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Demographic Transition in the South: A Regional Perspective

Introduction and Objectives of the Study

THROUGH the latest 1991 census findings did not bring any cheer to the nation, they were not totally disappointing either. For the first time since independence the country did witness a decline in the annual population growth rate compared to the previous decade even though that decline was very marginal (from 2.2 per cent per annum during 1971-81 to 2.1 per cent during 1981-91). The absolute annual increment to the country's population went up to 18 million in 1991 from 15 million in 1981. However, the demographic scenario at the aggregate level may conceal more than what it reveals. At the state and district level we can discern more interesting patterns than what has been observed at the national level. As has been pointed out by Visaria, "in a large country such as India, a disaggregated analysis is certainly necessary and can be expected to provide some useful insights" (Visaria, 1991). Similar views were expressed when the 1981 census figures were released. For example, Dyson had pointed out that there were substantial variations between states in the intercensal (1971-81) growth rates and also the range of interstate growth rates appears to have increased somewhat since the 1961-71 decade (Dyson, 1981). After analysing intercensal variations in population growth, Rao had emphasized that special attention should be paid to the individual states and interstate variations for the purposes of formulating national policy. This requires a thorough study of the demography of each individual state in respect of the role played by historical, economic, sociological, cultural, developmental and political factors (Rao, 1981).

It is the contention of this paper that much more interesting patterns can be observed by regions within each state and by districts as large variations tend to persist and these

patterns do merit some detailed discussion and analysis. Hence, the present study has tried to look at the following:

- (a) the historical patterns of population growth in the country and among the states in the-southern region viz., Andhra Pradesh, Karnataka, Kerala and Tamil Nadu,
- (b) the regional patterns within each state (regions and districts) in the south,
- (c) the major factors that have contributed to the behaviour in the population growth rate within each state and its regions,
- (d) plausible explanations for the demographic transition in the south, and
- (e) the emerging conclusions.

The main sources of data for the study have been taken from different census reports including the latest count of 1991. In addition, data from several surveys conducted at the state and regional levels have been made use of.

Historical Patterns of Population Growth in India and in Southern States

The share of southern region in the total population of the country stands at 23 per cent with 19 per cent of the total geographic area. Andhra Pradesh is the largest state in terms of both area and population and Kerala is the smallest. Population density is higher in the south compared to the country and also has a more favourable sex ratio (979 against 927 for India). The proportion of population resident in urban locations is close to 30 per cent in the south compared to 26 per cent for the country as a whole. These data are shown in Table 1.

From the beginning of this century one can distinguish three broad periods with regard to patterns of population growth in the country. During the first thirty year period (1901-1931), population growth was low (less than one per cent) or negative. Since 1931 population growth rate picked up but remained less than 2 per cent up to 1961. During the last thirty year period (1961-1991) it has remained over 2 per cent. As a result, the annual increments to the country's population have been increasing since 1930. The highest growth rate ever recorded was during 1961-71 even though that was not much different from that of 1971-81.

Compared to All India growth rates southern region as a whole did experience a relatively higher growth in the pre-Independence period and lower growth since then. During the last two decades, while the annual growth rate in the country has remained over 2 per cent, growth rate in the southern region has become less than 2 per cent. These patterns can be clearly seen from Table 2.

One of the fastest growing states in the country as well as in the southern region till 1971 has been Kerala as can be seen from Table 2. This state has experienced a sharp decline in its growth rate during the last two decades. The recent decline has been substantial and hence has been the subject of much discussion and debate not only at the national level but also in the international circles. During the last ninety year period the population

of Kerala has quadrupled indicating the highest growth experience. The other two important demographic features of Kerala have been its higher density and sex ratio with females outnumbering males. At the time of 1991 census, population density in Kerala stood at 749 persons per sq km as against 257 in the country. The sex ratio was of the order of 1036 in Kerala in contrast to 927 in India.

TABLE 1: AREA, POPULATION DENSITY, SEX RATIO AND PERCENT URBAN FOR THE STATES IN SOUTHERN REGION, 1991

<i>State</i>	<i>Area (in sq km)</i>	<i>Population</i>	<i>Density of (per sq km)</i>	<i>Sex Ratio</i>	<i>Population Per Cent Urban</i>
Andhra Pradesh	275,045 *43.26 **8.37	66,508,008 33.86 07.86	242	972	26.89
Karnataka	191,791 30.17 583	449,77,201 22.89 5.31	235	960	30.92
Kerala	38,863 611 118	29,098,518 1481 3.44	749	1036	26.39
Tamil Nadu	130,058 20.46 3.96	55,858,946 28.44 6.60	429	974	34.15
Southern Region	635,757 100.00 19.34	196,442,673 100.00 23.21	309	979	29.81
All India	3,287,263 100.00	846,302,688 100.00	257	927	26.13

* Percentage to the total of Southern Region.

** Percentage to the total of All India.

Source: A. R. Nanda, Registrar General and Census Commissioner, India, Census of India-1991, Series-1, India.

Paper 1 of 1992, Vol. 2, Final Population Totals.

Tamil Nadu, on the other hand, has experienced relatively lower population growth among the states in the south. Except during 1961-71, the annual growth rate in the state has never exceeded 2 per cent. The total population of this state has increased by two and half times during the last ninety year period. During the last census decade its annual growth rate has been less than 1.5 per cent closely behind Kerala. As a result, Tamil Nadu experience has become the focus of attention in recent years. Excepting Kerala, density and sex ratio in Tamil Nadu are higher compared to other southern states and India—a density of 429 persons per sq km area and a sex ratio of 974 females per 1,000 males. Among the southern states, Tamil Nadu is the most urbanised state even though it ranks third among all the major states in the country.

TABLE 2: DECADEAL VARIATION OF POPULATION BY REGIONS FOR SOUTHERN STATES, 1901-1991

State/Regions	1901-11	1911-21	1921-31	1931-41	1941-51	1951-61	1961-71	1971-81	1981-91
1. Andhra Pradesh	+12.49	-0.13	+12.99	+12.75	+14.02	+15.65	+20.90	+23.10	+24.20
	*(11.84)	(-0.13)	(+12.99)	(+12.07)	(+13.21)	(+14.65)	(+19.16)	(+20.72)	(+21.67)
Coastal Andhra-9	+9.34	+3.82	+11.89	+11.65	+13.16	+14.43	+18.27	+19.97	+21.02
Rayalseema-4	+4.52	-0.85	+10.05	+11.24	+11.42	+17.18	+20.41	+20.56	+21.40
Telangana-10	+21.67	-3.79	+16.20	+15.04	+16.61	+16.46	+24.60	+27.35	+29.27
2. Karnataka	+3.60	-1.09	+9.38	+11.09	+19.36	+21.57	+24.22	+26.43	+21.12
	(+3.55)	(-1.10)	(+9.01)	(+10.57)	(+17.85)	(+19.72)	(+21.92)	(+23.73)	(+19.16)
Coastal & Malnad-5	-0.51	-1.11	+5.71	+7.81	+17.24	+32.67	+24.19	+24.33	+13.13
Northern-Maidan-7	+3.15	-4.98	+9.96	+11.05	+15.60	+19.27	+22.53	+23.60	+23.00
Southern Maidan-8	+6.44	+3.35	+10.42	+12.81	+24.25	+19.55	+25.90	+30.15	+22.62
3. Kerala	+11.75	+9.16	+21.85	+16.04	+22.82	+24.76	+26.29	+19.24	+14.32
	(+11.17)	(+8.80)	(+19.96)	(+14.98)	(+20.77)	(+22.37)	(+23.61)	(+17.55)	(+13.38)
Malabar-6	+9.85	+3.17	+13.23	+12.19	+21.51	+23.37	+30.81	+25.29	+20.34
Cochin-2	+13.31	+7.50	+24.41	+18.58	+20.65	+20.95	+26.93	+15.79	+11.65
Travancore-6	+16.07	+17.65	+28.94	+19.18	+25.18	+27.96	+22.14	+14.95	+9.79
4. Tamil Nadu	+8.57	+3.47	+8.52	+11.91	+14.66	+11.85	+22.30	+17.50	+15.39
	(+8.26)	(+3.42)	(+8.21)	(+11.32)	(+13.78)	(+11.26)	(+20.33)	(+16.02)	(+14.32)
Madras-5	+10.23	+2.30	+10.57	+11.00	+14.35	+11.82	+26.00	+21.41	+18.91
Salem-5	+5.46	+4.88	+13.30	+16.75	+18.59	+13.66	+22.73	+17.01	+14.88
Madurai-5	+8.47	+2.06	+3.43	+10.84	+15.55	+9.40	+20.53	+14.99	+13.75
Kanniyakumari-5	+9.51	+6.21	+8.42	+9.75	+9.22	+13.59	+18.45	+14.99	+12.15
5. Southern Region	+9.09	+1.91	+11.81	+12.57	+16.50	+16.96	+22.86	+21.57	+19.38
	(+8.70)	(+1.90)	(+11.17)	(+11.84)	(+15.27)	(+15.67)	(+20.59)	(+19.54)	(+17.72)
6. All India	+5.75	-0.31	+11.00	+14.22	+13.31	+21.51	+24.80	+24.66	+23.51
	(+5.60)	(-0.31)	(+10.49)	(+13.39)	(+12.58)	(+19.78)	(+22.40)	(+22.36)	(+21.12)

Note: * Figures in parentheses are decadal exponential growth rates.

Sources:

1. A. R. Nanda, Registrar General and Census Commissioner, Census of India, 1991, Series I, India, Paper 2 of 1992, Final Population Totals: Brief Analysis of Primary Census Abstract.
2. Registrar General and Census Commissioner, Census of India, 1991, Series-I, India, Provisional Population Totals—Rural-Urban Distribution, Paper 2 of 1991.
3. Registrar General and Census Commissioner, Census of India, 1981, Series-1, India, General Population Tables (Tables A1 to A3) Part II-A (i).
4. Director of Census Operations, Census of India, 1981, Series-2, Andhra Pradesh, General Population Tables, Part II-A.
5. Registrar General and Census Commissioner, Census of India, Series 9, Karnataka, General Population Tables, Part II-A.
6. Registrar General and Census Commissioner, Census of India, 1971, Series 9, Kerala, General Population Tables, Part II-A.
7. Registrar General and Census Commissioner, Census of India, 1981, Series 20, Tamil Nadu, General Population Tables, Part II-A.

Population of Karnataka has experienced growth rates closer to that of the country. Since 1940s this state experienced a progressive increase till 1981 and during 1981-91

a substantial decline has been observed in the state. Since 1901 the population of the state has nearly trebled. While population density is much lower than its neighbours as well as India, sex ratio is higher than all India but lower compared to other states in the south.

Andhra Pradesh, has experienced growth rates closer to that of the country with one or two exceptions (1951-61 and 1961-71). Like Karnataka, its population has increased three-fold since 1901. However, among all the states in the region, Andhra Pradesh has not shown any decline in its growth rate during the last censal decade. While population density in Andhra Pradesh is similar to that of the country, sex ratio has remained at a higher level at 972.

In brief, the variations in the population growth rates since the beginning of this century have been large with Kerala on top and Tamil Nadu at the bottom. For the first time, annual growth rate in the region has come down much below 2 per cent. The variations in the growth rate during the last decade are also large with Kerala showing the lowest growth rate closely followed by Tamil Nadu. Karnataka, for the first time has also shown a sharp decline in its growth rate. The share of population of the southern region has come down to 23 per cent in 1991 from 24 per cent in 1981 sharing 19 per cent of the total geographical area. We shall now look at the regional patterns within each state.

Patterns of Population Growth by Regions and Districts in the South

There are three to four regions within each state which are homogeneous in terms of topography, cropping pattern, language spoken, cultural practices, etc., but heterogeneous in population size. Regional variations are important for the analysis as demographic, socio-economic and cultural variables are interrelated.

In Andhra Pradesh there are three regions viz., Coastal Andhra, Rayalseema and Telangana. While Telangana region contains ten districts, Coastal Andhra has nine and Rayalseema four. Consistently, Telangana has been the fastest growing area followed by Coastal Andhra and Rayalseema. Except during 1911-21 and 1951-61, growth rate in Telangana has been highest in the state. Coastal Andhra has experienced high growth till 1950s. However, after fifties, the population growth in the Rayalseema region has picked up surpassing Coastal Andhra. The fastest growing districts in the state happen to be Hyderabad city, Ranga Reddy, Khammam from the earlier periods and Vishakhapatnam and Anantapur in recent periods.

Karnataka has three regions i.e., Southern Maidan, Northern Maidan and Coastal and Malnad Regions. While Coastal and Malnad region contains five districts, Northern Maidan has seven and Southern Maidan has eight. Historically, Southern Maidan has been the fastest growing area followed by Northern Maidan and Coastal and Malnad areas. However, in the post Independence period, Coastal and Malnad areas did pick up momentum in their growth mainly due to control of malaria and opening up of new areas for cultivation and habitation. During the last decade (1981-91) substantial declines have been observed in the annual growth rate both in Coastal and Malnad and Southern Maidan

with the exception of Bangalore urban district. Districts belonging to the former Hyderabad, Karnataka and Bombay Karnataka continue to experience higher growth especially Hyderabad Karnataka area. While Bangalore and Chitradurga did experience higher growth in the earlier periods, districts such as Bidar, Raichur, Gulbarga, Bellary, Bijapur have shown higher growth in recent periods.

Kerala also has experienced large variations in population growth by regions. There are three regions namely Malabar, Cochin and Travancore. Historically, Travancore region consisting of six districts in the southern part of the state has been the fastest growing area with abnormally high growth in the earlier periods mainly because of heavy immigration. Now, it is this region which has experienced substantial decline in its growth rate since 1960s. Cochin region comprising Trichur and Ernakulam districts more or less had a similar pattern. However, Malabar region comprising six districts in the northern parts of Kerala had relatively low growth in the earlier periods but has picked up momentum since 1950s and 1960s and it has continued even in eighties.

Tamil Nadu, as mentioned already, had relatively slower growth from the beginning. There are four regions in this state, viz., Madras, Salem, Madurai and Kanyakumari. Each of these regions contain five or six districts. While Madras and Salem have been the fastest growing regions in the state, the other two have been slower growing regions. These slower growth areas in the earlier periods have shown a sharp decline in their growth in recent periods as well. It may be also worth noting here that the dry districts have relatively higher growth than the irrigated tracts of the state. Madras and Nilgiris have been the fastest growing districts in Tamil Nadu.

Historically, the fastest growing regions in the South have been Travancore in Kerala, Southern Mairdan in Karnataka, Telangana in Andhra Pradesh and Madras in Tamil Nadu. These can be seen in Table 2. Of late, the reverse seem to have happened and sharp declines have been observed in Travancore in Kerala, Southern Mairdan in Karnataka. On the other hand, Telangana in Andhra Pradesh and Northern Mairdan in Karnataka continue to experience higher growth. Geographically, they are contiguous regions including Marathwada region of Maharashtra. Demographic transition has progressed in most of the regions of the south. However, because of continued high growth in a few regions such as Telangana in Andhra Pradesh and Hyderabad Karnataka the overall growth rates continue to be moderate. Therefore, in any analysis of demographic situation in states, regional variations do need to be taken into consideration.

Table 3 provides a comparison of average annual growth rates for 1971-81 with 1981-91 period for regions in the south. The data clearly indicates that over half of the regions have experienced lower growth during 1981-91 compared to 1971-81. Out of a total of thirteen regions in the southern states, the growth rate in nine regions has declined while in the remaining four regions, it has almost remained the same or slightly increased. The problem areas stand out to be Telangana in Andhra Pradesh, former Hyderabad districts in Karnataka and Malabar region in Kerala.

TABLE 3: COMPARISONS OF AVERAGE ANNUAL GROWTH RATE OF POPULATION FOR 1971-81 WITH 1981-91 PERIOD FOR REGIONS IN SOUTHERN STATES

<i>1981-91</i>					
<i>1971-81</i>	<i>< 1.00</i>	<i>1.00-1.49</i>	<i>1.50-1.99</i>	<i>2.00-2.49</i>	<i>2.50 +</i>
<i>< 1.00</i>					
<i>1.00-1.49</i>		Madurai Region			
<i>1.50-1.99</i>	Travancore Region	Cochin Region Kanyakumari Region	Salem Region		
<i>2.00-2.49</i>		Coastal and Malnad Region	Madras Region	Coastal Andhra Rayalseema Northern Maidan	
<i>2.50+</i>			Southern Maidan Malabar Region	Telangana Region	

Analysis of Vital Rates in Southern States

Historically birth and death rates in the southern region were generally on the lower side compared to India (Mitra, 1978). However, the only exception to this general pattern appears to be Andhra Pradesh, where birth and death rates were higher in 1940s and 1950s. While decline in death rates began as early as 1930s and 1940s, the decline in birth rates is more recent beginning in 1960s and 1970s. Major differences can be observed in the spread of this decline in the southern states. For example, Kerala has recorded the lowest level of death rate which is comparable to many of the developed parts of the world. Tamil Nadu, Karnataka and Andhra Pradesh have also experienced sharp declines in death rates but have not reached the level of Kerala. Kerala and Karnataka were favourably placed in this regard in the earlier years but Karnataka has lagged behind Kerala on the mortality front. These trends can be observed in Table 4.

Decline in birth rates have been sharp both in Kerala and Tamil Nadu in recent periods and, as a result, population growth rates have also shown a substantial decline. Karnataka and Andhra Pradesh also have experienced declines in birth rates but the current rates are higher than the other two as can be seen from Table 4. The latest estimates of birth rates are available for all the states in the country from the National Family Health Survey for the period 1992-93 (NFHS, 1994). The all India crude birth rate stands at 28.9 which is very close to the SRS rate of 29.0 for the year 1992. The southern states have much lower rates ranging from 26.4 to 19.6. As expected, rural rates are slightly higher than urban rates with the exception of Tamil Nadu.

It is true that declines in birth rate will follow declines in death rates with a time lag and southern region is no exception to this rule. Initially, birth rates were about 40 and subsequent declines have followed the following pattern; (a) rate of decline in birth

TABLE 4: ESTIMATES OF BIRTH, DEATH AND INFANT MORTALITY RATES FOR SOUTHERN STATES AND ALL INDIA

Sl. No.	States	Period	Birth Rate	Death Rate	Infant Mortality Rate
1.	Andhra Pradesh	*1941-50	43.1	29.5	—
		1951-60	39.7	25.2	111
		1961-70	39.2	20.4	—
		1971-81	35.6	15.8	—
		1981-83	31.2	10.7	81
		1985-87	30.6	10.0	81
		** 1990-92	25.5	9.3	71
2.	Karnataka	NFHS	24.5	—	70.4
		*1941-50	36.9	18.9	—
		1951-60	41.6	22.2	120
		1961-70	39.9	17.6	—
		1971-81	33.8	14.1	—
		1981-83	28.4	9.2	68
		1985-87	29.2	8.7	73
3.	Kerala	** 1990-92	27.0	8.5	73
		NFHS	26.4	—	65.4
		*1941-50	39.8	20.0	—
		1951-60	38.9	16.1	120
		1961-70	37.5	13.5	—
		1971-81	26.9	7.4	—
		1981-83	25.6	6.6	34
4.	Tamil Nadu	1985-87	21.5	6.2	29
		** 1990-92	18.5	6.1	17
		NFHS	19.6	—	23.8
		*1941-50	35.7	22.8	—
		1951-60	34.9	22.5	109
		1961-70	36.8	16.8	—
		1971-81	30.8	14.3	—
5.	All India	1981-83	27.9	11.6	87
		1985-87	24.1	9.6	79
		** 1990-92	21.0	8.6	58
		NFHS	23.6	—	67.7
		*1941-50	39.9	27.4	—
		1951-60	41.7	28.8	139
		1961-70	41.2	19.2	—
		1971-81	36.6	16.1	—
		1981-83	33.8	12.1	107
		1985-87	32.6	11.3	96
		** 1990-92	29.5	9.8	80
		NFHS	28.9	—	78.5

Notes: * For 1941-50 period, data refer to Hyderabad, Mysore, Travancore, Cochin and Madras areas.

** Provisional

Sources: 1. Rayappa P. H. and Prabhakara N. R., "Patterns of Population Growth in Southern States", *Economic and Political Weekly*, Vol. XVIII, No. 48, Nov. 26, 1983, pp 2018-2013.

2. Registrar General of India, Ministry of Home Affairs, New Delhi, *Sample Registration Bulletin*—Vol. XXVIII, No. 1, Jan. 1994.

3. National Family Health Survey, India, 1994.

rates has not been uniform among the southern states, (b) though the decline has begun in all the states in 1960s and 1970s, the pace of decline has been faster in Kerala followed by Tamil Nadu, (c) in general, birth rates in the southern states have been lower than all India.

Large variations in vital rates have been observed not only between states but also between different regions within each state. Several studies conducted within each state have confirmed such a trend (Rayappa and Prabhakara, 1983). In 1951 census, the differentials in vital rates differed between Andhra region and Telangana region of Andhra Pradesh; between different topographical zones in Karnataka and Tamil Nadu. Estimates based on the Sample Registration Scheme also highlighted the existence of such differences in Kerala as well (Kurup and Cecil, 1979). Studies conducted in Karnataka and Kerala in 1979-80 have also indicated the existence of regional differences across different regions and districts (State Planning Board, Government of Kerala, 1986). For example, during 1975-80 period, the crude birth rates in Palghat, Ernakulam and Alleppey were 26.8, 21.8 and 20.0 respectively. Similarly, in Karnataka state, the variations in crude birth rates were observed in Dakshina Kannada, Dharwad and Mandya which are located in different regions in the state (Rao *et al.*, 1986).

The main contributing factors for the existing levels of fertility are female age at marriage and contraceptive acceptance. Though several other factors are important as they influence the fertility performance of couples, their influence is mainly through female age at marriage and acceptance of contraception. In the southern states female age at marriage has been higher than all India with the sole exception of former Hyderabad region. At present, female age at marriage is over 20 years in Kerala and Tamil Nadu and slightly lower in Karnataka and Andhra Pradesh (Table 5). Historically, Kerala always had higher female age at marriage followed by Tamil Nadu, Karnataka and Andhra Pradesh in that order. Even though female age at marriage has shown an increase over years, the rate of increase per decade ranges from 0.5-1.4 years during the last 30 year period. Within each state, there are variations in female age at marriage by different regions.

TABLE 5: FEMALE MEAN AGE AT MARRIAGE OF CENSUS SYNTHETIC COHORTS FOR SOUTHERN STATES AND ALL INDIA: 1901

States	1901	*1911	*1927	*1931	*1941	*1951	1961	1971	1981
Andhra Pradesh	12.18	10.80	11.22	10.45	11.82	12.57	15.4	16.4	17.3
Karnataka	15.14	15.21	15.22	14.55	15.85	16.09	16.5	17.9	19.3
Kerala	17.37	17.74	17.21	17.60	19.30	19.88	20.1	20.9	21.8
Tamil Nadu	15.25	15.00	15.31	14.92	16.13	17.05	18.4	19.6	20.3
All India	13.14	13.16	13.67	12.69	14.69	15.59	16.1	17.2	18.3

Note: * These Figures refer to old states of Hyderabad, Mysore, Travancore-Cochin and Madras.

Sources: 1. Ashok Mitra *India's Population: Aspects of Quality and Control*: Vol. I, Abhinav Publications, New

Delhi, 1978, pp. 299-306. 2. Goyal R. P., *Marriage Age in India*, B. R. Publishing Corporation, Delhi, 1988, p. 71, Table 2.3.

In Kerala northern parts have lower age at marriage than southern parts (Zachariah, 1984). In Karnataka, coastal districts have higher female age at marriage than the districts in the Maidan. Similarly, in Andhra Pradesh, Telangana region has the lowest female age at marriage (Goyal, 1988).

Similar situation exists with respect to contraceptive acceptance by eligible couples. The percentage of couples currently protected by any method is the highest in Kerala followed by Tamil Nadu, Karnataka and Andhra Pradesh. In fact, variations in female sterilisation are not large and the use of spacing methods is also at the lower level in all the states. However, all the states in the south have higher contraceptive acceptance than all India (Table 6).

Within each state we observe large variations in contraceptive acceptance between regions. For instance, in Kerala existence of regional variations were clearly visible in 1992, while over 70 per cent of eligible couples were protected in the state, the range varied from 47.9 per cent in Malappuram to 89.8 per cent in Kollam (Irudaya Rajan and James, 1992). However, knowledge about modern methods of family planning particularly sterilisation are uniformly high in all the southern states as well as in the country.

In sum, the practice of contraception coupled with female age at marriage which are the prime determinants of levels of fertility, account for the variations of fertility levels in the south. Regional variations being large, they explain the existing population growth patterns by regions. Though death rates also differ by state and within regions in each state, the differences are not large enough to account for such inter-regional variations. Regions with lower female age at marriage have also lower acceptance of contraception with one or two exceptions.

With respect to migration, the southern region as a whole can be considered as a net out-migrating area from the beginning of this century. However, the pattern of migration has been different for different states and regions and at different points in time for the same geographic unit. For instance, Travancore was an immigrating state in the earlier periods but outmigrating in recent periods. Karnataka has been an immigrating state during most of the earlier periods. Tamil Nadu has been experiencing outmigration almost from the beginning of this century. Andhra Pradesh had been an outmigrating state in the earlier years but that outflow appears to have been checked in recent years (Rayappa and Prabhakara, 1983). In the absence of data on migration from 1981-91 period, one can only conjecture that interstate movements might have showed down in recent years and intra-state movements might have picked up.

Demographic Transition in the South

The theory of demographic transition has tried to trace the behaviour of population growth in terms of its components, birth rates and death rates. It has tried to analyse the demographic situation as obtained in the developed parts of the world and link it with concomitant socio-economic scene. Four to five stages of demographic situations and their transition from one stage to the next was illustrated in this theoretical formulation.

The timing of this change and process of change differed from country to country. The main question that remained to be answered was the suitability of this formulation to the contemporary demographic situation in the developing countries of the world and the future course of demographic behaviour vis-a-vis the socio-economic situation. Historical and contemporary trends have shown that the transition itself and its pattern, sequence and timing may vary greatly from country to country and over time (United Nations, 1971).

TABLE 6: PERCENTAGE OF COUPLES CURRENTLY PROTECTED TO TOTAL COUPLES IN THE REPRODUCTIVE AGE GROUPS FOR SOUTHERN STATES AND ALL INDIA

<i>States</i>	<i>Period</i>	<i>Sterilisation</i>	<i>IUD</i>	<i>CC /Other Methods</i>	<i>All Methods</i>
AndhraPradesh	1976	18.0	0.7	1.3	20.0
	1981	25.7	0.3	0.2	26.2
	1986	31.2	1.5	1.8	34.5
	1990	36.0	3.4	4.8	44.)
	1992	36.3	4.0	5.0	45.3
Karnataka	1976	12.4	1.2	2.8	16.4
	1981	20.9	1.5	0.9	23.2
	1986	30.8	3.7	1.8	36.3
	1990	37.5	5.3	2.5	45.4
	1992	39.6	5.8	2.8	48.2
Kerala	1976	21.8	2.5	2.6	26.9
	1981	29.7	1.0	0.3	30.9
	1986	37.2	2.2	1.7	41.1
	1990	43.3	4.8	4.4	52.5
	1992	45.8	5.2	4.3	55.4
Tamil Nadu	1976	20.6	1.2	2.8	24.6
	1981	26.4	0.8	0.5	27.6
	1986	37.0	2.5	1.5	41.1
	1990	43.8	8.6	3.7	56.2
	1992	45.2	8.9	3.1	57.3
All India	1976	14.1	1.5	3.4	18.9
	1981	20.0	1.0	1.7	22.7
	1986	26.5	3.7	4.7	34.9
	1990	30.1	6.3	6.9	43.3
	1992	30.3	6.3	6.9	43.5

- Sources:* 1. Govt. of India, Ministry of Health and Family Welfare, Family Welfare Planning Year Book 1975-76; New Delhi, 1977, p. 66.
2. Govt. of India, Ministry of Health and Family Welfare, Family Welfare Planning Year Book 1980-81; New Delhi, 1981, p. 86.
3. Govt. of India, Ministry of Health and Family Welfare, Family Welfare Programme, Year Book 1985-86; New Delhi, pp. 207-210.
4. Govt. of India, Ministry of Health and Family Welfare, Family Welfare Programme, Year Book 1989-90; New Delhi, pp. 238-240.
5. Govt. of India, Ministry of Health and Family Welfare, Evaluation and Intelligence Division, "Analytical Review of Couple Protection Rates" (1991-92), New Delhi, 1994.

While mortality declines are considered as a necessary condition for bringing about corresponding declines in fertility levels, it has been argued that it is not a sufficient condition. The behaviour of fertility and its plausible determinants are much more complex and, hence, the declines in fertility will not be automatic and will usually follow declines in mortality with a time lag. Similarly, it has been argued that the pattern observed in the developed world need not be replicated in the developing countries. One explanation advanced is that the development levels, the pace of development and the process of development are not the same in each of these countries in addition to wide differentials in their cultural background.

Coming to the South, demographic transition in Kerala has become the subject of intense discussion and debate because of the unique conditions under which demographic transition has occurred. The discussion which began in seventies and continued since then has drawn not only national attention but also international curiosity. The main factors identified as responsible for transition in Kerala are literacy, health infrastructure and family planning programme. In addition, progress on communication, land reforms exposure to outside world are also considered as important landmarks favouring demographic transition (Zachariah, 1984). However, the economy of Kerala is not poised for take-off, productivity and production levels have not reached their maximum potential, its level of urbanisation is not really high (even though there is no marked distinction between rural and urban areas in the state as elsewhere in the country), the proportion of workforce outside agriculture is not really high as progress on industrial front has not been satisfactory. It has been pointed out that both in Kerala and Goa their demographic transitions were preceded by health and educational transitions (Krishnan, 1992).

There are certain historical factors which have contributed to transitions such as high female age at marriage, migration outside the state as well as outside the country and the status women enjoy in the society. Given these factors demographic transformation in a relatively shorter span of time (about 20-25 years) has been considered as an unique feature of Kerala. The onset of fertility decline has begun in early fifties and sixties. And, at present, levels of birth rates, death rates, infant mortality rates and expectation of life at birth are similar to the levels obtained in many developed countries of the world if not the same. In this situation the questions that are being raised today are: (i) Is the experience of Kerala relevant to other states in the country? (ii) Is it an exception rather than a rule? and (iii) what lessons can be drawn from this experience?

Our focus here being the experience of the southern states in India, one can briefly summarise the factors that have contributed to demographic change in these states. As pointed out already Tamil Nadu has experienced a drastic decline in its population growth rate during the last censal decade (1981-91) and stands closely behind Kerala. Birth rates and death rates are also on the lower side even though mortality, particularly infant mortality rate, has remained relatively at a higher level. The latest estimate by the NFHS has placed this figure at 67.7 compared to 23.8 in Kerala. The earlier social movements in Tamil Nadu might have had their impact on certain demographic factors such as age at marriage, status of women and family size norm (Kishor, 1994). Over the years, Tamil Nadu has

also witnessed marked improvements in transport and other communication networks. There are also improvements in the sphere of sophistication in its industrial activities particularly in the textile sector. The state has also experimented with a large number of nutrition intervention programmes which have a bearing on child survival and maternal health (Samuel and Rayappa, 1994). Publicity and campaigns on the family planning front have also been well orchestrated in this state. It has been argued that the explanation for fertility decline lies not in the extent of development but in the nature of development and institutional changes that have taken place in Tamil Nadu. And, given the existing motivation for fertility control, the official family planning programme in Tamil Nadu was responsible for making family limitation possible (Kishor, 1994). As a result of these changes, birth rate has declined sharply in recent periods and the state has progressed in the process of demographic transition.

The third state in the south which has shown a sharp decline in population growth in recent period has been Karnataka. Karnataka has been unique in several areas. The infrastructure facilities such as roads, schools and hospitals were relatively better developed during the period of rulers of Mysore. At the time of reorganisation of states in 1956, districts belonging to old Mysore state were better placed compared to districts belonging to Bombay Karnataka and Hyderabad Karnataka. The first major survey on aspects of family planning was conducted in parts of Old Mysore State which subsequently has become popular as Mysore Population Study. This survey carried out under the aegis of the United Nations probed into the feasibility of generating data on fertility and family planning in the traditional and cultural context of the Mysore state. However, over the years efforts have been made to develop the less developed areas in the state and to a greater extent inter-district and inter-division differences have narrowed down. However, on many social and economic indicators, differences have persisted over time.

One important development in the state favouring fertility decline and acceptance of contraception by couples is the marked progress in the provision of maternal and child health services. These services have been taken to the doorsteps of people in the rural areas and to the disadvantaged sections of the society. The latest NFHS has indicated that nearly three-fourths of pregnant mothers have received ante-natal and immunization services during their pregnancy. However, there are still areas such as control of diarrhoea, respiratory infections, immunization of children (particularly measles) which need to be tackled in a more concentrated manner. At the same time, female age at marriage has been increasing at a slow but steady rate. There is an unmet demand for contraception to the tune of 38 per cent among currently married women who either desire to space their next birth or want no more children (NFHS, Karnataka, 1995). The current use of spacing methods is at a low of about 5 per cent. Nearly half of the deliveries are attended by medical and health professionals leaving much scope for the promotion of safe deliveries. The Integrated Child Development Programme has to be taken to all the needy children in the state as the coverage is not total. There is need to introduce meaningful nutritional intervention strategies to tackle the problem of under-nutrition and malnutrition among pregnant mothers and children in the state. There is much scope for improvising

Information, Education and Communication Programme (IEC) emphasising aspects such as spacing, advantages of colostrum, nutrition and health related aspects in the state.

The rate of growth of population has been the highest in Andhra Pradesh during 1981-91 period among the southern states. There is early childbearing as age at marriage is relatively lower in the state. Childbearing is mostly concentrated in the 15-29 years (NFHS, 1995). Consanguineous marriages are more common in the state. Contraception acceptance is less than 50 per cent (47 per cent). Infant mortality rate has declined from a level of 88 per 1000 live births to 70 by 1987-91.

The main contributing factors for the existing situation are several. The spread of the message of family planning along with improvements in the coverage of maternal and child health services have been the major inputs into family welfare programme. The coverage of children under universal immunization programme has been another input as 45 per cent of children aged 12-23 months have been fully protected against childhood diseases. However, the success of Oral Rehydration Solution (ORS) has been less adequate. Nutritional programmes are not as widespread as in the case of Tamil Nadu. Inadequate nutrition continues to pose a serious problem even though Andhra Pradesh is considered as the granary of South India. The level of literacy particularly for females is lower in Andhra Pradesh compared to other states in the region. Sixty-two per cent of women are illiterate. Significant improvements have been brought about in terms of providing transport and communication networks, health and education, and other development programmes such as welfare of scheduled castes and scheduled tribes. However, large differentials exist between different regions and socio-economic groups in the state.

Discussion of Findings

Since Independence much change is visible on the demographic front in the country. By 1991, acceleration in the rate of growth of population has been halted. This has been mainly a result of decline in birth rates in almost all the states in the country as the current level of Crude Birth Rate (CBR) stands at 29. The current level of Crude Death Rate (CDR) is around 10 and variations in CDR between states are not as large as in the case of CBR. While the message of family planning has reached the nooks and corners of the country nearly half of the eligible couples in the reproductive ages have accepted contraception in order to limit their family size. Infant and child mortality levels have declined to 79 and 33, respectively, though there is much scope for further improvement. Expectation of life at birth has reached over 60 years for both the sex groups.

Despite these positive developments, there are areas of serious concern. We have not yet been able to achieve the goal of Net Reproduction Rate (NRR) of unity before the close of this century. At the current rate of population growth in the country, the doubling time (to double the size of the population) is estimated to be about 37 years. There is a large quantum of unmet need for the adoption of contraception particularly for the spacing

methods among eligible women in the reproductive ages. Female age at marriage in many parts of the country continues to be below the legally prescribed minimum of 18 years. Even the awareness about the legally prescribed age at marriage for both men and women is still lower. This broad scenario at the aggregate level may not reveal the magnitude of the problem as large variations persist between regions and states in the country. Therefore, it is only appropriate to probe into variations across states in much more detail.

The picture emerging at the state level indicates wide variations in almost all the indicators mentioned above. The annual rate of growth of population during 1981-91 varies between 1.2 to 2.4 per cent. The level of fertility is considerably below the national average in South India and West India where two states, namely Kerala and Goa have reached below replacement level of fertility. The range in CBR is at a minimum of 17.2 in Goa and 19.6 in Kerala and maximum of 36.0 in Uttar Pradesh and 34.6 in Arunachal Pradesh (NFHS, 1994). Similarly, variations in contraceptive acceptance (Couple Protection Rate) range from 75 in Kerala to 26 in Uttar Pradesh. Female age at marriage is higher at 22 years in Kerala and lower at 16 years in Rajasthan. Infant Mortality Rate, a crucial indicator of mortality levels in the country, ranges from 15 in Mizoram to 112 in Orissa. Since state is the administrative unit next to the national level, the happenings at the state level are of paramount importance to policy makers. However, as mentioned already, much more interesting patterns are visible at the district level within each state which merit attention and action. Therefore, a brief analysis of district variations are attempted for the four states below.

The variations in the demographic variables at the district level are large, and, hence, need a detailed scrutiny. In 1981, there were 70 districts in the four southern states and by 1992 this number has risen to 78. Maximum increase in the number of districts has taken place in Tamil Nadu (from 16 to 21). This increase, of course, has posed some problems for the computation and comparability of data. For subsequent analysis at the district level, only three variables have been considered viz., population growth rates for 1971-81 and 1981-91, Crude Birth Rate for 1974-80 and 1984-90, and Couple Protection Rate for 1985 and 1992. These data are provided in Appendix 1 for each state separately. Summary measures (Mean, Standard Deviation, Range and Co-efficient of Variation) for these sets of data have been shown in Table 7.

The decennial population growth rate among districts during 1971-81 ranged from a minimum of 9 per cent to 59 per cent for the entire region. This range was the smallest for Tamil Nadu (12 to 29) and the largest for Karnataka (20 to 59). In Andhra Pradesh, and Kerala the range was also large. During the last census decade i.e., 1981-91, the range in the entire region varied from 5 to 59. However, the range increased only in Andhra Pradesh. Between these two periods coefficient of variation increased in all the states except Tamil Nadu.

The Couple Protection Rate during 1985 ranged from a minimum of 20 to a maximum of 63. The range was the highest in Kerala followed by Tamil Nadu. During 1992, it ranged from a minimum of 26 to 84. The range increased in Andhra Pradesh, Tamil

Nadu and Karnataka, and declined in Kerala. Between these two periods the coefficient of variation did not differ much in Andhra Pradesh and Karnataka but declined in Kerala and Tamil Nadu.

TABLE 7: MEASURES OF CENTRAL TENDENCY AND DISPERSION FOR FOUR VARIABLES FOR DISTRICTS OF SOUTHERN STATES

State	Period	Mean	Standard Deviation	Range		Coefficient of Variation	N	
				Minimum	Maximum			
Andhra Pradesh	Population Growth Rate	1971-81	23.79	6.38	11	43	26.82	23
	Population Growth Rate	1981-91	24.41	8.79	16	59	36.01	23
	Couple Protection Rate	1985	31.22	7.08	20	45	22.68	23
	Couple Protection Rate	1992	44.12	9.92	26	60	22.48	23
	Crude Birth Rate	1974-80	33.87	2.89	29	40	8.53	23
	Crude Birth Rate	1984-90	28.48	2.80	25	34	9.83	23
Karnataka	Population Growth Rate	1971-81	25.98	8.33	20	59	32.06	20
	Population Growth Rate	1981-91	19.13	7.30	5	38	38.16	20
	Couple Protection Rate	1985	32.89	6.14	23	44	18.67	20
	Couple Protection Rate	1992	50.61	9.95	33	66	19.66	20
	Crude Birth Rate	1974-80	32.08	2.35	27	36	7.33	19
	Crude Birth Rate	1984-90	27.78	4.38	22	36	15.77	20
Kerala	Population Growth Rate	1971-81	20.44	7.51	9	34	36.74	14
	Population Growth Rate	1981-91	14.12	6.63	5	29	46.95	14
	Couple Protection Rate	1985	44.88	13.95	23	63	31.08	12
	Couple Protection Rate	1992	59.31	10.28	39	74	17.33	14
	Crude Birth Rate	1974-80	25.44	4.34	20	34	17.06	12
	Crude Birth Rate	1984-90	20.34	3.62	17	30	17.80	14
Tamil Nadu	Population Growth Rate	1971-81	17.68	5.18	12	29	29.30	21
	Population Growth Rate	1981-91	14.13	4.05	8	28	28.66	21
	Couple Protection Rate	1985	38.66	7.81	28	59	20.20	16
	Couple Protection Rate	1992	58.03	7.72	47	84	13.30	21
	Crude Birth Rate	1974-80	28.04	3.44	22	33	12.27	16
	Crude Birth Rate	1984-90	21.90	2.66	17	26	12.15	21

Sources: For sources for data of the above measures please refer to Table A1-A4 (in the Appendix).

The Crude Birth Rate during 1974-80 ranged from a minimum of 20 to 40 in the entire region. The range was the highest in Kerala and the lowest in Karnataka. However, during 1984-90, the range increased only in Karnataka while in all other states it showed a decline. The coefficient of variation did not change much between the two period except in Karnataka.

In the process of demographic transition, with the progress in transition we expect widening of inter-regional differences in population growth rates and their components before narrowing down. Is this happening in southern states? While differences in

population growth rates have increased, the coefficient of variation has indicated the same. However, the situation with respect to Couple Protection Rate and Crude Birth Rate indicates that the differences have not widened further. Therefore, one can conclude that in the coming decades, at least in the southern states, inter-district variation in population growth rates and components of population growth may narrow down.

Concluding Observations

Historically speaking, the demographic transition, its structure and pattern vary across space and time. In the earlier stages of transition, variations tend to be large and with the progress in transition these variations tend to narrow down. The components of population growth viz., birth rates, death rates and migration flows would show a similar pattern.

The demographic scenario in the four southern states has been varied. In the southern region of the country, mortality levels have reached lower levels than in the other parts of the country and further declines may be hard to come by. Fertility levels which began declining in sixties and seventies show large variations across states and districts. Acceptance of contraception has increased even though adoption of spacing methods continues to be low. Age at marriage is relatively higher in the south but there are areas where it is still below the legally prescribed minimum of 18 years for females. Official Family Planning Programme has played a dominant role in effecting declines in birth rates and consequently population growth rates. Maternal and Child Health Programme has paid rich dividends and its furthering would certainly hasten the process of demographic transition. May be other complementary and supplementary programmes such as literacy missions, welfare programmes, and nutritional intervention strategies have all contributed in varying degrees to the success of Family Welfare Programme.

What is required now is a more disaggregated level of analysis to identify areas of concern, understanding local situations and coming up with policies, programmes and strategies more suited to the local situation. It is here that regional perspective would become a more useful tool of analysis suited to local needs and requirements. There may be situations when such contiguous areas may cut across state boundaries as well. In this context it has been argued that in matters of detailed policy formulation and implementation of fertility regulation programmes, state governments should be encouraged to play the key role while the central government, functioning as a catalyst, provides financial, technical and managerial support. India has reached the stage in her demographic transition wherein population policy, programme goals, and programme strategy should become state responsibility (Srinivasan, 1995). To go one step further, one could argue that programmes and strategies should be designed at a more disaggregated level keeping the local situations and background in view. Similar views has been expressed by the expert group on population policy in their draft National Population Policy statement. It has been argued that population stabilisation strategies will have to keep in view the wide range of diversity prevailing among states in total fertility rate, death rate and infant

mortality rate. Policies and programmes will have to be tailored to suit the particular socio-cultural and economic factors prevailing in each area. Hence this population policy is structured on the basic theme; think, plan and act locally and support nationally (Expert Group on Population Policy, 1994).

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Appendix

TABLE AI: POPULATION GROWTH RATE, COUPLE PROTECTION RATE AND CRUDE BIRTH RATE FOR DISTRICTS IN ANDHRA PRADESH

Sl. No	State/District	Population Growth Rate		Couple Protection Rate		Crude Birth Rate/1000	
		71-81	81-91	1985	7992	74-80	84-90
		<i>1</i>		<i>2</i>	<i>2a</i>	<i>3</i>	
	AndhraPradesh	23.10	23.82	32.0	45.3	33.5	28.2
1.	Srikakulam	10.70	18.12	34.9	55.3	34.2	29.2
2.	Vizianagram	13.50	16.47	33.7	46.9	34.0	28.0
3.	Vishakhapatnam	26.56	27.00	34.6	52.2	32.7	26.8
4.	EastGodavari	19.88	22.70	43.5	54.6	31.9	27.5
5.	WestGodavari	21.04	22.27	44.5	60.4	31.9	26.4
6.	Krishna	22.25	21.15	38.5	56.2	29.4	25.8
7.	Guntur	20.75	18.96	40.1	55.1	29.8	24.9
8.	Prakasam	21.33	18.06	30.3	53.3	33.1	26.7
9.	Nellore	23.78	18.64	31.3	49.4	30.7	25.0
10.	Chittoor	20.72	18.71	33.0	40.5	31.6	25.0
11.	Cuddapah	22.59	17.03	32.6	39.3	32.4	25.5
12.	Anantapur	20.44	24.81	29.6	36.1	37.4	30.3
13.	Kumool	21.45	23.35	27.3	38.2	36.5	32.6
14.	Mahbubnagar	26.53	26.65	20.8	30.6	39.6	33.7
15.	Rangareddy	43.47	58.83	21.6	27.4	38.7	33.4
16.	Hyderabad	33.81	37.53	39.4	48.2	30.2	26.5
17.	Medak	23.11	25.29	21.1	29.0	35.1	31.2
18.	Nizamabad	27.90	21.14	27.2	41.2	33.4	28.3
19.	Adilabad	27.22	26.92	20.1	26.1	36.3	32.2
20.	Karimnagar	24.05	24.91	24.3	38.8	31.4	26.5
21.	Warangal	22.95	22.21	29.4	44.3	36.1	29.3
22.	Khammam	27.86	25.61	33.7	46.8	36.1	29.7
23.	Nalgonda	25.28	25.03	26.5	44.9	36.5	30.5

Source:

1. Ashish Bose, 1991, *Demographic Diversity of India, 1991 Census, State and District Level Data Reference Book*. B. R. Publishing Corporation, Delhi.
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3. Reverse Survival Estimates of Crude Birth Rate and Total Fertility Rate Derived from 1981 and 1991 Censuses for Districts in Major States of India.

TABLE A2: POPULATION GROWTH RATE, COUPLE PROTECTION RATE AND CRUDE BIRTH RATE FOR DISTRICTS IN KARNATAKA

Sl. No	State/District	Population Growth Rate		Couple Protection Rate		Crude Birth Rate/1000	
		71-81	81-91	1985	1992	74-80	84-90
		1		2	2a		3
	Karnataka	26.75	20.69	32.8	48.2	32.2	28.0
1.	Bangalore	59.08	38.00	28.9	46.9	31.3	24.6
2.	Bangalore Rural	24.30	14.70	34.6	52.5		25.2
3.	Belgaum	22.94	18.18	32.5	47.8	31.1	28.9
4.	Bellary	32.65	27.09	30.2	40.3	35.4	33.4
5.	Bidar	20.83	25.65	25.8	46.9	34.2	34.9
6.	Bijapur	20.96	21.35	26.2	46.4	34.3	32.6
7.	Chickmagalore	23.77	11.52	41.8	65.9	30.0	23.7
8.	Chitradurga	27.20	22.51	35.6	50.3	33.8	28.5
9.	Dakshin Kannada	22.55	13.27	25.2	41.9	27.3	22.3
10.	Dharwad	25.76	18.79	32.2	47.5	33.6	29.5
11.	Gulbarga	19.63	23.71	23.3	32.8	34.8	35.1
12.	Hassan	23.10	15.43	41.1	64.8	31.0	25.0
13.	Kodagu	22.10	5.05	39.0	62.9	27.9	23.1
14.	Kolar	25.64	16.05	37.8	51.3	32.6	26.5
15.	Mandya	22.85	15.90	43.5	65.6	31.9	24.2
16.	Mysore	24.97	21.58	37.4	63.0	31.1	25.9
17.	Raichur	26.00	29.33	24.8	35.9	35.8	36.2
18.	Shimoga	27.30	14.71	36.1	57.8	31.6	25.6
19.	Tumkur	21.51	16.36	33.2	50.1	31.6	25.4
20.	Uttar Kannada	26.38	13.49	28.6	41.6	30.3	24.9

Source: As in Appendix Table A1.

TABLE A3: POPULATION GROWTH RATE, COUPLE PROTECTION RATE AND CRUDE BIRTH RATE FOR DISTRICTS IN KERALA

Sl. No	State/District	Population Growth Rate		Couple Protection Rate		Crude Birth Rate/1000	
		71-81	81-91	1985	1992	74-80	84-90
		1		2	2a		3
	Kerala	19.24	13.98	38.1	55.4	25.0	20.3
1.	Kasargod	27.78	22.67		47.0		24.4
2.	Cannanore	24.34	16.27	50.8	59.2	28.8	20.5
3.	Wayanad	33.87	21.15	26.7	58.8	31.4	23.4
4.	Kozhikode	23.25	16.37	55.1	65.8	26.3	20.5
5.	Malappuram	29.43	28.74	23.9	39.0	33.6	29.5
6.	Palakkad	21.30	16.23	27.3	47.4	27.7	22.5
7.	Thrissur	14.60	12.08	46.5	64.8	22.2	187
8.	Emakulam	17.18	10.36	48.4	50.1	21.4	16.9
9.	Idukki	26.64	11.07	31.3	63.9	26.7	19.8
10.	Kottayam	10.29	7.20	54.0	70.3	20.1	16.6
11.	Alapuzha	11.62	6.71	54.0	61.7	21.0	16.7
12.	Pathanamthitta	9.45	5.45		57.0		17.2
13.	Kollam	18.27	10.25	58.8	73.9	23.3	18.5
14.	Thiruvananthapuram	18.08	13.19	62.7	71.3	22.8	196

Source: As in Appendix Table A1.

TABLE A4: POPULATION GROWTH RATE, COUPLE PROTECTION RATE AND CRUDE BIRTH RATE FOR DISTRICTS IN TAMIL NADU

Sl. No	State/District	Population Growth Rate		Couple Protection Rate		Crude Birth Rate/1000	
		71-81	81-91	1985	1992	74-80	84-90
		1	2	2a		3	
	Tamil Nadu	17.50	14.94	36.1	57.3	28.2	21.9
1.	Madras	27.04	15.82	58.9	83.5	24.7	19.4
2.	Chengalpattu	29.26	27.77	30.1	65.9	31.0	24.4
3.	North Arcot	17.79	14.14	39.9	56.8	32.9	24.6
4.	Dharmapuri	19.03	19.96	37.7	46.6	32.1	26.3
5.	Thiruvannamalai	17.15	11.85		57.5		25.7
6.	South Arcot	16.15	15.92	34.9	51.7	32.6	25.6
7.	Salem	15.01	13.73	36.9	49.9	24.1	19.5
8.	Periyar	15.11	12.30	44.0	52.2	22.4	16.9
9.	Nilgiris	27.56	11.85	44.5	59.8	27.2	19.2
10.	Coimbatore	18.79	15.39	38.1	57.4	23.1	17.6
11.	DindigulAnna	11.90	13.05		66.5		20.4
12.	Tiruchirapalli	13.16	13.90	35.3	53.2	26.2	21.1
13.	Thanjavur	14.46	11.40	43.4	50.8	26.5	21.4
14.	Pudukkottai	22.11	14.32	32.6	60.3	30.1	22.2
15.	PasumponThevar	12.43	10.57		57.7		21.4
16.	Madurai	16.98	16.02	44.3	61.7	28.4	22.1
17.	Kamarajar	16.45	15.92		54.8		23.2
18.	Ramanathapuram	21.12	11.11	27.5	58.5	30.9	24.5
19.	Chidambaranar	11.73	7.79		55.7		22.1
20.	Thirunelveli	11.62	12.15	28.2	55.7	29.9	22.5
21.	Kanyakumari	16.43	11.79	42.2	62.4	26.6	19.7

Source: As in Appendix Table A1.