STATISTICAL PAPER NO. IX

BIRTH-RATE AND EDUCATION

A comparative study of the Educational Implications for three assumptions of population growth and birth-rate

EDUCATION COMMISSION
UNIVERSITY GRANTS COMMISSION BUILDING
BAHADUR SHAH ZAFAR MARG
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C O N T E N T S

T A B L E S

A P P E N D I C E S

BIRTH-RATE AND EDUCATION

What does the birth-rate imply for education? The answer may be somewhat on the following lines:-

(a) A higher birth-rate will mean a faster increase in population. This will increase consumption and make economic growth more difficult. Consequently the rate of increase of national income per head of population would be slowed down, resulting in a comparatively smaller increase of investment in education.

(b) The advantage arising out of this decrease in resources available would be further accentuated by the increase in the 'educational load' because the number of children to be educated increases proportionately to the population when the birth-rate is high.

In other words, a higher birth-rate implies fewer resources for educational development on the one hand and a greater educational load of children to be educated on the other.

2. The object of this paper is to illustrate this point with reference to the projected populations of India over the period 1961-86.

3. Three Assumptions of Population Growth: The Registrar General of the census of India, with the assistance of an expert committee, has prepared three assumptions of population growth - high, medium and low - for the period 1961-81.

(a) In the high assumption, the birth-rate is assumed to continue more or less as it is at present

while a decline in the death rate is assumed in accordance with the present trends.

(b) In the medium assumption, it is assumed that the programme of family planning will begin to gather momentum in the Fourth Plan and would be intensified very considerably in the Fifth and Sixth Plans so that the birth-rate in 1985-86 would be about half of what it is at present. A decline in death-rate is assumed on the basis of normal trends (slightly increased in order to allow for the improvement in general health consequent upon a programme of family planning).

(c) In the low assumption, it is assumed that family planning work would be intensified very greatly and that, in 1985-86, both the birth and death rates would be brought down to a level that would be comparable with that in advanced countries.

The Institute of Applied Manpower Research has extended these assumptions to the Seventh Plan also and carried the projections over to 1986. It is this data that has been utilized in this paper.

4. The basic assumptions made about birth and death rates have been given in the following table:-

TABLE 1: BIRTH RATES, DEATH RATES AND NATURAL INCREASE RATES IMPLIED IN POPULATION PROJECTIONS UNDER DIFFERENT ASSUMPTIONS, 1961-86

(Per thousand Population)

Period	ASSUMPTION H			ASSUMPTION M			ASSUMPTION L			ASSUMPTION N		
	B.R.	D.R.	N.I.R.	B.R.	D.R.	N.I.R	B.R.	D.R.	N.I.R	B.R.	D.R.	N.I.R.
0	1	2	3	4	5	6	7	8	9	10	11	12
1961-66	41.3	16.7	24.6	41.0	17.2	23.8	41.3	16.7	24.6	18.2	14.6	3.6
1966-71	40.7	13.9	26.8	38.6	14.0	24.6	39.0	13.7	25.3	18.6	12.8	5.8
1971-76	40.2	11.6	28.6	35.1	11.3	23.8	30.0	10.8	19.2	18.1	11.3	6.8
1976-81	39.9	9.8	30.1	28.7	9.2	19.5	20.0	8.5	11.5	17.1	10.6	6.5
1981-86	39.6	8.3	31.3	22.3	7.7	14.6	17.1	7.6	9.5	16.0	10.4	5.6

Note: B.R. = Birth-Rate (Number of births per 1000 population per annum).

D.R. = Death-Rate (Number of deaths per 1000 population per annum).

N.I.R. = Natural Increase Rate (Excess of Birth-Rate over Death-Rate).

5. Projected Populations: On the basis of these assumptions, the projected populations - High, Medium and Low - for the period 1961-86 are given below:-

TABLE II: PROJECTED POPULATION OF INDIA UNDER DIFFERENT ASSUMPTIONS 1961-86

(Population numbers in 000's)

Year	Assumption H		Assumption M		Assumption L	
	Number	Growth Index	Number	Growth Index	Number	Growth Index
1	2	3	4	5	6	7
1961	439,235	100	439,235	100	439,235	100
1966	494,792	113	494,792	113	494,792	113
1971	568,095	129	559,622	127	563,772	128
1976	655,460	149	630,202	143	620,689	141
1981	762,159	174	694,896	158	657,363	150
1986	891,358	203	747,678	170	689,471	157

6. Number of Children to be Educated: The next step is to calculate the number of children to be educated at different levels of education in terms of these three assumptions. This exercise has been done and its results will be found in Appendices I, II and III. On the basis of these projections, it is possible to show clearly the implications of a rise or fall in the birth-rate on the development of education.

7. The Total Educational Load under the Different Assumptions: The following Table shows the number of children who would have to be enrolled in different educational institutions under the three different projections given above in 1966 and 1986:-

Table No.III: Total Number of Children/Young Persons under High, Medium and Low Assumptions (1966-86)

(in 000s)

Age	1966			1986		
	Number of Children/Young Persons under			Number of Children/Young Persons under		
	High Assumption	Medium Assumption	Low Assumption	High Assumption	Medium Assumption	Low Assumption
6	14,202 (2.9)	14,224 (2.9)	14,202 (2.9)	26,227 2.9)	16,634 (2.2)	10,582 (1.5)
7	13,632 (2.8)	13,648 (2.8)	13,632 (2.8)	25,265 (2.8)	17,192 (2.3)	11,446 (1.7)
8	13,105 (2.6)	13,117 (2.6)	13,105 (2.6)	24,351 (2.7)	17,603 (2.3)	12,301 (1.8)
9	12,618 (2.5)	12,626 (2.5)	12,618 (2.5)	23,483 (2.6)	17,879 (2.4)	13,130 (1.9)
Total (6-9)	53,557 (10.8)	53,615 (10.6)	53,557 (10.8)	99,326 (11.0)	69,308 (9.2)	47,459 (6.9)
10	12,168 (2.4)	12,174 (2.5)	12,168 (2.5)	22,659 (2.5)	18,032 (2.4)	13,919 (2.0)
11	11,752 (2.4)	11,756 (2.4)	11,752 (2.4)	21,876 (2.5)	18,075 (2.4)	14,660 (2.1)
12	11,366 (2.3)	11,368 (2.3)	11,366 (2.3)	21,132 (2.4)	18,020 (2.4)	15,336 (2.2)
Total (10-12)	35,286 (7.1)	35,298 (7.2)	35,286 (7.2)	65,667 (7.4)	54,127 (7.2)	43,915 (6.3)
13	11,007 (2.2)	11,008 (2.2)	11,007 (2.2)	20,423 (2.3)	17,881 (2.4)	15,934 (2.3)
14	10,671 (2.2)	10,671 (2.2)	10,671 (2.1)	19,748 (2.2)	17,669 (2.4)	16,438 (2.4)
15	10,359 (2.1)	10,360 (2.1)	10,359 (2.1)	19,104 (2.1)	17,387 (2.3)	16,453 (2.4)
Total (13-15)	32,037 (6.5)	32,039 (6.5)	32,037 (6.4)	59,275 (6.6)	52,937 (7.1)	48,825 (7.1)
16	10,071 (2.0)	10,072 (2.0)	10,071 (2.0)	18,487 (2.1)	17,038 (2.3)	15,908 (2.3)
17	9,788 (2.0)	9,788 (2.0)	9,788 (2.0)	17,900 (2.0)	16,684 (2.2)	15,380 (2.2)
Total (16-17)	19,859 (4.0)	19,860 (4.0)	19,859 (4.0)	36,387 (4.1)	33,722 (4.5)	31,288 (4.5)
18	9,492 (1.9)	9,492 (1.9)	9,492 (1.9)	17,334 (1.9)	16,359 (2.2)	14,940 (2.2)
19	9,192 (1.9)	9,193 (1.9)	9,192 (1.9)	16,783 (1.9)	16,036 (2.1)	14,532 (2.1)
20	8,912 (1.8)	8,912 (1.8)	8,912 (1.8)	16,255 (1.8)	15,676 (2.1)	16,255 (2.4)
Total (18-20)	27,596 (5.6)	27,597 (5.6)	27,596 (5.6)	50,372 (5.6)	48,071 (6.4)	45,727 (6.7)
21	8,644 (1.7)	8,643 (1.7)	8,614 (1.7)	15,742 (1.8)	15,283 (2.0)	15,742 (2.3)
22	8,396 (1.7)	8,395 (1.6)	8,396 (1.7)	15,249 (1.7)	14,897 (2.0)	15,249 (2.2)
23	8,170 (1.7)	8,171 (1.6)	8,170 (1.6)	14,768 (1.7)	14,527 (1.9)	14,768 (2.1)
Total (21-23)	25,210 (5.1)	25,209 (5.0)	25,180 (5.0)	45,759 (5.2)	44,707 (5.9)	45,759 (6.6)
Total Population	494,792 (100.0)	494,792 (100.0)	494,792 (100.0)	891,358 (100.0)	747,678 (100.0)	689,471 (100.0)

8. A number of very interesting points emerge from a careful study of this table :

(i) There would be a difference of about 202 million in the total populations under the high (891 million) and low (689) assumptions by 1986!

(ii) Let us assume that the total national income which is about Rs.180,000 million in 1966 were to increase at 7 p.c. per annum over the next 20 years. It would, of course, be difficult to achieve this rate of growth with the huge population under the high assumption to support. It would be more easily possible to do so with the much smaller population under the low assumption. Assuming for the sake of argument, however, that this rate of economic growth is maintained for all the three population assumptions, it is obvious that the national income per head of population will show large variations - it will be Rs. 781.4 under the high assumption, Rs. 931.6 under the medium assumption and Rs. 1010.3 under the low assumption! This illustrates the tremendous impact which an intensive programme of family planning can have on raising the standards of living.

(iii) The worst effect of a high birth-rate will be felt at the primary stage (classes I-IV or age-group 6-9). By 1966, we shall have to educate, at this stage, as many as 99 million children under the high assumption, whereas under the low assumption, this number will be as low as 47 million or less than 50% of the former! We may, therefore, do the job with about half the money or spend about twice as much on each student per year and raise

standards.

(iv) The same picture is seen at the middle school stage (classes V-VII or age-group 10-12), although to a lesser extent. Under the high assumption, the number of children to be educated would be about 66 million, which is about 50% higher than the number to be educated under the low assumption (44 million).

(v) Taking the entire elementary stage together, it may be said that under the high assumption education will have to be provided for about 165 million children, as against 123 million under the medium assumption and only 91 million under the low assumption. It is obvious that the lower the birth rate, the more easy it is to solve the problem of providing free and compulsory education till the age of 14.

(vi) Differences of this type continue at the secondary and university stages also, although the scale of difference becomes much less as we go higher up.

9. Let us assume that we shall be able to spend 6 p.c. of the national income on education by 1986. This will be obviously far more difficult to be achieved under the 'high' population than under the 'low' one. But even if this aspect is ignored, it will be seen that the total educational expenditure per head of population will be only Rs.46.9 under the high assumption whereas it can rise to Rs.55.9 under the medium assumption and still further to Rs.60.6 under the low assumption. It is, therefore, evident that the low rate of population growth will make it possible to raise the national

income more steeply, to spend more on education as a whole and also to spend a larger amount per pupil per year at every stage.

10. The great importance of emphasising population control from the point of view of educational development would thus become quite obvious.

APPENDIX NO. I - TOTAL NUMBER OF CHILDREN/YOUNG PERSONS UNDER HIGH ASSUMPTION (1961 - 86)

(In 000's)

Age	No. of children/young persons 1961	1966	1971	1976	1981	1986
6	11,965 (2.7)	14,202 (2.9)	16,224 (2.9)	18,798 (2.9)	22,035 (2.9)	26,227 (2.9)
7	11,587 (2.6)	13,632 (2.8)	15,798 (2.8)	18,204 (2.8)	21,282 (2.8)	25,265 (2.8)
8	11,230 (2.6)	13,105 (2.6)	15,353 (2.7)	17,637 (2.7)	20,567 (2.7)	24,351 (2.7)
9	10,892 (2.5)	12,618 (2.5)	14,893 (2.6)	17,094 (2.6)	19,888 (2.6)	23,483 (2.6)
Total (6 - 9)	45,674 (10.4)	53,557 (10.8)	62,268 (11.0)	71,733 (11.0)	83,772 (11.0)	99,326 (11.0)
10	10,569 (2.4)	12,168 (2.4)	14,423 (2.5)	16,573 (2.5)	19,243 (2.5)	22,659 (2.5)
11	10,249 (2.3)	11,752 (2.4)	13,946 (2.5)	16,070 (2.5)	18,628 (2.4)	21,876 (2.5)
12	9,943 (2.3)	11,366 (2.3)	13,468 (2.4)	15,584 (2.4)	18,041 (2.4)	21,132 (2.4)
Total (10-12)	30,761 (7.0)	35,286 (7.1)	41,837 (7.4)	48,227 (7.4)	55,912 (7.3)	65,667 (7.4)
13	9,648 (2.2)	11,007 (2.2)	12,992 (2.3)	15,111 (2.3)	17,479 (2.3)	20,423 (2.3)
14	9,367 (2.1)	10,671 (2.2)	12,523 (2.2)	14,649 (2.2)	16,940 (2.2)	19,748 (2.2)
15	9,103 (2.1)	10,359 (2.1)	12,059 (2.1)	14,203 (2.2)	16,422 (2.2)	19,104 (2.1)
Total (13-15)	28,118 (6.4)	32,037 (6.5)	37,574 (6.6)	43,963 (6.7)	50,841 (6.7)	59,275 (6.6)
16	8,847 (2.0)	10,071 (2.0)	11,594 (2.0)	13,775 (2.1)	15,920 (2.1)	18,487 (2.1)
17	8,604 (2.0)	9,788 (2.0)	11,172 (2.0)	13,334 (2.0)	15,434 (2.0)	17,900 (2.0)
Total (16-17)	17,451 (4.0)	19,859 (4.0)	22,766 (4.0)	27,109 (4.1)	31,354 (4.1)	36,387 (4.1)
18	8,370 (1.9)	9,492 (1.9)	10,812 (1.9)	12,853 (2.0)	14,956 (2.0)	17,334 (1.9)
19	8,145 (1.9)	9,192 (1.9)	10,488 (1.8)	12,351 (1.9)	14,481 (1.9)	16,783 (1.9)
20	7,960 (1.8)	8,912 (1.8)	10,175 (1.8)	11,869 (1.8)	14,024 (1.8)	16,255 (1.8)
Total (18-20)	24,475 (5.6)	27,596 (5.6)	31,475 (5.5)	37,073 (5.7)	43,461 (5.7)	50,372 (5.6)
21	7,765 (1.8)	8,644 (1.7)	9,876 (1.7)	11,394 (1.7)	13,585 (1.8)	15,742 (1.8)
22	7,588 (1.7)	8,396 (1.7)	9,584 (1.7)	10,964 (1.7)	13,136 (1.7)	15,249 (1.7)
23	7,433 (1.7)	8,170 (1.7)	9,286 (1.6)	10,601 (1.6)	12,653 (1.7)	14,768 (1.7)
Total (21-23)	22,806 (5.2)	25,210 (5.1)	28,746 (5.0)	32,959 (5.0)	39,374 (5.2)	45,759 (5.2)
Total Population	439,235 (100.0)	494,792 (100.0)	568,095 (100.0)	655,460 (100.0)	762,159 (100.0)	891,358 (100.0)

APPENDIX NO. II - TOTAL NUMBER OF CHILDREN/YOUNG PERSONS UNDER MEDIUM ASSUMPTION (1961 - 86)

(In 000's)

Age	No. of Children/Young Persons 1961	1966	1971	1976	1981	1986
6	11,965 (2.7)	14,224 (2.9)	15,732 (2.8)	17,335 (2.7)	18,256 (2.6)	16,634 (2.2)
7	11,587 (2.6)	13,648 (2.8)	15,466 (2.8)	16,985 (2.7)	18,099 (2.6)	17,192 (2.3)
8	11,230 (2.6)	13,117 (2.6)	15,148 (2.7)	16,638 (2.6)	17,907 (2.6)	17,603 (2.3)
9	10,892 (2.5)	12,626 (2.5)	14,785 (2.6)	16,292 (2.6)	17,685 (2.5)	17,879 (2.4)
Total (6 - 9)	45,674 (10.4)	53,615 (10.8)	61,131 (10.9)	67,250	71,947 (10.3)	69,308 (9.2)
10	10,565 (2.4)	12,174 (2.5)	14,386 (2.6)	15,946 (2.5)	17,434 (2.5)	18,032 (2.4)
11	10,248 (2.3)	11,756 (2.4)	13,957 (2.5)	15,596 (2.5)	17,157 (2.5)	18,075 (2.4)
12	9,942 (2.3)	11,368 (2.3)	13,507 (2.4)	15,243 (2.4)	16,857 (2.4)	18,020 (2.4)
Total (10-12)	30,755	35,298 (7.2)	41,850 (7.5)	46,785	51,448 (7.4)	54,127 (7.2)
13	9,651 (2.2)	11,008 (2.2)	13,043 (2.3)	14,882 (2.4)	16,535 (2.4)	17,881 (2.4)
14	9,371 (2.1)	10,671 (2.2)	12,573 (2.2)	14,514 (2.3)	16,196 (2.3)	17,669 (2.4)
15	9,103 (2.1)	10,360 (2.1)	12,094 (2.2)	14,146 (2.2)	15,837 (2.3)	17,387 (2.3)
Total (13-15)	28,125 (6.4)	32,039 (6.5)	37,710 (6.7)	43,542	48,568 (7.0)	52,937 (7.1)
16	8,847 (2.0)	10,072 (2.0)	11,602 (2.0)	13,782 (2.1)	15,456 (2.2)	17,038 (2.3)
17	8,604 (2.0)	9,788 (2.0)	11,161 (2.0)	13,383 (2.1)	15,078 (2.2)	16,684 (2.2)
Total (16-17)	17,451 (4.0)	19,860 (4.0)	22,763 (4.1)	27,165	30,534 (4.4)	33,722 (4.5)
18	8,370 (1.9)	9,492 (1.9)	10,799 (1.9)	12,913 (2.0)	14,712 (2.1)	16,359 (2.2)
19	8,145 (1.9)	9,193 (1.9)	10,485 (1.9)	12,403 (2.0)	14,343 (2.1)	16,036 (2.1)
20	7,941 (1.8)	8,912 (1.8)	10,174 (1.8)	11,905 (1.9)	13,967 (2.0)	15,676 (2.1)
Total (18-20)	24,456 (5.6)	27,597 (5.6)	31,458 (5.6)	37,221	43,022 (6.2)	48,071 (6.4)
21	7,763 (1.8)	8,643 (1.7)	9,875 (1.8)	11,403 (1.8)	13,592 (1.9)	15,263 (2.0)
22	7,600 (1.7)	8,395 (1.7)	9,584 (1.7)	10,953 (1.7)	13,184 (1.9)	14,897 (2.0)
23	7,443 (1.7)	8,171 (1.6)	9,286 (1.7)	10,589 (1.7)	12,719 (1.8)	14,527 (1.9)
Total (21-23)	22,806 (5.2)	25,209 (5.0)	28,745 (5.2)	32,945	39,495 (5.6)	44,707 (5.9)
Total Population	439,235 (100.0)	494,792 (100.0)	559,622 (100.0)	630,202 (100.0)	694,896 (100.0)	747,678 (100.0)

Appendix No.III : Total Number of Children/Young Persons under Low Assumption (1961-86)

(in 000s)

	No. of Children/Young Persons					
	1961	1966	1971	1976	1981	1986
6	11,965 (2.7)	14,202 (2.9)	16,224 (2.9)	17,698 (2.9)	14,574 (2.2)	10,582 (1.5)
7	11,587 (2.6)	13,632 (2.8)	15,798 (2.8)	17,438 (2.8)	15,640 (2.4)	11,446 (1.7)
8	11,230 (2.6)	13,105 (2.6)	15,353 (2.7)	17,137 (2.8)	16,434 (2.5)	12,301 (1.8)
9	10,892 (2.5)	12,618 (2.5)	14,893 (2.6)	16,801 (2.7)	16,981 (2.6)	13,130 (1.9)
Total (6-9)	45,674 (10.4)	53,557 (10.8)	62,268 (11.0)	69,074 (11.2)	63,629 (9.7)	47,459 (6.9)
10	10,569 (2.4)	12,168 (2.5)	14,423 (2.6)	16,573 (2.7)	17,305 (2.6)	13,919 (2.0)
11	10,249 (2.3)	11,752 (2.4)	13,946 (2.5)	16,070 (2.6)	17,432 (2.7)	14,660 (2.1)
12	9,943 (2.3)	11,366 (2.3)	13,468 (2.4)	15,584 (2.5)	17,388 (2.6)	15,336 (2.2)
Total (10-12)	30,761 (7.0)	35,286 (7.2)	41,837 (7.5)	48,227 (7.8)	52,125 (7.9)	43,915 (6.3)
13	9,648 (2.2)	11,007 (2.2)	12,992 (2.3)	15,111 (2.4)	17,596 (2.7)	15,934 (2.3)
14	9,367 (2.1)	10,671 (2.1)	12,523 (2.2)	14,649 (2.4)	16,883 (2.6)	16,438 (2.4)
15	9,103 (2.1)	10,359 (2.1)	12,059 (2.1)	14,203 (2.3)	16,422 (2.5)	16,453 (2.4)
Total (13-15)	28,118 (6.4)	32,037 (6.4)	37,574 (6.6)	43,963 (7.1)	50,901 (7.8)	48,825 (7.1)
16	8,847 (2.0)	10,071 (2.0)	11,594 (2.1)	13,775 (2.2)	15,920 (2.4)	15,908 (2.3)
17	8,604 (2.0)	9,788 (2.0)	11,172 (2.0)	13,334 (2.1)	15,434 (2.3)	15,380 (2.2)
Total (16-17)	17,451 (4.0)	19,859 (4.0)	22,766 (4.1)	27,109 (4.3)	31,354 (4.7)	31,288 (4.5)
18	8,370 (1.9)	9,492 (1.9)	10,812 (1.9)	12,853 (2.1)	14,956 (2.3)	14,910 (2.2)
19	8,145 (1.9)	9,192 (1.9)	10,488 (1.9)	12,351 (2.0)	14,481 (2.2)	14,532 (2.1)
20	7,960 (1.8)	8,912 (1.8)	10,175 (1.8)	11,869 (1.9)	14,024 (2.1)	16,255 (2.4)
Total (18-20)	24,475 (5.6)	27,596 (5.6)	31,475 (5.6)	37,073 (6.0)	43,461 (6.6)	45,727 (6.7)
21	7,765 (1.8)	8,614 (1.7)	9,876 (1.7)	11,394 (1.8)	13,585 (2.1)	15,742 (2.3)
22	7,588 (1.7)	8,396 (1.7)	9,584 (1.7)	10,964 (1.8)	13,136 (2.0)	15,249 (2.2)
23	7,453 (1.7)	8,170 (1.6)	9,286 (1.6)	10,601 (1.7)	12,653 (1.9)	14,768 (2.1)
Total (21-23)	22,806 (5.2)	25,180 (5.0)	28,746 (5.0)	32,959 (5.3)	39,374 (6.0)	45,759 (6.6)
Total Population	439,235 (100.0)	494,792 (100.0)	563,772 (100.0)	620,689 (100.0)	657,363 (100.0)	689,471 (100.0)

APPENDIX IV

Estimated National Income and Expenditure on Education during 1970-71 to 1985-86

1. National Income in 1965-66 — Rs.18,000 crores.

Year	Total National Income (Assumed Annual Rate of increase as 7%) (Rs. in crores)	Estimated Expenditure on Education (6% of National Income) (Rs. in crores)
1970-71	25,250	1515.00
1975-76	35,410	2124.60
1980-81	49,660	2979.60
1985-86	69,660	4179.60

3. Per Capita National Income

Year	High Assumption (Rs.)	Medium Assumption (Rs.)	Low Assumption (Rs.)
1970-71	444.5	451.1	447.8
1975-76	540.2	561.9	570.5
1980-81	651.6	714.7	755.5
1985-86	781.4	931.6	1010.3

4. Per Capita Expenditure on Education

Year	High Assumption (Rs.)	Medium Assumption (Rs.)	Low Assumption (Rs.)
1970-71	26.7	27.1	26.9
1975-76	32.4	33.7	34.2
1980-81	39.1	42.9	45.3
1985-86	46.9	55.9	60.6