

consequence the gap between the two has narrowed down which has tended to reduce the rate of natural increase in population (Table 3).

The preceding analysis also highlights the fact that of all the four southern states, Kerala is one such state which has made commendable progress in decelerating the natural growth rate of population. If we compare stage III of Kerala with those of West European countries it can be said that, what Kerala achieved in a span of 20 years even some West European countries could not accomplish in half of the century's time period (Figs. 2C and 3).

Another coastal part of India is its western region, from where we have considered two important states viz., Gujarat and Maharashtra. The integrated trend of the two states regarding CBR and CDR is shown in Fig. 4.

TABLE 3: NATURAL RATE OF GROWTH OF POPULATION IN SOUTHERN STATES (in % per annum)

| Period | AP and TN Combined | AP | Tamil Nadu | Karnataka | Kerala |
|--|-----------------------|------|---------------|-----------|--------|
| 1911-20 (Concluding decade of 1st stage) | 0.45 | n.a | n.a | -0.24 | n.a |
| 1961-70 (Concluding decade of II nd stage) | 2.04 | 2.01 | 2.07 | 2.05 | 2.09 |
| 1991-94 (Current period) | 1.37 | 1.57 | 1.17 | 1.71 | 1.16 |
| As per NFHS for the period 1990-92 | 1.46 | 1.55 | 1.38 | 1.84 | 1.34 |

Source: derived from Tables A-1 and A-2 alongwith NFHS report for India.

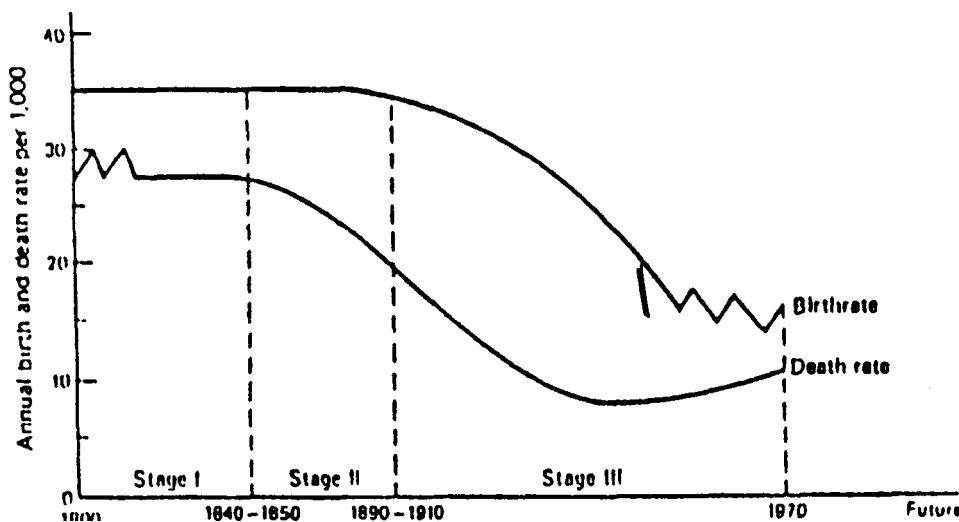


Fig. 3. The Demographic Transition in Western Europe

Source: *Economic Development in the Third World*, Todaro M.P. (Third Edition), 1985.

The Figure 4 reflect clearly that the western states of India too have the same stages of demographic transition as those of the southern states of India. The changes in the natural growth rate of population during the three stages (Table 4) provides support to the identical classification of demographic transition stages with that of the southern states of India.

From Table 4 it is obvious that in the first stage on account of high birth and death rates the natural growth rate of population is fairly low in the two western states but in the second stage as death rate declined and birth rate fluctuated around high levels the natural growth rate of population went up at alarming levels to around 2.8% p.a. In the third stage on account of a sharp decline in birth rate the natural growth rate of population during the terminal period of study has come down to around 1.8% p.a., both by official and NFHS estimates.

Given the pattern of birth rate in a little less than century's time period, as well as the current trend in it both by official and NFHS estimates (Table 5), it is inferred that Maharashtra and Gujarat qualify the category of 'Unlikely' states to reach the target of 20/1000 in CBR by the year 2000.

As we move away from the coastal regions and enter the northern belt of India we come across three important states of our country viz., Punjab, Haryana and Rajasthan.

TABLE 4: NATURAL GROWTH RATE OF POPULATION IN MAHARASHTRA AND GUJARAT
(in percentage per annum)

| <i>Period</i> | <i>Maharashtra and Gujarat</i> | <i>Maharashtra</i> | <i>Gujarat</i> |
|--|------------------------------------|--------------------|----------------|
| 1911-20 (Concluding decade of 1st stage) | 0.53 | 0.53 | n.a |
| 1961-70 (Concluding decade of Und Stage) | 2.79 | 2.80 | 2.78 |
| 1991-94 (Current period) | 1.83 | 1.77 | 1.91 |
| As per NFHS for the period 1990-92 | 1.83 | 1.86 | 1.81 |

Source: Derived from Tables A-1 & A-2 alongwith NFHS report for India.

Trend in CBR and CDR in Maharashtra and Gujarat Combined

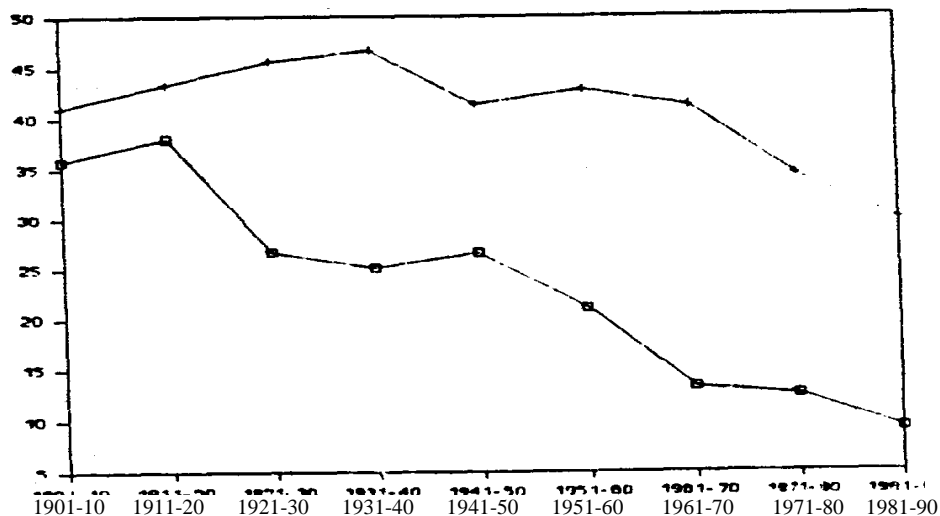
**Fig. 4.** Trend in CBR and CDR in Maharashtra and Gujarat Combined

TABLE 5: PATTERN OF CRUDE BIRTH AND DEATH RATE IN MAHARASHTRA AND GUJARAT FROM 1991 TO 1994 (in Mille)

| States | | Official Estimates | | | | NFHS figures for CBR period is (1990-92) and for CDR period is (1991-92) |
|-------------|-----|--------------------|------|------|------|--|
| | | 1991 | 1991 | 1993 | 1994 | |
| Maharashtra | CBR | 26.2 | 25.3 | 25.2 | 25.0 | 26.3 |
| | CDR | 8.2 | 7.9 | 7.3 | 7.4 | 7.7 |
| Gujarat | CBR | 27.5 | 28.1 | 28.0 | 27.1 | 27.2 |
| | CDR | 8.5 | 9.2 | 8.2 | 8.7 | 9.1 |

Source: SRS (1993), Fertility and Mortality Indicators, Registrar General, India.

The trend of the two demographic parameters viz., CBR and CDR for Punjab and Haryana combined is shown in Figure 5A.

From the figure it is obvious that in Punjab and Haryana together stages of demographic transition do have almost identical time period as those for the southern and western states. As in the case of preceding states in these two states too the natural growth rate of population in three different time periods (Table 6) conforms to the theory of demographic transition. As is evident from Table 6 that in the second

stage natural rate of increase in population is at its peak while in the first stage it is least and in the third stage it has the tendency to decline.



Fig. 5A. Trend in CBR and CDR in Punjab and Haryana Combined

TABLE 6: NATURAL RATE OF INCREASE IN POPULATION IN PUNJAB, HARYANA AND RAJASTHAN

| Period | Punjab and Haryana | Punjab | Haryana | Rajasthan |
|--|--------------------|--------|-------------|-----------|
| 1911-20 Concluding decade of 1st stage in Punjab and Haryana | 1.06 | n.a | n.a | n.a |
| 1961-70 Concluding decade of stage II in Punjab and Haryana | 2.34 | 1.71 | 2.98 | 2.60 |
| 1971-80 Concluding decade of stage II in Rajasthan | 2.24 | 2.15 | 2.55 | 2.87 |
| 1991-94 Current period | 2.10 | 1.86 | 2.35 | 2.48 |
| As per NHFS for the period 1990-92 | 2.09 | 1.79 | 2.39 | 1.92 |

Source: Derived from Table A-1 and A-2 alongwith NFHS report for India.

As regards the third state viz. Rajasthan, its trend in CBR and CDR is shown in Figure 5B.

The Figure 5B and our common understanding regarding Rajasthan facilitate to say that not only in terms of physical characteristics this state is much different from other states but in terms of demographic features too is substantially different from other states of India covered so far in the study.

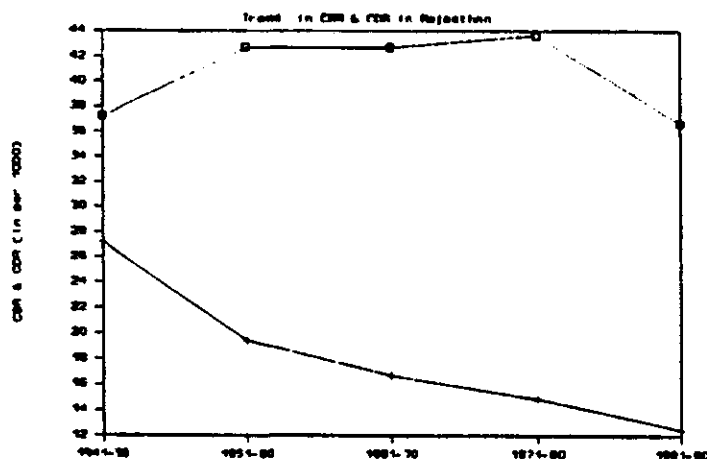


Fig. 5B. Trend in CBR and CDR in Rajasthan

TABLE 7: CBR AND CDR IN THE NORTHERN STATES DURING EARLY 1990s (in Mille)

| States | | Official Estimates | | | | NFHS figures for CBR period is (1990-92) and for CDR period is (1991-92) |
|-----------|-----|--------------------|------|------|------|---|
| | | 1991 | 1992 | 1993 | 1994 | |
| Punjab | CBR | 27.7 | 27.1 | 26.3 | 25.0 | 25.0 |
| | CDR | 7.8 | 8.2 | 7.9 | 7.6 | 7.1 |
| Haryana | CBR | 33. | 32.0 | 30.9 | 30.5 | 32.9 |
| | CDR | 1 8.2 | 8.7 | 7.9 | 7.8 | 9.0 |
| Rajasthan | CBR | 35.0 | 34.9 | 34.0 | 33.7 | 27.0 |
| | CDR | 10.1 | 10.5 | 9.1 | 8.9 | 7.8 |

Source: Sample Registration System (1993), *Mortality and Fertility Indicators*, Registrar General, India and NFHS Report for India.

On account of paucity of data trends in CBR and CDR for this state is known only from the decade 1941-50 and therefore nothing can be said about stage-I. Whatever that can be inferred from Fig. 5B is that Rajasthan was in the IInd stage of demographic transition until the completion of 1971-80 decade and thereafter it entered the stage III.

The shift from northern to the central part of India provides us an opportunity to analyse the pattern of CBR and CDR in the two highly populated states of our country viz. Madhya Pradesh (MP) and Uttar Pradesh (U.P.).

The trend in CBR and CDR for MP is presented in Figure 6A. From the figure it is obvious that the start of second phase in MP was delayed as compared to the Western and Southern states of India. The second phase commenced after the culmination of the 1941-50 decade. In this stage death rate had shown the tendency to decline sharply. This is quite consistent with the theory of demographic transition. The theory has laid stress on the fact that countries (in our case it is states) having very high death rates and are entering late into the second phase will experience a faster decline in their death rates than those countries (states in our case) who have entered the second phase at an early stage.

M.P. has entered the IIIrd stage exactly in the same time period as the one for the southern and western states of India, but with a noticeable difference. In the case of southern and western states the death rate has gone down below 10/1000, but in the case of M.P. death rate is still above 10/1000. The pattern of death rate for M.P. in the IIIrd stage (Fig. 6A) is not unusual. Todaro (1985) has observed that 'population history of third world countries reveal two distinct pattern of death rates. On the one hand, there are countries where death rates have fallen to as low as 10/1000 or below it while on the other hand there are countries where death rates has the tendency to stabilize at higher levels'. This is largely due to persistence of widespread absolute poverty and low levels of living'. The highest poverty ratio in M.P. (Table 5A) and a death rate of over 10/1000 in the IIIrd stage quite largely reflect the presence of the aforementioned typical characteristic in M.P.

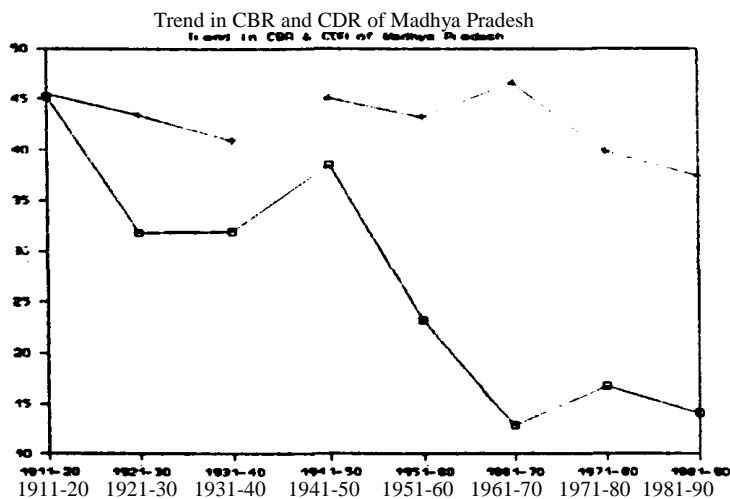


Fig. 6A. Trend in CBR and CDR of Madhya Pradesh

TABLE 8: NATURAL GROWTH RATE OF POPULATION (in Percentage per annum)

| Period | U.P. | M.P. |
|---|------|------|
| 1911-20 | | |
| Concluding decade of Stage-I in U.P. | 1.11 | 0.03 |
| 1941-50 | | |
| Concluding decade of Stage-I in U.P. | 1.14 | 0.66 |
| 1961-70 | | |
| Concluding decade of Stage-II in M.P. | 2.14 | 3.38 |
| 1971-80 | | |
| Concluding decade of Stage-II in U.P. | 2.40 | 2.30 |
| 1991-94 | | |
| Current period for which official figs, are available | 2.42 | 2.19 |
| 1991-92 | | |
| As per NFHS estimates | 2.40 | 2.13 |

Source: Derived from Table A-1 and A-2 alongwith NFHS report for India.

On account of relatively high death rate in M.P., the birth rate in M.P. is also high. It is on account of this that the natural rate of increase in population is about 2% even in the Illrd stage (Table 10) in the case of Madhya Pradesh.

Further looking at the current pattern of CBR and CDR both by official and NFHS estimates (Table 11) it can be inferred that M.P. comes under the category of 'unlikely' state to reach the target of 20/1000 by the turn of the century.

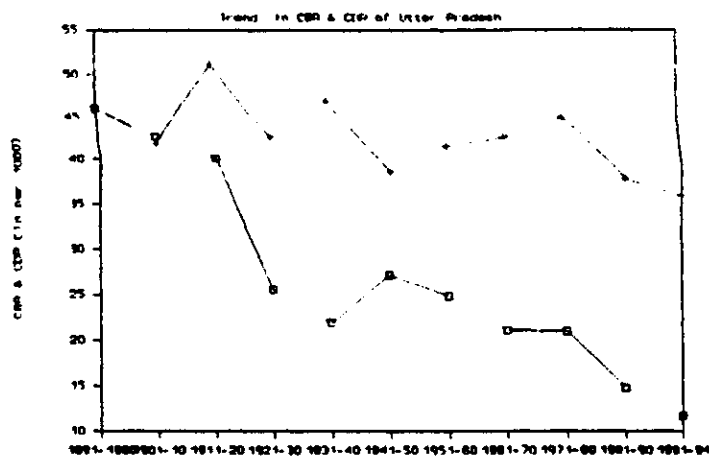


Fig. 6B. Trend in CBR and CDR of Uttar Pradesh

The Most significant state in terms of population is U.P., its situation is much more critical than that of M.P. The IIIrd stage, therefore, did not begin from the same time period as that of M.P. Rather it began a decade after the start of IIIrd stage in M.P. i.e., after the completion of 1971 -80 decade. Because of a high poverty ratio in U.P. (Table A-5) the death rate has remained above 10/1000 as in the case of M.P. The birth rate too has fallen slowly therefore natural growth rate of population in the third stage has remained above 2% p.a. (Table 10). The first stage culminated with the end of the 1911-20 decade while the second stage remained until the end of the 1971-80 decade.

TABLE 9: PATTERN OF CBR AND CDR IN M.P. AND U.P. (IN MILLE)

| <i>States</i> | | <i>1991</i> | <i>1992</i> | <i>1993</i> | <i>1994</i> | <i>NFHS estimates for CBR period is 1990-92 and for CDR period is 1991-92</i> |
|----------------|-----|-------------|-------------|-------------|-------------|---|
| Madhya Pradesh | CBR | 35.8 | 34.9 | 34.9 | 32.8 | 31.6 |
| | CDR | 13.8 | 12.9 | 12.6 | 11.8 | 10.3 |
| Uttar Pradesh | CBR | 35.7 | 36.3 | 36.2 | 35.4 | 35.9 |
| | CDR | 11.3 | 12.8 | 11.6 | 11.0 | 11.9 |

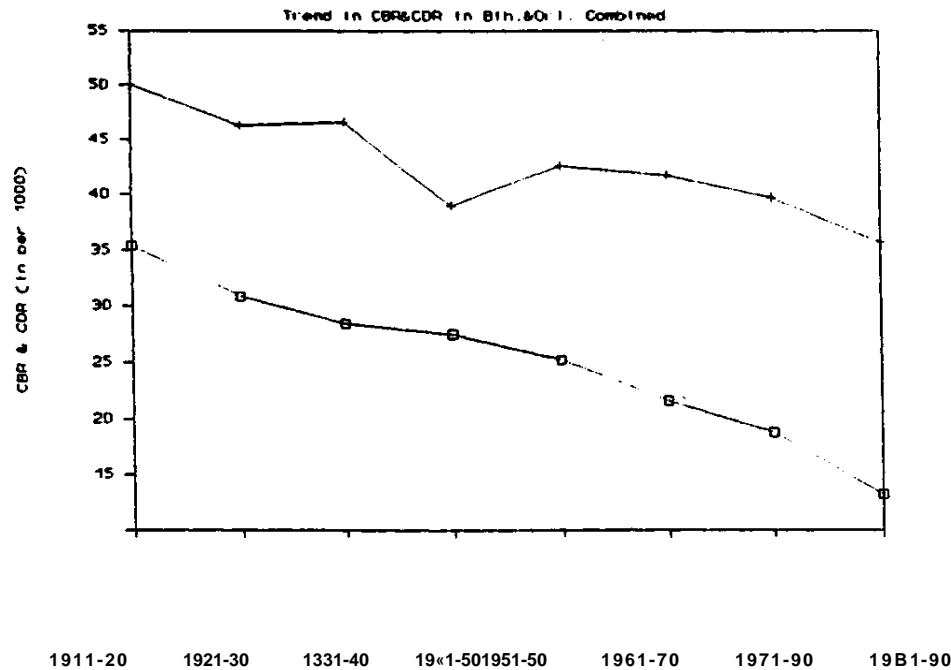
Source: Sample Registration System (1993), *Mortality and Fertility Indicators*, Registrar General, India and NFHS Report for India.

Considering the current pattern of fall in CBR (Table 1) as well as the behaviour of the CBR during the entire IIIrd stage (Fig. 6B) it is reasonable to put U.P. too, in the category of 'unlikely' state to reach the target of 20/1000 by the end of 2000 A.D.

Further it is indeed noticeable that around one-fourth of the total population resides in the central part of India, and if population growth of India is to be controlled then population growth of these two states has to be effectively checked.

Moreover if we take into account poverty ratio then we find that a little less than 1/3rd (almost 30%) of total persons living below the poverty line in India live in these two states (Table A-5). In the light of these facts it can be said that Todaro's observation regarding death rate to fluctuate above 10/1000 for certain less developed countries is equally applicable for certain states of a country too. From this it follows that for lowering the birth rate significantly in these states further lowering of death rate is a prerequisite. Government must therefore, channelise more efforts in the central part of India to ameliorate the living conditions of people and reducing the number of people living below the poverty line through more innovative and

productive programmes. This, however, is only a long run solution, while the short run strategy for effectively reducing the natural growth rate of population requires introduction of coercive as well as incentive methods as the one adopted by the government of India during the emergency period.



Coercive method require a firm political will which under present circumstances appear to be a remote possibility. Therefore the method of incentives should be adopted in a more broadbased way. The incentives should not merely be confined to monetary benefits for those who follow one or two children family norm, likewise, subsidies on fertilizers to farmers be given to those who follow the above norm. Similarly benefits of certain government programmes like IRDP etc. should flow to those persons especially who follow the above family norm.

Fig. 7A. Trend in CBR and CDR in Bihar and Orissa Combined

Finally we move on to the eastern states of our country which includes Bihar, Orissa, West Bengal and Assam.

The pattern of CBR and CDR for Bihar and Orissa combined is shown in Fig. 7A. From Fig. 7A, it is obvious that for Bihar and Orissa combined the first stage culminated sometimes around the¹ end of the 1911 -20 decade. The two states remained in the second stage until the completion of 1961 -70 decade. Thereafter the two states

entered the IIIrd phase of demographic transition. Considering the trend of fall in birth rate (Fig. 7A) as well as the available data for the early 1990s by NFHS and census estimates (Table 12) it can be inferred that both the states come under the 'unlikely' category to reach the target of 20/1000 by the end of the 1990 decade. The natural growth rate of population in the two states (Table 13) also reflect an unlikely possibility of even coming nearer to 1 percent by the end of this century.

Another important state of the eastern part of India is West Bengal. This state had faced worst types of famines in the past, therefore, the state had a record of high birth and death rates till the end of the 1941-50 decade. It also marks the end of the 1st stage of demographic transition. Thereafter started the period of the 2nd stage of demographic transition. This stage culminated by the end of the 1961-70 decade. From then on as in the case of some other states the third stage of demographic transition began. All the three stages are shown in Fig. 7B. Since poverty ratio in West Bengal is much below the national average (Table A-5) therefore death rate in West Bengal has fallen sharply to below 10/1000 by the end of the 1981-90 decade. Birth rate too in West Bengal by the beginning of 1990s has come down to around 25/1000. Considering the pattern of decline in birth rate during the beginning of 1990s (Table 12) it can be safe to infer that West Bengal should also be classified in the category of 'unlikely' state to reach the target of 20/1000 in birth rate by the end of this century. Despite sharp decline in birth rate of West Bengal yet the natural growth rate of population during the decade (1981-90) is around 1.7% p.a.

TABLE 10: PATTERN OF CBR AND CDR IN FOUR EASTERN STATES IN INDIA (in Mille)

| <i>States</i> | | <i>1991</i> | <i>1992</i> | <i>1993</i> | <i>1994</i> | <i>NFHS estimates for CBR period is 1990-92 and for CDR period is 1991-92</i> |
|---------------|-----|-------------|-------------|-------------|-------------|---|
| Bihar | CBR | 30.7 | 32.3 | 32.0 | 32.5 | 32.1 |
| | CDR | 9.8 | 10.9 | 10.6 | 10.4 | 11.5 |
| Orissa | CBR | 28.8 | 27.8 | 27.2 | 28.0 | 26.5 |
| | CDR | 12.8 | 11.7 | 12.2 | 11.1 | 11.0 |
| W. Bengal | CBR | 27.0 | 24.8 | 25.7 | 25.1 | 25.5 |
| | CDR | 8.3 | 8.4 | 7.4 | 8.3 | 9.7 |
| Assam | CBR | 30.9 | 30.8 | 29.5 | 30.7 | 30.4 |
| | CDR | 11.5 | 10.4 | 10.2 | 9.1 | 11.3 |

Source: Sample Registration System (1993), *Mortality and Fertility Indicators*, Registrar General, India and NFHS Report for India.

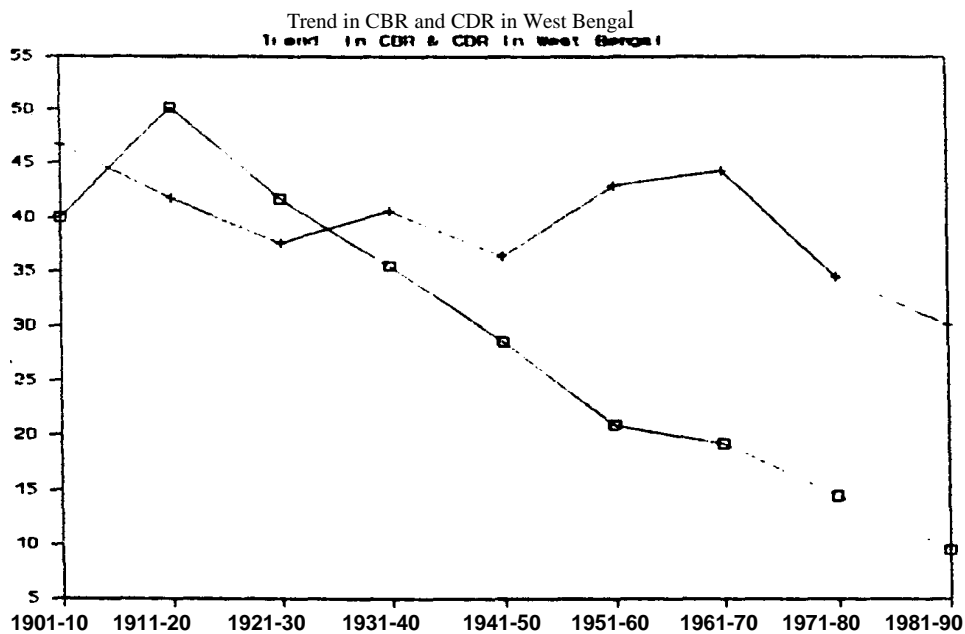
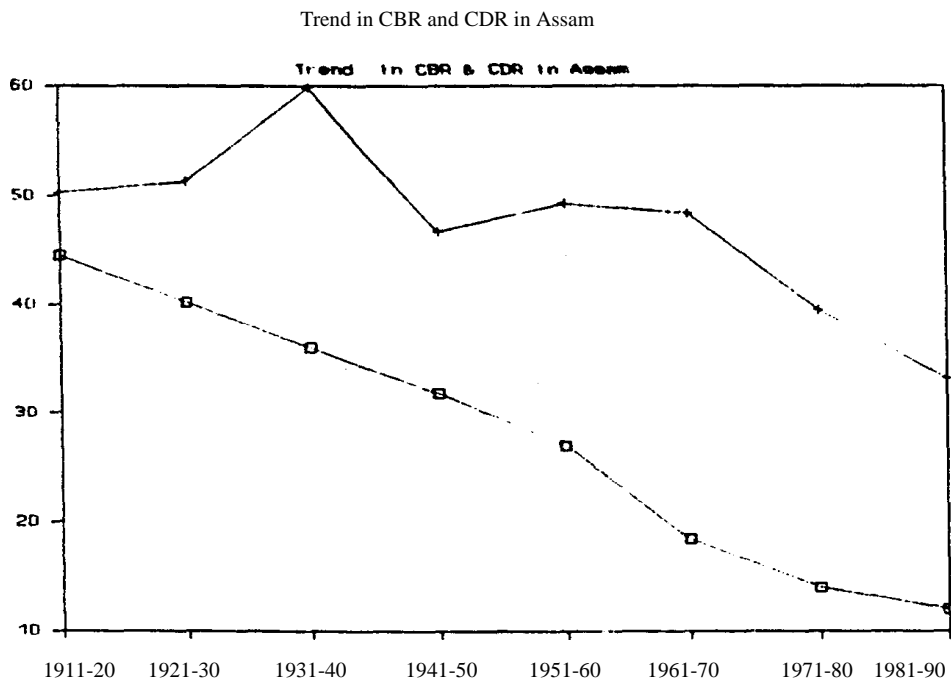


Fig. 7B. Trend in CBR and CDR in West Bengal



The last state considered in our study is Assam. Its pattern of birth and death rates is shown in Fig. 7C. From Figure 7C all the three stages of demographic transition are quite clear. The first stage ended with the completion of 1911-20 decade. The second stage started thereafter and which culminated by the end of the 1961-70 decade. In the third stage birth rate fell more sharply as compared to the death rate which brought down the natural growth rate of population from 3% p.a. during the concluding decade of second stage to around 2.1% p.a. during the 1981-90 decade (Table 11). Despite sharp decline in birth rate during the last 25 years yet the birth rate in Assam is still over 30/1000 (Table 12), hence Assam is placed in the category of 'unlikely' state to reach the target of 20/1000 in CBR by the end of this century.

TABLE 11: NATURAL GROWTH RATE OF POPULATION IN
FOUR EASTERN STATES OF INDIA
(in percentage per annum)

| <i>Period</i> | <i>Bihar & Orissa Combined</i> | <i>Bihar</i> | <i>Orissa</i> | <i>West Bengal</i> | <i>Assam</i> |
|---|--|--------------|---------------|------------------------|--------------|
| 1911-20 Concluding decade of Stage-1 in Bihar, Orissa & Assam | 1.47 | n.a | n.a | -0.84 | 0.58 |
| 1941-50 Concluding decade of Stage-1 in West Bengal | 1.07 | 1.24 | n.a | 0.68 | 1.49 |
| 1961-70 Concluding decade of Stage-11 for all four States | 2.07 | 1.95 | 2.19 | 2.51 | 3.00 |
| 1991-94 Current period for which official data is available | 1.87 | 2.15 | 1.59 | 1.76 | 2.02 |
| 1991-92 As per NFHS figures | 1.80 | 2.06 | 1.55 | 1.58 | 1.91 |

Source: Derived from Table A-1 and A-2 alongwith NFHS report for India.

In the end we have tried to find out the factors that bear a significant impact on the natural growth of population. For this purpose we have estimated the regression

equation in the log form. The estimated regression equations around the years 1970, 1980 and 1990 respectively are as follows:

- (i) $\log d_1 = 9.83 - 0.09 \log X_1 + 0.20 \log X_2 - 0.46 \log X_3 - 2.17 \log X_4 - 0.58 \log X_5$.
- (ii) $\log d_1 = 8.38 - 0.01 \log X_1 + 0.10 \log X_2 - 0.19 \log X_3 - 1.53 \log X_4 - 0.20 \log X_5$.
- (iii) $\log d_1 = 18.39 - 0.02 \log X_1 + 0.13 \log X_2 - 1.94 \log X_3 - 2.38 \log X_4 - 0.04 \log X_5$.

Note: (i) In all the three regression equations the coefficients associated with Variables X_2 and X_4 are significant around 5 percent probability level. Further for the regression equations estimated around the years 1970 and 1990 coefficients associated with X_1 and X_3 , respectively are also significant at 5 percent probability level.

- (ii) The values of R^2 and R^2 are respectively 0.84649 and 0.76121 for the first regression equation, 0.63182 and 0.42727 for the second regression equation and 0.78408 and 0.66413 for the third regression equation, all of which are significant around 5 percent probability level.

As we have noticed during the analysis of birth and death rates of different states as well as our general observation suggest that per capita state domestic product (X_1), average life expectancy in each state (X_3), mean age at marriage (X_4) and literacy rates in state (X_5) should have a negative effect while poverty ratio (X_2) should have the positive effect on the natural growth of population (d_1). The regression equations clearly demonstrate that the coefficients associated with X_1 , X_3 , X_4 , and X_5 , respectively are negative while the regression coefficient linked to X_2 is positive. Moreover the values of R^2 as well as adjusted R^2 i.e. R^1 for all the three regression equations are significant therefore the variables considered in the equation significantly explain the difference in the natural growth rate of population among states. From the equations a common feature which emerges is that, of the five variables considered two most important variables which are responsible for explaining the variations in the natural growth of population are poverty ratio (X_2), and mean age at marriage (X_4). Since mean age at marriage is directly associated with the literacy levels hence government should channelise more efforts to improve the overall literacy levels and of the females in particular. Simultaneously government should also try to ameliorate the living conditions of people living below the poverty line by introducing

some more innovative programmes and must also try its level best to provide basic medical facilities even in deep rural areas.

Conclusions

The following conclusions emerge from the preceeding analysis.

- (1) The pattern of CBR and CDR facilitate to demarcate different stages of demographic transition. Barring Rajasthan and U.P., all the states, as well as India, entered the third stage of demographic transition during the 1970s. U.P. and Rajasthan entered the IIIrd stage during the 1980s. The period of first and the second stage differ for states.

On account of paucity of data the completion of first stage for Rajasthan is not known. It can only be said that from the decade 1941-50 and until 1971-80, Rajasthan has remained in the second stage. In the case of M.P. and West Bengal the first stage culminated by the end of the 1941-50 decade and thereafter till the completion of 1961-70 decade the second stage of demographic transition lasted. For all other states the first stage ended with the completion of 1911 -20 decade and thereafter till the culmination of 1961-70 decade lasted the second stage except Rajasthan and U.P., where the second stage was over after the end of 1971-80 decade.

- (2) The analysis has demonstrated effectively two essential characteristics of the theory of demographic transition. In the first place our analysis has clearly revealed that those states which have entered late in their second stage of demographic transition have experienced faster decline in death rates. Secondly, states where absolute poverty is high, death rate is also high, and has the tendency to fluctuate above 10/1000. These states have relatively high birth rates too. Therefore for reducing birth rate significantly, reduction in death rate is a prerequisite. This implies that poverty eradication from these states is necessary for sharply curtailing the natural increase in population.
- (3) Keeping in view whether a particular state can achieve a natural growth rate of population of 1 percent by the end of 20th century, the states are classified into 3 categories viz., 'certain', 'likely' and 'unlikely' states. Barring the four southern states all the remaining 11 states as well as India are placed in the unlikely category. Some of the eleven states will have to wait for another 10 years while others have to wait for at least first 25 years in the 21st century to reach the target of 1 percent in the natural growth rate of population. In

a nutshell all the major states in India will be able to reach the 1 percent natural growth rate of population by around 2025 A.D.

- (4) The variables which significantly explain the difference in the natural growth of population among states are poverty ratio, life expectancy and mean age at marriage.
- (5) The long run strategy of effectively reducing the natural growth rate of population requires raising the mean at marriage. Since mean age at marriage is directly linked to the literacy levels, government must channelise more efforts to improve the overall literacy levels and of the females, in particular. At the same time government must also try to ameliorate the living condition of people living below the poverty line by introducing more innovative programmes of poverty eradication and should also try its level best to provide basic medical facilities even in deep rural areas.

However, as a short run strategy introduction of coercive methods of family planning will be an effective remedy to curtail the natural growth rate of population but it requires a firm political will which under present circumstances is a remote possibility to be implemented. An effective alternative to it is to broadbase the policy of incentives. The policy of incentives should not merely be confined to monetary benefits to those who follow one or two children family norm, likewise, subsidies on fertilizers to farmers be given to those who follow the above norm. Similarly benefits of certain government programmes like IRDP etc. should flow to those persons especially who follow the above family norm.

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Appendix

TABLE A-I: AVERAGE CRUDE BIRTH RATES IN INDIAN STATES (in Mille)

| <i>States</i> | <i>1891- 1901</i> | <i>1911</i> | <i>1921</i> | <i>1931</i> | <i>1941</i> | <i>1951</i> | <i>1961</i> | <i>1971</i> | <i>1981</i> | <i>1991</i> | |
|------------------|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|
| | <i>1900 -10</i> | <i>-20</i> | <i>-30</i> | <i>-40</i> | <i>-50</i> | <i>-60</i> | <i>-70</i> | <i>-80</i> | <i>-90</i> | <i>-94</i> | |
| Anchra Pradesh | | | | | | 39.7 | 39.2 | 35.1 | 29.6 | 24.6 | |
| Tamil Nadu | — | 41.9 | 36.1 | 37.5 | 40.9 | 41.0 | 34.9 | 36.8 | 29.5 | 25.1 | 20.0 |
| Karnataka | — | — | 44.0 | 45.6 | 44.5 | 43.5 | 41.6 | 39.9 | 35.3 | 28.8 | 25.5 |
| Kerala | — | — | 47.0 | 45.7 | 44.6 | 42.6 | 38.9 | 37.5 | 27.5 | 22.7 | 17.7 |
| Maharashtra | — | 41.0 | 43.3 | 45.6 | 46.7 | 41.3 | 42.8 | 41.0 | 32.7 | 28.8 | 25.4 |
| Gujarat | | | | | | 45.7 | 41.6 | 37.5 | 32.0 | 27.7 | |
| Punjab | — | 44.3 | 45.6 | 42.3 | 44.8 | 41.2 | 44.7 | 36.9 | 32.3 | 29.0 | 26.6 |
| Haryana | | | | | | — | 44.5 | 37.7 | 35.3 | 31.6 | |
| Rajasthan | — | — | — | — | — | 37.2 | 42.7 | 42.7 | 43.6 | 36.7 | 34.4 |
| Madhya Pradesh | — | — | 45.5 | 43.4 | 40.9 | 45.1 | 43.2 | 46.6 | 39.8 | 37.4 | 34.6 |
| Uttar Pradesh | 46.5 | 41.7 | 51.2 | 42.5 | 47.0 | 38.6 | 41.5 | 42.5 | 45.0 | 37.8 | 35.9 |
| Bihar | — | — | 50.1 | 46.3 | 46.6 | 39.0 | 43.4 | 41.9 | 40.9 | 37.1 | 31.9 |
| Orissa | — | — | — | — | — | — | 40.4 | 41.3 | 36.5 | 32.0 | 21.9 |
| West Bengal | — | 46.7 | 41.8 | 37.6 | 40.6 | 36.4 | 42.9 | 44.3 | 34.5 | 30.1 | 25.7 |
| Assam | — | — | 50.3 | 51.3 | 59.8 | 46.7 | 49.3 | 48.4 | 39.5 | 33.2 | 30.5 |
| India | 45.8 | 49.2 | 48.1 | 46.4 | 45.2 | 39.9 | 41.7 | 41.2 | 37.2 | 33.3 | 29.3 |

Source: See references 7, 8, 11 and 12. *Note:* Intermediate missing values for some states are estimated by looking at the trend of the graph.

TABLE A-2: AVERAGE CRUDE DEATH RATES IN INDIAN STATES (in Mille)

| <i>States</i> | <i>1891-1900</i> | <i>1901-10</i> | <i>1911-20</i> | <i>1921-30</i> | <i>1931-40</i> | <i>1941-50</i> | <i>1951-60</i> | <i>1961-70</i> | <i>1971-80</i> | <i>1981-90</i> | <i>1991-94</i> |
|----------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Andhra Pradesh | — | — | 38.4 | 23.7 | — | 29.5 | 25.2 | 19.1 | 13.8 | 10.2 | 8.9 |
| Tamil Nadu | — | 33.4 | 24.8 | 22.1 | 22.3 | 22.8 | 22.5 | 16.1 | 13.0 | 10.1 | 8.3 |
| Karnataka | — | — | 46.4 | 37.1 | 28.1 | 18.9 | 22.2 | 19.4 | 11.6 | 8.9 | 8.4 |
| Kerala | — | — | 36.9 | 31.8 | 29.3 | 18.0 | 16.1 | 16.6 | 9.2 | 6.3 | 6.1 |
| Maharashtra | — | 35.8 | 38.0 | 26.7 | 52.1 | 24.9 | 19.3 | 13.0 | 12.0 | 8.6 | 7.7 |
| Gujarat | — | — | — | — | — | 29.9 | 23.5 | 13.8 | 13.5 | 10.7 | 8.6 |
| Punjab | — | 43.3 | 35.0 | 30.4 | 26.3 | 26.3 | 18.9 | 19.8 | 10.8 | 8.6 | 7.9 |
| Haryana | — | — | — | — | — | — | — | 14.7 | 12.2 | 9.4 | 8.1 |
| Rajasthan | — | — | 46.8 | 30.2 | — | 27.2 | 19.4 | 16.7 | 14.9 | 12.5 | 9.6 |
| Madhya Pradesh | — | — | 45.2 | 31.8 | 31.9 | 38.5 | 23.2 | 12.8 | 16.8 | 14.1 | 12.7 |
| Uttar Pradesh | 46.0 | 42.7 | 40.1 | 25.6 | 21.9 | 27.2 | 24.9 | 21.1 | 21.0 | 14.8 | 11.7 |
| Bihar | — | — | — | — | — | 26.6 | 26.1 | 22.4 | 18.8 | 13.3 | 10.4 |
| Orissa | — | — | 35.4 | 30.8 | 28.4 | 29.9 | 22.9 | 19.4 | 18.8 | 13.0 | 12.0 |
| West Bengal | — | 40.0 | 50.2 | 41.7 | 35.5 | 28.6 | 20.9 | 19.2 | 14.5 | 9.5 | 8.1 |
| Assam | — | — | 44.5 | 40.2 | 36.0 | 31.8 | 26.9 | 18.4 | 14.0 | 12.0 | 10.3 |
| India | 44.4 | 42.6 | 47.2 | 36.3 | 31.2 | 27.4 | 22.8 | 19.2 | 15.0 | 11.9 | 9.7 |

Source: See references 7, 8, 11 and 12. Note: Intermediate missing values for some states are estimated by looking at the trend of the graph.

TABLE A-3: MEAN AGE AT MARRIAGE IN SELECTED STATES 1901-93
(in Years)

| <i>States</i> | | <i>1901</i> | <i>11</i> | <i>21</i> | <i>31</i> | <i>41</i> | <i>51</i> | <i>61</i> | <i>71</i> | <i>81</i> | <i>91-93</i> |
|-----------------------|---|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|
| Andhra Pradesh | M | 19.4 | 19.0 | 19.3 | 16.4 | 17.3 | 19.9 | 22.2 | 22.7 | 23.0 | 23.6 |
| | F | 12.2 | 10.8 | 11.2 | 10.4 | 11.8 | 12.6 | 15.1 | 16.2 | 17.3 | 18.1 |
| Assam | M | 23.6 | 23.9 | 24.0 | 21.9 | 23.2 | 23.2 | 25.8 | 25.6 | | 27.9 |
| | F | 14.9 | 14.9 | 15.3 | 14.9 | 16.3 | 16.8 | 18.5 | 18.7 | | 21.6 |
| Bihar and Orissa | M | 19.0 | 17.0 | 17.6 | 15.7 | 18.1 | 17.7 | 19.6 | 20.6 | 22.8 | 24.4 |
| Combined | | | | | | | | | | | |
| | F | 11.4 | 11.6 | 12.5 | 11.2 | 13.4 | 14.3 | 14.6 | 15.9 | 17.8 | 18.0 |
| Karnataka | M | 24.3 | 24.2 | 24.98 | 23.8 | 24.3 | 24.8 | 24.8 | 25.1 | 25.9 | 26.1 |
| | F | 15.1 | 15.2 | 15.2 | 14.1 | 15.9 | 16.1 | 16.3 | 17.8 | 19.2 | 18.1 |
| Kerala | M | 23.0 | 23.4 | 24.2 | 23.3 | 25.3 | 25.6 | 26.3 | 26.8 | 27.2 | 28.1 |
| | F | 17.4 | 17.7 | 17.2 | 17.6 | 19.3 | 19.9 | 19.8 | 21.0 | 21.9 | 22.1 |
| Madhya Pradesh | M | 18.4 | 17.9 | 17.5 | 15.7 | 18.8 | 19.1 | 18.4 | 19.3 | 20.6 | 22.0 |
| | F | 13.0 | 11.6 | 12.1 | 10.7 | 13.9 | 14.5 | 13.9 | 15.0 | 16.5 | 17.4 |
| Punjab and Haryana | M | 21.9 | 21.8 | 22.1 | 21.4 | 20.6 | 20.3 | 21.7 | 22.1 | 23.0 | 23.9 |
| Combined | | | | | | | | | | | |
| | F | 15.0 | 14.6 | 15.1 | 15.2 | 15.4 | 16.1 | 17.4 | 18.6 | 19.5 | 19.7 |
| Rajasthan | M | 19.7 | 21.0 | 20.4 | 18.4 | 18.7 | 18.7 | 19.1 | 19.5 | 20.4 | 22.7 |
| | F | 13.7 | 13.0 | 13.1 | 12.4 | 13.5 | 14.2 | 14.2 | 15.1 | 16.1 | 18.4 |
| Uttar Pradesh | M | 17.7 | 17.8 | 18.3 | 16.7 | 18.2 | 18.1 | 18.8 | 19.3 | 20.9 | 23.0 |
| | F | 12.3 | 12.2 | 12.4 | 11.7 | 13.1 | 13.8 | 14.4 | 15.4 | 17.8 | 18.6 |
| West Bengal | M | 19.0 | 20.8 | 18.8 | 21.6 | 21.9 | 24.0 | 24.5 | 25.7 | 22.0 | 25.9 |
| | F | 11.4 | 12.3 | 10.7 | 13.2 | 14.5 | 15.9 | 18.0 | 19.3 | 14.1 | 19.2 |

Sources: (i) NFHS, India, 1993, for the last column only.

(ii) Agarwal S. N., 1985, *Indian Population Problems* (3rd edn., revised by U. P. Sinha).

TABLE A-4: LITERACY RATES IN INDIA AND ITS STATES (in percentage terms)

| <i>States</i> | <i>1971</i> | | <i>1981</i> | | <i>1991</i> | |
|----------------|-------------|---------------|-------------|---------------|-------------|---------------|
| | <i>Male</i> | <i>Female</i> | <i>Male</i> | <i>Female</i> | <i>Male</i> | <i>Female</i> |
| Andhra Pradesh | 33.18 | 15.75 | 36.26 | 20.39 | 55.13 | 32.72 |
| Assam | — | — | — | — | 61.87 | 43.03 |
| Bihar | 30.64 | 8.72 | 38.11 | 13.62 | 52.49 | 22.89 |
| Gujarat | 46.11 | 24.75 | 54.44 | 32.30 | 73.13 | 48.64 |
| Haryana | 37.30 | 14.89 | 48.20 | 22.27 | 69.10 | 40.47 |
| Karnataka | 41.62 | 20.97 | 48.81 | 27.71 | 67.26 | 44.34 |
| Kerala | 66.62 | 54.31 | 75.26 | 65.73 | 93.62 | 86.17 |
| Madhya Pradesh | 32.70 | 10.92 | 39.49 | 15.53 | 58.42 | 28.85 |
| Maharashtra | 51.04 | 26.43 | 58.79 | 34.79 | 76.56 | 52.32 |
| Orissa | 38.29 | 13.92 | 47.10 | 21.12 | 63.09 | 34.68 |
| Punjab | 40.38 | 25.90 | 47.16 | 33.69 | 65.66 | 50.41 |
| Rajasthan | 28.74 | 8.46 | 36.30 | 11.42 | 54.99 | 20.44 |
| Tamil Nadu | 51.78 | 26.86 | 58.26 | 34.99 | 73.75 | 51.33 |
| Uttar Pradesh | 31.50 | 10.55 | 38.76 | 14.04 | 55.73 | 25.31 |
| West Bengal | 42.81 | 22.42 | 50.67 | 30.25 | 67.81 | 46.56 |
| India | 39.52 | 18.70 | 46.89 | 24.82 | 64.13 | 39.29 |

Source: Different Issues of Economic Survey, Ministry of Finance, Economic Division, Government of India.

TABLE A-5: STATE WISE POVERTY LEVELS

| <i>States</i> | <i>1973-74 1977-78 1983 Revised 1987-88</i> | | | | | | | |
|----------------|---|-------------------------|---------------------------------------|-------------------------|---------------------------------------|-------------------------|---------------------------------------|-------------------------|
| | <i>Absolute Poverty Levels in Lacs</i> | <i>Poverty Rate (%)</i> | <i>Absolute Poverty Levels (Lacs)</i> | <i>Poverty Rate (%)</i> | <i>Absolute Poverty Levels (Lacs)</i> | <i>Poverty Rate (%)</i> | <i>Absolute Poverty Levels (Lacs)</i> | <i>Poverty Rate (%)</i> |
| Andhra Pradesh | 227.52 | 49.25 | 200.77 | 39.96 | 169.53 | 29.88 | 165.16 | 26.62 |
| Karnataka | 170.25 | 54.34 | 170.57 | 49.93 | 152.63 | 38.47 | 117.05 | 27.70 |
| Kerala | 135.33 | 59.77 | 128.94 | 52.93 | 109.93 | 40.97 | 38.63 | 13.88 |
| T.N. | 246.39 | 56.51 | 262.26 | 56.25 | — | — | 152.23 | 28.08 |
| Maharashtra | 285.83 | 52.94 | 330.96 | 56.06 | 291.79 | 43.54 | 183.63 | 25.05 |
| Gujarat | 135.7 | 47.21 | 133.86 | 42.17 | 120.76 | 33.27 | 56.12 | 14.46 |
| M.P. | 276.84 | 61.09 | 306.05 | 62.43 | 279.38 | 50.13 | 195.71 | 31.89 |
| U.P. | 534.86 | 56.98 | 505.83 | 49.19 | 557.54 | 47.19 | 289.35 | 30.08 |
| Bihar | 369.79 | 61.78 | 404.43 | 61.95 | 465.95 | 62.51 | 278.12 | 34.44 |
| Orissa | 154.62 | 66.24 | 177.03 | 70.35 | 181.79 | 65.32 | 119.61 | 40.07 |
| West Bengal | 299.1 | 63.39 | 311.24 | 60.65 | 317.10 | 52.72 | 142.60 | 22.49 |
| Assam | 81.87 | 51.23 | 104.25 | 57.63 | 87.35 | 40.86 | 37.44 | 17.89 |
| Punjab | 40.4 | 28.08 | 30.36 | 19.36 | 29.11 | 16.29 | 9.59 | 5.03 |
| Haryana | 38.2 | 35.24 | 35.40 | 29.48 | 29.85 | 21.14 | 14.24 | 9.34 |
| Rajasthan | 129.04 | 46.33 | 118.64 | 37.99 | 130.28 | 35.02 | 84.31 | 20.74 |
| India | 3216.03 | 54.93 | 3319.86 | 51.81 | 3270.08 | 44.76 | 2014.06 | 25.49 |

Sources: (i) Poverty estimates for the years 1973-74 to 1983, Alagh, Y. K. "A note on measurement and use of poverty estimates", *The Indian Journal of Labour Economics*, 38(1). (ii) Poverty estimates for the year 1987-88 is taken from *The Indian Journal of Labour Economics*, 39(2), April-June, 1996.