J. Soc. Sci., 6 (4): 279-319 (2002)
PRINT: ISSN 0971-8923 ONLINE: ISSN 2456-6756 **DOI: 10.31901/24566756.2002/06.04.07**

People in India: Health and Disease

M.K. Bhasin and Veena Bhasin

Department of Anthropology, University of Delhi, Delhi 110 007, India.

KEY WORDS Population; health; diseases; fertility; mortality; India.

ABSTRACT In this paper an attempt is made to give an overview of health of Indians, as well as, essential aspect of their environment. India is a multi-ethnic, multi-linguistic and multi-religious state. Most of the people who are at a disadvantage due to nutritional handicaps are found in developing countries and India is no exception. Nutrition or rather lack of good food coupled with a stress filled environment can place the population at a disadvantage. The maintenance of ill health across generations result from a complex interplay of social, economic, cultural and biological factors. The complexity of relationship provides many points at which the passage of ill health from generation to generation can be interrupted. Similarly, protecting the health of infants and young children also protects the health of the next generation of adults.

INTRODUCTION

In the analysis of the 1000 million people in India, we try to give an overview of their health as well as of essential aspects of their environment, The analysis builds on a variety of contributions on specific subjects, and from different states, provided by professionals and institutions.

It is difficult to summarise the condition and contents of the lives of people in a country of such size and with wide difference in geographic, social, economic and cultural form. Statistical averages rarely communicate the true picture of a diverse reality. Thus, when ever we present statistics, we have tried to portray the range of diversity, taking a holistic view rather than a sectorial path to analyis. Population growth is the priority facing India, more so because a solution commensurate with the problem is not yet at hand. The population size has increased from 342 million in 1947 to 840 million in 1991 and is at 1000 million in 2000. The current annual net increase of some 15-16 million is the highest for any country, including China. The practical implications of this order of population growth are staggering, in terms of the additional needs each year of food, clothing, housing, health care and schooling. The density of population (1987) is estimated at 256 persons per square kilometer in India (267, Census of India, 1991) against 120 in China.

Since 1951, there have been two significant developments, consequent on successful control of deaths due to famines and epidemics: first, mortality has declined from 27.4 per thousand population in 1951 to 10.9 in 1988 (8.9 in 1998 *SRS*) second, over the same period, life expectancy for females is higher at 56.4 years (64 in 1999 *ESCAP*) years than that of men at 55.6 years (63 in 1999 *ESCAP*) years. Coupled with the continuing high birth rate on account of the subdued results of family planning, these trends explain the rapid decennial growth rate (of about 25 per cent) during 1971-81.

The health status of Indian population is directly related to the ecology, human settlements and amenities available. The natural life support systems of land, water and air have been weakening over time as a result of the pressure of population and certain demands made by economic growth. In consequence, the symbiotic relationship between society and nature is disturbed.

India is a multi-linguistic, multi-religious and multi-ethnic state. Historical events have played their part in creating such a mosaic. The population is unevenly distributed over the large area. This spatial distribution is influenced by a host of environmental, historical, socio-cultural, economic, demographic and developmental factors. For example, environmental geographical factors, such as climate, terrain, soils, natural resources etc. could very well account for the variation in opportunities for economic activities in various regions of the country. These factors could directly affect the spatial distribution of population by restricting physical mobility of the people.

The diversity of the country is the source of disparity-including gender discrimination, the distance separating some castes and tribes from the rest and the rural-urban rift. The extent of economic inequalities - of income and assets— and the links between the material poverty on one hand and various differentials on the other- socio-cultural, linguistic, ethnic, demographic, agroclimatic, regional. Socio-economic problems and their solutions are intertwined. The reports and studies on various population measures, fertility, mortality, diseases etc. reported

ESCAP = Economic and Social Commission for Asia and Pacific. UNO, Bangkok, Thailand

SRS = Sample Registration System (Vital Statistics Division, Ministry of Home Affairs, New Delhi, India).

Table 1: Distribution of population (in per cent) and area (in sq. km) in different States and Union Territories of India, 1901-1991

S. No.	Political Division of India	Area (1981)	Population 1901	1911	1921	1931	1941	1951	1961	1971	1981	1991
I. NORTH INDIA												
A. Western Himalaya (S. No. 1, 2)												
1.	Jammu and Kashmir	6.76	0.90	0.91	0.96	0.96	0.92	0.90	0.81	0.84	0.88	0.91
2.	Himachal Pradesh	1.69	0.81	0.75	0.77	0.73	0.71	0.66	0.64	0.63	0.63	0.61
3.	Punjab	1.53	3.15	2.67	2.85	2.86	3.01	2.54	2.54	2.47	2.46	2.39
4.	Chandigarh UT	n	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.05	0.07	0.08
5.	Haryana	1.35	1.94	1.66	1.69	1.63	1.65	1.57	1.73	1.83	1.89	1.93
6.	Delhi UT	0.05	0.17	0.16	0.19	0.23	0.29	0.48	0.61	0.74	0.91	1.11
B. Central Himalaya (S. No. 7, Eight Districts of Uttar Pradesh)												
7.	Uttar Pradesh	8.96	20.40	16.10	18.57	17.85	17.74	17.50	16.79	16.10	16.22	16.44
8.	Rajasthan	10.41	4.32	4.36	4.10	4.21	4.35	4.42	4.59	4.70	5.01	5.20
II. WEST INDIA												
9.	Gujarat	5.96	3.81	3.88	4.05	4.12	4.30	4.50	4.70	4.87	4.98	4.88
10.	Maharashtra	9.36	8.13	8.52	8.30	8.59	8.42	8.87	9.01	9.20	9.19	9.32
11.	Goa	0.11	0.20	0.19	0.19	0.18	0.17	0.15	0.13	0.15	0.15	0.14
12.	Daman and Diu UT	n	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
13.	Dadra and Nagar Haveli UT	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
III. EAST INDIA												
C. Eastern Himalaya (S. No. 14 to 21 and Darjeeling District of West Bengal)												
14.	Arunachal Pradesh[1]	2.54	—	—	—	—	—	—	0.08	0.09	0.09	0.10
15.	Assam	2.39	1.38	1.53	1.85	1.99	2.10	2.22	2.47	2.67	2.64	2.64
16.	Nagaland	0.50	0.04	0.06	0.06	0.06	0.06	0.06	0.08	0.09	0.11	0.14
17.	Manipur	0.68	0.12	0.14	0.15	0.16	0.16	0.16	0.18	0.20	0.21	0.22
18.	Mizoram	0.64	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.08
19.	Tripura	0.32	0.08	0.09	0.13	0.14	0.16	0.17	0.26	0.28	0.30	0.33
20.	Meghalaya	0.68	0.14	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.20	0.21
21.	Sikkim	0.22	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05
22.	West Bengal	2.70	7.11	7.14	6.95	6.77	7.29	7.28	7.95	8.08	7.99	8.06
23.	Bihar	5.29	11.46	11.23	11.19	11.24	11.04	10.74	10.57	10.29	10.23	10.23
24.	Orissa	4.74	4.32	4.52	4.44	4.48	4.32	4.06	4.00	4.00	3.86	3.73
IV. CENTRAL INDIA												
25.	Madhya Pradesh	13.49	7.07	7.71	7.63	7.65	7.53	7.23	7.37	7.60	7.64	7.84
V. SOUTH INDIA												
26.	Karnataka	5.83	5.48	5.37	5.32	5.26	5.10	5.37	5.37	5.34	5.43	5.31
27.	Andhra Pradesh	8.37	8.00	8.51	8.52	8.67	8.51	8.62	8.19	7.94	7.84	7.86
28.	Tamil Nadu	3.96	8.08	8.28	8.61	8.41	8.24	8.34	7.67	7.52	7.08	6.59
29.	Kerala	1.18	2.69	2.84	3.10	3.41	3.46	3.75	3.85	3.88	3.72	3.44
30.	Pondicherry UT	0.01	0.10	0.10	0.10	0.08	0.09	0.08	0.08	0.09	0.09	0.09
VI. ISLANDS												
31.	Lakshadweep UT	n	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
32.	Andaman and Nicobar Islands	0.25	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03
	INDIA	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	MALES		120911[3]	128385	128546	143055	163825	185528	226293	283937	353324	439230
	FEMALES		117485	123708	122775	135922	154835	175560	212942	264013	330005	407072
	INDIA (TOTAL)	3287263[2]	238296	252093	251321	278977	318661	361088	439235	548160	683329	846302

1. Censused for the first time in 1961 n = negligible UT = Union Territory
2. Area in sq. km 3. Population (in Thousand)

from India have been placed in 25 States and 7 Union Territories (U.T.)

POPULATION

India is the second largest in the world in terms of population size (846.30 million consisting of 439.23 million males and 407.07 million females). About 16 per cent of the world's population is in India; but the country accounts for only 2.42 per cent of the total world area. The area of India is 3.28 million square kilome-

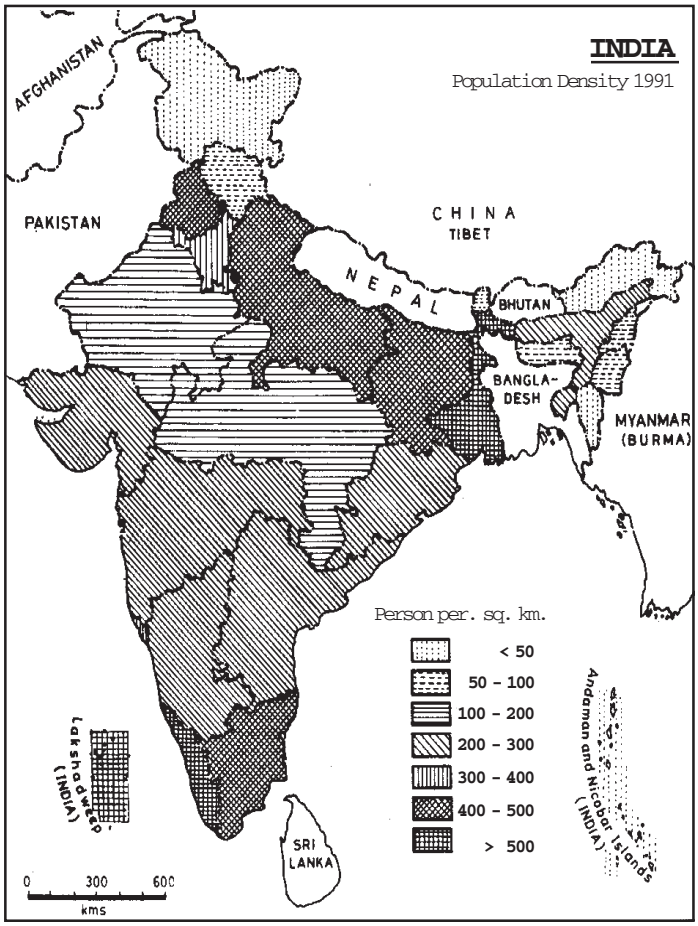

Fig. 1. India-Population Density, 1991 (Person per sq. km)

ter out of the total world area of 135.79 million square kilometer. The percentage distribution of population and area in different States and Union Territories of India from 1901 to 1991 is represented in table 1. It has been observed that area wise that state of Madhya Pradesh is the biggest (13.49) and Uttar Pradesh is largest in population. The population of the States of Southern India is declining whereas population in the eastern and western zones is increasing. In the Northern India, the population of all the states is increasing except Himachal Pradesh and Jammu and Kashmir where it is declining (Table 1).

In the first two decades (1901-1911 and 1911-1921), it has been observed that there is a loss in population in North India due to various famines and epidemics, whereas in rest of the zones of India there was increase in the population, particularly in the South and East India zones. In Assam, there was a rapid population growth, which was mainly due to heavy immigration to the state's tea gardens. In the next thirty years (1921-31, 1931-41 and 1941-51), the population growth was gradual in North, East and South India zones, whereas in West India, the growth rate was higher. The gain in population in West India was through in-migration, due to initial industrial growth in this zone. From 1951 to 1981, the total population of India has increased about 89 per cent. Therefore in the demographic history of India from the year 1951 onwards there has been an acceleration in the population growth. The higher increase in the population size has been reported from North, East and West India zones as compared to South and Central India zones.

Density

The population density has increased from 72 persons per square kilometer in 1901 to 267 in 1991 and 312 in 2001. It varies considerably from state to state, being as high as 749 in Kerala and as low as 33 in Mizoram and only 10 in Arunachal Pradesh.

India can be divided into densely, moderately and sparsely populated regions according to the distribution of the populations (Fig. 1).

(1) Densely Populated Areas

(a) The Ganga Plains: This region with an average density of 300 persons per sq. km comprises of West Bengal, Bihar, Uttar Pradesh, Punjab, Haryana and Delhi. About 40 per cent of the total population of India lives here.

(b) East and West Coast Plains: The average density of this part is 200 to 300 persons per sq. km, which comprises coastal plains of Orissa, Andhra Pradesh, Tamil Nadu, Kerala and Western part of Maharashtra.

(2) Moderately Populated Areas

The population is between 100 and 200 persons per sq. km in most of the Deccan region which includes Orissa, Madhya Pradesh, Maharashtra, Karnataka, Gujarat, Tripura and Andhra Pradesh.

(3) Sparsely Populated Areas

A population of less than 100 persons per sq. km has been reported in the following areas:

(a) The Himalayan Region: It comprises of Kashmir, Himachal Pradesh and Sikkim.

(b) Tarai: This area is situated at the foot of the Himalayas.

(c) Neighbouring States of Assam: It includes Manipur, Meghalaya, Nagaland, Arunachal Pradesh and Mizoram.

(d) Cutch and West Rajasthan: This area is a sandy desert.

(e) Andaman and Nicobar Islands

Age Composition

Table 2 shows the percentage distribution of population in age groups and its trends since 1901. It indicates that the population of India is young, as is obvious from the fact that it was characterized by high fertility and high mortality combination. There is not much change in the composition of population in broad age groups over the 90 year period. Since 1951, however, proportion of population in ages below 15 has increased. This could be because of a decrease in mortality rather than due to an increase in the birthrate. In 1981, 39.6 per cent of the population in India is below 15 years of age indicating the population is still young in age structure and consequently has a potential for greater growth in future, unless checked, and only 8.3 per cent over 60 years of age due to high mortality incidence (Fig. 2).

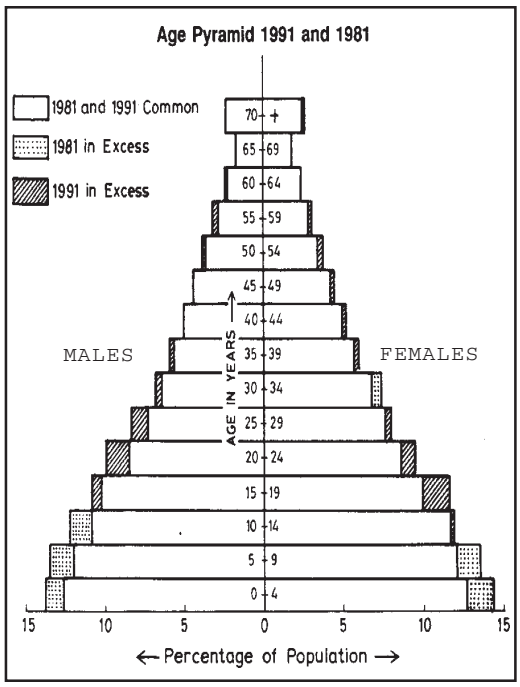

Fig. 2. India-Age Pyramid 1981, 1991
Source: Report of the Expert Committee on Population Projections for India up to 2001

A common, useful way of assessing the impact of age structure on economic well-being is through calculation of demographic "dependency ratios". Three such ratios, the child dependency ratio, the elderly dependency ratio and the total dependency ratio, have been taken. Since they consider only age data, that is, they do not use data on economic activity of the different age segments of the population, demographic dependency ratios are in fact placeholders for genuine economic dependency ratios. The underlying assumption is that persons under age

Table 2: Distribution of population by age groups (in per cent) in India, 1901-1991

Age	1901		1911		1921		1931		1941		1951		1961		1971		1981[1]		1991[2]	
group	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-4	12.5	13.3	13.3	14.3	12.1	13.2	14.7	16.0	13.2	14.0	13.1	13.7	14.7	15.5	14.2	14.9	13.9	14.3	12.0	12.4
5-9	14.0	13.8	13.8	13.8	14.8	15.0	13.3	12.8	13.6	13.6	12.6	12.9	14.6	14.9	14.9	15.1	13.4	13.5	13.2	13.4
10-14	12.7	10.9	11.7	10.0	12.5	10.8	12.0	11.2	11.3	10.8	11.4	11.3	11.6	10.8	12.9	12.2	12.1	11.9	11.9	11.6
0-14	**39.2**	**38.0**	**38.8**	**38.1**	**39.4**	**39.0**	**40.0**	**40.0**	**38.1**	**38.4**	**37.1**	**37.9**	**40.9**	**41.2**	**42.0**	**42.2**	**39.4**	**39.7**	**37.1**	**37.4**
15-24	16.5	17.2	16.7	17.6	16.0	16.8	17.9	19.2	18.1	18.3	18.9	19.1	16.3	17.1	16.5	16.6	18.7	18.6	18.3	18.3
25-34	17.2	17.5	17.2	17.5	16.9	17.3	16.4	16.2	15.9	16.3	15.4	15.3	15.2	15.5	13.6	14.5	13.7	14.2	14.8	15.7
15-34	**33.7**	**34.7**	**33.9**	**35.1**	**32.9**	**34.2**	**34.3**	**35.4**	**34.1**	**34.6**	**34.3**	**34.4**	**31.5**	**32.6**	**30.1**	**31.1**	**32.4**	**32.8**	**33.1**	**34.0**
35-44	12.6	12.2	12.6	11.9	12.6	11.9	11.9	11.0	12.1	11.6	12.0	11.3	11.4	10.6	11.4	10.9	10.8	10.7	11.5	11.1
45-59	9.9	9.6	9.9	9.4	10.1	9.5	9.9	9.4	10.9	10.5	11.1	10.6	10.7	9.8	10.7	9.8	11.1	10.4	10.8	10.4
35-59	**22.5**	**21.8**	**22.5**	**21.3**	**22.7**	**21.4**	**21.8**	**20.4**	**23.0**	**22.1**	**23.1**	**21.9**	**22.1**	**20.4**	**22.1**	**20.7**	**21.9**	**21.1**	**22.3**	**21.5**
60+	4.6	5.5	4.8	5.5	5.0	5.5	3.9	4.2	4.9	4.9	5.5	5.8	5.5	5.8	5.9	6.0	6.3	6.4	6.8	6.8

M = Male, F = Female

Note : 1961 figures are based on unsmoothed population count and exclude the population of NEFA and Goa, Daman and Diu. Percentage of 1901-31 are based on unadjusted and those of 1941 and 1951 on adjusted data. The proportions for 1961 on data smoothed by Census Actuary are : 0-14 (40.6 M, 41.7 F); 15-44 (44.3 M, 43.6 F); 45-59 (10.4 M, 9.7 F) and 60+ (4.7 M, 5.0 F)

1. Excludes Assam

2. Census of India, 1991 and Report Expert Committee on Population Projections (Medium Projection) for India upto 2001.

15 or aged 60 and over would be unlikely to participate in economic activity and probably depend economically on those belonging to the segment of the population aged 15-59 (Table 3).

Table 3: Distribution of population by age groups (in per cent) in India, 1901-1991

S. No.	Measures	Year 1971	1981	1991[1]
1.	Index of Aging	8.00	9.95	11.58
2.	Dependency Ratio			
	(a) Child Dependency Ratio	76.45	70.45	50.96
	(b) Old Age Dependency Ratio	6.12	7.00	6.82
	(c) Total Dependency Ratio	82.57	77.45	57.78

1. Report of Expert Committee on Populations (Medium Projection) for India upto 2001.

Sex Composition

In 1991, there are 439.23 million males and 407.07 million females. Thus for every 1000 males, India has 927 females, the number declining from 972 in 1901 to 950 in 1931. The reasons for the sex imbalance given in the Census of India 1911 were: omissions of females, female infanticide, neglect of female infants, early marriage, death consequent on child birth, bad treatment to women and hard work. The reasons were indicated about 80 years back and some of the reasons mentioned do not seem to be true today but provide a basis for new, revised hypotheses. Whatever may be the cause, the situation is not improving.

Sex ratio is invariably lower in the urban

Table 4: Trend and growth of urban population in India[1] 1901-1991

Census year	Total population	Urban population	Decadal increase	Decadal per cent Increase	Cumulative growth 1901	Urban populations as per cent to total population
1901	232,967,285	25,616.051		—	100	11.00
1911	245,952,238	25,580,199	-35,852	-0.14	100	10.40
1921	244,259,874	27,691,306	+2,111,107	+8.25	10	11.34
1931	270,746,659	32,976,018	+5,284,712	+19.08	129	12.18
1941	309,019,062	43,558,665	+10,582,647	+32.09	170	14.10
1951	349,805,382	61,629,646[2]	+18,070,981	+41.49	24	17.62
1961	424,836,466	77,562,000	+15,932,354	+25.85	303	18.26
1971	528,917,868	106,966,534	+29,904,534	+37.91	418	20.22
1981	658,140,676	156,188,507	+49,221,973	+46.02	610	23.73
1991	846,302,688	217,611,012	+61,422,505	+23.90		25.71

1. Excludes Assam and Jammu and Kashmir

2. Excludes a population of 12019 of Kanchrapara Rural Development Colony in West Bengal

Table 5: Distribution (in per cent) of main, marginal and total workers by industrial categories in India 1981 and 1991

S. No.	Industrial Category	Main Workers[1]		Marginal Workers[2]		Total Workers		Main Workers 1991	
		Male	Female	Male	Female	Male	Female	Male	Female
I.	Cultivators	43.70	33.20	41.66	47.91	43.66	37.50	39.9	34.6
II.	Agricultural labourers	19.56	46.18	33.29	41.43	19.83	44.79	20.8	44.2
III.	Livestock, forestry, fishing, hunting and plantations, orchards and allied activities	2.34	1.85	3.68	1.64	2.37	1.79	2.1	2.1
IV.	Mining and quarrying	0.62	0.36	0.25	0.06	0.61	0.27	0.7	0.3
V.	Manufacturing, processing, servicing and repairs								
	(1) Household industry	3.18	4.59	3.03	4.07	3.18	4.44	2.1	3.5
	(2) Other than household industry	8.92	3.55	5.34	2.15	8.85	3.14	0.8	3.8
VI.	Constructions	1.81	0.80	1.95	0.39	1.81	0.68	2.3	0.7
VII.	Trade and commerce	7.33	2.04	4.86	1.09	7.28	1.75	9.0	2.2
VIII.	Transport, storage and communications	3.32	0.38	1.71	0.06	3.29	0.29	3.5	0.3
IX.	Other Services	9.22	7.05	4.23	1.25	9.12	5.35	10.8	8.3
Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note : Excludes figures for Assam and Jammu and Kashmir where the 1981 and 1991 census data could not be conducted due to disturbed conditions respectively

1. Main workers are those who have worked for a major part of the year preceding enumeration.

2. Marginal workers are those who have worked any time at all in the year preceding the enumeration but have not worked for a major part of the year.

Pradesh, Orissa and Tripura show a level of urbanization between 9 and 15.

Occupational Structure

The majority of the Indian workers are involved in agriculture; 63 per cent of the male workers and 70 per cent of the female workers are either cultivators or agricultural labourers (Table 5). India's economy is still rural-based and about 80 per cent of her people reside in 587,226 villages. Among females the percentage of agricultural labourers is significantly higher than that of cultivators. It is because in most parts of rural India, bread winning responsibility goes mainly to the males who do all kinds of agricultural work and the females are engaged to help carry out simple operations in the farms, particularly at the sowing and harvesting time.

Literacy and Education

In the census of 1991, 42.29 per cent of the population in India was enumerated as literate (Table 6). Though there has been substantial increase in the rate of literacy since the beginning of the century, it is still low and varies in different parts of the country. Among all the states in India, Kerala still occupies the highest overall literacy level in the country. States which have higher literacy rate in 1991 compared to the all India figure are Mizoram, Lakshadweep, Chandigarh, Goa, Delhi, Pondicherry, Andaman and Nicobar Islands, Daman and Diu, Tamil Nadu, Himachal Pradesh, Maharashtra, Nagaland, Manipur, Gujarat, Tripura, West Bengal, Punjab, Sikkim, Karnataka, Haryana and Assam in that order (Fig. 3).

Religious Composition

Religion has been held responsible for many differences and norms affecting the fundamental values and behavioural patterns in life including health behaviour. People in India be-

Table 6: Progress of crude literacy in India, 1901-1991

Census	Percentage to literates to total population		
	Person	Male	Female
1901[1]	5.35	9.83	0.60
1911[1]	5.92	10.56	1.05
1921[1]	7.16	12.21	1.81
1931[1]	9.50	15.59	2.93
1941[1]	16.10	24.90	7.30
1951[2]	16.67	24.95	7.93
1961	24.02	34.44	12.95
1971	29.46	39.45	18.72
1981[3]	36.23	46.89	24.82
1991[2]	52.21	64.13	39.29

Note: Literates refer to those who can read and write with understanding. Children aged 0 to 4 are treated as illiterates 1. For undivided India 2. Excludes Jammu and Kashmir 3. Excludes Assam

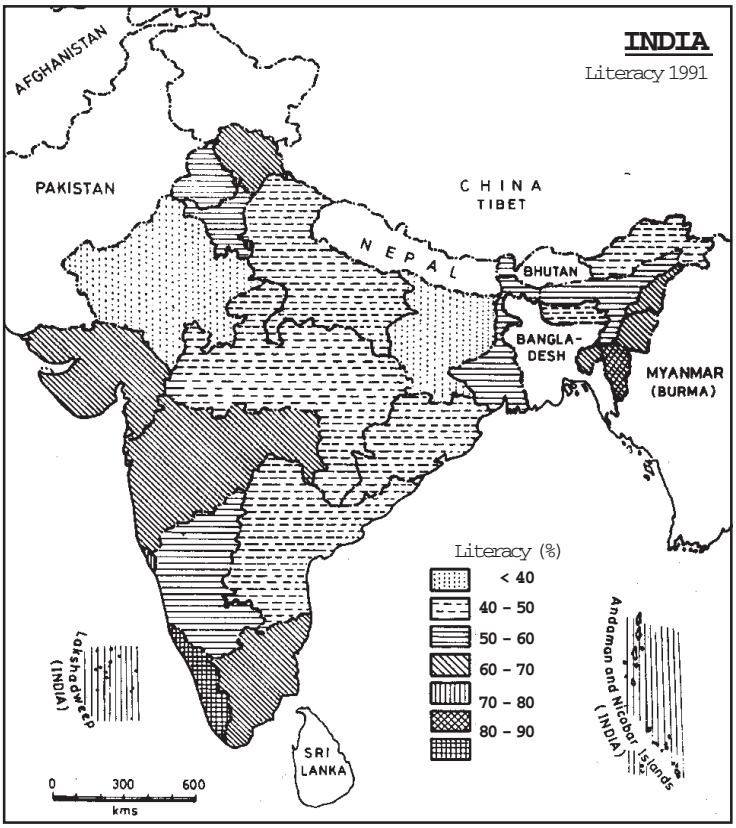

Fig. 3. India-Literacy 1991 (in per cent)

Table 7: Distribution (in per cent) of the population of India according to religious affiliations 1901-1991

Religion	*Before Independence*						*After Independence*			
	Census Year									
	1901	*1911*	*1921*	*1931*	*1941*	*1951*	*1961*	*1971*	*1981*[3]	*1991*[4]
Hindu	72.87	71.68	70.73	70.67	69.46	84.98	83.51	82.72	82.64	82.00
Muslim	21.88	22.39	23.23	23.49	24.48	9.91	10.70	11.21	11.35	12.12
Christian	0.98	1.21	1.47	1.77	1.91	2.35	2.44	2.60	2.43	2.34
Sikh	0.77	1.00	1.06	1.28	1.46	1.74	1.79	1.89	1.96	1.94
Buddhist	0.10	0.11	0.12	0.13	0.12	0.05	0.73	0.70	0.71	0.76
Jain	0.47	0.41	0.39	0.37	0.37	0.45	0.46	0.47	0.48	0.40
Others Religion and Persuations[1]	2.92	3.21	3.01	2.30	2.41	0.52	0.34	0.40	0.42	0.39
Religion not stated[2]		—	—	—	—	—	—	—	—	0.05
Total	99.99	100.01	100.01	100.01	100.01	100.00	100.00	100.00	100.00	100.00

1. Others Religion and Persuations - total of remaining religions as given by respondents
2. Religion not stated - If a person refuses to state his religion
3. 1981 figures are based on the information on religion of heads of households tabulated through the household schedule
4. Census of India 1991

long to six major religious categories: Hindus, Muslims, Christians, Sikhs, Buddhists and Jains in that order. Table 7 gives the religious composition of India's population and the changes from 1901-1991. Hindus form the majority, making 82.00 per cent of India's population,

the second major religious community are the Muslims with 12.12 per cent of the population. From the Census 1951 onwards Hindus have decreased in proportion and Muslims, Sikhs and Jains have increased. Apart from the six major religions is the category 'Other religions and persuasions', whose number is 183 and this category is 0.39 per cent of the total population according to Census of India 1991 Series 1, India.

Caste Cleavages

Traditionally caste represented hereditary skills. But as all skills do not fetch equal status or reward, some castes came to be classified as superiors and others as inferiors. The higher weightage given to mental work as against manual work added to the inequality of status. As a result there is a close connection between caste affiliation and income level.

However, with social change increased education and the anonymity of the urban development's caste distinction are becoming less acute.

Scheduled Castes and Scheduled Tribes

In the Census of India 1991, 16.48 per cent of the population was enumerated as belonging to 'Scheduled Castes' and another 8.08 per cent as belonging to 'Scheduled Tribes'. Roughly one in every four persons in India belongs to 'Scheduled Castes or Scheduled Tribes'. As stated earlier that there are, however, vast differences in the concentration pattern of Scheduled Castes in the different regions of the country. The fact that these castes are associated with agriculture explains their main concentration in the alluvial and the coastal plains of the country. The hilly and the forested tracts of the tribal belt of the central and north-eastern India have only a sparse population of the Scheduled Castes (Table 8, Fig. 4).

It has been mentioned in the previous section that the total population of the Scheduled Tribes in the states of Madhya Pradesh, Orissa, Bihar, Gujarat, Rajasthan, Maharashtra and West Bengal together accounts for about 80 per cent of the entire tribal population of the country. On the contrary, the States and Union Territories with high tribal percentages have a far lesser share in the country's total tribal population. The tribal population of Mizoram, Lakshadweep, Arunachal Pradesh, Nagaland and Meghalaya accounts for only one twentieth part of the total tribal population of India (Table 8, Fig. 5).

Among the Scheduled Castes, the largest proportion of workers relate to category "agricultural labourer" and the proportion is more than that among the general population. Among Scheduled Tribes most of the male workers are cultivators and the females are agricultural labourers. Both in total and in case of males and females separately, the proportion of Scheduled Castes engaged in agricultural occupations is significantly higher than that among the general population but is less than that among the Scheduled Tribes. Among the Scheduled Tribes about 92 per cent of the males and about 94 per cent of the females are engaged in agricultural pursuits. In the census of 1951 the Scheduled Tribes were 5.35 per cent of the population of India.

The policy of positive discrimination has helped these segments but their gains are confined to the public sector only which forms but a small segment of the economy. The caste base of inequity in the national life is not only persisting but is getting accentuated. The tribal people are losing command over their resources on account of pressure from more advanced people, displacement by development projects and claims by the state. The tribal sub-plan and special component plans for the Scheduled Castes (within the national five year plan) do provide substantial financial outlays but in the absence of a holistic frame and co-ordinated implementation, results have been less than expected.

Birth and Death Rate

The estimated birth rate for India indicates that, in the first decade of the twentieth century, it was quite high and that up to 1951-60, it had declined very slightly. From 1901-1911 to 1951-60, the birth rate declined by only about 8 points, that is from 49.2 to 41.7 per thousand population. From 1961-70 to 1971-80, however, a dent was made in national birth rate which declined by 4 points.

From table 9 it is evident that India has made impressive progress in her fight against death. From 1911-1921 to 1961-71, that is in fifty years the average annual Indian death rate has declined from 47.2 per thousand population to 19.0, a reduction of about 60 per cent.

The average expectation of life at birth for

Table 8: Percentage distribution of members of Scheduled Castes and Scheduled Tribes to the total population by different States and Union Territories of India 1971, 1981 and 1991

S. No.	Political division of India	Scheduled Castes			Scheduled Tribes		
		1971	1981	1991	1971	1981	1991
	I. NORTH INDIA						
	A. Western Himalaya (S. No. 1, 2)						
1.	Jammu and Kashmir	8.26	8.31	—	—	—	—
2.	Himachal Pradesh	22.24	24.62	25.34	4.09	4.61	4.22
3.	Punjab	24.71	26.87	28.31	—	—	—
4.	Chandigarh UT	11.30	14.09	16.51	—	—	—
5.	Haryana	18.89	19.07	19.75	—	—	—
6.	Delhi UT	15.64	18.03	19.05	—	—	—
	B. Central Himalaya (S. No. 7, Eight Districts of Uttar Pradesh)						
7.	Uttar Pradesh	21.00	21.16	21.04	0.22	0.21	0.21
8.	Rajasthan	15.82	17.04	17.29	12.13	12.21	12.44
	II. WEST INDIA						
9.	Gujarat	6.84	7.15	7.41	13.99	14.22	14.92
10.	Maharashtra	6.00	7.14	11.10	5.86	9.19	9.27
11.	Goa, Daman and Diu UT	1.93	2.16	5.91	0.89	0.99	11.57
12.	Dadra and Nagar Haveli UT	1.80	1.97	1.97	86.89	78.82	78.99
	III. EAST INDIA						
	C. Eastern Himalaya (S. No. 13 to 20 and Darjeeling District of West Bengal)						
13.	Arunachal Pradesh	0.07	0.467	0.47	9.02	69.82	66.66
14.	Assam[1,2]	6.10	—	7.40	12.84	—	12.82
15.	Nagaland	—	—	—	88.61	83.99	87.70
16.	Manipur	1.53	1.25	2.02	31.18	27.30	34.41
17.	Mizoram	—	—	0.10	0.03	93.55	94.75
18.	Tripura	12.39	15.12	16.36	28.95	28.44	30.95
19.	Meghalaya	0.38	0.41	0.51	80.48	80.58	85.53
20.	Sikkim	4.53	5.78	5.93	—	23.27	22.36
21.	West Bengal	19.90	21.9	23.62	95.72	5.63	5.60
22.	Bihar	14.11	14.51	14.56	8.75	8.31	7.66
23.	Orissa	15.09	14.66	16.20	23.11	22.43	22.21
	IV. CENTRAL INDIA						
24.	Madhya Pradesh	13.09	14.10	14.54	20.14	22.97	23.27
	V. SOUTH INDIA						
25.	Karnataka	13.14	15.07	16.38	0.79	4.91	4.26
26.	Andhra Pradesh	13.27	14.87	15.93	3.81	5.93	6.31
27.	Tamil Nadu	17.76	18.35	19.18	0.76	1.07	1.03
28.	Kerala	8.30	10.02	9.92	1.26	0.03	1.10
29.	Pondicherry UT	15.46	15.99	16.25	—	—	—
	VI. ISLANDS						
30.	Lakshadweep UT	—	—	—	92.36	93.82	93.15
31.	Andaman and Nicobar Islands UT	—	—	—	15.72	11.85	9.54
	INDIA (TOTAL)	14.40	15.75	16.48	6.94	7.76	8.08

1. Includes Union Territory of Mizoram which was carved out of Assam after the 1971 Census
2. Excludes Assam where census could not be held

Indian males and females for each decade (1901-1981) is given in table 9. During 1911-21, it was 19.4 years for males and 20.9 years for females. These figures may be considered lowest for the country. The mortality conditions in India have, however, improved over the years and the average life expectancy has increased in each successive decade.

Table 10 shows the expectation of life at birth for India by sex and by residence for the period 1981-85 along with corresponding figures for the periods 1970-75 and 1976-80. It is observed that for rural areas the female expectation of life at birth (53.6) is found to be marginally lower than the male expectation of life at birth (54.0 years), which for urban areas, the male exepectation of life at birth (61.6) is found to be lower than the female expectation of life at birth

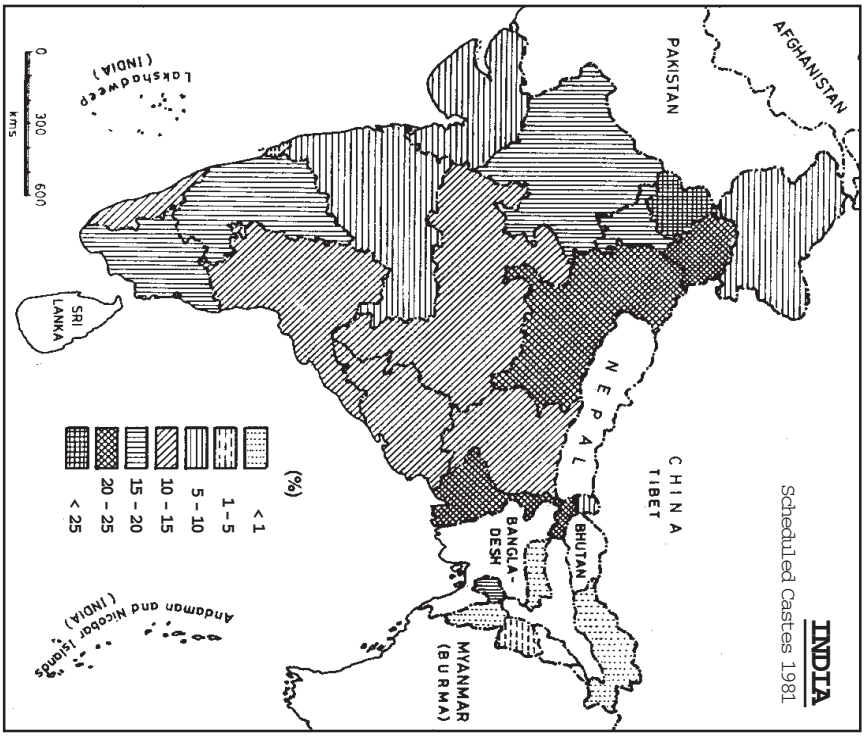

Fig. 4. India-Scheduled Castes 1981 in per cent to the Total Population

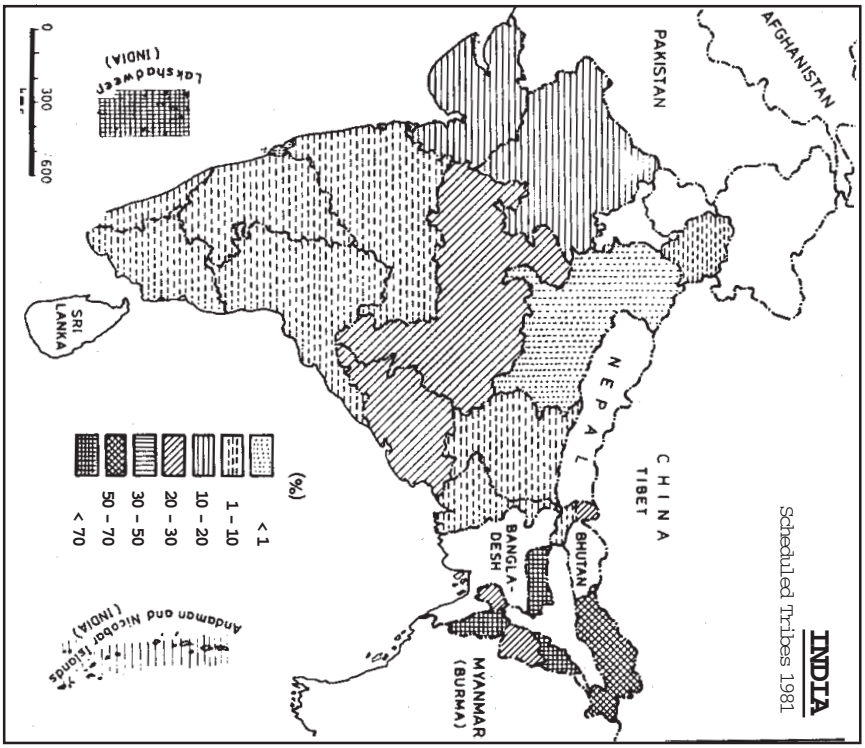

Fig. 5. India-Scheduled Tribes 1981 in per cent to the Total Population

Table 9: Estimated crude birth, death, natural growth rates and expectation of life at birth in india 1901-1981

Period	*Crude Birth Rate*	*Crude Death Rate*	*Natural Growth Rate*	*Expectation of Life at Birth*	
				Male	*Female*
1901-1911 (Census estimates)	49.2	42.6	6.6	22.6	23.3
1911-1921 (Census estimates)	48.1	47.2	0.9	19.4	20.9
1921-1931 (Census estimates)	46.4	36.3	10.1	26.9	26.6
1931-1941 (Census estimates)	45.2	31.2	14.0	32.1	31.4
1941-1951 (Census estimates)	39.9	27.4	12.5	32.5	31.7
1951-1961 (Census estimates)	41.7	22.8	18.9	41.9	40.6
1961-1971 (Census estimates)	41.2	19.0	22.2	46.4	44.7
1971-1981 (Census estimates)	37.2	15.0	22.2	50.9[1]	50.0[1]
1980 (*SRS* estimates)	—	—	—	54.1	54.7
1997 (*SRS* Bull. Oct., 1998)	27.2	8.9	18.3	—	—
1999 (*ESCAP*)	24.6	8.7		63	64
2001 (*ESCAP*)	24.5	8.6		63	64

Note : Figures for crude birth, death and natural growth rates (except the projections) for the decades 1901-1911 to 1931-1941 are estimates by Kingslay Davis in 'The Population of India and Pakistan': For the next three decades, they are based on Census Actuary. In view of the different methods adopted in the Census, the figures are not strictly comparable.

1. Relates to SRS estimates

(64.1) years during 1981-85. The extent of urban rural difference in case of females is more than that among males. Between 1970-75 and 1981-85, the expectation of life at birth has improved.

For rural and urban areas combined, the expectation of life at birth by sex is given in table 10 for major States for three periods 1970-75, 1976-80 and 1981-85. Expectation of life at birth varies from 45.4, 48.5 and 51.4 years for males and 40.5, 43.8 and 48.5 years for females in Uttar Pradesh to 60.8, 63.5 and 65.4 years for males and 63.3, 67.6 and 71.5 years for females in Kerala during 1970-75, 1976-80 and 1981-85, respectively. Expectation of life at birth for females is lower than that for males in Bihar, Haryana and Uttar Pradesh. It is observed that expectation of life at birth has increased in all the states during the periods 1970-75 and 1981-85 for both males and females. Expectations of life at birth for males and females is more than 55 years in India and lower than this value has been observed for both the sexes from the states of Uttar Pradesh, Rajasthan, Assam, Bihar, Orissa and Madhya Pradesh (SRS Bulletin Oct. 1998).

In the rural areas the estimates are found to be higher as compared to urban areas. The birth rate less than 30 per thousand has been observed in states of Goa, Kerala, Nagaland, Tamil Nadu, Manipur, Tripura, Andhra Pradesh, Karnataka, Punjab, West Bengal, Maharashtra, Gujarat (*SRS* Bulletin, Oct., 1998). The highest birth rate (33.5 per thousand) is reported from the states of Uttar Pradesh followed by Rajasthan (32.1) Madhya Pradesh (31.9), Bihar (31.7), Meghalaya (30.2) and Haryana (28.3). From Union Territories, the minimum birth rate *i.e.*, 18.4 is from Pondicherry, (Fig. 6).

The death rate less than 9 per thousand has been reported from Kerala, Manipur, Goa, Punjab, Tripura, Maharashtra, Karnataka, West Bengal, Himachal Pradesh, Andhra Pradesh, Gujarat, Rajasthan, Tamil Nadu, Arunachal Pradesh, Meghalaya, Mizoram, Sikkim, and Haryana states and more than 10 per thousand from Bihar, Madhya Pradesh, Orrisa and Uttar Pradesh. In Union Territories the death rate is about 8 per thousand in all areas except in Chandigarh where it is 4.2 per thousand (*SRS* Bulletin, Oct. 1998) (Fig. 7).

The crude birth and death rates are higher in rural areas—about 34 and 12 per thousand, respectively as compared to urban areas where the rates are 27.9 and 8.2 per thousand, respectively. It has been observed that all the fertility and mortality indicators are higher for those living in rural areas than those living in urban areas.

The total fertility rate (TFR) for India is found to be 4.1 (3.0 in 1999 *ESCAP*) and a comparison of TFRs for 1984 and 1987 indicates decline in all the states. The states of Bihar, Haryana, Madhya Pradesh, Rajasthan have values exceeding All India, whereas Uttar Pradesh has the highest value (5.5). On other extreme, Kerala has the lowest TFR (2.2). The total fertility rate has been examined with socio-economic variables like ethnic groups (Scheduled Castes/Scheduled Tribes), religion of the mother, annual income of the household and level of edu-

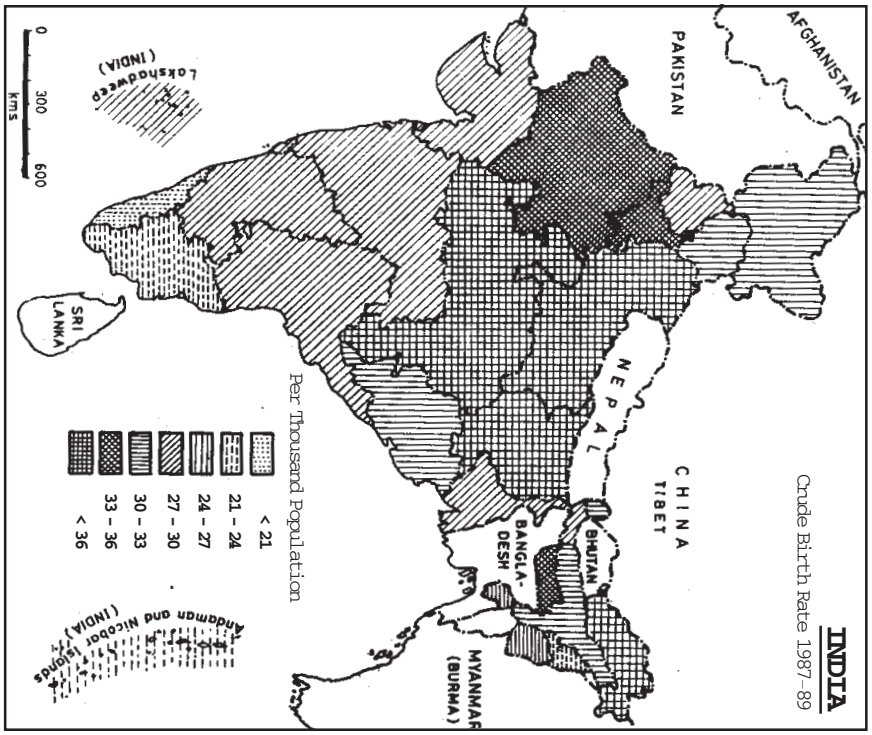

Fig. 6. India-Crude Birth Rate (1987-89) Per Thousand Population

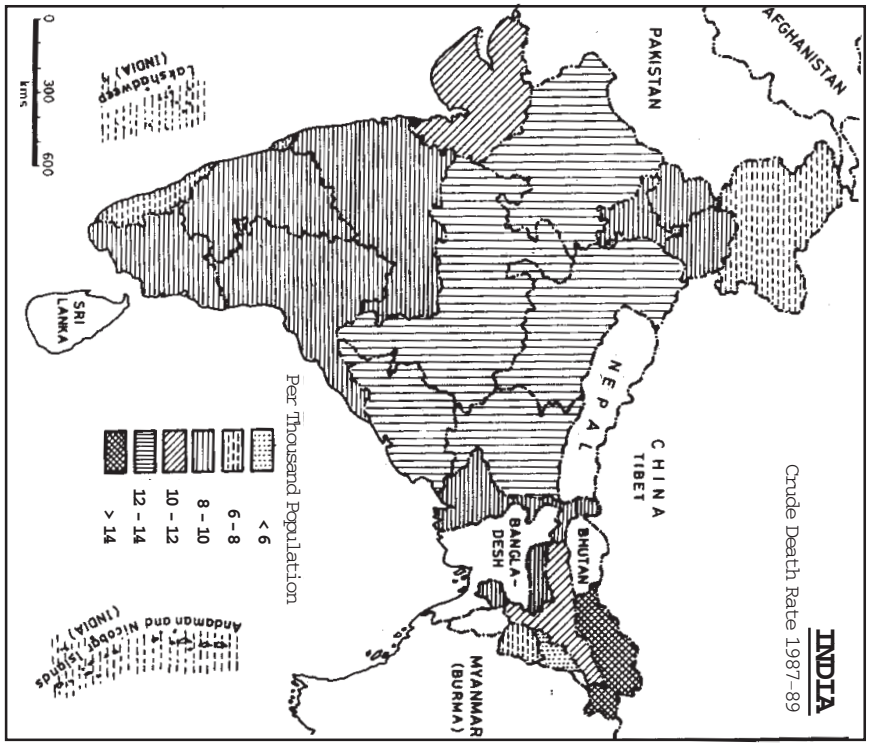

Fig. 7. India-Crude Death Rate (1987-1989) Per Thousand Population

Table 10: Expectation of life at birth by residence and Major States of India, 1970-75, 1976-80 and 1981-85

S. No.	Political division of India	1970-1975		1976-80		1981-85					
		Combined		Combined		Rural		Urban		Combined	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
I. NORTH INDIA											
A. Western Himalaya (S. No. 1, 2)											
1.	Jammu and Kashmir	56.9	55.2	58.1	55.2	59.0	59.9	63.3	61.9	60.2	60.7
2.	Himachal Pradesh	54.8	50.9	58.1	54.9	58.0	62.6	67.5	60.0	58.5	62.9
3.	Punjab	59.0	56.8	60.9	60.2	61.3	62.3	67.8	68.3	62.6	63.6
4.	Chandigarh UT										
5.	Haryana	59.0	55.6	56.7	52.5	60.3	57.3	66.1	65.9	61.5	59.0
6.	Delhi UT										
B.	*Central Himalaya (S. No. 7, Eight Districts of Uttar Pradesh)*										
7.	Uttar Pradesh	45.4	40.5	48.5	43.8	50.2	46.9	58.3	57.6	51.4	48.5
8.	Rajasthan	49.2	47.5	51.0	53.0	52.0	52.1	60.0	62.6	53.3	53.8
II. WEST INDIA											
9.	Gujarat	48.8	48.8	51.6	53.2	53.8	57.9	59.3	62.1	55.5	59.3
10.	Maharashtra	53.3	54.5	55.6	57.1	58.5	59.7	62.0	66.4	59.6	62.1
11.	Goa, Daman and Diu UT										
12.	Dadra and Nagar Haveli UT										
III. EAST INDIA											
C. Eastern Himalaya (S. No. 13 to 20 and Darjeeling District of West Bengal)											
13.	Arunachal Pradesh										
14.	Assam	46.2	44.8	51.6	50.4	51.5	51.0	59.4	61.2	52.0	51.9
15.	Nagaland										
16.	Manipur										
17.	Mizoram										
18.	Tripura										
19.	Meghalaya										
20.	Sikkim										
21.	West Bengal					54.7	55.7	64.0	66.2	56.9	58.0
22.	Bihar					53.6	50.7	61.3	60.7	54.2	51.5
23.	Orissa	46.0	45.3	50.0	48.4	52.4	52.4	58.8	60.5	53.1	53.0
IV. CENTRAL INDIA											
24.	Madhya Pradesh	47.6	46.3	49.4	48.7	50.0	50.2	59.4	61.4	51.5	51.9
V. SOUTH INDIA											
25.	Karnataka	55.4	55.1	56.2	56.6	57.5	60.0	65.4	69.1	59.7	62.0
26.	Andhra Pradesh	48.4	49.3	52.2	54.2	56.1	58.3	61.5	66.3	57.2	59.8
27.	Tamil Nadu	49.6	49.5	53.5	53.4	54.5	54.7	61.2	64.1	56.5	57.4
28.	Kerala	60.8	63.3	63.5	67.6	65.5	71.7	65.0	70.3	65.4	71.5
29.	Pondicherry UT										
VI. ISLANDS											
30.	Lakshadweep UT										
31.	Andaman and Nicobar Islands UT										
INDIA (TOTAL)		50.5	49.0	52.5		52.1	54.0	53.6	61.6	64.1	55.4

cation of women. It has been observed that education of the mother and annual income of the household have direct relationship with pattern of child bearing. In the ethnic groups, TFR is higher among Scheduled Castes and Scheduled Tribes as compared to others, whereas in the religious groups more TFR is observed among Muslims.

The statewise average infant mortality rates during the 1976, 1981 and 1989 among states are found to be lower in 1989 than those of the years 1976 and 1981. The infant mortality rate for India for 1987 is 91 per thousand live births (71 in 1997-*SRS* Bulletin Oct. 1998 and 70 in 1999 *(ESCAP*). The rural rate (98 and in 1997 it is 77, *SRS* Bulletin Oct. 1998) is higher than the urban rate (58 and in 1997 it is 45, *SRS* Bulletin Oct. 1998). Among the major states, the lowest rate is recorded for Kerala (21). The highest rate is recorded for Orissa (121 and in 1997 it is 96) followed by Uttar Pradesh (118 in 1997 it is 85) and Madhya Pradesh (117 and in 1987 it is 96).

Some socio-economic factors have been considered to study their influence on infant mortality rate and death rate. It has been observed

that with the increase in level of education of women and income of the household, there is apparently a reduction in mortality rate. On the basis of status of women (workers/non-workers), it is reported that infant mortality is higher among workers than among non-workers in both rural and urban areas (Survey of Infant and Child Mortality 1979, Office of the Registrar General, India, 1983), whereas in the death rate, it is higher in non-workers than workers (Mortality Differentials in India 1984, Office of the Registrar General, India, 1989).

Previous analyses, drawing primarily on European demographic history, concluded that levels of fertility depend primarily on levels of economic development and of levels of mortality. Demographic transition theory states that a fertility decline follows a mortality decline with a lag, particularly when the mortality decline is linked to economic development and the spread of "western" ideas on consumerism and the positive benefits of small families. Thus for, the literature has had little to say on whether fertility declines can also be achieved without development (or without westernization). An implication of the demographic transition model is that such fertility declines are unlikely. Recently, however, some developing countries, relatively unaffected by "westernization" and with low levels of development have experienced sharp drops in their crude birth rates, causing fertility analysts to rethink their positions on the validity of demographic transition theory when applied in "non-western" context.

HEALTH

"Health" in the broad sense is "quality of life" rather than only the absence of disease, it is a universal goal even if cultural variations encrust in the way it is defined and achieved. The health situation is often reduced to the extent of registered disease and available health resources. Such elements as the death rates, man power in the field of health, incidence of a particular disease etc., are presented which leads to a narrow and sometimes misleading interpretation of the causal variables. Health situation is a complex dynamic equilibrium which stems from the entire socio-economic condition. Health is not a component but is an expression of development; so that the health of a community at a given moment is the very situation of the whole social system seen from a health view point, in which health is defined as a combination of physiological development associated with reduced mortality-morbidity trends, and the capacity of both mentally and physically creative work.

In the living context, the surrounding systems—the environment and structures and services are important. Under the environment, the following cluster of inter-related concerns has a direct bearing on level of living: Physical environment; population growth; urban expansion; water supply; sanitation and shelter; and social environment, structures and services permit or prevent a change for the better. The structures and services do not work independently but influence one another, creating a balance bias for or against the poor and the weak. These instruments of change are not value-neutral and, in a skewed socio-economic situation, their effect on development trends will be consequence of policies and strategies. Sturctures and services are part of the living content and critically affect the lives of people.

Resource endowment of the "environment" affects the health status of the community. The relationships are extremely complex and may work through long causal chains, which are not immediately apparent. For instance, soil degradation may lead to a scarcity of fuelwood or safe water and thus compel a mother to spend several hours a day away from home, putting the small toddlers in the custody of older siblings. The repercussions in terms of morbidity, infant mortality or just sensorial retardation may never be singled out. In addition, greater maternal fatigue, superimposed on already low calorie-intake may lead to a low weight at birth of progeny and thereby to increased infant mortality.

In India 30 to 50 per cent of the total energy used comes from traditional sources. Wood and charcoal are preferred because they give more heat and a higher temperature for a given weight. It has been estimated that in India in 1973-74, the per capita consumption of wood and charcoal for all energy purposes was 151.2 kg, of other solid fuels it was 4.9 kg for coke and 25.2 kg for dung (Desai, 1980). The conditional use of wood for fuel has led to the degradation of forests, and the smoke is endangering the health of people.

The physical environment of a population is not just a provider of natural resources, but also a source of constraints to a population. It first affects the individual by influencing growth, sexual maturity, fecundity, then influences fer-

tility and mortality and thereby the population as a whole. Sex and spatial distribution of a population is a result of climate, rainfall, altitude, terrain and the carrying capacity of land. The stability between a population and the physical environment is reached after a prolonged exposure of a population to a particular environment and the stresses therein.

Safe water and sanitation are two basic components of hygiene which have a strong cultural determination and key influence on people's health, perhaps comparable only to food. 74 per cent of India's urban area is served by piped water to households and only 31 per cent of the rural area has easy access to safe water. While in case of sanitation, 47 per cent of urban area is served with installed sanitation facilities and only 2 per cent of rural area has any access to such facilities.

Despite the over-all resource constraints, the success of the water supply programme largely depends on public acceptance and appropriate utilisation of the new facilities. For instance, the evaluation of the UNICEF/WHO, assisted Rural Water Supply Programme in India in 1976, noted that spot studies showed nearly 70 per cent of the pumps as not functioning at any given time. There is necessity to design and introduce a water supply and sanitation technology suited to local conditions which the villagers themselves can operate and maintain without external assistance. This technology must be cheap enough so that village communities can afford to buy it if they cannot build it themselves.

The correlation between "educational level" and health status is now widely recognised. Health and education are inter-related. A child's ability to take full advantage of schooling provided to him depends on his health, and later on, his ability to apply the knowledge and skills he has acquired depends on his mental and physical fitness.

Perhaps the most important factor in determining the health status of a population is food intake. Although affected by cultural patterns, seasonal variation, dietary knowledge of the mother or house-hold food-procurer, the intake is chiefly determined by food availability at household level. In turn, food availability is a function of food production, price mechanism and purchasing power, that is, wages.

Health is the outcome of a complex set of socio-cultural and economic, as well as physical, or biological factors. Health is realised in the context of overall development and specifically of a pattern of development which will give high priority to social goals in addition to economic ones. The health of a community depends on the health care system and related aspects. The role of pharmaceuticals in the delivery of health care is essential. Primary health care for the rural communities has gained momentum in recent years. Steps have been intitiated for implementation of primary health care. While medical practitioners and organizers have the main responsibility of promoting, administering and evaluating the delivery system, yet economic, social, political, cultural and moral dimensions of rural life cannot be ignored. The involvement of other disciplines for the success of primary health care programmes is also essential. One must take cognizance of the dual aspects of the problem and the multifarious responsibilities involved in the realisation of one's goal.

The problem of health care has been tackled by two approaches—firstly, health care is seen as dependent on and derived from the wider social system and consequently, the problem of maintaining and improving the health of the members of a community is formulated as a problem of continuously restructuring the social system in a manner that is conducive to the needs of maintenance and improvement of health. In the second approach, attention is mainly focussed on the system of health care as an autonomous agency operating directly and exogenously on the health front. Ideally, it should have been an integrated approach, but in India the policy makers are concentrating on the second type of approach while almost neglecting the first one. Sometimes, a few socio-economic criteria are taken into account when there are some operational difficulties. No pragmatic approach is forthcoming.

According to a WHO definition "Health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity". No generally accepted classification of health indicators exists. The two most widely used measures, life expectancy at birth and the infant mortality rate, are not perfect. In fact, no such thing as a perfect health status indicator exists. Much of the criticism against the use of mortality (survival) measures is exaggerated and/or misguided. For instance, mortality data are frequently criticised because of their alleged insensitivity to the efforts of the health care system. From the various existing

health indicators mortality and survival (demographic structure), growth and development and morbidity and disability, mortality statistics still retain their central place in the evaluation of a health programme. "With respect to health indicators, problems arise, among other things, from the awareness that health is the continuum between death and complete health and also that health tends to become more and more a matter of social perception and behavioural patterns" (Hansluwka, 1987). For comparisons among countries and the study of changes over time, mortality statistics simply cannot be replaced.

Health is difficult to measure, studies have been carried out by taking the 'Physical Quality of Life Index' (PQLI). The index attempts to assess the development and well being in a population. Three variables—the literacy rate, the infant mortality rate and the life expectancy at birth—have been fused into a composite index, with a range of assigned values from zero to one hundred. The PQLI was estimated 95 for the USA, 82 for Sri Lanka and 40 for India for 1975. The male-female PQLI differential is significant. In all states in India PQLI is higher for males than females (UNICEF, 1980).

Health of a person or a community is a function of several factors. In India relevant host factors include genetic constitution of individuals, their nutritional status, resistance to infections, and culturally determined health practices. Exposure to disease producing organism deficiency of certain micronutrients (such as iron, vitamin A, calcium and iodine) as well as the inadequate intake of calories and proteins, remain important reasons for ill health. Environmental factors continue to be the most important barrier in delivering better health. It is estimated that less than 50 per cent of the rural population has access to potable water and less than one per cent have basic sanitation facilities.

A sensitive index of a community's health status is provided by the chances of survival and growth of its most vulnerable segment, the young children below five years of age. An analysis of the health and nutrition situation of children and women leads to the following broad inference on what happen's to every 100 children born: *one* of them is likely to die before or at birth, some times along with the mother. Another *one* does not live to complete the first year. A further 6-7 die between one and five years. Of the remaining 92, some 60 to 70 survive against odds, their growth is sporadic, their development subdued. Only some 15-20 progress to anywhere close to their full potential. In addressing this situation, the primary health care approach is of direct relevance. Disease incidence and the health facilities available are reviewed below.

During infancy and childhood the major diseases, ranked by the extent of estimated mortality, are diarrhoea (acute, chronic), and dysentery of some 20 etiologies (1.5 million child deaths a year), acute respiratory diseases, mostly bacterial and viral pneumonias (0.6 million), measles (0.5 million) and tetanus (0.4 million), followed by infectious fevers such as malaria, typhoid and hepatitis. In the majority of fatal cases the common underlying factor is malnutrition.

Diarrhoea is the single largest killer and as many as two thirds of the deaths are probably due to dehydration and underlying malnutrition. The child under five years of age suffer three episodes of diarrhoea in a year on an average, 10 per cent develop dehydration and one per cent require to be admitted in a hospital. During the monsoon, the incidence of diarrhoea increases further, before it declines during winter in most parts of the country except in the hilly north-eastern region.

Studies show that safe drinking water helps to prevent diarrhoea, but only when the water supply is supported by health education, leading to behaviour changes like washing hands and covering the containers. During the last five years, the proportion of dehydration in paediatric has fallen from 35-40 per cent to much lower levels as a result of effective management of diarrhoea at home and in the outpatient departments. Oral rehydration therapy is accepted in health policy as the right response to dehydration on account of diarrhoea.

Under acute respiratory infection pneumonia contributes about a fifth of the mortality in children under five years of age. The case fatality rates in hospitals is around 10 per cent. Morbidity on this account is extensive, children suffering 3 to 5 episodes a year, each lasting 7 to 14 days. Acute respiratory infection accounts for 30 to 60 per cent of out-patient hospital visits and 20 to 40 per cent of pediatric admissions. Some 20 to 30 per cent of all children suffer from pneumonia each year. In India up to 60 per cent of pneumonia is caused by bacteria (unlike in Europe and North America where

pneumonia is caused mainly by virus).

Among the vaccine preventable diseases like poliomyelitis and tuberculosis seem to result more in debility and disability than in death. Tetanus and measles contribute significantly to infant and child deaths.

The health situation among the children in India is unsatisfactory and has to be viewed against the background of their socio-economic status. The child health situation in India is both a consequence and cause of their less developed state. The rate of infant and child mortality is high. Yet the child population constitutes the growing bulk of India's population. These conditions call for the diversion of increasing attention and resources to deal with the problem of child health. Here children die of diseases usually not considered lethal elsewhere. Diarrhoea, complicated, brought on by malnutrition, causes about a third of all child and infant deaths. Pneumonia vies with diarrhoeal diseases as the leading taker of young lives. Measles, one of the most infectious diseases known, makes children more susceptible to pneumonia, though it is preventable by vaccination. Tetanus, whooping cough, diptheria, and tuberculosis, also preventable by vaccinations, continue to take a heavy toll.

Low death rates have been achieved in parts of India, where Primary Health care procedures—midwifery, maternal education on breast feeding and weaning, vaccinations, oral rehydration of victims of diarrhoea, and antibiotics against respiratory infection— have been implemented.

Parents in areas with high infant mortality rates typically produce more children than they desire because they want to ensure the survival of a minimum number as observed among cultivators. Subjected to repeated pregnancies these women suffer from an almost continuous nutritional drain which exposes both mother and child to high mortality risks that shows a definite increase from one pregnancy to the next. The pressure of the population growth is felt more by the large families at low incomes. It has been shown by various studies that the larger the family size, the greater is the occurrence of common illnesses in the family. The health of the family is affected by nutritional deficiencies. The health of a mother in a large family with limited income is affected by the low nutritional level and also by the physical and material pressures associated with child-bearing and child rearing. The larger families moreover find it difficult to provide adequate medical facilities which result in the neglect of their members. Their ailments are noted only when they become serious. Women and children usually lack the most basic advantages. A United Nations' survey showed that pregnant or lactating women throughout the Third World consume an average of only 1750 calories per day, at least one third fewer than the recommended and one third fewer than men (Whitehead, 1983).

If the child survives birth, it faces dangerous years. The major threat includes malnutrition due to poor weaning practices, diarrhoeal infection from contaminated water and infectious diseases that prosper in malnourished children. Repeated episodes of diarrhoea which are common where clean drinking water is unavailable, lead to further malnutrition, infection and even death. Dehydration followed by advanced diarrhoea, is also a high risk factor.

During the last century in the United States and Great Britain, cholera and diarrhoea rates dropped sharply, mainly because of improvements in sanitary conditions. Studies in California and Kentucky have shown that compared to disease rates for children with both indoor water and toilets, diarrhoea occurred twice as often in children who had outside toilets, and four times as often in children who had neither. In twenty American cities, the average reduction in typhoid fever following installation of water filtration was 65 per cent (Rosenberg, 1962). A Chilean study concluded that, "The availability of drinking water supply.....cut the incidence of acute diarrhoea by about 74 per cent" (Department of Rural Water Supply, National Sanitary Work, Chile). The World Bank's privy construction in Costa Rica helped cut the death rate to half for diarrhoea and related diseases between 1941 and 1954.

In India high costs and cultural barriers have blocked sanitation development. Villagers want water, but convenience is more important than quality. Food, housing and fuel take precedence over water purity, and toilets are seen as a luxury, not a necessity (Chauhan, 1983). It is estimated that about 30 per cent of the rural population have access to potable water and 0.5 per cent basic santiation facilities in India. The majority of the people are ignorant about the causation and prevention of disease being demonistic or deistic in outlook on health matters. People do not relate diseases to water supply and waste disposal.

Most of India's health problems are related

to insanitary conditions and lack of education, they are preventable by public health measures. In India greater importance is given to curative measures instead of preventive ones.

Women and Health

Motherhood for the majority of poor Indian women has always been a period fraught with difficulties, given the low nutritional and health status and harsh living conditions. While women are being helped by improvements in health care, but factors like urban growth and congestion, increasing number of nuclear families, population increase and environmental degradation are not making life easier for them.

An Indian woman, on an average, has 6-7 pregnancies, resulting in 5-6 live births, of which 4-5 survive. She is estimated to spend the greater part of her reproductive years in pregnancy and lactation. Social scientists have felt that in all spheres of life women are discriminated against and their accessibility to various welfare services such as education, health and employment etc. is far less than their male counterparts. The situation is still worse in rural areas. Mortality and morbidity are perhaps much higher among females resulting in a continuous decline in the sex ratio. The discrimination against women starts right from her birth and continues till her last breath. Differences between the sexes frequently emerge in consideration of health and nutritional status. Infant mortality rates were 131 and 120, respectively for females and males in 1978 with a greater disproportion in rural areas (Office of Registrar General, 1980). In Northern India, the higher value placed on male infants is reflected in their higher overall rates during infancy and early childhood. Sons increase the family's status and wealth and are considered the mainstay of parent's old age. Though female infanticide has technically disappeared in the country, a large number of female deaths occur during the pre-school years due to neglect of female children (Miller, 1981).

Another demographic indicator of women's health status is the maternal mortality rate. At around 500 per 1,00,000 live births, the Indian rate is about 50 times that of a developed country. Besides anemia or general malnutrition, the commonest causes of maternal deaths are poor obstetric care of post-partum infections—a manifestation of inadequate services available to women in the antinatal, intra-natal and postnatal periods.

Nutrition and Health

Population growth, food supply, health, mortality and nutrition are closely related with each other. Population growth increases demand for basic needs of food and shelter. If the demand is met there may not be any effect on people's health and nutrition: otherwise it will affect health, nutrition and the mortality level of the community. Rapid increase in population, thereby decreasing total size of arable land and the cumulative effect of the deterioration of economic conditions of farmers, poses a serious threat.

The food that we eat is assimilated in the body and is used for the growth and good health. For sustaining healthy and vigorous life, diets should be planned with the knowledge of various nutritional constituents that are present in foodstuffs and their requirements for persons belonging to different age and sex groups. The formulation of nutrient requirements of Indians was being mainly based on the work carried out in other countries. In 1958, the Nutrition Advisory Committee of the Indian Council of Medical Research, revised the calories and protein requirements on the basis of the data collected by National Institute of Nutrition, Hyderabad. Further, in the light of more research work, recommendations with regard to requirement of several other nutrients were made by the Nutrition Advisory Committee in 1968 and daily allowances of nutrients for various segments of Indians were drawn up.

Socio-economically, Indian society is heterogeneous. There is a small segment of the affluent population participating in high tech, consumerism with a throwaway attitude. There is a very large segment of the population suffering at the subsistence level that is destitution and low-earning.

About 29 per cent population of India is below the poverty line (32.66 per cent rural) which was estimated by using the All-India poverty line of Rs. 49 per capita per month in 1973-74 prices corresponding to minimum daily calorie requirement of 2400 per person in rural areas and the poverty line of Rs. 56.64 per month corresponding to daily calorie requirement of 2100 in urban areas (National Sample Survey). The highest percentage of population below poverty line is from Bihar (40.74) followed by Orissa (37.90), Madhya Pradesh (36.45), Uttar Pradesh (33.00), Tamil Nadu (32.80), Karnataka (31.98), Andhra Pradesh (31.62), West Bengal (30.25)

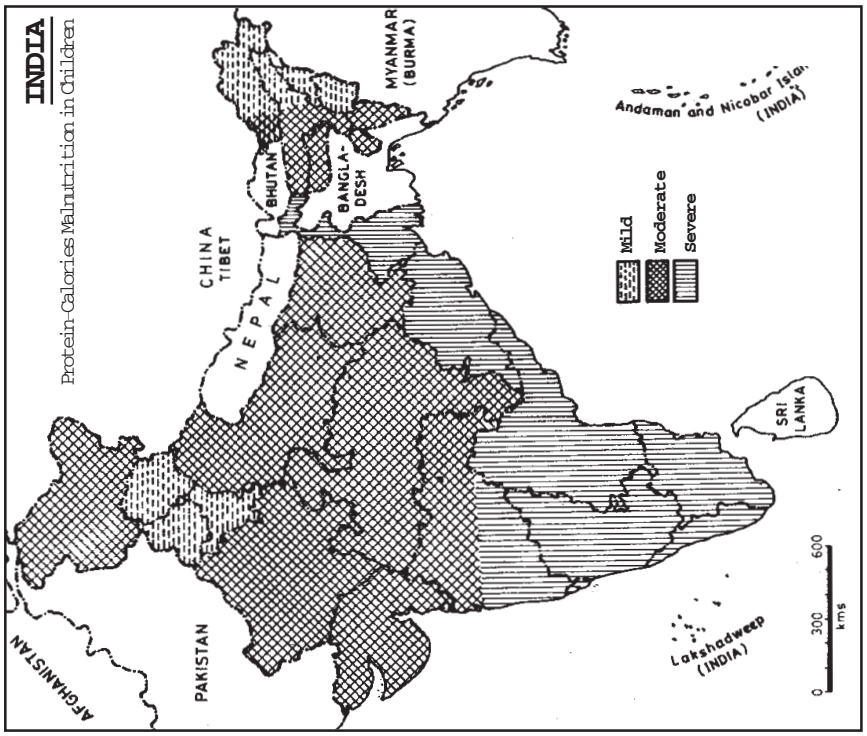

Fig. 9. India-Protein-Calories Malnutrition in Children

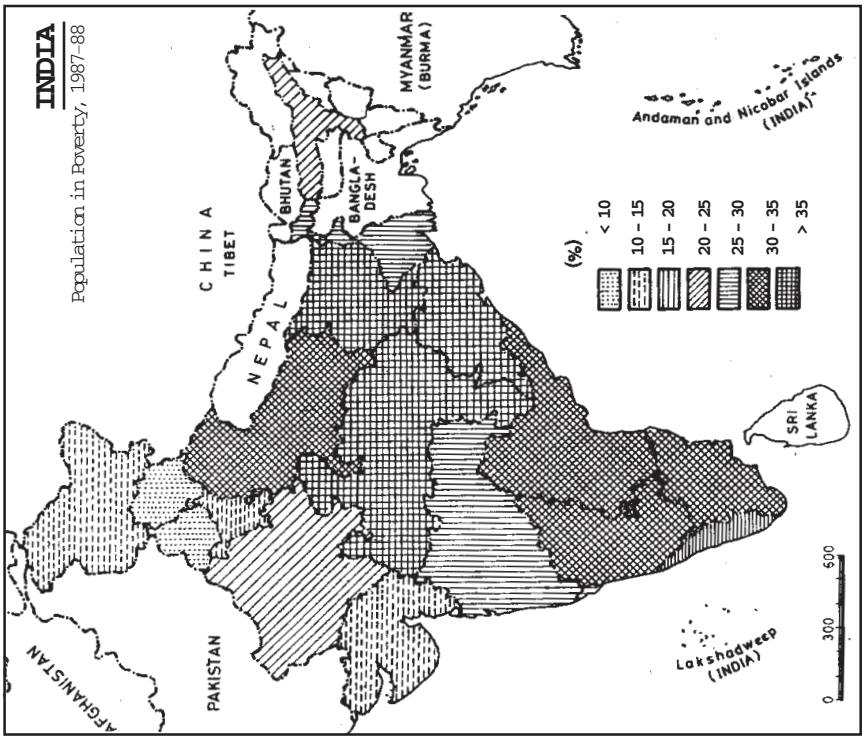

Fig. 8. India-Population in Poverty, 1987-88 (in per cent)

and lowest frequency is observed from Punjab (7.02), Himachal Pradesh (9.12) (Fig. 8).

Malnutrition* emerges as one of the important disabilities inherent in the culture of poverty. It has an adverse effect on physical growth, capacity to use intellectual endowment, emotional unfolding and personality development. Survivors of malnutrition start with a developmental path characterized by defective psychological functioning, scholastic backwardness and subsequent maladaptive behaviour. The resultant chain of events is a spiral effect.

A malnourished body is the victim of a number of deficiency diseases. Protein deficiency leads to Kwashiorkor, retarded growth of the body, apathy and anorexia, edema, skin lesions, acterations in skin, hair pigmentation, fatty liver and diarrhoea. Deficiency of proteins, iron, folic acid and vitamin B12 gives rise to anemia which is most common among children and expectant and nourishing mothers. Vitamin A deficiency produces night blindness and xerophthalmia and dermatosis. There are many other diseases associated with deficiencies of nutrients in human food. Beriberi, pellagra, scurvey, rickets, goitre, etc., are a few of them.

Malnutrition itself is an all-pervading disability and constitutes an important back-drop to tropical health. When it impinges at vulnerable points in the life cycle of an individual, its effect can be serious and far reaching. Even during intra-uterine life, in the unborn state as it were, maternal malnutrition can adversely affect the health of the embryo and the ultimate outcome of pregnancy. From the moment the child is born up to the school going age, again malnutrition impairs seriously growth and development and ability to cope with environmental hazards such as infections and infestations. Severe malnutrition in the early stages of infancy and childhood can produce long lasting results on the learning abilities of the individual. By its effect on body defences, malnutrition makes the individual susceptible to a variety of environmental hazards.

The National Insititue of Nutrition of the Indian Council of Medical Research (Gopalan and Vijaya Raghavan) in 1971 reported the geographic distribution of protein-calories malnutrition in children, which was categorized into mild, moderate and severe degrees (Fig. 9) in which also a similar pattern is observed as reported above *i.e.,* the severe degrees of protein-calorie malnutition in South India, part of Maharashtra, Orissa and West Bengal (*i.e.*, along the rice-eating belt of the country).

Undernutrition results in loss of weight and such disturbances as low basal metabolic rate; slow pulse; lowered blood pressure; suppression of menses in women; dry, coarse, cold skin; blood shot eyes; insomnia and fractures from osteoporotic changes in the bones. Nutritional edema, burning sensations in the feet and hands and a sore mouth with increased salivation are common symptoms in chronic starvation.

Most of the people who are at a disadvantage due to nutritional handicaps are found in developing countries. India is no exception, Nutrition or rather lack of good food is the cause of a number of physical impairments like visual impairment particularly blindness arising out of vitamin A deficiency. Different types of deformities also arise due to nutritional causes for example lathyrism—a preventable paralysis due to eating a toxic legume (Khesri dhal - *Lathyrus sativus* is endemic in Central India, Fig. 10); fluorosis—a crippling disease due to toxic nature of drinking water itself is endemic in parts of Andhra Pradesh and Punjab (Fig. 10), deficiency of iodine (Fig. 11) causing endemic goitre along the sub-Himalayan belt (Fig. 10). Malnutrition in its entirety is also the cause for less perceivable disabilities. Growth retardation due to marginal malnutrition affects work capacity and mental efficiency. Thus, malnutrition coupled with a stress filled environment can place the population at a disadvantage.

Growth is a complex phenomenon. By definition it means 'progressive development of a living being or part of an organism from its earliest stage to maturity, including the attendant increases in size.' The control of body size is certainly a complicated affair. Both genetic and envi-ronmental factors influence growth and the progress of any given child is the result of many different factors. Among the environmental factors, nutrition is the single most important determinant. In fact the growth status of chil-

*Malnutrition is poor nourishment of the body resulting from an inappropriate (usually deficient) supply of essential nutrients. Undernourished individuals get too few calories to maintain normal body weight and normal activity. Malnourished persons, on the other hand, may get enough calories, but wrong proportions in the quantities of nutrients such as building and regulative foods. Undernourished people are malnourished also, but the reverse is not necessarily true. Malnutrition is by no means confined to undernourished regions of the world, but it is prevalent also in regions where there are seasonal variations of food supplies. Poverty and ignorance of the basic principles of nutrition are major causes of malnutrition (UNESCO, 1975).

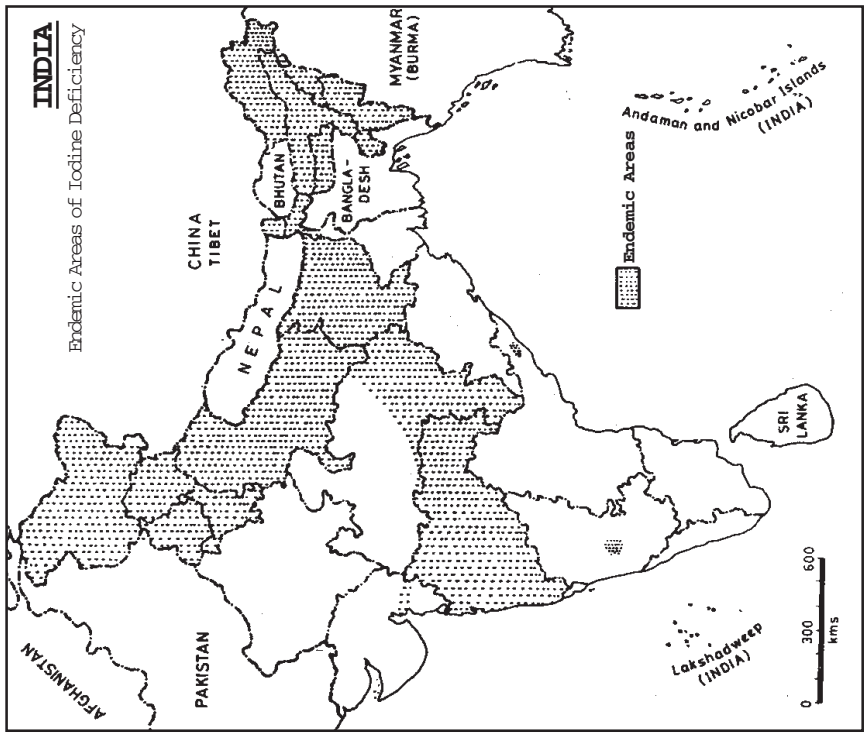

Fig. 11. India-Endemic Areas of Iodine Deficiency

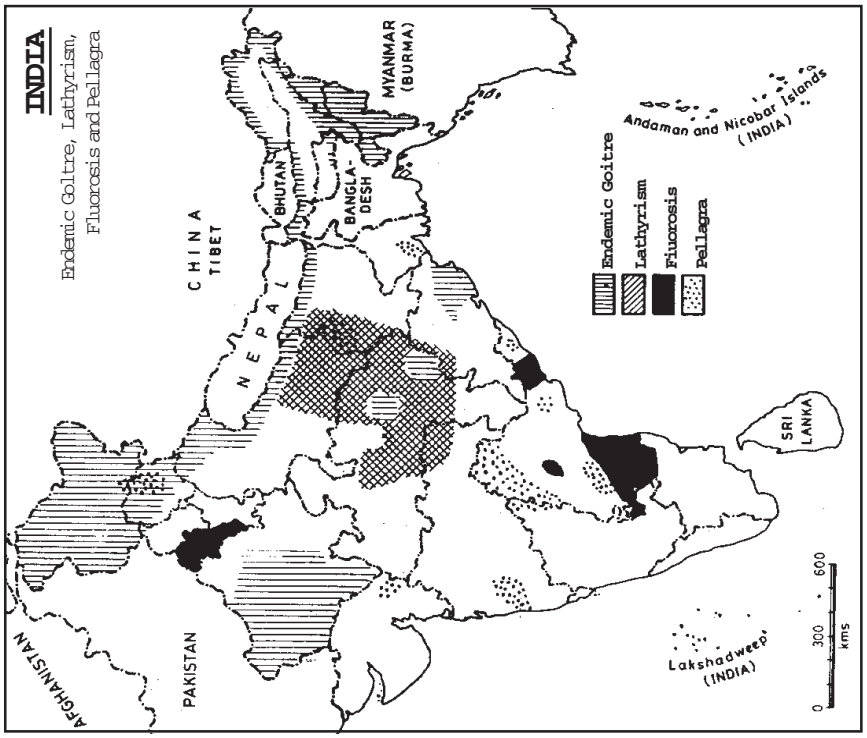

Fig. 10. India-Endemic Goitre, Lathyrism, Fluorosis and Pellagra

dren is generally accepted as a good index of the nutritional status of a community. Growth tangible alterations both during undernutrition and after nutritional rehabilitation have been studied. The lag in the growth rate of poor Indian children is mostly due to insufficiency of calories resulting from delayed and poor weaning practices. With weaning, diarrhoeal disease and impending malnutrition usually follow. Protein energy malnutrition, one of the most important nutritional disorders affecting children in India, is widely prevalent in pre-school children (1-5 years of age) belonging to poorer sections of the community. In addition these children suffer from vitamin A deficiency, anaemia and B-complex deficiency. In children with severe weight deficit, functional status as ability to fight infections can be affected. Lowered stature can also lower work capacity. All these are disabilities arising from lack of proper nutrition, coupled with a stress filled environment. The major bottleneck in the diet of Indian preschool children is calories and not protein as was hitherto believed. Thus the growth of undernourished children can be improved by a food supplement which provides adequate calories and marginally more protein. The low heights and weights in a great majority of Indian school children are due to inadequate or suboptimal nutrition. As a consequence of unfavourable circumstances (mainly undernutrition and frequent infections throughout childhood) the Indian child remains stunted in growth even when he or she reaches adulthood. Indian adults of poorer income groups are very much shorter and lighter than their Western counterparts. Various studies indicate that work capacity and workout of under weight adult is considerably lower than that of normal adults. In addition those with low body weights have been shown to have higher heart rates from given work load. It is now recognised that environmental factors are stronger determinants and nutrition is the single most important determinant. However, the differences of about 3 to 4 cm between well-to-do Indian and Western adult could still be attributable to genetic factors, particularly during adolescence. While on the average a rural Indian adult is about 160 cm tall, a well-to-do Indian measures 172 cm (after National Institute of Nutrition, Indian Council of Medical Research, 1981).

There is an interaction between malnutrition and the various confounding environmental factors which influence mental development. In 1981 from India, about 83 per cent reported cases of patients of mental disorders treated in specialized mental hospitals are classified due to psychoses conditions (*see* Fig. 12). Some common diseases like mental disorders, skin disorders, anaemia, blindness, beriberi, pellagra, scurvy, rickets, eye abnormalities etc. are due to deficiency of nutrients like the magnitude of disabilities of the human mind resulting from various mental illnesses and emotional disturbances may be related to a relative insufficiency of one or more crucial nutrients like vitamins or minerals, coupled with a poor environment. The mental disorders may be due to *B-complex vitamin deficiency* (producing mental and neurological symptoms), *riboflavin* deficiency (significant elevation on personality measures of hypochondriasis, depression, psychopathy, hysteria, hypomania and the like), *thiamine* deficiency (unsteadiness of gait with involvement of peripheral nerves), *niacin or nicotinic acid* (insufficient dietary supply of niacin or an amino acid, tryptophan) can cause pellagra. Endemic pellagra has been associated with maize consumption because of low availability of niacin, and whereas high leucine content present in *jowar* is known to influence the metabolism of niacin and thereby cause pellagra, though reported from many parts of India is peculiar to Deccan plateau where *jowar* forms the staple diet (Fig. 10), *folic acid* (disorders in folic acid metabolism can produce mental illness among infants with inborn errors of folate metabolism, as shown by abnormally high folate activity in the serum, exhibit congenital deficiencies and mental retardation), *Vitamin deficiency* (mental symptoms such as subacute combined degeneration of the spinal cord), *ascorbic acid or vitamin C* deficiency (scurvy - a nutritional disability), *iron* (anaemia and mental and behavioural disabilities), *minerals* (sodium, potassium, magnesium, calcium, zinc, manganese, copper, deficiencies can lead to mental disorders and not normal prenatal and postnatal development).

Health Problems in India

The health problems in India can be grouped into following main categories:

(a) a high rate of infectious and water borne diseases;
(b) poor environmental sanitation, hygiene and communicable diseases;
(c) unsatisfactory nutritional status (malnutrition and undernourishment);

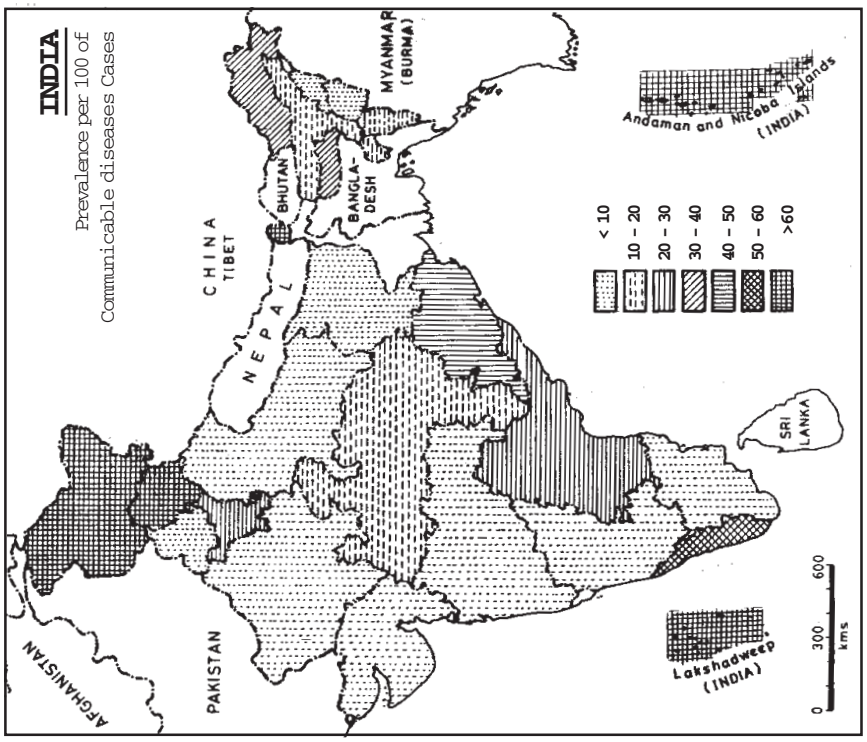

Fig. 13. India-Prevalence per 1000 of Communicable Diseases Cases

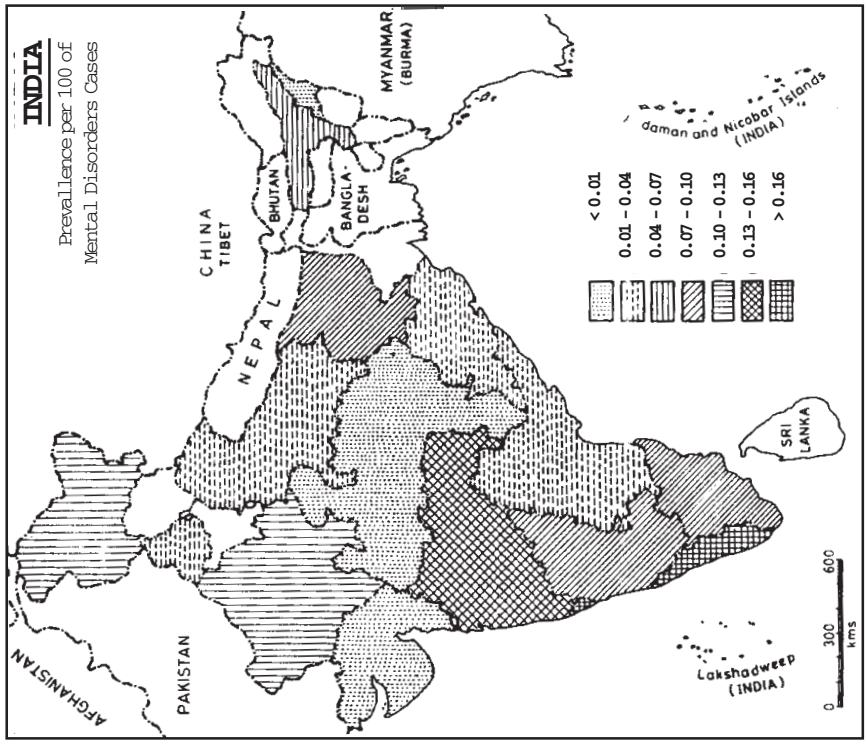

Fig. 12. India-Prevalence per 1000 of Mental Disorders Cases

(d) genetic diseases;
(e) ignorance about health; and
(f) an unsatisfactory health care delivery system.

General poverty, low family income, a high rate of illiteracy and various socio-cultural factors contribute to this type of health structure. Disorders prevalent within older age groups, namely, cardiovascular illness and malignant neoplasmic disease, dominate as causes of death at all stages.

Infectious diseases have played a significant role in altering the course of history (cultural change) in addition to bringing about genetic change in man. Infectious diseases have been grouped under the bacterial, viral, protozoal and worm infestation categories. Infectious diseases are caused by a wide variety of organisms. The major types involved are the viruses, rickettsiae bacteria, spirocheties, protozoans, fungi and parasitic worms. Transmission of pathogens and the resultant spread of infectious disease are by one or more of the mechanisms; by the air, entering the respiratory tract; direct contact; contaminated water and food; vectors (UNESCO, 1975).

Infectious diseases have been grouped under the following categories:

1. Bacterial—typhoid, whooping cough, tuberculosis, leprosy and syphilis;
2. Viral—Pox (small pox, chicken pox, measles);
3. Protozoal—Malaria, Kala-azar, Filaria, Dengue, Japanese encephalitis;
4. Worm infestation

The prevalence rate per 1000 is 12.28 for communicable diseases (Fig. 13), [chicken pox - 0.055 in 1981, diphtheria - 0.012 (Fig. 14), measles - 0.195 (Fig. 15), whooping cough - 0.181 (Fig. 16), poliomyelitis - 0.014 (Fig. 17), tetanus - 0.035 (Fig. 18), tuberculosis - 1.290 (Fig. 19), enteric fever - 0.399 (Fig. 20), encephalitis - 0.029 in 1981, influenza - 2.759 in 1981, acute respiratory infection - 9.158 (Fig. 21), pneumonia - 0.619 (Fig. 22), infection hepatitis - 0.202, in 1981, viral hepatitis - 0.167 (Fig. 23), dengue fever 0.007 in 1981, haemorrhagic fever - 0.006 in 1981, guinea worm - 0.028 in 1981, syphilis - 0.055 (Fig. 24), gonococcal infection - 0.138 (Fig. 25) rabies - 0.011 (Fig. 26) during the year 1989. The frequency of communicable discases is high in the Himalayan region and Islands.

Aids: Aids - Acquired Immune Deficiency Syndrome is a combination of infections and diseases caused by a general break down of the immune system in the person infected with HIV (Human Immunodeficiency Virus - it is a virus which invades the body slowly destroying the immune system). It is a sexually transmitted disease (STD) like gonorrhoea and syphilis. Since the first cases were diagnosed in the U.S. in 1981, Aids has swept North America, Europe, Africa and parts of Asia. The figures released by WHO on the occasion of world AIDS day (1st December 1992) show that 11 to 13 million men, women and children have been infected since the epidemic hit. There are no definite figures available from India, but whatever cases reported out of which 75-80 per cent of all HIV infection in India are acquired through sexual contact.

Dengue Fever: Epidemic during the rainy season, especially in urban areas, is reported in some 5000 cases per year and may occur in 10 times that number or more. The aedes mosquito breeds in and around houses in clean water. In recent years, there has been an increase in haemorrhagic fever and dengue shock syndrome associated with these outbreaks, particularly among children and it is expected that these could rise in coming years with the increase in mosquitoes and population densities.

Tuberculosis: It remains the single major communicable disease affecting adults, with more than 10 million persons suffering, a fourth of them openly infectious (Fig. 19). Some 500,000 persons die each year with a far fewer number effectively detected and treated in over 370 district tuberculosis centres, 300 urban clinics and specialised hospitals. While BCG protects from the most devastating forms of infantile tuberculosis (meningitis and disseminated tuberculosis), it does not appear to offer long-term protection against the adult form of disease, which occurs from adult to child in millions of households throughout the country today.

Viral Hepatitis : About 150,000 cases reported annually are due to at least three types of organisms: acute viral Hepatitis A, transmitted entrically like diarrhoeal disease form 30-70 per cent of jaundice cases in children. It is not usually fatal. Hepatitis B, the serum hepatitis transmitted at birth by blood and in adults by blood or second contact, is a far more infectious causing chronic and eventually fatal conditions, such as liver cancer. The disease is transmitted particularly from asymptomatic carrier and is found in 5 to 10 per cent of professional blood donors, as well as drug abusers, and patients in sexu-

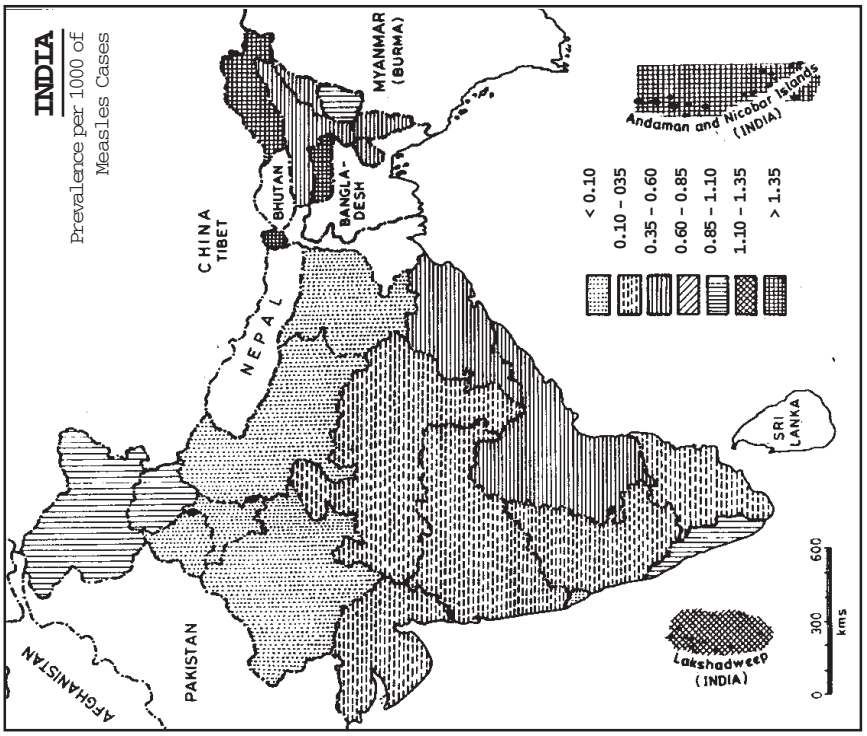

Fig. 15. India-Prevalence per 1000 of Measles Cases

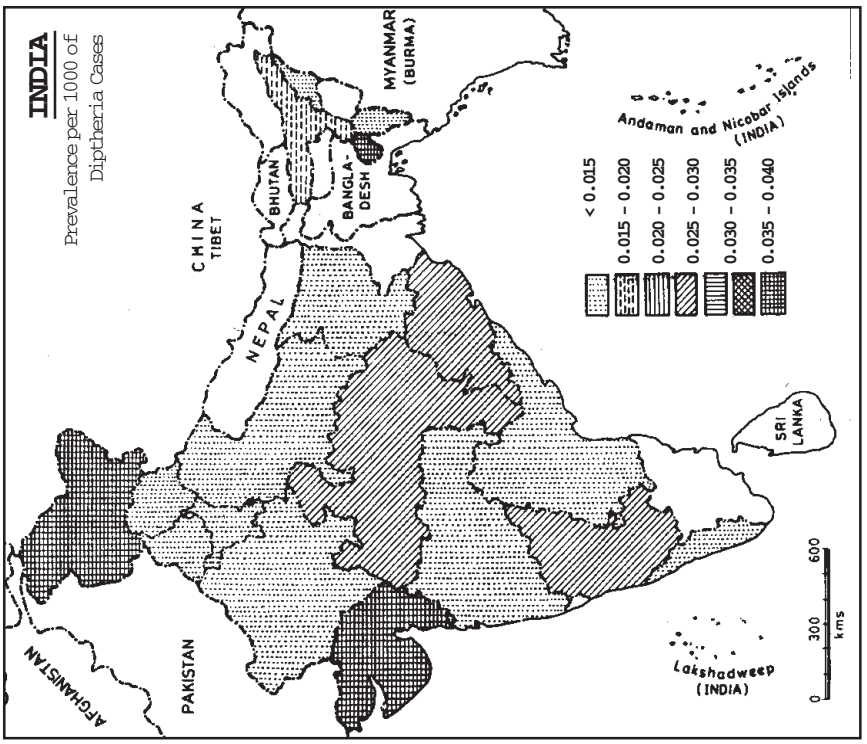

Fig. 14. India-Prevalence per 1000 of Diptheria Cases

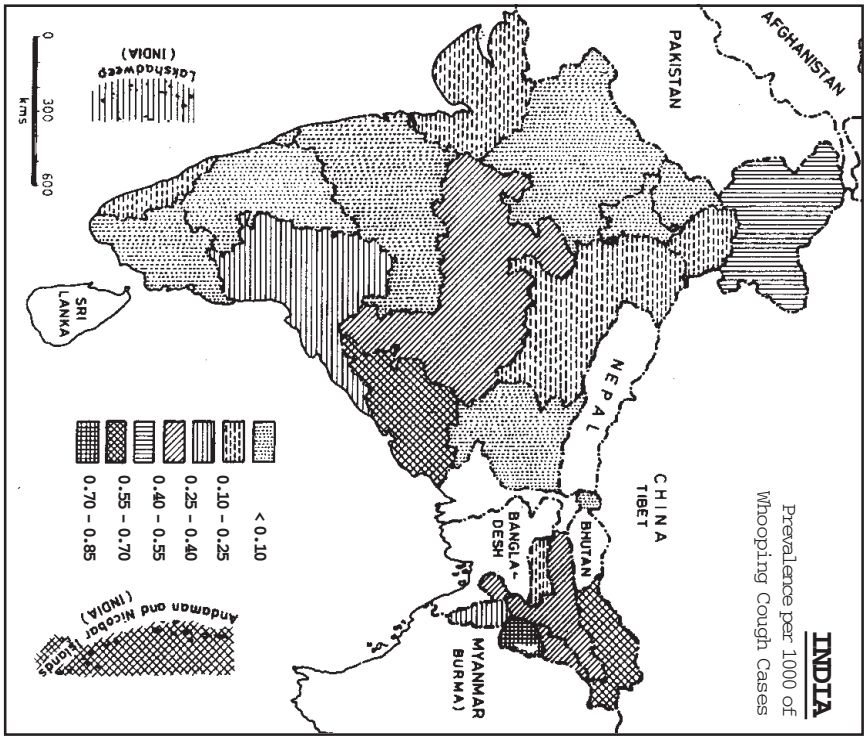

Fig. 16. India-Prevalence per 1000 of Whooping Cough Cases

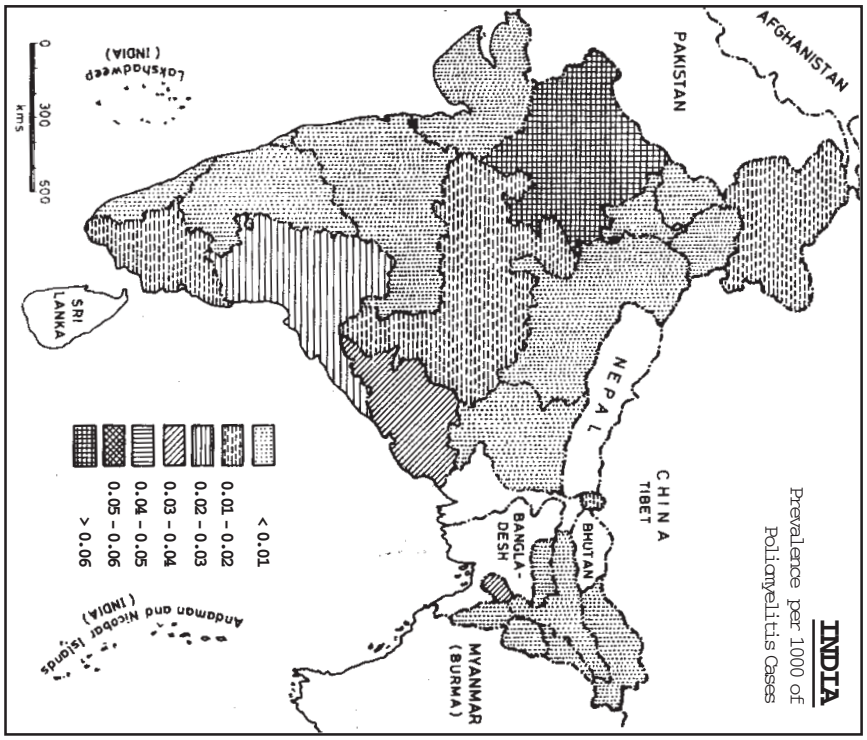

Fig. 17. India-Prevalence per 1000 of Poliomyelitis Cases

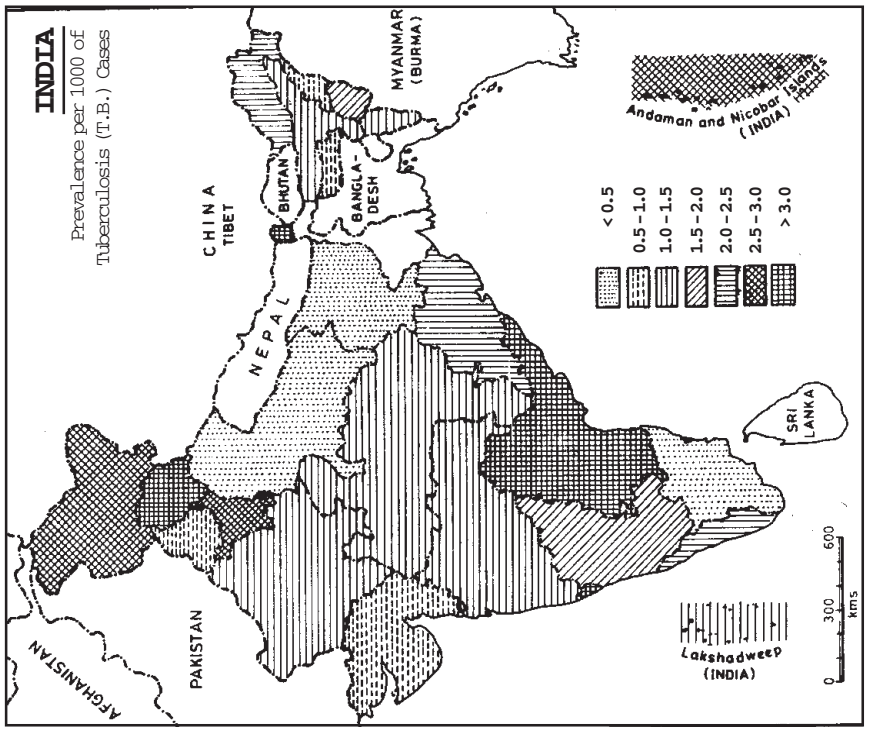

Fig. 19. India-Prevalence per 1000 of Tuberculosis (T.B) Cases

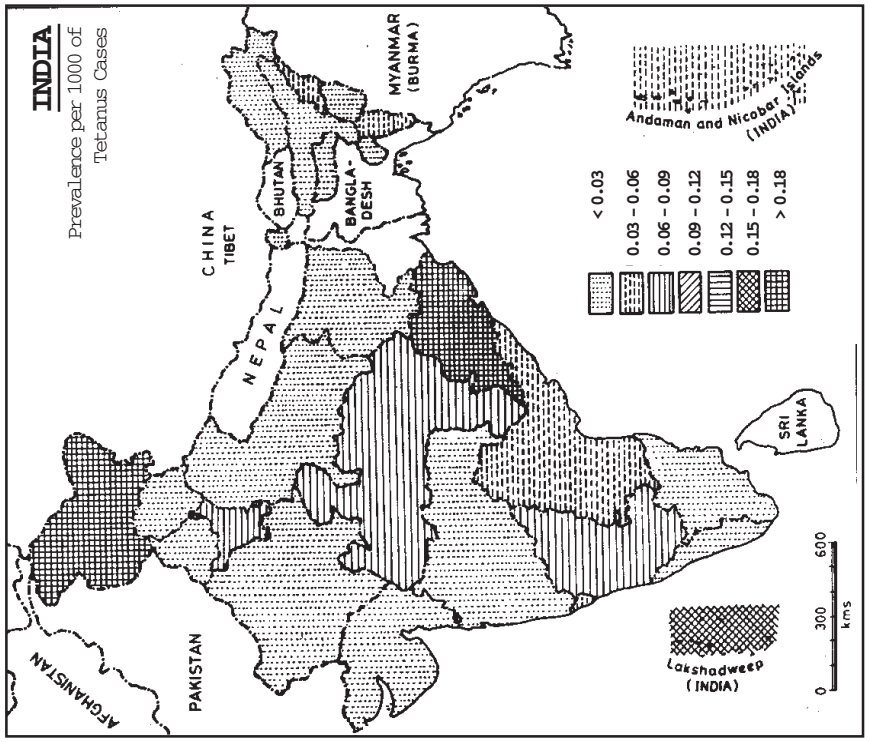

Fig. 18. India-Prevalence per 1000 of Tetanus Cases

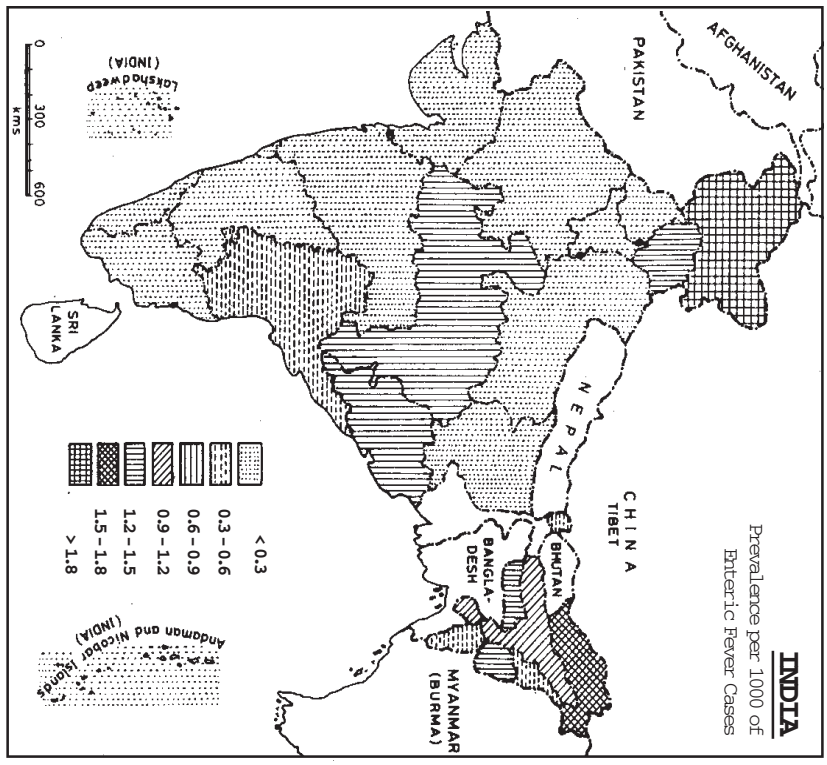

Fig. 20. India-Prevalence per 1000 of Enteric Fever Cases

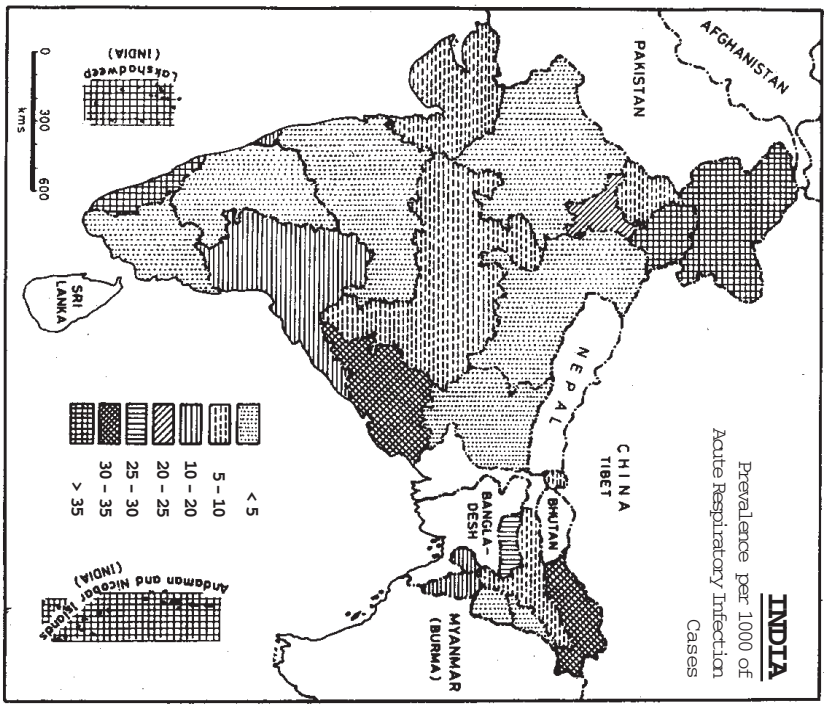

Fig. 21 India-Prevalence per 1000 of Acute Repiratory-Infection Cases

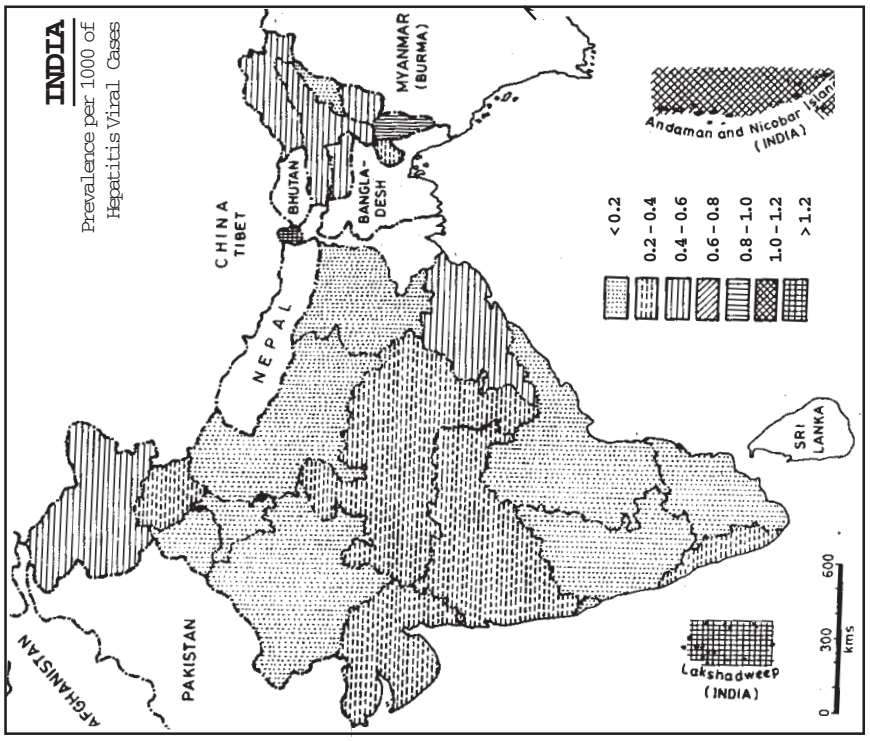

Fig. 23. India-Prevalence per 1000 of Hepatitis Viral Cases

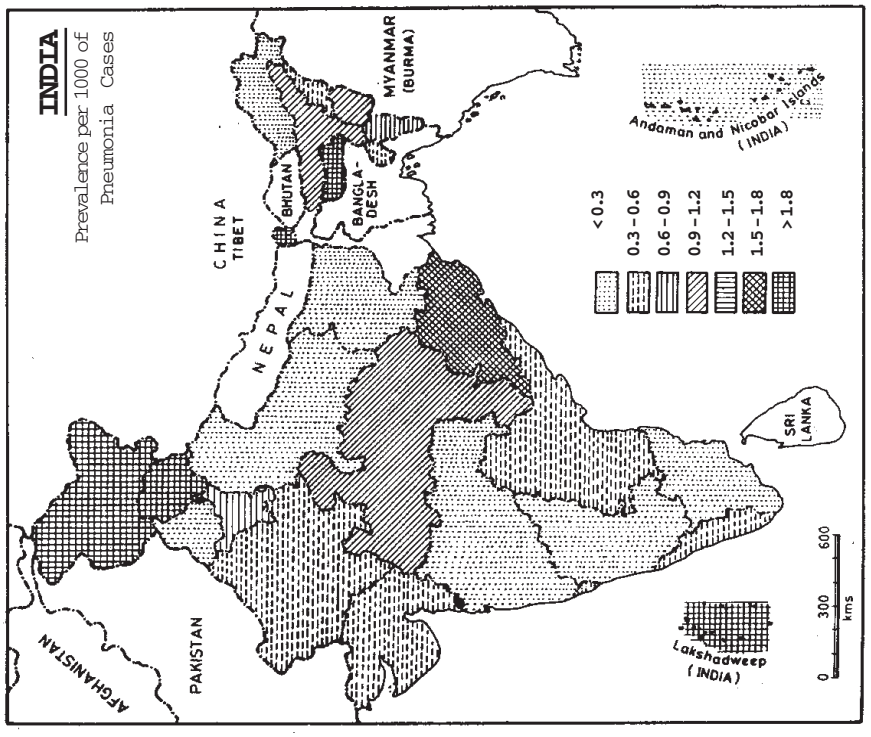

Fig. 22. India-Prevalence per 1000 of Pneumonia Cases

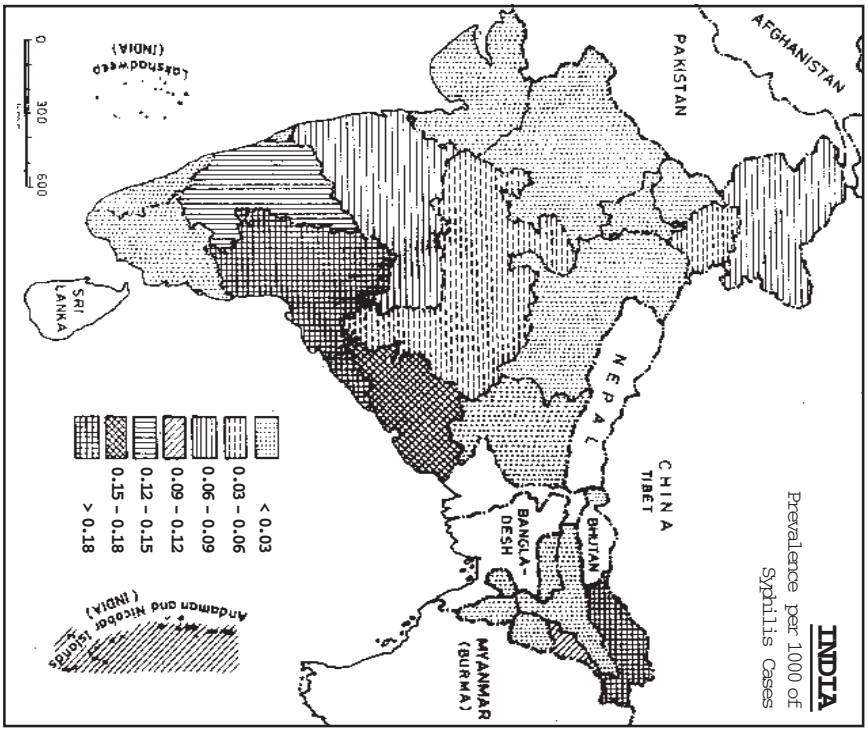

Fig. 24. India-Prevalence per 1000 of Syphillis Cases

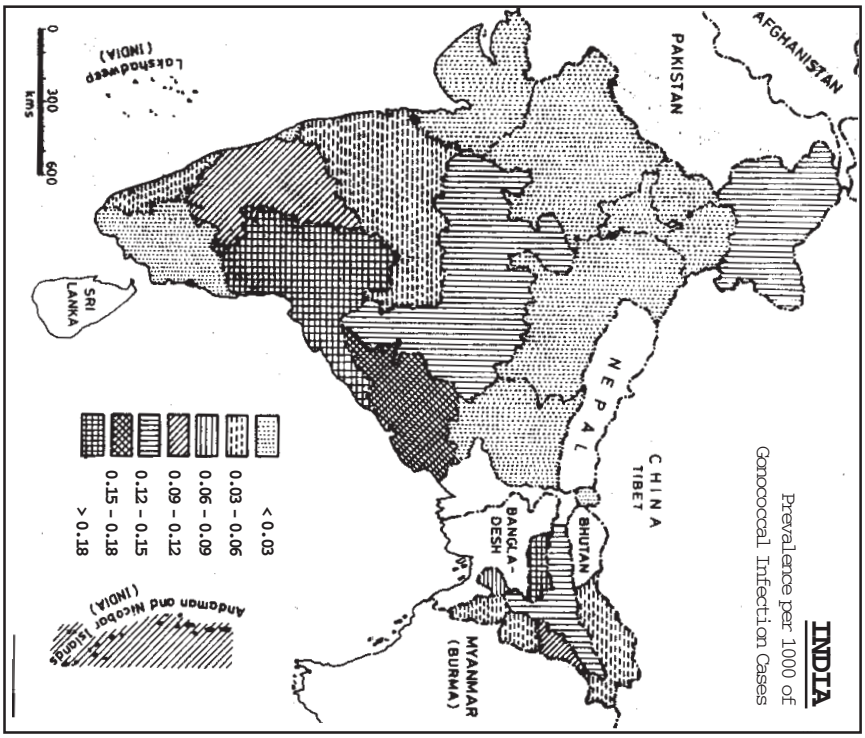

Fig. 25. India-Prevalence per 1000 of Gonococcal Infection Cases

ally transmitted disease clinics. The disease is passed from mother to child at birth, a transmission which can be effectively interrupted by the early administration of hepatitis B vaccine in 3 doses in the 1st, 3rd and 6th months of life.

Typhoid: Typhoid and para typhoid are seen in localised outbreaks with some 300,000 cases reported annually, and even higher level in 1988. The disease is water-borne and is spread from food handlers.

Worm infestation: It is seen widely in all segments of the population with the most common ascrasis, or round worm, almost universal.

Guinea worm: It is endemic in 6 states spread over some 4,000 villages in 65 districts. Tamil Nadu, and more recently Gujarat, have become free of disease in 1980s with the major population still affected residing in Maharashtra, Rajasthan, Karnataka and neighbouring Andhra Pradesh.

Malaria: The parasitic disease malaria is endemic in India and is greatest health problem. In 1981, the malaria prevalence rate was 3.9 per 1000 and in 1990, it has come down to 1.72 per 1000 (Fig. 27). The frequency of malaria positive cases has increased from the year 1961 to 1976 and after that it started decreasing. The frequency is high in Himachal Pradesh, Punjab and Haryana in Northern India; Gujarat in West India; in the Eastern Himalayan region, Orissa in East India; Madhya Pradesh; Karnataka in South India and Islands.

Kala-azar: It is a communicable disease spread by the sand fly, a tiny insect which breeds ubiquitously in damp dark places. After disappearing consequent to the mass application of insecticides for malaria control, Kala-azar has returned in the 1970s in epidemic form in Northern Bihar and adjacent districts of West Bengal. In 1989, 34185 cases were detected. The disease is characterized by chronic fever, enlargement of liver and spleen, extreme susceptibility to other infections, and progressive weight loss is chronic, longstanding and eventually fatal if untreated.

Yaws: A disease mainly of childhood, yaws continues to be transmitted especially in the tribal areas of the states of Andhra Pradesh, Madhya Pradesh and Orissa. Having neared eradication in the early 1960s residual cases continue, with this disease transmitted by direct contact, often from mother to child. Some 1300 cases were recorded in 1985, many among children. Though relatively few in numbers, cases of yaws represent a debilitating disease among the most remote and least served population.

Japanese encephalitis: This is also spread by mosquito, has occurred in sporadic outbreaks since 1955, appearing to intensifying since 1986 when more than 10,000 cases and in 1989, 6487 cases were reported with fatality rate 40 per cent especially among children.

Meningococcal meningitis: It is endemic in large urban areas spreading person to person in epidemic form; especially during winter and early spring, affecting primarily children particularly those in close contact with other children, (creches, *aanganwadis*). The disease is frequently fatal.

Filariasis: It is the disease due to filarias in the blood. it is seen widely in all segments of the population (Fig. 28). Personal hygiene, safe drinking water and improved public sanitation are necessary for control.

Leprosy: It is not hereditary and the least communicable of all infectious diseases. It is caused by a germ. Research on leprosy has not yet revealed how the infection enters a healthy body. It can occur in any social or economic class and 20 per cent of all newly-detected cases are children. India has among its citizens at least a third of the world's leprosy patients (about 4 million estimated men, women and children). Leprosy cases are reported from all over the country. However the prevalence of the disease is not uniformly distributed. Bihar, Tamil Nadu, Andhra Pradesh, Pondicherry, Orissa, West Bengal, Karnataka, Maharashtra and Lakshadweep taken together have over 85 per cent of all leprosy cases in the country (Fig. 29).

Cancer: Cancer and other degenerative diseases like those of heart and arteries and the various diseases of the nervous system are still largely unconquered. The cancer patients treated in specialized cancer hospitals 1989 are shown in figure 30, according to international classification of diseases. The highest frequency of malignant neoplasm has been reported for genital urinary organs follows in by lip, oral cavity and pharynx and digestive organs and peritoneum out of total patients reported for cancer.

Rheumatic Fever: It is associated with urban crowding and follows in 1-3 per cent of cases with the common streptoccocal group A sore throat. There is high prevalence of rheumatic heart disease in the age group of 5-16 years (2-11 per thousand) (ICMR Survey).

Heart Disease: The data pertaining to heart disease from different states and union territories of India are not available. This may be due to

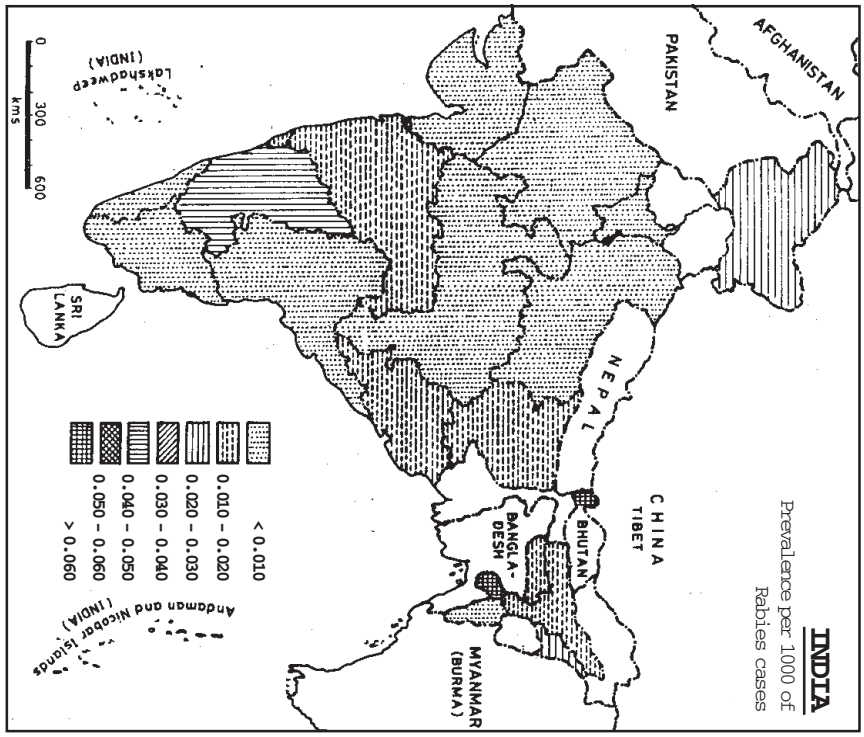

Fig. 26. India-Prevalence per 1000 of Rabies Cases

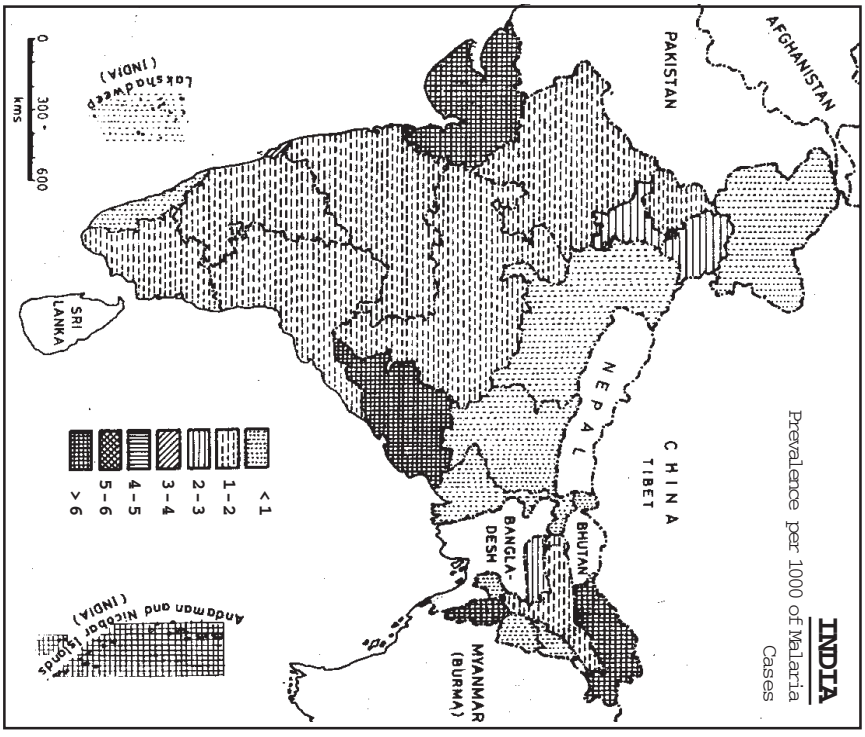

Fig. 27. India-Prevalence per 1000 of Malaria Cases

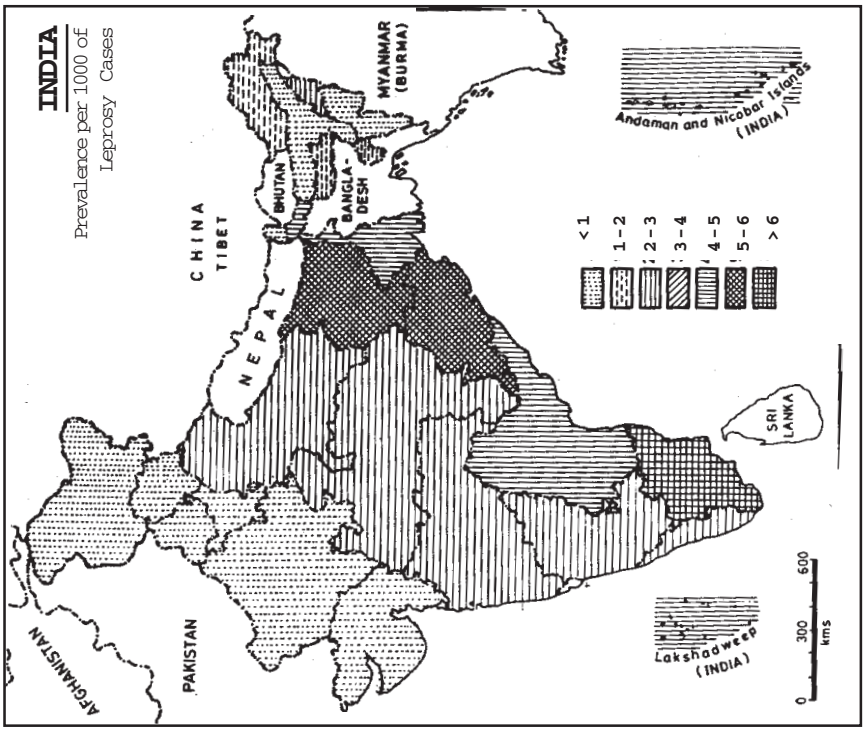

Fig. 29. India-Prevalence per 1000 of Leprosy Cases

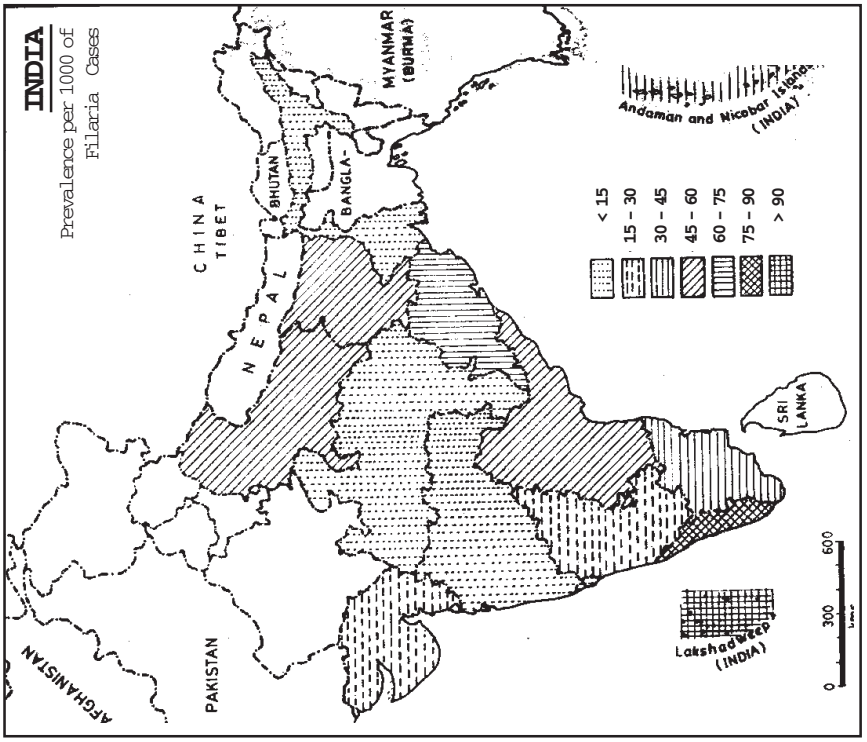

Fig. 28. India-Prevalence per 1000 of Filaria Cases

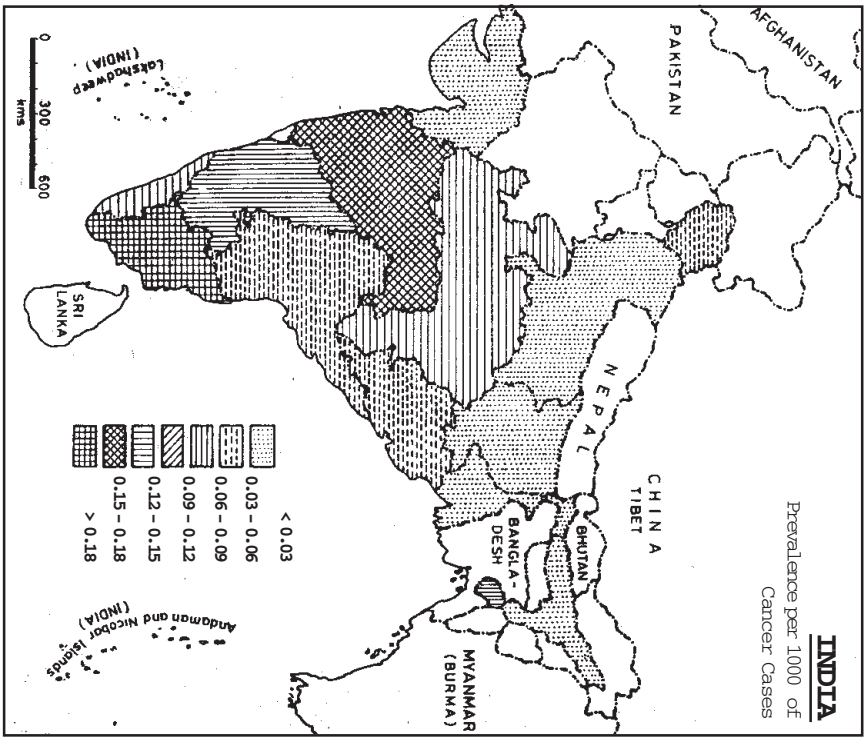

Fig. 30. India-Prevalence per 1000 of Cancer Cases

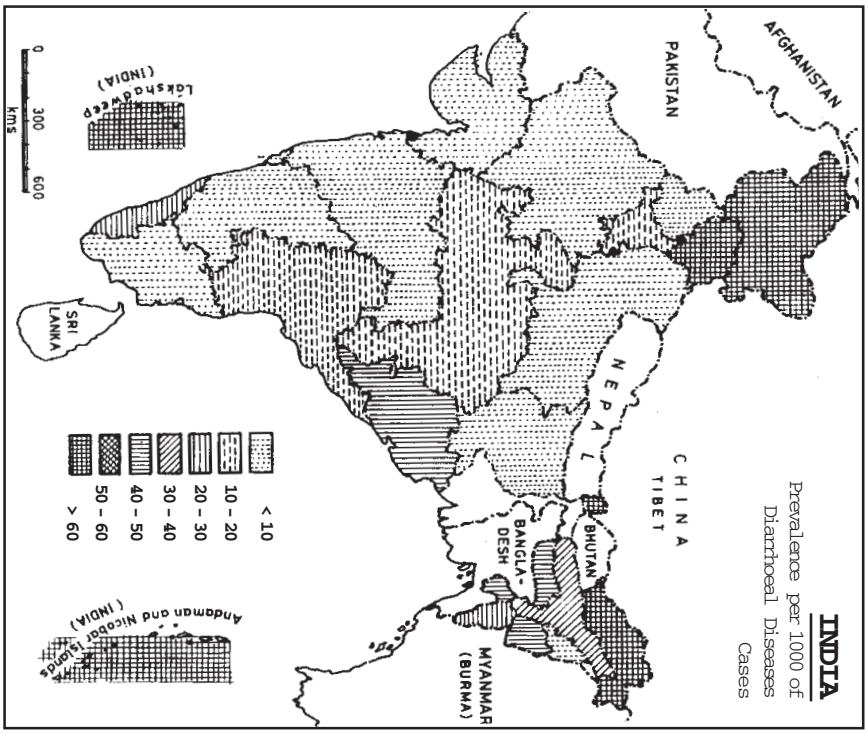

Fig. 31. India-Prevalence per 1000 of Diarrhoeal Diseases Cases

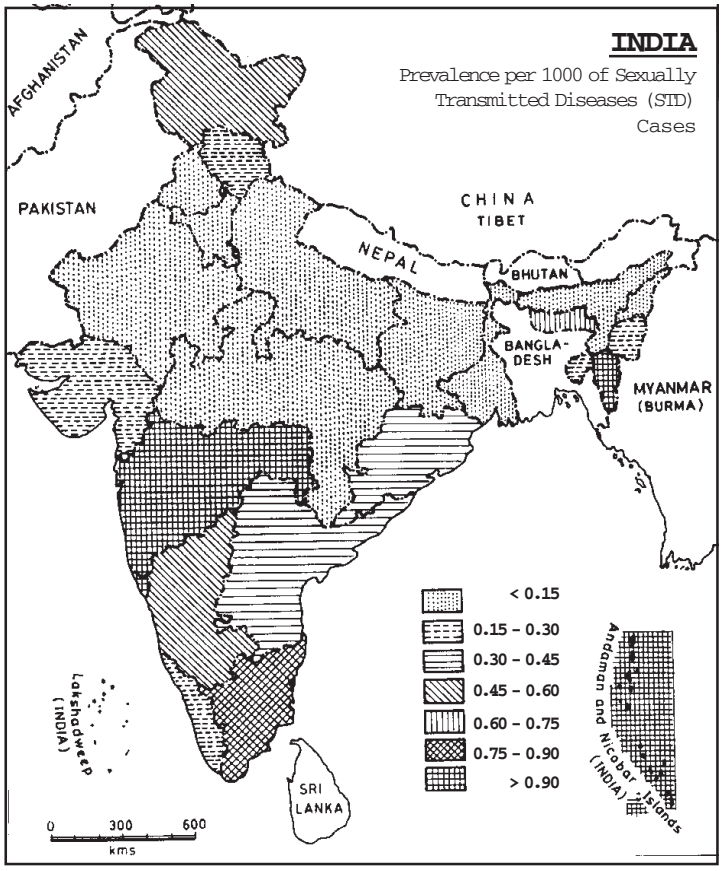

Fig. 32. India-Prevalence per 1000 of Sexually Transmitted Diseases (STD) Cases

non-availability of proper facilities either for cardiac disease treatment or investigation. However, it has been reported that the incidence of heart disease is the highest in Gujarat. At the major heart disease detection centres situated in Gujarat nearly 11,000 new cases are detected every year, which may be only the tip of the iceberg. Both the major categories of heart disease—(a) congenital (infant acquires symptoms of heart disease at birth) and (b) acquired (rheumatic—a type of fever that affects the joints of the body, as well as, valves of the heart and coronary artery and blood vessels of the heart) are reported.

Diseases of poor environmental sanitation continue to afflict most Indians.

Gastric Disorders: The prevalence per 1000 of diarrhoeal diseases (Cholera 0.008 per 1000; Dysentry 9.06 per 1000 and Gastroenteritis 1.30 per 1000) was 10.37 in the year 1981 and 11.52 per 1000 in 1989 (Fig. 31). However, cholera has declined in recent years although it occurs in occasional outbreaks such as the epidemic in Delhi in 1988, when over 30,000 cases of cholera like illness with more than 2,000 confirmed cases, claimed over 300 lives in the city. The incidence of diarrhoeal reported cases is high in the Himalayan region and Islands (Fig. 31). The notified cases of cholera from the year 1950 to 1981 show that prevalence of cholera per 1000 has decreased from 1951 (0.24) to 1981 (0.0084).

Sexually Transmitted Diseases: These are found in from 1 to 4 per cent of the adult population both in urban and rural areas. 1 to 3 per cent of women attending anti-natal clinics are sero-positive for syphilis with a wider prevalence of gonorrhoea, chancroid and, in the

Table 11: Percentage distribution of deaths by major cause-groups in India (Rural) during 1981, 1988, 1989

S. No.	Major cause-groups	Year 1981	1988	1989
1.	Accidents and injuries	5.1	6.5	7.4
2.	Fevers	8.4	8.0	7.4
3.	Digestive disorders	8.0	6.5	6.6
4.	Coughs (Disorders of respiratory system)	20.7	20.3	20.2
5.	Disorders of central nervous system	3.5	4.6	4.8
6.	Diseases of circulatory system	8.8	10.0	10.9
7.	Other clear symptoms	8.1	8.8	8.2
8.	Causes peculiar to infancy	12.1	9.8	9.8
9.	Child-birth and pregnancy	1.0	0.8	0.9
10.	Senility	22.4	24.7	23.8
11.	Rest	1.9	—	—
	Total (Per cent)	100.0	100.0	100.0
	(No. of Deaths)	(17394)		(21409)

Percentage distribution of deaths due to specific causes-India during 1989

1. Accidents and Injuries - Specific Causes: *Vehicular Accidents* (28.3%), *Suicide* (14.8%), *Burns* (13.0%), *Drowning* (11.8%), *Snake Bite* (7.2%), *Fall* (6.3%), *Homicide* (3.8%), *Others* (14.7%) = Total (100.0%).

2. Fevers - **Specific Causes:** *Typhoid (21.3%) , Influenza* (12.7%), *Malaria* (8.7%), *Not Classifiable* (57.1%) = Total (100.0%).

3. Digestive Disorders - Specific Causes: *Gastroentrities (24.5%), Acute Abdomen* (23.8%), *Dysentry* (20.8%), *Peptic Ulcer (12.2%) , Food Posioning* (14.8%) , *Cholera* (0.7%) , *Not Classifiable* (13.2%) = Total (100.0%).

4. Coughs (Disorders of Respiratory System)- Specific Causes: *Asthsma & Bron chitis* (43.6%) , *Pneumonia* (27.5%) , *T.B. of Lungs* (25.6%), *Whooping coughs* (0.5%) , *Not Classifiable* (2.8%) = Total (100.0%).

5. Disorders of the Central Nervous System- Specific Causes: *Paralysis* (66.4%), *Meningitis* (10.0%), *Convulsions* (13.5%), *Not Classifiable (10.1%)* = Total (100.0%).

6. Diseases of Circulatory Systems - Specific Causes: *Heart Attack* (52.9%), *Anaemia* (29.0%), *Other Heart Diseases* (18.1%) = Total (100.0%).

7. Other Clear Symptoms- Specific Causes: *Cancer* (38.8%), *Jaundice* (11.5%), *Cirrhosis of Liver Diseases* (10.1%), *Diabetes* (6.6%), *Tetanus* (5.8%), *Measles* (5.0%), *Leprosy* (2.3%), *Others* (27.1%) = Total (100.0%).

8. Causes Peculiar to Infancy- Specific Causes: *Prematurity* (48.2%), *Respiratory Infection of New Born* (14.7%), *Diarrhoea of New Born* (7.3%), *Cord Infection (including Tetanus* (5.7%), *Birth Injury* (2.9%), *Congenital Malformations* (2.7%), *Not Classifiable* (18.4%) = Total (100.0%).

9. Child - Birth and Pregnancy (Maternal Mortality) - Specific Causes: *Abortion* (10.9%), *Toxaemia* (7.9%), *Anaemia* (20.3%), *Bleeding of Pregnancy (23.8%), Malposition of Child* (10.0%), *Puerpeal Sepsis (5.9%), Not Classifiable* (20.3%) = Total (100.0%).

10. Senility

Note: In 1989, the Survey was conducted over 23 states and union territories of India. The survey not covered Sikkim, Andaman & Nicobar Islands, Mizoram, Pondicherry and Lakshadweep, whereas Chandigarh has become urban.

southern states, increasing endemicity of Lympho Granuloma Venereum (LGV) and Granuloma Venereum (GV) has been observed (Fig. 32).

Studies have been reported showing relationship between blood groups and major diseases such as infectious diseases; neoplasm (malignant growth); diabetes mellitus; mental disorders; diseases of circulatory systems; diseases of the blood; diseases of the digestive system; diseases of genito-urinary diseases, diseases of the skin and the congenital anamolies, in Indian population (For review *see* Bhasin and Khanna, 1991). It was proved that the blood groups were inherited and their allele/haplotype frequency varied widely which were involved in the process of natural selection (Mourant et al., 1976a, 1978). Wiener (1970) is the strongestcritic of the studies of association of diseases with blood groups. In India, association of diseases with blood groups and polymorphic systems requires care and caution in the choice of diseases and control groups in view of (a) the ethnic diversity, and (b) the probably variation in the incidence of diseases and allele/haplotype frequencies of the markers in the two groups.

Causes of Death (Rural)

It is observed that more deaths have been reported in 1989 as compared to 1981 from the states of Haryana, Rajasthan, Gujarat, Maharashtra, Manipur, Orissa, Andhra Pradesh, Kerala.

The percentage distribution of deaths by major cause-groups for the year 1981, 1988 and 1989 is given in table 11. The major cause-groups 'Senility' and 'Coughs' are holding their respective first and second ranks. It has been noticed, on further examination, that deaths in the age groups 55 years and more account for about half of the total reported deaths. This would partly explain the higher percentage under 'Senility' cause-group. Deaths due to 'Coughs' cause-group are around 20 per cent. Deaths due to circulatory system are increasing since 1989 accounting 10.9 per cent of the total reported deaths as against 8.8 per cent in 1981. The major cause-group 'Causes peculiar to infancy' has declined from 12.1 per cent in 1981 to 9.8 per cent of the total reported deaths in 1989. The major cause-group 'Other clear symptoms' comprising various independent diseases has shown a similar trend from 8.1 per cent in

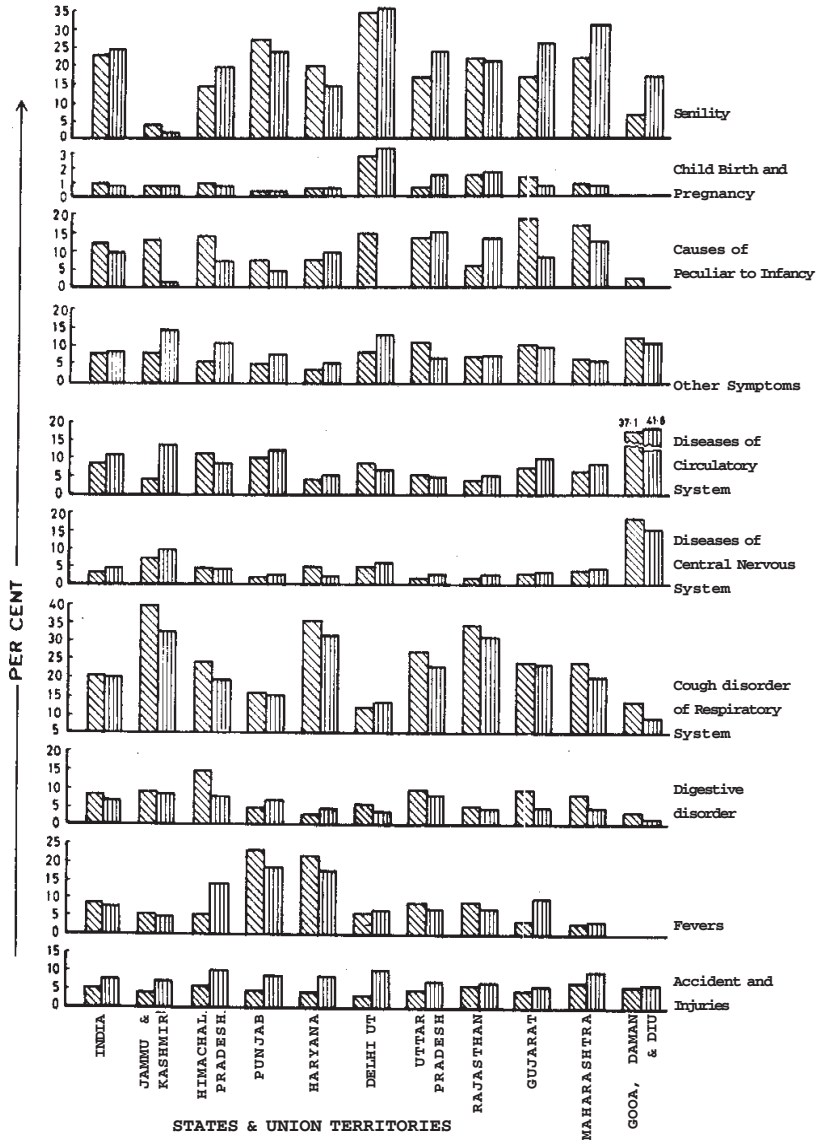

Fig. 33. India-Percentage Distribution of Deaths by Major Cause Groups

1981 to 8.2 per cent 1989. Deaths due to major cause-group 'Digestive disorders' is 8.0 per cent in 1981 but in 1989 year it has declined to 6.6 per cent. 'Accidents and injuries' accounted for 7.4 per cent deaths in 1989 year. Deaths due to 'Disorders of central nervous system' accounted for 4.8 per cent of reported deaths in 1989 as compared to 3.5 per cent during 1981. Deaths due to 'Child birth and pregnancy' have remained to account for about one per cent of the reported deaths (Fig. 33, 33a).

State-wise Analysis of Major Cause-groups

Statewise percentage distribution of deaths according to major cause-groups is given in (Fig. 33, 33a). Deaths due to 'Senility' at the national level accounted for 23.8 per cent of total deaths reported under survey. In 1989 'Senility' deaths were higher than the national average in Andhra

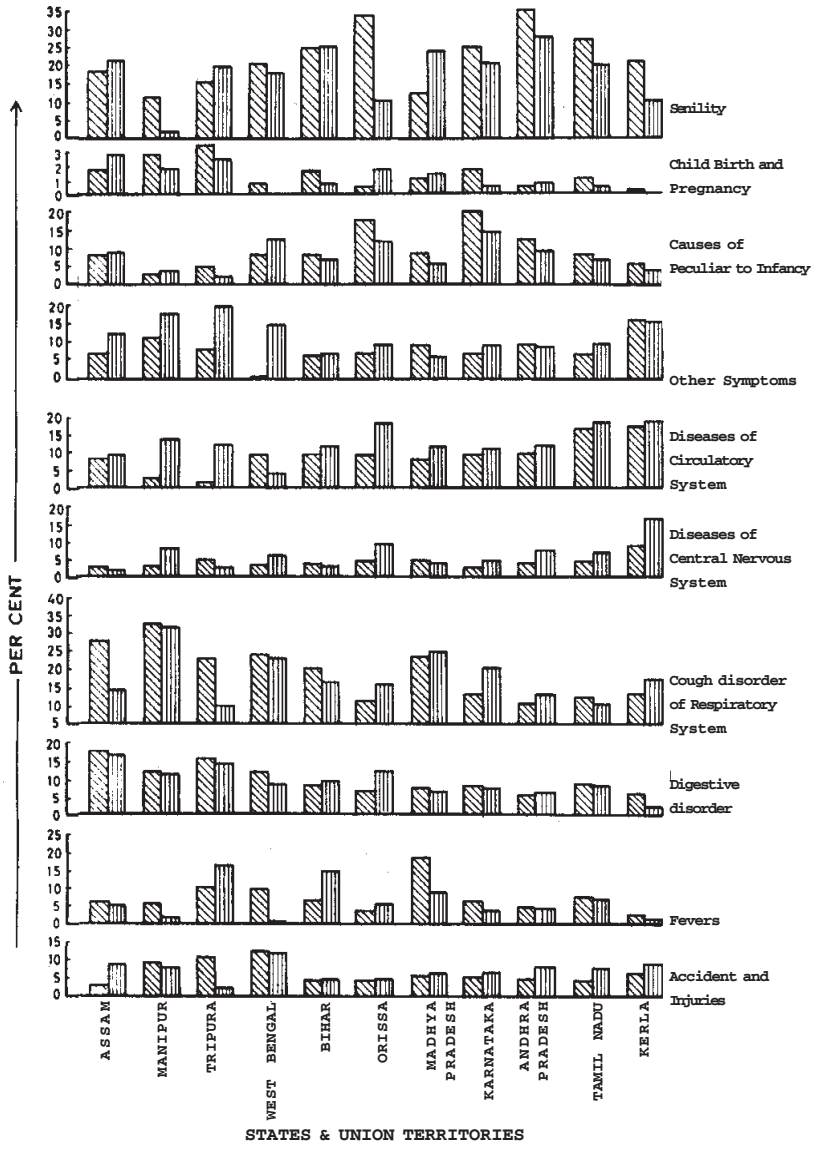

Fig. 33a. India-Percentage Distribution of Deaths by Major Cause Groups

Pradesh (28.5 per cent), Bihar (25.9 per cent), Gujarat (25.4 per cent), Madhya Pradesh (24.3 per cent) and Maharashtra (31.0 per cent). Like 1981 the lowest 'Senility' deaths have been reported from Jammu and Kashmir (2.1 per cent).

Deaths in 'Coughs' cause-group in percentage terms were higher than the national average of 20 per cent in the states of Gujarat (23.9 per cent), Haryana (31.5 per cent), Jammu and Kashmir (32.9 per cent), Madhya Pradesh (25.0 per cent), Rajasthan (31.1 per cent) and Uttar Pradesh (22.9 per cent) in 1989 and almost similar patterns were also observed in 1981.

Deaths in the cause-group 'Diseases of circulatory system' which comprised Anaemia, Congestive Heart Failure and Heart Attack, has been reported much higher than national average of 10.9 per cent in states of Jammu and Kashmir (18.6 per cent), Kerala (22.4 per cent),

Orissa (18.0 per cent), Punjab (12.6 per cent) and Tamil Nadu (22.9 per cent), while substantially lower deaths have been reported from Haryana (5.8 per cent), Maharashtra (8.2 per cent), Rajasthan (5.5 per cent) and Uttar Pradesh (5.4 per cent) in the year 1989 except in Jammu and Kashmir, where similar trend has been observed in 1981.

The state-wise variations in respect of 'Causes peculiar to infancy' appear to be more hetrogeneous. At the national level this group is responsible for 9.3 per cent of total deaths in the year 1989 and 12.1 per cent in 1981. Higher percentage of deaths under this cause-group is observed in the states of Uttar Pradesh (15.0 per cent), Karnataka (14.7 per cent), Orissa (11.6 per cent), Maharashtra (12.2 per cent) and Rajasthan (12.9 per cent). Quite low percentages of deaths have been reported from Jammu and Kashmir (1.4 per cent) as compared to 12.6 per cent in the year 1981.

The major cause group 'Other Clear Symptoms' accounted for 8.2 and 8.1 per cent deaths at the national level in 1989 and 1981, respectively. This cause-group is comprised of independent 'Causes of Clear Symptoms' like Jaundice, Measles, Tetanus, Poliomyelitis, Cancer and Uremia etc. Higher percentages of such deaths have been reported from Gujarat, Manipur, Tripura, Kerala.

'Fevers' cause-group accounted for 7.4 and 8.4 per cent deaths at national level in 1989 and 1981, respectively. Higher percentages than national average have been reported from Haryana, Punjab, Dadra and Nagar Haveli, Tripura, Madhya Pradesh.

Deaths in the cause-group 'Accidents and Injuries' accounted for 7.4 and 5.1 per cent of the total reported deaths in 1989 and 1981, respectively. Higher percentage than national average has been reported from Himachal Pradesh, Kerala, Maha-rashtra, West Bengal.

In 1989 about 6.6 per cent of total deaths were reported under 'Digestive disorder' as compared to 8.0 per cent in 1981. Deaths reported under this group were higher than the national average in the states of Assam, Bihar, Himachal Pradesh, Jammu and Kashmir, Karnataka, Manipur, Madhya Pradesh, Orissa, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

'Disorders of the Central Nervous System', comprising mainly two specific causes, namely, 'Paralysis (Cerebral apoplaxy) and Meningitis' claimed 4.8 per cent of reported deaths in 1989 than 3.5 per cent in 1981. Deaths reported under this group were higher than the national level in the states of Andhra Pradesh, Jammu and Kashsmir, Kerala, Orissa and Tamil Nadu.

Age and Sex Distribution

Age and sex are important demographic variables for the study of mortality patterns. It has been seen that male deaths constituted 54.4 per cent in 1981 and 55.7 per cent in 1989 indicating no substantial change in the sex composition of reported deaths.

Deaths due to 'Accidents and Injuries' have been reported mainly in the age-groups 5 years and above for both males and females during 1981 and 1989. It may be noted that deaths due to accidents and injuries are the major killers in the age-groups 15-24 and 25-34 years for both the sexes during 1981 and 1989. It is mainly contributed by deaths due to 'burns', suicide, vehicular accidents, and drowning. The 'Fever' group has taken major toll in the 55 years and more, followed by age-groups of 1-4 years and 5-14 years for both males and females during 1981 and 1989. Same trend has been observed in deaths due to 'Digestive disorders' in both the years and for both sexes. Deaths under 'Coughs' are mainly concentrated in the age-group 55 years and more followed by less than 1 year, 1-4 years and 45-54 years for both sexes during 1981 and 1989. Around 75 per cent of total deaths due to 'Pneumonia' were among children aged below 1 year and 1-4 years. About two-third of deaths due to major cause-group 'Disorders of the central nervous system' have been reported among males in the age-group 55 years and more with specific cause of death being paralysis. Deaths due to 'Diseases of circulatory system' were least among infants and it increases with age and was highest in the age-group 55 and more for both sexes in 1981 and also in 1989. Heart attack is the major killer in the age group 55+. Same trend has been observed in the major cause-group 'Other clear symptoms'. Cancer followed by diabetes and jaundice are the major killers in this group.

Health Care System

For safeguarding the population from disease, more emphasis is being given to medical facilities, especially on increasing the availability of these facilities in the rural areas. A number of hospitals, allopathic dispensaries and primary health centres are being set up in the coun-

try. In India, greater importance is given to curative measures instead of preventive ones. Most of India's health problems are related to insanitary conditions and lack of education. They are preventable by public health measures. The difficulty in making progress in preventive medicine is compounded by a number of cultural and traditional habits and beliefs surrounding dietary practice, childbirth, illness and hygiene.

In 1990, in 412 districts of India (comprising of 3949 towns, 5011 Development Blocks and 5,57,137 inhabited villages) there were 10,172 hospitals and 6,02,490 beds, out of which 4526 hospitals and 4,25,407 beds were Government and 5646 hospitals and 1,77,083 beds were private. The area served per hospital (sq. km) (000) was 2-1643 and population served per hospital and per bed was 14450-65000 and 319-2097, respectively; hospital beds per 1000 population comes to 0.73. Apart from government and private hospitals, there are 20,531 Public Health Centres, 1,30,390 Sub-centres and 1852 Community Health Centres catering to the needs of the people. In 1987 there were 3,31,630 medical doctors registered with Medical Council of India. In addition, in 1988 there were 2,45,405 nurses and midwives registered with Nursing Council of India. A large number of indigenous practitioners serve the vast majority of rural population. There are about 4,00,000 registered practitioners—Ayurveda (2,40,000), Unani (28,000), Siddha (12,000) and Homeopathy (1,22,000). In addition, there are an estimated 5,00,000 practitioners of medicine who have not graduated from a formally recognised course or programme.

The vast population of India with its multiracial origin, diverse cultural, dietary and living habits, marriage laws and tradition, and the extreme variations in environment presents complexities in the study of diseases and faces a great challenge in seeking to improve the health status of its people, especially its child population. Poor socio-economic conditions in a large section of the population are associated with high infant mortality (ranging from 60-80 per 1000 births) and a high birth rate varying from state to state (22.9-40.2 per 1000 population). Perinatal death and still birth rates are also high, environmental factors like birth trauma, poor antenatal nutrition and care, perinatal infections and dietary deficiencies account for most of the cases. One might hope that these rates would decline with better child health care and antenatal supervision. The maintenance of ill health across generations result from a complex interplay of social, economic, cultural and biological factors. This cycle can, in theory, be broken at any point. The complexity of the relationship provides many points at which the passage of ill health from generation to generation can be interrupted. Similarly, protection of the health of infants and young children also protects the health of the next generation of adult health.

In the heterogeneous Indian society, to bridge the gap between different socio-economic levels, there is a need of holistic approach to environment, economy, energy, equity and development. The whole range of transitions, which is needed, include among other things, population stabilization; intergradations land-use planning; sustainable agriculture, forestry, animal husbandry and fisheries; conservation of biodiversity; control of air and water pollution; non-polluting energy systems especially renewable ones with high energy efficiencies; recycling of wastes and residues; ecologically compatible housing and slum improvement; environment friendly technologies; poverty alleviation; blending economics with ecology.

REFERENCES

Bhasin, M.K. and A. Khanna. 1991. "Biological traits and their association with diseases: A review of studies from Indian Region." *J. Hum. Ecol.*, 2: 231-252.

Bhasin, Veena. 1990. *Habitat, Habitation and Health in the Himalayas.* Delhi: Kamla-Raj Enterprises.

—. 1994. *People, Health and Disease: The Indian Scenario.* Delhi: Kamla-Raj Enterprises.

Census of India 1981. Series-1. *India, Paper 3 of 1981. Provisional Population Totals. Workers and Non-workers.* New Delhi: Registrar General & Census Commissioner, India.

Census of India 1981. Series-1. *Final Population Totals 1982.* New Delhi: Office of the Registrar General India.

Census of India 1981. *Series-1 India. Paper 1 of 1984. Population Projections for India 1981-2001.* New Delhi: The Registrar General & Census Commissioner, India.

Census of India 1991 Series-1 *India. General Population and Population of Scheduled Castes and Scheduled Tribes.* New Delhi: The Registrar General & Census Commissioner, India.

Census of India 1991. Series-1, *India, Paper 1 of 1991. Provisional Population Totals.* New Delhi: The Registrar General & Census Commissioner, India.

Chauhan, S.K. 1983. "Water a necessity, clean water a luxury." *Pakistan and Gulf Economicsts*. November 19-25.

Child in India. A Statistical Profile 1985. New Delhi: Min-

istry of Welfare.
Davis, K. 1951. *The Population of India and Pakistan*. Princeton: Princeton University Press.
Desai, A.V. 1980. "India's energy economy: Facts and interpretation." *Centre for Monitoring Indian Economy*, Bombay, p. 45.
Family Welfare Programme in India: Year Book 1984-85, 1985-86, 1986-87, 1987-88, 1988-89, 1998-99. New Delhi: Ministry of Health and Family Welfare.
Gopalan, C. and K. Vijay Raghavan. 1971. *Nutriation Atlas of India.* Hyderabad: National Institute of Nutrition, Indian Council of Medical Research.
Gopalan, C., B.V. Rama Sastri and S.C. Balasubramanian. 1982. *Nutritive Value of Indian Foods.* Hyderabad: National Institute of Nutrition. Indian Council of Medical Research.
Handbook on Social Welfare Statistics 1986. New Delhi: Ministry of Welfare (1987).
Health Information India - 1986-1999. New Delhi: Ministry of Health & Family Welfare.
I.C.M.R. 1981. *Nutritional Disabilities.* I. Gopalan and M. Mohan Ram (eds.). Hyderabad: National Institute of Nutrition, Indian Council of Medical Research.
Indian Council of Medical Research 1984. *Diet Atlas of India.* Special Report Series No. 48. Hyderabad: Nutrition Research Laboratories.
Miller, B.D. 1981. *The Endangered Sex.* Ithaca: Cornell University Press.
Mourant, A.E., A.C. Kopec and K. Domaniewska-Sobczak. 1976. *The Distribution of the Human Blood Groups and Other Polymorphisms.* London: Oxford University Press.
—., —. and —. 1978. *Blood Groups and Diseases. A Study of Associations of Diseses with Bood Groups and Other Polymorphisms.* Oxford: Oxford University Press.
Office of the Registrar General, India 1990, 1997-2000. *Sample Registration System*. New Delhi: Ministry of Home Affairs.
Office of the Registrar General, India 1989. *Mortality Differentials in India 1984.* New Delhi: Ministry of Home Affairs.
Office of the Registrar General India. Occasional Paper No. 1 of 1989. *SRS Based Abridged Life-Tables 1981-85.* New Delhi: Ministry of Home Affairs.
Office of the Registrar General, India 1990. *Fertility Differentials in India 1984*. New Delhi: Ministry of Home Affairs.
Office, of the Registrar General, India11983-2001. *Surveys of Causes of Death (Rural) Annual Report. 1981, 1988, 1989, 1998*. New Delhi: Ministry of Home Affairs.
Registrar General of India 1981-2001. *Sample Registration Bulletin. Volume XV to XXV. 1981-1991*. New Delhi: Ministry of Home Affairs.
Rosenberg, C.E. 1962. *The Cholera Years: The United States in 1832, 1849 and 1866.* Chicago: The University of Chicago Press.
UNESCO 1975. *Teacher's Study Guide on the Biology of the Human Populations, Asia.* Paris: The Unesco Press.
UNICEF 1980. *The State of World's Children.* New Delhi: United Nations Children's Fund.
Whitehead, R.G. (ed.). 1983. *Maternal Diet Breast-feeding Capacity and Lactational Infertility*. Tokyo: The United Nation University.
Wiener, A.S. 1970. "Blood groups and disease." *Am. J. Hum. Genet.*, 22: 476-483.