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# The demographic situation in India

Mahendra K. Premi

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*ABSTRACT* In presenting the current demographic situation in India, this paper focuses on population size, growth, and distribution; sex and age structure over time; trends in fertility, mortality, urbanization, and migration; the national family planning program and issues relating to population policy; and the likely patterns of future population growth.

The population of India (684 million in 1981) has nearly tripled since 1901 and nearly doubled since Independence in 1947. This fast rate of growth has been due mainly to rapidly declining mortality and only recently to a slow decline in fertility. Given the past trend and the likely pattern of decline in fertility and mortality rates, India's population is likely to reach anywhere between 925 and 1,000 million by the year 2001.

Although India has experienced a declining trend in mortality since 1921, the prevailing death rate and the infant mortality rate are still much higher than the levels in many other developing countries. There are clear indications that marital fertility rates in India have started to fall. With the rise in age at marriage of girls, the decline in marital fertility, and the expected success of the family planning program in the near future, India can anticipate a net reproduction rate of unity by the end of this century.

Rural-to-urban migration and, consequently, the pace of urbanization were slower during the 1960s than in the 1950s. If this trend continues, it is likely that only about one-fourth of India's population will be living in urban areas by the turn of the century.

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The Republic of India in its present form came into existence with Independence in 1947 and the partition of the Indian subcontinent into India and Pakistan. Prior to Independence, the Indian subcontinent was divided into British India and the princely states. There were eleven provinces and six other territories in British India and there were 570 princely states ranging in population from a few thousand to more than 10 million persons in 1941. After partition, in the truncated Indian Union many of the princely states were merged into provinces, but many others maintained their identity at the time of the 1951 census. In 1956 there was a major reorganization of states. The States Reorganisation Act created the pattern of states and union territories

that was extensively used in the 1961 census and its publications. Since 1961 there have been further adjustments in the boundaries of some states, leading to the creation of several new states and union territories—namely, Haryana, Meghalaya, Chandigarh, and Mizoram—and the upgrading of some of the union territories into states. The 1981 census, accordingly, classified the country into 22 states (including Sikkim) and nine union territories (Map 1).

### **Physical features**

In area, India is the seventh largest country in the world. It is separated from the rest of Asia by mountains and the sea, which give the country a distinct geographical identity. Bounded by the Great Himalayas in the north, it stretches southward and, at the Tropic of Cancer, tapers off into the Indian Ocean between the Bay of Bengal in the east and Arabian Sea in the west. Lying entirely in the northern hemisphere, the mainland extends between latitude  $8^{\circ}4'$  and  $37^{\circ}6'$  N and longitudes  $68^{\circ}7'$  and  $97^{\circ}25'$  E and measures 3,214 km. from north to south and 2,933 km. from east to west (India, Ministry of Information and Broadcasting, 1979:1).

The mainland comprises four well-defined geographical regions: the great mountain region, the plains of the Ganga and the Indus, the desert region, and the southern peninsula (Map 2).

The Himalayas comprise three almost parallel ranges interspersed with large plateaus and valleys, some of which, like the Kashmir and Kulu Valleys, are fertile, extensive, and of great scenic beauty. The mountain wall extends over a distance of about 2,400 km. and has a varying depth of 240 to 320 km.

The plains of the Ganga and the Indus, about 2,400 km. long and 240 to 320 km. broad, are formed by the basins of three distinct river systems—the Indus, the Ganga, and the Brahmaputra. They compose one of the world's greatest stretches of flat alluvium and are also one of the most densely populated areas on earth.

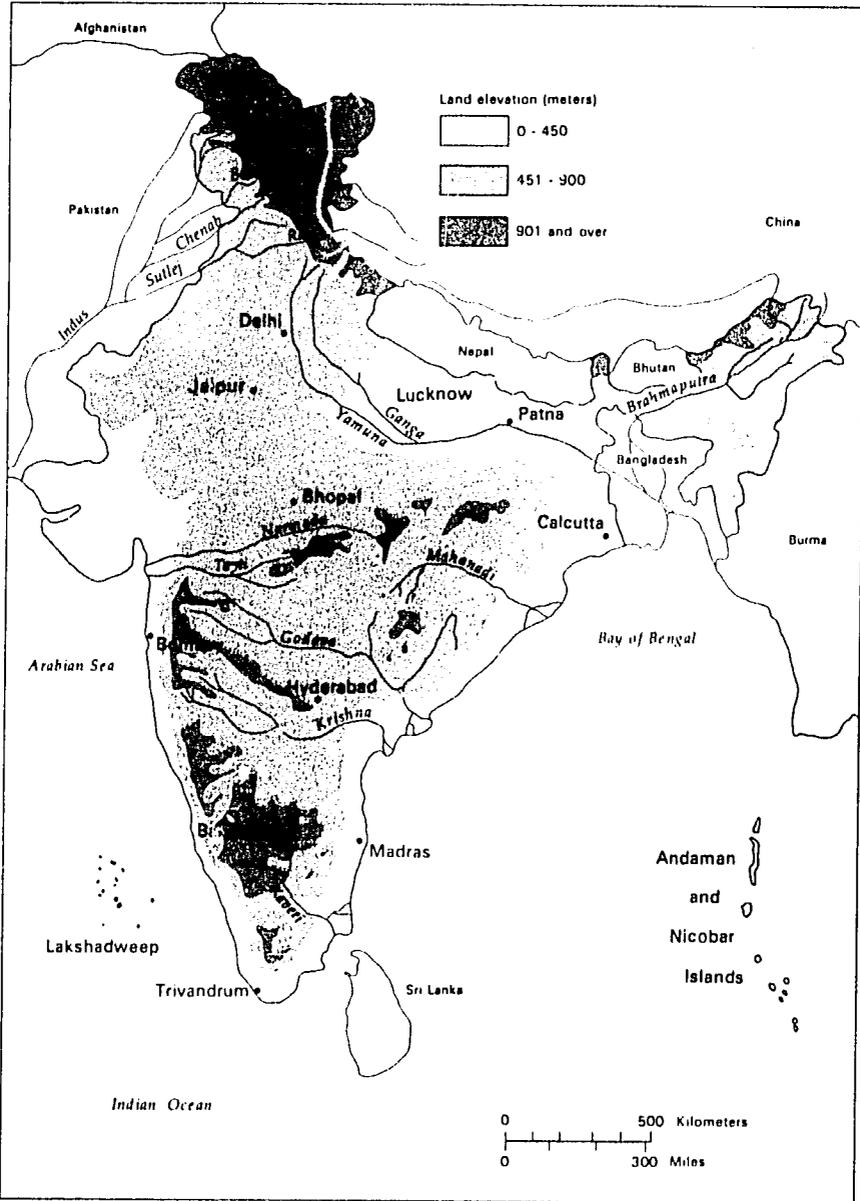
The desert region can be divided into two parts, the "great desert" and the "little desert." The "great desert" extends from the edge of the Rann of Kutch beyond the Luni River northward. The whole of the Rajasthan-Sind frontier runs through this desert. The "little desert" extends from the Luni River between Jaisalmer and Jodhpur up to the northern wastes. Between the two deserts lies a zone consisting of rocky land cut up by limestone ridges. Owing to the absence of surface water and scanty rainfall, the region is almost barren.

MAP 1 States and union territories of India: 1981



SOURCE: India, Census of India 1981 [1981].

MAP 2 The topography of India



SOURCE: Based on Survey of India map in Kundra and Bawa (1981:14).

The peninsular plateau is separated from the plains of the Ganga and the Indus by a mass of mountain and hill ranges varying from 460 to 1,220 meters in height. The peninsula is flanked on one side by the Eastern Ghats and on the other by the Western Ghats (or Sahyadri ranges). Between the Western Ghats and the Arabian Sea lies a narrow coastal strip, and between the Eastern Ghats and the Bay of Bengal there is a broader coastal plain (India, Ministry of Information and Broadcasting, 1979:1--2).

### **History and heritage**

India's civilization, which has continued over thousands of years, is among the world's most ancient. Indian Neolithic technology—comprising agriculture, domesticated animals, polished stone tools, and pottery—apparently dates from 7,000 years ago. Excavations have revealed the existence of a mature civilization in India around 3000 B.C., if not before. During its early history, India had in the northwestern region the urban centers of Mohen-jo-daro, Harappa, Lothal, and Ruar. They indicate that India possessed a highly developed civilization with large and populous cities, well-built homes, temples, and public buildings of brick, and many other amenities enjoyed at that period by the peoples of Mesopotamia and Egypt. Besides agriculture, many industries flourished and cotton fabrics and other products were exported to western Asia.

The other source of advanced culture in India was the Aryans, who came into India from the north and northwest around 2000 B.C. The first Aryan settlements, according to available evidence, were established in the Punjab region. From there they spread eastward and occupied the whole of northern India; in the course of time they also penetrated southern India. The Aryans were an agricultural and pastoral people who understood the principles of irrigation and manuring and used the animal-drawn plow. They knew the use of the wheel, employing carts for hauling and chariots for fighting and racing (Davis, 1951:23; India, Ministry of Information and Broadcasting, 1976:9–10).

## **POPULATION SIZE AND GROWTH**

### **From earliest times to the nineteenth century**

Some three to seven thousand years ago there were in India peoples possessing a technology sufficiently advanced to support a dense

population. They encountered in the soil and climate of India conditions favorable to the application of this technology.

Alexander's army, which invaded India in 327–326 B.C., found a large population there. One small kingdom was said to have 37 towns of over 5,000 inhabitants. India's first real empire under Chandragupta Maurya (ca. 321–297 B.C.) left records indicating the existence of a standing army of approximately 700,000 men, the maintenance of which must have required a substantial population (Davis, 1951:24).

These were the conditions in northern India (north of the Vindhyaehal and Satpura ranges). But contemporaneous with or only a little later than the Aryan culture of the Ganges and the Mohen-jodaro culture of the Indus were almost equally advanced civilizations in the south. Together the evidence from archeology, literature, and history suggests that before the beginning of the Christian era India already had a substantial population. This view is confirmed by Pran Nath, who, after careful examination of the evidence, concluded that the population of India around 300 B.C. was between 100 and 140 million (Davis, 1951:24).

In making an estimate for the year 1600, W.H. Moreland cited contemporary accounts to show that in the fifteenth and sixteenth centuries Europeans were impressed by the density of settlements in India, both on the plains and in the Deccan. In fact, some visitors considered the country to be overpopulated at the time. Their accounts indicate that India had cities of a quarter to half a million in size. Taking into account the strength of the army in the south and the land under cultivation in Akbar's empire, for which contemporary figures are available, and making adjustments for areas about which little was known, Moreland concluded that the total population of India at that time was around 100 million (Davis, 1951:24).

Table 1 gives estimates of India's population made during the first two-thirds of the nineteenth century and, for purposes of comparison, the two earlier estimates and the corrected 1871 figures. Two things stand out clearly: The sharp fluctuations of the growth rates indicate that the estimates vary unpredictably; and the growth from 1845 to 1871 was incredibly rapid even if the 1860s were a period of comparatively high prosperity. If, for example, the estimate for 1845 is accepted, the increase by 1871 amounted to almost 100 percent, a rate of growth never even half reached during the subsequent period of more accurate documentation. This implausibility leads to the

TABLE 1 Estimates of India's population, 300 B.C. to 1871 A.D.

Date	Population (millions)	Percentage of average annual growth during preceding period
300 B.C.	100-140	u
1600 A.D.	100	u
1800 <sup>a</sup>	120	0.09
1834	130	0.24
1845 <sup>a</sup>	130	u
1855	175	2.97
1867	194	0.86
1871	255	6.84

NOTE: The estimates relate to undivided India.

u—unavailable.

a Durand (1967:137) estimated the population of India for ca. 1800 as 195 million and for ca. 1850 as 233 million.

SOURCE: Davis (1951:25).

conclusion that, prior to the censuses, people guessed the population of India to be much smaller than it really was.

### Population growth in the modern era

Population counts in India in the modern sense started in 1881. Since then, a population census has been conducted regularly every ten years. A census of population was conducted during 1871--72, but it was nonsynchronous. Moreover, the 1872 census omitted several territories, the population of which totaled some 33 million in 1881. It omitted the native states entirely, and it omitted the provinces of Oudh, Berar, and the Punjab because these had taken censuses only a few years before (Davis, 1951:26). Table 2 shows the population of the Indian Union (according to the present boundaries) from 1901 onward.

Before turning to a discussion of the growth pattern of India's population, we should examine the quality of the census enumerations. In the earlier censuses, up to 1901, there was additional coverage of territories not covered previously and there were improvements in the enumeration as well (Davis, 1951:26). Furthermore, until the 1931 census, the enumeration was a one-night *de facto* affair in which all movements of the people were stopped and the enumerators collected information about people at the place of enumeration. The *de facto* censuses required a large army of enumerators to cover the entire

TABLE 2 Population growth pattern of India: 1901-81

Year	Population (thousands)	Percentage of decade variation
1901	238,396	na
1911	252,093	5.75
1921	251,321	-0.31
1931	278,977	11.00
1941	318,661	14.22
1951	361,088	13.31
1961	439,235	21.51
1971	548,160	24.80
1981	683,810	24.75

na--not applicable.

SOURCE: Census of India 1981 (1981:52-53).

population of the country in one day and provided little supervision of enumerators' work. As there were no postenumeration checks in these earlier censuses, it is difficult to say anything about their overall quality.

From 1941 onward, the system of census taking was changed to an extended *de jure* type in which the census enumeration was spread over a period of roughly three weeks (generally in the month of February). Postenumeration checks (PEC) were built into the census enumeration procedures from 1951 onward. The 1951 PEC indicated a net undercount of 1.1 percent of India's population, with substantial state-to-state variation in the net undercount. The 1961 PEC recorded a net undercount of only 0.7 percent, but the net undercount in 1971 was 1.7 percent. These figures suggest that the Indian census has been fairly accurate.

The pattern of growth of India's population over the past 80 years can be divided into three parts, the points of division being 1921 and 1951. The year 1921 is called the year of the "Great Divide" because it distinguished the earlier period of checkered population growth from a period of moderately increasing growth. The year 1951 marks the beginning of three decades of rapid population growth.

Mortality levels were responsible for the variable growth rates of the population during the 30 years before 1921. A severe famine affected large areas of the country in 1896 and 1897. In the Bombay Presidency (excluding the princely states) especially, the effects of the

famine were aggravated by a severe plague. As a result of the two scourges, the 1901 census recorded a population loss of about 2 per cent from the 1891 level of 18.8 million (Mitra, 1978:16).

Like the 1891-1901 decade, the decade of 1901-11 witnessed several local famines and a severe one in 1907 in most parts of Uttar Pradesh. Plague was in evidence in the Bengal and Bombay Presidencies, and both plague and malaria were widespread in the Punjab and Uttar Pradesh, where population growth was negligible. Yet, because the country as a whole suffered from famine less widely and for shorter durations, there was an appreciable rise in the population growth rate compared with the previous decade.

During the next decade, 1911-20, India suffered from an influenza epidemic that caused an estimated 7 per cent of the total population to die. It was much more virulent in some provinces than in others (Mitra, 1978:22, 27).

Since 1921, the major causes of high mortality have been gradually brought under control, and between 1921 and 1951 the country witnessed a gradual rise in population growth rates. The decline in death rates became sharper after Independence in 1947, with the result that the population nearly doubled from an estimated 347.5 million in 1947 to 683.8 million in 1981.

### **Population distribution by zones and states**

Table A1 in the Appendix gives the distribution of India's population by zone and by state and union territory over the 80-year period from 1901 to 1981. Table A2 gives the percentage share of area and population for each zone and each state and union territory.<sup>1</sup>

Madhya Pradesh, in the central zone, is geographically the biggest state in the country, accounting for 13.5 per cent of the total land area. Uttar Pradesh is largest in population. In fact, the two together, forming the central zone, at present account for 22.4 per cent of the area and 23.8 per cent of the total population (Table A2). The share of the country's population enumerated in the central zone consistently declined from 27.5 per cent in 1901 to 23.7 in 1971. In contrast, the share of the country's population enumerated in the eastern zone has continuously increased over the past 80 years except in 1951, when it

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1 The Indian census divides the country into five zones—north, south, east, west, and central. In Tables A1 and A2 the states and union territories are grouped according to these zones.

declined slightly owing to the exodus of Muslims to newly created Pakistan. The share of the country's population in the southern zone increased until 1951, when it was 26.2 percent, and has been monotonically declining ever since, becoming 24.1 percent in 1981.

The nine union territories taken together account for 9.8 million persons only, or 1.4 percent of the country's population. In population size, the largest of the nine is the almost entirely urban territory of Delhi, containing 6.2 million persons in 1981.

Table A1 indicates that Uttar Pradesh has remained the most populous state in the country, followed by Bihar, over the entire period of 80 years. At the other extreme, Lakshadweep, with a population of 40.2 thousand in 1981, has ranked last throughout the period.

Between these two extremes, some of the states—Karnataka (eighth in population size), Rajasthan (tenth except in 1981, when it stepped up to ninth in rank), Kerala (twelfth), Jammu and Kashmir (sixteenth except in 1981, when it slid to seventeenth in size), and Himachal Pradesh (seventeenth except in 1971 and 1981, when it slid to eighteenth position)—have maintained their ranking over the whole period. Many other states and union territories have formed groups, and there have been changes in the ranks within these groups.

### **Population growth, 1901–81**

The changing pattern of population distribution among the states is a consequence of differentials in decennial growth rates over time, which can be accounted for partly through differentials in the rates of natural increase and partly through migration. Table A3 presents the growth rates of India's population for each zone, state, and union territory during successive time periods.

*Population growth, 1901–21.* During the first two decades of this century, the northern zone suffered a net loss in population of 1.4 percent due to various famines and epidemics. Among the remaining four zones, the southern zone experienced the fastest rate of growth, of 11.1 percent, during the period. Its growth rate was a result of almost uniform growth of the population of its constituent units. In the eastern zone Assam, Manipur, Nagaland, and Tripura experienced very high population growth rates during 1901–21. The rapid growth in Assam was due mainly to heavy in-migration to the state's tea plantations.

*Population growth, 1921–51.* During the 30-year period between

1921 and 1951, the Indian population grew gradually from 251.3 million to 361.1 million, attaining an overall growth rate of 43.7 percent. The northern, eastern, and southern zones had growth rates close to the national average. The central zone (comprising Madhya Pradesh and Uttar Pradesh) had a comparatively low growth rate of 35.6 percent, mostly due to a higher incidence of mortality and substantial out-migration. The western zone, which experienced a growth rate of 55.0 percent during the period, gained in population through in-migration. This was the period of initial industrial growth in the western zone, particularly in and around Bombay and, to some extent, in Baroda State. The industry attracted in-migrants from almost all parts of the country.

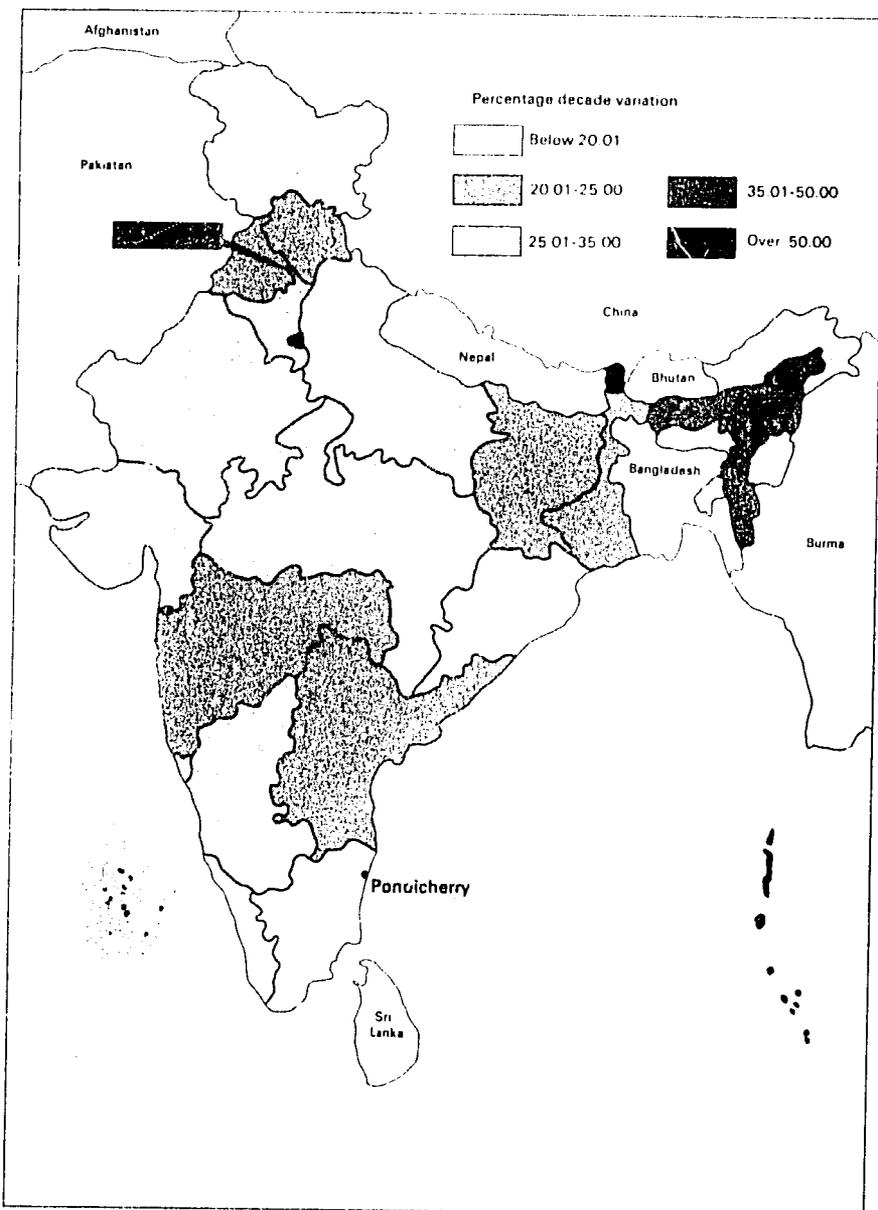
*Population growth, 1951–81.* During the 30-year period since the first census of independent India, the population has almost doubled, increasing from 361.1 million in 1951 to 683.8 million in 1981. The northern zone has experienced the highest growth rate (110.6 percent), whereas the southern zone, which had higher than national growth rates during 1901–21 and 1921–51, has had the lowest growth rate (74.3 percent) during 1951–81 (Table A3).

During 1951–61, the western zone experienced the highest growth rate (26.5 percent) and the southern zone the lowest (17.0 percent). Rates varied from 11.8 percent in Tamil Nadu to 24.8 percent in Kerala.

The pattern of population growth changed somewhat during the 1960s as the northern zone recorded the highest growth rate (28.6 percent) and the central zone the lowest (22.5 percent). Among the states, Haryana, Jammu and Kashmir, and Rajasthan in the northern zone; Assam, Manipur, Meghalaya, Nagaland, Orissa, Sikkim, Tripura, and West Bengal in the eastern zone; Madhya Pradesh in the central zone; Gujarat and Maharashtra in the western zone; and Kerala in the southern zone experienced higher than average growth rates.

The northern zone continued to lead the other zones in the rate of population growth during 1971–81. The southern zone resumed the last place during this period, all of its states except Karnataka experiencing below average growth rates (Map 3). The pattern of population growth during 1971–81 was similar in most states to that during 1961–71, with a few exceptions; for example, growth rates in Kerala, Maharashtra, Orissa, and West Bengal fell below the national average, whereas they rose above the national average in Karnataka and Uttar Pradesh.

MAP 3 Decennial population growth rates by state: India, 1971-81



NOTE: National average = 24.75 percent.  
 SOURCE: Census of India 1981 (1981:18).

**Population density**

When the area of a country and its constituent units is fixed over time, population growth will increase the population density. If the population growth is uniform, density will increase uniformly; but a differential pattern of population growth in constituent units will lead to variations in population densities. Tables 3 and 4 indicate the changing pattern of population density in India at the zonal and state levels from 1901 to 1981. Table 3 gives the density of each geographical unit for the nine census years from 1901 to 1981; whereas Table 4 gives it as an index over time with 1901 = 100.

Nationally, population density has increased from 72 persons per square kilometer (sq. km.) in 1901 to 208 persons in 1981. In 1981 the northern zone, with the sparsely populated states of Himachal Pradesh, Jammu and Kashmir, and Rajasthan, had the lowest density (112 persons per sq. km.). Throughout the 80-year period, the density of this zone has remained the lowest. In contrast, the southern zone consistently has had the highest density of all zones, except in 1981 when the density of the eastern zone became equal. Kerala, in the southern zone, has been the most densely populated state in the country, with a density of 654 persons per sq. km. in 1981, although some of the union territories—Chandigarh, Delhi, Lakshadweep, and Pondicherry—exceed that state's density (Table 3 and Map 4).

Among the low-density states and territories, besides Himachal Pradesh, Jammu and Kashmir, and Rajasthan in the northern zone, the states of Manipur, Meghalaya, Nagaland, and Sikkim and the union territories of Andaman and Nicobar Islands, Arunachal Pradesh, and Mizoram form a significant part of the eastern zone. Population density in each of these states and union territories in 1981 was below 65 persons.

The index of population density from 1911 to 1981 (Table 4) shows more clearly the differentials in population redistribution, revealing that density grew at the fastest rate in the western zone, where the index rose to 337 in 1981. Throughout most of the 80-year period, density grew much faster in Gujarat than in Maharashtra, which is one of India's most industrialized states and has been attracting migrants from all over the country.

Other states in which population density grew at a fast pace owing to heavy in-migration and natural increase are Tripura (with an index of 1,192 in 1981), Assam (605), and West Bengal (322) in the eastern

TABLE 3 Population density (per sq. km.) by zone and state: India, 1901–81

Zone and state	1901	1911	1921	1931	1941	1951	1961	1971	1981
INDIA	72.5	76.7	76.4	84.9	96.9	109.8	133.6	166.7	208.0
NORTHERN ZONE	37.6	37.0	37.1	41.4	48.7	53.3	67.1	86.2	112.4
Haryana	104.5	94.4	96.2	103.1	119.2	128.3	171.6	227.0	290.6
Himachal Pradesh	34.5	34.1	34.6	36.4	40.7	42.9	50.5	62.1	76.1
Jammu & Kashmir	9.6	10.3	10.9	12.0	13.3	14.6	16.0	20.8	26.9
Punjab	149.8	133.7	142.0	159.1	190.6	181.9	221.1	269.1	331.0
Rajasthan	30.1	32.1	30.1	34.3	40.5	46.7	58.9	75.3	99.7
Chandigarh (UT)	192.7	161.7	159.1	173.5	198.0	212.8	1,051.6	2,256.6	3,947.4
Delhi (UT)	273.3	278.7	328.9	428.4	618.1	1,174.5	1,790.3	2,737.8	4,172.4
EASTERN ZONE	85.6	91.4	91.4	101.8	117.6	131.0	165.2	207.1	258.2
Assam	41.9	49.0	59.1	70.8	85.3	102.3	138.0	186.3	253.5
Bihar	157.1	162.8	161.8	180.3	202.3	223.0	267.1	327.1	401.6
Manipur	12.7	15.5	17.2	19.9	22.9	25.8	34.9	48.0	64.1
Meghalaya	15.1	17.5	18.8	21.4	24.7	26.9	34.2	45.0	59.1
Nagaland	6.1	9.0	9.6	10.8	11.5	12.9	22.3	21.2	46.8
Orissa	66.1	73.0	71.6	80.2	88.4	94.0	112.7	140.9	168.6
Sikkim	8.1	12.0	11.2	15.0	16.6	18.9	22.2	28.7	43.3
Tripura	16.5	21.9	29.1	36.5	49.0	61.0	109.0	148.5	196.6
West Bengal	192.8	204.9	198.9	215.1	264.4	299.4	397.5	504.4	620.2
Andaman & Nicobar Islands (UT)	3.0	3.2	3.3	3.6	4.1	3.7	7.7	13.9	22.7
Arunachal Pradesh (UT) <sup>a</sup>	u	u	u	u	u	u	4.0	5.6	7.5
Mizoram (UT)	3.9	4.3	4.6	5.9	7.3	9.3	12.6	15.7	23.1

CENTRAL ZONE	88.8	91.7	89.3	96.5	109.2	121.1	143.9	176.3	221.1
Madhya Pradesh	38.1	43.9	43.3	48.2	54.2	58.9	73.1	94.0	117.7
Uttar Pradesh	165.2	163.6	158.5	169.1	192.0	214.7	250.5	300.1	376.5
WESTERN ZONE	57.1	62.6	62.1	70.9	81.0	96.3	119.8	153.6	192.6
Gujarat	46.4	50.0	51.9	58.6	69.9	83.0	105.3	136.2	173.3
Maharashtra	63.0	69.8	67.7	77.9	87.2	104.0	128.5	163.8	203.7
Dadra & Nagar Haveli (UT)	49.5	59.1	63.2	77.9	82.4	84.6	118.1	151.1	211.8
Goa, Daman, & Diu (UT)	133.1	136.2	131.4	142.1	151.1	156.3	164.4	225.0	283.8
SOUTHERN ZONE	91.0	99.2	101.1	113.0	127.2	148.1	173.2	212.1	258.3
Andhra Pradesh	68.9	77.5	77.4	87.4	98.6	112.4	130.0	157.2	192.9
Karnataka	68.1	70.5	69.8	76.3	84.8	101.2	123.0	152.8	193.2
Kerala	164.6	183.9	200.6	244.6	283.8	348.6	434.9	549.3	653.6
Tamil Nadu	148.0	160.7	166.3	180.5	202.0	231.6	259.0	316.9	371.3
Lakshadweep (UT)	433.8	454.8	426.2	501.3	573.6	657.3	753.4	994.1	1,257.4
Pondicherry (UT)	513.2	535.8	508.7	538.8	593.8	660.9	768.9	982.7	1,258.6

NOTE: Population densities are derived from total population figures instead of from rounded figures given in Table A1.

u—unavailable.

UT—union territory.

a Included in the census for the first time in 1961.

TABLE 4 Indexes of change in population density: India, 1911–81  
(1901 = 100)

Zone and state	1911	1921	1931	1941	1951	1961	1971	1981
INDIA	106	105	117	134	151	184	230	287
NORTHERN ZONE	98	99	110	130	142	178	229	299
Haryana	90	92	99	114	123	164	217	278
Himachal Pradesh	99	100	106	118	124	146	180	221
Jammu & Kashmir	107	114	125	139	152	167	217	280
Punjab	89	95	106	127	121	148	180	221
Rajasthan	107	100	114	135	155	196	250	331
Chandigarh (UT)	84	83	90	103	110	546	1,171	2,048
Delhi (UT)	102	120	157	226	430	655	1,002	1,527
EASTERN ZONE	107	107	119	137	153	193	242	302
Assam	117	141	169	204	244	329	445	605
Bihar	104	103	115	129	142	170	206	256
Manipur	122	135	157	180	203	275	378	505
Meghalaya	116	125	142	164	178	226	298	391
Nagaland	148	157	177	189	211	366	511	767
Orissa	110	108	121	134	142	170	213	255
Sikkim	148	138	185	205	233	274	354	535
Tripura	133	176	221	297	370	661	900	1,192
West Bengal	106	103	112	137	155	206	262	322
Andaman & Nicobar Islands (UT)	107	110	120	137	123	257	463	757
Arunachal Pradesh (UT) <sup>a</sup>	u	u	u	u	u	u	u	u
Mizoram (UT)	110	118	151	187	238	323	403	592

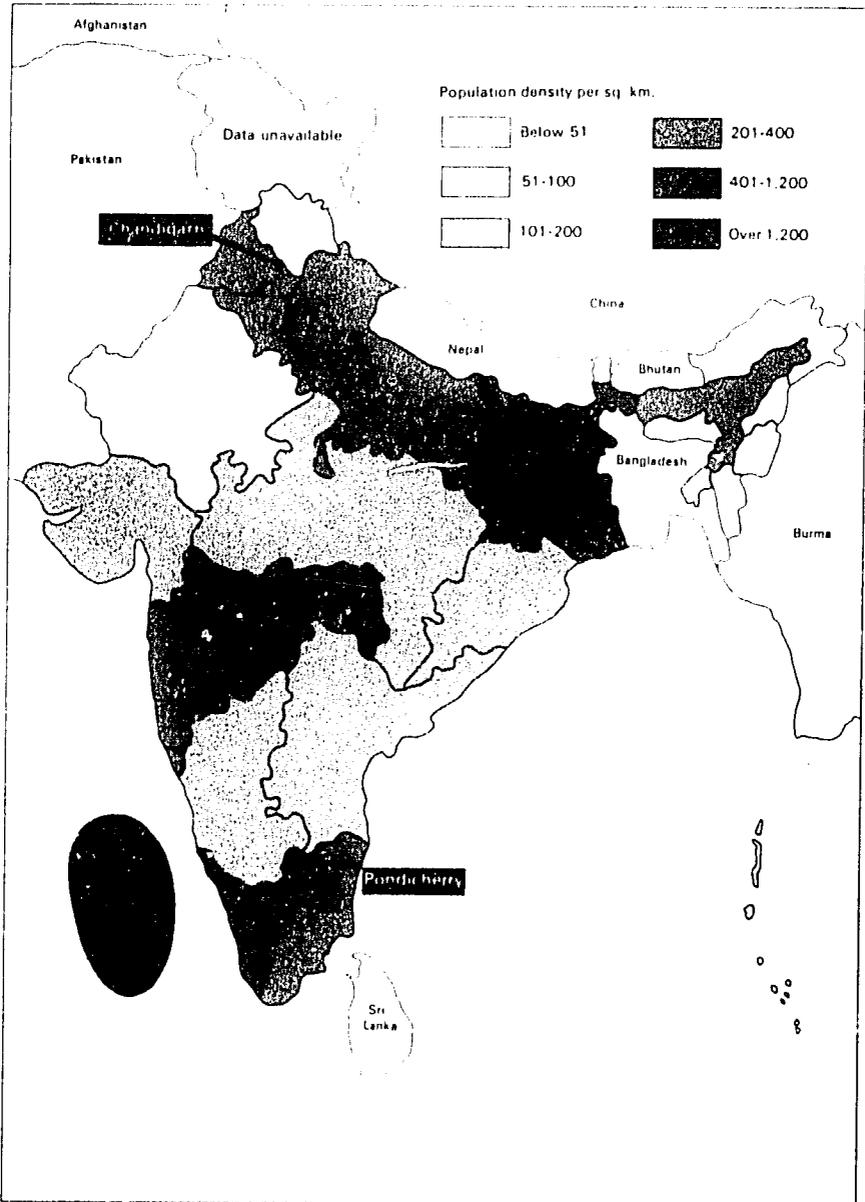
CENTRAL ZONE	103	101	109	123	136	162	199	249
Madhya Pradesh	115	114	127	142	155	192	247	309
Uttar Pradesh	99	96	102	116	130	152	182	228
WESTERN ZONE	110	109	124	142	169	210	269	337
Gujarat	108	112	126	151	179	227	294	373
Maharashtra	111	107	124	138	165	204	260	323
Dadra & Nagar Haveli (UT)	119	128	157	166	171	239	305	428
Goa, Daman, & Diu (UT)	102	99	107	114	117	124	169	213
SOUTHERN ZONE	109	111	124	140	163	190	234	284
Andhra Pradesh	112	112	127	143	163	189	228	280
Karnataka	104	102	112	125	149	181	224	284
Kerala	112	122	149	172	212	264	334	397
Tamil Nadu	109	112	122	136	156	175	214	251
Lakshadweep (UT)	105	98	116	132	152	174	229	290
Pondicherry (UT)	104	99	105	116	129	150	191	244

u—unavailable.

UT—union territory.

a Included in the census for the first time in 1961.

MAP 4 Population density by state: India, 1981



NOTE: National average = 221 persons per sq. km.

SOURCE: Census of India 1981 (1981:32).

zone, and Kerala (397) in the southern zone. In this connection, it is noteworthy that the process of heavy in-migration in the northeastern states (e.g., Assam, Manipur, Meghalaya, Nagaland, and Tripura) started at the beginning of this century. The faster growth in West Bengal, however, was due to heavy immigration of people from Bangladesh during the 1950s and 1960s.

#### POPULATION COMPOSITION

The sex-age structure of a population at any time is the result of past trends in fertility, mortality, and migration. In most populations, males outnumber females at the younger ages and females outnumber males from about age 20–25 onward, with the result that the overall sex ratio (number of males per 100 females) is in favor of females.

#### Sex composition

In India the overall sex ratio has been favorable to males and during 1901–71 became increasingly so, though the 1981 census recorded a decline in the preeminence of males (Table 5).

There are three plausible reasons for India's high sex ratio: (a) a greater undercount of females than of males in the Indian census, (b) greater emigration of females, and (c) more adverse mortality conditions for females than for males.

*Differential omission of females in the censuses.* When the censuses began in the last quarter of the preceding century, the deficit of females was, plausibly, attributed to incomplete enumeration in the first

TABLE 5 Sex ratio: India, 1901–81

Year	Sex ratio (males per 100 females)
1901	102.9
1911	103.8
1921	104.7
1931	105.3
1941	105.8
1951	105.7
1961	106.3
1971	107.5
1981	106.9

few censuses. This was particularly so in the northern and north-western regions of the country. Census officials believe that this tendency toward differential female undercount was reduced substantially in later censuses—particularly after 1931 with the abandonment of the one-night enumeration. No data are available that can shed light on the extent of differential undercount in the various censuses prior to Independence. Estimates of the percentage of undercount by sex derived from the postenumeration checks of 1951 and 1971, however, indicate that the differential between the male and female undercount has not widened and is also not substantial enough to explain the growing imbalance in the overall sex ratio:

Census year	Male	Female	$\frac{\text{Female undercount}}{\text{Male undercount}}$
1951	0.86	1.12	1.30
1971	1.53	1.83	1.20

SOURCE: India, ORGCC (1974:49).

(Although a postenumeration check was undertaken in 1961, the results are not available by sex.)

*Emigration.* Statistics on international migration for India are scarce. Moreover, the volume of international migration in India, compared with the total population, has always been insignificant. The available records of emigration during 1923–47 indicate a preponderance of males (2,105 males for every 1,000 females). The emigration of indentured labor during the early part of this century to East Africa and a few countries in Southeast Asia was basically of males. In the post-Independence period, there has been no sizable international migration, except that to and from Pakistan. According to the 1951 census, the number of displaced persons in India was 7.3 million (3.9 million males and 3.4 million females). According to the 1961 census, persons born in Pakistan and enumerated in India (survivors of those who came to India at the time of partition, and those who came between 1951 and 1961) numbered 4.5 million males and 3.8 million females. Hence, international migration also does not help to explain the increasing sex-ratio imbalance in India (India, Office of the Registrar General and Census Commissioner, India [ORGCC], 1974:49–50).

*Differential mortality.* The excess of males in the population of India rose steadily and rapidly each census year until 1981 from a

difference of only 3.4 million in 1901, and this widening of the gap seems to have accelerated dramatically between 1951 and 1971 (Table 6). The female death rate, which was lower than the male death rate in 1901, became higher in the 1911–21 decade and remained so through 1971. What is more, the difference between the female and male death rates reached its highest level (2.9 per thousand) in 1961, even though there was a steady reduction in mortality after 1921 of both males and females (Mitra, 1978:378–80).

The ratios of sex- and age-specific probabilities of deaths ( $q_x^m/q_x^f$ ) presented in Table 7 suggest the extent of neglect that normally attends female babies and young girls from birth to about age nine, and the pace at which this selected neglect grew between 1941–50 and 1961–70 (Mitra, 1978:380). It is largely for this reason that the sex ratio of the overall population of India became more and more unfavorable to females over time. Unless the male and female mortality pattern undergoes a drastic change and starts following the pattern of developed countries, the sex ratio is likely to increase further. The reasons for the reversal of the trend in 1981 can be known only after there has been a detailed analysis of the census data and the available data on sex-age-specific death rates.

### Age composition

“Although age has been a major question in the Indian census schedule ever since 1872, the tabulation of single year ages either from a representative sample or [from] the entire population was not attempted until 1951. Successive Census Actuaries up to 1931 had to be content with small selected single year age distributions or [with] a few representative tracts of the country as well as quinquennial groups for the entire population on which to construct their life tables. . . . The Census of 1951 tabulated for each district, political State as well as for India, the first ever comprehensive single year age distribution by each sex on a ten percent systematic sample with a random start” (Census of India 1961 [1963: foreword]).

The Indian census age returns suffer from pronounced heapings at certain preferred ending digits such as 0 and 5 and, to a lesser extent, at even digits like 2, 4, and 8; hence, they have deficits in most of the odd digits. This age heaping is largely due to ignorance on the part of many Indians about their actual age. Guesses tend to produce ages with desirable endings considerably more often than the purposeful

TABLE 6 Population of males and females: India, 1901–71

Year	Population (thousands)		M – F (thousands)	Decadal growth rate		Estimated death rate for previous decade per 1,000		
	Males	Females		Males	Females	Males	Females	F – M
1901	120,911	117,485	3,426			50.4	49.9	-0.5
1911	128,385	123,708	4,677	6.18	5.30	46.6	48.2	+1.6
1921	128,546	122,775	5,771	0.13	-0.75	52.8	53.5	+0.7
1931	143,055	135,922	7,133	11.29	10.71	35.2	37.7	+2.5
1941	163,825	154,835	8,990	14.52	13.91	27.2	29.4	+2.2
1951	185,528	175,560	9,968	13.25	13.39	28.8	30.2	+1.4
1961	226,293	212,942	13,351	21.97	21.29	5	23.4	+2.9
1971	283,937	264,013	19,924	25.47	23.98	17.3	18.6	+1.3

NOTE: The death rates of males and females for the decade 1961–71 were computed from the life table death rates for 1961–71 and estimated mid-decade population in each age group.

SOURCE: Mitra (1978:379).

TABLE 7 Ratio of age-specific mortality rates of males to age-specific mortality rates of females: India, 1941-50, 1951-60, and 1961-70

Age	1941-50	1951-60	1961-70
0	1.09	1.11	1.01
1	0.76	0.83	1.11
2	0.74	0.83	0.73
3	0.76	0.82	0.72
4	0.80	0.82	0.72
5	0.83	0.81	0.70
6	0.86	0.81	0.69
7	0.89	0.81	0.66
8	0.92	0.82	0.69
9	0.96	0.83	0.70
10	1.00	0.86	0.72
15	1.27	0.94	1.41
20	1.34	0.95	1.24
25	1.05	1.00	1.10
30	0.84	0.63	0.73
35	0.80	0.64	0.71
40	0.83	0.79	0.72
45	0.91	0.92	0.78
50	1.03	0.99	0.99
60	1.15	1.09	1.08
70	1.18	1.17	1.02

NOTE: Figures in the last column were computed from the official life tables for 1961-70 (Census of India 1971 [1977a]).

SOURCE: Mitra (1978:380).

rounding of a known age would. The single-year census age data when plotted on a graph show the familiar concentrations and depressions at regular intervals. Age heaping is also evident in the U.N. Index (age-ratio scores and joint scores of age-ratio and sex-ratio scores) for India and its five zones (Table 8). There is a steady decline in the value of the scores and, hence, according to Mukherjee (1976:53), a steady improvement in the quality of the age data in Indian censuses. However, as the Index of Concentration (Whipple's Index)<sup>2</sup> and the Index of

<sup>2</sup> Whipple's Index measures the extent of concentration at ages ending in digits 0 and 5. It is calculated by summing the populations at ages ending in digits 0 and 5 in the age range 23-62 to one-fifth of the total enumerated population in the age range. The index varies between 100 and 500.

TABLE 8 Age-ratio score, sex-ratio score, and joint score: India and its zones, 1881–1961

Zone	1881	1891	1901	1911	1921	1931	1941	1951	1961
<b>INDIA</b>									
Age-ratio score: male	26	20	22	18	19	10	10	8	8
Age-ratio score: female	31	26	25	25	24	11	13	9	10
Sex-ratio score	12	13	11	12	12	8	9	7	7
Joint score	94	85	80	80	79	45	50	38	38
<b>EASTERN</b>									
Age-ratio score: male	22	20	17	15	14	9	8	7	8
Age-ratio score: female	26	23	19	19	18	10	10	6	11
Sex-ratio score	13	11	11	12	11	10	10	6	10
Joint score	87	77	70	68	66	50	49	29	47
<b>CENTRAL</b>									
Age-ratio score: male	34	30	25	23	22	14	13	9	9
Age-ratio score: female	37	36	27	29	27	15	16	10	11
Sex-ratio score	11	13	9	11	11	10	9	8	7
Joint score	104	105	78	85	82	60	56	43	42
<b>SOUTHERN</b>									
Age-ratio score: male	27	18	21	16	17	9	11	8	7
Age-ratio score: female	39	31	29	24	26	10	13	12	10
Sex-ratio score	15	16	14	14	14	7	7	7	6
Joint score	111	97	93	81	86	41	47	42	34
<b>WESTERN</b>									
Age-ratio score: male	19	23	22	17	22	6	9	7	5
Age-ratio score: female	20	31	24	26	27	7	13	10	9
Sex-ratio score	10	15	12	15	14	7	12	9	7
Joint score	70	100	80	87	90	34	57	45	36
<b>NORTHERN</b>									
Age-ratio score: male	25	4	25	21	22	11	13	10	12
Age-ratio score: female	31	5	30	32	28	11	14	12	13
Sex-ratio score	14	8	12	16	14	5	8	7	6
Joint score	97	32	91	103	93	38	51	42	41

NOTE: The age ratio for a particular five-year age group is obtained by multiplying by 100 the ratio of the population of that age group to the average population of two adjacent age groups. The sum of the absolute deviations of the age ratio from 100 for each age group divided by the number of age intervals for which the age ratios have been calculated gives the age-ratio score. The sex-ratio score is the mean of the difference between the sex ratios of all the pairs of successive age groups. The joint score equals the age-ratio score for males plus the age-ratio score for females plus the sex-ratio score multiplied by 3. Small discrepancies exist owing to rounding errors.

SOURCE: Mukherjee (1976:60).

TABLE 9 Indices of Concentration and Preference: India, 1951--71

Year	Index of Concentration		Index of Preference	
	Male	Female	Male	Female
1951	247	258	57.4	61.4
1961	282	294	59.5	63.4
1971	294	300	61.4	63.8

NOTE: The Index for Preference for 1951 is based on age range 20-59. The comparable figures for 1961 for males and females are 70.7 and 75.1 respectively. The figures for 1961 and 1971 in the table are based on age range 10-79.

SOURCES: Census of India 1961 (1963:7); Census of India 1971 (1977c:3).

Preference (Myer's Index)<sup>3</sup> for the years 1951, 1961, and 1971 (Table 9) indicate, the errors in age reporting seem to have been increasing over time. This discrepant result occurs because Mukherjee's joint scores are obtained from quinquennial age data whereas the indices in Table 9 are obtained from single-year age returns.

The detailed age data for 1971 indicate that the concentration at digit 0 is much higher than at digit 5; ages 0 and 1 are in heavy deficit, the deficit at age 1 being more than at age 0; ages 10, 30, 35, and 40 seem to be most preferred; after age 40, the heaping at ages ending in digit 0 is much sharper than that at ages ending in digit 5; and ages ending in digits 2 and 8 are, on an average, correctly reported up to age 30 (Census of India 1971[1977c:1]).

In general, the pattern of age biases is uniform throughout the country. Variations between states are minor, although it seems that the greater the literacy of a state's population, the smaller the distortions in age reporting. The female population tends to show a slightly more distorted age distribution than the male population (Zlotnik, 1979:5).

Because of these distortions in the census age count, for a large number of uses it is necessary to apply corrections to the single-year age returns. Unfortunately, Census Actuaries' smoothed age tables for different census years suffer in comparability because of differences in methods of smoothing from one census to the next.

3 For calculating Myer's Index of Digit Preference, two age ranges (10-69 and 20-79) are used. In each range the sum of the population enumerated in ages ending in each of the ten digits 0, 1, 2, . . . , 9 is calculated. This gives rise to two series of ten values each. The two series are blended into one by the assignment of weights 1, 2, 3, . . . , 10 for the first series and 9, 8, 7, . . . , 0 for the second series. Deviations from 10 percent, irrespective of sign, when added give Myer's Index. The index can vary from 0 to 180.

Discussion of secular trends in the age pyramids of India and of its constituent states, territories, and zones had to wait until the meticulous work of Mukherjee appeared in 1976 in *The Age Distribution of the Indian Population: A Reconstruction for the States and Territories, 1881-1961* (Mitra, 1978:238). Mukherjee worked out the age tables of the census count in quinquennial age groups from 1881 to 1961 not only for India and its zones but also for each state and union territory as defined at the time of the 1971 census. The percentage distribution of population by sex and age for India from 1881 to 1971 is given in Table 10. Figures 1 and 2 depict the pattern of changes in the male and female age distributions from 1901 to 1971. They indicate that concentration on the digit 0 from age 30 onward dampened considerably in the censuses of 1951, 1961, and 1971.

Figures 1 and 2 also indicate that the gradient of the age curve is steep in the early ages, moderate in the middle ages, and steep once again in the older ages. This finding is, by and large, repeated in the five zones and different states of India and for both male and female populations (Mukherjee, 1976:44).

#### NUPTIALITY

The social and cultural milieu of India has long favored universal and early marriage for women. Among the Hindus, who form more than 80 percent of the population, the primary role of women has remained that of mother. Even among other communities, such as Muslims, Christians, and Sikhs, the practice of universal and early marriage is prevalent (India, ORGCC, 1974:52). Because of this, female marriage ages in India are among the lowest in the world.

India does not have a marriage registration system. Hence, whatever analyses of nuptiality and age at marriage are available have been done with census data or sample surveys. Table 11 gives the proportions of females and males remaining single in each age group in the "decade synthetic cohorts"<sup>4</sup> from 1891-1901 to 1951-61 and the mean age at marriage (MAM) for each sex. These data indicate a

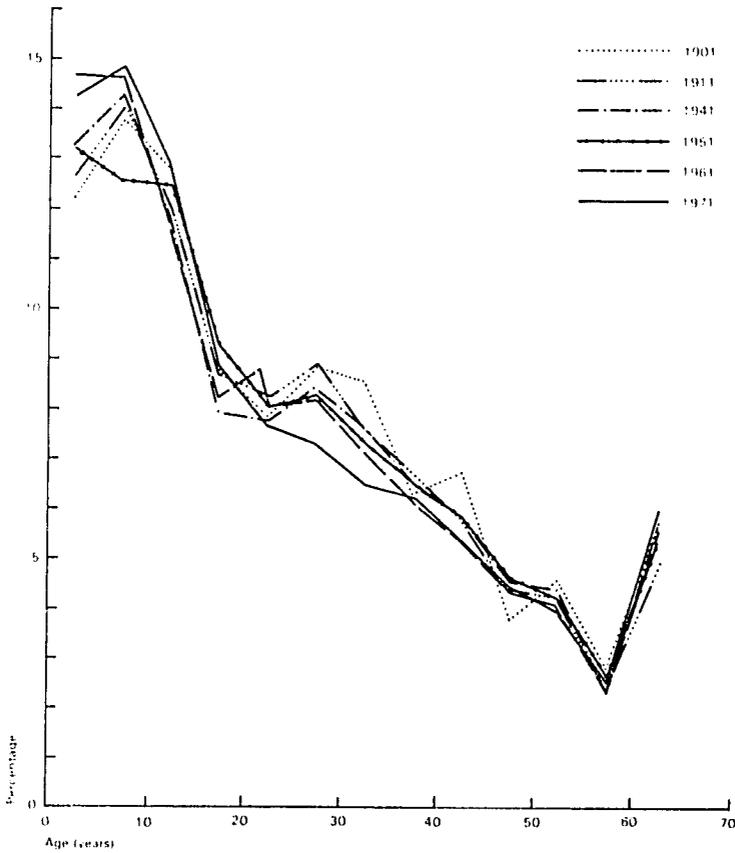
4 In a "decade synthetic cohort," the marriage experience of a decade is isolated by the calculation of the probabilities of remaining unmarried between age  $x$  at time  $t$  and  $x + 10$  at time  $t + 10$  (where  $t + 10$  refers to another census year 10 years later) and by the application of these probabilities to a synthetic cohort. The proportions "single" for ages 0-4 and 5-9 are those found in the census at time  $t + 10$  because these proportions are logically the result of the marriage experience (if it occurs) of the decade (Agarwala, 1972:73).

TABLE 10 Percentage distribution of population by sex and age: India, 1881—1971

Age group	1881	1891	1901	1911	1921	1931	1941	1951	1961	1971
<b>MALES</b>										
0—4	12.86	13.85	12.19	13.11	11.83	12.62	13.13	13.17	14.68	14.16
5—9	14.09	14.13	13.70	13.52	14.57	14.00	14.23	12.60	14.63	14.87
10—14	12.23	11.41	12.77	11.59	12.48	11.95	11.91	12.45	11.62	12.85
15—19	8.14	8.30	8.74	8.51	8.36	8.64	7.97	9.14	8.23	8.88
20—24	8.09	8.07	7.93	8.31	7.73	8.15	7.74	8.05	8.05	7.60
25—29	9.06	8.74	8.78	8.96	8.62	8.84	8.40	8.27	8.20	7.16
30—34	9.05	8.56	8.52	8.36	8.32	7.61	7.62	7.32	7.07	6.45
35—39	5.87	6.08	6.09	6.25	6.40	6.72	6.47	6.44	6.02	6.07
40—44	6.65	6.61	6.64	6.47	6.34	5.89	5.85	5.87	5.35	5.30
45—49	3.33	3.64	3.77	3.85	3.96	4.42	4.54	4.58	4.31	4.39
50—54	4.42	4.26	4.49	4.45	4.48	4.11	4.34	4.21	4.04	3.91
55—59	1.59	1.73	1.80	1.79	1.85	2.18	2.36	2.62	2.34	2.42
60+	4.63	4.65	4.57	4.83	5.06	4.87	5.45	5.28	5.47	5.94
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
<b>FEMALES</b>										
0—4	13.85	15.00	12.94	14.07	12.89	13.78	13.96	13.80	15.47	14.90
5—9	13.63	13.80	13.53	13.44	14.74	13.99	14.34	12.88	14.86	15.07
10—14	10.11	9.41	10.94	9.93	10.84	10.65	10.71	11.95	10.83	12.22
15—19	7.60	7.85	8.17	8.05	7.80	8.47	7.84	9.08	8.12	8.43
20—24	9.15	9.00	8.92	9.32	8.71	9.21	8.55	8.71	9.00	8.15
25—29	9.31	9.03	8.93	9.13	8.84	9.12	8.78	8.32	8.49	7.76
30—34	9.03	8.68	8.63	8.52	8.49	7.57	7.71	7.41	6.98	6.77
35—39	5.35	5.57	5.68	5.64	5.78	6.22	6.09	5.95	5.58	5.93
40—44	6.66	6.50	6.74	6.50	6.41	5.62	5.70	5.58	5.07	5.01
45—49	3.10	3.22	3.49	3.46	3.54	4.02	4.10	4.10	3.91	3.95
50—54	4.72	4.41	4.69	4.59	4.53	3.93	4.18	4.11	3.75	3.57
55—59	1.58	1.65	1.73	1.67	1.72	2.06	2.10	2.38	2.14	2.25
60+	5.90	5.86	5.60	5.67	5.72	5.36	5.94	5.73	5.81	5.99
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

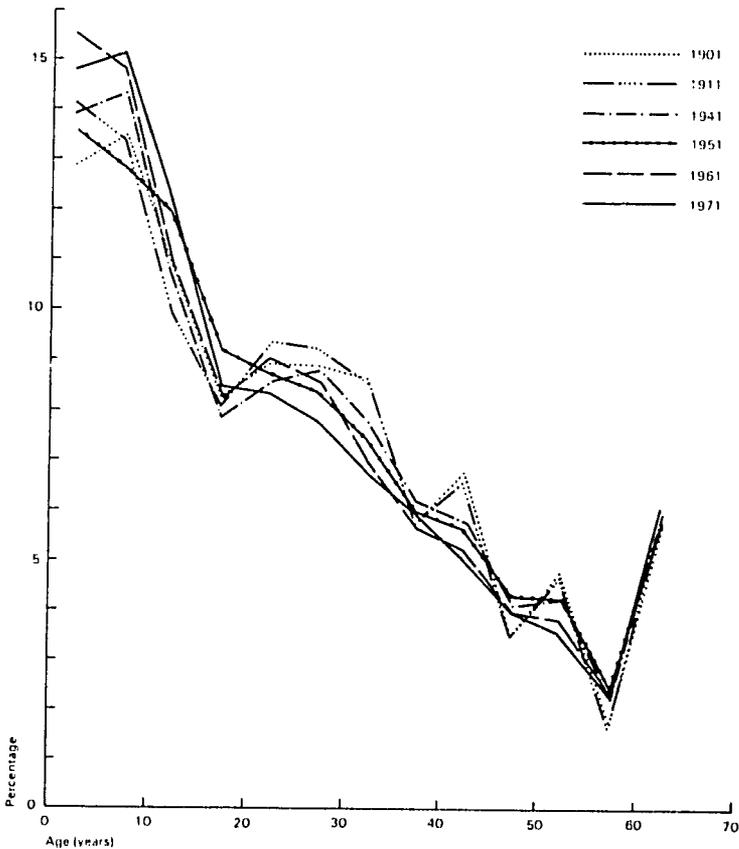
SOURCES: 1881—1961: Mukherjee (1976:97). 1971: Census of India 1971 (1977c:68—69).

FIGURE 1 Male age distribution: India, 1901–71



gradual rise in the age at marriage of both males and females during the 30 years from 1891 to 1921. The MAM of both sexes, however, declined sharply during the 1921–31 decade owing to the passage of the Child Marriage Restraint Act in 1929, which prescribed a minimum age at marriage of 14 years for girls and 18 years for boys. The public used the period between the passing of the Act in September 1929 and its enforcement from April 1930 to perform child marriages on a large scale. The Act was amended once in 1949 to raise the

FIGURE 2 Female age distribution: India, 1901–71



minimum age at marriage to 15 years for females and again in 1978 to raise it to 18 years for females and 21 years for males. In the decade following the Child Marriage Restraint Act there was a sharp rise in the MAM of females and a substantial drop in child marriages, although they still existed in 1951–61 (Mitra, 1978:296–301).

As the customs and marriage practices in India differ from state to state, there are state and regional variations in the MAM of males and females. Goyal (1975) has calculated the mean age at marriage for

TABLE 11 Proportions single and mean age at marriage by sex:  
decade synthetic cohorts, India, 1891–1901 to  
1951–61

Sex and age group	1891-- 1901	1901-- 11	1911-- 21	1921-- 31	1931-- 41	1941-- 51	1951-- 61
<b>FEMALES</b>							
Proportions single							
0–4	0.985	0.985	0.988	0.976	0.986	0.986	0.986
5–9	0.889	0.890	0.907	0.858	0.919	0.946	0.947
10–14	0.543	0.555	0.603	0.487	0.763	0.827	0.804
15–19	0.158	0.163	0.192	0.157	0.270	0.289	0.290
20–24	0.046	0.045	0.056	0.034	0.063	0.071	0.057
25–29	0.030	0.023	0.029	0.015	0.023	0.048	0.018
30–34	0.028	0.018	0.024	0.008	0.014	0.031	0.009
35–39	0.028	0.013	0.020	0.007	0.012	0.031	0.003
Mean age at marriage <sup>a</sup>	12.77	13.07	13.53	12.52	14.94	15.38	15.43
<b>MALES</b>							
Proportions single							
0–4	0.993	0.993	0.994	0.986	0.989	0.989	0.989
5–9	0.961	0.962	0.966	0.941	0.960	0.958	0.958
10–14	0.854	0.866	0.879	0.792	0.854	0.853	0.931
15–19	0.639	0.666	0.690	0.560	0.688	0.660	0.761
20–24	0.396	0.384	0.408	0.288	0.381	0.367	0.478
25–29	0.188	0.188	0.200	0.120	0.196	0.162	0.204
30–34	0.112	0.098	0.105	0.057	0.093	0.077	0.100
35–39	0.073	0.061	0.069	0.034	0.069	0.054	0.057
40–44	0.070	0.050	0.059	0.026	0.049	0.038	0.052
45–49	0.057	0.038	0.048	0.023	0.049	0.038	0.043
50–54	0.057	0.036	0.045	0.021	0.040	0.032	0.034
Mean age at marriage <sup>b</sup>	20.01	20.41	20.74	18.44	20.30	19.93	21.76

a Among females married up to age 35.

b Among males married up to age 50.

SOURCE: Agarwala (1972:74).

each sex, by rural and urban residence and by state in 1961 and 1971 (Table 12), applying Hajnal's (1953) methodology.<sup>5</sup> The statewide variations in the MAM of both sexes are quite large. In 1971 they were 5.7 years for females between Madhya Pradesh and Kerala in the total population, 6.3 years between Madhya Pradesh and the union territory of Goa, Daman, and Diu, and 7.1 years for males between Madhya Pradesh and Kerala. These differences are more pronounced in rural than in urban areas. The entire heartland of India, comprising mainly Bihar, Madhya Pradesh, and Uttar Pradesh, and also Andhra Pradesh, Orissa, and Rajasthan, has the lowest MAM for both males and females (Mitra, 1978:301). In contrast, the southern states of Kerala and Tamil Nadu, the union territory of Goa, Daman, and Diu, and, to some extent, Mysore have exhibited the highest MAMs over time. Nevertheless, almost all the states and union territories of India experienced an upward shift in the MAM between 1961 and 1971.

One peculiar feature of early marriages in India is that they are not consummated for some years. The bride continues to live in her natal home until a ceremony called in Hindi *gauna* or *vida* ("return marriage") is performed, after which the couple truly starts its married life. The National Sample Survey (NSS) Eleventh Round reported that for marriages contracted between 1930 and 1949 the average interval between formal and "return," or effective, marriage in the rural areas was 27.6 months when formal marriage was contracted before the girl reached age 15, and 3.2 months for marriages at age 15 and over. The corresponding figures for urban areas were 19.2 months and 1.8 months. The NSS Seventeenth Round established that the average age of females at effective marriage increased in rural areas from 15.62 years in 1921-30 to 16.41 years in 1956-60. In urban areas the increase was from 15.35 years in 1921-30 to 16.65 years in 1956-60 and 17.42 years in 1961-62 (India, Cabinet Secretariat, 1970a:6). The rise in the age at marriage has been accompanied by virtual elimination

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5 Zlotnik and Visaria (1979) have also calculated for the years 1951, 1961, and 1971 the singulate mean age at marriage (SMAM), or the expected length of single life among those who marry before a certain upper age limit. Whereas for 1971 Goyal used tables on sex, age, and marital status based on a 1 percent sample of the 1971 census, Zlotnik and Visaria used detailed tabulations based on a 10 percent rural and a 20 percent urban sample. In comparing the years 1961 and 1971, however, Goyal was able to have a greater coverage of the Indian states and union territories than Zlotnik and Visaria.

TABLE 12 Mean age at marriage by sex and rural/urban residence: Indian states, 196<sup>1</sup> and 1971

State	Females						Males					
	Total		Rural		Urban		Total		Rural		Urban	
	1961	1971	1961	1971	1961	1971	1961	1971	1961	1971	1961	1971
INDIA	16.1	17.2	15.7	16.7	17.9	19.2	21.4	22.2	20.8	21.6	23.5	24.3
MAJOR STATES												
Andhra Pradesh	15.4	16.4	15.1	15.9	16.6	18.0	21.9	22.6	21.7	22.2	23.3	24.0
Assam	18.6	18.5	18.5	18.3	19.1	20.1	24.9	25.1	24.9	24.8	25.4	26.7
Bihar	14.7	15.5	14.5	15.3	16.1	17.1	18.6	19.9	18.4	19.5	20.9	22.4
Gujarat	17.2	18.3	16.8	17.9	18.4	19.5	21.3	22.1	20.6	21.3	22.9	23.7
Jammu & Kashmir	16.1	17.8	15.9	17.3	17.1	19.8	22.1	23.4	21.7	22.8	23.5	25.4
Kerala	20.1	20.9	19.9	20.7	20.9	21.6	25.8	26.3	25.6	26.1	27.1	27.2
Madhya Pradesh	14.3	15.2	14.0	14.7	16.1	17.6	18.4	19.2	17.8	18.4	21.4	22.5
Maharashtra	15.9	17.5	15.1	16.6	18.2	19.4	22.2	23.3	21.2	22.4	24.1	24.6
Mysore (Karnataka)	16.5	17.9	16.0	17.3	17.9	19.5	24.2	24.8	23.8	24.3	25.4	26.1
Orissa	16.5	17.2	16.5	17.2	17.0	17.6	21.7	22.6	21.5	22.5	23.1	24.0
Punjab	17.6	18.8	17.2	18.3	19.0	20.3	21.6	22.4	21.1	21.8	23.2	23.9
Rajasthan	14.6	15.4	14.4	15.0	15.7	16.3	19.2	19.5	19.0	19.1	20.3	21.0
Tamil Nadu	18.4	19.6	18.2	19.3	18.7	20.2	24.8	25.5	24.5	25.2	25.5	26.2
Uttar Pradesh	14.8	15.6	14.5	15.1	17.0	18.3	18.7	19.4	18.2	18.8	21.4	22.5
West Bengal	16.1	17.8	15.2	16.8	19.2	20.5	23.5	24.3	22.8	23.6	25.0	25.8
OTHER AREAS												
Himachal Pradesh	15.8	17.5	15.6	17.2	18.4	20.9	21.2	22.5	21.1	22.2	23.6	24.6
Delhi (UT)	18.7	19.9	16.0	17.2	19.0	20.1	22.8	23.5	19.1	20.9	23.1	23.8
Manipur	19.8	21.1	18.8	20.8	19.7	22.7	24.4	24.8	24.2	24.9	25.5	24.8
Tripura	16.4	18.4	16.1	18.1	18.7	21.1	23.7	24.9	23.4	24.7	26.5	27.3
Goa, Daman, and Diu (UT)	20.7	21.5	20.8	20.8	22.5	23.3	26.1	26.1	25.9	26.0	26.6	26.4

UT— union territory.

SOURCE: Goyal (1975:336–44).

of the traditional time interval between formal ceremonies of marriage and the start of cohabitation (Visaria and Jain, 1976:13).

## FERTILITY

### **The civil registration system**

The conventional method of obtaining information about vital events is the civil registration system, wherein births and deaths are reported and recorded shortly after their occurrence. Although the Indian civil registration system is more than a century old, the registration of births and deaths is still very deficient in content, coverage, and completeness. Some of the factors responsible for the undercoverage of vital events are the low level of literacy, the overwhelmingly rural population, and the inadequacy of registration machinery (India, ORGCC, 1979). The system of registration started in India with the registration of deaths mainly for the control of pestilence in the mid-1860s. Subsequently, registration of births was introduced gradually in different parts of the country. An act to register births, deaths, and marriages nationwide on a voluntary basis was introduced in 1886, but it remained mainly inoperative so far as the general population was concerned.

Although efforts were made from time to time to improve the civil registration system and various committees and commissions (important among them being the Health Survey and Development Committee in 1946 and the Vital Statistics Committee in 1949) made detailed suggestions, it was not until the beginning of the 1960s that concrete steps were taken to improve the registration system. The Office of the Registrar General and Census Commissioner, India, took measures to have one common legislative act for the registration of vital statistics known as the Birth and Death Registration Act, 1969, which came into force on 1 April 1969. This new law has unified the system of registration nationally and promoted uniformity and comparability in registration and compilation of vital statistics. Because the agency in charge of the registration of vital statistics at the village and town level in different states has remained basically the same, however, the deficiencies in coverage and reporting of events continue. According to one estimate made at the all-India level by the Office of the Registrar General and Census Commissioner, the extent of under-reporting of births and deaths is 58 percent and 65 percent,

respectively (India, ORGCC, 1979a:8). Hence, these data are rarely used for scientific analysis of vital rates in India.

### **Alternative sources of vital statistics**

In the absence of dependable data from the civil registration system, alternative methods have been devised for the estimation of vital rates and collection of vital statistics. The successive censuses of India have provided information on the sex and age composition of India's population. Intercensal estimates of birth and death rates at the all-India, zonal, and state levels have been obtained by government officials using the reverse-survival/differencing method, and by various researchers applying other techniques. The reliability of these estimates has been questioned from time to time because the assumptions used in the smoothing of the age data and in the calculation of childhood mortality are often found not to be realistic.

As the methods based on census age distributions do not provide year-to-year estimates of vital rates on a "current" and "continuous" basis, various agencies have undertaken sample surveys in India from time to time to facilitate such estimates. These surveys include single-round retrospective surveys at local, regional, and national levels and multi-round follow-up surveys at the national level.

The National Sample Survey Organisation (NSSO) made a beginning to collect nationwide information on current and historical fertility as part of its regular socioeconomic inquiries. During 1958--68, population surveys of the single-round retrospective type became an integral part of its annual rounds, but they were later discontinued. In such surveys information on events occurring to the members of the sample households during the 12 months preceding the inquiry were collected. The NSSO conducted a comprehensive survey of population, fertility, family planning, and mortality in its Twenty-Eighth Round (1973--74), but vital rates derived from that round have been found to be grossly underestimated. Results of other rounds of the NSS have also suffered from substantial recall bias.

In order to have regular and reliable estimates of birth and death rates at least at the state level, the Office of the Registrar General and Census Commissioner in 1964 introduced a pilot scheme of sample registration in the rural areas of selected states. Later, the scheme was extended to cover both rural and urban areas in almost all the states and union territories. This Sample Registration Scheme (SRS) is a dual

record system in which events in the sampled areas are recorded as they occur by a specially appointed "registrar" and a survey is conducted every six months by a supervisor covering all the households in the selected areas to make an independent list of events. The events obtained from the two records are matched; the unmatched or the partially matched events are then verified in the field so as to yield an unduplicated count of correct vital events. The SRS provides half-yearly and yearly estimates of vital rates and other measures of fertility and mortality at the national and state levels that are considered to be sufficiently reliable for most practical purposes; but they suffer from some unavoidable undercount of events, which can be put roughly at 5 percent on the basis of some intensive inquiries on the performance of the local registrars and supervisors (India, ORGCC, 1974:10).

### Estimates of birth rates

Using the smoothed age distribution from two consecutive censuses, Census Actuaries have obtained estimates of birth rates for each decade (Table 13). Though there are variations in the reporting of ages and differences in the procedures employed, the figures broadly indicate that the birth rate in India has remained at a high level for a long period. The dip in the birth rate during 1941–51 is partly attributed to the method of smoothing age data and the method of estimating deaths in the age group 0–4.

As the estimates for the period up to 1941 are for undivided India and as the methodology of estimating birth rates has differed over

TABLE 13 Decadal birth rates: India, 1901–71

Decade	Birth rate (per 1,000 population)
1901–11	49.2
1911–21	48.1
1921–31	46.4
1931–41	45.2
1941–51	39.9
1951–61	41.7
1961–71	41.1

NOTE: The estimates for 1941–51 and 1951–61 are based on the "differentiation" method; all others are based on the "reverse survival" method.

SOURCE: India, ORGCC (1974:10).

time,<sup>6</sup> Mukherjee (1976) has developed estimates of birth and death rates for India, its zones, states, and union territories as they were constituted at the time of the 1971 census by following a uniform methodology (of the quasi-stable population model) and applying it to the period 1901–71. His estimates of birth rates for all India and its zones are reproduced in Table 14.

TABLE 14 Estimated birth rates for India and its zones: 1901–71

Zone	1901	1911	1921	1931	1941	1951	1961	1971
INDIA	47–49	48–50	48–50	46–48	44–46	42–44	43–45	40.59
Eastern	50–52	48–50	49–51	46–48	45–47	43–45	44–46	43.75
Central	46–48	48–50	48–50	46–48	44–46	42–44	43–45	39.99
Southern	44–46	45–47	43–45	43–45	44–46	40–42	42–44	39.35
Western	49–51	49–51	47–49	46–48	43–45	43–45	42–44	40.45
Northern	46–48	47–49	47–49	46–48	46–48	44–46	44–46	40.94

SOURCES: 1901–61: Mukherjee (1976:221), 1971: Census of India 1971 (1977a:38, table 2).

After the publication of the U.N. Manual IV, *Methods of Estimating Basic Demographic Measures from Incomplete Data* (United Nations, ECOSOC, 1967), several researchers in India and abroad estimated vital rates for 1961 and 1971 by applying stable population models to the unsmoothed census data or by assuming quasi-stability of the population's age structure (Adlakha and Kirk, 1974; Ambannavar, 1975; Cassen, 1978; Dyson, 1979; Premi, 1972; Rele and Sinha, 1969 and 1973; Srikantan and Raychaudhuri, 1972). Their estimates at the all-India level vary within a narrow range for 1961 as well as for 1971, and therefore it becomes almost impossible to say which method is superior. Some of the differences in the state-level estimates, however, are quite substantial and it is difficult to believe several of these estimates. Table 15 presents a comparison of state-level estimates of birth rates from various sources by Srikantan (1979). The estimates speak

6 The question of obtaining consistent estimates of birth and death rates for India and its states over time came up for discussion at a meeting of the Panel on India of the U.S. Academy of Sciences held in New Delhi, October 1979. As the different methodologies used for estimating vital rates from census age data had both advantages and disadvantages, the panel was of the opinion that no uniform methodology can be suggested and one should take the estimates within a range of values.

for themselves about the variation in rates because of differences in the methodologies.

The NSS rounds during 1958-67 have provided estimates of crude birth rates for India and its states. Leaving aside possible errors due to recall lapse in the recording of births in a single-round retrospective survey such as the NSS, these estimates indicate that during the 1960s a sharper reduction in fertility occurred in urban areas than in rural areas (Table 16).

As indicated earlier, the Office of the Registrar General and Census Commissioner initiated the Sample Registration Scheme (SRS) in the mid-1960s in order to obtain reliable annual estimates of birth and death rates at the national and state levels. National-level estimates of birth rates for the rural and urban areas of the country during 1970-79 are presented in Table 17;<sup>7</sup> state-level estimates are presented in Table A4.

Barring the estimates for 1973 and 1974, which were affected by inadequate supervision due to postponement of the half-yearly survey, one observes a declining trend in the birth rate, in both rural and urban areas (Table 17). Among the causes that may be hypothesized for the decline is the massive family planning drive that took place in India during the first half of the decade. The program is discussed in the next major section of this paper.

The data in Table A4 indicate variable birth rates among the states. On the basis of these data, states can be grouped as in Table 18 according to their birth rates in 1970 and 1978. Uttar Pradesh is the only state where the birth rate in rural areas remained 40 or above per 1,000 over the period.<sup>8</sup> There was a considerable reduction in urban fertility in all the states. Rajasthan, Gujarat, Madhya Pradesh, and Uttar Pradesh form one contiguous belt wherein birth rates continued to be highest in both rural and urban areas. A significant reduction in the national birth rate depends on lowering birth rates in these states and

7 The aggregated estimates for India exclude Bihar and West Bengal. As the birth rates in these states, particularly in Bihar, are believed to be higher than the national average and as they together cover 19.2 percent of the rural and 15.2 percent of the urban population of the country, their inclusion is expected to raise the overall birth rate by half a point to one point. Moreover, the SRS estimates suffer from under-recording of vital events by about 5 percent. If both these factors are taken into account, the all-India birth rate in 1978 is in the vicinity of 35 per thousand.

8 If reliable data were available for Bihar, they would probably indicate a birth rate similar to that of Uttar Pradesh.

TABLE 15 Estimated births per 1,000 population: India and 15 major

Source, period, and method	INDIA	Andhra Pradesh	Karna- taka	Kerala	Tamil Nadu	Maha- rashtra	Gujarat
Registrar General, 1941-51							
State, 1951	India	Madras	Mysore	Travan- core- Cochin	Madras	Bombay	Bombay
Difference	39.9	35.7	36.9	37.4	35.7	41.0	41.0
Reverse survival	39.2	34.7	38.7	39.8	34.7	41.8	41.8
Registrar General, 1951-61	41.7	39.7	41.6	38.9	34.9	41.2	45.7
Srikantan & Raychaud- huri, 1951-61	44.9	40.1	44.0	46.2	37.9	46.0	49.4
Registrar General, 1961-71							
Quasi-stable	40.6	39.4	42.5	40.3	37.5	38.4	41.1
Reverse survival	41.2	39.2	39.9	37.5	36.8	41.0	41.6
Central death rate	41.0	36.2	40.1	41.0	36.9	40.3	40.8
Difference	40.0	38.6	38.6	35.1	34.5	42.7	40.2
Srikantan, unadjusted							
1961-66	42.1	39.4	40.7	38.8	37.3	41.8	44.5
1966-71	40.4	38.8	39.1	36.2	36.1	39.9	38.9
1961-71	41.3	39.1	39.9	37.5	36.7	40.9	41.6
Srikantan, adjusted							
1961-66	42.2	38.3	39.4	38.0	36.4	41.0	44.2
1966-71	40.3	38.4	39.1	35.9	36.1	39.3	38.7
1961-71	41.3	38.4	39.3	37.0	36.3	40.2	41.4
Sample Registration Scheme							
1971	37.2	35.0	32.7	30.6	30.8	32.0	40.4
Average, 1970-72	37.2	35.4	32.0	31.3	31.3	32.0	40.4
Seal, 1971	37.6	36.0	37.7	33.5	30.7	35.0	40.7
National Sample Survey							
July 65-June 66							
Rural	36.3	34.7	34.7	30.9	31.8	35.7	35.2
Urban	30.3	30.3	30.6	33.0	32.3	32.3	33.9
July 66-June 67							
Rural	36.3	35.5	30.6	31.3	32.3	36.2	33.2
Urban	30.0	31.1	30.2	26.4	29.9	28.9	32.7
Preston et al.	39.5 (1969- 71)	35.8 (1968- 70)	37.1 (1969- 70)	35.3 (1968- 70)	35.5 (1969- 70)	36.8 (1968- 70)	42.9 (1968- 70)
Dyson, 1971	u	36.4	39.3	38.5	38.7	36.8	42.5

NOTE: Figures are for the states as they were constituted at the time of the respective censuses.  
u—unavailable.

SOURCE: Srikantan (1979:3-7).

states, various sources, periods, and methods

Uttar Pradesh	Madhya Pradesh	Assam	Bihar	Orissa	West Bengal	Haryana	Punjab	Rajasthan
Uttar Pradesh	Madhya Pradesh	Assam	Bihar	Orissa	West Bengal	Punjab	Punjab	Rajasthan
38.6	46.1	46.7	39.0	u	35.4	41.2	41.2	42.5
37.1	45.1	49.8	42.2	u	35.3	40.8	40.8	47.9
41.5	43.2	49.3	43.4	40.4	42.9	44.7	44.7	42.7
42.7	47.7	53.4	46.2	42.7	47.5	50.5	50.5	49.6
41.2	39.7	49.3	42.6	42.7	44.8	44.0	39.7	44.0
42.5	46.6	48.4	41.9	41.3	44.3	44.5	36.9	42.7
40.1	47.4	49.0	38.6	40.1	45.4	44.5	36.4	40.1
39.5	43.4	44.1	40.0	38.9	44.7	39.7 <sup>a</sup>	39.7 <sup>a</sup>	42.5
43.1	46.8	52.3	42.5	44.1	46.5	45.8	38.3	43.7
41.8	47.1	44.7	41.2	38.5	41.9	43.3	35.6	41.7
42.5	47.1	48.4	41.8	41.2	44.2	44.6	36.9	42.7
45.1	46.6	50.9	42.3	43.2	45.5	47.5	39.6	44.7
42.6	47.1	43.3	40.7	37.6	40.4	44.4	36.5	41.8
43.8	47.0	46.9	41.5	40.3	42.9	46.0	38.0	43.2
45.0	39.2	38.8	33.7	38.3	30.0	33.2 <sup>a</sup>	33.2 <sup>a</sup>	42.9
44.5	39.2	37.9	32.3	35.8	u	39.6	34.2	41.1
39.1	39.3	46.8	41.1	35.5	39.0	37.0 <sup>a</sup>	37.0 <sup>a</sup>	40.5
45.4	40.5	24.7	33.3	32.5	29.4	40.5	32.6	44.7
33.6	32.7	22.9	28.8	29.2	20.2	30.9	21.9	36.2
44.6	42.2	26.4	32.7	36.2	32.7	41.2	32.7	43.1
33.3	37.8	23.1	28.3	34.0	28.1	34.3	28.1	36.7
42.0 (1968--70)	u	41.6 (1968--70)	37.2 (1970)	39.2 (1970)	37.7 (1970)	41.4 (1969--70)	33.3 (1968--70)	43.7 (1968--70)
42.0	43.0	42.6	35.6	39.8	u	41.2	39.1	42.1

TABLE 16 Estimates of birth rates for rural and urban areas of India:  
National Sample Survey, various periods, 1958–67

Period	Rural	Urban
July 1958–June 1959	38.3	u
July 1959–June 1960	38.9	u
July 1960–August 1961	u	33.0
September 1961–August 1962	36.0	34.0
February 1963–January 1964	37.0	31.5
July 1964–June 1965	37.1	31.9
July 1965–June 1966	36.3	30.3
July 1966–June 1967	36.3	30.0

u—unavailable.

SOURCES: India, Cabinet Secretariat (1966:7; 1970b:5; 1970c:8; 1971:5; 1975a:6; 1975b:5).

TABLE 17 Estimates of birth rates for rural and urban India,  
obtained through the Sample Registration Scheme:  
1970–79

Year	Total <sup>a</sup>	Rural	Urban
1970	36.8	38.9	29.7
1971	36.9	38.9	30.1
1972	36.6	38.4	30.5
1973 <sup>b</sup>	34.6	35.9	28.9
1974 <sup>b</sup>	34.5	35.9	28.4
1975	35.2	36.7	28.5
1976	34.4	35.8	28.4
1977	33.0	34.3	27.8
1978	33.3	34.7	27.8
1979 <sup>c</sup>	33.0	34.3	27.8

a The aggregated estimates for India exclude Bihar and West Bengal because the SRs work in these two states has not proceeded satisfactorily.

b The half-yearly survey for the period July–December 1973 was postponed and combined with the half-yearly survey for January–June 1974. Supervision of the combined survey was also suspended. These changes might have affected the estimates for 1973 and 1974.

c Provisional.

SOURCE: India, ORGCC, *Sample Registration Bulletin* (1981: vol. 14, no. 2, p. 2).

in Bihar and West Bengal, which together account for more than half (51.6 percent) of the population of the country.

I have obtained estimates of crude birth rates and total fertility rates for rural and urban areas of India and its states in 1971 by using Palmore's regression equations (Palmore, 1978). These estimates, along with the Sample Registration System estimates of rural and urban birth rates for a three-year average of 1970, 1971, and 1972 birth rates, are given in Table 19. Input variables in the regression equations--child-woman ratio, ratio of population aged 0-4 to total population, percentage of women ever married in the age group 20-24, and index of fertility age composition--were obtained from 1971 census data, and the infant mortality rate for each state is from the SRS. A comparison of the first three columns with the last three indicates that the regression estimates are higher than the SRS estimates. The estimated birth rates for the total population nevertheless compare quite well with the reverse-survival method estimates for 1961-71 (Table 15).

### **Age-specific fertility rates**

To understand the pattern of fertility decline more clearly, it is useful to consider age-specific fertility rates. Data on age-specific fertility rates at the national level are available from certain rounds of the NSS and from the SRS for some years (Table 20).

As I have already indicated, the NSS and the SRS data are not strictly comparable, for the NSS is a one-time retrospective survey whereas the SRS is a dual record system and, hence, there is a greater degree of underreporting in the NSS than in the SRS. Table 20 indicates, however, that there may not have been any change in the Indian fertility schedule until the mid-1960s. Any reduction in fertility at the early ages that might have taken place during the period was more than made up by increased fertility in the 20-34 age bracket, and this held true in both rural and urban areas.

The SRS age-specific fertility rates (ASFRs) for the 1970s show a definite decline. The decline has come about through a greater reduction in ASFRs among older than among younger women, especially in urban areas. SRS-based estimates of total fertility rates for 1972 are higher than those based on the NSS. The differences may be due largely to an improved system of recording vital events in the SRS.

Adlakha and Kirk (1974) suggested that about a third of the decline

TABLE 19 Estimated crude birth rates and total fertility rates by rural-urban residence: India and its states, 1971, and three-year average (1970–72) of crude birth rates from the Sample Registration Scheme

State	Crude birth rate			Total fertility rate			SRS crude birth rate		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
INDIA	41.28	42.90	34.64	5.95	6.24	4.73	37.2	38.7	30.2
Andhra Pradesh	37.36	38.44	32.45	5.08	5.30	4.08	35.4	35.7	33.0
Assam	46.05	49.89	34.33	7.44	8.43	5.38	37.9	38.7	30.2
Bihar <sup>a</sup>	45.37	46.08	38.67	6.43	6.50	5.71	32.3	32.7	27.5
Gujarat	41.85	43.99	35.95	6.05	6.47	4.96	40.4	42.1	35.6
Haryana	40.72	42.21	32.93	6.52	6.85	4.89	39.6	41.5	30.9
Himachal Pradesh	38.03	38.50	29.42	5.27	5.34	3.93	34.4	35.1	24.1
Jammu & Kashmir	35.93	37.15	29.20	5.24	5.47	4.09	32.5	35.0	23.2
Karnataka	37.67	39.03	33.00	5.39	5.68	4.43	32.0	33.9	27.0
Kerala	31.51	31.87	28.87	4.13	4.22	3.65	31.3	31.6	29.7
Madhya Pradesh	45.92	47.15	39.46	6.81	7.02	5.74	39.2	40.4	33.2
Maharashtra	38.81	40.97	33.84	5.48	5.83	4.67	32.0	33.1	29.6
Orissa	40.43	40.73	36.63	5.76	5.82	5.17	35.8	36.0	33.0
Punjab	35.99	37.03	32.03	5.54	5.81	4.49	34.2	36.2	30.7
Rajasthan	43.34	44.51	37.32	6.45	6.64	5.47	41.1	42.6	34.6
Tamil Nadu	35.44	36.28	31.11	4.54	4.91	3.60	31.3	33.6	25.8
Uttar Pradesh	45.91	46.60	39.15	6.88	6.95	5.98	44.5	45.9	34.6
West Bengal <sup>b</sup>	42.11	46.12	28.44	6.46	7.15	4.16	u	u	24.3
Delhi	31.69	40.43	30.58	4.38	6.32	4.16	31.8	44.8	30.3

NOTE: Crude birth rates and total fertility rates were obtained by applying Palmore's regression equations (Palmore, 1978) to the 1971 census data. The infant mortality rate for each state, one of the inputs in the regression equations, was obtained from the Sample Registration Scheme (SRS) and is a three-year average for the period 1971–73 (Swamy, 1979).

u—unavailable.

a The infant mortality rate for Uttar Pradesh was used in the regression equation for Bihar.

b The infant mortality rate for all India was used in the regression equation for West Bengal.

SOURCE: SRS crude birth rates: India, ORGCC (1979a:9–13).

TABLE 20 Age-specific fertility rates for rural and urban areas of India, from the NSS and the SRS: 1958–59 to 1978

Age group	Rural					Urban				
	NSS		SRS			NSS		SRS		
	1958–59	1963–64	1972	1976	1978	1960–61	1963–64	1972	1976	1978
15–19	143.9	83.2	97.5	83.0	72.7	105.0	67.5	52.2	64.6	41.9
20–24	263.6	247.2	273.5	260.2	237.7	244.7	251.9	220.6	213.7	192.1
25–29	244.3	241.3	283.4	250.8	240.7	218.6	271.5	247.3	197.5	190.5
30–34	188.3	195.4	227.2	190.9	167.9	168.9	195.1	173.4	133.9	133.4
35–39	127.9	177.5	151.2	126.3	115.0	110.7	130.9	108.2	73.6	70.0
40–44	49.6	79.1	82.7	58.9	52.3	41.5	12.1	43.3	28.9	24.1
45–49	17.6	33.4	23.7	17.3	24.9	9.6	8.5	11.0	8.3	6.8
Total fertility rate	5.18	5.29	5.8	5.0	4.6	4.50	4.69	4.3	3.6	3.1

NSS—National Sample Survey.

SRS—Sample Registration System.

SOURCES: India, ORGCC (1974:16; 1980:21–22); India, Cabinet Secretariat (1971:6).

in fertility during 1961–71 may have been due to changes in the age and marital status composition of the population, and that the remaining two-thirds could be attributed to changes in marital fertility. Table 21, which gives the SRS age-specific marital fertility rates for rural and urban India in 1972 and 1978, shows that there was a decline in marital fertility in each age group over the period. The decline was more marked at ages 30 and over than at earlier ages, indicating that the higher-order births were becoming less prevalent.

### Live births by birth order and age of women

Analysis of live births by birth order and age of the mother (Table 22) reveals that 42.9 and 44.2 percent of all live births in 1978 were to women under age 25 in rural and urban areas, respectively. Women above age 30 contributed about one-third of all live births in the rural areas and a little over one-fourth in the urban areas. The higher order births—fourth and above—constituted 38.4 percent in rural areas and 33.3 percent in urban areas. As these proportions are still very high, curtailment of these higher order births is necessary to bring about substantial reduction in the birth rate.

### Fertility differentials

In addition to regional and rural-urban differentials in fertility, socio-economic variables such as age at marriage, religion, educational attainment of women, their work participation and the occupational category of the household, and income of the household help to

TABLE 21 SRS estimates of age-specific marital fertility rates in rural and urban India: 1972 and 1978

Age group	Rural			Urban		
	1972	1978	Ratio	1972	1978	Ratio
15-19	211.5	181.1	.856	220.6	192.2	.871
20-24	312.9	287.6	.919	312.6	283.2	.906
25-29	302.8	255.8	.845	284.3	214.0	.753
30-34	248.8	177.6	.714	201.2	141.9	.705
35-39	170.1	124.4	.731	123.7	76.4	.618
40-44	94.5	60.3	.638	52.2	28.1	.538
45-49	32.4	31.4	.969	15.5	8.7	.561

SOURCE: India, ORGCC (1980:23).

TABLE 22 Percentage of live births by birth order and age of women: rural and urban India, 1978

Rural/urban residence and age group	Birth order						All birth orders
	1	2	3	4	5	6+	
<b>RURAL</b>							
< 25	20.33	14.06	6.25	1.75	0.38	0.16	42.94
25-29	2.38	5.17	7.42	5.94	2.79	1.42	25.12
30+	0.76	1.70	3.48	5.96	6.38	13.67	31.94
All age groups	23.45	20.94	17.16	13.65	9.56	15.24	100.00
<b>URBAN</b>							
< 25	20.36	14.84	6.61	1.67	0.37	0.30	44.15
25-29	4.24	6.69	7.91	6.02	2.89	1.75	29.50
30+	0.72	2.00	3.31	4.68	4.42	11.22	26.35
All age groups	25.31	23.53	17.83	12.37	7.68	13.27	100.00

NOTE: Percentages may not sum exactly to 100.00 because of rounding error.

SOURCE: India, ORGCC (1980:30).

explain the emerging patterns of fertility change in India. This section examines the interplay of these variables with fertility. In considering each variable separately, one should bear in mind that the variables usually influence fertility jointly and that it is almost impossible to isolate the influence of each variable. Furthermore, no less important than these variables may be changes in attitudes toward the use of contraception and desired family size.

*Age at marriage.* Although people generally agree that a rise in age at marriage is desirable in India and the Government of India in 1978 enacted a law to raise the minimum age at marriage for girls from 15 to 18 and for boys from 18 to 21, opinions vary on the effect that a given change would have on overall fertility. Agarwala (1965) estimated that, if the female age at marriage in India rose to 19 and if no woman was allowed to have a child before age 20, the birth rate would decline by about 40 percent within 25 years. Assuming unaltered age-specific marital fertility rates, Malaker (1972) estimated that a rise in female marriage age from 15 to 17 would produce an insignificant reduction of the birth rate, but that if female age at marriage rose to 19, the birth rate would fall by 11 percent. If it rose to 21, the birth rate

would decline by 25 percent; in the last case both the net reproduction rate (NRR) and TFR would go down by 17 percent. Some authors (e.g., Cassen, 1978:52) have suggested that a rise of two to three years in female age at marriage might reduce the reproductive period so little as to leave fertility barely altered. Nevertheless, recent data suggest a decline in the total marital fertility in both rural and urban areas as age at marriage has shifted upward (Table 23).

If the government's efforts to raise the minimum age at marriage for females to 18 are successful, the average age at marriage may go up to a little over 20 years and, in turn, influence the total marital fertility rate and the crude birth rate quite significantly. Raising the minimum female age at marriage to 18 would, of course, entail various social changes among India's population groups.

*Religion and fertility.* The analysis by Davis (1951:79-81) of census data prior to 1951 on the basis of the child-woman ratio and various sample surveys conducted in India during the past 30 years have indicated distinct fertility differentials among religious groups. In general, these studies have indicated that Muslims have higher fertility than Hindus and that Hindus have higher fertility than Christians. Data from the Fertility Survey, 1972, and the Survey of Infant and Child Mortality, 1979, both conducted under the auspices of the Office of the Registrar General and Census Commissioner, revealed the same fertility pattern among the three major religious groups regardless of whether the general fertility rate or the general marital fertility rate is

TABLE 23 Total marital fertility of women by rural/urban residence and age at marriage: India, 1972 and 1978

Rural/urban residence and year	Age at marriage			
	<18	18-20	21-23	24+
<b>RURAL</b>				
1972	6.9	6.7	5.2	
1978	5.45	5.10	5.02	3.36
<b>URBAN</b>				
1972	6.4	5.5	4.9	
1978	4.82	4.08	3.66	2.28

SOURCES: India, ORGCC (1976:20; 1980:25).

would decline by 25 percent; in the last case both the net reproduction rate (NRR) and TFR would go down by 17 percent. Some authors (e.g., Cassen, 1978:52) have suggested that a rise of two to three years in female age at marriage might reduce the reproductive period so little as to leave fertility barely altered. Nevertheless, recent data suggest a decline in the total marital fertility in both rural and urban areas as age at marriage has shifted upward (Table 23).

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1978	5.45	5.10	5.02	3.36
<b>URBAN</b>				
1972	6.4	5.5	4.9	
1978	4.82	4.08	3.66	2.28

SOURCES: India, ORGCC (1976:20; 1980:25).

TABLE 24 Fertility indicators by rural/urban residence and religion: India, 1972 and 1978

Fertility indicator, year, and rural/urban residence	Hindus	Muslims	Christians
General fertility rate			
1972			
Rural	171.1	191.5	136.6
Urban	131.4	150.8	109.5
1978			
Rural	134.6	149.5	104.1
Urban	99.3	121.4	66.0
General marital fertility rate			
1972			
Rural	192.6	213.0	172.4
Urban	176.7	204.0	161.6
1978			
Rural	171.1	191.5	157.7
Urban	140.8	147.7	107.4

SOURCES: India, ORGCC (1976:6; 1980:24).

considered (Table 24).<sup>9</sup> In a study of fertility differentials in Greater Bombay, Rele and Kanitkar (1980:83) observed that fertility differences between wives of different religions diminish when age and education of husband or wife are held constant; still, Muslims continue to have higher fertility than Hindus and Christians.

The 1971 Census of India included a question about the number of live births to currently married women during the past year. Tabulations of the 1 percent sample of responses to this fertility question provide information on births by religion of women cross-classified by age at marriage, present age of women, educational attainment, and rural/urban residence (Census of India 1971 [1977b]). An analysis of

<sup>9</sup> A few nationwide sample surveys and local studies have indicated that Muslim fertility is not necessarily the highest, however. In the 18th round of the NSS (1963-64), rural Muslims were found to have slightly lower fertility (CBR = 37.01) than rural Hindus (CBR = 38.07). The urban sample in 1963-64 recorded similar fertility rates for Hindus and Muslims, as did the general sample in the round of 1964-65. Similarly, in two small-scale studies of West Bengal villages, Muslims showed lower fertility rates than did most of their Hindu neighbors (Mandelbaum, 1974:44-45).

these data for the three major religious groups (Hindus, Muslims, and Christians) by age at marriage, present age, and educational attainment (Table 25), lends support to the view that Muslims have higher fertility than Hindus; but these data also suggest that the fertility of the Christians is not the lowest in India. Christian fertility fluctuates within a wide range, being lower than that of Muslims in many subgroups but highest in certain other subgroups.

*Education and fertility.* Of the modern social influences on fertility, education of girls seems to be one of the most important. Various surveys in India (United Nations, ECOSOC, 1961; Driver, 1963; NSS Report No. 116; Husain, 1972; Operations Research Group, 1971) have found that women who have completed a high school education have significantly fewer children, on the average, than those with less or no education; the sharpest fertility drop occurs, as one might expect, at the level of college education. These surveys have also shown, however, that women with some literacy (below primary or primary) have slightly higher fertility than illiterate women. This may be so because poor families whose members begin to obtain better nutrition and health resources increase their fertility for a time before taking on the higher status pattern of lowered fertility.

Data from the Fertility Survey, 1972, indicate a slight inverse relationship between the total marital fertility rate (TMFR) and the educational level of women in urban areas (Table 26). In rural areas, however, the TMFR was slightly higher among women possessing some primary education than among illiterate women, though it was sharply lower among women with high school or higher education. Data from the Infant and Child Mortality Survey, 1979, present a different pattern of TMFRs in rural areas: slightly higher fertility among illiterate than among literate women, but virtually no difference in fertility among those who were literate, regardless of educational level. In urban areas, fertility was progressively lower among literate women as educational level increased but there was no difference in TMFR between illiterate women and those with minimal education.

*Occupation of the household head and fertility.* Some surveys, including certain rounds of the NSS, have examined the differentials in birth rates by main occupation of the household. Data on fertility differentials by occupation derived from the 16th, 18th, and 19th rounds of the NSS are presented in Table 27. As some of these estimates are based on very small samples, they need to be interpreted with great

TABLE 25 Births in 1971 per 1,000 currently married women by marriage: India

Current age and religion	Education and age at marriage <sup>a</sup>					
	No schooling (illiterate)					
	All ages	< 13	13--17	18--22	23--27	28+
All ages						
Hindu	146.4	145.1	160.0	146.1	136.7	93.1
Muslim	164.5	167.3	179.0	162.5	149.5	110.4
Christian	148.1	142.7	167.3	147.5	152.1	114.6
13-17						
Hindu	67.0	69.0	75.0	na	na	na
Muslim	96.8	108.2	101.0	na	na	na
Christian	125.4	196.7	116.7	na	na	na
18-22						
Hindu	222.8	230.4	237.1	198.9	na	na
Muslim	235.9	231.3	251.7	211.8	na	na
Christian	255.1	197.5	270.5	274.4	na	na
23-27						
Hindu	248.4	255.1	256.3	258.5	211.9	na
Muslim	256.3	248.5	269.8	273.2	191.0	na
Christian	261.1	254.9	268.0	277.5	288.5	na
28-32						
Hindu	210.1	216.2	216.4	218.8	231.8	228.5
Muslim	228.6	237.7	234.3	243.7	223.7	238.1
Christian	215.9	169.9	236.8	224.0	237.1	307.7
33-37						
Hindu	157.5	161.5	163.1	161.6	175.1	202.2
Muslim	176.4	186.7	183.0	181.7	189.7	231.9
Christian	157.1	87.9	151.3	175.8	258.8	150.0
38-42						
Hindu	93.3	94.3	95.9	100.5	119.2	110.8
Muslim	104.4	102.1	104.1	119.5	149.3	165.2
Christian	110.9	114.6	98.3	123.6	151.9	186.0
43-47						
Hindu	43.4	41.8	46.1	45.8	42.6	69.8
Muslim	47.9	57.2	51.0	49.3	73.2	54.9
Christian	38.7	28.6	24.0	38.2	148.1	83.3
48+						
Hindu	15.6	15.8	16.2	17.5	19.3	21.1
Muslim	18.3	20.9	19.0	17.3	26.9	38.8
Christian	10.2	0.0	13.3	11.2	0.0	17.5

NOTE: Figures are estimates based on a 1 percent sample of the enumerated population in the relatively small number of women in that category.

na—not applicable.

a Because the proportion of women who marry after age 22 is extremely small in India,

b Depending upon the area, matriculation takes place upon the completion of 10, 11, or

c Graduation takes place upon the completion of 14 or 15 years of schooling, again de-

d There was only one woman in this category who gave birth.

e There were only two women in this category who gave birth.

SOURCE: Based on Census of India 1971 (1977b:16-19).

current age and religion cross-classified by education and age at

Less than matriculation <sup>b</sup>						Less than graduation <sup>c</sup>					
All ages	<13	13--17	18--22	23--27	28+	All ages	<13	13--17	18--22	23--27	28+
172.2	156.6	182.3	184.3	166.9	121.4	173.5	155.3	165.1	195.3	192.5	116.2
199.9	184.8	215.2	207.2	205.7	149.4	214.7	136.4	223.1	239.1	255.3	272.7
172.0	129.4	164.0	186.3	205.8	89.8	189.8	133.3	158.6	212.3	219.0	164.9
86.8	83.9	97.8	na	na	na	60.5	0.0	76.9	na	na	na
114.2	123.5	119.7	na	na	na	121.2	0.0	160.0	na	na	na
140.8	214.3	158.9	na	na	na	0.0	0.0	0.0	na	na	na
261.9	258.5	277.6	250.0	na	na	235.0	179.2	252.6	248.9	na	na
266.5	254.2	283.1	266.2	na	na	256.7	222.2	287.2	266.2	na	na
304.6	269.2	355.7	277.7	na	na	306.1	166.7	351.9	327.4	na	na
268.2	267.2	268.0	291.2	254.1	na	259.4	275.5	228.8	287.0	251.7	na
279.0	286.7	279.8	306.9	304.3	na	278.9	333.3	368.4	287.0	210.5	na
285.9	200.0	245.6	319.0	281.5	na	304.2	1000.0 <sup>d</sup>	200.0	328.8	339.3	na
190.2	210.3	185.7	204.4	257.4	252.3	140.1	133.3	97.1	141.3	230.6	179.1
224.9	194.1	244.2	226.8	260.9	125.0	214.3	0.0	119.0	246.4	461.5	1000.0 <sup>e</sup>
231.6	240.0	192.7	244.1	367.9	95.2	237.7	0.0	214.3	179.8	336.0	458.3
115.4	129.3	118.5	117.0	124.5	173.9	72.2	90.9	78.2	55.4	95.1	182.9
155.0	175.9	158.3	155.9	266.7	217.4	158.7	0.0	111.1	192.3	222.2	250.0
173.1	62.5	173.7	164.1	257.4	166.7	104.2	0.0	54.1	102.6	149.3	120.0
57.6	61.4	58.2	61.2	67.8	105.3	20.4	0.0	34.1	10.2	28.8	23.3
88.0	104.7	104.8	71.0	68.2	250.0	62.5	0.0	153.8	45.5	0.0	0.0
87.1	0.0	86.3	92.2	107.5	114.3	42.1	0.0	0.0	71.4	32.8	0.0
19.7	21.7	18.5	20.2	34.3	73.7	21.3	0.0	51.5	0.0	56.6	0.0
26.2	0.0	26.1	29.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
21.6	0.0	36.3	15.4	0.0	69.0	8.4	0.0	0.0	15.9	0.0	0.0
9.2	11.7	10.7	6.7	10.9	29.9	14.4	0.0	17.0	13.4	45.5	0.0
19.3	21.3	24.5	10.1	37.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
10.3	20.0	7.1	9.8	14.2	38.5	12.6	0.0	0.0	0.0	0.0	76.9

1971. Data on women with graduate and higher qualifications are not presented because of

estimates for ages 23 and above have high sampling variability.

12 years of schooling.

pending upon the area.

TABLE 26 Total marital fertility rates by women's level of education: India, 1972 and 1978

Year and rural/urban residence	Educational level			
	Illiterate	Literate but below primary	Primary but below matriculation	Matriculation and above
1972				
Rural	6.9	7.1		5.0
Urban	6.3	5.0		4.5
1978				
Rural	5.54	4.95	4.92	4.96
Urban	4.49	4.49	4.14	3.75

NOTE: Primary education usually implies five years of schooling. Matriculation occurs upon the completion of 10-12 years of schooling. The middle educational level as defined by the 1972 survey was literate but below matriculation.

SOURCES: India, ORGCC (1976:7; 1980:25).

TABLE 27 Annual birth rates by household occupation: India, 16th, 18th, and 19th rounds of the National Sample Survey

Household occupation	16th		18th		19th	
	Urban	Rural	Urban	Rural	Urban	
Professional, technical, and related	30.5	34.0	26.9	37.6 <sup>d</sup>	28.3	
Administrative and executive	28.1	38.3	26.3	36.7 <sup>d</sup>	19.7	
Clerical and related	31.9	34.3	30.3	u	u	
Sales	32.4	36.3	31.0	35.0	31.4	
Agriculture	35.0	37.2	31.3	37.3	36.4	
Mining and related	31.4	28.2	50.0 <sup>d</sup>	u	u	
Transport and communication	37.8	42.9	36.7	23.3 <sup>a</sup>	35.8	
Crafts and production process	36.1	38.3	34.9	40.8	38.7	
Service, sports, and recreation	34.8	38.0	31.7	41.5 <sup>a</sup>	35.7	
All occupations	33.0	37.0	31.5	37.3	34.3	

u unavailable. Occupational category was not used in the tabulations of fertility data for the 19th round.

a Sample size too small for a reliable estimate.

SOURCES: 16th round (July 1960-August 1961): India, Cabinet Secretariat (1971:7).

18th round (February 1963-January 1964): India, Cabinet Secretariat (1970b:6).

19th round (July 1964-June 1965): India, Cabinet Secretariat (1970d:5-6).

caution. On a broad level of generalization, nevertheless, households whose heads were in white-collar occupations had lower birth rates than those whose heads were engaged in blue-collar occupations. The data do not show any trend over the four-year period.

#### FAMILY PLANNING AND POPULATION POLICY

Many national family planning programs have two rationales: a concern for the health of mothers and children, and a concern about the socioeconomic effects of rapid population growth. Both these rationales have been present in India's family planning history. The first well-known public advocacy of family limitation in India was by Wattal (1916), who put the argument for family limitation in both health and socioeconomic terms, as did the National Planning Committee of the Indian National Congress appointed under the chairmanship of Jawaharlal Nehru. Although the importance of family limitation was appreciated by the Indian leadership and intelligencia, these early days were marked by one particular debate, over how this objective was to be achieved. Gandhi favored abstinence, but those who supported contraception eventually prevailed (Cassen, 1978:145).

#### **The family planning program**

The first family planning clinic in India was opened in Bombay in 1925 by Professor R.D. Karve, who subsequently lost his job for his "advanced" views. Later, in 1930, the Mysore government established a family planning clinic in the state hospital. In 1932 the Madras government agreed to open birth control clinics in the presidency. In the same year, the All India Women's Conference at Lucknow passed a resolution stating that "men and women should be instructed in method[s] of birth control in recognized clinics" (Agarwala, 1977: 106). The effect of these and other efforts was limited to a small segment of the population, but private interest in spreading family limitation culminated in the formation of the Family Planning Association of India in 1949.

Realizing that improvement of health and control of diseases and famine would cause increasingly serious problems of population growth, the Health Survey and Development Committee, which was appointed by the government in 1943 and which submitted its report in 1946, considered deliberate limitation of families to be "advisable"

and also observed that such limitation could not be secured through self-control "to any material extent" (Visaria and Jain, 1976:24).

Soon after Independence the Government of India appointed the Planning Commission to formulate a plan for the most effective and balanced use of natural resources for economic development. In formulating the First Five-Year Plan (1951–56), the Planning Commission recognized that "population policy is . . . essential to planning" and that family planning is a step toward improvement in health, particularly that of mothers and children (Visaria and Jain, 1976: 24–25). In the Plan, a provision of 6.5 million rupees (U.S. \$1.37 million at the prevailing exchange rate) was made for the family planning program to discover effective techniques of family limitation and to suggest methods by which knowledge of the techniques could be widely disseminated. Thus, in 1952 India became the first country in the world to have a state-sponsored population control program. During the First Five-Year Plan, 21 rural and 126 urban family planning clinics were opened.

In the Second Plan period (1956–61), over 1,030 rural and 400 urban family planning clinics were established and contraceptives were made available at a further 1,865 rural and 330 urban health centers. The outlay for this Plan period was increased to Rs. 49.7 million but the approach remained essentially clinical. It was expected that people would avail themselves of the services offered by the clinics.

Because the clinical approach was not as successful as expected, the strategy was changed midway through the Third Five-Year Plan period (1961–66) to the "community extension" approach, which aimed at (1) providing family planning services close to people's homes through a greatly expanded network of primary health centers and subcenters in the rural areas, and hospitals and family welfare planning centers in the urban areas<sup>10</sup>; and (2) conducting an intense educational, motivational, and communication campaign to lift the taboo on free and open discussion of all aspects of family planning (physiological, social, and psychological), in such discussion to dissociate the facts of reproduction from the sex act, and to disseminate widely the message of family planning. The program gained momentum in 1966 when the

<sup>10</sup> As of 1979 there were 1,820 family planning clinics in urban areas and 2,333 other institutions that also provided family planning services to urban areas. There were 5,168 family welfare planning centers and 37,690 subcenters providing services to the rural population (Banerji, 1980:20–21).

government established a full-fledged Department of Family Planning in the Ministry of Health and Family Planning to administer the program. The emphasis has since then been on "time-bound" and "target-oriented" activities with the objective of stabilizing the growth of population within a specific period of time. The government developed this concept more fully while formulating the Fourth Five-Year Plan (1969-74), which had the explicit objective of reducing the crude birth rate from 39 to 25 per thousand within the next ten to 12 years. The budget for family planning was increased during the Plan period from Rs. 950 million to Rs. 3,150 million (equivalent to U.S. \$420 million<sup>11</sup>).

The outlay for family planning activities during the Fifth Five-Year Plan (1974-79) was increased further to Rs. 4,970 million, of which 82 percent was allocated to services and supplies. Table 28 gives the budget outlay and actual expenditure on family planning during the various Five-Year Plans. The Indian government spent a total of Rs. 10,128 million on the national family planning program during 1951-80, of which 62.7 percent was spent during the seven-year period from 1974 to 1980, 27.7 percent during 1969-74, and the remaining 9.6 percent prior to 1969.

For several years beginning in 1965, the program emphasized the intrauterine device (IUD) as a contraceptive method. The IUD had gained wide acceptance in smaller countries of Asia and in other parts of the world. The IUD program did not, however, meet with the expected success in India and was later replaced by a "cafeteria" approach that allowed clients to select a preferred contraceptive from a variety of available methods.

A development of great importance during the latter 1960s was the linking of maternal and child health (MCH) schemes with family planning services. Sterilization became, and has remained, a method favored by the government because it is considered to be the most effective and inexpensive means of fertility control. To achieve acceptance targets, the government built into the program monetary incentives to physicians, motivators, and acceptors of sterilization and, in some states, mobilized its law enforcement and tax collection machinery for family planning work. With the initial success of a "mass vasectomy camp" in Ernakulam, Kerala, in 1970, the government

<sup>11</sup> Prior to 1966, U.S. \$1.00 was equivalent to Rs. 4.75. With the devaluation of the Indian rupee in 1966, U.S. \$1.00 became equivalent to Rs. 7.50.

TABLE 28 Budget outlay and actual expenditure on family planning: India, 1951–56 to 1980–85

Five-Year Plan and period	Budget outlay in public sector			Actual expenditure on family planning (million Rs.)
	All developmental activities (million Rs.)	Family planning (million Rs.)	Family planning as % of total development outlays	
First, 1951–56	23,560	6.50	0.03	1.45
Second, 1956–61	43,000	49.70	0.10	21.56
Third, 1961–66	75,000	269.76	0.36	248.60
Annual, 1966–69	67,565	829.30	1.23	704.64
Fourth, 1969–74	159,020	3,150.00	1.98	2,800.40
Fifth, 1974–79	393,220	4,970.00	1.26	4,090.00 <sup>a</sup>
Sixth, 1978–83 <sup>b</sup>	710,000	7,650.00	1.08	
Sixth, 1980–85 <sup>c</sup>	975,000	10,100.00	1.04	

NOTE: If allowance is made for inflation, the annual public-sector expenditure on family planning during the Fifth Plan period and during 1978–80 remained at almost the same level as during the Fourth Plan period.

a Expenditure during four years, 1974–78.

b Figures are based on the Draft Five-Year Plan prepared before the parliamentary elections held in January 1980.

c Figures, based on 1979–80 prices, are taken from the Draft of the Sixth Five-Year Plan, 1980–85, prepared by the reconstituted Planning Commission in January 1981. During 1978–80, the total expenditure on family planning is estimated to have been Rs. 2,261 million against an allocation of Rs. 2,280 million.

SOURCE: Personal communication from Leela and Pravin Visaria, dated 6 April 1981.

established vasectomy camps in many other parts of the country during the 1970s.

The failure of mass vasectomy camps as a national approach impelled government decision-makers, in early 1974, to recognize the need for improving the health and nutritional status of the populace while trying to reduce population growth. In the draft of the Fifth Five-Year Plan, the Planning Commission came up with a Minimum Needs Programme as “a frontal attack on poverty.” This program included a package of integrated health, nutrition, and family planning services along with such social welfare measures as increased education and employment opportunities and equitable status for women (Banerji, 1980:13).

### National population policy statements

In 1975–76 the Indian government recognized that to promote family

planning at a faster pace, it would have to involve more directly in the program other development departments besides the Department of Family Planning, both at the center and in the states. Prior to 1975--76, there was a tendency even on the part of official agencies to treat the program as the exclusive responsibility of the Ministry of Health and Family Welfare at the center and of its counterparts in the states (Grewal, 1980:3). A comprehensive National Population Policy (India, Department of Family Planning, 1976) was drawn up and presented by the Health Minister to the Parliament on 16 April 1976. Besides emphasizing the crucial role of fertility control in India's movement toward economic independence and social transformation, the policy stated: "The Government have decided on a series of fundamental measures . . . which, it is hoped, will enable us to achieve the planned target of reducing the birth rate from an estimated 35 per thousand in the beginning of the Fifth Plan to 25 per thousand at the end of the Sixth" (India, Ministry of Health and Family Welfare, n.d.: 172). These measures included setting aside 8 percent of the central assistance to state plans specifically for family planning, freezing representation in the central and state legislatures on the basis of the 1971 census population for the next 25 years, raising the age at marriage to 18 for females and 21 for males, providing increased monetary incentives to sterilization acceptors as compensation for loss of wages, and giving higher priority to girls' education up to the middle level and to child nutrition.

Implementation of the policy was taken up by all the states in earnest. Leaders of public opinion came forward to help the government to promote the family planning movement. Development departments of the government started sharing responsibilities with the health and family welfare infrastructure at all levels in a more effective manner. But implementation of the policy focused on the sterilization program and involved a certain degree of compulsion and coercion. The country was not prepared for such harshness, and as a result there was a change in political power at the center in March 1977 and consequently in many states in July 1977.

The leaders of the major political parties who formed the new central government in March 1977 also stressed the importance of population limitation for India. The new government issued a policy statement in April 1977, dealing largely with family planning strategy. A more comprehensive population policy statement made by the

government in June 1977 treated family planning as an integral part of the total welfare program but emphasized that family planning adoption would be voluntary.

Nevertheless, as a result of the severe criticism of the family planning program's coercive tactics during 1976, the program fell into disrepute and acceptance rates declined sharply during 1977 and 1978. The number of sterilizations, for example, dropped from 8.3 million in 1976-77 to 0.95 million in 1977-78. The government is now trying to revitalize the program through strengthening and expanding services; through massive countrywide information, motivation, and education campaigns; through large-scale involvement of other development departments and voluntary agencies; and, at the level of the family, through interpersonal communication.

### **Family planning awareness and knowledge**

Nationwide and localized family planning knowledge, attitude, and practice (KAP) surveys have indicated that a majority of Indian couples are aware of at least one method of contraception and have favorable attitudes toward family planning, but that a smaller percentage of couples have detailed knowledge about the nature and use of specific methods. For example, a 1970 all-India survey by the Operations Research Group showed that about 78 percent of couples were aware of at least one family planning method. The proportions aware of specific methods were: vasectomy, 73 percent; tubectomy, 62 percent; the IUD, 46 percent; condoms, 25 percent; oral contraceptives, 15 percent; and the diaphragm, jelly, or foam tablets, 7 percent. The percentage of couples having detailed knowledge of specific methods was, however, much smaller: vasectomy, 30 percent; tubectomy, 26 percent; the IUD, 18 percent; condoms, 16 percent; oral contraceptives, 7 percent. The level of awareness and knowledge of family planning methods was found to vary among states as well as between husbands and wives (Visaria and Jain, 1976:35).

A survey conducted by the Office of the Registrar General and Census Commissioner during 1971-72 showed that about 58 percent of couples in rural areas and 69 percent in urban areas had some knowledge of family planning methods. About 49 percent knew about sterilization, 39 percent about condoms, and 29 percent about IUDs. The proportion of couples who had knowledge of other methods was very low: oral contraceptives, 5 percent, and jelly and cream, 2 percent (Visaria and Jain, 1976:35).

### **Acceptance of various family planning methods**

The number of acceptors of contraceptive methods offered by the family planning program has consistently increased over time with only minor fluctuations (Table 29). Although the program has, in principle, followed the cafeteria approach since about 1965, it has continued to emphasize sterilization since the mid-1950s. As vasectomy has proved to be a less complicated surgical procedure and more convenient method than tubectomy, the proportion of tubectomies among total sterilization operations began to decline in 1957 and reached a low of 10.4 percent in 1967-68.

From the official inception of the family planning program in 1952 to the end of March 1980, 31.4 million people opted for sterilizations and nearly 8.2 million women accepted IUDs. The number of users of conventional contraceptives during 1979-80 (1 April 1979 through 31 March 1980) was over 3 million. If attrition caused by age, mortality, discontinuation of IUD use, and other factors is taken into account, the number of couples currently using program methods approximates 26.9 million and constitutes 24 percent of the estimated 112 million eligible couples (India, Ministry of Health and Family Welfare, 1981:8-11).

It is important to note that it is the younger couples who are increasingly adopting family planning as a way of life. The mean age of acceptors of vasectomy, tubectomy, and the IUD in 1973-74 was 32.7, 31.4, and 29.4 respectively, but in 1978-79 it was 32.4, 30.4, and 28.3 respectively (Grewal, 1980:15).

### **Births averted**

Several attempts have been made to estimate the effect of the family planning program on India's population growth. Most of these efforts have sought to estimate the total number of births averted as a result of contraceptive practice. For a terminal method like sterilization, the effects are spread over the remaining reproductive period of the woman, during which children could have been born. To assess the cumulative benefits of each method it is necessary to know the age distributions of acceptors (or of the wives if a male method is chosen), their age-specific fertility and mortality rates, and the period-specific termination rates for acceptors of IUDs and other impermanent methods. According to one estimate, one sterilization averts about 2.5 births over a period of 23 years, one IUD insertion averts about 0.7

TABLE 29 Number of acceptors: Indian family planning program, 1956 to 1979–80

Year	Sterilization			Percentage of tubectomies to total	IUD (thousands)	cc users <sup>a</sup> (thousands)	Sterilization equivalents <sup>b</sup> (thousands)
	Vasectomy	Tubectomy	Total				
1956	2,395	4,758	7,153	66.5	0	0	7
1957	4,152	9,584	13,736	69.8	0	0	14
1958	9,189	15,959	25,148	63.5	0	0	25
1959	17,633	24,669	42,302	58.3	0	0	42
1960	37,596	26,742	64,338	41.6	0	0	64
1961	63,880	40,705	104,585	38.9	0	0	105
1962	112,357	45,590	157,947	28.9	0	0	158
1963	114,621	55,625	170,246	32.7	0	298	187
1964	201,171	68,394	269,565	25.4	0	439	294
1965–March 1966	576,609	94,214	670,823	14.0	813	582	974
1966–67	785,378	101,990	887,368	11.5	910	465	1,216
1967–68	1,648,152	191,659	1,839,811	10.4	669	475	2,089
1968–69	1,383,053	281,764	1,664,817	16.9	479	961	1,878
1969–70	1,055,860	366,258	1,422,118	25.8	459	1,509	1,659
1970–71	878,800	451,114	1,329,914	33.9	476	1,963	1,598
1971–72	1,620,076	567,260	2,187,336	25.9	488	2,354	2,481
1972–73	2,613,263	508,593	3,121,856	16.3	355	2,398	3,373
1973–74	403,107	539,295	942,402	57.2	372	3,010	1,233
1974–75	611,960	741,899	1,353,859	54.7	433	2,521	1,638

1975-76	1,438,337	1,230,417	2,668,754	46.1	607	3,528	3,068
1976-77	6,199,158	2,062,015	8,261,173	25.0	581	3,692	8,663
1977-78	187,609	761,160	948,769	80.2	326	3,253	1,242
1978-79	390,921	1,092,985	1,483,907	73.7	552	3,469	1,865
1979-80 <sup>c</sup>	471,283	1,301,757	1,773,040	73.4	634	3,036	2,158
Cumulative since inception	20,826,561	10,584,406	31,410,967	33.7	8,154	33,953	36,031

- a cc users are conventional contraceptive users. Methods in this category include condoms, diaphragms, vaginal jellies and creams, and foam tablets. The number of users is estimated from distribution figures for conventional methods. The numbers for 1971-72 onward exclude condoms distributed to vasectomy acceptors.
- b Sterilization equivalents for the period before 1970-71 have been calculated by adding the number of sterilizations, one-third of IUD insertions, and one-twelfth of conventional contraceptive users. For 1970-71 onward sterilization equivalents are based on the combination of sterilizations, one-third of IUD insertions, one-eighteenth of conventional contraceptive users, and one-ninth of oral contraceptive users.

SOURCE: India, Ministry of Health and Family Welfare, Department of Family Welfare (1981:93).

births over ten years, and one year's use of condom averts about 0.15 births over three years (Visaria and Jain, 1976:41). The Department of Family Planning in 1981 estimated the number of births averted in India between 1961 and March 1980 to be over 39.2 million (Table 30). (A somewhat higher figure of 41.6 million births averted over the same period was estimated by Grewal [1980:15].) Earlier the Department projected that the program would avert a total of 55.3 million births by 1997-98 (India, Ministry of Health and Family Planning, 1976).

Estimates of the number of births averted by the program depend to a great extent on the assumed effectiveness of different methods and the age distribution of acceptors used in the calculations. Moreover, it is difficult to isolate the effect of the family planning program

TABLE 30 Estimated number of births averted as a result of the family planning program: India, 1961 to 1979-80

Year	Births averted (thousands)
1961	34
1962	55
1963	95
1964	158
January 1965--March 1966	258
1966--67	552
1967--68	844
1968--69	1,258
1969--70	1,616
1970--71	1,917
1971--72	2,142
1972--73	2,532
1973--74	2,993
1974--75	3,030
1975--76	3,129
1976--77	3,723
1977--78	5,050
1978--79	4,928
1979--80 (provisional)	4,908
All years	39,220

SOURCE: India, Ministry of Health and Family Welfare, Department of Family Welfare (1981:126).

from other effects on the birth rate of the country or to establish a causal relationship between program efforts and a decline in the birth rate even when adequate data on the many interrelated factors affecting the birth rate are available. Nevertheless, on the basis of the annual number of births estimated to have been averted through the acceptance of various methods, the Department of Family Planning estimated a decline of 6.7 points in the annual birth rate from 41.7 in 1960–61 to about 37.5 in 1970–71 and about 35 during 1974–75 (Visaria and Jain, 1976:41).

### The prospective strategy

Annual birth rates for the 1970s based on the Sample Registration Scheme (Table 17) indicate that fertility has begun to decline in India and suggest that the country will be able to reach the replacement level in the next couple of decades. The pace of decline in the birth rate might have been accelerated, however, if the country had placed greater emphasis on achieving socioeconomic development as well. Unfortunately, in the last twenty years, family planning has received almost exclusive attention as *the* population policy *par excellence*, to the comparative neglect of all other policies, even those that have been diagnosed to have a strong determining effect on fertility. Such policies focus on mortality reduction, health, sanitation, nutrition, social welfare, status of women, literacy and education, rural-to-urban distribution of population, migration, employment, engagement of primary, secondary and tertiary sectors, skill formation, spatial and vertical mobility, social and economic aspiration, quality of life, cost of living and upbringing, national product, and per capita income (Mitra, 1980:1).

Recently, a Study Group set up jointly by the Indian Council of Medical Research and the Indian Council of Social Science Research has recommended the establishment of a National Population Commission by an Act of Parliament to formulate and implement a comprehensive population policy. The Commission's objective would be to reduce the net reproduction rate from 1.67 to 1 daughter per woman and the crude birth rate from 33 to 21 per thousand population. The proposed program implies effective protection of 60 percent of the eligible couples (compared with 22 percent at present), a reduction in average family size from 4.3 to 2.3 children, and stabilization of the total population at 1,200 million by the year 2050 (*Hindustan*

*Times*, 1980). According to the Study Group, the proposed Commission should review India's population policy and its implementation each year and submit an annual report to Parliament. The Study Group believes that in the days ahead motivating couples to plan their families will be easier because the family planning program has to be linked to overall development. If such a National Population Commission is established and given the power to coordinate the demographic work of various development ministries, it should greatly help the government to achieve the national objective of stabilizing the population in the foreseeable future.

#### MORTALITY

As indicated earlier, the registered vital statistics of India are incomplete to varying degrees in different parts of the country and are of minimal utility for any scientific study of mortality patterns. From the age returns of each two consecutive censuses, the Census Actuaries have estimated the death rates and expectation of life for each census decade from 1881–90 to 1961–71 (Table 31).

Differences in the methods of smoothing the census age data from one decade to another and in the estimation procedures for death rates and construction of life tables have led to differences in death

TABLE 31 Estimated death rates and expectation of life at birth:  
India, 1881–90 to 1961–70

Decade	Death rate (per 1,000 population)	Expectation of life at birth (years)		
		Males	Females	Both sexes
1881–90	41.3	24.6	25.5	25.0
1891–1900	44.4	23.6	24.0	23.8
1901–10	42.6	22.6	23.3	22.9
1911–20	48.6	19.4	20.9	20.1
1921–30	36.3	26.9	26.6	26.8
1931–40	31.2	32.1	31.4	31.8
1941–50	27.4	32.5	31.7	32.1
1951–60	22.8	41.9	40.6	41.3
1961–70	19.2	46.4	44.7	45.6

NOTE: Figures for the decades prior to 1941–50 relate to undivided India.

SOURCES: Davis (1951:36, 62); India, ORGCC (1974:35–36); Census of India 1971 (1977a: 14, 16, 38).

rates and life expectancy, but the general declining trend in mortality and upward trend in life expectancy at birth ( $e_0^0$ ) are unmistakable. They seem to be due mainly to improvements in public health facilities and control of specific diseases, and also to the economic and social progress that has taken place over the past half-century or more. Nevertheless, the death rate remains higher in India than in all the developed countries and a large number of developing countries.

The high death rates in India before 1921 were due largely to famines and epidemics and to the poor living conditions of the majority of the Indians. As discussed earlier, the years 1896, 1897, and 1907 saw severe famines in parts of the country, and plague and influenza epidemics accounted for a heavy death toll during 1901–20. Davis (1951:237) estimated the loss of roughly 20 million lives in 1918 due to influenza alone. The development of a better transport system after 1921, which enabled the government to carry food supplies from one part of the country to another, and of more organized efforts to control epidemics like smallpox, cholera, and plague helped greatly to reduce the death rate in India from 1921 onward.

As Table 31 indicates, life expectancy for both males and females actually declined up through the decade 1911–20. Beginning in 1921, a monotonically rising trend in  $e_0^0$  set in. Female  $e_0^0$  appears to have been higher than male  $e_0^0$  until 1921–30, partly because the British Actuaries who constructed the Indian life tables for the earlier years relied (at least in part) on the British model of differentials in sex patterns of mortality at different ages. Another possible explanation is that, during this period, mortality was high for both males and females and there may have been no difference between the sexes in mortality rates at younger ages or perhaps slightly higher mortality for males. With the improvement in medical facilities and health conditions beginning in 1921, male mortality was brought under control at a faster pace than female mortality because, the male being the principal breadwinner in the Indian social system, his survival was given a higher consideration than that of the female.

Mukherjee (1976) has made a comparison of death rates in the Republic of India over time by applying a uniform methodology. His estimates for the country and its various zones are presented in Table 32. From the estimates of birth rates and death rates for the period 1901 to 1961 (Tables 14 and 32, respectively), Mukherjee concludes:

TABLE 32 Estimated death rates for India and its zones: 1901–71

Zone	1901	1911	1921	1931	1941	1951	1961	1971
INDIA	47–49	42–44	48–50	36–38	32–34	30–32	25–27	17.02
Eastern	45–47	43–45	49–51	35–37	33–35	31–33	25–27	20.38
Central	46–48	45–47	50–52	39–41	31–31 <sup>a</sup>	32–34	26–28	18.29
Southern	37–39	36–38	41–43	33–35	32–34	24–26	25–27	17.72
Western	55–57	40–42	49–51	33–35	30–32	29–31	22–24	14.57
Northern	54–56	50–52	47–49	35–37	30–32	29–31	22–24	14.26

a Possibly a typographical error. Mukherjee's estimates for male and female death rates are 30–32 and 32–34 respectively (Mukherjee, 1976:197, 201).

SOURCES: Mukherjee (1976:221); Census of India 1971 (1977a:38, table 2).

The story told is clear and unambiguous. At the end of the last century, both the birth and the death rates in India were about 48 with a near-zero rate of natural increase. During the next two decades, the birth rate remained at about the same high level, but the death rate declined in the first decade (1901–1911) and increased in the second (1911–1921). Thereafter the birth rate recorded only a marginal increase and remained high. The death rate decreased substantially and monotonically, leading to an accelerated rate of growth in population. This was the overall picture in the country, although there were variations from zone to zone (Mukherjee 1976:220).

Up to 1921, different zones had large fluctuations in their death rates, depending on whether they were heavily affected by famine and epidemics or not. The extent of these variations dampened from 1931 onward with a progressive decline in mortality. The northern and the western zones, however, were able to achieve greater reductions in mortality after Independence than the other three zones.

Annual estimates of death rates have been available since the late 1950s from the various rounds of the NSS and from the SRS (Table 33). The NSS rates are lower than the SRS rates mainly because of differences in the method of collecting primary data.<sup>12</sup> In the dual-record system of the SRS, it has become possible to reduce substantially the recall bias from which the NSS rates suffer.

Data from the two sources establish a clearly declining trend in mortality, though the pace of the decline seems to have slowed in recent

<sup>12</sup> The SRS estimates exclude the states of Bihar and West Bengal, where the SRS work has not proceeded satisfactorily. As Bihar is a high-mortality state, the overall death rate would have been slightly higher if these two states had been included.

TABLE 33 Estimated death rates of rural and urban areas based on the National Sample Survey and the Sample Registration System: India, 1958–79

Period	Rural	Urban	Total
NSS			
July 1958–June 1959 (14th round)	19.42	u	u
July 1959–June 1960 (15th round)	15.08	u	u
July 1960–August 1961 (16th round)	u	7.82	u
February 1963–June 1964 (18th round)	12.39	7.98	u
July 1964–June 1965 (19th round)	13.01	7.97	u
July 1965–June 1966 (20th round)	11.85	7.20	u
July 1966–June 1967 (21st round)	11.31	7.51	u
SRS <sup>a</sup>			
1970	17.3	10.2	15.7
1971	16.4	9.7	14.9
1972	18.9	10.3	16.9
1973 <sup>b</sup>	17.0	9.6	15.5
1974 <sup>b</sup>	15.9	9.2	14.5
1975	17.3	10.2	15.9
1976	16.3	9.5	15.0
1977	15.0	9.4	14.7
1978	15.3	9.4	14.2
1979 <sup>c</sup>	13.9	8.3	12.8

u—unavailable.

a The aggregated estimates for India exclude the states of Bihar and West Bengal.

b The half yearly survey in the SRS for the period July–December 1973 was postponed and combined with the half yearly survey for January–June 1974. The supervision work was also suspended. This might have affected the estimates for 1973 and 1974.

c Provisional.

SOURCES: India, Cabinet Secretariat (1966:7; 1970b:5; 1970c:8; 1971:5; 1975a:6; 1975b:5); India, ORGCC, *Sample Registration Bulletin* (1981: vol. 14, no. 2, p. 2).

years. During most of the 1970s the death rate seems to have stabilized around 15 per thousand. The recent further decline in mortality implies basic improvements in the living conditions of the people, which in turn imply greater availability of preventive and curative health services on one hand and elimination of contagious diseases, malnutrition, and infant mortality on the other.

**Mortality differentials**

*Rural-urban differentials.* Table 33 also reveals the existence of rural-urban differentials in the Indian death rate. These differentials cannot be explained merely by differentials in the sex-age structure of the rural and urban populations. The greater availability of medical facilities in urban areas and people's attitudes toward using these facilities in times of need seem to be largely responsible for a faster decline in the urban death rates over time. Moreover, better sanitary conditions and the availability of protected drinking water seem to have helped to reduce substantially various diseases in urban areas.

*Regional differentials.* Table A5 presents crude death rates for rural and urban areas of each state separately as obtained in the SRS over the period 1970-78. Among the major states, only Kerala achieved a death rate of less than 10 per thousand during the period, with rural-urban differentials almost vanishing. The other states with consistently low death rates were Haryana, Jammu and Kashmir, Karnataka, Maharashtra, and Punjab. In Haryana, however, the death rate went up instead of down. The apparent rise seems to have been due to improvements in the reporting of events in the later years, for no epidemics or other diseases taking an unusual toll in this state during the 1970s have come to light. The death rate in Uttar Pradesh, the most populous state of the country, remained above 20 per thousand. Even in urban areas, the death rate there was higher than in rural areas of many other states.

Among the smaller states and union territories, Chandigarh registered the lowest death rate, and the pattern seems to have been well established. This union territory was created in 1966 at the time of the bifurcation of the erstwhile Punjab. In the early 1950s the city of Chandigarh was established as the capital of Punjab. The population of Chandigarh is young and highly educated, characteristics that may explain its low mortality. Low death rates were also registered by Manipur and the union territories of Delhi; Goa, Daman, and Diu; and Pondicherry.

*Sex and age pattern of mortality.* Sex-age-specific death rates for rural and urban areas of the country in 1976, shown in Table 34 and Figure 3, indicate that female mortality in India has continued to remain high in the younger and childbearing ages and that the differential is larger in urban than in rural areas. At older ages, however, female mortality is lower than male mortality. The last two columns of

TABLE 34 Sex-age-specific mortality rates by rural/urban residence, based on Sample Registration System data: India, 1976

Age group	Rural		Urban		Male Female × 100	
	Male	Female	Male	Female	Rural	Urban
0-4	54.2	55.9	29.0	30.1	97.0	96.3
5-9	4.8	5.4	2.2	3.3	88.9	66.7
10-14	2.6	2.6	1.1	1.5	100.0	73.3
15-19	2.7	3.1	1.6	2.0	87.1	80.0
20-24	3.0	4.4	1.9	3.3	68.2	57.6
25-29	3.5	5.0	2.1	3.0	70.0	70.0
30-34	4.7	5.1	2.7	3.3	92.2	81.8
35-39	4.8	5.3	3.8	3.8	90.6	100.0
40-44	10.1	4.9	7.1	6.3	206.1	112.7
45-49	12.5	8.1	10.3	7.2	154.3	143.1
50-54	20.5	12.7	15.1	11.8	161.4	128.0
55-59	29.8	18.7	22.9	16.7	159.4	137.1
60-64	52.6	35.0	33.5	23.7	150.3	141.4
65-69	59.1	47.3	49.7	40.3	124.9	123.3
70+	119.6	85.7	89.7	83.4	139.6	107.6
All age groups	16.0	16.6	9.4	9.6	96.4	97.9

NOTE: The aggregated estimates for India exclude the states of Bihar and West Bengal.

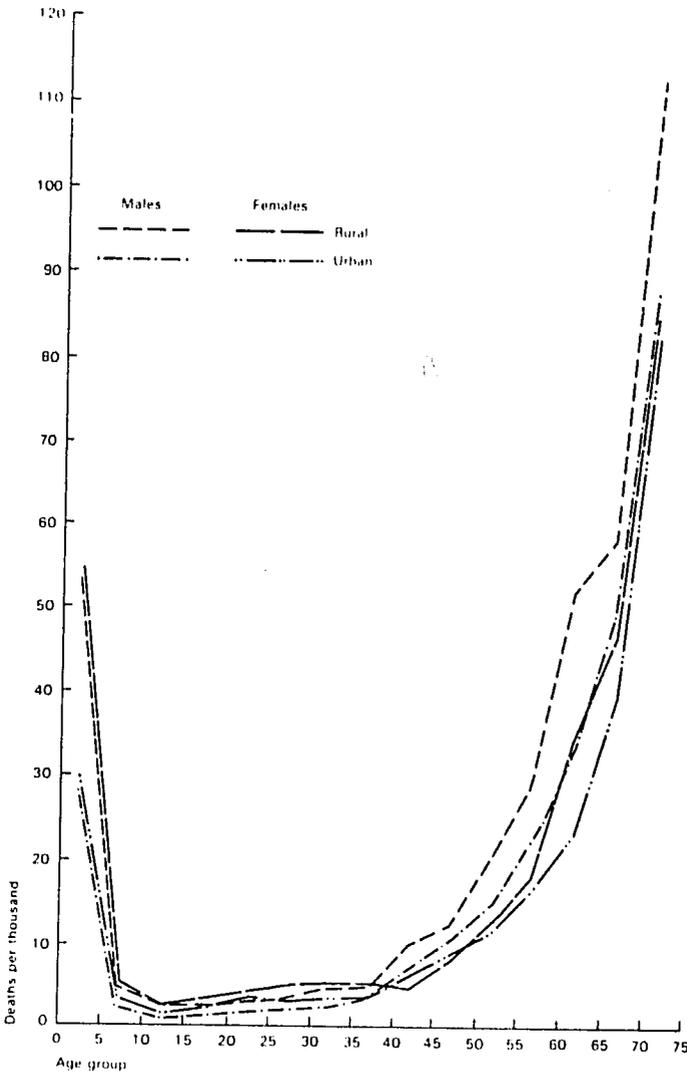
SOURCE: India, ORGCC, *Sample Registration Bulletin* (1980: vol. 13, no. 2, table 5).

Table 34 reveal that the mortality ratios (male death rate/female death rate) for age groups above age 40 are greater in rural than in urban areas, indicating that in later life women living in rural areas live longer than men probably because the selection process at younger ages leaves only those women who develop strong resistance to various diseases.

*Religion and mortality.* Differentials in death rates by religion have been studied in certain rounds of the NSS. Data from the 18th round in 1963-64 (Table 35) indicate that in rural areas the death rate was highest among Hindus and lowest among Sikhs. In the urban areas, the death rates of Hindus and Muslims were almost the same. On the basis of mortality patterns, Sikhs and Christians form a separate group from Hindus and Muslims.

*Household occupation and mortality.* The 18th and 19th rounds of the NSS compiled rural and urban death rates by household occupation

FIGURE 3 Sex-age-specific death rates by rural/urban residence, based on SRS data: India, 1976



(Table 36). Death rates for some occupational categories, as for rural and urban areas overall, were higher in 1964–65 than in 1963–64. The data in Table 36 do not form a consistent pattern, however, owing perhaps to the smallness of sample size for certain occupational categories and also to differentials in the age composition of the population subgroups. Nevertheless, death rates were generally lower in the

TABLE 35 Annual death rates by religion and rural/urban residence: India, 1963-64

Rural/urban residence	Hinduism	Islam	Christianity	Sikhism	All religions
Rural	12.85	10.67	6.04	5.50	12.39
Urban	8.10	8.28	5.95	5.44	7.98

NOTE: Because NSS rates are underestimates, they should be read as indicators of differentials rather than true levels.

SOURCE: India, Cabinet Secretariat (1970b:5).

white-collar categories (professional, administrative, clerical, and sales workers) than in blue-collar occupations.

### Infant mortality

Unlike many developing countries, India has suffered in the past and still continues to suffer from very high infant mortality rates (IMRs). This is probably so because infants, particularly after the first month of life, are more responsive than older people to environmental conditions, and infant deaths increase sharply during epidemics. The

TABLE 36 Annual death rates by household occupation and rural/urban residence: India, 18th and 19th rounds of the National Sample Survey

Household occupation	Rural		Urban	
	18th	19th	18th	19th
Professional, technical, and related	9.52	9.24	5.72	2.73
Administrative and executive	7.16	18.57	4.44	1.84
Clerical and related	9.73	u	5.52	u
Sales	9.97	10.96	7.01	5.85
Agriculture	12.62	14.94	9.34	11.03
Mining and related	7.73	u	10.72	u
Transport and communication	12.37	9.68	8.42	8.57
Crafts and production process	11.63	16.45	9.65	11.08
Service, sports, and recreation	14.00	11.07	8.29	11.82
All occupations	12.39	14.75	7.98	8.93

u--unavailable. Occupational category was not used in the tabulations of mortality data for the 19th round.

SOURCES: 18th round (February 1963--January 1964): India, Cabinet Secretariat (1970b:6). 19th round (July 1964--June 1965): India, Cabinet Secretariat (1970d:7).

TABLE 37 Five-year averages of infant mortality rates for registration areas: India, 1900-04 to 1946-50

Period	Rate per 1,000
1900-04	215
1905-10	228
1911-15	204
1916-20	219
1921-30	174
1931-35	178
1936-40	174
1941-45	161
1946-50	161

SOURCE: India, ORGCC (1974:42).

pattern of infant mortality for undivided India, based on civil registration data, is presented in Table 37. It represents a declining trend, particularly since 1921. A more reliable indicator of the decline in infant mortality is the probability of death at age 0 (i.e., less than one year) obtained from intercensal life tables. Figures for males and females in each decade from 1881-91 to 1961-71 (Table 38) reveal higher male than female IMR, but the difference between the two sexes has narrowed considerably in recent decades. The IMR during 1961-71 was about half of the level prevailing at the beginning of this

TABLE 38 Probability of death before one year of age, derived from intercensal life tables: India, 1881-91 to 1961-71

Decade	Probability per 1,000 live births		Difference [(M) - (F)]
	Males	Females	
1881-91	272.6	239.9	32.7
1891-1901	285.4	258.8	26.6
1901-11	290.0	284.5	5.5
1911-21	301.5	279.3	22.2
1921-31	248.7	232.3	16.4
1931-41	217.5	203.9	13.6
1941-51	190.0	175.0	15.0
1951-61	153.0	138.0	15.0
1961-71	130.1	128.4	1.7

SOURCES: Davis (1951:240, 242); India, ORGCC (1974:42); Census of India 1971 (1977a: 14, 16).

century, but the rate is still high compared with rates in the developed countries and in many developing countries.

Over the past half-century, the decline in the crude death rate has been much greater than the decline in the IMR. This implies that although mortality in general has responded to community health measures such as the control of infectious and parasitic diseases, the reduction of infant mortality is limited by other factors such as low birth weights indicative of mothers' low nutritional status (Mitra, 1978:114).

The Office of the Registrar General and Census Commissioner conducted a comprehensive Survey on Infant and Child Mortality in 1979 to provide benchmark information on various facets of children's lives. The survey was conducted in about 3,700 sample units of the SRS covering 0.72 million households along with the regular half-yearly survey. The preliminary report of the special survey (India, ORGCC, 1980), based on an advance tabulation of a 25 percent subsample of the SRS households, provides information about infant and child mortality patterns in various subgroups of the population.

*Rural-urban differentials.* Table 39, derived from earlier SRS data, shows that infant mortality rates during the period 1970-78 were consistently and substantially higher in rural than in urban areas. It also indicates that combined IMRs during the 1970s fluctuated around an average of 131 but shot up in 1972 to 139 and in 1975 to 140, probably because of severe drought conditions in several parts of the country in those years that resulted in food shortages.

TABLE 39 Infant mortality rates by rural/urban residence as estimated in the Sample Registration System: India, 1970-78

Year	Rural	Urban	Total
1970	136	90	129
1971	138	82	129
1972	150	85	139
1973	143	89	134
1974	136	74	126
1975	151	84	140
1976	139	80	129
1977	142	67	129
1978	136	70	125

SOURCE: India, ORGCC (1980:33).

*Sex differentials.* A comparison of Table 38 and Table 40, which gives IMRs by sex for selected years between 1972 and 1978, reveals that whereas male IMRs were higher than female IMRs before the 1970s, more recently the trend has been just the opposite. This anomaly raises three questions: (1) Are the methods of estimation used for making intercensal life tables and obtaining various probabilities of dying between one age and another ( $q_x$ ) sound enough to give reliable estimates of  $q_0$  (probability of infant mortality) and early childhood mortality and, hence, of life expectancy at birth? (2) Could it be that the SRS has not been able to record the deaths to male infants in the same manner as it has been recording female infant deaths? and, (3) Has the sex pattern of IMR in India undergone a change in recent years? To answer all these questions requires a more detailed investigation.

*Differentials by state.* Estimates of infant mortality rates by state and rural/urban residence for the periods 1971-73 and 1974-76 as obtained in the SRS are given in Table 41. The rates are three-year averages and can be taken as centered at 1972 and 1975, respectively. Whereas Kerala succeeded in achieving an IMR of 55 in the latter period, Uttar Pradesh had an IMR of 182—almost three and a half times the rate for Kerala. Other states with high IMRs were Madhya Pradesh, Orissa, and Rajasthan. (Table 41 does not include figures for Bihar and West Bengal because data for these states were not available. The pattern of IMR in Bihar, however, is thought to be similar to that in Uttar Pradesh.) In comparison with this pattern, all the southern states and the states of Haryana, Jammu and Kashmir, Maharashtra,

TABLE 40 Infant mortality by rural/urban residence and sex as estimated in the Sample Registration System: India, 1972-78

Year	Rural		Urban		Total	
	Males	Females	Males	Females	Males	Females
1972	141	161	85	85	132	148
1973	141	144	88	90	132	135
1976	133	146	78	82	124	135
1977	134	149	69	65	124	134
1978	130	142	69	71	120	131

SOURCE: India, ORGCC (1980:33).

TABLE 41 Infant mortality rates for India and its states by rural/urban residence: 1971-73 and 1974-76

States	1971-73			1974-76		
	Rural	Urban	Total	Rural	Urban	Total
INDIA	144	85	134	142	79	132
Andhra Pradesh	119	62	109	126	76	118
Assam	141	84	137	137	103	135
Gujarat	157	106	144	146	101	156
Haryana	93	64	90	118	56	109
Himachal Pradesh	107	49	105	116	60	114
Jammu & Kashmir	71	48	70	75	38	71
Karnataka	101	63	93	94	57	85
Kerala	61	46	60	57	42	55
Madhya Pradesh	154	96	145	150	87	142
Maharashtra	117	84	107	97	66	88
Orissa	139	78	134	146	85	142
Punjab	120	79	112	108	80	101
Rajasthan	135	83	127	154	74	143
Tamil Nadu	127	76	114	123	72	109
Uttar Pradesh	189	124	183	189	120	182

NOTE: Rates are three-year averages for the periods 1971-73 and 1974-76, and can be taken as centered at 1972 and 1975 respectively.

SOURCE: Swamy (1979).

and Punjab seem to have achieved low IMRs. Besides Kerala, only Jammu and Kashmir, Karnataka, and Maharashtra succeeded in having IMRs below 100.

IMRs in Andhra Pradesh, Haryana, Himachal Pradesh, Orissa, and Rajasthan actually increased over the three-year period by varying amounts. The reasons for that are not known.

### Childhood mortality

In countries able to provide proper care for children, deaths among children below five years of age constitute a tiny proportion of the total deaths (e.g., 1.1 percent in Sweden and 4.2 percent in Italy in 1977—United Nations Statistical Office, 1978), depending in part on the age structure of the total population. In countries where children fail to receive proper care, as is the case with many developing countries, the proportion of childhood deaths is quite high (ranging in 1977

from 24.7 percent in Chile to 47.8 percent in Egypt and 47.7 percent in Albania (United Nations Statistical Office, 1978). In India, deaths of children below five years constituted 48.9 percent of all deaths in rural areas and 38.3 percent of all deaths in urban areas in 1976 (Table 42). More than half of all female deaths were of children below age five; this proportion among males was 44.9 percent. In some states, the mortality of young children was exceptionally high. For example, deaths of children below five years in Uttar Pradesh constituted 56.3 percent of all deaths, in Gujarat 54.6 percent, and in Rajasthan 53.0 percent. At the other end of the scale, in Kerala such deaths accounted for less than 30 percent of all deaths (Premi, 1980a: 14).

### Causes of death

Statistics on causes of death in India are published in the annual reports on vital statistics of the Registrar General, India. The causes are classified into eight categories: (1) cholera, (2) plague, (3) smallpox, (4) fevers, (5) dysentery and diarrhea, (6) respiratory diseases, (7) injuries, and (8) other causes. Even in this broad classification, more than half the deaths are in the last category, with the result that no one can be sure of the most important causes of death in India. This situation arises primarily because a great many deaths taking place in rural areas are not attended to by doctors and, hence, the cause of death is not certified in such cases.

Of the classified causes, only cholera, plague, and smallpox are notifiable diseases throughout the country, and information covering a long period of time is available on them. In recent years, data on some other communicable diseases (e.g., malaria and tuberculosis) have also become available as these diseases have been brought under the national control and eradication programs. Table 43 reveals that plague, cholera, and smallpox have been continuously brought under control and by the mid-1970s were greatly reduced.

Over the first seven decades of this century, the most impressive gains seem to have been made in the control of plague. In post-Independence India especially, the number of plague victims has fallen sharply. Deaths due to plague are now likely to be extremely few in number, other than in remote areas, because plague can be cured by sulphur drugs and antibiotics (Cassen, 1978:82-83). Given the vigilance of the health authorities and the predictability of cure when cases occur, it would appear that plague in India has been eliminated.

TABLE 42 Proportion (percentage) of deaths of children below age five to total deaths, by rural, urban residence and sex: India and its states, 1976

State	Rural			Urban			Combined		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
INDIA	45.97	51.75	48.92	37.14	39.57	38.29	44.88	50.43	47.69
Andhra Pradesh	43.16	44.52	43.84	38.12	32.17	35.35	42.54	43.19	42.86
Assam	35.76	41.25	38.48	37.00	43.33	36.56	35.84	41.33	38.52
Gujarat	55.53	58.44	56.97	41.55	45.94	43.69	52.96	56.20	54.56
Haryana	52.20	55.36	53.83	29.37	40.58	34.14	49.53	54.14	51.87
Himachal Pradesh	42.32	47.84	45.12	24.72	26.09	25.27	41.86	47.40	44.66
Jammu & Kashmir	43.76	40.08	41.88	16.93	35.49	25.06	40.63	39.65	39.67
Karnataka	41.23	40.13	40.68	31.40	31.28	31.28	39.34	38.50	38.92
Kerala	28.85	30.67	29.72	21.46	31.76	26.03	27.58	30.86	29.07
Madhya Pradesh	49.08	51.91	50.50	41.77	47.53	44.42	45.16	51.52	48.32
Maharashtra	37.30	42.26	39.61	32.72	38.45	35.43	36.31	41.39	38.68
Orissa	38.60	43.30	40.94	36.19	36.69	36.25	38.48	43.06	40.74
Punjab	42.16	48.97	45.57	36.64	39.72	38.04	41.12	47.44	44.24
Rajasthan	51.45	56.60	53.99	40.30	46.24	42.92	50.43	55.73	53.02
Tamil Nadu	39.88	41.33	40.39	35.64	34.57	35.59	39.03	40.15	39.57
Uttar Pradesh	52.95	60.69	57.14	45.23	47.74	46.28	52.23	59.76	56.26

SOURCE: Swamy (1979: tables 3, 4).

TABLE 43 Registered deaths due to plague, cholera, and smallpox: India, 1898–1908 to 1969–73

Period	Plague	Cholera	Smallpox
1898–1908 <sup>a</sup>	6,032,693	3,879,735	853,254
1909–18	4,221,529	3,474,074	745,801
1919–28	1,762,718	2,567,543	803,859
1929–38	422,580	1,731,899	717,030
1939–48	268,596	2,051,808	722,260
1949–58	59,059	516,065	643,786
1959–68	1,380	147,979	415,838
1969–73	1,183 <sup>b</sup>	32,660	63,068

a Cholera and smallpox figures relate to the period 1900–08 only.

b The number of deaths due to plague in 1969 alone was 706.

SOURCES: India, ORGCC (1973:88; 1974:44; 1975:112; 1977:126; 1978:106; 1979b:120).

Like plague, cholera can spread rapidly and kill profusely. Unlike plague, cholera has been regarded through much of history as having its home in India and particularly in the Bengal delta. During 1961–65, India alone was responsible for 73.9 percent of all cholera cases worldwide and 84.9 percent of all cholera deaths. This was so even though the mean annual death rate from cholera, which was as high as 1.58 deaths per 1,000 population during 1900–24, dropped to 0.74 during 1925–47 and declined further to 0.17 during 1948–63 (Mitra, 1978:151–52).

Unlike plague and cholera, smallpox is found in almost all areas of the country. Nationally, however, this disease has not been a major killer in the twentieth century. The decline in deaths due to smallpox has occurred in three phases: (1) 1900–20: the death rate varied from 0.19 to 0.80 per 1,000 population, with an annual mean of 0.37; (2) 1921–46: the death rate varied from 0.09 to 0.70, with an annual mean of 0.29; and (3) 1947–67: the death rate varied from 0.02 to 0.44, with an annual mean of 0.15 (Mitra, 1978:157). During 1969–73, however, seven states, namely Madhya Pradesh, Bihar, Uttar Pradesh, Karnataka, Gujarat, West Bengal, and Andhra Pradesh (in that order), accounted for 89.2 percent of all Indian deaths from smallpox.

Smallpox prevention, which entails vaccination, is much easier and less costly than prevention of cholera. Nevertheless, even though the immunization against smallpox is effective for a long period, the

fact that smallpox in 1967 still accounted for approximately 1 percent of all deaths in India testifies to the difficulty of ensuring universal vaccination. There was a disquieting episode in the early 1970s when smallpox reappeared in eastern India, probably as a consequence of the tremendous refugee movement during and after the Bangladesh War. In 1974, India recorded 188,000 smallpox cases, three-quarters of them in Bihar. Smallpox deaths numbered more than 31,000 (Mitra, 1978:160).

The final elimination of smallpox, once considered difficult to achieve in India, now appears to be a reality. Since 1975, there seem to have been few, if any, cases. The Indian government now offers a reward of Rs. 1,000 (US \$133.33 at the current rate of exchange) to anyone reporting a case of smallpox.

Another major disease for which the picture has changed radically since Independence is malaria. Profiting from the dichloro-diphenyl-trichloro-ethane (DDT) campaign against malaria during World War II and after, India in 1953 established the National Malaria Control Programme, which was succeeded by the National Malaria Eradication Programme in 1958. During the 1950s the incidence of malaria dropped rapidly, and by the early 1960s it had reached a low level as reflected in the incidence of malaria and the annual parasite index (Table 44). Beginning in 1966, however, there was a steadily rising trend in both incidence and positive cases of the disease. The annual parasite index rose sharply in 1975 and 1976, but declined in 1977 and 1978. There have been local outbreaks of malaria since 1966 in various parts of the country, resulting in setbacks to the malaria eradication program. The outbreaks have been attributed to the development of resistance by vector mosquitoes to insecticides and of the disease to antimalarial drugs. The growing cost of petroleum-based insecticides has also impeded the program (Dutta and Bhasin, 1980:8).

With the control of malaria within reasonable limits, the other important cause of death seems to be tuberculosis (TB). In the absence of proper diagnosis and registration, it is difficult to estimate the exact number of persons suffering from TB and the number dying. Because of difficulties in the medical certification of the cause of death, most deaths resulting from TB are perhaps registered simply as respiratory diseases. An important hindrance to control is that institutional treatment of TB is prolonged and costly. The strategy under the TB control program is therefore to detect active cases in an early stage and to

TABLE 44 Incidence of malaria: India, 1961-78

Year	Incidence <sup>a</sup>	Annual parasite index <sup>b</sup>	Average blood examination rate
1961	49,151	0.13	3.50
1962	59,575	0.14	6.43
1963	87,306	0.20	9.08
1964	112,942	0.25	9.77
1965	99,667	0.22	8.71
1966	148,012	0.31	8.37
1967	278,214	0.57	8.26
1968	274,634	0.55	8.36
1969	347,975	0.68	8.14
1970	694,017	1.32	7.77
1971	1,322,398	2.47	7.56
1972	1,428,649	2.61	7.17
1973	1,930,273	3.46	7.59
1974	3,167,658	5.59	7.86
1975	5,166,142	9.10	9.12
1976	6,467,015	11.25	8.89
1977	4,740,900	7.56	9.41
1978	4,144,385	6.53	8.22

a Number of persons contracting malaria.

b Number of positive cases per thousand population in area covered by malaria eradication program.

SOURCE: Dutta and Bhasin (1980:26).

protect healthy persons under age 20 with bacillus Calmette-Guérin (BCG) inoculation. By 1971, about 250 million persons had been tuberculin-tested and about 142 million BCG-vaccinated (India, ORGCC, 1974:46).

#### POPULATION DISTRIBUTION AND URBANIZATION

In India, as in most countries of the world, human settlements are divided into two basic categories, rural and urban. Although Indian authorities define a rural settlement in terms of village revenue boundaries as demarcated in the revenue clerk's register, for census purposes it is simpler to define urban settlements first and treat the remainder as rural. Until the 1951 census, the definition of "urban" settlement remained essentially unchanged, but it left a lot of latitude for

interpretation with the Superintendents of Census Operations<sup>13</sup> in the various states. For example, the 1951 census defined a “town” as

... normally an inhabited locality with a total population of not less than 5,000 persons. But places with a somewhat larger population which do not possess definite urban character may not be treated as towns. At the same time, places with a smaller population with definite urban character (including generally all municipalities and cantonments and other places having a local administration of their own) may be treated as separate towns. The decision in the marginal cases rests with the State Governments in some states and Census Superintendents in others (Census of India 1951 [1953:44]).

To bring greater uniformity to the definition of urban areas from state to state, the government adopted the following definition of urban places on the eve of the 1961 census:

To qualify for an urban area, a place should first be either a municipal corporation or a municipal area, or under a Town Committee or a Notified Area Committee or a Cantonment Board. All other places which satisfy the following criteria:

- a) a density of not less than 1,000 per sq. mile;
- b) a population of 5,000;
- c) three-fourths of the occupations of the working population should be outside of agriculture; and
- d) the place should have, according to the Superintendent of the State, [a] few pronounced urban characteristics (Census of India 1961 [1962:xxxvii]).

Almost the same definition of urban areas was used in the 1971 census. There was, however, still some looseness in the definition of urban areas, and urban populations from one state to another are not strictly comparable (Bose, 1978:33–55; Premi et al., 1977:351–71).

Despite these limitations of comparability over time, Table 45 presents the rural-urban distribution of India’s population for the decades 1901–71 and the decadal rates of change in each category. At the turn of the century, only 10.8 percent of the population lived in urban areas. The proportion remained approximately the same until 1921, after which it increased gradually until, in 1971, one-fifth of India’s population was classified as urban. This gain in the proportion of urban population over a period of half a century seems modest compared with the urbanization rates of many developing countries. During the same period, however, the number of urban inhabitants almost quadrupled, reaching 109.1 million in 1971—which was a much

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<sup>13</sup> The Superintendent was the head of census operations in each state or union territory. In the 1971 census, this designation was changed to Director of Census Operations.

TABLE 45 Population by rural/urban residence and percentage of decadal variation: India, 1901–71

Year	Population (in millions)			Percentage distribution		Decadal growth rate	
	Total	Rural	Urban	Rural	Urban	Rural	Urban
1901	238.4	212.5	25.9	89.2	10.8	na	na
1911	252.1	226.1	25.9	89.7	10.3	6.4	0.3
1921	251.3	223.2	28.1	88.8	11.2	-1.3	8.3
1931	279.0	245.4	33.5	88.0	12.0	9.9	19.1
1941	318.7	274.4	44.2	86.1	13.9	11.8	31.9
1951	361.1	298.7	62.4	82.7	17.3	8.8	41.4
1961	439.2	{ 360.2	78.9	82.0	18.0	20.6	26.4
		{ 355.4 <sup>a</sup>	83.7 <sup>a</sup>	80.9 <sup>a</sup>	19.1 <sup>a</sup>	19.0 <sup>a</sup>	34.0 <sup>a</sup>
1971	548.2	439.0	109.1	80.1	19.9	21.8	38.3

na--not applicable.

a Estimate obtained by applying the 1951 definition of urban areas to the 1961 census data. See Bose (1978:817).

SOURCE: Census of India 1971 (1975:45, 131).

higher figure than the entire population size of any country except China, the Soviet Union, the United States, and Indonesia in 1970–71.

Table 45 shows that, beginning in the 1940s, the urban population of India increased at a fast pace. This happened mainly through the processes of migration and reclassification, first as a result of the establishment of certain industries in urban areas during World War II and, later, after the country was partitioned into India and Pakistan in 1947, due to the migration of refugees. The decadal growth rate of the urban population during the 1950s fell to only 26.4 percent, but if adjustment is made for definitional changes the rate was 34.0 percent. The urban growth rate during the 1960s rose to 38.3 percent, but in relation to the rural growth rate it was slower in the 1960s than in the 1950s.

### Distribution by size of settlements

Besides their rural or urban classification, settlements are classified in the Indian census by size. Table 46 gives the percentage distribution of population of India and its states and union territories by size of settlements for 1961 and 1971. The last column, showing the index

of dissimilarity<sup>14</sup> between 1961 and 1971, indicates the amount of shift that took place in this distribution over the decade. In 1961 roughly one-sixth of the Indian population was living in settlements of fewer than 500 persons, but by 1971<sup>15</sup> this proportion had declined to 13 percent. At the other extreme, 3.2 percent of the country's population was concentrated in just seven metropolises of one million or more inhabitants in 1961, and this proportion increased to 3.8 percent in 1971 (in nine metropolises). The major contributors to the population of small settlements (those with fewer than 200 persons) were the hill states of Himachal Pradesh (29 percent in 1971), Meghalaya (29 percent), Tripura ( 5 percent), and the union territories of Arunachal Pradesh (38 percent) and Andaman and Nicobar Islands (14 percent). The proportion of inhabitants in small settlements fell sharply over 1961--71, mainly owing to natural increase and the consequent shift of some settlements from the lowest size class to higher classes.

Settlements of 20,000 or more inhabitants accounted for nearly 14 percent of the population in 1961 and 16 percent in 1971. The increase in this proportion was due largely to the graduation of lower-order settlements into higher-order ones through natural increase and to migration from rural areas and small towns to larger ones.

The index of dissimilarity indicates that there was a shift of nearly 7 percent in the distribution of India's population during the 1960s. The shift was caused by a reduction in the proportion of people living in settlements of fewer than 1,000 persons and a consequent increase in the share of population living in larger settlements. Among the states and union territories, the major shifts in population distribution (as indicated by an index of dissimilarity of more than 10 points) occurred in smaller states like Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Sikkim, and Tripura, and in all the union territories except Arunachal Pradesh, Chandigarh, and Delhi. Among the major states, only Kerala underwent a shift of more than 20 percentage points in its population distribution.

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14 The index of dissimilarity is defined as half the sum of the absolute differences (without regard to signs) of two percentage distributions relating to the same or similar items.

15 A great proportion of small settlements does not have even the basic amenities of life: safe drinking water, a medical facility of any kind, school, communication facilities (post and telegraph offices), electricity, or bus or rail route. The problem becomes more acute for settlements in inaccessible areas.

TABLE 46 Percentage distribution of the Indian population by size

Zone, state or union territory, and year	Total	Size class				
		< 200	200 - 499	500 - 999	1,000 - 1,999	2,000 - 4,999
INDIA						
1961	100.00	4.06	13.13	19.11	20.39	17.66
1971	100.00	2.79	10.34	17.22	20.64	19.23
NORTHERN ZONE						
1961	100.00	5.02	14.09	19.28	19.96	16.74
1971	100.00	3.92	11.69	18.11	20.50	17.88
Haryana						
1961	100.00	0.68	4.97	13.91	23.64	29.66
1971	100.00	0.67	4.94	13.84	23.52	29.10
Himachal Pradesh						
1961	100.00	29.50	33.07	16.85	10.15	5.34
1971	100.00	29.31	32.84	16.73	10.08	5.39
Jammu & Kashmir						
1961	100.00	6.87	21.39	25.85	19.98	10.68
1971	100.00	4.38	15.98	23.53	22.66	14.55
Punjab						
1961	100.00	1.49	8.56	19.05	24.50	20.23
1971	100.00	1.48	8.48	18.88	24.28	19.70
Rajasthan						
1961	100.00	5.53	18.49	22.86	19.72	14.31
1971	100.00	3.64	14.31	21.43	21.32	17.10
Chandigarh (UT)						
1961	0.0	0.0	0.0	0.0	0.0	0.0
1971	100.00	0.02	0.66	3.12	3.61	0.0
Delhi (UT)						
1961	100.00	0.11	0.71	2.76	3.16	4.52
1971	100.00	0.03	0.21	0.98	2.73	4.61
EASTERN ZONE						
1961	100.00	6.1	16.8	21.8	21.2	16.4
1971	100.00	4.2	13.2	20.1	22.4	19.3
Assam						
1961	100.00	3.95	15.66	28.97	28.30	15.04
1971	100.00	3.87	15.37	28.44	27.79	14.56
Bihar						
1961	100.00	4.73	15.06	20.86	22.62	20.97
1971	100.00	3.26	12.12	19.17	22.95	22.71
Manipur						
1961	100.00	12.60	17.20	18.70	22.00	19.40
1971	100.00	9.13	14.02	15.37	21.79	22.68
Meghalaya						
1961	100.00	39.70	28.10	12.60	4.30	0.0
1971	100.00	28.73	32.37	15.64	6.62	2.55
Nagaland						
1961	100.00	9.00	25.10	30.10	23.90	6.60
1971	100.00	7.26	20.80	22.19	29.55	8.91
Orissa						
1961	100.00	11.41	27.62	28.39	18.96	6.85
1971	100.00	8.14	22.79	28.04	21.70	10.22

class of settlements, zone, and state or union territory: 1961 and 1971

5,000 - 9,999	10,000 - 19,999	20,000 - 49,999	50,000 - 99,999	100,000 - 499,999	500,000 - 999,999	1,000,000+	Index of dissimilarity
6.52 7.10	5.37 6.62	3.59 3.64	2.17 2.68	4.02 4.83	0.74 1.12	3.24 3.79	5.9
5.47 5.66	2.96 3.23	3.91 3.52	2.11 2.94	6.17 6.23	0.0 1.00	4.29 5.32	4.6
10.93 10.84	3.69 3.21	4.89 4.60	6.24 7.02	1.39 2.26	0.0 0.0	0.0 0.0	1.7
1.93 1.53	1.64 1.90	1.52 0.62	0.0 1.60	0.0 0.0	0.0 0.0	0.0 0.0	1.9
2.07 3.72	1.67 0.99	0.59 1.77	0.0 0.0	10.90 12.42	0.0 0.0	0.0 0.0	10.9
6.00 5.42	2.95 3.42	6.65 5.16	1.88 3.72	8.69 9.47	0.0 0.0	0.0 0.0	3.1
4.91 5.47	3.51 4.09	3.31 3.53	1.20 1.89	6.16 4.83	0.0 2.39	0.0 0.0	8.9
0.0 2.04	0.0 5.52	0.0 0.0	0.0 0.0	0.0 85.03	0.0 0.0	0.0 0.0	0.0
0.0 0.88	0.0 0.86	1.36 0.0	0.0 1.41	9.84 7.42	0.0 0.0	77.55 80.87	6.6
5.1 6.2	2.4 3.2	2.6 2.9	2.0 2.4	2.5 3.4	0.5 0.5	2.6 2.2	7.6
2.67 2.35	1.35 2.38	2.62 2.16	0.53 2.11	0.91 0.97	0.0 0.0	0.0 0.0	2.7
6.97 8.54	2.77 3.85	2.17 2.82	1.06 1.35	2.79 3.23	0.0 0.0	0.0 0.0	6.1
1.50 7.65	0.0 0.0	0.0 0.0	8.60 0.0	0.0 9.36	0.0 0.0	0.0 0.0	18.3
3.10 9.88	2.80 4.53	0.0 0.0	9.40 8.66	0.0 0.0	0.0 0.0	0.0 0.0	13.9
5.20 1.35	0.0 5.78	0.0 4.17	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	17.9
1.59 1.69	1.77 1.55	1.28 2.67	1.30 0.67	0.83 2.55	0.0 0.0	0.0 0.0	9.3

TABLE 46 (continued)

Zone, state or union territory, and year	Total	Size class				
		<200	200-499	500-999	1,000-1,999	2,000-4,999
<b>Jharkhand</b>						
1961	100.00	10.22	47.59	33.50	4.17	0.0
1971	100.00	0.0	5.73	38.69	37.38	11.85
<b>Tripura</b>						
1961	100.00	24.62	20.62	22.29	16.55	6.85
1971	100.00	16.36	19.95	21.22	19.68	11.33
<b>West Bengal</b>						
1961	100.00	3.10	11.43	17.28	20.58	17.88
1971	100.00	1.90	8.34	14.58	20.83	22.04
<b>Andaman &amp; Nicobar Islands (UT)</b>						
1961	100.00	26.46	26.23	21.88	3.28	0.0
1971	100.00	14.21	20.95	18.92	21.25	1.90
<b>Arunachal Pradesh (UT)</b>						
1961	100.00	43.91	26.65	12.98	8.81	6.12
1971	100.00	38.16	26.76	15.42	10.52	8.05
<b>Mizoram (UT)</b>						
1961	100.00	12.40	34.08	35.29	11.98	0.89
1971	100.00	1.17	5.20	7.44	21.31	48.15
<b>CENTRAL ZONE</b>						
1961	100.00	5.8	19.9	25.5	21.1	12.2
1971	100.00	3.8	16.1	24.3	23.0	14.5
<b>Madhya Pradesh</b>						
1961	100.00	8.57	27.23	27.08	15.57	6.94
1971	100.00	5.21	21.85	27.48	19.03	8.70
<b>Uttar Pradesh</b>						
1961	100.00	4.57	16.72	24.79	23.47	14.54
1971	100.00	3.20	13.31	22.74	24.94	17.28
<b>WESTERN ZONE</b>						
1961	100.00	1.8	8.9	18.3	21.0	17.4
1971	100.00	1.3	6.0	14.7	21.1	19.3
<b>Gujarat</b>						
1961	100.00	1.76	8.82	18.41	21.87	18.83
1971	100.00	0.39	5.67	14.23	22.80	21.61
<b>Maharashtra</b>						
1961	100.00	1.76	9.01	18.45	20.49	16.22
1971	100.00	1.09	6.27	15.00	20.24	17.90
<b>Dadra &amp; Nagar Haveli (UT)</b>						
1961	100.00	2.01	12.14	29.54	39.35	16.96
1971	100.00	0.61	9.32	16.78	48.59	24.70
<b>Goa, Daman, &amp; Diu (UT)</b>						
1961	100.00	0.11	0.92	5.45	18.49	44.83
1971	100.00	0.88	2.96	7.17	14.81	29.35
<b>SOUTHERN ZONE</b>						
1961	100.00	1.1	4.6	10.2	18.7	25.1
1971	100.00	0.8	3.7	8.6	16.3	24.2
<b>Andhra Pradesh</b>						
1961	100.00	1.45	4.63	11.83	23.86	31.80
1971	100.00	1.10	3.44	9.19	21.08	32.98

5,000– 9,999	10,000– 19,999	20,000– 49,999	50,000– 99,999	100,000– 499,999	500,000– 999,999	1,000,000+	Index of dissimilarity
4.22 0.0	0.0 6.34	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	56.3
3.05 1.65	1.16 3.39	4.80 0.0	0.0 0.0	0.0 6.44	0.0 0.0	0.0 0.0	16.3
5.53 6.99	2.82 3.50	4.16 3.42	3.65 4.80	3.72 4.82	1.47 1.67	8.38 7.11	9.0
0.0 0.0	22.15 0.0	0.0 22.77	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	42.7
1.53 1.09	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	6.2
0.0 7.18	5.36 0.0	0.0 9.55	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	73.3
3.3 4.1	2.1 2.5	2.7 2.8	1.7 1.8	4.5 4.4	1.4 1.9	0.0 0.9	7.1
2.63 3.02	2.43 2.67	3.52 3.32	1.52 2.03	4.51 5.34	0.0 1.35	0.0 0.0	9.0
3.53 4.56	1.91 2.41	2.29 2.51	1.70 1.62	4.46 3.94	2.02 2.18	0.0 1.31	7.4
6.7 7.9	4.0 4.7	4.6 4.2	2.6 3.8	4.0 5.5	2.0 2.2	8.7 9.6	7.8
6.54 8.04	3.89 4.72	6.23 4.98	2.72 4.40	5.36 6.70	0.0 0.0	5.57 5.96	9.0
6.66 7.55	4.07 4.67	3.67 3.65	2.59 3.45	3.44 4.92	3.14 3.42	10.50 11.84	7.2
0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	17.0
17.99 20.31	6.55 4.48	5.66 13.13	0.0 6.91	0.0 0.0	0.0 0.0	0.0 0.0	21.3
11.7 11.2	13.3 16.8	4.8 5.0	2.7 3.1	4.2 5.7	0.0 0.4	3.6 4.1	6.6
9.66 11.57	3.76 4.92	4.23 4.15	1.70 2.80	3.97 5.08	0.0 0.0	3.11 3.69	7.1

TABLE 46 (continued)

Zone, state or union territory, and year	Total	Size class				
		<200	200-499	500-999	1,000-1,999	2,000-4,999
Kerala						
1961	100.00	0.00	0.01	0.09	0.51	8.76
1971	100.00	0.00	0.01	0.03	0.12	2.23
Karnataka						
1961	100.00	2.74	12.18	19.32	21.59	17.74
1971	100.00	1.78	9.31	17.20	21.53	20.19
Tamil Nadu						
1961	100.00	0.24	1.34	7.21	20.30	31.50
1971	100.00	0.25	1.71	6.20	15.84	29.28
Lakshadweep (UT)						
1961	100.00	0.83	0.0	3.95	13.98	81.73
1971	100.00	0.35	0.0	0.0	3.77	62.03
Pondicherry (UT)						
1961	100.00	2.70	11.88	17.85	24.44	16.71
1971	100.00	1.53	6.81	12.31	16.78	16.24

SOURCE: Premi and Tyagi (1979:14-16).

### Pattern of urbanization over the past 70 years

To understand India's pattern of urbanization more clearly, it is necessary to analyze the growth of urban settlements as well as the growth of urban population over time. Table 47 shows the absolute growth in the number of towns in each state and union territory between 1901 and 1971, and Figure 4 depicts the relative growth between 1901 and 1971. Table 48 gives the indices of growth in the urban population over the same period.

Table 47 indicates that the number of towns in the country increased progressively until 1951, when there were 60 percent more towns than in 1901. Owing to a change in the definition of urban areas on the eve of the 1961 census, however, the number of towns declined from 3,059 in 1951 to 2,699 in 1961 (in fact 857 towns were declassified and 497 new towns were created). With the growth of new towns during the 1960s, the index of urban settlements in 1971 again reached the 1951 level.

The picture at the state level is in sharp contrast to the national picture (Figure 4). The northeastern states of Assam, Manipur, Meghalaya, and Tripura had major spurts in the number of towns due to recognition of new urban centers at the 1961 and 1971 censuses. It

5,000– 9,999	10,000– 19,999	20,000– 49,999	50,000– 99,999	100,000– 499,999	500,000– 999,999	1,000,000+	Index of dissimilarity
25.26 11.86	53.82 71.55	5.24 5.16	2.24 2.17	4.07 6.87	0.0 0.0	0.0 0.0	20.6
6.66 6.94	4.65 5.34	4.05 4.21	2.86 2.47	3.57 5.77	0.0 0.0	4.61 5.26	6.5
10.72 13.64	9.28 9.35	5.56 6.31	3.78 4.17	4.94 5.93	0.0 1.33	5.13 5.99	7.7
0.0 33.85	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	33.9
8.90 7.96	0.0 0.0	17.52 19.16	0.0 19.21	0.0 0.0	0.0 0.0	0.0 0.0	30.9

is somewhat surprising that the number of towns in Uttar Pradesh, the state with the second largest urban population, declined over the 70-year period. Among the industrialized states of Maharashtra, Tamil Nadu, Gujarat, and West Bengal, Tamil Nadu and West Bengal made the greatest progress in creating new towns. Jammu and Kashmir State emerges as a special case. There, the number of towns rose from two to 45 between 1901 and 1911, declined to 29 in 1921, then gradually increased to 45 again in 1971 after a little setback in 1951 because of the 1948 Indo-Pakistan War in Kashmir.

As Table 48 reveals, it is again the northeastern states that had the greatest growth in urban population during the 70-year period. Among the other major states, Kerala, Orissa, West Bengal, and Bihar had high urban growth, largely owing to increased industrial activity from 1951 onward in the Chhota Nagpur Plateau cutting across the states of Bihar, West Bengal, Orissa, and Madhya Pradesh. In contrast, the urban population in Uttar Pradesh over the 70-year period grew just 2.3 times, practically at the natural increase rate. The faster urban growth in Bihar and Orissa was due to the creation of new urban centers rather than to increasing concentration in the existing cities and towns.

TABLE 47 Number of towns, by zone and state: India, 1901-71

Zone and state or union territory	1901	1911	1921	1931	1941	1951	1961	1971
INDIA	1,917	1,909	2,047	2,219	2,424	3,059	2,699	3,119
NORTHERN ZONE								
Haryana	54	36	39	41	45	62	61	65
Himachal Pradesh	21	11	12	19	22	29	30	36
Jammu & Kashmir	2	45	29	31	32	25 <sup>a</sup>	43	45
Punjab	77	62	59	66	75	114	109	108
Rajasthan	135	138	147	150	157	227	145	157
Chandigarh (UT)	0	0	0	0	0	0	2	2
Delhi (UT)	0	2	1	3	9	10	3	3
EASTERN ZONE								
Assam <sup>b</sup>	12	14	22	22	24	25	54	74
Bihar	57	59	63	66	84	108	153	202
Manipur	1	1	1	1	1	1	1	8
Meghalaya	1	1	1	2	2	2	6	6
Nagaland	1	1	1	1	1	1	3	3
Orissa	14	18	20	21	29	39	62	81
Tripura	1	1	1	1	1	1	6	6
West Bengal	78	81	89	94	105	120	184	223
Andaman & Nicobar islands (UT)	0	0	0	0	0	1	1	1
Arunachal Pradesh (UT)	0	0	0	0	0	0	0	4
CENTRAL ZONE								
Madhya Pradesh	121	118	122	147	174	202	219	250
Uttar Pradesh	461	424	448	452	458	486	267	325

WESTERN ZONE								
Gujarat	166	155	166	172	191	243	181	216
Maharashtra	219	232	238	258	266	383	266	289
Dadra & Nagar Haveli (UT)	0	0	0	0	0	0	0	0
Goa, Daman, & Diu (UT) <sup>c</sup>	3	3	3	3	3	7	13	13
SOUTHERN ZONE								
Andhra Pradesh <sup>d</sup>	118	135	155	179	214	293	223	224
Kerala	21	27	44	53	62	94	92	88
Mysore (Karnataka)	219	183	197	215	212	289	231	245
Tamil Nadu	133	162	189	222	257	297	339	439
Laccadive, Minicoy, & Amindivi Islands (Lakshadweep) (UT)	0	0	0	0	0	0	0	0
Pondicherry	0	0	0	0	0	0	5	6

NOTE: The number of towns is affected by changes in the census definition of "town" as well as by demographic changes between one census and another.

UT—union territory.

a Denotes the number of towns continuing between 1941 and 1961.

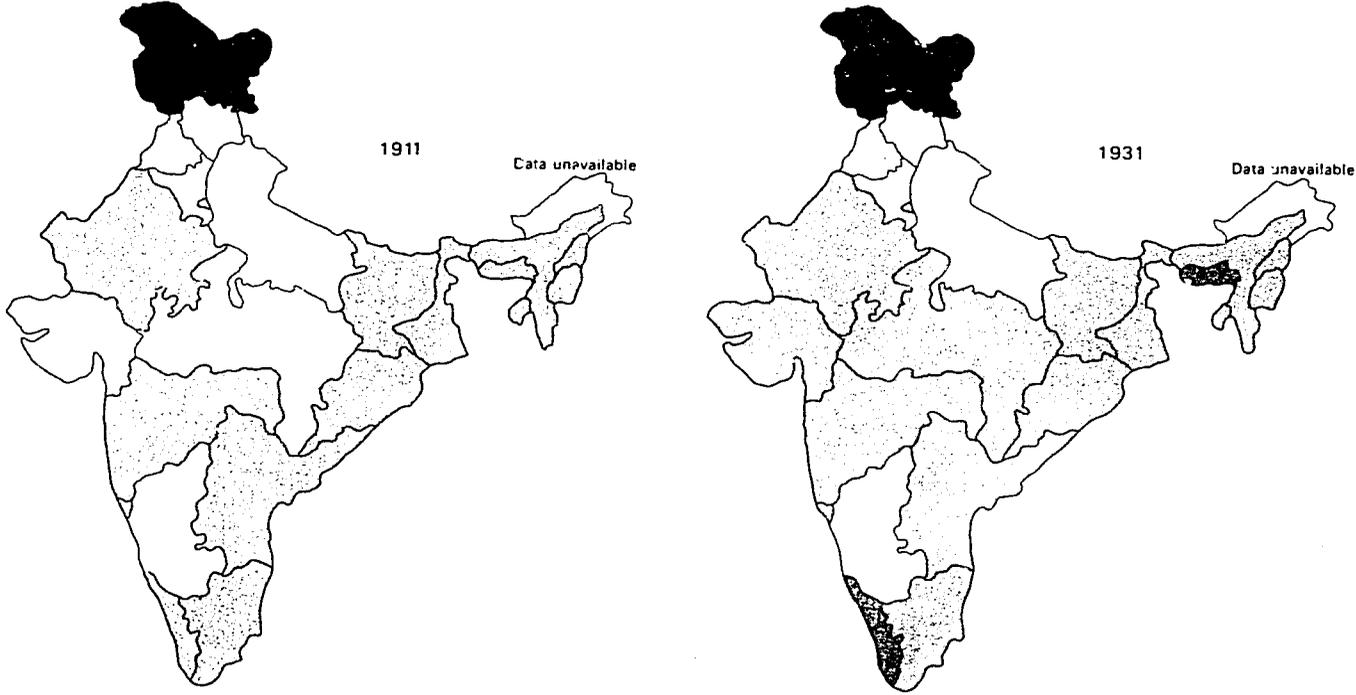
b Includes Mizo District, now the Union Territory of Mizoram.

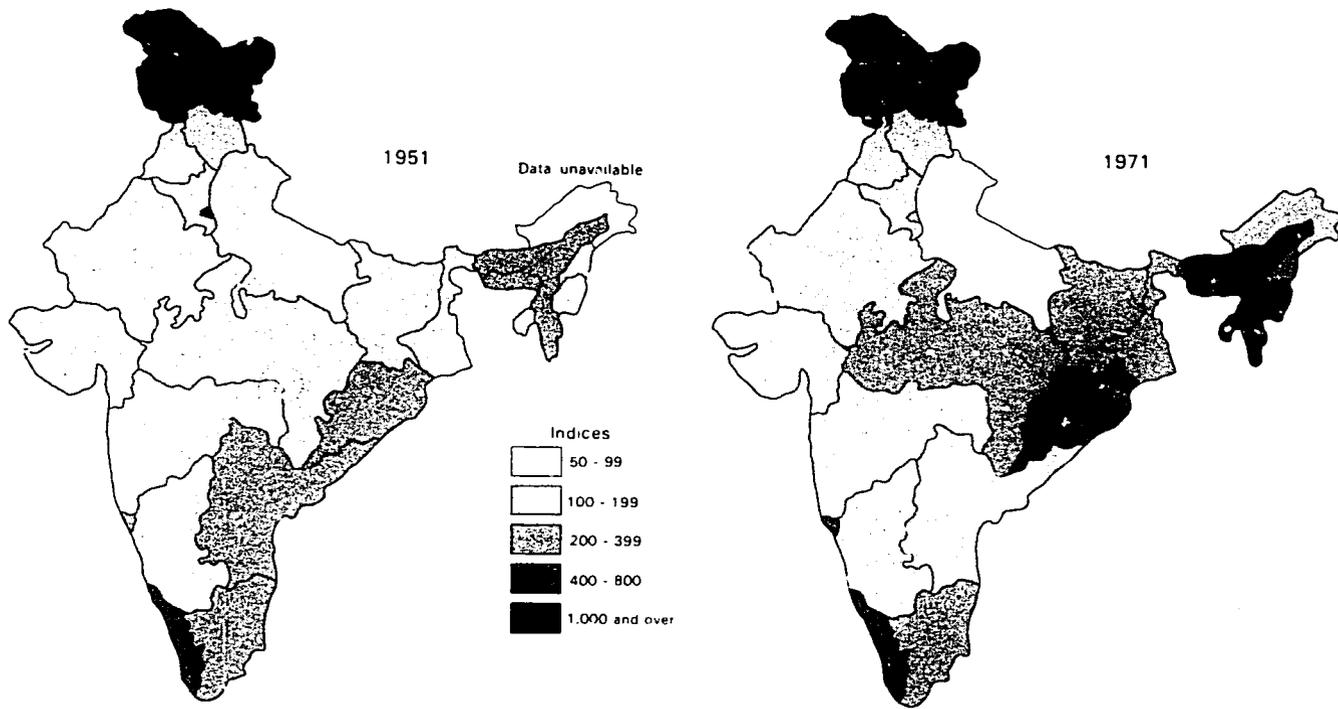
c The number of towns for the years 1901–41 is different from that in the 1971 General Population Tables for Goa, Daman, and Diu, which were revised as a result of direct investigation.

d The number of towns for the years 1901–51 is different from that in the Census of India 1971, Part II-A volume for Andhra Pradesh, because in this table the constituent units of Hyderabad City are reckoned as separate towns in those years whereas in the volume for Andhra Pradesh, Hyderabad City is counted as a single town.

SOURCE: Census of India 1971 (1975:43–44).

FIGURE 4 Index of growth of the number of towns, by state and union territory: India, 1911, 1931, 1951, and 1971  
(1901 = 100)





SOURCE: Census of India 1971 (1975:44).

TABLE 48 Indices of growth in the urban population, by zone and state: India, 1901–71  
(1901 = 100)

Zone and state or union territory	1911	1921	1931	1941	1951	1961	1971
INDIA	100	109	129	171	242	305	422
NORTHERN ZONE							
Haryana	78	84	98	123	169	228	309
Himachal Pradesh	77	86	95	111	199	231	313
Jammu & Kashmir	169	169	200	244	288	341	541
Punjab	87	93	125	177	213	275	344
Rajasthan	95	95	112	137	191	212	293
Chandigarh (UT)	na	na	na	na	na	100	235
Delhi (UT)	111	142	209	325	671	1,102	1,703
EASTERN ZONE							
Assam <sup>a</sup>	121	165	210	270	456	1,032	1,722
Bihar	98	106	130	173	239	357	514
Manipur	103	111	119	138	4	94	196
Meghalaya	142	179	276	397	608	1,221	1,530
Nagaland	78	90	89	113	133	61 <sup>9</sup>	1,662
Orissa	108	111	125	162	233	436	725
Tripura	106	121	149	276	664	1,606	2,531
West Bengal	114	122	140	229	304	413	531
Andaman & Nicobar Islands (UT)	na	na	na	na	100	181	337
Arunachal Pradesh (UT)	na	na	na	na	na	na	100

CENTRAL ZONE							
Madhya Pradesh	89	99	122	161	215	317	465
Uttar Pradesh	91	92	103	130	160	176	230
WESTERN ZONE							
Gujarat	93	101	116	161	218	262	369
Maharashtra	101	120	139	176	286	347	488
Dadra & Nagar Haveli (UT)	na						
Goa, Daman & Diu (UT)	na	na	na	na	100	113	254
SOUTHERN ZONE							
Andhra Pradesh	118	119	146	199	295	341	457
Karnataka	95	112	137	168	272	321	434
Kerala	115	150	202	263	402	562	763
Tamil Nadu	116	126	155	190	269	330	457
Lakshadweep (UT)	na						
Pondicherry (UT)	na	na	na	na	na	100	223

UT—union territory.

na—not applicable. There was no urban population in the union territory at the time of this census. The indices of growth for subsequent years were computed by taking the first year in which there was an urban population as the base year.

a Includes Mizo District, now the Union Territory of Mizoram.

SOURCE: Census of India 1971 (1975:45).

**Urban growth by size of settlements**

The Indian census customarily classifies urban settlements into the following size classes:

Class	Population size
I	100,000 and over
II	50,000 to 99,999
III	20,000 to 49,999
IV	10,000 to 19,999
V	5,000 to 9,999
VI	Less than 5,000

Table 49 gives the percentage distribution of towns and urban population by size class for census years 1901-71. The figures in the table are not strictly comparable over time because of the introduction of the concepts of town group in the 1961 census and urban agglomeration<sup>16</sup> in the 1971 census. Still, they are revealing in many ways. For example, in 1971, 5.6 percent of the urban settlements belonging to class I contained 55.8 percent of the country's urban population. Even in 1961, more than half of the urban population was living in cities and town groups with populations of 100,000 and over. Although the proportion of towns of size-classes II and III together increased from 9.6 percent in 1901 to 29 percent in 1971, the proportion of the urban population living in such towns remained almost stationary at close to 27 percent. Further, the proportion of towns as well as of population of small towns belonging to categories V and VI declined over the period, the decline being very sharp after 1951. The proportion of urban population living in class IV towns also decreased monotonically over time. Observing this pattern of urban growth, some demographers (e.g., Bose, 1978:109-16; Premi, 1980c) have questioned whether there may be stagnation of small towns in India.

Analyzing the growth of the population of urban settlements between 1961 and 1971, I have shown that of a total of 3,119 cities

<sup>16</sup> An urban agglomeration is composed of a main city and other cities, towns, or other developments in the form of a railway colony, university campus, etc., in their close vicinity which form a continuous spread with the main city and whose day-to-day economy is closely linked with the main city. It is important to note that the urban agglomeration of Calcutta is composed of 74 constituent urban units spreading over five districts and out of which ten units besides the core city have populations of more than 100,000. Similarly, the Madras urban agglomeration is composed of 58 settlements.

TABLE 49 Percentage distribution of towns and urban population by size class of urban settlements: India, 1901-71

Size class	1901	1911	1921	1931	1941	1951	1961	1971
Towns								
I (100,000+)	1.35	1.31	1.47	1.62	2.12	2.60	4.34	5.61
II (50,000-99,999)	2.27	2.13	2.28	2.57	3.45	3.32	5.37	6.94
III (20,000-49,999)	7.36	7.79	7.81	9.29	10.95	11.63	18.96	22.08
IV (10,000-19,999)	21.38	20.00	18.98	21.24	22.70	21.83	30.77	33.12
V (5,000-9,999)	40.91	39.62	38.21	38.85	41.48	40.00	31.51	25.72
VI (<5,000)	26.73	29.15	31.25	26.43	19.30	20.62	9.05	6.53
Urban population								
I (100,000+)	25.81	27.15	28.89	29.99	36.83	43.38	50.23	55.83
II (50,000-99,999)	10.79	9.90	10.22	11.16	11.80	10.40	11.09	11.32
III (20,000-49,999)	16.03	16.84	16.42	17.80	16.63	15.95	17.51	16.32
IV (10,000-19,999)	20.87	19.64	18.21	18.25	16.12	13.99	12.99	11.31
V (5,000-9,999)	20.23	19.54	18.85	17.24	15.19	13.08	7.25	4.71
VI (<5,000)	6.27	6.93	7.41	5.56	3.43	3.20	0.93	0.51

SOURCE: Census of India 1971 (1975:205-7).

and towns in the country, 112 had an absolute decline in population and another 320 cities and towns had decadal growth rates of less than 15 percent and hence did not grow as much as their natural increase rates would imply.<sup>17</sup> I have called these towns "out-migrating towns" (Premi, 1980c:3). Among them is Calcutta. The distribution of the out-migrating towns by size class (Table 50) shows that their proportion to the total number of towns in each size class increases as size class decreases. The pattern is duplicated with the population of these out-migrating towns. Furthermore, a sizable number of out-migrating towns have had constant populations over the past half a century or more, gaining in one census but losing in another.

### International migration

International migration to and from India has been an insignificant factor in its total population growth since the beginning of the modern

<sup>17</sup> The cutting point at 15 percent is purely arbitrary. It can change from census to census and from region to region depending on the overall natural increase rate, but in the absence of direct knowledge about the natural increase rate of the population of each individual town and city, I chose 15 percent because no settlement was expected to have a natural increase rate of less than 15 percent during 1951-61.

TABLE 50 Distribution of out-migrating towns by size class: India, 1971

Item	Size class						All size classes
	I (100,000+)	II (50,000– 99,999)	III (20,000– 49,999)	IV (10,000– 19,999)	V (5,000– 9,999)	VI (<5,000)	
Number of towns	151	219	652	987	820	290	3,119
Total population of towns	53,380,841	14,712,382	19,946,611	13,961,297	6,197,427	895,751	109,094,309
Number of out-migrating towns	10	16	69	141	134	62	432
Population of out-migrating towns	4,349,284	1,110,723	2,116,360	1,947,759	978,451	187,632	
Percentage of out-migrating towns to total towns	6.6	7.3	10.6	14.3	16.3	21.4	13.9
Percentage of population of out-migrating towns to total urban population	8.1	7.5	10.6	14.0	15.8	20.9	9.8
Number of chronically out-migrating towns	1	6	17	74	56	8	162
Population of chronically out-migrating towns	100,366	392,918	424,992	1,026,072	443,861	25,254	2,413,463
Percentage of chronically out-migrating towns to total towns	0.7	2.7	2.6	7.5	6.8	2.8	5.2
Percentage of population of chronically out-migrating towns to total urban population	0.2	2.7	2.1	7.3	7.2	2.8	2.2

NOTE: Chronically out-migrating towns are those in which either the 1971 population was smaller than the 1901 population, or the population growth rate between 1901 and 1971 was less than 50 percent.

SOURCE: Premi (1980c:8–9).

population censuses. During the late nineteenth and early twentieth centuries there was emigration of Indians as indentured labor to parts of Africa and to southeast Asia, but its volume is not known. India has open borders with Nepal and Bhutan in the north, but most international migration has been from Pakistan in the west and Bangladesh in the east as a result of partition in 1947. There was virtually an even exchange of refugees (around 7 million) between India and Pakistan as the latter was then constituted up to the 1951 census. Place-of-birth data from the 1961 census indicate a net immigration of about 1.2 to 1.3 million persons into India, almost entirely from the East Pakistan (now Bangladesh), during 1951–61 (Visaria and Jain, 1976: 16).

On the basis of birthplace statistics, the 1971 census counted 9.36 million lifetime immigrants into India; these persons constituted 5.61 percent of all migrants and 1.71 percent of the total population. Among them were 4.94 million males and 4.41 million females.

The 1971 census also provided information on the distribution of migrants by duration of residence at the place of enumeration by classifying them according to the place of last residence.<sup>18</sup> According to these statistics, 1.26 million males and 1.20 million females migrated to India during 1961–71, comprising 30.19 percent of all immigrants (on the basis of place of last residence). Among these, immigrants from Bangladesh and Pakistan constituted the largest single group of 1.82 million persons. Nepal, Malaysia, Sri Lanka, and Burma also sent substantial numbers of people to India during the 1960s.

Direct data on emigration from India to other countries are not available because India does not maintain statistics on international migration and it has not been possible to estimate the figures with indirect methods. Data for a few selected countries on number of immigrants from India suggest that the figure may not exceed a couple of hundred thousand persons in any year.

### **Internal migration**

To delineate the pattern of internal migration in India, all censuses

<sup>18</sup> In this process, persons considered immigrants according to the place-of-birth criterion were classified as migrants within India if they had changed their residence after coming to India. Persons born in India who had been to other countries and were now returning were classified as immigrants. The difference in the count of immigrants by birthplace statistics and place-of-last-residence statistics is of 1.21 million persons, the former being higher by this amount.

from 1872 onward have collected information on place of birth of all people enumerated. It was not until 1961, however, that the birth-place was classified as rural or urban and as (1) within the district of enumeration, (2) outside the district but within the state of enumeration, (3) outside the state of enumeration but within India, or (4) outside India. Information on duration of residence at the place of enumeration was also collected for the first time in the 1961 census. The 1971 census further refined the statistics on migration by including a question on place of last residence.

In the 1961 census, 144.8 million persons (constituting 33.0 percent of the total population) were enumerated at places other than their place of birth and were hence considered migrants. In the 1971 census 166.8 million persons (or 30.4 percent of the population) were counted as migrants by the same criterion. According to the criterion of place of last residence, however, 167.9 million persons were migrants. Taking either of the two measures, we find that the internal migration rate in India was lower during the 1960s than in the 1950s. One reason may be that in 1961 there were more survivors among persons who migrated to India as a result of the country's partition in 1947 than there were in 1971. According to data on duration of residence at the place of enumeration, the number of migrants during 1951-61 and 1961-71 was 70.45 million and 70.62 million, respectively, indicating that there were proportionately more intercensal migrants during the 1950s than during the 1960s.<sup>19</sup>

Migrants can be classified into four migration streams: rural-to-rural, rural-to-urban, urban-to-urban, and urban-to-rural, according to their place of last residence and place of enumeration. They can be classified further into three categories roughly indicative of distance of migration: (1) *intradistrict migrants*: persons born (or with last residence) outside the place of enumeration but within the same district; (2) *interdistrict migrants*: persons born (or with last residence) outside the district of enumeration but within the same state; and (3) *interstate migrants*: persons born (or with last residence) in the states of India but beyond the state of enumeration.

Table 51 gives the 1971 census distribution of lifetime migrants by

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<sup>19</sup> The estimates for 1951-61 are based on birthplace statistics, whereas those for 1961-71 are based on statistics on last residence. Moreover, the figures for 1951-61 cover a period of 0-10 years, whereas the figures for the 1961-71 decade relate to a period of 0-9 years.

TABLE 51 Lifetime migration streams: India, 1971

Type of migration stream	Population (in thousands)			Percentage distribution			Sex ratio (per 1,000)
	Total	Males	Females	Total	Males	Females	
<b>INTRADISTRICT</b>							
Rural to rural	85,700	18,577	67,123	54.73	38.42	62.01	277
Rural to urban	10,170	4,555	5,615	6.49	9.42	5.19	811
Urban to urban	2,789	1,192	1,597	1.78	2.47	1.47	746
Urban to rural	4,737	1,580	3,157	3.03	3.27	2.92	500
Subtotal	103,396	25,904	77,492	66.03	53.58	71.59	334
<b>INTERDISTRICT</b>							
Rural to rural	18,138	4,901	13,237	11.58	10.14	12.23	370
Rural to urban	8,060	4,359	3,701	5.15	9.02	3.42	1,178
Urban to urban	6,193	2,901	3,292	3.95	6.00	3.04	881
Urban to rural	2,636	1,006	1,630	1.68	2.08	1.51	617
Subtotal	35,027	13,167	21,860	22.36	27.24	20.20	602
<b>INTERSTATE</b>							
Rural to rural	6,198	2,402	3,796	3.96	4.97	3.51	633
Rural to urban	5,718	3,651	2,067	3.65	7.55	1.91	1,766
Urban to urban	5,004	2,651	2,353	3.20	5.48	2.17	1,127
Urban to rural	1,250	572	678	0.80	1.18	0.63	844
Subtotal	18,170	9,276	8,894	11.61	19.18	8.22	1,043
<b>ALL STREAMS</b>							
Rural to rural	110,036	25,880	84,156	70.27	53.53	77.75	308
Rural to urban	23,948	12,565	11,383	15.29	25.99	10.52	1,104
Urban to urban	13,986	6,744	7,242	8.93	13.95	6.69	913
Urban to rural	8,623	3,158	5,465	5.51	6.53	5.05	578
<b>TOTAL</b>	<b>156,593</b>	<b>48,347</b>	<b>108,246</b>	<b>100.00</b>	<b>100.00</b>	<b>100.01</b>	<b>447</b>

the two types of migration stream. About two-thirds of the migrants changed their residence within the district of enumeration itself, a little over one-fifth changed their residence from one district to another but within the state of enumeration, and the rest (a little over one-tenth) moved across state boundaries. Among the intradistrict migrants, three-fourths were females. The proportion of females was sharply lower among interdistrict migrants, but females still outnumbered males by 100 to 60.2. The sex ratio (104.3) favored males only among interstate migrants. A likely explanation for the dominance of females in intradistrict migration is that a large proportion of female migration in India is related to marriage. The system of village exogamy in marriage and patrilocal residence requires that a girl or young woman move to her husband's home, which is generally located in a different community. As most marriages are arranged, the search for a bridegroom is generally confined to the bride's district or neighboring districts. Interstate migration, however, is undertaken mainly for economic purposes and hence is male-dominated.

Rural-to-rural migration was the dominant stream, accounting for 70.3 percent of all migrants. Even among males, more than half of the migrants were in the rural-to-rural stream. Among them 38.4 percent changed their residence within the district of enumeration only.

It is also useful to know the pattern of population distribution at the state level. Table A6 indicates for males and females separately the number of in-migrants, out-migrants, and net migrants by duration of residence at the place of enumeration. Among the major states, Assam, Haryana, Madhya Pradesh, Maharashtra, Mysore (Karnataka), and West Bengal gained from about four to about 30 persons per 1,000 population through lifetime in-migration. In contrast, Andhra Pradesh, Bihar, Gujarat, Kerala, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh lost varying proportions of their populations through net out-migration. Among the smaller states and the union territories, Manipur, Meghalaya, Nagaland, and Arunachal Pradesh in the northeast all gained population through net in-migration. Only Tripura in that region lost a small proportion of its population through net lifetime out-migration. Chandigarh, being a new union territory, has grown so much through in-migration that the number of intercensal male in-migrants exceeded the intercensal growth of the male population during the 1960s. All the other union territories except Goa, Daman, and Diu gained population through net in-migration.

It is noteworthy that whereas some states were net out-migrating states on the basis of lifetime migrants, they were net in-migrating states during the 1961-71 intercensal period; examples are Gujarat, Orissa (males), Tripura (males), and the union territory of Goa, Daman, and Diu. In contrast, West Bengal lost some population on a current migration basis through net out-migration. (Migrants who have resided at the place of enumeration for less than one year are termed here current migrants and those whose length of residence at the place of enumeration is 0-9 years are termed intercensal migrants.)

It is easily seen from Table A6 that intercensal migration accounted for more than half of the interstate movement in almost all the states during the 1960s. Intercensal migration as a percentage of intercensal growth exceeded the proportion of total migrants in almost all states' populations, indicating increased migration activity during the decade. The variations in this proportion were quite high, ranging from gains of 77.2 percent and 66.2 percent for males and females respectively in Chandigarh to losses of 9.65 percent and 9.38 percent for males and females respectively in Punjab.

### **Rural-to-urban migration**

Among all migrants to urban areas recorded by the 1961 census, the net rural-to-urban migration stream accounted for 46.9 percent for males and 36.8 percent for females. The proportions were slightly lower among current migrants—44.4 percent for males and 32.9 percent for females—but they were almost the same for intercensal migrants as for all migrants. At the time of the 1971 census, net rural-to-urban migration accounted for 36.4 percent of all male migrants to urban areas and 26.4 percent of all female migrants. These figures imply that the rate of net rural-to-urban migration in India was slower during the 1960s than in the 1950s. A point of greater significance is that the volume of net rural-to-urban migration during the 1960s was just two-thirds of the 1951-61 intercensal migration.

### **POPULATION PROJECTIONS**

Population projections for India have been made since the beginning of the 1950s, when India embarked on its development planning. Over the years, the literature on projections has grown enormously. Some of the more recent and important projections are considered in this section. They include those by Frejka (1973), the International Bank

for Reconstruction and Development (IBRD, 1973), Ambannavar (1975), Cassen (1978), the Expert Committee on Population Projections (Census of India 1971 [1979]), and Natarajan (forthcoming), summarized in Table 52. The high projection (projection III) of the Expert Committee - which is the medium projection of Natarajan - is the officially accepted projection for India and is in use for planning purposes. A comparison of the projections for 1981 with the 1981 census provisional population total (of 684 million) indicates that only the IBRD Series A projection, Ambannavar's medium and high projections, and Cassen's set (b) are close to the population count.

The projections differ not only in their assumptions about the future course of fertility and mortality, but also in their baseline population figures. For example, Frejka started his projections with a base population of 534.3 million for 1970; the IBRD used a base figure of 537 million for 1970, which was taken from the *U.N. Demographic Yearbook 1971*; and Cassen felt it necessary to adjust India's 1971 enumerated population of 547.9 million upward to 557.3 million to compensate for underenumeration of 1.7 percent as revealed in the postenumeration check and also to adjust for differentials in the undercount in different age groups. The projections of the Expert Committee and Natarajan started with a base population of 547.1 million persons as of 1 March 1971 (the census count was as of 1 April 1971). Although the fertility and mortality assumptions of the projections vary greatly (Table 53), some of the projections turn out to be quite close to each other at the end of the present century. Leaving aside Frejka's projections (4) and (5), which imply the attainment of a net reproduction rate (NRR) of 1 in 1980-85 and 1970-75 respectively (because these possibilities were out of the question for India), one concludes that India is likely to have a minimum population of 859 million in the year 2001 even if fertility declines very sharply during the next 20 years. With a slower decline in fertility as assumed by Natarajan, Cassen, Ambannavar, or Frejka (NRR = 1 in 2000-05), the size of the Indian population in 2001 is projected to be around 950 million, varying from 922 to 1,003 million. However, if an NRR of 1 is not achieved until about the year 2020, India is almost certain to have a population of more than 1,000 million before the end of the present century. The discussion of Indian fertility and the performance of the national family planning program during the 1970s, presented earlier in this paper, suggest that India can achieve an NRR of 1 by the end of this century.

TABLE 52 Selected population projections for India, 1971–2001

Source and assumption	Population (in thousands)						
	1971	1976	1981	1986	1991	1996	2001
1. Frejka (1973)							
NRR = 1 in							
2040–45 (1)	547		697	789			1,124
2020–25 (2)	547		692	776			1,069
2000–05 (3)	546		680	753			959
1980–85 (4)	545		642	676			799
1970–75 (5)	539		590	626			728
2. IBRD (1973)							
Series C	550		713	823			1,288
Series B	550		696	782			1,108
Series A	550		681	748			871
3. Ambannavar (1975)							
Low	548	611	678	747	814	875	928
Medium	548	612	683	759	839	921	1,003
High	548	612	683	762	849	942	1,040
4. Cassen (1978)							
F <sub>6</sub> M <sub>2</sub>	– Ultra fast fertility decline, fast mortality decline (a)						
	557	619	673	720	760	807	859
F <sub>3</sub> M <sub>1</sub>	– Medium fertility decline, slow mortality decline (b)						
	557	619	682	745	808	868	922
F <sub>4</sub> M <sub>1.5</sub>	– Medium fast fertility and mortality declines (c)						
	557	618	678	736	792	843	887

TABLE 52 (continued)

Source and assumption	Population (in thousands)						
	1971	1976	1981	1986	1991	1996	2001
5. Expert Committee (1979)							
Fast fertility decline (I)	547	606	663	713	754		
Medium fertility decline (II)	547	609	671	729	778		
Slow fertility decline (III)	547	609	672	735	799		
6. Natarajan (forthcoming)							
High	547	609	676	747	822	901	988
Medium	547	609	672	735	799	865	936
Low	547	609	668	724	778	831	886

NRR—net reproduction rate.

- SOURCES: 1. Frejka (1973). Population figures from Cassen (1978:128).  
 2. IBRD (1973). Population figures from Cassen (1978:128).  
 3. Ambannavar (1975:54).  
 4. Cassen (1978:134).  
 5. Census of India 1971 (1979:10).  
 6. Natarajan (forthcoming).

TABLE 53 Assumptions regarding the future course of fertility and mortality underlying the population projections in Table 52: India, 1971–2001

Source of projection, projection, and assumptions	1971	1976	1981	1986	1991	1996	2001
1. Frejka (1973)							
NRR = 1 in 2000–05 (3)							
Crude birth rate			35		29		23
Crude death rate			13		10		9
NRR = 1 in 2040–45 (5)							
Crude birth rate			38		35		32
Crude death rate			13		10		9
2. IBRD (1973)							
Series C							
Crude birth rate			38.9		38.9		38.3
Crude death rate			11.7		9.2		7.6
Series B							
Crude birth rate			34.6		32.7		30.4
Crude death rate			11.4		9.1		7.8
Series A							
Crude birth rate			30.7		27.2		23.8
Crude death rate			11.1		9.0		8.1
3. Ambannavar (1978)							
Low: GRR	2.667	2.438	2.198	1.918	1.585	1.318	1.131
Medium: GRR	2.667	2.494	2.307	2.107	1.894	1.694	1.521
High: GRR	2.667	2.500	2.340	2.187	2.040	1.900	1.767
All: $e_0^0$							
Males	49.90	52.90	55.90	58.40	60.90	62.90	64.90
Females	47.55	50.55	53.55	56.45	59.35	61.75	64.15

TABLE 53 (continued)

Source of projection, projection, and assumptions	1971	1976	1981	1986	1991	1996	2001
4. Cassen (1978)							
$F_6M_2$							
TFR	5.258	4.104	3.203	2.500	2.500	2.500	
$e_0^0$							
Males	50.8	53.6	56.2	58.8	61.3	63.6	
Females	49.1	52.2	55.2	58.1	60.9	63.5	
$F_3M_1$							
TFR	5.456	4.881	4.366	3.906	3.494	3.125	
$e_0^0$							
Males	49.1	50.2	51.2	52.3	53.4	54.4	
Females	47.2	48.4	49.6	50.8	52.0	53.2	
$F_4M_{1,5}$							
TFR	5.258	4.532	3.906	3.368	2.903	2.500	
$e_0^0$							
Males	50.0	51.9	53.8	55.6	57.4	59.1	
Females	48.2	50.3	52.4	54.4	56.4	58.3	
5. Expert Committee (1979)							
Fast fertility decline (I)							
Birth rate	35.5	30.9	26.0	21.0			
Death rate	14.8	12.8	11.2	9.9			
Medium fertility decline (II)							
Birth rate	36.4	32.7	28.0	23.0			
Death rate	14.9	13.0	11.3	10.0			
Slow fertility decline (III)							
Birth rate	36.6	32.9	29.5	27.0			
Death rate	15.2	13.2	11.6	10.4			

6. Natarajan (forthcoming)

High

Birth rate	36.6	34.1	31.6	29.6	28.1	26.6
Death rate	15.2	13.3	11.7	10.5	9.7	8.2

Medium

Birth rate	36.6	32.9	29.5	27.0	25.5	24.5
Death rate	15.2	13.2	11.6	10.4	9.6	8.7

Low

Birth rate	36.6	31.6	27.6	24.6	22.6	21.6
Death rate	15.2	13.1	11.4	10.2	9.6	8.7

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NOTE: The estimates of crude birth rate and crude death rate for future dates in the projections of Frejka and IBRD relate to the years 1980, 1990, and 2000 respectively.

NRR—net reproduction rate.

GRR—gross reproduction rate.

$e_0^0$ —life expectancy at birth.

SOURCES: Same as in Table 52.

### **Population projections for states**

For economic and social planning it is useful to disaggregate the projected population of the country into its geographical units, by sex and age and by rural-urban residence. The Expert Committee calculated population projections for all the states and union territories up to the year 1991 that correspond to the officially accepted all-India projections. (For the assumptions implied in the official projections for the various states and union territories, see Census of India 1971 [1979:6-8].) Natarajan extended these projections to the year 2001 for the 12 major states (Table 54). Table 55 shows projected indices of population growth in which the 1971 population of each state and union territory is equal to 100.

According to these projections, India's population will grow by 71 percent over the 30 years from 1971 to 2001. Variations in growth among the states, however, are large. Madhya Pradesh and Rajasthan are projected to experience very fast growth, presumably because of rapidly declining death rates and slow declines in fertility during the next 30 years. Rajasthan's population is expected almost to double over the period. In contrast, Tamil Nadu, Maharashtra, and Andhra Pradesh are projected to have substantial declines in their growth rates, and their populations are not expected to be more than one and a half times the 1971 level by the end of the century.

Among the smaller states and union territories, for which the projections are available only up to 1991, variations in the growth rates are expected to be much larger primarily because of in-migration. For example, the northeastern states (Assam, Manipur, Nagaland, Tripura, and the union territory of Arunachal Pradesh) are projected to continue having very fast population growth. The population of the union territory of Chandigarh is expected nearly to quadruple over the 20-year period as a result of heavy in-migration. According to the projections, Delhi will more than double its population in this period.

### **Sex and age composition of the projected population**

A by-product of the component method of population projection is the sex and age distribution of the projected population, shown for the three alternative projections of Natarajan in Table 56 and Figure 5. The shape of India's age pyramid begins to change substantially by 2001 under all three assumptions. Although the shape remains pyramidal under the "high" projection, under the low projection it more

TABLE 54 Projected population growth of major Indian states, 1971–2001, and of remaining states and union territories, 1971–91

State/union territory	Population (in thousands)						
	1971	1976	1981	1986	1991	1996	2001
INDIA	547,137	609,145	672,014	735,094	798,958	864,978	936,193
MAJOR STATES							
Andhra Pradesh	43,503	47,417	51,122	54,064	57,518	61,455	65,630
Bihar	56,353	62,077	68,256	75,104	82,468	89,926	97,656
Gujarat	26,698	29,666	32,524	35,074	37,659	40,394	43,266
Karnataka	29,299	32,394	35,557	38,784	42,061	45,249	48,417
Kerala	21,347	23,859	26,107	28,103	30,253	32,425	34,470
Madhya Pradesh	41,654	47,580	52,826	57,963	63,606	69,736	76,364
Maharashtra	50,412	55,289	59,555	62,368	65,862	69,693	73,889
Orissa	21,945	24,258	26,435	28,435	30,502	32,854	35,154
Rajasthan	25,766	29,497	33,437	37,713	41,639	46,326	51,115
Tamil Nadu	41,199	44,192	46,830	48,869	51,211	53,724	56,505
Uttar Pradesh	88,341	96,901	106,267	116,629	127,740	139,377	151,242
West Bengal	44,312	50,281	55,857	61,315	67,021	72,914	79,122
REMAINING STATES & UNION TERRITORIES							
Assam	14,920	17,526	20,391	23,564	27,356		
Haryana	10,013	11,173	12,482	13,799	15,097		
Himachal Pradesh	3,454	3,838	4,227	4,608	4,996		
Jammu & Kashmir	4,606	5,271	5,982	6,732	7,550		
Manipur	1,070	1,257	1,464	1,688	1,932		
Meghalaya	1,009	1,158	1,321	1,480	1,657		

TABLE 54 (continued)

State/union territory	Population (in thousands)						
	1971	1976	1981	1986	1991	1996	2001
<b>REMAINING STATES AND UNION TERRITORIES</b>							
<i>(continued)</i>							
Nagaland	515	610	714	830	958		
Punjab	13,528	14,719	16,052	17,298	18,394		
Sikkim	209	233	253	267	278		
Tripura	1,552	1,816	2,104	2,412	2,751		
Andaman & Nicobar Islands (UT)	115	150	189	230	275		
Arunachal Pradesh (UT)	466	548	636	728	828		
Chandigarh (UT)	257	369	517	710	952		
Dadra & Nagar Haveli (UT)	74	81	88	96	104		
Delhi (UT)	4,051	5,030	6,184	7,529	9,123		
Goa, Daman, & Diu (UT)	856	1,002	1,161	1,333	1,519		
Lakshadweep (UT)	32	34	36	38	40		
Pondicherry (UT)	471	532	593	655	718		

UT—union territory.

SOURCES: 12 major states: Natarajan (forthcoming). Remaining states and union territories: Census of India 1971 (1979:158–59).

TABLE 55 Index of projected population growth of major Indian states, 1971–2001, and of remaining states and union territories, 1971–91  
(1971 = 100)

State/union territory	1976	1981	1986	1991	1996	2001
INDIA	111	123	134	146	158	171
MAJOR STATES						
Andhra Pradesh	109	118	124	132	141	151
Bihar	110	121	133	146	160	173
Gujarat	111	122	131	141	151	162
Karnataka	111	121	132	144	154	165
Kerala	112	122	131	142	152	161
Madhya Pradesh	114	127	139	153	167	183
Maharashtra	110	118	124	131	138	147
Orissa	111	120	130	139	150	160
Rajasthan	114	130	146	162	180	193
Tamil Nadu	107	114	119	124	130	137
Uttar Pradesh	110	120	132	145	158	171
West Bengal	113	120	138	151	165	179
REMAINING STATES & UNION TERRITORIES						
Assam	117	137	158	183		
Haryana	112	125	138	151		
Himachal Pradesh	111	122	133	145		
Jammu & Kashmir	114	130	146	164		
Manipur	117	137	158	181		
Meghalaya	115	131	147	164		
Nagaland	118	139	161	186		
Punjab	109	119	129	136		
Sikkim	111	121	128	133		
Tripura	117	136	155	177		
Andaman & Nicobar Islands (UT)	130	164	200	239		
Arunachal Pradesh (UT)	118	136	156	178		
Chandigarh (UT)	144	201	276	370		
Dadra & Nagar Haveli (UT)	109	119	130	141		
Delhi (UT)	124	153	186	225		
Goa, Daman, & Diu (UT)	117	136	156	177		
Lakshadweep (UT)	106	112	119	125		
Pondicherry (UT)	113	126	139	152		

SOURCE: Computed from Table 54.

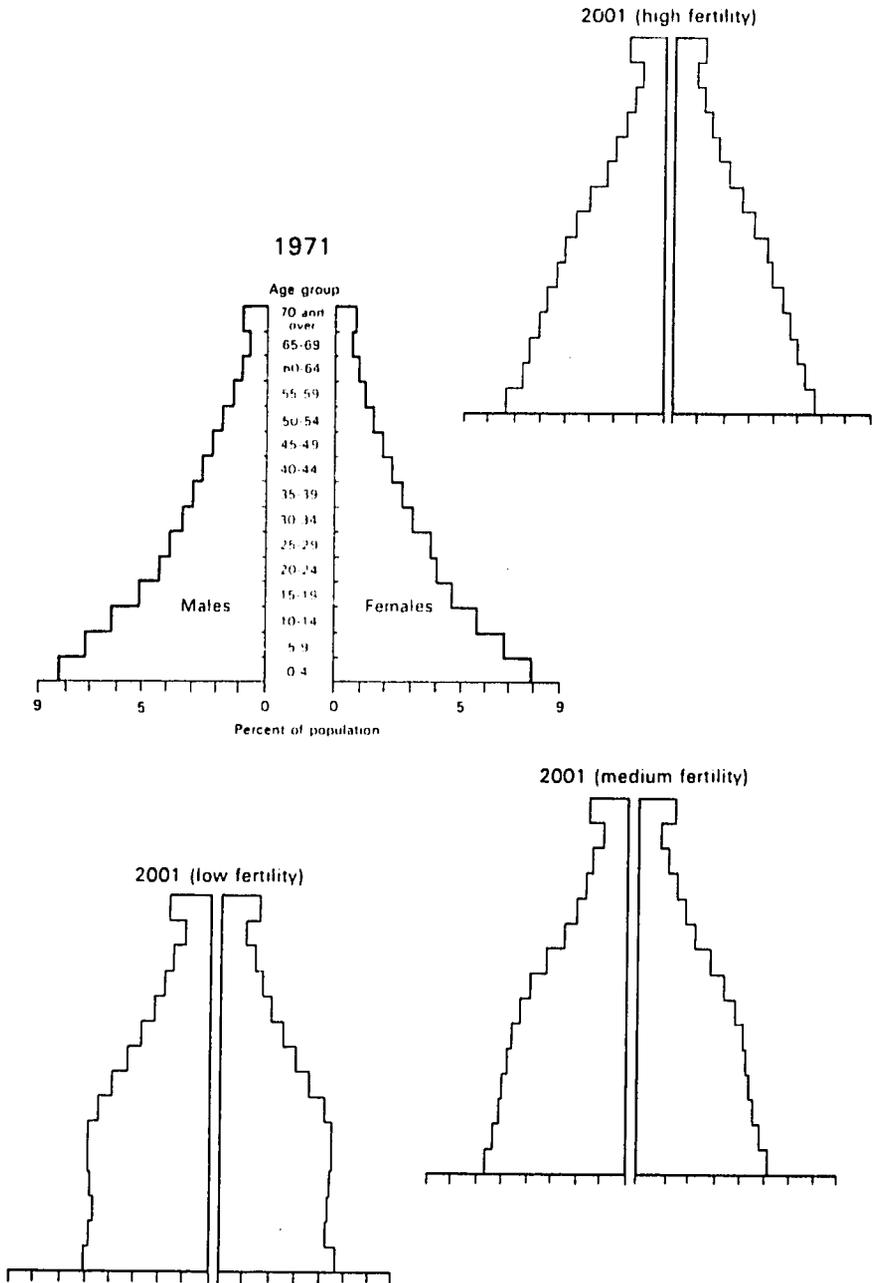
TABLE 56 Percentage distribution of the Indian population by age and sex in 1971 and 2001 under alternative assumptions of population growth

Age group	1971			2001 (alternative projections)								
	Male	Female	Total	High fertility			Medium fertility			Low fertility		
				Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	8.26	7.91	16.17	6.30	5.72	12.02	5.65	5.31	10.96	5.02	4.71	9.72
5-9	7.27	6.82	14.09	5.67	5.35	11.02	5.26	4.94	10.20	4.77	4.46	9.23
10-14	6.17	5.70	11.87	5.35	5.01	10.36	5.03	4.71	9.75	4.74	4.45	9.20
<b>0-14</b>	<b>21.70</b>	<b>20.43</b>	<b>42.13</b>	<b>17.32</b>	<b>16.08</b>	<b>33.40</b>	<b>15.94</b>	<b>14.96</b>	<b>30.91</b>	<b>14.53</b>	<b>13.62</b>	<b>28.15</b>
15-19	5.07	4.75	9.82	5.04	4.72	9.77	4.91	4.61	9.52	4.79	4.51	9.31
20-24	4.29	4.12	8.41	4.73	4.44	9.16	4.78	4.50	9.28	4.86	4.55	9.40
25-29	3.77	3.65	7.42	4.37	4.08	8.45	4.61	4.30	8.91	4.87	4.54	9.41
30-34	3.35	3.20	6.55	4.04	3.80	7.83	4.26	4.00	8.26	4.50	4.23	8.73
35-39	2.99	2.74	5.73	3.59	3.31	6.90	3.79	3.49	7.27	4.00	3.69	7.69
40-44	2.60	2.27	4.87	3.00	2.75	5.75	3.16	2.90	6.06	3.34	3.06	6.40
45-49	2.20	1.86	4.06	2.37	2.24	4.61	2.50	2.36	4.87	2.65	2.49	5.14
50-54	1.77	1.49	3.26	1.95	1.85	3.81	2.06	1.96	4.02	2.18	2.07	4.25
55-59	1.39	1.21	2.60	1.60	1.54	3.14	1.69	1.62	3.31	1.78	1.72	3.50
60-64	1.05	0.94	1.99	1.27	1.23	2.50	1.35	1.29	2.64	1.42	1.37	2.79
<b>15-64</b>	<b>28.48</b>	<b>26.23</b>	<b>54.71</b>	<b>31.96</b>	<b>29.96</b>	<b>61.92</b>	<b>33.11</b>	<b>31.03</b>	<b>64.14</b>	<b>34.39</b>	<b>32.23</b>	<b>66.62</b>
65-69	0.71	0.64	1.36	0.96	0.91	1.87	1.01	0.96	1.97	1.07	1.02	2.09
70+	0.93	0.87	1.80	1.45	1.37	2.82	1.53	1.45	2.98	1.62	1.53	3.15
<b>65+</b>	<b>1.64</b>	<b>1.51</b>	<b>3.16</b>	<b>2.41</b>	<b>2.28</b>	<b>4.69</b>	<b>2.54</b>	<b>2.41</b>	<b>4.95</b>	<b>2.69</b>	<b>2.55</b>	<b>5.24</b>
<b>All ages</b>	<b>51.82</b>	<b>48.17</b>	<b>99.99</b>	<b>51.69</b>	<b>48.32</b>	<b>100.01</b>	<b>51.59</b>	<b>48.41</b>	<b>100.00</b>	<b>51.61</b>	<b>48.40</b>	<b>100.01</b>

NOTE: Percentages may not sum to 100 because of rounding.

SOURCE: Derived from Natarajan (forthcoming).

FIGURE 5 Sex and age composition of the Indian population in 1971 and 2001 under alternative assumptions of population growth



close<sup>ly</sup> resembles an inverted top. This change in the shape of the age pyramid implies a much higher proportion of women in the child-bearing ages in the year 2001 than in 1971 and, hence, the continuation of a large number of births even after a sharp decline in fertility has occurred.

### **Rural-urban projections**

The Expert Committee on Population Projections for India (Census of India 1971 [1979]) prepared rural-urban projections for India and its various states up to the year 1991. In making these projections for the country as a whole, the Committee preferred to use the urban-rural growth difference (URGD) method (United Nations, ECOSOC, 1974). The Committee obtained the statewise projections, however, by projecting the proportion of urban population (U) to total population (T) observed during the earlier censuses from 1931 onward by fitting straight lines for each state separately. The final totals of the state and union territory projections were adjusted *pro rata* to tally with the all-India projections. These rural-urban projections for India and the states and union territory of Delhi for the year 1991, along with the 1971 actual figures, are given in Table 57.

According to these projections, the urban population of India will number 194.4 million in 1991, representing a growth of 85.5 million during a period of just 20 years. Almost a quarter of the country's 1991 population is projected to live in urban areas.

The last column of Table 57 indicates that the urbanization process is likely to be very slow in Rajasthan, Uttar Pradesh, and Gujarat but very fast in Assam, Orissa, and some of the smaller states. The urbanization level in the latter group remained low prior to 1971, but those states are likely to catch up in the near future through internal migration.

Other projections put India's urban population in the year 2001 at 278 million (Raghavachari, 1974:438-39), 291 million (Ambannavar, 1975:74), and (for the year 2000) 361 million (United Nations, Department of International Economic and Social Affairs, 1980:140). These figures imply that the urban population of India will be two and a half times to more than three times greater by the end of the century than in 1971 and will then constitute roughly 30 to 35 percent of the total population. After examining the role of migration in the urbanization process during the 1950s and 1960s, however, I

TABLE 57 Rural and urban population of India and its states and the ratio of urban to total population: 1971 and 1991 (projected)

State	Population (in millions)				Ratio of urban to total population (%)		
	1971		1991 (projected)		1971	1991	1991/1971
	Rural	Urban	Rural	Urban			
INDIA	438.26	108.88	604.57	194.39	19.90	24.33	1.22
Andhra Pradesh	35.04	8.39	45.72	14.27	19.30	23.79	1.23
Assam	13.60	1.32	23.94	3.42	8.87	12.49	1.41
Bihar	59.64	5.62	69.52	10.47	10.00	13.09	1.31
Gujarat	19.16	7.48	26.79	12.68	28.08	32.12	1.14
Haryana	8.25	1.77	11.96	3.14	17.65	20.80	1.18
Himachal Pradesh	3.21	0.24	4.55	0.45	6.99	8.93	1.28
Jammu & Kashmir	3.75	0.86	5.86	1.69	18.57	22.43	1.21
Karnataka	22.13	7.11	29.10	12.16	24.31	29.48	1.21
Kerala	17.85	3.46	24.31	6.06	16.24	19.96	1.23
Madhya Pradesh	34.80	6.77	52.36	13.76	16.19	20.81	1.29
Maharashtra	34.63	15.68	44.35	27.43	31.16	38.26	1.23
Manipur	0.93	0.14	1.50	0.43	13.14	22.37	1.70
Meghalaya	0.86	0.15	1.33	0.33	14.53	19.79	1.29
Nagaland	0.46	0.05	0.81	0.14	9.88	15.03	1.52
Orissa	20.07	1.84	28.34	3.81	8.41	11.84	1.41
Punjab	10.32	3.21	13.08	5.31	23.72	28.88	1.22
Rajasthan	21.18	4.53	33.53	8.09	17.63	19.39	1.10
Tamil Nadu	28.69	12.44	33.25	19.77	30.25	37.29	1.23
Tripura	1.39	0.16	2.34	0.41	10.43	14.87	1.43
Uttar Pradesh	75.84	12.36	102.77	19.34	14.02	15.84	1.13
West Bengal	33.28	10.94	46.81	19.68	24.74	29.59	1.20
Delhi	0.42	3.63	0.04	9.09	89.67	99.61	1.11

SOURCE: Census of India 1971 (1979:158-59).

believe that the level of urbanization will be closer to 25 percent by the year 2001 than to 30 percent (Premi, 1980b).

### **Projections of infants, toddlers, and young children**

In discussions of population projections, attention is generally given to the size of the projected population, its rural-urban distribution, and its sex and age composition as they affect the size of the labor force or the school-going population. For the purpose of planning nutrition and health care programs, however, it is necessary to disaggregate the projected childhood population, for a particular type of care and attention is required for infants below the age of one year, another type of program for children in the age group of 1-3 years, and still another for preschool toddlers. Making use of Natarajan's (forthcoming) projections by sex and age, I have calculated single-year age projections by using Sprague's multipliers and regrouped them to give estimates for the age groups <1, 1-2, 3-5, and 6-10. These projections, based on three alternative assumptions of the rate of population growth (high, medium, and low) from 1971 to 2001, are presented in Table 58. If India's population increases according to the high variant, the number of infants will increase in each quinquennium, reaching almost 25 million by the year 2001. If the country experiences a fast decline in fertility, however, the absolute number of infants will start to decline from 1976 onward and will continue to decline until 1996, when the total number of infants will be 16.9 million (equivalent to the 1961 figure); but the number will go up in the following quinquennium owing to a larger proportion of women of childbearing ages. Between the high and low projections, the difference in the infant population alone in 2001 comes to almost 7 million. If the population increases according to the medium projection, there will be slightly more than 21 million infants in 2001.

Whereas the absolute size of the infant population will continue to increase under both high and medium projections, the proportion of infants in the total population will decline monotonically from 3.38 percent in 1971 to 2.51 percent in 2001 under the high projection, 2.27 percent under the medium projection, and 2.02 percent under the low projection.

The number of toddlers (1-2 years old) will increase from 35.8 million in 1971 to 47.9 million in 2001 under the high variant, but under the low variant their number will not exceed the 37.1 million

TABLE 58 Population of children by age group under alternative assumptions of population growth:  
India, 1961–2001

Assumption and year	Population (in thousands)											
	Total				Males				Females			
	<1	1-2	3-5	6-10	<1	1-2	3-5	6-10	<1	1-2	3-5	6-10
<b>High fertility</b>												
1961	16,860	29,366	38,604	56,115	8,450	14,890	19,601	28,580	8,410	14,475	19,003	27,536
1971	18,499	35,834	50,521	74,692	9,415	18,285	25,907	38,612	9,084	17,549	24,614	36,079
1976	18,897	37,100	53,628	82,783	9,789	19,070	27,402	42,466	9,108	18,029	26,226	40,317
1981	20,352	39,122	55,676	87,372	10,398	20,071	28,669	44,980	9,954	19,051	27,008	42,392
1986	20,765	40,697	58,896	92,377	10,708	20,930	30,241	47,554	10,057	19,767	28,655	44,823
1991	21,863	42,566	61,397	97,111	11,207	21,866	31,611	50,054	10,656	20,700	29,786	47,057
1996	22,953	44,681	64,413	101,870	11,738	22,904	33,121	52,521	11,215	21,776	31,292	49,349
2001	24,785	47,903	68,417	107,319	13,184	25,173	35,460	55,224	11,602	22,731	32,958	52,095
<b>Medium fertility</b>												
1976	18,900	37,100	53,623	82,787	9,792	19,071	27,397	42,471	9,108	18,029	26,226	40,317
1981	18,983	37,411	54,972	87,507	9,693	19,184	28,196	45,030	9,289	18,227	26,596	42,477
1986	18,988	37,441	55,102	89,550	9,771	19,224	28,267	46,079	9,217	18,217	26,836	43,471
1991	19,283	37,853	55,475	90,366	9,913	19,463	28,535	46,510	9,371	18,390	26,941	43,856
1996	20,142	39,169	56,700	91,419	10,316	20,119	29,210	47,141	9,826	19,050	27,491	44,279
2001	21,275	41,376	59,582	94,441	10,969	21,326	30,713	48,731	10,307	20,050	28,868	45,710
<b>Low fertility</b>												
1976	18,900	37,100	53,623	82,787	9,792	19,071	27,397	42,471	9,108	18,029	26,226	40,317
1981	17,582	35,690	53,960	87,727	8,993	18,330	27,798	45,160	8,589	17,360	26,162	42,567
1986	17,524	34,539	51,428	86,656	8,994	17,711	26,387	44,635	8,520	16,828	25,041	42,021
1991	16,956	33,676	50,275	84,207	8,728	17,306	25,814	43,316	8,229	16,369	24,460	40,891
1996	16,935	33,396	49,421	82,241	8,705	17,197	25,480	42,367	8,231	16,200	23,941	39,873
2001	17,874	34,670	50,142	81,474	9,201	17,881	25,910	42,115	8,673	16,709	24,232	39,360

SOURCE: Premi (1980a:3-4).

already attained in 1976. Under the medium projection, the population of this age group in 2001 is likely to increase to 41.4 million.

Table 58 also gives estimates of the number of preschool children in the age group 3-5 and of children expected to be in the primary school system (age group 6-10) under alternative assumptions of population growth. The projections for different age groups are given by sex to show male-female differentials. The absolute number of children 3-5 years old in 2001 will be 68.4 million under the high projection, 59.6 million under the medium projection, and 50.1 million under the low projection. The share of the population of preschool children in the total will decline from 9.2 percent in 1971 to 6.9 percent in 2001 under the high variant, to 6.4 percent under the medium variant, and to 5.7 percent under the low variant. The projected population of children 6-10 years old will increase by 43.7 percent over 1971-2001 under the assumptions of the high projection, but by only 9.1 percent under the low projection. Although the absolute size of population in this age group will increase continuously over the 30-year period under both the high and medium projections, under the low projection it will reach a maximum of 87.7 million in 1981 and thereafter decline to 81.5 million in the next 20 years. The problem of providing schooling at the primary stage can be eased only if the future population growth rate declines substantially during the next two decades or so.

### **Dependency ratios in the projected population**

Population projections of the future school-going population, labor force, and retired population are useful for economic planning. This monograph does not include projections of India's school-going population or the labor force, but projected changes in the dependency ratios for the young, old-age, and combined populations under alternative assumptions are discussed below.

Table 59 shows projected dependency ratios for males, females, and both sexes under assumptions of high, medium, and low growth between 1971 and 2001.<sup>20</sup> Although the female dependency ratios are slightly higher than the male, the differences are only marginal and the pattern remains the same in all three projections.

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<sup>20</sup> Data for computing the dependency ratios are from Natarajan (forthcoming). The assumptions underlying these projections are given in Table 53.

TABLE 9 Dependency ratios under alternative assumptions of future population growth: India, 1971–2001

Assumption and year	Total			Males			Females		
	Young age	Old age	Total	Young age	Old age	Total	Young age	Old age	Total
High fertility									
1971	79.9	9.8	89.7	79.1	9.8	88.9	80.8	9.7	90.5
1976	77.3	9.9	87.1	76.5	9.9	86.4	78.1	9.8	87.9
1981	72.3	10.0	82.3	71.6	10.1	81.7	73.1	9.9	83.0
1986	66.9	10.3	77.2	66.5	10.4	77.0	67.2	10.2	77.4
1991	62.5	10.8	73.3	62.3	10.9	73.2	62.8	10.7	73.5
1996	58.8	11.3	70.1	58.6	11.4	70.0	59.0	11.2	70.2
2001	56.2	12.1	68.3	56.4	12.0	68.4	56.0	11.2	67.2
Medium fertility									
1971	79.9	9.8	89.7	79.1	9.8	88.9	80.8	9.7	90.5
1976	77.3	9.9	87.1	76.5	9.9	86.4	78.1	9.8	87.9
1981	71.3	10.0	81.3	70.6	10.1	80.7	72.0	9.9	81.9
1986	64.1	10.3	74.5	63.8	10.4	74.2	64.5	10.2	74.7
1991	57.8	10.8	68.6	57.6	10.9	68.5	58.0	10.7	68.7
1996	53.1	11.4	64.5	52.9	11.5	64.4	53.2	11.3	64.5
2001	50.3	12.3	62.6	50.2	12.2	62.5	50.3	12.5	62.8
Low fertility									
1971	79.9	9.8	89.7	79.1	9.8	88.9	80.8	9.7	90.5
1976	77.3	9.9	87.1	76.5	9.9	86.4	78.1	9.8	87.9
1981	70.2	10.0	80.3	69.6	10.1	79.7	70.9	9.9	80.8
1986	61.6	10.3	71.9	61.3	10.4	71.7	61.9	10.2	72.1
1991	53.5	10.8	64.3	53.2	10.9	64.1	53.7	10.7	64.4
1996	47.6	11.5	59.1	47.5	11.6	59.0	47.7	11.4	59.1
2001	44.1	12.6	56.7	44.1	12.5	56.5	44.1	12.7	56.8

NOTE: Dependency ratio is defined as  $\frac{\text{persons of ages 0-14} + \text{persons of ages 60+}}{\text{persons of ages 15-59}} \times 100$ .

Thus, the old-age dependency ratio relates to persons of ages 60 and above.

SOURCE: Computed from Natarajan (forthcoming).

The dependency ratio for both sexes declines over the three decades in all of the projections. It declines from 89.7 in 1971 to 68.3 in 2001 if the population increases according to the high-variant projection but falls sharply to 56.7 if the population increases according to the low variant. Old-age dependency increases slowly and steadily almost in the same manner under all three alternatives of population growth.

Only the young-age dependency ratio is affected differently under the three alternatives, because, after 1986, the size of the population 0–14 years old is purely a consequence of the assumptions made about the future course of fertility and mortality.

#### SUMMARY AND CONCLUSIONS

India's population of 684 million persons as of 1 March 1981 was almost three times the size of the 1901 population and almost double the number in 1947, the year of Independence. After a period of checkered growth--sometimes increasing and sometimes declining because of widespread famines and epidemics--India's population began to increase gradually after 1921. The growth rate became very rapid after 1951 (almost double the rate experienced during 1921–51), resulting in an annual growth rate of 2.2 percent during the 1960s and the 1970s. The increase has been due largely to an accelerating decline in mortality but only a very small decline (the latter during the 1970s) in fertility.

The regional distribution of the country's population and the trends in growth rates present an interesting pattern. Madhya Pradesh (the largest state in area) and Uttar Pradesh (the largest in population), which form the central zone, together accounted for 22.4 percent of the nation's area and 23.8 percent of the total population in 1981. The share of the central zone in the country's population, however, monotonically declined from 27.5 percent in 1901 to 23.7 percent in 1971. In contrast, the share of the eastern zone has continuously increased over the past 80 years except for a small dip in 1951. The share of the southern zone increased to 26.2 percent in 1951, after which it began to decline monotonically.

India is one of the few countries wherein the overall sex ratio has favored males, increasingly so during 1901–71. It seems that the major cause of this growing differential is higher female than male mortality (specially in the young and childbearing ages), even though there has been much improvement in the living conditions of both males and females.

Although the civil registration system in India is more than one century old, there is still gross under-registration of vital events, and any estimates of birth and death rates based on them are rarely of use for scientific analysis of the dynamics of population growth. In the absence of direct measures, most estimates of birth and death rates

are based on indirect methods. The estimates vary within a certain range from one another depending upon the assumed sex-age structure and the methodology of estimation. With the establishment of the sample registration scheme in the mid-1960s, vital rates have now become available annually for the nation, states, and union territories by rural and urban residence. The estimates of birth rates portray a declining trend, with the crude birth rate for 1978 at 33.3 per thousand. There seem to be several reasons for the declining birth rate: a rise in the age at marriage and a decline in the marital fertility, a rising level of education and increased participation of women in economic activity outside agriculture and household industry, and some success on the part of the national family planning program.

Differentials in fertility are well marked in India. Urban fertility is considerably lower than rural fertility, and fertility is lower in certain regions, particularly southern India, than in other parts of the country. Muslims show higher fertility than Hindus, but no pattern seems to emerge about the fertility of the Christians when rural-urban residence, present age, and age at marriage are controlled.

Death rates started to decline after 1921 as major epidemics were brought under control and deaths due to famine were almost eliminated through an improved transportation and distribution system of food grains. The decline in mortality has been faster since Independence because of public health measures, the establishment of a vastly expanded network of primary health centers in rural areas, and the greater availability of life-saving drugs. The death rate of 15 per thousand in the late 1970s, however, was still much higher than in many other developing countries. Moreover, the pace of decline in the death rate seems to have slowed down. The infant mortality rate (IMR) of 132 for 1974–76 was extremely high in comparison with IMRs in the developed countries and many developing countries. Deaths of children below five years of age constitute almost half the total deaths. The problem of high infant and childhood mortality is most severe in the heartland of India covering the states of Bihar, Gujarat, Haryana, Madhya Pradesh, Rajasthan, and Uttar Pradesh. Except for Gujarat, these states have low literacy levels and are backward on most of the indicators of economic development. Unless efforts are made to eliminate the various causes of high infant and childhood mortality, further reductions in the crude death rate seem doubtful.

One-fifth of India's population was living in urban areas at the time

of the 1971 census. The 148 cities with populations of 100,000 and above, constituting 5.6 percent of the total urban settlements, contained 55.8 percent of the country's urban population. Even in 1961, more than half of the urban population was living in places with populations of 100,000 and more. The growth of urban population was slower during the 1960s than in the preceding decade. During the 1960s the pace of migration, particularly rural-to-urban migration, also slowed down. A slower pace of rural-to-urban migration implies a slower rate of urbanization and probably, in turn, of economic development.

Among the major states, Assam, Haryana, Karnataka, Madhya Pradesh, Maharashtra, and West Bengal experienced varying degrees of net in-migration, whereas Andhra Pradesh, Bihar, Gujarat, Kerala, Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh experienced net out-migration.

There have been numerous attempts to project India's population for future dates. The projections differ in their assumptions underlying the future course of fertility and mortality and in their baseline populations. Depending on the future course of fertility and mortality (migration having been assumed to be negligible), India's population in 2001 is expected to number between 925 and 1,000 million. According to Natarajan's projections, the dependency ratio will decline to 57 persons in 2001 from 90 persons in 1971 if the population grows according to his low-fertility assumption, but it will be 68 if the population grows according to his high-fertility assumption.

The 1981 census count was higher by 12 million than had been projected by the Expert Committee on Population Projections under its high-fertility assumption. India must therefore make all-out efforts to curb the present high growth rates and to achieve a net reproduction rate of unity (if not less) in the next two decades. India has entered the third stage of demographic transition (in which fertility declines to lower levels), however, and needs only a concerted effort to achieve faster decline in the birth rate in the coming years.

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APPENDIX TABLES

TABLE A1 Area and population by zone and state: India, 1901–81

Zone and state	Area in Km <sup>2</sup> (1971)	Population (in thou-	
		1901	1911
INDIA	3,287,782	238,396	252,093
NORTHERN ZONE	716,306	26,949	26,511
Haryana	44,222	4,623	4,175
Himachal Pradesh	55,673	1,920	1,897
Jammu & Kashmir	222,236	2,139	2,292
Punjab	50,362	7,545	6,732
Rajasthan	342,214	10,294	10,984
Chandigarh (UT)	114	22	18
Delhi (UT)	1,485	406	414
EASTERN ZONE	688,140	58,910	62,865
Assam	78,523	3,290	3,849
Bihar	173,876	27,312	28,314
Manipur	22,356	284	346
Meghalaya	22,489	340	394
Nagaland	16,527	102	149
Orissa	155,782	10,303	11,379
Sikkim	7,299	59	88
Tripura	10,477	173	230
West Bengal	87,853	16,940	17,999
Andaman & Nicobar Islands (UT)	8,293	25	26
Arunachal Pradesh (UT) <sup>a</sup>	83,578	u	u
Mizoram (UT)	21,087	82	91
CENTRAL ZONE	737,254	65,489	67,596
Madhya Pradesh	442,841	16,861	19,441
Uttar Pradesh	294,413	48,628	48,155
WESTERN ZONE	508,050	29,018	31,827
Gujarat	195,984	9,095	9,804
Maharashtra	307,762	19,392	21,475
Dadra & Nagar Haveli (UT)	491	24	29
Goa, Daman, & Diu (UT)	3,813	507	519
SOUTHERN ZONE	638,032	58,030	63,294
Andhra Pradesh	276,814	19,066	21,447
Karnataka	191,773	13,055	13,525
Kerala	38,864	6,396	7,148
Tamil Nadu	130,069	19,253	20,903
Lakshadweep (UT)	32	14	14
Pondicherry (UT)	480	246	257

u—unavailable.

UT—union territory.

a Included in the census for the first time in 1961.

SOURCES: Census of India 1971 (1975:54–55); Census of India 1981 (1981:52).

sands)						
1921	1931	1941	1951	1961	1971	1981
251,321	278,977	318,661	361,088	439,235	548,160	683,810
26,560	29,675	34,888	38,213	48,034	61,754	80,490
4,256	4,560	5,273	5,674	7,591	10,037	12,851
1,928	2,029	2,263	2,386	2,812	3,460	4,238
2,424	2,670	2,947	3,254	3,561	4,617	5,982
7,153	8,012	9,600	9,160	11,135	13,551	16,670
10,293	11,748	13,864	15,971	20,156	25,766	34,103
18	20	23	24	120	257	450
488	636	918	1,744	2,659	4,066	6,196
62,873	70,046	80,943	90,158	113,648	142,517	177,698
4,637	5,560	6,695	8,029	10,837	14,625	19,903
28,127	31,347	35,171	38,782	46,447	56,353	69,823
384	446	512	578	780	1,073	1,434
422	481	556	606	769	1,012	1,328
159	179	190	213	369	516	773
11,159	12,491	13,768	14,646	17,549	21,945	26,272
82	110	121	138	162	210	316
304	382	513	639	1,142	1,556	2,060
17,474	18,897	23,230	26,300	34,926	44,312	54,485
27	29	34	31	64	115	188
u	u	u	u	337	468	628
98	124	153	196	266	332	488
65,844	71,136	80,526	89,292	106,127	129,995	162,990
19,172	21,356	23,991	26,072	32,372	41,654	52,132
46,672	49,780	56,535	63,220	73,755	88,341	110,858
31,557	36,029	41,159	48,902	60,872	78,042	97,841
10,175	11,490	13,702	16,263	20,633	26,698	33,961
20,850	23,959	26,833	32,002	39,554	50,412	62,694
31	38	40	41	58	74	104
501	542	584	596	627	858	1,082
64,487	72,091	81,145	94,523	110,554	135,852	164,791
21,420	24,204	27,289	31,115	35,983	43,503	53,404
13,378	14,633	16,255	19,402	23,587	29,299	37,043
7,802	9,507	11,031	13,549	16,904	21,347	25,403
21,629	23,472	26,267	30,119	33,687	41,199	48,297
14	16	18	21	24	32	40
244	259	285	317	369	472	604

TABLE A2 Percentage distribution of area and population by zone

Zone and state	% distribution of area (1971)	% distribution of	
		1901	1911
INDIA	100.00	100.00	100.00
NORTHERN ZONE	21.79	11.30	10.52
Haryana	1.35	1.94	1.66
Himachal Pradesh	1.69	0.81	0.75
Jammu & Kashmir	6.76	0.90	0.91
Punjab	1.53	3.15	2.67
Rajasthan	10.41	4.32	4.36
Chandigarh (UT)	*	0.01	0.01
Delhi (UT)	0.05	0.17	0.16
EASTERN ZONE	20.93	24.71	24.94
Assam	2.39 <sup>d</sup>	1.38	1.53
Bihar	5.29	11.46	11.23
Manipur	0.68	0.12	0.14
Meghalaya	0.68	0.14	0.16
Nagaland	0.50	0.04	0.06
Orissa	4.74	4.32	4.51
Sikkim	0.22	0.02	0.03
Tripura	0.32	0.07	0.09
West Bengal	2.67	7.11	7.14
Andaman & Nicobar Islands (UT)	0.25	0.01	0.01
Arunachal Pradesh (UT) <sup>b</sup>	2.54	u	u
Mizoram (UT)	0.64	0.03	0.04
CENTRAL ZONE	22.42	27.47	26.81
Madhya Pradesh	13.47	7.07	7.71
Uttar Pradesh	8.95	20.40	19.10
WESTERN ZONE	15.45	12.17	12.62
Gujarat	5.96	3.81	3.88
Maharashtra	9.36	8.13	8.52
Dadra & Nagar Haveli (UT)	0.01	0.01	0.01
Goa, Daman, & Diu (UT)	0.12	0.21	0.21
SOUTHERN ZONE	19.41	24.34	25.11
Andhra Pradesh	8.42	8.00	8.51
Karnataka	5.83	5.48	5.37
Kerala	1.18	2.68	2.84
Tamil Nadu	3.96	8.08	8.29
Lakshadweep (UT)	*	0.01	0.01
Pondicherry (UT)	0.01	0.10	0.10

u—unavailable.

UT—union territory.

a Percentage for Assam (according to its 1981 boundaries) excludes the area of Mizoram shown separately.

b Included in the census for the first time in 1961.

\* Less than 0.005 percent.

SOURCES: Premi and Tyagi (1979:5–6); Census of India 1981 (1981:2).

and state: India, 1901-81

population						
1921	1931	1941	1951	1961	1971	1981
100.00	100.00	100.00	100.00	100.00	100.00	100.00
10.56	10.64	10.95	10.58	10.94	11.27	11.78
1.69	1.63	1.65	1.57	1.73	1.83	1.88
0.77	0.73	0.71	0.66	0.64	0.63	0.62
0.96	0.96	0.92	0.90	0.81	0.84	0.88
2.85	2.87	3.01	2.54	2.54	2.47	2.44
4.10	4.21	4.35	4.42	4.59	4.70	4.99
0.01	0.01	0.01	0.01	0.02	0.05	0.06
0.19	0.23	0.29	0.48	0.61	0.74	0.91
25.02	25.11	25.40	24.96	25.38	26.00	25.98
1.85	1.99	2.10	2.22	2.47	2.67	2.91
11.19	11.24	11.04	10.74	10.57	10.28	10.21
0.15	0.16	0.16	0.16	0.18	0.20	0.21
0.17	0.17	0.17	0.17	0.18	0.18	0.20
0.06	0.06	0.06	0.06	0.08	0.09	0.11
4.44	4.48	4.32	4.06	4.00	4.00	3.84
0.03	0.04	0.04	0.04	0.04	0.04	0.04
0.13	0.14	0.16	0.17	0.26	0.28	0.30
6.95	6.77	7.29	7.28	7.95	8.08	7.97
0.01	0.01	0.01	0.01	0.01	0.02	0.03
u	u	u	u	0.08	0.09	0.09
0.04	0.04	0.05	0.05	0.06	0.06	0.07
26.20	25.50	25.27	24.73	24.16	23.71	23.83
7.63	7.65	7.53	7.22	7.37	7.60	7.62
18.57	17.85	17.74	17.50	16.79	16.11	16.21
12.56	12.91	12.92	13.55	13.86	14.24	14.32
4.05	4.12	4.30	4.50	4.70	4.87	4.97
8.30	8.59	8.42	8.87	9.01	9.20	9.17
0.01	0.01	0.01	0.01	0.01	0.01	0.02
0.20	0.19	0.18	0.16	0.14	0.16	0.16
25.66	25.84	25.46	26.17	25.17	24.78	24.09
8.52	8.67	8.56	8.62	8.19	7.94	7.80
5.32	5.25	5.10	5.37	5.37	5.34	5.42
3.10	3.41	3.46	3.75	3.85	3.88	3.71
8.61	8.41	8.24	8.34	7.67	7.52	7.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.10	0.09	0.09	0.08	0.08	0.09	0.09

district, which became a union territory in 1972. The percentage share of Mizoram is

TABLE A3 Population change during successive periods by zone and

Zone and state	1901-21	1921-51
INDIA	+5.42	+43.67
NORTHERN ZONE	-1.44	+43.87
Haryana	-7.94	+33.31
Himachal Pradesh	+0.41	+23.74
Jammu & Kashmir	+13.32	+34.21
Punjab	-5.20	+28.07
Rajasthan	-0.01	+55.17
Chandigarh (UT)	-17.45	+33.79
Delhi (UT)	+20.36	+257.06
EASTERN ZONE	+6.73	+43.39
Assam	+40.94	+73.15
Bihar	+2.90	+37.88
Manipur	+35.00	+50.42
Meghalaya	+24.05	+43.39
Nagaland	+56.38	+34.11
Orissa	+8.31	+31.25
Sikkim	+38.48	+68.53
Tripura	+75.65	+109.91
West Bengal	+3.15	+50.51
Andaman & Nicobar Islands (UT)	+9.89	+14.34
Arunachal Pradesh (UT) <sup>a</sup>	u	u
Mizoram (UT)	+19.51	+100.00
CENTRAL ZONE	+0.54	+35.61
Madhya Pradesh	+13.71	+35.99
Uttar Pradesh	-4.03	+35.45
WESTERN ZONE	+8.75	+54.97
Gujarat	+11.88	+59.83
Maharashtra	+7.52	+53.49
Dadra & Nagar Haveli (UT)	+27.87	+33.77
Goa, Daman, & Diu (UT)	-1.13	+19.00
SOUTHERN ZONE	+11.13	+46.58
Andhra Pradesh	+12.35	+45.26
Karnataka	+12.09	+45.03
Kerala	+21.98	+73.66
Tamil Nadu	+12.34	+39.26
Lakshadweep (UT)	-1.76	+54.25
Pondicherry (UT)	-0.89	+29.94

u—unavailable.

UT—union territory.

a Included in the census for the first time in 1961.

SOURCES: Premi and Tyagi (1979:20); Census of India 1981 (1981:53).

## state: India, 1901-81

1951-81	1901-81	1951-61	1961-71	1971-81
+89.37	+186.84	+21.52	+24.80	+24.75
+110.64	+198.68	+25.70	+28.56	+30.34
+126.49	+177.97	+33.79	+32.23	+28.04
+77.62	+120.67	+17.87	+23.04	+22.46
+83.84	+179.60	+9.44	+29.65	+29.57
+81.99	+120.94	+21.56	+21.70	+23.01
+113.53	+231.29	+26.20	+27.83	+32.36
+1,775.00	+1,948.81	+394.13	+114.59	+74.95
+255.27	+1,426.89	+52.44	+52.93	+52.41
+97.10	+201.64	+26.06	+25.54	+24.69
+147.89	+505.01	+34.98	+34.95	+36.09
+80.04	+155.65	+19.76	+21.33	+23.90
+148.10	+404.00	+35.04	+37.53	+33.65
+119.14	+289.95	+27.03	+31.50	+31.25
+262.91	+661.48	+14.07	+39.88	+49.73
+79.38	+155.00	+19.82	+25.05	+19.72
+128.99	+434.93	+17.76	+29.38	+50.44
+222.38	+1,088.63	+78.71	+36.28	+32.37
+107.17	+221.64	+32.80	+26.87	+22.96
+506.45	+663.74	+105.19	+81.17	+63.51
u	u	u	+38.91	+34.34
+148.98	+491.71	+35.61	+24.93	+46.75
+82.54	+148.88	+18.85	+22.49	+25.38
+99.95	+209.19	+24.17	+28.67	+25.15
+75.35	+127.97	+16.66	+19.78	+25.49
+100.08	+237.17	+26.52	+28.21	+25.37
+108.82	+273.41	+26.88	+29.39	+27.21
+95.91	+223.30	+23.60	+27.45	+24.36
+153.66	+327.01	+39.56	+27.96	+39.78
+81.54	+113.22	+5.14	+36.88	+26.15
+74.34	+183.98	+16.96	+22.82	+21.30
+71.63	+180.10	+15.65	+20.90	+22.76
+90.92	+183.75	+21.57	+24.22	+26.43
+87.49	+297.16	+24.76	+26.29	+19.00
+60.35	+150.86	+11.85	+22.30	+17.23
+90.48	+189.85	+14.61	+31.95	+26.49
+90.54	+145.23	+16.34	+27.81	+28.07

TABLE A4 Crude birth rates by rural and urban areas: India and states, 1970–78

State or union territory and area	1970	1971	1972	1973	1974	1975	1976	1977	1978
<b>INDIA</b>									
Rural	38.9	38.9	38.4	35.9	35.9	36.7	35.8	34.3	34.6
Urban	29.7	30.1	30.5	28.9	28.4	28.5	28.4	27.8	27.7
Combined	36.8	36.9	36.6	34.6	34.5	35.2	34.4	33.0	33.2
<b>Andhra Pradesh</b>									
Rural	35.8	35.6	35.7	31.7	35.2	35.9	34.6	33.3	34.6
Urban	33.8	31.3	36.7	31.2	32.2	30.1	29.8	27.7	27.8
Combined	35.4	34.8	35.8	31.6	34.6	34.9	33.7	32.3	33.4
<b>Assam<sup>a</sup></b>									
Rural	39.5	39.3	37.3	33.8	33.6	30.7	33.7	30.6	31.3
Urban	32.0	31.0	27.7	27.6	24.8	23.7	24.0	24.7	22.9
Combined	38.8	38.5	36.4	33.3	32.8	30.1	32.8	30.1	30.6
<b>Bihar</b>									
Rural	32.4	33.2	33.6	31.7	29.0	27.7	31.4	u	u
Urban	28.2	27.9	26.7	27.7	25.8	26.9	27.6	u	u
Combined	32.0	32.8	33.1	31.4	28.7	27.7	31.1	u	u
<b>Gujarat</b>									
Rural	43.2	41.5	41.8	37.1	40.0	38.9	39.0	37.8	37.4
Urban	34.9	35.8	35.8	31.0	34.1	31.8	32.7	31.2	31.0
Combined	41.0	40.0	40.2	35.4	38.4	37.0	37.4	36.1	35.8
<b>Haryana</b>									
Rural	38.0	44.2	42.2	41.1	41.6	39.7	37.6	35.7	34.8
Urban	27.9	32.4	32.4	31.2	29.0	29.7	29.7	29.0	26.8
Combined	36.2	42.1	40.5	39.4	39.5	38.0	36.3	34.6	33.4
<b>Himachal Pradesh</b>									
Rural	33.3	38.2	33.7	38.6	35.7	33.5	33.2	33.3	27.6
Urban	24.6	23.9	24.0	22.7	23.2	20.6	22.0	19.9	23.4
Combined	32.7	37.3	33.1	37.6	34.9	32.7	32.5	32.5	27.3
<b>Jammu &amp; Kashmir</b>									
Rural	35.0	36.0	34.1	34.7	31.8	34.4	34.6	33.6	34.5
Urban	25.6	21.6	22.4	23.7	19.4	21.6	21.7	23.3	24.9
Combined	33.0	32.9	31.6	32.5	29.2	31.9	32.1	31.6	32.7

Karnataka									
Rural	35.0	34.5	32.8	30.1	29.5	29.7	31.1	27.2	29.7
Urban	27.8	25.3	28.0	26.1	24.3	22.5	25.2	24.0	26.4
Combined	33.0	31.7	31.5	28.9	28.0	27.7	29.4	26.3	28.8
Kerala									
Rural	31.9	31.3	31.5	29.4	26.7	28.1	28.1	26.1	25.3
Urban	30.1	29.6	29.5	28.5	26.9	27.5	26.5	24.1	24.7
Combined	31.6	31.1	31.2	29.2	26.8	28.0	27.8	25.8	25.2
Madhya Pradesh									
Rural	40.7	40.0	40.4	38.3	37.5	41.7	41.0	39.4	38.5
Urban	32.2	34.5	32.9	32.8	31.8	32.6	33.2	32.5	30.3
Combined	39.3	39.1	39.3	37.4	36.6	40.3	39.8	38.3	37.3
Maharashtra									
Rural	32.1	33.7	33.5	28.9	29.1	29.9	30.1	26.8	27.6
Urban	30.4	29.0	29.4	28.5	28.8	29.4	27.6	25.0	25.3
Combined	31.5	32.2	32.2	28.8	29.0	29.7	29.3	26.2	26.9
Manipur									
Rural	35.0	34.0	32.1	29.2	25.1	25.3	25.7	27.3	31.2
Urban	24.8	26.4	21.9	24.1	23.6	18.7	21.2	19.4	25.5
Combined	34.1	33.3	31.2	28.7	25.0	24.5	25.3	26.6	30.7
Meghalaya <sup>a</sup>									
Rural							36.8	35.8	34.7
Urban							20.6	15.9	17.8
Combined							33.5	32.5	32.0
Nagaland									
Rural					24.6	19.5	20.3	20.9	22.3
Urban									
Combined					24.6	19.5	20.3	20.9	22.3
Orissa									
Rural	38.5	34.7	34.7	35.0	33.9	33.8	35.3	30.2	33.3
Urban	34.2	33.0	31.7	32.7	30.5	30.7	29.1	26.0	28.9
Combined	38.1	34.6	34.5	34.8	33.6	33.6	34.8	29.9	32.9
Punjab									
Rural	34.7	35.0	35.8	34.4	33.0	32.5	32.4	31.8	30.2
Urban	30.6	31.4	30.1	29.6	28.2	29.2	28.5	28.2	26.5
Combined	33.8	34.2	34.6	33.4	32.0	31.8	31.6	31.0	29.4

TABLE A4 (continued)

State or union territory and area	1970	1971	1972	1973	1974	1975	1976	1977	1978
Rajasthan									
Rural	39.7	44.4	43.5	39.4	37.8	38.1	34.7	35.0	36.8
Urban	33.3	33.4	37.2	32.5	29.8	31.4	27.3	28.1	29.5
Combined	38.5	42.4	42.4	38.1	36.3	36.9	33.4	33.8	35.5
Tamil Nadu									
Rural	32.6	32.9	35.2	32.2	31.3	32.7	32.2	30.7	29.8
Urban	23.8	27.8	25.9	24.9	24.3	25.9	27.2	27.5	26.4
Combined	30.0	31.4	32.4	30.0	29.2	30.7	30.7	29.8	28.8
Tripura									
Rural	37.9	37.2	34.0	33.8	33.6	30.3	36.4	29.5	29.9
Urban	23.4	23.1	23.1	21.4	18.4	17.8	17.7	14.4	17.1
Combined	36.5	35.8	32.9	32.6	32.2	29.2	34.7	28.2	28.8
Uttar Pradesh									
Rural	46.9	46.3	44.4	43.0	43.5	44.5	41.2	41.5	41.6
Urban	34.7	34.7	34.2	32.9	32.0	33.9	32.5	32.3	32.0
Combined	45.4	44.9	43.2	41.7	42.1	43.1	40.0	40.3	40.4
West Bengal									
Rural	29.9	u	u	u	29.7	30.1	34.1	35.3	u
Urban	24.7	24.8	26.5	24.8	23.1	24.2	24.6	21.6	21.9
Combined	27.8	u	u	u	28.0	28.7	31.9	32.1	u
Andaman & Nicobar Islands									
Rural		33.8	42.5	33.4	35.6	39.0	40.6	38.1	34.7
Urban		21.8	25.5	16.8	29.5	23.4	29.2	30.0	23.2
Combined		31.9	29.9	30.7	34.7	36.7	39.0	37.0	33.1
Arunachal Pradesh									
Rural		36.8	37.9	32.0	35.7	28.7	32.5	38.4	30.6
Urban									
Combined		36.8	37.9	32.0	35.7	28.7	32.5	38.4	30.6
Chandigarh									
Rural			33.9	27.4	32.4	35.6	28.6	29.2	34.2
Urban			40.4	34.8	36.9	36.5	31.4	30.0	25.9
Combined			40.0	34.3	36.6	36.4	31.2	30.0	26.5

Dadra & Nagar Haveli									
Rural		36.4	37.2	42.4	37.6	37.1	42.1	34.0	36.3
Urban									
Combined		36.4	37.2	42.4	37.6	37.1	42.1	34.0	36.3
Delhi									
Rural	47.4	44.7	42.6	40.9	39.1	39.6	39.4	38.2	32.1
Urban	29.6	32.4	28.9	28.1	30.2	25.4	27.4	26.2	25.0
Combined	31.4	33.6	30.3	29.5	31.2	27.0	28.6	27.3	25.7
Goa, Daman, & Diu									
Rural	29.2	28.5	26.7	25.9	25.4	24.8	25.6	20.8	21.7
Urban	22.0	20.2	20.1	22.3	20.2	19.3	21.0	17.7	19.2
Combined	27.4	26.3	25.0	24.9	24.1	23.4	24.4	19.9	21.0
Lakshadweep									
Rural		32.5	37.2	37.9	37.9	40.1	35.2	30.0	30.6
Urban									
Combined		32.5	37.2	37.9	37.9	40.1	35.2	30.0	30.6
Pondicherry									
Rural		29.2	31.7	28.5	28.0	29.9	33.4	29.7	27.9
Urban		28.0	26.8	21.1	20.7	20.7	17.9	24.2	24.1
Combined		29.0	31.0	27.4	27.0	28.4	31.1	29.0	27.4

NOTE: There was no urban sample for Nagaland, Arunachal Pradesh, Dadra and Nagar Haveli, and Lakshadweep. Sample registration work in Andaman and Nicobar Islands, Arunachal Pradesh, Dadra and Nagar Haveli, Lakshadweep, and Pondicherry started in 1971; in Chandigarh in 1972; and in Nagaland in 1974. Figures for Bihar and West Bengal appear to be deficient. Complete data for rural and urban Bihar in 1977 and 1978 and for rural West Bengal in 1978 have not been received. The aggregated estimates for India exclude these states.

u—unavailable.

a The figures for Assam from 1970 to 1975 include Meghalaya.

SOURCES: India, ORGCC, *Sample Registration Bulletin* (various issues).

TABLE A5 Crude death rates by rural and urban areas: India and states, 1970-78

State or union territory and area	1970	1971	1972	1973	1974	1975	1976	1977	1978
<b>INDIA</b>									
Rural	17.3	16.4	18.9	17.0	15.9	17.3	16.3	16.0	15.3
Urban	10.2	9.7	10.3	9.6	9.2	10.2	9.5	9.4	9.3
Combined	15.7	14.9	16.9	15.5	14.5	15.9	15.0	14.7	14.1
<b>Andhra Pradesh</b>									
Rural	16.8	15.7	17.0	18.0	16.5	16.3	15.6	15.6	14.3
Urban	11.4	9.1	11.6	10.1	10.0	10.4	9.5	8.0	8.6
Combined	15.8	14.6	16.1	16.6	15.3	15.2	14.5	14.2	13.2
<b>Assam<sup>a</sup></b>									
Rural	16.8	18.7	18.6	17.0	17.5	17.6	15.4	13.4	13.6
Urban	10.2	9.5	10.0	9.8	9.5	9.6	9.7	7.6	7.9
Combined	16.2	17.8	17.9	16.4	16.8	16.9	14.9	12.9	13.1
<b>Bihar</b>									
Rural	14.5	14.6	19.0	15.1	16.5	13.6	12.3	u	u
Urban	9.8	9.4	9.7	9.8	10.0	9.6	9.4	u	u
Combined	14.1	14.2	18.3	14.7	15.9	13.3	12.1	u	u
<b>Gujarat</b>									
Rural	18.7	17.6	16.4	17.2	14.0	16.6	16.8	15.8	13.8
Urban	13.7	13.0	11.0	12.2	10.4	12.2	11.0	11.8	9.4
Combined	17.4	16.4	14.9	15.8	13.0	15.4	15.3	14.8	12.7
<b>Haryana</b>									
Rural	10.0	10.4	12.3	12.8	13.4	13.2	13.9	14.9	14.4
Urban	6.5	7.3	8.8	8.7	8.4	8.3	7.8	7.7	8.8
Combined	9.4	9.9	11.7	12.1	12.6	12.3	12.8	13.7	13.4
<b>Himachal Pradesh</b>									
Rural	16.2	16.2	16.6	12.7	12.6	13.6	14.0	12.0	12.2
Urban	7.5	7.3	6.1	7.2	7.2	7.4	6.8	5.4	6.8
Combined	15.6	15.6	15.9	12.4	12.3	13.2	13.5	11.6	11.8
<b>Jammu &amp; Kashmir</b>									
Rural	13.6	11.7	12.0	11.1	11.3	13.8	12.3	12.3	12.5
Urban	5.6	6.0	6.5	7.2	4.8	7.6	7.0	6.8	7.7
Combined	11.9	10.5	10.8	10.3	9.9	12.6	11.3	11.3	11.6

<b>Karnataka</b>									
Rural	14.2	14.0	14.3	14.3	12.4	12.5	13.4	12.5	13.3
Urban	10.3	7.2	8.7	7.7	7.0	7.5	7.7	7.8	8.2
Combined	13.1	12.1	12.8	12.4	10.8	11.1	11.7	11.1	11.7
<b>Kerala</b>									
Rural	9.2	9.1	9.4	8.7	8.0	8.5	8.2	7.4	7.1
Urban	8.8	8.4	7.8	7.2	7.0	7.8	7.6	6.8	6.6
Combined	9.2	9.0	9.2	8.5	7.8	8.4	8.1	7.3	7.0
<b>Madhya Pradesh</b>									
Rural	17.5	16.6	19.9	17.9	16.9	19.8	17.7	19.4	16.1
Urban	10.7	9.8	11.6	11.2	9.6	11.1	10.2	9.6	9.9
Combined	16.4	15.6	18.7	16.9	15.8	18.5	16.5	17.9	15.1
<b>Maharashtra</b>									
Rural	13.0	13.5	14.5	15.6	12.6	12.2	12.5	14.5	11.2
Urban	9.8	9.7	9.0	9.3	9.1	9.6	8.7	9.0	8.2
Combined	11.9	12.3	12.8	13.6	11.5	11.4	11.3	12.8	10.3
<b>Manipur</b>									
Rural	8.7	7.1	9.1	7.9	8.3	5.6	7.1	6.4	7.1
Urban	5.2	5.5	7.8	6.5	8.0	5.5	5.4	4.5	5.7
Combined	8.4	6.9	9.0	7.8	8.3	5.6	6.9	6.3	7.0
<b>Meghalaya</b>									
Rural							17.6	16.0	11.3
Urban							5.1	4.6	5.0
Combined							15.5	14.1	10.2
<b>Nagaland</b>									
Rural					9.3	9.5	8.3	6.7	6.0
Urban									
Combined					9.3	9.5	8.3	6.7	6.0
<b>Orissa</b>									
Rural	16.8	15.9	20.6	18.8	16.3	18.1	16.3	17.2	14.5
Urban	11.4	10.0	12.1	10.6	9.9	12.7	9.9	9.6	9.8
Combined	16.4	15.5	20.0	18.2	15.8	17.7	15.8	16.6	14.1
<b>Punjab</b>									
Rural	11.8	10.9	13.4	13.0	11.3	11.3	11.4	11.4	12.3
Urban	9.2	8.7	9.5	9.0	8.1	9.2	9.3	8.6	9.0
Combined	11.2	10.4	12.6	12.1	10.6	10.8	11.0	10.8	11.6

TABLE A5 (continued)

State or union territory and area	1970	1971	1972	1973	1974	1975	1976	1977	1978
Rajasthan									
Rural	18.9	17.0	18.3	17.6	15.8	17.4	16.2	16.0	16.7
Urban	11.9	9.3	10.1	9.3	7.7	9.3	7.9	9.2	10.2
Combined	17.6	15.6	16.8	16.1	14.3	15.9	14.7	14.8	15.6
Tamil Nadu									
Rural	18.1	16.5	17.8	16.5	16.1	17.5	16.7	15.2	14.4
Urban	9.4	9.3	8.9	8.4	8.7	9.0	9.8	10.1	9.1
Combined	15.6	14.4	15.1	14.1	13.9	15.0	14.6	13.7	12.8
Tripura									
Rural	15.6	16.1	10.5	15.3	12.5	9.7	10.6	9.8	12.0
Urban	6.1	7.6	8.6	7.7	7.1	6.9	5.6	4.6	6.5
Combined	14.7	15.3	10.3	14.6	12.0	9.4	10.2	9.4	11.6
Uttar Pradesh									
Rural	22.7	21.1	27.1	20.4	20.8	23.7	21.7	20.1	21.2
Urban	13.7	13.1	14.8	12.6	12.0	14.8	12.9	11.9	13.4
Combined	21.6	20.1	25.6	19.4	19.7	22.6	20.5	19.1	20.2
West Bengal									
Rural	12.0	u	u	u	13.1	13.7	12.5	12.8	u
Urban	6.3	9.2	10.5	8.9	10.4	10.6	9.8	8.4	8.3
Combined	10.6	u	u	u	12.4	13.0	11.9	11.7	u
Andaman & Nicobar Islands									
Rural		8.3	9.8	7.9	6.9	10.1	9.8	8.6	8.6
Urban		4.1	2.9	3.3	4.6	5.9	5.0	7.6	6.3
Combined		7.6	8.8	7.2	6.5	9.5	9.1	8.5	8.3
Arunachal Pradesh									
Rural		19.8	22.4	20.6	24.9	16.6	27.0	14.5	17.3
Urban									
Combined		19.8	22.4	20.6	24.9	16.6	27.0	14.5	17.3
Chandigarh									
Rural			8.5	6.0	4.5	5.5	4.8	7.2	9.5
Urban			4.4	3.9	3.4	4.9	4.5	3.6	3.9
Combined			4.7	4.0	3.5	5.0	4.5	3.9	4.3

Dadra & Nagar Haveli									
Rural		15.1	16.4	12.8	15.6	12.8	12.3	22.7	17.5
Urban									
Combined		15.1	16.4	12.8	15.6	12.8	12.3	22.7	17.5
Delhi									
Rural	12.3	11.8	12.9	11.2	12.6	12.4	10.1	11.6	11.9
Urban	7.4	7.2	7.5	7.1	6.8	7.3	7.3	8.0	7.7
Combined	7.9	7.6	8.1	7.6	7.4	7.9	7.6	8.4	8.1
Goa, Daman, & Diu									
Rural	11.6	11.2	8.9	9.5	10.2	10.5	10.4	10.2	9.8
Urban	5.7	5.9	5.8	5.8	6.6	6.7	5.9	7.5	7.6
Combined	10.1	9.8	8.1	8.6	9.3	9.5	9.2	9.4	9.2
Lakshadweep									
Rural		15.7	17.1	10.7	10.9	15.0	8.8	8.7	8.9
Urban									
Combined		15.7	17.1	10.7	10.9	15.0	8.8	8.7	8.9
Pondicherry									
Rural		9.0	8.5	11.2	10.9	9.9	12.6	10.7	10.9
Urban		9.7	7.8	8.3	5.6	9.4	6.0	8.1	10.3
Combined		9.1	8.4	10.8	10.1	9.8	11.6	10.3	10.6

NOTE: There was no urban sample for Nagaland, Arunachal Pradesh, Dadra and Nagar Haveli, and Lakshadweep. Sample registration work in Andaman and Nicobar Islands, Arunachal Pradesh, Dadra and Nagar Haveli, Lakshadweep, and Pondicherry started in 1971; in Chandigarh in 1972; and in Nagaland in 1974. Figures for Bihar and West Bengal appear to be deficient. Complete data for rural and urban Bihar in 1977 and 1978 and for rural West Bengal in 1978 have not been received. The aggregated estimates for India exclude these states.

u—unavailable.

a The figures for Assam from 1970 to 1975 include Meghalaya.

SOURCES: India, ORGCC, *Sample Registration Bulletin* (various issues).

TABLE A6 Distribution of in-migrants, out-migrants, and net migrants total population and intercensal growth: India, 1971

State/union territory and type of migrants	Males					
	Total migrants	Current migrants	Inter-censal migrants	As % of total migrants		Total migrants as % of total population
				Current	Inter-censal	
<b>Andhra Pradesh</b>						
In-migrants	326,670	53,635	202,415	16.42	61.96	1.48
Out-migrants	482,540	55,802	267,186	11.56	55.37	2.19
Net migrants	-155,870	-2,167	-64,771	1.39	41.55	-0.71
<b>Assam</b>						
In-migrants	320,220	39,135	182,420	12.22	56.97	4.06
Out-migrants	150,971	24,838	98,627	16.45	65.33	1.91
Net migrants	169,249	14,297	83,793	8.45	49.51	2.15
<b>Bihar</b>						
In-migrants	403,130	46,860	217,820	11.62	54.03	1.40
Out-migrants	1,320,309	89,114	608,040	6.75	46.05	4.58
Net migrants	-917,179	-42,254	-390,220	4.61	42.55	-3.18
<b>Gujarat</b>						
In-migrants	416,735	62,865	229,550	15.09	55.08	3.02
Out-migrants	459,595	33,197	176,037	7.22	38.30	3.33
Net migrants	-42,860	29,668	53,513	-69.22	-124.86	-0.31
<b>Haryana</b>						
In-migrants	373,895	64,615	226,830	17.28	60.67	6.95
Out-migrants	355,024	41,370	190,686	11.65	35.50	6.60
Net migrants	18,871	23,245	36,144	123.18	191.53	0.35
<b>Himachal Pradesh</b>						
In-migrants	81,715	21,624	60,684	26.46	74.26	4.62
Out-migrants	123,796	20,573	74,122	16.62	59.87	7.01
Net migrants	-42,081	1,051	-13,438	-2.50	31.93	-2.38
<b>Jammu &amp; Kashmir</b>						
In-migrants	44,364	11,908	31,769	26.84	71.61	1.80
Out-migrants	62,337	18,008	45,089	28.89	72.33	2.54
Net migrants	-17,973	-6,100	-13,320	33.94	74.11	-0.73
<b>Kerala</b>						
In-migrants	150,290	25,510	94,974	16.97	63.19	1.42
Out-migrants	492,483	45,708	284,400	9.28	57.75	4.65
Net migrants	-342,193	-20,198	-189,426	5.90	55.36	-3.23
<b>Madhya Pradesh</b>						
In-migrants	765,945	110,770	403,280	14.46	52.65	3.57
Out-migrants	374,393	56,153	216,609	15.00	57.86	1.74
Net migrants	391,552	54,617	186,671	13.95	47.67	1.82
<b>Maharashtra</b>						
In-migrants	1,843,260	129,270	839,645	7.01	45.55	7.06
Out-migrants	595,864	102,952	349,205	17.28	58.60	2.28
Net migrants	1,247,396	26,318	490,440	2.11	39.32	4.78

by state or union territory, sex, duration of residence, and share of

Inter-censal migrants as % of inter-censal growth	Females						Inter-censal migrants as % of inter-censal growth
	Total migrants	Current migrants	Inter-censal migrants	As % of total migrants		Total migrants as % of total population	
				Current	Inter-censal		
5.26	408,270	40,215	198,825	9.85	48.70	1.90	5.41
6.95	538,186	39,258	259,693	7.29	48.25	2.50	7.07
-1.68	-129,916	957	-60,868	-0.74	46.85	-0.60	-1.66
9.33	163,265	12,045	88,995	7.38	54.51	2.31	4.68
5.05	97,158	7,411	54,511	7.63	56.11	1.37	2.87
4.29	66,107	4,634	34,484	6.71	52.16	0.93	1.82
3.92	576,205	27,090	225,905	4.70	39.21	2.09	5.19
10.96	850,812	42,679	355,390	5.02	41.77	3.09	8.16
-7.03	-274,607	-15,589	-129,485	5.68	47.15	-1.00	-2.97
7.24	342,110	41,335	177,825	12.08	51.98	2.65	6.14
5.56	419,562	22,646	162,365	5.40	38.70	3.25	5.61
1.69	-77,452	18,689	15,460	-24.13	-19.96	-0.60	0.53
17.26	586,460	53,960	256,375	9.20	43.72	12.59	22.65
14.51	550,559	42,903	227,111	7.79	41.25	11.82	20.07
2.75	35,901	11,057	29,264	30.80	81.51	0.77	2.59
19.22	72,505	11,872	41,601	16.37	57.38	4.28	12.52
23.48	101,424	11,027	49,179	10.87	48.49	5.99	14.80
-4.26	-28,919	845	-7,578	-2.92	26.20	-1.71	-2.28
5.66	31,115	5,784	17,545	18.59	56.39	1.44	3.55
8.03	36,769	4,803	19,329	13.06	52.57	1.70	3.91
-2.37	-5,654	981	-1,784	-17.35	31.55	-0.26	-0.36
4.27	129,570	13,455	74,575	10.38	57.56	1.20	3.36
12.78	316,749	26,282	183,297	8.30	57.87	2.94	8.27
-8.51	-187,179	-12,827	-108,722	6.85	58.08	-1.74	-4.90
8.27	924,220	88,025	405,615	9.52	43.89	4.58	9.21
4.44	658,856	63,256	284,250	9.60	43.14	3.26	6.45
3.83	265,364	24,769	121,365	9.33	45.73	1.31	2.76
14.76	1,301,570	82,940	587,235	6.37	45.12	5.36	11.36
6.14	691,542	76,275	350,307	11.03	50.66	2.85	6.77
8.62	610,028	6,665	236,928	1.09	39.28	2.51	4.58

TABLE A6 (continued)

State/union territory and type of migrants	Males					
	Total migrants	Current migrants	Inter- censal migrants	As % of total migrants		Total migrants as % of total popu- lation
				Current	Inter- censal	
<b>Manipur</b>						
In-migrants	11,670	1,304	7,547	11.17	64.67	2.15
Out-migrants	7,757	1,200	5,491	15.47	70.79	1.43
Net migrants	3,913	104	2,056	2.66	52.54	0.72
<b>Meghalaya</b>						
In-migrants	38,102	3,428	21,607	9.00	56.71	7.31
Out-migrants	18,147	2,484	12,721	13.69	70.10	3.48
Net migrants	19,955	944	8,886	4.73	44.53	3.83
<b>Mysore (Karnataka)</b>						
In-migrants	544,450	79,180	310,685	14.54	57.06	3.64
Out-migrants	480,708	48,240	251,168	10.04	52.25	3.21
Net migrants	63,742	30,940	59,517	48.54	93.37	0.43
<b>Nagaland</b>						
In-migrants	28,467	4,697	21,873	16.50	76.84	10.31
Out-migrants	10,654	2,880	8,624	27.03	80.95	3.86
Net migrants	17,813	1,817	13,249	10.20	74.38	6.45
<b>Orissa</b>						
In-migrants	239,800	28,615	142,665	11.93	59.49	2.17
Out-migrants	255,001	24,389	123,024	9.56	48.24	2.31
Net migrants	-15,201	4,226	19,641	-27.80	-129.21	-0.14
<b>Punjab</b>						
In-migrants	296,360	56,765	196,980	19.15	66.47	4.08
Out-migrants	640,621	62,296	318,509	9.72	49.72	8.82
Net migrants	-344,261	-5,531	-121,529	1.61	35.30	-4.74
<b>Rajasthan</b>						
In-migrants	329,515	66,315	193,835	20.13	58.82	2.44
Out-migrants	627,255	85,971	320,317	13.71	51.07	4.65
Net migrants	-297,740	-19,656	-126,482	6.60	42.48	-2.21
<b>Sikkim</b>						
In-migrants	8,007	508	5,031	6.34	62.83	7.11
Out-migrants	5,966	933	3,684	15.64	61.75	5.30
Net migrants	2,041	-425	1,347	-20.82	66.00	1.81
<b>Tamil Nadu</b>						
In-migrants	399,090	33,595	219,835	8.42	55.08	1.92
Out-migrants	531,740	59,100	284,849	11.11	53.57	2.55
Net migrants	-132,650	-25,505	-65,014	19.23	49.01	-0.64
<b>Tripura</b>						
In-migrants	16,573	3,422	11,838	20.65	71.43	2.07
Out-migrants	18,359	1,437	10,509	7.83	57.24	2.29
Net migrants	-1,786	1,985	1,329	-111.14	-74.41	-0.22

Inter-censal migrants as % of inter-censal growth	Females						Total migrants as % of total population	Inter-censal migrants as % of inter-censal growth
	Total migrants	Current migrants	Inter-censal migrants	As % of total migrants				
				Current	Inter-censal			
4.88	7,874	357	3,811	4.53	48.40	1.48	2.76	
3.55	4,372	325	2,974	7.43	68.02	0.82	2.15	
1.33	3,502	32	837	0.91	23.90	0.66	0.61	
17.47	23,491	1,670	16,204	7.11	68.98	4.79	13.66	
10.29	15,112	1,472	10,156	9.74	67.20	3.08	8.56	
7.18	8,379	198	6,048	2.36	72.18	1.71	5.10	
10.60	596,640	52,230	281,650	8.75	47.21	4.16	10.13	
8.57	552,982	39,966	258,260	7.23	46.70	3.86	9.29	
2.03	43,658	12,264	23,390	28.09	53.58	0.30	0.84	
25.72	7,157	673	5,625	9.40	78.59	2.98	9.04	
10.14	3,494	357	2,331	10.22	66.71	1.45	3.75	
15.58	3,663	316	3,294	8.63	89.93	1.52	5.30	
6.28	277,625	25,295	139,480	9.11	50.24	2.55	6.56	
5.42	229,101	14,214	95,605	6.20	41.73	2.10	4.50	
0.87	48,524	11,081	43,875	22.84	90.42	0.45	2.06	
15.65	339,870	40,115	174,825	11.80	51.44	5.41	15.11	
25.30	597,574	42,892	283,362	7.18	47.42	9.51	24.49	
-9.65	-257,704	-2,777	-108,537	1.08	42.12	-4.10	-9.38	
6.64	534,860	51,510	237,365	9.63	44.38	4.36	8.82	
10.97	724,812	70,260	301,276	9.69	41.57	5.90	11.20	
-4.33	-189,952	-18,750	-63,911	9.87	33.65	-1.55	-2.38	
9.24	3,544	209	2,321	5.90	65.49	3.65	11.50	
6.76	4,186	133	1,776	3.18	42.43	4.31	8.80	
2.47	-642	76	545	11.84	84.89	-0.66	2.70	
5.61	394,130	24,915	202,550	6.32	51.39	1.93	5.63	
7.27	503,164	42,820	248,664	8.51	49.42	2.47	6.92	
-1.66	-109,034	-17,905	-46,114	16.42	42.29	-0.54	-1.28	
5.64	12,124	1,645	8,065	13.57	66.52	1.61	3.94	
5.01	16,181	887	9,473	5.48	58.54	2.14	4.63	
0.63	-4,057	758	-1,408	-18.68	34.71	-0.54	-0.69	

TABLE A6 (continued)

State/union territory and type of migrants	Males					Total migrants as % of total popula- tion
	Total migrants	Current migrants	Inter- censal migrants	As % of total migrants		
				Current	Inter- censal	
<b>Uttar Pradesh</b>						
In-migrants	495,965	89,135	304,570	17.97	61.41	1.05
Out-migrants	1,934,102	201,021	1,033,374	10.39	53.43	4.11
Net migrants	-1,438,137	-111,886	-728,804	7.78	50.68	-3.06
<b>West Bengal</b>						
In-migrants	1,449,990	46,135	560,000	3.18	38.62	6.19
Out-migrants	449,063	74,702	274,286	16.82	61.78	1.92
Net migrants	1,000,987	-28,567	285,714	-2.85	28.54	4.27
<b>Andaman &amp; Nicobar Islands</b>						
In-migrants	24,812	2,337	15,824	9.42	63.78	35.43
Out-migrants	3,088	766	2,257	24.81	73.09	4.41
Net migrants	21,724	1,571	13,567	7.23	62.45	31.02
<b>Arunachal Pradesh</b>						
In-migrants	28,609	4,371	21,235	15.28	74.22	11.39
Out-migrants	4,699	1,268	3,807	26.98	81.02	1.87
Net migrants	23,910	3,103	17,428	12.98	72.89	9.52
<b>Chandigarh</b>						
In-migrants	107,883	12,338	74,697	11.44	69.24	73.35
Out-migrants	21,609	4,210	17,216	19.48	79.67	14.69
Net migrants	86,274	8,128	57,481	9.42	66.63	58.66
<b>Dadra &amp; Nagar Haveli</b>						
In-migrants	4,611	874	2,867	18.95	62.18	12.47
Out-migrants	1,784	225	795	12.61	44.56	4.83
Net migrants	2,827	649	2,072	22.96	73.29	7.65
<b>Delhi</b>						
In-migrants	852,805	78,613	466,693	9.22	54.72	37.78
Out-migrants	175,046	30,225	119,349	17.27	68.18	7.75
Net migrants	677,759	48,388	347,344	7.14	51.25	30.02
<b>Goa, Daman, &amp; Diu</b>						
In-migrants	57,751	13,203	45,578	22.86	78.92	13.39
Out-migrants	59,749	3,407	17,110	5.70	28.64	13.86
Net migrants	-1,998	9,796	28,468	-490.29	-142.48	-0.46
<b>Lakshadweep</b>						
In-migrants	1,366	656	1,219	48.02	89.24	8.50
Out-migrants	424	86	300	20.28	70.75	2.64
Net migrants	942	570	919	60.51	97.56	5.86
<b>Pondicherry</b>						
In-migrants	35,590	3,412	19,620	9.59	55.13	15.01
Out-migrants	30,880	2,167	14,047	7.02	45.49	13.02
Net migrants	4,710	1,245	5,573	26.43	118.32	1.99

Inter-censal migrants as % of inter-censal growth	Females						Total migrants as % of total population	Inter-censal migrants as % of inter-censal growth
	Total migrants	Current migrants	Inter-censal migrants	As % of total migrants				
				Current	Inter-censal			
3.64	854,660	69,000	353,831	8.07	41.40	2.07	5.70	
12.33	1,397,775	114,268	660,339	8.17	47.24	3.38	10.64	
-8.70	-543,115	-45,268	-306,508	8.33	56.44	-1.31	-4.94	
11.58	675,480	20,095	260,165	2.97	38.52	3.24	5.72	
5.67	482,835	44,415	242,121	9.20	50.15	2.31	5.32	
5.91	192,645	-24,320	18,044	-12.62	9.37	0.92	0.40	
51.51	11,792	981	7,164	8.32	60.75	26.14	34.34	
7.35	1,331	304	992	22.84	74.53	2.95	4.76	
44.16	10,461	677	6,172	6.47	59.00	23.19	29.58	
28.87	11,305	1,141	7,680	10.09	67.93	5.23	13.38	
5.18	1,243	165	948	13.27	76.27	0.57	1.65	
23.70	10,062	976	6,732	9.70	66.91	4.65	11.73	
100.26	80,962	8,669	55,129	10.71	68.09	73.49	87.69	
23.11	18,442	2,740	13,524	14.86	73.33	16.74	21.51	
77.15	62,520	5,929	41,605	9.48	66.55	56.75	66.18	
38.53	7,353	704	3,627	9.57	49.33	19.76	41.37	
10.68	2,825	257	982	9.10	34.76	7.59	11.20	
27.85	4,528	447	2,645	9.87	58.41	12.17	30.17	
60.76	668,096	53,124	346,766	7.95	51.90	36.95	54.27	
15.54	222,612	23,349	122,272	10.49	54.93	12.31	19.14	
45.22	445,484	29,775	224,494	6.68	50.39	24.64	35.13	
35.42	47,518	7,827	33,684	16.47	70.89	11.14	32.89	
13.30	60,643	2,824	17,909	4.66	29.53	14.22	17.49	
22.12	-13,125	5,003	15,775	-38.12	-120.19	3.08	15.40	
29.42	508	189	469	37.20	92.32	3.23	13.18	
7.24	126	9	75	7.14	59.52	0.80	2.11	
22.18	382	180	394	47.12	103.14	2.43	11.07	
36.49	63,947	3,705	28,783	5.79	45.01	27.26	58.91	
26.13	52,416	2,437	21,115	4.65	40.28	22.34	43.21	
10.37	11,531	1,268	7,668	11.00	66.50	4.92	15.69	

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