DECLINE IN BIRTH-RATE IN KERALA: A STUDY OF THE INTER-RELATIONSHIP BETWEEN DEMOGRAPHIC VARIABLES, HEALTH SERVICES AND EDUCATION

BY

P.R. GOPINATHAN NAIR.

The rapid decline in mortality rates, rendered possible by the spread of modern medicine and public health services, and the high and unchanging fertility rates are generally considered portents of imminent population explosions in many underdeveloped countries of Asia and Latin America. The conventionally held point of view is that, whereas mortality rates can be and are being reduced rapidly in most underdeveloped countries, substantial decline in birth rates is not feasible in most of them since they have not attained the level of industrialisation, urbanisation and per capita income associated with Europe, Japan and other developed countries at the time fertility rates recorded significant decline in these parts of the world. In other words, economic development is, according to this view, the precondition for rapid decline in birth rates.[1] But much more recent writings in this area clearly warn that "if the LDCs want to learn what specific steps they might take to make people want fewer children, they will not learn them from the experience of the richer countries that have already experienced the demographic transition to low birth and death rates".[2] Perhaps there is no single recipe suitable for all the LDCs. "Each LDC will have to devise experiments based on the specifics of its own situation".[3]

Some alternative hypotheses regarding fertility decline have been advanced in the recent past. One view virtually suggests: 'reduce mortality - child and infant mortality - and fertility will take care of itself'. Once mortality rate has declined to a level at which couples feel confident of the survival of the minimum

number of children they wish to have, the birth rate may fall faster than mortality rate.[4] Though according to this view there may be a strong linkage between mortality and fertility, and fertility decline may be 'induced' by decreasing mortality, it is difficult to generalise this proposition; there may be other socio-economic variables which are essential for such inducement to become effective. It has been suggested, for instance, that in the case of Taiwan the recent fertility decline may be as much related to educational development as to mortality decline.[5] The role of education in bringing down fertility rate has been enphasized in other studies also.[6] It would appear therefore, that reduction in mortality (especially infant and child mortality) and educational development together provide the necessary and sufficient conditions for fertility decline. It is possible also that mortality decline itself will be easier and faster with educational development.

Some demographers are nevertheless of the view that reduction in mortality and the rise in the confidence of child survival do not necessarily lead to a fall in fertility rate; they suspect that it may even lead to an increase in live births, due to a fall in the incidence of still births, miscarriage, etc., to decline in the incidence of widowhood and to increase in the average reproductive span.[7] They put their faith instead on the success of the family planning programmes. But this view is questioned by other demographers like Davis and Hauser who seriously doubt the effectiveness of family planning programmes.[9] Again in the case of Taiwan, it is intended that the family planning programmes neither

precipitated the initial fertility decline nor was it accelerated by family planning.[10] The significant point to note in both these hypotheses — the one relying more on family planning programmes and the other on reduction in mortality rates — is that the emphasis on income levels, industrialisation and urbanisation as the sine qua non of fertility decline has become considerably weaker; instead attention is mainly focussed on other socio-economic variables like health, education, age at marriage of women, etc. as the operable variables.

In this paper our attempt will be to show that the birth rate in Kerala appears to have started on a course of rapid decline; that the decline began before the intensitifation of the family planning programme; and that the impact of this fall has already begun to be felt in the growth rate of primary school enrolment. Of course a distinction needs to be drawn between decline in crude birth rate and decline in fertility,[11] but if our analysis portrays correctly the recent trends in fertility rate in this State, and if they continue, it would have far-reaching implications for the population policy of underdeveloped areas like Kerala with low levels of per capita income, industrialisation and urbanisation, but high levels of literacy and education.[12]

The analysis is divided into two parts: In the first part, we attempt to show on the basis of the available evidence from Census and Sample Registration results that the crude birth rate in Kerala had declined by 1971 to the lowest level among all States in India and that the rate had been declining continuously in the later years of the 'sixties. In the second part, we hypothesise

that the fall in birth rate started in the early 'sixties; that is, ahead of the intensification of the family planning programmes, indicating that some kind of broad societal adjustment had taken place prior to the favourable, broad-based response to family planning measures observed more recently in the State. This part is mainly based on an analysis of the trends in primary school enrolment. We advance the proposition that the fall in the birth-rate in the early 'sixties could have been the consequence of the decline in infant and child mortality rates during the latter 'fifties following extension of primary health centres and other public health measures over a period of time.[13] We also show, on the basis of available data and "guesstimates" with respect to the pattern of changes that might have taken place in birth, death and infant mortality rates during the period from 1951 onwards, that such demographic evidence as we have for this period is not inconsistent with the trends actually observed in enrolment to the first year of primary schooling.

I

According to the 1971 Census, the rate of growth of population in Kerala during 1961-71 continued to be higher at 26.3 per cent than the all-India average of 24.8 per cent and was higher than the State's own rate for the previous decade of 24.8 per cent. One explanation which would immediately suggest itself is that the death rate might have been falling faster than the birth rate, a phenomenon considered typical of underdeveloped countries. A closer look at the facts suggests however a different hypothesis.

An examination of the available State-wise data on population in the different age-groups in 1961 and 1971 indicates that during the 'sixties, the birth-rate and the infant mortality (and child mortality) rates were the lowest in Kerala among all the Indian States. We have attempted in particular comparing the size of the population in the age-group 5-9 in 1961 with that in the age-group 15-19 in 1971 and of the population in the age-group 10-14 in 1961 with that in the age-group 20-24 in 1971. We shall describe the number in the higher age-group in 1971 as the "survivors" from among the number belonging to the matching lower age-group in 1961 and give in Table 1 the estimates of the former as percentage of the latter.[14]

Table 1: Percentage of 'survivors' between 1961 and 1971 in Specified Age-Groups

State	Percentage of population in the age-group 15-19 in 1971 to population in the age-group 5-9 in 1961	Percentage of population in the age-group 20-24 in 1971 to population in the age-group 10-15 in 1961	Percentage of population in the age-group 15 and above in 1971 to population in the age-group 5 and above in 1971
(1)	(2)	(3)	(4)
Andhra Pradesh	82.3	85.2	85.0
Bihar	68.6	82.2	83.8
Gujarat	86.9	90.0	89.0
Kerala	103.0*	100.1*	89.6
Madhya Pradesh	75.3	90.0	87.9
Maharashtra	81.1	91.4	89.0
Mysore	88.6	87.3	85.9
Orissa	78.2	77.8	85.9
Rajasthan	77.7	82.7	86.3
Tamil Nadu	90.2	97.0	89.1
Uttar Pradesh	76.3	79.0	83.4
INDIA	81.9	86.7	86.7

Source: Census 1961, Age Tables; Pocket Book of Population Statistics, op.cit. (The border States of Punjab, Jammu & Kashmir, Assam

(contd...6)

and West Bengal are omitted in Table 3, as the population change in these States has been considerably affected by migration).

*On a comparison of the population of Kerala in the age-group 5-9 in 1961 and 15-19 in 1971, it is seen that the percentage of survival was 103.0; similarly, the survival rate of the age-group 10-14 of 1961 was 100.1 per cent in the State. Survival rate higher than 100 per cent does not make any sense. The reason for this result may be the fact that the comparison we have made is between the adjusted data for 1961 and the Census count for 1971. However, the inter-State differences which we have worked out in the Table are based on the same source and therefore on comparable data for all the States. The differences are large and reveal the extremely high survival rate in Kerala in the younger age-groups. Data on the population in the age-group 10-14 in 1971 are not yet available for being compared with the population in the age-group 0-4 in 1961.

Column 4 in Table 1 shows that the percentage of 'survivors' from 1961 population aged 5 and above taken as a whole has been the highest in Kerala (which means that the general mortality level was the lowest). But it was only marginally higher than in Tamil Nadu, Gujarat and Maharashtra. Much more striking are the differences in the percentage of "survivors" among those who belonged to the age-groups 5-9 and 10-14 in 1961, they being perceptibly higher in Kerala than in other States. Unfortunately data on the number of persons in the age-group 10-14 in 1971 are not so far available and it is therefore not possible to estimate in this way what percentage of those in the age-group 0-4 in 1961 survived the following decade. Though this is only a crude method of comparing the mortality rates among the population belonging to the different age-groups and we are comparing the 'adjusted' data for 1961 with the first Census count for 1971 which has yet to be adjusted, the inter-State differences in the estimated survival rates in the two lower age-groups

are so large that they cannot be simply attributed to the statistical deficiencies of the data (particularly since we have used for each of the Census years comparable data for all the States).

At the same time, it can be seen from Table 2 that the growth rate of population in Kerala in the age-group 0-14 was perceptibly lower than the growth rate of its total population (see columns 4 and 5 in the table); this is generally at variance with the record of the other States (the only other State in which is was so being Gujarat).

Table 2: Percentage of Population in the Age-Group 0-14 by States, 1961 and 1971

State	Population in age-groups 0-14 as %age of total population in		Growth of population in the age-groups 0-14 during 1961-71	Growth of total population during 1961-1971
	1961	1971	(%)	(%)
(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	39.1	40.5	25.3	20.9
Bihar	42.6	42.6	21.2	21.3
Gujarat	43.2	43.1	28.7	29.4
Kerala	41.0	40.3	24.1	26.3
Madhya Pradesh	41.4	43.7	35.8	28.7
Maharashtra	41.4	41.3	29.4	27.5
Mysore	41.0	42.4	28.4	24.2
Orissa	39.9	42.4	32.7	25.0
Rajasthan	43.1	44.4	30.9	27.8
Tamil Nadu	37.2	37.8	24.1	22.3
Uttar Pradesh	40.5	41.8	23.8	19.8
India	41.0	42.0	27.9	24.8

Source: (1) Census of India 1961, Age Tables; (2) Pocket Book of Population Statistics, India, Census Centenary, 1972, Registrar-General of India (New Delhi 1972).

The Census data show that while the survival rate of the population above the age of 5 — more especially in the younger age-groups 5 to 9 and 10-14 was much higher in Kerala than in other States, growth of population in Kerala in the age-groups 0-14 between 1961 and 1971 was not only lower than of the population with higher age-groups but was among the lowest in India. The growth of population in the age-group 0-14 was of course about the same or lower in Tamil Nadu, Uttar Pradesh and Bihar; but it must be noted that, in these States, the survival rate among those in the age-groups 5-9 and 10-14 in 1961 was much lower than in Kerala, which suggests that the mortality rate in the lower age-groups in these States was probably much higher. It appears therefore legitimate to infer from the available Census data (with all their imperfections) that the birth rate in Kerala during 1961-1971 was the lowest among the States. We got confirmation of this from the Sample Registration data.

The Sample Registration Data

It is well-known that data on key demographic rates, like birth rate, death rate, infant mortality rate, etc. are, in general scanty and not-too-reliable in most underdeveloped countries. This is especially true of India. Till recently the only source of information on birth and death rates was the data collected through Civil Registrations. Since these registrations could not be compulsorily enforced due to administrative shortcomings, they were incomplete to a large extent.

In order to overcome this deficiency, the Registrar-General of India has organised since 1963-64 a Sample Registration Scheme

covering all the States in India. At present this Scheme covers about 2400 rural and 1300 urban sample units in the whole country. The sample units in the rural areas of each State consists of 150 units, one unit being a Census village or its segment with a population of not more than 2000 according to the 1961 Census. For the urban areas, the sample size varies from 60 to 100 blocks. Through this system it has been possible to measure the birth rate at the national level with a coefficient of variation of less than 1 per cent.[15] The Sample Registration Scheme was introduced in Kerala as a pilot study in 1964-65.[16]

According to the Sample Registration data the rate of decline of the birth rate between 1966 and 1971 has been as high as 2.9 per cent per annum, higher than the rate of decline of the death rate. This relates to the rural areas. The Sample Registration Scheme was introduced in the urban areas of this State only from the beginning of 1970. It would appear from the estimates for this year that the birth and death rates were somewhat lower than in the rural areas.

Table 3: Crude Rates of Births and Deaths in Kerala, 1966-71

Year	Crude Birth Rate (Per 1000)		Crude Death Rate (Per 1000)	
	Rural	Urban	Rural	Urban
1966	37.4	N.A.	10.5	N.A.
1967	36.3	N.A.	10.1	N.A.
1968	34.3	N.A.	10.4	N.A.
1969	33.3	N.A.	9.8	N.A.
1970	32.3	N.A.	9.2	N.A.
1971	31.9	30.1	9.2	8.8
Annual percentage decline, 1966-71	2.9	-	2.3	-

Source: Sample Registration Scheme, Annual Report, 1971, Issue No.8, No.1973 (Mimeo) Sample Registration Unit, Population Division, Trivandrum, November 1973.

If the Sample Registration data provide a reasonably dependable basis for judging the trends during the period covered there has been continuous fall in the crude birth rate in the second half of the 'sixties. But we do not know whether the decline began only in the latter half of the 'sixties or earlier. In the absence of direct evidence from available demographic data we have to look for indirect evidence to locate roughly the point of time when the continuous decline might have started.

II

Primary School Enrolment

On the assumption that a rapid decline in fertility rate, should get reflected in the rate of growth of enrolment in the first year of the primary school (an assumption one is justified in making in Kerala) we have studied the data on primary school enrolment covering the period 1956 to 1971 to see whether it is possible to identify approximately the period from which birth rate in Kerala might have started declining perceptibly.

The rate of growth of enrolment in the first year of primary schoolhas shown a decline in recent years. From about 3.1 per cent per annum in the first few years after the formation of the State in 1956, the annual rate of growth had increased to nearly 4.0 per cent per annum in the first half of the 'sixties; but it fell sharply to 1.6 per cent per annum over the second half of the 'sixties and the early years of the 'seventies. (See Table 4).

Table 4: Average Annual Growth Rate of Enrolment in the First Year of the Primary School

Period	Annual Rate of Growth(%)
1956-57 to 1961-62	3.1
1961-62 to 1965-66	4.0
1965-66 to 1971-72	1.6

Such a decline in the rate of growth of enrolment could have come about either as a result of a change in the rate of growth of the population in the relevant age-group or due to a number of other factors. Let us therefore consider first the more important of the latter as listed below:

(a) Changes in the percentages of enrolment to total population in the relevant age-group;

(b) Changes in the extent of bogus reporting of enrolment by schools;

(c) Change in age of admission to primary school; and

(d) Changes in the promotion policy adopted by schools in regard to Standard I.

(a) Percentage of Enrolment to Total Population in the Age-Group

If an area starts from a low level, a vigorous policy of enrolment promotion may result in a continuous rise in the number of children enrolled at a rate higher than that of the growth of population in the age-group concerned. In Kerala the number of children enrolled in the first year of the primary school was in excess of the total population in the age-group 5-6 even in 1956 when the State was formed (which was a reflection of the high rate of enrolment at this stage of primary education, as also the fact that some children belonging to higher age-groups were also enrolled in Standard I, in some cases due to non-promotion). In 1961 the Kerala Government extended its mid-day meal programme to all children in primary schools throughout the State, which could only have increased the percentage of enrolment. There is no reason to assume that the percentage of enrolment to the population in the relevant age-range has gone down over the years. The observed fall in the growth rate of enrolment from the middle 'sixties could not therefore have been due to this factor.

(b) False Reporting

It is common knowledge that private managements of schools have a stake in maintaining the reported level of enrolment in each class from year to year, if possible in enhancing it since more classes or class divisions bring them financial advantage. The urge to sustain enrolment in schools is not absent even in departmental (government) schools, since a reduction of a standard/division may mean transfer of a teacher away from his home town or village. No doubt the Kerala Education Rules (passed and brought into force in 1959) contain provisions which could be used to check this tendency, but there is no evidence to show that its enforcement has been made stricter in recent years. One would therefore be justified in assuming that the percentage of bogus enrolment reported by schools must have remained more or less unchanged over the years.

(c) Change in Age of Admission to Primary School

The growth rate could have declined for another reason, namely change brought about by administrative decisions regarding the age of admission to schools. Actually there were some changes in this regard during this period, as indicated below:

Period	Completed age for admission to Standard I
1956-57 to 1957-58	5 years on 1st June of the year of admission.
1958-59	5½ years on 15th June of the year of admission.
1959-60 to 1963-64	5½ years on 1st June of the year of admission.
1964-65 to 1965-66	5 years on 1st June of the year of admission.
1966-67 to 1968-69	5 years on 1st August of the year of admission.
1969-70 to 1973-74	5 years on 1st June of the year of admission.

The annual changes in enrolment of children to Standard I of the primary school are given in Table 5.

Table 5: Enrolment to Standard I of the Primary School

Year	Enrolment (In thousands)	Change over previous Year (in thousands)
1956-57	555	-
1957-58	591	+ 36
1958-59	615	+ 24
1959-60	582	- 33
1960-61	595	+ 13
1961-62	646	+ 51
1962-63	657	+ 11
1963-64	675	+ 18
1964-65	746	+ 71
1965-66	756	+ 10
1966-67	785	+ 29
1967-68	783	- 2
1968-69	797	+ 14
1969-70	792	- 5
1970-71	800	+ 8
1971-72	848	+ 48

Source: Administration Reports, Department of Education, Kerala.

An examination of these figures indicates that there might be some influence on admissions when the age for admission to the primary school is altered. The effect of such a change need not take place in the same year but could as well take place through a lagged adjustment. For instance, the age for admission was raised from 5 to 5½ years in 1958-59, and the increase in admissions over the previous year fell to 24,000 compared to 38,000 in 1957-58; and there was actually a decline in total admissions in the following year, from 615,000 in 1958-59 to 582,000 in 1959-60, which could have been a lagged effect. Similarly, the age of admissions was again reduced to 5 years in 1964-65, in which year the enrolment

rose by 71,000 (from 675,000 in 1963-64 to 746,000 in 1964-65). Thus it appears that administrative decisions regarding the age for admission in Standard I might have contributed to variations in the annual growth rates in enrolment. But this cannot explain changes in long-run trends noticed earlier, since any change in a particular year due to this factor is likely to be offset by changes in the opposite direction in the succeeding period, and since there were no significant changes in administrative policy regarding the age of admission after 1964-65.

(d) Promotion Policy

Another factor which could possibly affect enrolment is a change in the policy of promotions to higher classes. For example, if a new policy of promoting all the pupils in Standard I to the next higher Standard at the end of each year is introduced, there will be no repeaters in Standard I during the succeeding year and this would result in a sudden drop in enrolment in the Standard during that year. But until June 1972 (when a policy of promoting all pupils to the next higher class was adopted), we know that no such change in promotion policy had actually been introduced in Kerala.

From the preceding analysis it would appear that we are on safe grounds to infer that none of the factors other than change in the rate of growth of population in the relevant age-group can convincingly explain the declining trends in the rate of growth in enrolment observed from the latter half of the 'sixties.

Comparison of Demographic Trends with Primary School Enrolment

Though we do not have any reliable data on the birth,death and the infant mortality rates prior to 1966 it is possible to indicate that, under certain assumptions regarding the changes in these rates, the annual flow of children reaching the primary school enrolment age could fit broadly into the pattern of actual enrolment observed in Kerala during the period from 1956-57 to 1971-72.

Let,

P_o = Total population in the year 0

b = Crude birth-rate per 1000 population

d = Crude death rate per 1000 population

m_f = infant mortality rate (mortality rate in the age-group 0-1) per 1000 live births

m_c = child mortality rate = $\frac{1}{6} m_f$

t = years 1, 2, 3.....,n

C_e = Children surviving to the enrolment age 5-6

Then,

$$P_t = P_{t-1}(1 + b_{t-1} - d_{t-1}) \quad \ldots (1), \text{ and}$$

$$C_{e_{t+5}} = P_t b_t (1 - 7/6\, m_{ft}) \quad \ldots (2)$$

The number of children surviving to the enrolment age of the first year of primary schooling can be projected using the above formula when values for the different variables are given. Let us suppose that b, d, m_f and m_c remained constant during the first half of the 'fifties; that d, m_f and m_c declined but b remained unchanged during the second half of the 'fifties; and that all these variables

declined in the first half of the 'sixties. In this exercise we have assumed the following values for the variables for the years indicated:[17]

	b	d	m_f	m_c
1951	38.9	18.0	120	(1/6 m_f)
1956	38.9	17.0	115	(1/6 m_f)
1961	38.9	14.0	90	(1/6 m_f)
1966	35.5	13.0	70	(1/6 m_f)
1971	31.9	9.2	55	(1/6 m_f)

On the basis of the above values, using the formula, the number of children surviving to the school going age of 5-6 in each year from 1956 to 1976 have been estimated. The rates of change in enrolment for the five year intervals calculated therefrom are given in Table 6.

Table 6: Average annual growth of children surviving to the age-group 5-6 during the five year periods from 1956-61, 1961-66 and 1966-71

Period	Annual Growth Rate(%) (Estimated)
1956-61	2.3
1961-66	3.0
1966-71	1.1

The actual trends in enrolment (Table 4) and the estimated trends in the population reaching the school-going age-group of 5-6 (Table 6) for the three quinquennial periods show the same broad pattern of change. However the values for the growth rates of actual enrolment are seen to be higher than for those estimated

for the population surviving to the school-going age-group. The higher values of growth rates of actual enrolment could be due to reasons like enrolment in Standard I of children above and below the assumed age-group, stagnation in Standard I due to failures and extension of the mid-day meal programme for primary school children.

Our analysis strongly suggests that continuous and significant decline in birth-rate in Kerala began in the early 'sixties. With the extension of family planning facilities and the response that has been forthcoming for utilising these facilities (Kerala has been reported as showing one of the highest rates of response among all the States) it is possible that the decline in birth rate will continue. Before one can make forecasts with confidence, it is however necessary to undertake further investigations to ascertain how far the recorded decline in the birth-rate is a reflection of factors such as rise in the age at marriage and how far it is due to decline in fertility.

Control of population growth in poor countries has so far eluded any satisfactory solution though various methods are being tried out in different parts of the world as part of family planning programmes. If, as our study indicates, education, together with widespread public health facilities, is an essential precondition for bringing down the birth-rate, it might be appropriate to direct more resources to extension of education and public health facilities along with popularisation of family planning. Above all, the experience of Kerala in this regard suggests that reduction in the rate of growth of population does not have to await substantial increases in per capita income and that it might be possible to achieve it through a combination of enlightened policies as an integral part of the development programme.

NOTES AND REFERENCES

* The author gratefully acknowledges the valuable suggestions and comments made by Dr. K.N.Raj, Dr. T.N.Krishnan and Dr. I.S.Gulati on an earlier draft of this paper. The defects that remain are the author's own.

1. A.J.Coale and E.J.Hoover, Population Growth and Economic Development in Low Income Countries, Oxford University Press (Bombay, 1959), pp.13-17.

2. George B.Baldwin,"Population Policy in Developing Countries," Finance and Development, Vol.10, No.4, December 1973, pp.3-7.

3. Ibid.

4. S.K.Rao, On Reducing the Growth Rate of Population through Declines in Mortality - A Note, Centre for Economic Studies, Presidency College, Calcutta (Mimeographed), 1973.

5. Wen L.Li, "Temporay and Spatial Analysis of Fertility Decline in Taiwan", Population Studies, Vol.27, No.1, March 1973, pp.97-10

6. Robert O.Carleton, "The Effect of Educational Improvement on Fertility in Latin America", World Population Conference, 1965, Vol.IV, United Nations (New York, 1967), p.141.

7. G.B.Saxena, Indian Population in Transition, Commercial Publicati Bureau, New Delhi, 1971, p.173.

8. See the views of: Donald J.Bogne, Berelson and Freedman, quoted in Wen L.Li (5); and Saxena (7).

9. Cited by Wen L.Li (5).

10. Wen L.Li (5).

11. A decline in the crude birth rate, i.e.

$$\frac{\text{total number of births in a year}}{\text{total female population in that year}} \times 1000$$

does not necessarily imply a decline in the fertility rate. Demographers use various measures of fertility in their studies - general fertility, total fertility, marital fertility and nuptial fertility. Age-specific fertility rates are also used for detailed analyses of demographic behaviour. General fertility refers to the number of live births in a year per 1000 women in the reproductive age-group (say 15-49). Total fertility gives the average number of children born to a women through her entire reproductive span. The number of children born in a year to women in each group, per 1000 women in the female population in the same age-group in that year, gives the age-specific fertility rate. Nuptial fertility and marital fertility refer to births per 1000 'ever-married' women and 1000 married women respectively in the reproductive age-group.

The factors that affect fertility rate are numerous and there is no general agreement even among demographers as to the precise ways in which or to the extent to which these factors affect the fertility rate. The most important of the factors include the proportion of married women to total female population, the age at marriage of women, the educational and income levels of families, the practice of contraceptives, the biological capacity to procreate, etc.

Detailed studies on all the factors affecting fertility rate in Kerala have not been made so far. However we have evidence to show that the proportion of married women to total female population has been lower in Kerala than elsewhere in India and that the age at marriage of women here has been significantly higher. According to the results of the 16th Round of the N.S.S., the percentage of married women to the total female population (during 1958-59) was 39.3 in Kerala as against 48.1 for India. Similarly, according to the 1961 Census, the age at marriage of women in the rural and urban areas of Kerala was 19.9 and 20.7 respectively while for the country as a whole the corresponding figures were 15.4 and 17.8 respectively.

Even though all the data which are necessary for analysing the factors influencing the fertility rate in this State are not readily available, there is evidence of a definite downward trend in fertility rate in recent years as may be seen below:

Year	General Fertility Rate	Total Fertility Rate	Age-Specific Fertility Rate						
			Age-Group						
			15-19	20-24	25-29	30-34	35-39	40-44	45-49
1958-59	171.9	N.A.	87.5	237.9	291.8	205.0	161.8	46.8	1.5
1968	139.8	4.6	63.7	227.8	224.9	188.9	147.5	53.1	7.0
1971	127.4	4.1	48.4	210.8	223.3	173.2	116.7	42.8	6.9

Sources: 1) Nitai Chandra Das, "A Study on the Fertility-variation between Kerala and her Neighbours", Population Growth in Kerala (ed), R.S.Kurup and K.A.George, Demographic Research Centre, Bureau of Economics and Statistics, Government Press, Trivandrum, 1966, pp.55-67.

2) Government of India, Sample Registration Bulletin, Vol.VI, 3 and 4, July-December, 1972, Vital Statistics Division, Office of the Registrar-General of India, Ministry of Home Affairs, New Delhi, 1972.

3) Bureau of Economics and Statistics, Kerala State Sample Registration Scheme, Annual Report, 1971, Issue No.8, Sample Registration Unit, Population Division, Trivandrum, November 1973 (mimeographed).

12. Kerala is the most advanced State in India in terms of literacy and education, both among men and women, though it does not rank high in terms of per capita income, industrialisation and urbanisation, as may be seen below:

	Kerala	All-India
(i) Per capita income* (1969-70)	Rs.567	Rs.590
(ii) Net income per worker in manufacturing industries (1950-61)**	Rs.764	Rs.1,111
(iii) Percentage of Urban Population to total population (1971)***	16.3	19.9
(iv) Literacy rate (including population in the age-group 0-4) in 1971***		
Males	66.6	39.5
Females	54.3	18.7
Total	60.4	29.5
(v) School enrolment in 1968-69 (percentage of population in the relevant age-group)@		
Classes I - V		
Boys	123	96
Girls	114	59
Total	119	78
Classes VI to VIII		
Boys	83	47
Girls	70	20
Total	77	34
Classes IX to XI		
Boys	36	29
Girls	30	10
Total	33	19

Sources: * State Planning Board, Kerala, Economic Review Kerala, 1972, Trivandrum, 1973, p.29.

** NCAER, Distribution of National Income by States, 1960-61, New Delhi, 1965.

*** Census, 1971.

@ Planning Commission, Government of India, Educational Statistics at a Glance, Education Division, Planning Commission, June 1969, pp.35-37.

13. Though in terms of indices like per capita expenditure on public health, bed-population ratio, percentage of population covered by primary and secondary health centres, etc., Kerala does not rank as high as some other States in India it would appear that the facilities available in this State are more easily accessible to the population in the rural areas than in other States. In the absence of adequate data on the spatial dispersal and coverage of the public health and medical facilities and their impact on infant mortality rates, we furnish below the number of patients treated in hospitals and dispensaries in the course of a year for diseases of pregnancy and child-birth per 10,000 of the population in each State. The data given are for years as close to 1961 as are now available.

State	Population (in '000s)	Number of Patients treated in hospitals and dispensaries for diseases of pregnancy and child-birth (000s)	Number of patients treated per 10,000 of the population
Andhra Pradesh	38,090(1964)	302 (1964)	79
Assam	12,320(1964)	30 (1961)	24
Bihar	43,670(1958)	45 (1958)	10
Gujarat	22,460(1961)	370 (1961)	165
Haryana	8,860(1966)	61 (1966)	69
Kerala	17,030(1961)	357 (1961)	210
Madhya Pradesh	32,640(1961)	34 (1961)	10
Maharashtra	42,730(1961)	114 (1961)	27
Mysore	23,750(1961)	361 (1961)	152
Orissa	17,680(1961)	78 (1961)	44
Punjab	11,210(1961)	121 (1961)	108
Rajasthan	20,330(1961)	123 (1961)	61
Tamil Nadu	33,850(1961)	371 (1961)	110
Uttar Pradesh	71,160(1961)	329 (1961)	44
West Bengal	35,240(1961)	382 (1961)	108

(The figures in brackets show the year to which the data relate.)

Source: Government of India, Statistical Abstract of India, 1970, Department of Statistics, Cabinet Secretariat, New Delhi, 1972, pp.709-711.

14. The Inter-Censal survival rate will be affected to some extent by inter-State migration of population. Some studies have, however, shown that this factor was not stronger in Kerala than in other States in the period 1951-61; in any case, it does not seem likely that by introducing this factor, the inter-State ordering of survival rate will be substantially altered (see for example, G.B.Saxena, Indian Population in Transition (8), p.141).

15. Government of India, Sample Registration Bulletin, Vital Statistics Division, Vol.VI No.3 and 4, Office of the Registrar-General of India, Ministry of Home Affairs, New Delhi, July-December 1972.

16. The Scheme was launched full-scale in the rural sector on July 1, 1965, and it was continued every year thereafter. As in other States, the sample for the rural sector in this State also consists of 150 units, each with a population of not more than 2000 according to the Census of 1961. The units have been chosen from the three natural divisions, namely, lowlands, midlands and highlands. In each natural division, the villages have been classified into four groups on the basis of population size. The sample contain 2.22 lakhs persons out of 142.68 lakhs, and 150 units out of 10303 units, in the universe; in in other words, the sample covers 1.56 per cent of the universe in terms of population and 1.46 per cent in terms of number of units. In order to ensure a high degree of accuracy in the enumeration of births and deaths by Enumerators, surveys were conducted by the Supervisors at half-yearly intervals. Besides, intensive surveys were also periodically carried out by officers above the level of Supervisors during 1968 and 1969. Since the second half of the year 1969, a system of overlapping surveys by Supervisors have been introduced with a view to detecting the events missed by the Enumerators. It would seem, as a result of these regular checks and rechecks built into the Scheme, that the data collected under this Scheme have acquired a fairly high degree of accuracy and consistency.

(Government of Kerala, Annual Report for 1969-70, Issue No.6, Sample Registration of Births and Deaths, Kerala, State Bureau of Economics and Statistics (Trivandrum, 1973), p.10).

17 The table below indicates that the decline in death rate during 1951-60 was significant.

Period	Birth rate	Death Rate
1921-30	26.92	14.18
1931-40	23.36	12.69
1941-50	24.91	11.32
1951-60	23.80	7.80

(Source: Census 1961 Vol.VII, Kerala Part I A(i) General Report pp.122; the data were obtained from the Civil Registration),

Further this decline seems to have been confined mainly to the second part of the 'fifties.

Number of Deaths per 10,000 Population by all Causes

	Travancore-Cochin (All age-groups)	Malabar (All age-groups)	Travancore-Cochin Infant Deaths
1951	67	117	11
1956	64	117	9

KERALA

	All Age-Groups	Infant Deaths
1957	96	15
1958	76	12
1959	78	13
1960	69	10
1961	73	11

(Source: Census, 1961, Vol.VII, Part IA(i), General Report, p.131).

Since the above-mentioned rates are based on Civil Registration data they are likely to be gross underestimates. (The degree of under-estimation during the latter 'sixties was found to vary between 34 per cent to 49 per cent, vide Sample Registration Scheme Annual Report, 1971, Issue No.8, Sample Registration Unit, Population Division, Bureau of Economics and Statistics, Kerala State, Trivandrum, November 1973 (mimeographed). However, the trend observed in the rate during 1957-61 is clearly downward and steady.

Another piece of evidence in support of the decline in general-mortality rate is provided by the expectation of life at birth during the period.

Expectation of Life at Birth (Years)

	Male	Female
1956	49.5	47.1
1963	55.5	53.1

(Source: Statistical Profile of Children and Youth in India, United Nations Children's Fund, New Delhi, Sept.1973)

According to the NSS, infant mortality rate in Kerala had fallen to 88.86 per 1000 live births by 1958-59. The decline in mortality and the increase in expectation of life may have been due to the health programmes undertaken during the First and Second Plan periods, as claimed in the Third Plan document for Kerala; "The health programs undertaken during the first and second plan periods have contributed in some measure to the general improvement in the health conditions of the people as is reflected in the comparatively lower incidence of disease, decrease in infant mortality, general decline in death rates and increase in the expectation of life". Government of Kerala, Third Five Year Plan, Policy and Programme, Superintendent of Government Presses, Trivandrum, 1961, p.103.