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Has 'Modernization' Increased Fertility in Karnataka, India?

Introduction

THE most widely recognized effect of modernization[1] on fertility is that outlined in the theory of demographic transition (Notestein 1953). Small-scale studies conducted in India around the 1950s brought out clearly the complexity of assessing the effects of modernizing influences on fertility in developing countries, especially in the early phases of development. They stressed in particular, that such effects are not always unidirectional. A study in and around the city of Calcutta, found that the 'upper' and 'lower' middle class currently married Hindu women, aged 45 years and over, living in the city had borne 5.8 and 6.5 children respectively, compared with 6.9 for those living in a rural area, 20 miles from Calcutta. A higher average age at marriage and the greater practice of modern methods of contraception were in conformity with the nature of the differentials in fertility observed between these three groups (Chandrasekaran J954). On the other hand, hardly any difference in the average number of children born was found between women who passed their

1. It is difficult to define *modernization* precisely even though its connotation is fairly clear. Nag (1980) has given a fairly broad definition of moderisation viz., 'that it will include any one or combination of the following processes : industrialisati*on*, urbanisation, spread of education, improvement in health and nutrition, control of epidemic diseases, erosion of traditional customs and emergence of secular values and beliefs'. For our discussion, the social and economic developments which took place in Karnataka between 1951 and 1975, primarily due to the implementation of India's Five Year Plans provide the main background for modernization. Some of the changes that occurred as a reslut of this development are given *by* Srinivasan *et a!.* (1978) under the sections on "socio-economic development" and "health and family planning."

entire reproductive life in a 'married' state in Poona City and those in the 'non-city' sample; the average being 6.4 in both cases (Dandekar and Dandekar 1953). The Mysore Population Study showed that 'ever-married' women in urban areas had higher fertility than those in rural areas, although the difference was insignificant among women who continued to remain married till the end of reproductive life (United Nations 1961).

Supplementing the findings of such studies with the insights gained on some of the biological factors affecting fertility from the field studies on the Rhythm method a 1954 discussion of the fertility trends in India concluded 'It seems reasonable to conclude that in the last few decades the fertility of the Indian population has not declined; it might conceivably have even increased' (Chandrasekaran 1954). Coale and Hoover, around that time postulated the probability of 'essentially constant or even rising fertility' in India in the absence of a Government Programme for family limitation (Coale and Hoover 1958). More recently Nag (1980) has presented an excellent review of the variables which can cause an increase in fertility. In a follow-up paper he (1983) has attempted to fit the modernization variables in Easterlia's economic framework of the determinants of fertility (Easterlin 1975) and has provided a useful summary of the influence of modernization on selected intervening variables affecting fertility in a global context.

The renewed interest in the effect of modernization on fertility in India stems from two publications by Srinivasan *et al* (1977, 1978) which dealt with changes over a generation in fertility levels and values in Karnataka using essentially the same set of data. The comparison of the findings from the Mysore Population Study for which the field-work was conducted in 1951-52 and the Bangalore Population Study conducted in 1975, both in Karnataka, was the main aim of these two publications. Srinivasan *et al* (1978, p. 265) concluded that 'when the fertility decreasing effects of adoption of family planning are counteracted by the fertility increasing effects of modernization, fertility may fail to decline substantially even in the presence of a strong family planning program'.

The object of the present paper is to study in greater detail the data from the Mysore Population Study (MPS) and the Bangalore Population Study (BPS) and take a fresh look at the changes in fertility which Srinivasan et al attributed to the effects of modernization. This presentation will include an examination of the comparability of the findings from MPS and BPS on fertility and a recapitulation of the modernizing influences which Srinivasan et al attributed as having led to an increase in fertility; and will probe into the quantitative nature of these influences and of their possible roles in increasing fertility. An effort will also be made to bring out the lacunae in data and the need for augmenting the data-base if the early effects of modernization on fertility in India are to be well-understood.

Comparability of MPS and BPS Surveys[2]

The Mysore Population Study was essentially a sample survey of households in some parts of the once princely Mysore State undertaken primarily with the object of studying the interrelationships of demographic, economic and social changes. The choice of Mysore state for the study was made primarily because of the multifarious development activities that had been undertaken in the state; the choice was justified by the fast rate of population growth which the state recorded between the 1941 and 1951 censuses, viz., 23.7 per cent compared with 13.3 per cent during this period for the whole of India. Three rural zones (Zone I, Rural Hills—villages with large-scale anti-malarial operations; Zone II, Rural Hills—villages without large-scale anti-malarial operations; and Zone III, Rural Plains—tank-irrigated areas), 15 towns with population size 10,000 to 25,000 in 1951 from these zones, and Bangalore city were the contrasting areas in which the Household Survey of the Mysore Population Study was conducted. In addition to the Household Survey, the Mysore Population Study carried out a Fertility and Attitude Survey among currently married women, aged 18-33 years and an Attitude Survey of their husbands selected from Zone III (Rural Plains) and from four strata in Bangalore city.[3]

In 1956 when the Indian states were reorganized on a linguistic basis, a new Mysore state was formed including most of the old Mysore state, large parts of the adjoining Maharashtra and Andhra states, some parts of Tamil Nadu and Kerala, and Coorg. The new Mysore state, re-named Karnataka in 1973, consisted of 19 districts grouped into four divisions, including the Bangalore Division, The Bangalore Population Study was restricted to the Bangalore Division consisting of 5 districts, viz., Bangalore, Chitradurga, Kolar, Shimoga and Tumkur. Four of the districts of the old Mysore state viz., Mysore, Mandya, Hassan and Chickmagalur do not belong to the Bangalore Division; three of these had contributed villages surveyed in Zones I and II of the MPS while the fourth and one of the other three districts had contributed villages surveyed in Zone III of the MPS. Of the 5 districts of Bangalore Division the MPS did not include Chitradurga. The areas covered by the two surveys are given in the Appendix.

While the Bangalore Population Survey made use of a Household Schedule and a Fertility Schedule which collected information similar to that obtained in the Mysore Population Survey, the areas covered by the two surveys were not quite comparable. The BPS covered a very small part of Zones land II ami had no basis for differentiating the villages in these two zones. In regard

2. **The Mysore Population Study and** the Bangalore **Population** Study will often **be** refe**red to** respectively as the Mysore **Population Survey** and the Bangalore Population Survey.

3. **Zones I** and **II and one** of the **5** strata from Bangalore city were not taken up for **the Fertility or the Attitude Survey for reasons** of economy,

to 'towns', the BPS selected the headquarters of four districts which between them had an average population of 66,174 in 1971. The 15 'towns' surveyed in MPS had an average population of 15,739 in 1951 and 27,203 in 1971 and were therefore much smaller than those selected for BPS. Zone III of MPS was well comparable to what may be termed as 'rural plains' in the BPS. Also there is apparently little difficulty in comparing the data on fertility obtained by the two surveys in Bangalore city. So comparisons for Zone III (Rural Plains) and Bangalore city are likely to be more valid than for Zones I and II taken together (Rural Hills) or for 'towns'.

Srinivasan *et al* on Fertility Trends

Srinivasan *et al* based their discussion of changes in current and cumulative fertility between 1951 and 1975—the duration between MPS and BPS. The mean number of children ever born per ever-married woman by age-group and geographical area were used for the discussion on cumulative fertility. The mean number of children born as given in their two publications referred to earlier are reproduced in Table 1.[4] The numbers of ever-married women on which the

TABLE 1—MEAN NUMBER OF CHILDREN BORN PER EVER MARRIED WOMAN BY AGE AND BY GEOGRAPHICAL ZONES IN THE TWO STUDIES

Age group	*Rural Hills*		*Rural Plains*		*Towns*		*Bangalore city*	
	MPS	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*
15-24	1.2	1.4	1.3	1.3	1.3	1.3	1.3	1.4
	(897)	(99)	(825)	(726)	(440)	(288)	(1698)	(276)
25-34	3.5	4.1	3.6	3.9	3.6	3.4	3.2	3.4
	(901)	(145)	(773)	(728)	(382)	(394)	(1661)	(384)
35-44	4.7	6.0	5.1	5.5	5.6	5.6	4.9	5.2
	(615)	(131)	(550)	(473)	(294)	(247)	(1091)	(258)
45 +	4.8	6.3	4.9	5.2	5.6	5.9	5.3	5.7
	(779)	(95)	(854)	(591)	(461)	(224)	(1839)	(200)

SOURCE : United Nations, (1961), Table 10.1, p. 112 and Srinivasan, Reddy and Raju (1977), Table 12, p. 45.

Note : The rates for Rural Hills are presented by pooling Zones I and II in MPS. Figures in parentheses indicate number of ever married women in MPS and BPS.

4. Because of additional tabulations made for the sake of preparing our paper, the numbers of women given in the different tables differ to some extent from those given in the publications by Srinivasan *et al* (1977, 1978); however, the differences are not of a magnitude to vitiate comparisons.

TABLE 2—AGE SPECIFIC MARITAL FERTILITY RATES (ASMFR) AS GIVEN BY MPS AND BPS

Area	Age group	MPS		BPS	
		ASMFR per 1000 currently married women	*Number of currently married women interviewed*	*ASMFR per 1000 currently married women*	*Number of currently married women interviewed*
Rural Hills	15-19	282	419	448	22
	20-24	337	454	364	52
	25-29	317	428	234	64
	30-34	232	347	299	54
	35-39	163	238	179	61
	40-44	57	151	75	40
Rural Plains	15-19	277	361	282	230
	20-24	293	433	295	318
	25-29	302	409	286	339
	30-34	170	275	179	271
	35-39	157	237	142	227
	40-44	61	173	39	144
Towns	15-19	231	164	381	66
	20-24	310	173	371	153
	25-29	273	187	314	194
	30-34	263	149	165	137
	35-39	201	99	101	103
	40-44	73	71	44	85
Bangalore city	15-19	297	610	290	69
	20-24	253	1033	351	165
	25-29	201	935	229	201
	30-34	174	549	134	135
	35-39	88	489	61	132
	40-44	36	362	12	82

SOURCE : United Nations, (1961), Table 8.9, p. 84 for data of MPS. Srinivasan, Reddy and Raju (1978), Table 3, p. 261 provided rates BPS.

Note : The rates for Rural Hills for MPS were obtained by pooling the data for Zones I and II. The numbers of currently married women for BPS were estimated by using the figures of ever married women and the ratio of weighted ever married to currently married women in each age group given in the work sheets of BPS. Some differences in the number of ever married women given in the different work sheets of BPS were found and are attributed to tabulations having been undertaken for different purposes at different times and non-availability of some information.

means were based were given in Srinivasan *et al.* (1977) but not in Srinivasan *et al.* (1978). Current fertility rates were shown in terms of age-specific marital rates by geographical areas and also in terms of crude birth rate, general fertility rate, general ever-married fertility rate and general marital fertility rate. These rates were based on the births during a fixed period of 12 months prior to the two surveys. The age-specific marital fertility rates as given in the papers by Srinivasan *et al* are reproduced in Table 2. The number of women on whose experience the age-specific marital fertility rates were based are shown in Table 2 but were not given in either of the publications by Srinivaian *et al.* (1977,1978).

(a) Observations of Srinivasan et al on Changes in Cumulative Fertility

An increase in the average number of children born was observed in virtually every age group in every area except the 'towns'. Even fbcre the number of children born per women in all age groups but one was in 1975 the same as or higher than in the 1951 study. Noting also that the increase appeared substantial in older age groups the combined effect of the following two factors were hypothesized as responsible for these features :

(i) a relatively greater under-enumeration of children in the Mysore Population Study, and
(ii) a real increase in the *potential fertility* of women during the period 1951-75 as a result of some relaxation of traditional checks on fertility such as prolonged breast-feeding, prohibition of sexual intercourse on certain days for social or religious reasons and taboo on remarriage of widows,

(b) Current Fertility

A small decline in birth rate in all areas over the 24-year period was explained more by changes in marriage patterns than by changes in the number of children married women had borne. Changes in age distribution were also found to diminish the birth rate in the BPS to a minor extent.

Srinivasan *et al* (1977) also opined that the small over-all decline in marital fertility was due mainly to a drop in the fertility of older women. They pointed out that marital fertility in the age group 15-19 had increased in three areas. In the rural hills, marital fertility increased in all age groups except 25-29 years, in the rural plains and towns, marital fertility increased in the age-groups 15-19 and 20-24, in Bangalore city the increase was noted only in the latter age group. In the towns and Bangalore city, there was an increase in the age-group 25-29 as well. Among women aged 30 and older, however, a substantial decrease in marital fertility rates had occurred in towns and Bangalore city, with the rural plains showing a slight increase among women aged 30-34 but a decline among those aged 35 and over.

The increase in marital fertility rates in the younger age-groups, and particularly in the age group 15-19, was attributed by the authors partly to an increase in the age at marriage which reduces the effect of adolescent infertility. However, they were disposed to emphasize other eflects of modernization in increasing fertility. The similarity in cumulative fertility patterns between rural and urban areas found in the BPS was attributed to the effects of increase in fertility counteracting the effects of family-planning. In support of this view it was argued that greater increase in *fecundability* can be expected in the urban as compared to the rural areas. In a more detailed discussion of the ways in which modernization might have increased fertility, the authors emphasized, in addition to the factors already mentioned, the following: decrease in the practice of abstinence after delivery (because of return of wives from the parents 'to those of the husbands' home more quickly than before), increase in widow remarriage and increase in fecundity due to improvements in health, particularly from malaria control.

Differences in Cumulative Fertility Rates between MPS and BPS

Srinivasan *et al* (1977, 1978) had shown that the mean number of children ever-born per ever-married woman as given by BPS was higher in virtual ly every age group in every area (Table I) when compared with MPS. The differences became larger as the age group of the women increased. The need for exercising caution in interpreting such differences in the number of children born to ever-married women, particularly in the Indian situation, had been under-secored even when the MPS data were first analysed. The MPS had given the unexpected finding that ever-married women 45 years and over had borne a larger number of children in urban areas than in rural areas. Further analysis showed that for women once married and continuously married till reaching the age of 45 years (i.e., neither widowed nor separated) the average number of children born did not differ significantly between the urban and rural areas. The lower fertility in rural areas was mainly attributable to earlier and more frequent widowhood. The taboo on widow remarriage along with the higher mortality rates *prevailing* in the rural areas shortened the reproductive span of women living in rural areas. It was, therefore, felt necessary to further investigate the differences in fertility of ever-married women as recorded in the MPS and BPS taking into consideration the taboo on widow remarriage.

(a) Effect of Taboo on Widow Remarriage

A tabulation of females in the MPS and BPS according to marital status in broad age groups (Table 3) showed that in the 15-44 age group the incidence of widowhood/separation was higher in MPS than in BPS in all the areas. It was also found that the percentage who remained 'single' in the 15-44 years was higher in BPS than in MPS for all the areas. An increase in the age at

TABLE 3—PERCENTAGE DISTRIBUTION OF FEMALES UNDER 45 YEARS OF AGE BY MARITAL STATUS IN MPS AND BPS

Age group and Marital Status	*Rural Hills*		*Rural Plains*		*Towns*		*Bangalore city*	
	MPS	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*
Under 15 years								
Single	97.0	99.8	96.3	99.1	98.3	99.9	98.9	99.9
Married	3.0	0.2	3.7	0.9	1.6	0.1	1.1	0.1
Widowed/ Separated	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Number of Women	(2493)	(573)	(2317)	(2192)	(1235)	(1108)	(4579)	(1083)
15-44 years								
Single	7.5	28.6	4.3	10.8	11.6	30.0	16.6	27.3
Married	78.0	67.4	84.1	84.2	77.4	65.7	75.2	69.2
Widowed/ Separated	14.5	4.0	11.6	6.8	11.0	4.3	8.2	3.5
Number of women	(2610)	(543)	(2245)	(2167)	(1274)	(1360)	(5490)	(1293)

SOURCE : United Nations, (1961), Table 8.6 p. 82 for MPS. Those of BPS were derived from the tabulation made for this study and differ slightly from the preliminary findings reported in Vol. **II,** No- 3 of the *Newsletter* of Population Centre, Bangalore.

Note : The rates for Rural Hills are presented by pooling Zones I and II in MPS.

marriage of females and a decrease in the incidence of widowhood during the 24 years that intervened between the MPS and BPS were, therefore, in evidence.[5]

Table 4 showed that the percentage of widowed or separated women, among the ever-married women, was higher in all the three age groups 15-24,25-34 and 35-44 years in MPS as compared with BPS in all the areas studied and the differences increased as the age advanced. These differences are also influenced by the likelihood of a higher incidence of remarriage of widows during the interval between MPS and BPS whose effect will also have to be taken into account while probing into the differentials between the marital statuses of ever-married women between the two surveys.

5. Under the Indian situation the proportion of separated women among widowed/ separated is small (United Nations 1961, footnote on page 83).

TABLE 4—PERCENTAGE OF WIDOWED OR SEPARATED WOMEN TO EVER MARRIED WOMEN IN MPS AND BPS

Age group	*Rural Areas*		*Towns*		*Bangalore city*	
	MPS	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*
15-24	3.1 (1721)	2.7 (825)	3.9 (440)	2.1 (288)	3.4 (1698)	2.0 (276)
25-34	12.9 (1673)	7.2 (873)	12.6 (382)	4.1 (394)	10.7 (1661)	3.1 (384)
35-44	31.3 (1165)	14.0 (604)	24.5 (294)	15.8 (247)	22.0 (1091)	10.1 (258)

SOURCE : United Nations, (1961), Table 10.4, p. 115 for MPS. For BPS from worksheets and are approximate. The estimates both for MPS and BPS are from unweighted data.

Note : Rural Areas include both Rural Hills and Rural Plains. Figures in parentheses refer to number of ever married women used in calculating the percentages.

The Mysore Population Study had divided ever-married women, on the basis of its data on current marital status, number of times married and age at widowhood or separation into the following four groups :

I currently married plus widowed or separated after reaching the age of 45 (once married only);
II currently married, married more than once;
III widowed or separated (once married only) before reaching the age of 45;
IV widowed or separated, married more than once.

The BPS did not ask the question on the number of times married. In order to compare the fertility of women who were continuously married the mean number of children born to women in Group I of the MPS is compared in the top portion of Table 5 with the mean for women currently married in the BPS for the age groups 15-24, 25-34, 35-44 and 45 and over in rural areas, towns and Bangalore city. The comparison is not strictly valid for the following reason: Group I includes only women who were married once and were continuously married till the time of survey or till they were 45 years of age, in case they were older at the time of the survey. Currently married women in BPS on the other hand could have been married more than once after having been widowed or separated. Such discontinuity in married life, on the basis of the data obtained in the MPS, would normally have tended to reduce the mean number of children born when compared with the fertility of women who were continuously married (United Nations 1961, Table 10.4).

A quick look at Table 5 shows the relative closeness of the mean number of children born to currently married women as given by the MPS and BPS in

TABLE 5—MEAN NUMBER OF CHILDREN BORN FOR CURRENTLY MARRIED AND EVER MARRIED WOMEN BY AGE GROUP IN MPS AND BPS

Age Group	*Rural Areas*		*Towns*		*Bangalore city*	
	MPS	*BPS*	*MPS*	*BPS*	*MPS*	*BPS*
	Currently Married Women					
15-24	1.3	1.3	1.3	1.3	1.3	1.4
	(1653)	(802)	(421)	(282)	(1638)	(270)
25-34	3.8	4.0	3.8	3.4	3.4	3.4
	(1398)	(810)	(327)	(378)	(1469)	(372)
35-44	5.7	5.9	6.2	5.7	5.4	5.2
	(754)	(519)	(217)	(208)	(830)	(232)
45 +	5.8	5.8	6.7	6.2	5.9	5.8
	(873)	(434)	(263)	(146)	(1164)	(147)
All age groups	3.6	3.9	4.0	3.7	3.6	3.6
	(4678)	(2565)	(1228)	(1014)	(5101)	(1021)
	Ever Married Women					
15-24	1.3	1.3	1.3	1.3	1.3	1.4
	(1722)	(825)	(440)	(288)	(1698)	(276)
25-34	3.5	3.9	3.6	3.4	3.2	3.4
	(1674)	(873)	(382)	(394)	(1661)	(384)
35-44	4.9	5.6	5.6	5.6	4.9	5.2
	(1165)	(604)	(294)	(247)	(1091)	(258)
45 +	4.8	5.3	5.6	5.9	5.3	5.7
	(1633)	(689)	(461)	(224)	(1839)	(200)
All age groups	3.4	3.9	3.9	3.9	3.6	3.7
	(6194)	(2991)	(1577)	(1153)	(6289)	(1118)

SOURCE : For currently married women, United Nations (1961), Table 10.4, p. 115 for MPS and worksheets for BPS. For ever married women, see Table 1.

Notes : 1. The mean number of children born given under currently married women for MPS refers to women married only once, and currently married if they were under 45 years of age and if over 45 years their marriage lasted at least till they were 45 years old.

2. Figures in parentheses refer to the number of women used in calculating the means.

the rural areas. Such closeness in seen in all age groups and is in great contrast to the data given in Table 1 for ever-married women. In towns there was even a reversal in the age groups 35-44 and 45 +, the MPS averages now being actually higher than those given by the BPS. A similar feature is also seen in the case of Bangalore city. This complete change-over is no doubt a reflection of

the pitfalls that might arise while comparing the mean number of children born to ever-married women, ignoring their marital histories when the effect of the taboo on widow remarriage on fertility is quite pronounced.

(b) Effect of Remarriage of Widows

As stated earlier, the Mysore Population Study obtained data on the number of times ever-married women had married, if more than once. Assuming that women who had married more than once were either widowed or separated when they remarried, it was possible to estimate the proportion of widowed/separated women who had remarried. Remarriage after widowhood/separation was more frequent in rural areas, as compared with towns, and as a rule was the least in Bangalore city. There was evidence that women under 35 years at the time of the survey had married more than once more frequently than women who were in the 35-44 age group.[6] About 24 per cent of women in the rural

TABLE 6—ESTIMATES OF EVER WIDOWED OR SEPARATED WOMEN REMARRIED ACCORDING TO MPS

Marital Status at the time of MPS	*Rural Areas*			*Towns*			*Bangalore city*		
	Age at the time of Survey			*Age at the time of Survey*			*Age at the time of Survey*		
	15-24	*25-34*	*35-44*	*15-24*	*25-34*	*35-44*	*15-24*	*25-34*	*35-44*
I Currently married (married once only)	1653	1398	754	421	327	217	1638	1469	830
II Currently married (married more than once)	14	60	46	2	7	5	3	15	21
III Widowed or Separated (once married only)	53	210	358	17	48	72	56	177	238
IV Widowed or Separated (married more than once)	1	5	7	—	—	—	1	—	2
Percentage of widowed/separated, who had remarried (sum of II & IV divided by sum of II to IV, multiplied by 100)	22.1	23.6	12.9	10.5	12.7	6.5	6.7	7.8	8.8

SOURCE : United Nations (1961), Table 10.4, p. 115.

Note : Women of category II, currently married (married more than once) are assumed to have been widowed or separated before their second marriage.

6. The proportion of women who had married more than twice was small when reckoned against those who had married more than once. The maximum proportions were in Zones I and II where they amounted to 10 and 5 per cent respectively (United Nations 1961, TabJe 9.21). Marriages of third or higher orders were particularly absent in rural plains, towns and Bangalore city.

areas aged 25-34 years who had become widowed/separated had married again compared with about 13 per cent in towns and 8 per cent in Bangalore city (Table 6). It was not possible to differentiate the experience of widows from those separated, but as the proportion of separated women among the widowed or separated was 23 per cent in Bangalore city, 14 per cent in towns and 20 per cent in rural plains (United Nations 1971, footnote on page *83),* the figures cited above can be assumed to give a fair idea of the frequency of remarriage among widows at the time of the MPS.

Recently Bhat and Kanbargi (1984) have outlined a procedure for estimating the incidence of widow remarriage from census data. Their method does not **give** an estimate of ever-remarried among the ever-widowed but only that of widows who are currently remarried i.e., the estimate does not include those who had remarried and are currently widowed. Our estimates given in Table 6 include remarried widowed/separated women who were currently widowed/-separated *at* the time of the MPS Since we will be applying Bhat and Kanbargi's model to estimate the incidence of remarriage using the BPS data, we have recalculated the rates given in Table 6 to give MPS data which will be in conformity with those derived using Bhat and Kanbargi's procedure. The revised figures are given in Table 7.[7] It is worth noting from Tables 6 and 7

TABLE 7—PERCENTAGE OF WIDOWED OR SEPARATED WOMEN WHO HAD REMARRIED ACCORDING TO MPS (MODELLED ON BHAT AND KANBARGI'S ASSUMPTION)

Age group of widowed or separated women	*Rural Areas*	*Towns*	*Bangalore city*
15-24	20.6	10.5	5.0
25-34	21.8	12.7	7.8
35-44-	11.2	6.5	8.0

Note : Women who were widowed or separated and had remarried bul were currently widowed or separated at The time of the MPS are excluded from those remarried. Reference Bhat and Kanbargi (1984).

that the frequency of remarriage of widowed/separated at the time of the MPS was highest in rural areas, less in towns and the least in Bangalore city. The indications were that remarriage of widowed/separated women was culturally

7. Bhat and Kanbargi's method on" estimating remarriage among widows, as explained in the text, excluded those who after remarriage were r.gain found widowed at the time of the census. The estimates given in. Table 7 are in keeping with this procedure for widowed/separated women. Bhat and Kanbargi's method provides estimates for remarriage among widows while MPS provided estimates for widowed; separated women taken together.

more acceptable among those living in rural areas than among those living in urban areas. At the same time it would appear even at the time of the MPS, that it was becoming more frequent among the younger women in both rural and urban areas.

Using Bhat and Kanbargi's model, the estimated proportion of the remarried among the ever-widowed was worked out using the BPS data and the estimates obtained are presented in Table 8.[8] Comparing the remarriage rates as given in Tables 7 and 8, there is strong evidence of an increase in the frequency of

TABLE 8—ESTIMATED PROPORTION OF REMARRIED **AMONG** EVER-WIDOWED IN BPS USING **BHAT** AND KANBARGI'S **MODEL**

Age group	*Rural areas*	*Towns*	*Bangalore city*
15-24	18.6	34.7	39.1
25-34	44.9	66.6	77.1
35-44	52.3	42.4	67.1

remarriage of widows between MPS and BPS. The urban areas which had recorded lower remarriage rates as compared with rural areas in MPS, had reversed the position by the time of BPS, particularly in the younger age groups. In course of time when the younger age cohorts get older, it is very likely that the remarriage rates among widows will be markedly higher in urban areas.

The effect of widow-remarriage on fertility is not as great as might be expected from the high remarriage rates recorded by the BPS. For instance, Bhat and Kanbargi estimated (taking the demographic trends in India upto 1971 into account) that the increase made towards a total fertility of around 6.0 by allowing remarriage would be 0.4 children as compared with a situation where no remarriage is allowed. In fact, they were dealing with remarriage rates which were much higher than even the ones recorded by BPS. We are actually interested in the increase in fertility arising from the increase in widow-remarriage rates between MPS and BPS.

The MPS (Table 10.4) showed that while non-remarriage of widow had a significant effect in reducing fertility, the remarriage of widows could not bring their fertility to the level of those who remained continuously married throughout their reproductive life. On the other hand remarried women had on an

8. In making this estimation it was assumed that the proportion of never widowed among ever-married as given by Bhat and Kanbargi for ages less than 20 applied to the age group 15-19. A second-order parabola was assumed to convert the proportions given in quinquennia! age-groups to decennial age-groups. Further the MPS ratios of'separated' to 'widowed or separated' were assumed to apply to the BPS data viz., 20 per cent for rural areas 14 per cent for towns aud 23 per cent for Bangalore city.

average more children than women who did not marry after their widowhood. Using the data provided by **MPS** and BPS and the widow remarriage rates obtained as indicated above, the increase in total fertility in rural areas, towns and Bangalore city for women aged 35-44 years, for example, is estimated as no more than 0.1 child.[9]

Differences in Current Fertility Rales between MPS and BPS

The exercise conducted by Srinivasan *et al.* (1977, 1978} clearly suggests the need for extreme caution in attaching significance to the differences in marital age specific rates given in two surveys. The number of women surveyed in BPS was particularly low in the rural hills. The BPS marital fertility rate in the age group 15-19 in this area was based on the record of 22 currently married women; the rate of 448 for this age group when compared with 282 given by the MPS was not found to be statistically significant even at the 5 per cent level of the Chi-square test. **In** fact, none of the differences in the age specific marital fertility rates in the other five age groups was found to be statistically significant at this level. An overall test taking into account the differences for all the age-groups also failed to reveal any statistically significant difference in the rates given by the two surveys.[10]

Srinivasan *et al.* (1978) had pointed out that marital fertility rates in the age group 15-19 had increased in three areas, the exception being Bangalore city. **We** have already indicated that the rates did not differ significantly in the rural hills. The difference was negligible in the rural plains, the rates being 277 in MPS and 282 in the BPS. Only in the case of towns was the diffenence statistically significant, the Chi.-square test showing a value between the 1 per cent and 5 per cent significance levels. The city has recorded almost the same rates in the two surveys in the age group 15-19. In the age-group 20-24, although the BPS recorded higher rates in all the four areas, the difference was statistically significant only in the case of Bangalore city.

A detailed comparison of the age specific mariial fertility rates given by the BPS with those given by the MPS reveals a significant rise in the rates for the 15-19 age group in towns and 20-24 age group in Bangalore city. Another feature which stands out is the lowering of the rates in the three age groups 30-34, 35-39 and 40-44 in the towns and Bangalore city and a similar feature

9. Women in the age-group 35-44 in BPS were divided into the following three groups using Bhat and Kanbargi's model : (1) Women who were continuously married (2) Women who had become widowed and had remarried and (3) Women who had become widowed but had not remarried. The MPS data on the mean number of children born for the three groups were used to determine the effect on fertility of changes in the remarriage pattern of widows.

10. The sum of the Chi-squares for the six age groups, each worked out separately, was 7,22 with 6 degrees of freedom; the probability of getting a higher value of Chi-square is about 0.30.

in the age groups 35-39, and 40-44 in rural plains. It is difficult to attach much significance to the other differences in the rates recorded by the two surveys and as pointed out above the comparison for the rural hills suffered from the small number of women surveyed by the BPS m this area.[11]

A plausible explanation of the increase in the age specific marital fertility rates in the younger age groups, particularly in towns and Bangalore city, is the increase in age at marriage of females noted earlier (Table 3).[12] Especially in countries like India where age at marriage of females is low, an increase in age at marriage has a significant effect in shortening the interval between age at cohabitation and age at termination of first pregnancy (Chandrasekaran and George 1962).[13] Adolescent sterility is one of the main reasons for this trend. In fact, Jain (1969), using the data on conception delays in Taiwan, has shown that mean fecundability increases up to age of 21 years, remains constant at that level for a few years and then declines. The effect of such indirect influence of an increase in age at marriage of women on the pattern of fertility in the Indian situation becomes particularly important while considering changes in age-specific marital fertility rates which deal with the fertility performance of different birth cohorts. While accepting the possible positive influence of the increase in age at marriage of females on age specific fertility rates of younger women, Srinivasan *et al* (1978) point to a number of other factors attributable to the effects of modernization. Chief among these is the increase in fecundability, particularly due to the eradication of malaria.

The history of malaria in the past few decades hardly supports this contention. The control of malaria in the princely Mysore state is of long standing. Malaria had been prevalent chiefly in the canal-irrigated areas of Mandya district, not included in the BPS area and in the foot-hills of Malnad, only a small part of which was included in the BPS. As stated in the Mysore Population Study (United Nations 1961, p. 12), 'A planned programme of permanent engineering works and a recurrent programme of D. D. T. spraying to eliminate malaria transmission have been initiated in areas where irrigation has already created a malaria problem. The control of malaria in the foot-hill of the Malnad continued to be a serious problem till the advent of residual

11. It has already been pointed out that the rural hills area **covered** by **the BPS did** not bear much resemblance to that surveyed by the MPS. It should also be remembered that the towns **of** the **BPS were** much larger than those covered by the MPS.

12. The tempo of the increase in age at marriage of females in Karnataka is shown by the following estimates obtained from the data given by the censuses; about 16.5 years for 1961, 18-0 years for 1971 and 19-4 years for 1981 (Family Welfare Programme in India, Year Book 1976-77 and 1982-83).

13. In a study of three groups of Hindu women, 'upper' and 'lower' middle class women from Calcutta city and a group of rural women from Singur near Calcutta aged 25-34 years at the time of survey, the average ages at Cohabitation for these groups were 17.2, 14.4 and 11.4 years respectively and fix average age at first pregnancy termination 19.5, 18.0 and 16.6 years respectively.

insecticides. A pilot scheme of D. D. T. spraying was initiated in 1946 and on the basis of the experience gained a comprehensive scheme was prepared and sanctioned ay the Government in February 1949. As a result, a sharp decline in malaria mortality rates appears to have occurred. The spleen rates which varied from 50 to 80 per 100 persons examined have dropped to a figure around 10'. The MPS also showed that the birth rate for 1950-51 did not differ significantly between Zone I (Rural hills with anti-malarial operations) and Zone II (Rural hills without anti-malarial operations) being 44.4 and 44.7 respectively, and that the birth rate in the rural hills was actually higher than in the rural plains, viz., 39.9 (United Nations, 1961, p. 78). The loss of fecundability due to malaria in Malnad, if any, had disappeared by 1951.

By the time the **BPS** was undertaken, malaria, which had been virtually eradicated in India, became active again. The National Malaria Control Programme which was established in 1953 was followed by the National Malaria Eradication Programme in 1958, and Karnataka like other states participated in these programmes. Malaria had been practically eliminated from the state during the last years of the decade ending in 1970 and 81 per cent of the state had entered the maintenance phase. But thereafter there was a resurgence of the disease in the state as elsewhere in the country. The number of cases in the state increased from about 39,000 in 1971 to 465,000 by 1976 and declined subsequently (Rudrappa 1977). Therefore, if malaria did affect fecundity, the situation in (he BPS area *was* worse around 1975 when the survey was undertaken than at the time of the MPS.

There are further indications that the fecundity in Karnataka state was about as high as can be expected in healthy populations when there is no specific attempt to control fertility. The Mysore Population Study had found that the interval between the first and the second births was 30.6 months in Bangalore city and 32,5 months in rural plains. For births upto the fourth order the interval was about 29 months; higher order intervals were smaller but are likely to have suffered from 'truncation effect as the women who were interviewed were currently married and were between 18 and 33 years of age at the time of the survey. In order to avoid the effect of possible adolescent fertility as well as of 'truncation effect', the birth interval between the second and third births was selected for estimating mean waiting time for conception. The avciitgc waiting time for conceptinn was found to be 7.8 months for Bangalore city and 7.9 months for rural plains.[14] These estimates are in keep-

14. The waiting time to conception was estimated using the following assumptions derived mainly from the MPS and a study done in Ramanagaram situated 30 Kms. from Bangalore city at about the same time as the MPS (Chandrasekaran 1963) : Infant Mortality Rate 110 for Bangalore city and 140 for Rural Plains; lactation amenorrhoea for surviving infants 12 months; for infants who died average length of life 4.2 months and lactation amenorrhoea 2 months; proportion of pregnancies ending in foetal loss following conception after live birth 015 for Bangalore city and 0,10 for rural plains ; gestation period for foetal Joss 3 months and for a live birth 9 months. No woman was assumed to have had both an infant loss and a foetal loss in the interval between birth.

ing with the experience recorded by non-contracepting populations in Western countries and in Taiwan (Bongaarts and Potter 1983 and Jain 1969).

While there is no evidence that fecundability could have increased, it is also of relevance to examine if some cultural practices which might have suppressed fertility in the past are slowly disappearing due to modernization. Srinivasan *et at.* (1978) have referred to the practice of prolonged separation from the husband after delivery when it takes place in the parental home of the wife, causing delay in the resumption of sex relations, and to the practice of prolonged breast feeding of infants which tends to extend the duration of lactation amenorrhoea. The MPS had collected data on both practices but those on the first only are available in the report (United Nations, 1961, p. 135). The finding was that 54 per cent of women in Bangalore city and 61 per cent in the rural plains ha3 gone to their parents' homes for the first delivery. For the second and subsequent pregnancies the percentage was lower averaging about 12. This practice has not shown any change since MPS.[15] The influence on fertility of this and the related factor of taboo on sex relations after delivery could not have been substantial even at the time of the MPS in view of the long durations of lactation amenorrhoea.[16] There is not much evidence that either the length of breast feeding or the length of lactation amenorrhoea is being reduced substantially, in the population as a whole. Prema *et al.* (1979) made a study of women belonging to a low income urban group who had never used contraception, and who attended a hospital in Hyderabad, the capital of the neighbouring state of Andhra Pradesh. The mean duration of lactation was found to be 19.8 months and the mean duration of lactation amenorrhoea was 11.1 months, A recent study of the Nutrition Foundation of India, in three metropolitan cities and in villages in their hinterland, has come up with the finding that breast feeding is maintained for a long period. At the age of 12 months more than 85 per cent of the surveyed infants in Bombay, more than 90 per cent in Calcutta and more than 70 per cent in Madras were still receiving breast milk (Gopujkar *et a!.* 1984). The likelihood of the length of lactation amenorrhoea having declined markedly in the last few decades in India seems remote.

One factor which can be suspected as influencing marital fertility rates without any change in fecundability is the decrease in infant mortality rate. Srinivasan *et al.* (1978) reported that infant mortality had dropped sharply in Karnataka between 1951 and 1970. The rates reported for I95J were 168 per 1000 live births for rural plains and 101 for towns; in 1970 the rates were 101

15. As part of a longitudinal study on infant mortality, a survey was conducted in the EPS (rural) area on the place of delivery and its relationship to the order of pregnancy. The findings were similar to those obtained in the MPS (Badari *et al.* 1978).

16. A study in Karnataka found that in the rural areas 80 per cent of persons interviewed reported avodiance of sex for six months or more after child birth. (Chandrasekaran, 1952).

in rural and 73 in urban areas. Model studies, such as the one mentioned earlier, for estimating fecundability at the time of the MPS using data on lactation ammenorrhoea, abortion rate etc., as then prevalent do not show a significant change in the spacing between births arising because of such changes in infant mortality rates. Hence, such changes are not likely to have played an important part in modifying marital fertility rates.

Effect of Family Planning Programme

The princely state of Mysore was a pioneer in India in the provision of family planning services; the first two official family planning clinics in the country were set up as early as in 1930, one in Bangalore city and the other in Mysore city. The state took up family planning as one of its important activities in the mid-1950s as part of the National Family Planning Programme and it was to make the programme more effective through the development of innovative research that the World Bank-sponsored India Population Project was set up. The BPS was part of the efforts made to obtain baseline data for this project shortly after it went into operation. As such, the achievement of the family planning programme at the time of the BPS was that which could be expected under the normal state activity. The reduction in age specific marital fertility rates among higher age groups in both towns and Bangalore city between the MPS and BPS is in keeping with this expectation.

Both the MPS and BPS included questions to on contraceptive history; but the data presented in the reports are meagre as the practice of family limitation methods was quite low particularly in the MPS. The data available for comparing MPS and BPS refer only to *ever-use* of contraception by currently married women. In Bangalore city, in the MPS, women in the age group 18-33 reported 9,5 per cent of ever-use of contraception (12.4 per cent if the positive responses of the wife and'or husband are taken together); in the BPS ever-use as reported by women in the age group 15-34 was 31.5 per cent. While abstinence was the main method used at the time of the MPS, its use was negligible in the BPS; use of condom, IUD and male and female sterilisations was reported in the BPS. In the rural areas MPS had recorded ever use of 2.3 per cent for 18-33 age group; the method was abstinence. In the BPS the corresponding figure was 16.7 per cent; the methods were mostly other than abstinence (United Nations, 1961 : Table 12.10, p. 167 and Srinivasan *et al* 1978 : Table 12, p. 269).

Unfortunately we do not have comparative data on current practice from MPS and BPS. However, Srinivasan *et al.* (1978) indicated that a decline of 10 per cent in general marital fertility rate might have occurred at the time of the RPS because of the family planning programme. Due to the exclusion of the non-programme effects and the lack of knowledge of the efficacy of abstinence as practised at the time of the MPS, it is difficult to assess the effect of chan-

ges in family planning practice on the levete of marital fertility between the MPS and BPS.

The effect of family planning practice on the fertility of the younger age-groups is of particular interest but we can only surmise this change. In the younger age groups especially, below 25 years, it is reasonable to expect the use of spacing methods such as condom and IUD. These methods have low continuation rates; they do not in the Indian situation, affect fertility markedly, A study by Srim'vasan *(1978)* showed that the births averted in 1971 due to the cumulative effect of *the national* family planning programme in Karnataka was about 1 per cent in the age-group 15-19, 4 per cent in the age-group 20-24 and JO per cent in the age-group 25-29. In the age-groups 30-34 and 35-39 the births averted were about 20 per cent and in the age-groups 40-44 and 45-49 they were somewhat lower, ft woufd therefore appear that the effect of the family planning *programme in th&* age-groups 15-19 and 20-24 in BPS would not have been significant.

Summary and Concluding Remarks

At *least* three decades have passed since views were expressed to the effect that the Indian demographic situation had built-in forces, essentially cultural in nature, which were operating to keep fertility relatively low and that such forces were likely to be weakened as a result of social and economic development (Chandrasekaran, 1954). It was therefore pointed out that development might tend to increase fertility, in some ways, though it was generally accepted that its effect would be to lower fertility in the long run.

Srinivasan *et al.* (1977, 1978) used the data obtained in the BPS Conducted jfl 1975 for studying fertility changes attributable to modernization over a 24-year period since the MPS was conducted in about the same area in Karnataka state. *Their somewhat tentative* conclusions have been considered in this paper, by harnessing some of the available data bearing on changes in cultural factors influencing fertility in the Indian context and assessing quamitativcly their effect on changes in fertility in Karnataka.

Srinivasan *et al.* (1977, 1978} had focussed their attention on cumulative fertility and current *fertility.* The cumulative fertility as measured by the mean number of children ever born per *ever married* woman had shown an increase, or remained at the same level, in every age group in every area studied in BPS and MPS. Current fertility, as reflected by age-specific marital fertility rates, showed in general an increase in the younger age groups and a decline in the higher. *The noted increase in fertility* was attributed to an increase in the potential fertility of women due to the relaxation of the traditional checks on fertility such as prolonged breast-feeding, prohibition of sexual intercourse on certain days for religious or social reasons and taboo on widow remarriage. Better health, in particular due to the eradication of malaria, was suggested as a pro-

bable factor in increasing fecundability. The emphasis placed on an increase in potential fertility was such that Srinivasan *et al.* (1978) felt that its effect might be large enough to counter the initial effects of the national family planning programme.

Our analysis of the number of children born to ever-married women in BPS considered two categories viz., (I) women who were currently married at the time of the survey and (2) women who were widowed or separated at the time of the survey. It showed that the mean number of children born to women who were currently married in the BPS bore a close resemblance to the number born to women who were continuously married in the MPS. As the currently married women in the BPS included women who might have married more than once the mean number of children given by BPS would have been affected by the changes in the frequency of remarriage, particularly of widows. It revealed that the remarriages which were frequent in rural areas at the time of the MPS had become more common in urban areas during the interval between MPS and BPS, However, it was found that changes in the practice of remarriage of widows had only a trivial effect on cumulative fertility. In summary the chief factor which led to an increase in the cumulative fertility of ever-married women between MPS and BPS was the improvement in health conditions causing less and delayed widowhood.

Srinivasan *et al* (1977, 1978) had pointed to the higher age specific fertility rates as given by the BPS, particularly in the 'rural hills'. The non-comparability of the BPS and M PS areas included under this region and the small number of women surveyed by BPS in this region stand in the way of attaching much importance to the differences noted, which were also not statistically significant. The genera 1 thesis that 'potential fertility' of married women might have increased particularly due to the control of malaria or due to the break-up of cultural taboos does not stand close scrutiny. The history of malaria in the region does not support but goes counter to the hypothetical increase of fecundity between MPS and BPS. Besides, the fecundity of the married women even at the time of the MPS was practically as high as that expected in healthy populations, if the long periods of amenorrhoea is taken into account. The main cultural practice leading to long birth intervals in the given setting is prolonged breast-feeding which indirectly increases the length of the post-parcum amenorrhoea. However, the evidence that we have from studies conducted in various parts of India, does not sho\fr such marked decline in the length of breast-feeding as to reduce the duration of lactation amenorrhoea markedly and hence lead to shorter birth intervals. Another cultural practice of prolonged separation of the spouses after child birth was not of much significance even at the time of MPS except for the first parity; the available evidence indicates that this pattern had not changed over the past two decades.

The main differences in age specific marital fertility rates between the BPS and MPS viz,, the higher rates observed in the BPS in the younger age groups

(15-19 and 20-24) in the towns and Bangalore city and the lower rates given by BPS in the more advanced age groups in these two areas, can be explained in terms respectively of the increase in the age at marriage of females and the adoption of family planning methods, particularly sterilization. Even in the rural plains similar tendencies are noticeable.

What then has been the effect of 'modernization' on Karnatafca's fertility? The present study indicates that much importance need not be attached to an increase in 'potential fertility' or to 'fecundability.' Changes brought about by an increase in the age at marriage of women would have tended to change the fertility pattern in the younger age groups and were probably responsible for the higher, though not always statistically significant increase in age specific marital fertility rates in these age groups. This reanalysis of the available data does not yield any evidence of changes in other cultural factors which would have led to a marked increase in fertility in the younger age groups.

In conclusion, the increase in cumulative fertility between the MPS and the BPS is mainly due to the indirect effect of a reduction in mortality lessening the incidence of widowhood and not to any increase in 'potential fertility' due to the lessening of the more important cultural taboos that had kept fertility low. The increase in the age at marriage of females is certainly causing an increase in the marital fertility rates of the younger age groups; and in response to the family planning programme, the fertility in the higher age groups has declined. The changes in the pattern of marital fertility rates between MPS and BPS are in keeping with the expectation that modernization in the long run will reduce the total fertility.

While there is a need for appreciating changes in cultural practices affecting fertility in the Indian setting brought about by modernization, quantitative measurement of their influence on fertility is extremely important. In particular, assessment of the effects of the changing pattern of marriage and remarriage require more attention than they have received hitherto. Further there is an urgent need for obtaining data relating to changes in the practice of breast-feeding and its effect on Jactation amenorrhoea and, therefore, on fertility. The need for such studies gets further strengthened since interest in the evaluation of the effect of the national family planning programme on fertility has greatly increased.

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APPENDIX

COMPARISON OF AREAS COVERED BY MPS (1951) AND BPS (1975)

Designations of areas included	*Areas included*		*Number of households Surveyed*	
	MPS	*BPS*	*MPS*	*BPS*
Zone I Rural Hills (villages with large scale anti-malarial operations	*Parts of* Chikmagalur, Hassan, Shimoga and Mysore districts	Shimoga district only	*1137*	308
Zone II Rural Hills (villages without large-scale anti-malarial operations)	—do—		*1571*	
Zone III Rural Plains (tank-irrigated areas)	Bangalore, Kolar and Tumkur districts, and parts of Mandya and Hassan districts	Bangalore, Kolar and Tumkur districts	2202	1793
Towns	15 towns in Zones I, II and III with population size 10,000 to 25,000 in 1951	Chitradurga town, Kolar town, Shimoga town and Tumkur town, all headquarters of the districts	1274	986
Bangalore city	Bangalore city	Bangalore city	4479	966

Note : The relatively more comparable areas of MPS and BPS were Bangalore city and Rural Plains. None of the four towns surveyed for BPS was included in the MPS. The area covered by BPS in Rural Hills, i.e., Zones I and II combined was only a small fraction of that covered by MPS. Chitradurga Rural area, included in BPS is not shown because it was not included in the comparative analysis of MPS and BPS. Referring to the four towns included in the BPS, the *Occasional Papers Series* No. 2 states on page 4 "These four district headquarters towns, each of which had a population of 10,000-25,000 in 1941, were included in the universe of towns of the MPS. Hence the towns of the MPS are compared with the four district headquarters of the BPS". Actually the size range 10,000-25,000 for towns fixed for MPS referred to 1951 and none of the headquarters towns was included in the MPS. Shimoga town erroneously listed as a town chosen for the Mysore Population Study (United Nations 1961, p. 430) had a population of 27,712 even in 1941; actually Sagar was chosen from this district.