CHAPTER - IV

-:- DYSENTERY AND DIARRHOEA -:-

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4.1 INTRODUCTION :

Dysentery and diarrhoea are the most common diseases found all over the Maharashtra. 'If the number of patients treated in hospitals is any guide, the group of diseases clubbed together under the head ' Dysentery and Diarrhoea ' occupy the third place of importance among the diseases of India, the first being fever and the second respiratory diseases' (Misra, 1970).

Literally, dysentery means dysfunction or impairment of the functioning of intestines. Technically, it means passing of blood and mucus through the motion accompained by diarrhoea, abdominal pain, fever and tenesmus. Diarrhoea is a common disease of children and more common in Maharashtrian children of all ages. Frequently, it is found amongst infants especially those who are artificially fed than in those who are breast fed.

This group of diseases is more prevalent in the early summer and in the rainy season. All races, both sexes, and almost all age groups are susceptible. Overcrowding and insanitary surroundings predispose to the infection. Dysentery may be found in epidemic form especially when large groups of people gathered together and sanitation becomes defective. The infection is conveyed through contaminated water, milk and other food stuffs. The work of the carrier of the organism is generally done by house flies or the fomcites.

MAHARASHTRA STATE

PERCENTAGE OF DYSENTERY AND DIARRHOEA DEATHS IN RAINY SEASON

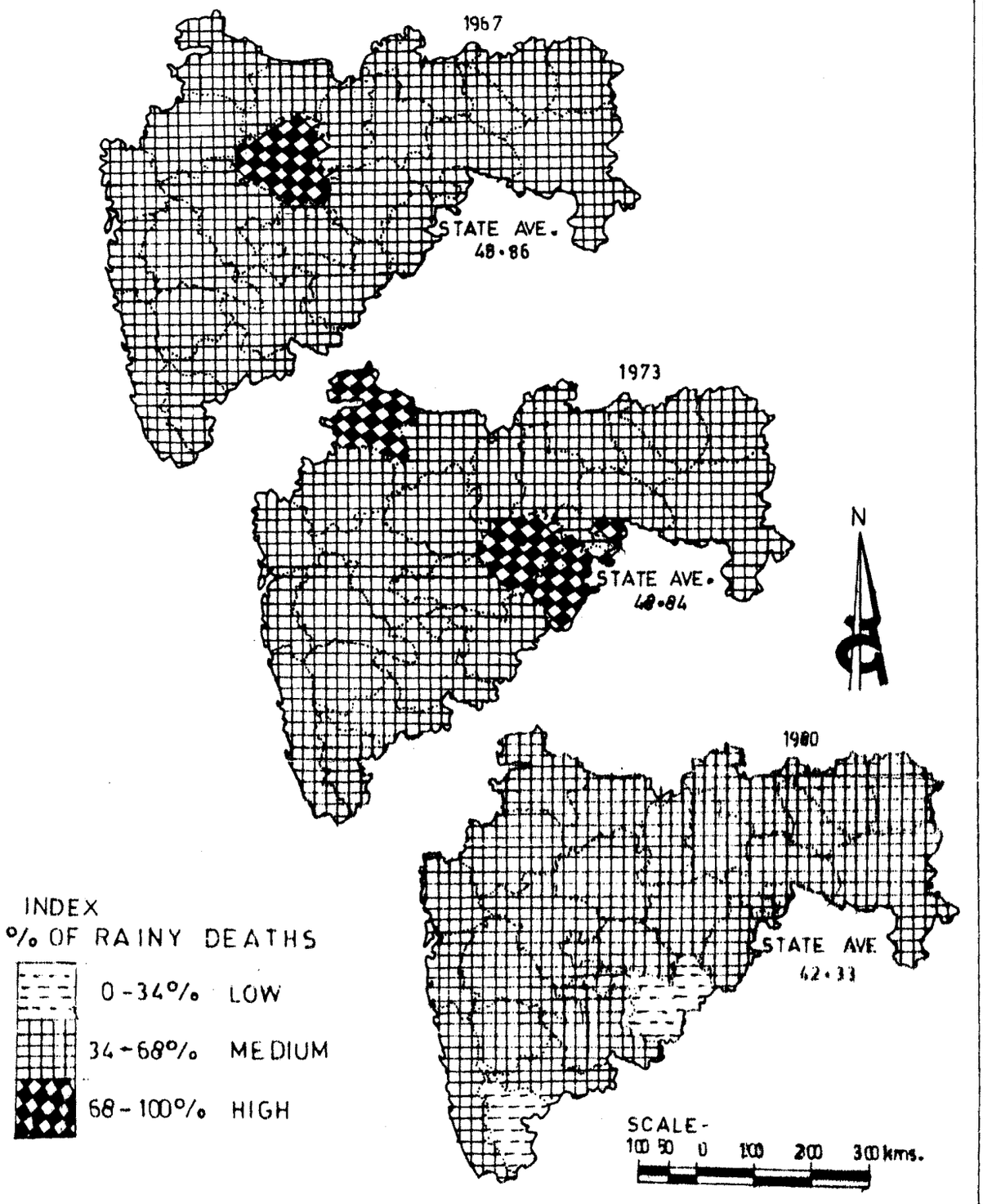

FIG. 4-1

4.2 ETIOLOGICAL FEATURES :

The low lying areas which are below 100 ft. in deltaic regions seem to be of high mortality rates of dysentery and diarrhoea. Generally, surface outwash ends in river. As a result the river becomes contaminated. The contamination rate is highest in the deltalic regions. In the river basins, water becomes sluggish and stagnant. The growth of organism is more in this area and causes the rapid spread of disease. There is also a seasonal pattern of the incidence of dysentery and diarrhoea. The high incidence is associated with the season of rainfall. The map (Fig.4.1) shows percentage of deaths by dysentery and diarrhoea in rainy season. The author has calculated percentage of dysentery and diarrhoea deaths in rainy seasons in different districts of Maharashtra for the years 1967, 1973 and 1980. It seems that the heavy rainfall regions of Konkan and eastern most districts of Vidarbha have more deaths in rainy season. The Upper Krishna Valley of Kolhapur and Sangli districts have up slope and moderate terrain and rainfall is low due to which the mortality is moderate. The flood plains of Godawari and Bhima in Western Maharashtra and Tapi river basin of Khandesh, comprising the Dhule, Jalgaon, Bhir, Osmanabad and Ahmednagar districts are the areas of low precipitation and of sluggishness of river flow with moderate to gentle slope. The stagnant water gets contaminated and develop disease organisms rapidly.

In rainy season, the drinking water is highly contaminated due to which disease organisms rapidly develop. In summer, the

stagnant water is contaminated in plain areas and spreads the disease. In urban area, the type of water supply available to the population, the quality and quantity of water for drinking purposes play the major role in the intensity of endemicity of dysentery and diarrhoea. In urban areas, drinking water supplied through pipelines and drainage pipelines run parallel. Hence, there is easy possibility of seepage of waste water in drinking water lines. In villages, during summer, people use stagnant water for many purposes viz. washing the clothes and animals, bathing and for drinking purposes. It leads to water contamination resulting in spread of dysentery and diarrhoea.

The density of population and disease spread are closely associated with each other. Densly populated areas, mainly the slums face the problem of sanitation, low standard of living, non nutritive diet which lead in spread of these diseases. The fairs and festivals also spread these diseases in society. Millions of people take holy bath in the rivers (Kumbh mela in Nasik, days of eclipses and the Mahashivaratri in Pandharpur) due to which river water gets polluted and the people are easily victimised by dysentery and diarrhoea.

4.3 DYSENTERY :

Dysentery is the acute, waterborne and chronic disease. Dysentery is a most common disease all over the world. But, it is more frequent and voilent in tropical lands. It's frequency

increases during the hot season, particularly if the environmental sanitation is poor. The infection rate goes high when adequate water is not available for personal hygiene. It is thus, partly a disease of unwashed hands (Mishra R.P.,1970). It consists of passage of frequent stools with mucus and blood accompained by diarrhoea, abdominal pain, fever, and tenesmus. On the basis of an etiological factors, the following two types of dysenteries are recognised i) Bacillary Dysentery and ii) Amoebic Dysentery (Vakil,1973).

i) Bacillary Dysentery :

It is an infections disease caused by the dysentery bacilli. It occurs predominatly in the tropics, but can be prevalent in any parts of the world. It is common in the early summer and in the rainy season. Dysentery is characterised by frequency of loose motions accompained by blood, mucus and pus and the pains. Many a times, it is associated with fever. The agent shigellae are transported to man by flies. Thus, the condition which favours the growth of flies also favour the occurrence of bacillary dysentery. Bacillary dysentery is caused by sh.shiga, sh.flexneri and sh.sonnei (Vakil, 1973). V.shiga is more serious than flexneri, sonnei is mild and found generally in cold countries. These organisms enter the body of man through contaminated water, drinks, foods, milk etc. The disease can be spreaded in it's epidemic form by important media of 'house flies'. Susceptibility is more in

children though no age is immune to . Incubation period is of 1-7 days. All races, both sexes and almost all age groups are susceptible. Overcrowding, insanitary surroundings and chronic intestinal affecticns predispose to the infection. The disease may attain an epidemic form especially when large groups of people are gathered and the sanitation is defective. The epidemic, thus is usually observed at the times of religious fairs and festivals, millitary and army camps or in youth hostels.

The agent shigellae is transported to man by the house flies, hence the conditions favour the growth of flies should be taken into consideration for the occurrence of the bacillary dysentery. The breeding of the fly is closely related to temperature. At 16°C, the average time required for the house fly to develop from the egg to the adult stage is 44 days. The hatching time drops to 16 days at 25°C and to 10 days at 30°C. Although the exact nature of the chemicals needed for optimal development is not known. It is well established that decomposed organic material is preferred by a fly as a hatching ground (Mishra, 1970).

ii) Amoebic or protozoal dysentery :

Amoebic dysentery results from the invasion of human intestines by an organism known as entemoeba hystolytica, entemoeba coli, Iodamoeba butschli, Endolimaxna and Dietamoeba fragilis. The disease onset is very slow. Motions are not frequent as compaired to bacillary dysentery. Amongst above,

entamoeba hystolytica is the important member of the groups responsible for amoebic dysentery. It enters the human intestine in the form of cyst by ingestion. After reaching the intestine, the cyst ruptures to release young motile which enters the wall of the intestines (Mishra,1970).

Due to the lack of water closed facilities in villages and slum areas of cities, human excreta containing cysts is contaminated in the soil, vegetables and drinking water. Flies by ingesting and then excreting the cysts, disseminate the infection. Waterborne epidemics may results from the contamination of drinking water by a sewar. In amoebic dysentery, the onset is generally slow, commencing with 3 to 4 bulky loose motions, having fetid smell and containing blood and mucus (Howe, G.M.,1977).

4.3.1 Dysentery spread in world :

Although Abercrombie gave the first accurate description about dysentery spread in 1830, over 30 years passed before it was realized that human excreta were the source of the miasma and it was only in 1898 when the first dysentery bacillus was identified by Shiga in Japan during a severe epidemic. In sub-tropical and tropical countries on the other hand, where temperature fluctuations are small, epidemics tend to correspond to the fly season and also associated with the rainy season. Shiga dysentery has the most limited distribution, with the heaviest concentration in Asia. Westwards it fades out Eastern Europe, where before 1950,

it was endemic in several Baltic States. Eastern Poland, Northern Italy and the Balkans, and eastwards across the Pacific its fringe rests on the western regions of Central and South America. In spite of importations on a fairly large scale during both world wars and temporary endemicity in a few areas thereafter, this Shiga type has never become established in Western Europe (Howe, 1977).

Both Flexner and Sonne organisms are widely distributed and have been isolated in most countries at one time or other. In areas such as India, South America and some far Eastern States with a high dysentery rate. In many parts of Northern Europe and North America, Sonne infection accounts for most of the cases.

4.4 DYSENTERY SPREAD IN MAHARASHTRA :

It is observed that dysentery is a common disease found all over Maharashtra. But it seems that dysentery is not a major disease as the average death rate of the last two decades is declining sharply. The author has calculated the death rate of Maharashtra for rural and urban areas separately for the years 1965-83. It mainly shows that dysentery is prominent disease in urban areas rather than rural.

4.4.1 Factors affecting dysentery in Maharashtra :

Dysentery is most common disease found all over the Maharashtra State. The various physical and socio-cultural factors are affecting it's spread. These factors are studied

in detail. Amongst physical factors; slope of land, velocity of river, seasonal incidence based on the duration of the precipitation are the major factor affecting the levels of endemicity of dysentery in Maharashtra. The slope of region affect mortality rate of this region. In Konkan division, terrain slope is very steep and the percentage of rainfall is more. It leads generally to more surface outwash. Monthly variation in temperature and humidity are highly responsible for development of disease organisms.

Density of population is another major factor governing the spread of disease in any region. In slum areas of the city, density of population is more which leads to the problems of sanitation, filtered drinking water and availability of medical aid. It leads to high mortality. Amongst other social factors religion, social customs, pollution, population migration, economic status of people, fairs and festivals affect mortality pattern of dysentery.

4.5 DISTRICTWISE SPREAD OF DYSENTERY :

The author has collected mortality data districtwise for the span of 19 years in the Maharashtra State, from 1965-83 and it has also been split up in rural and urban areas. The yearly death rates were calculated under three periodical groups i) 1965-70 ii) 1971-76 and iii) 1977-83 to study the temporal changes. It is found that dysentery is most common disease in all districts of Maharashtra. But mortality rates vary differently in different districts.

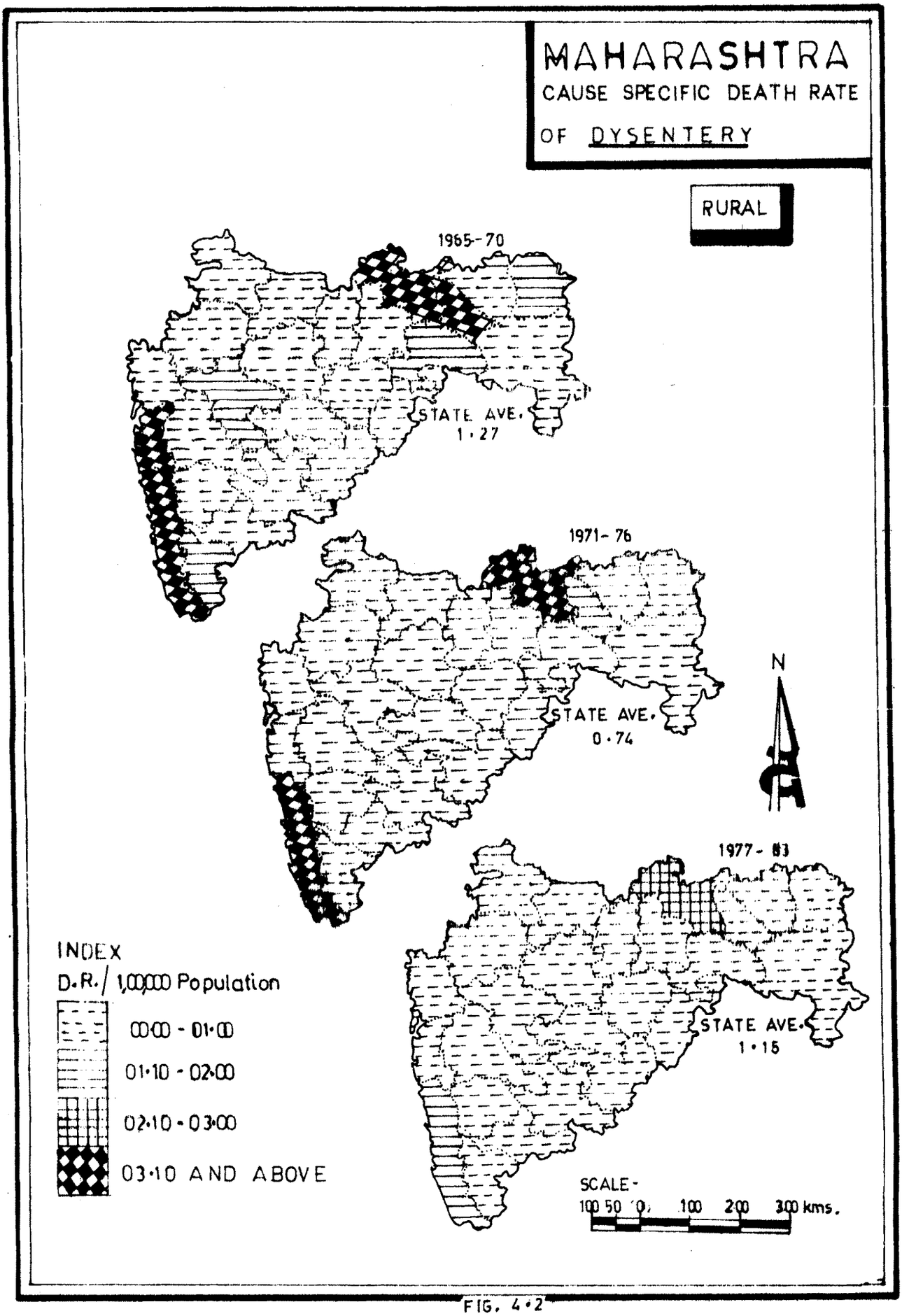
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DYSENTERY
RURAL
1965-70
STATE AVE.
1·27
1971-76
STATE AVE.
0·74
1977-83
STATE AVE.
1·15
N
INDEX
D.R./ 1,00,000 Population
00·00 - 01·00
01·10 - 02·00
02·10 - 03·00
03·10 AND ABOVE
SCALE -
100 50 0 100 200 300 kms.

FIG. 4·2

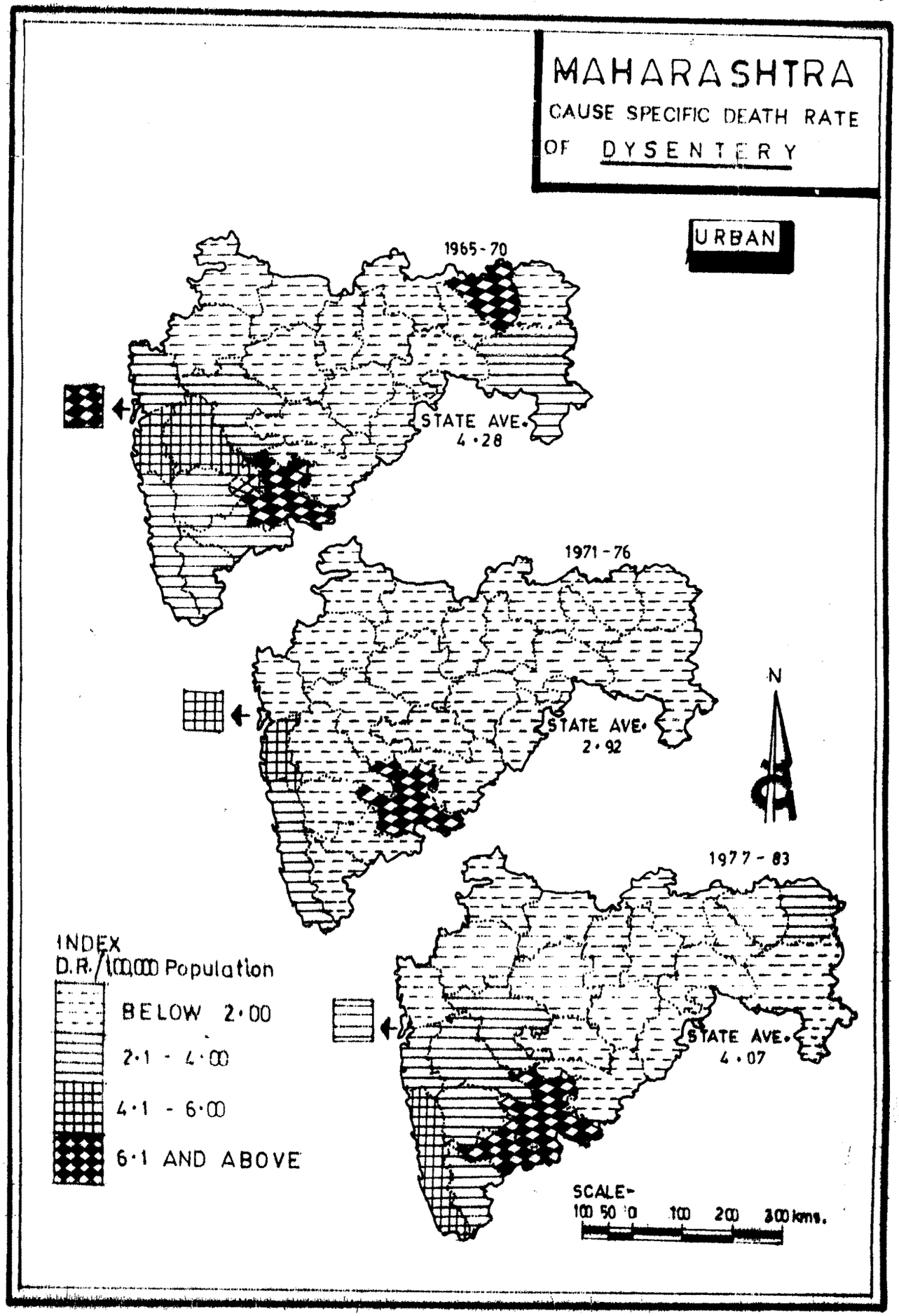
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DYSENTERY
URBAN
1965-70
STATE AVE.
4·28
1971-76
STATE AVE.
2·92
1977-83
STATE AVE.
4·07
N
INDEX
D.R./100,000 Population
BELOW 2·00
2·1 - 4·00
4·1 - 6·00
6·1 AND ABOVE
SCALE-
100 50 0 100 200 300 kms.

FIG. 4·3

The choropleth map of rural area (Fig.4.2) show that during 1965-70, the highest intensity zone of dysentery was located in districts like Raigad and Ratnagiri of Konkan division and in the Wardha-Wainganga basin of Vidarbha division i.e. in Amraoti and Wardha districts. The average death rate of the state during the said period was 1.27/1,00,000 pop. Bhandara, Yeotmal, Kolhapur and Ahmednagar districts were of moderate intensity and in all other districts rate was low. The rural mortality rates have decreased in the second period (1971-76) but comparitively the rates are high in Ratnagiri, Amraoti and Wardha than other districts of Maharashtra State. In the third period (1977-83), the rates have gone substantially down in all districts with state average of 1.15/1,00,000 pop. but Amraoti and Ratnagiri districts show high mortality rates.

The choropleth map for urban areas (Fig.4.3) shows that during first period 1965-70, the cities of all districts were affected by dysentery. The average death rate of dysentery in urban area was 4.28/1,00,000 pop. The highest urban mortality was observed in the districts of Bombay, Solapur and Nagpur, while the Thana, Raigad, Poona, Ratnagiri, Sangli, Kolhapur, Satara, Ahmednagar and Chandrapur districts' cities have moderate mortality rate. The cities of Dhule, Jalgaon and all other districts have low mortality rates. The mortality rate has decreased in the second period (1971-76) as the state average rate has declined upto 2.92/1,00,000 pop. The cities of Bombay, Raigad, Ratnagiri and Solapur districts show high mortality rates. In the

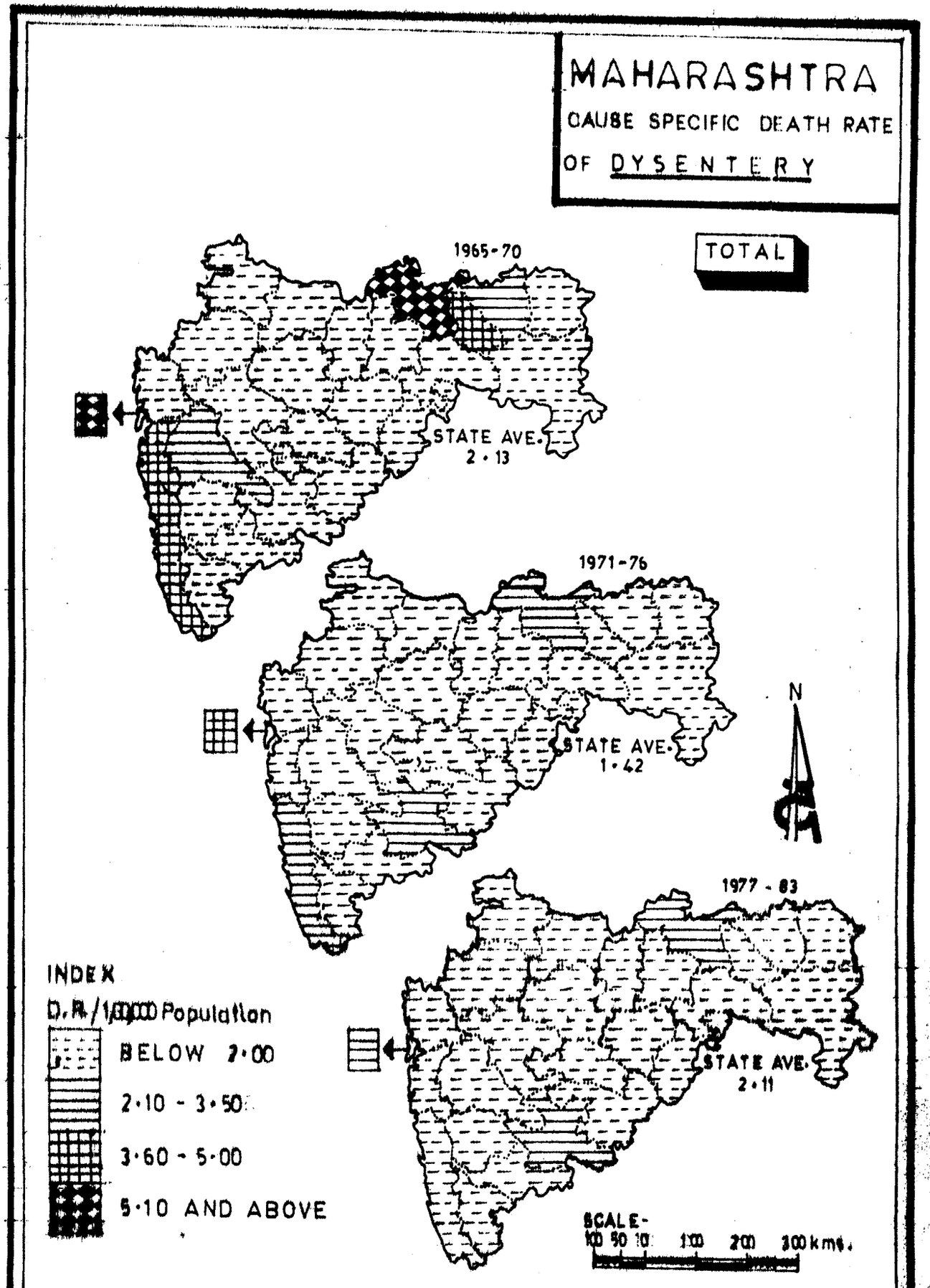
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DYSENTERY
TOTAL
1965-70
STATE AVE.
2·13
1971-76
STATE AVE.
1·42
1977-83
STATE AVE.
2·11
N
INDEX
D.R./1,00,000 Population
BELOW 2·00
2·10 - 3·50
3·60 - 5·00
5·10 AND ABOVE
SCALE-
100 50 10 100 200 300 kms.

FIG. 4·4

third period (1977-83) also Bombay, Ratnagiri, Raigad, Sangli, Kolhapur, Solapur, Satara, Ahmednagar, Bhandara urban areas show highest intensity of this disease than other districts.

The general districtwise (rural + urban) death rate of dysentery of Maharashtra State is shown in Fig.4.4. This map shows that, during first period (1965-70) the highest intensity of dysentery was observed in the districts of Bombay, Raigad, Ratnagiri, Amraoti and Wardha. These districts' mortality rates are higher than the state average i.e. 2.13/1,00,000 population. The districts like Poona and Nagpur show the moderate mortality rates and in remaining districts, the rates are low. During second period (1971-76) the overall mortality rate has decreased (State average, 1.42/1,00,000 pop.). But the districts of Bombay, Ratnagiri, Solapur, Amraoti show still the high mortality rates. In third period (1977-83), the disease mortality was found it's trace in Bombay, Amraoti and Solapur districts.

The Bombay city shows high mortality in all years under study. The high density of population, defective drinking water and rapid growth of slum areas lead to this high intensity. Amraoti and Wardha districts of Wardha-Wainganga basins have more water stagnation due to gentle slope of land which might be leading to more spread.

4.6 CITYWISE SPREAD OF DYSENTERY :

Here, the researcher proposes to study the spatio-temporal analysis of dysentery in major cities (population of each of which

MAHARASHTRA

CAUSE SPECIFIC DEATH RATE OF DYSENTERY (CITIWISE) (1971-83)

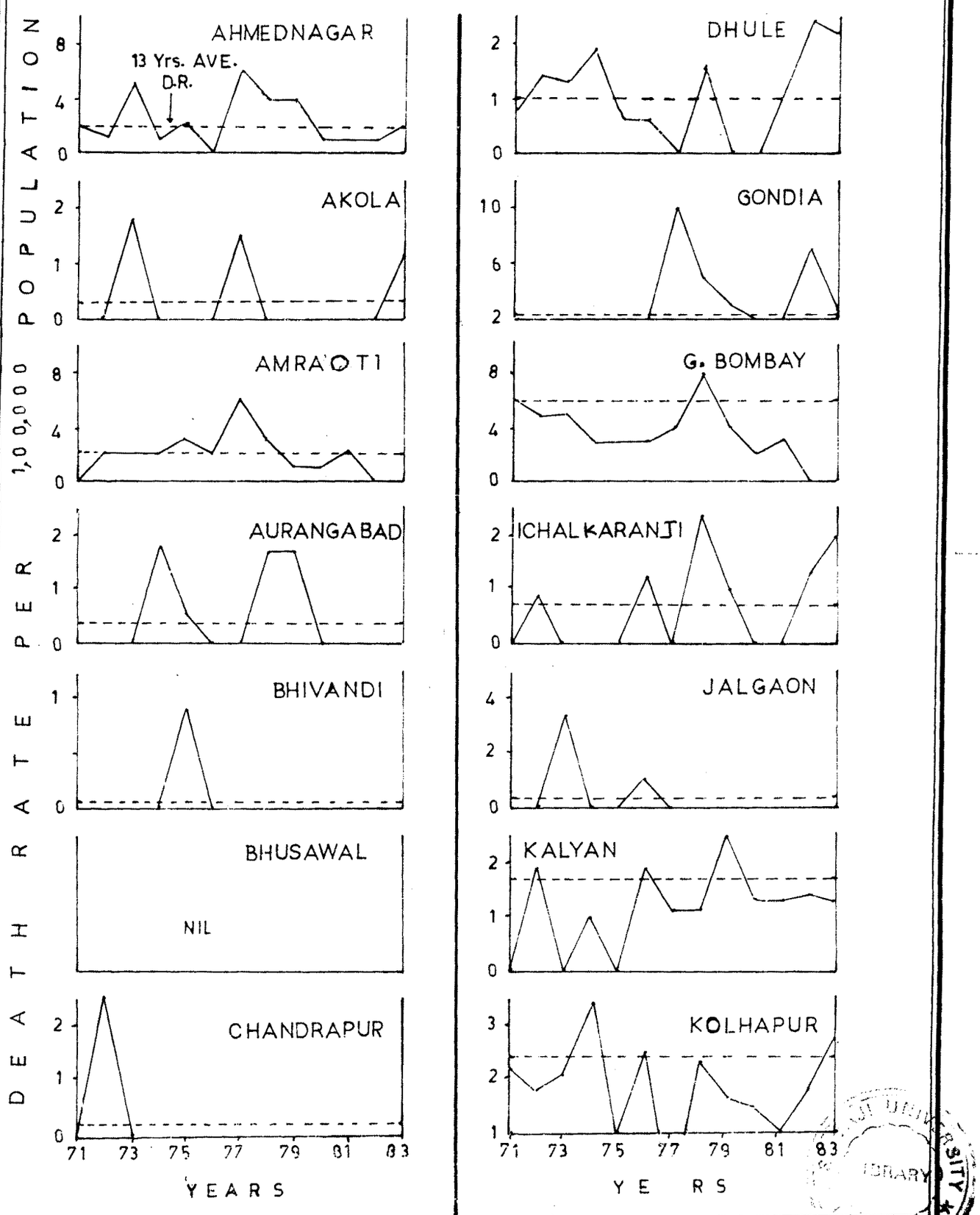

FIG. 4-5

MAHARASHTRA

CAUSE SPECIFIC DEATH RATE OF DYSENTERY (CITIWISE) (1971 - 83)

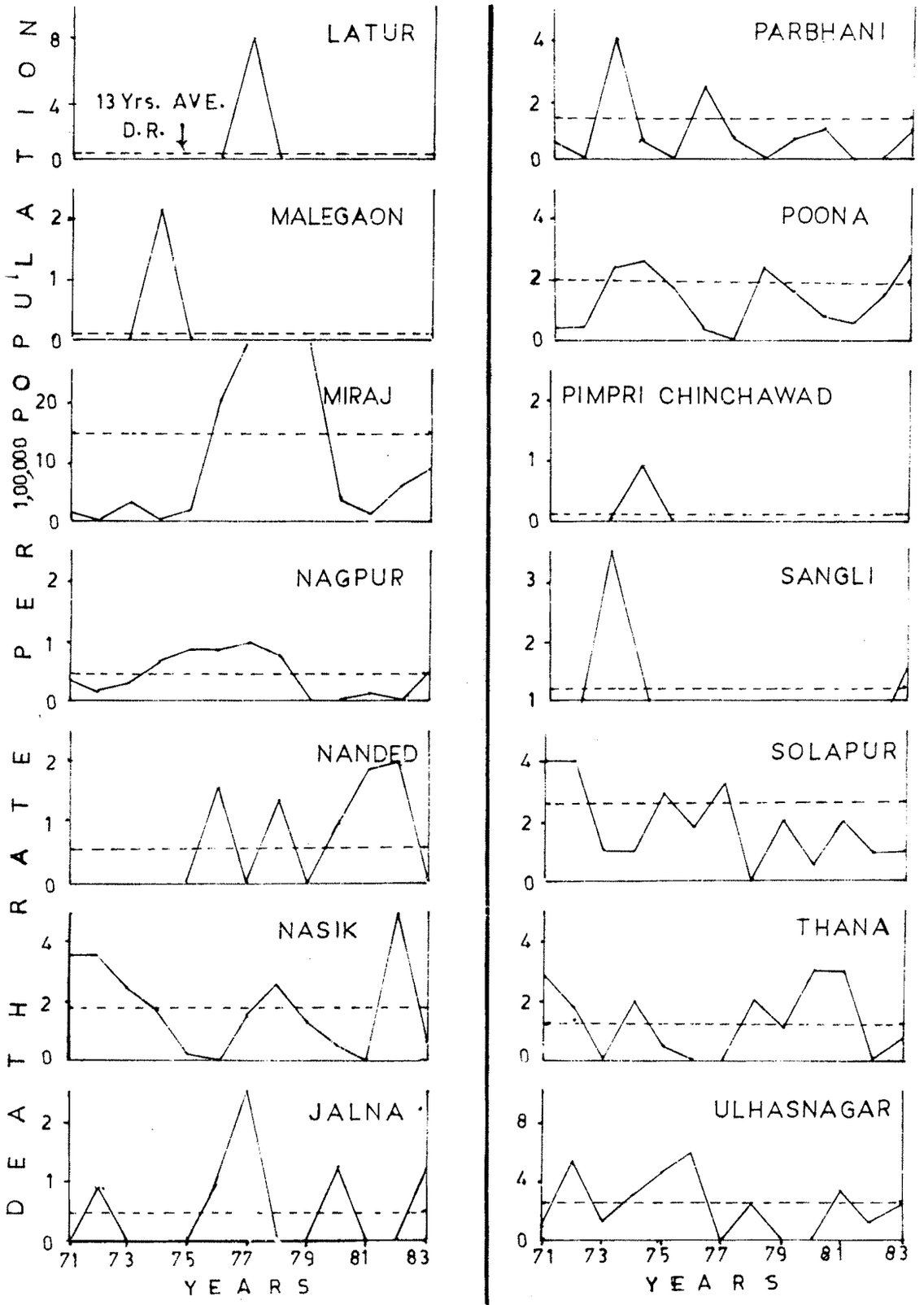

FIG. 4·6

is above one lakh per 1981 census) of Maharashtra State. The author has collected the data about mortality of dysentery occuring in different cities throughout the Maharashtra State. The data so collected for the period of 13 years (1971-83) are studied citywise, and is shown with the help of line graphs in Fig.4.5 and Fig.4.6. The cities selected for the study are twenty eight in number. Each graph also shows the average death rate of a city for the last 13 years (1971-83).

The high mortality rates of dysentery are observed in the cities like Miraj (20/1,00,000 pop. in 1977), Gondia (10/1,00,000 pop. in 1977), Gr.Bombay (8/1,00,000 pop. in 1978) and also in Latur, Ulhasnagar, Amraoti, Ahmednagar which is above 4/1,00,000 population each. These cities top in the list of mortality ranking of dysentery. These cities are located in low lying areas of Wardha-Wainganga river basin and in Godawari river basin. Though, the rainfall is comparatively low, the water stagnation and sluggishness have caused the spread. The possibility of water pollution might be more in Nasik, Jalna, Parbhani, Poona, Sangli, Thana, Dhule, Jalgaon and Kolhapur as the death rates of these cities vary in between 2 and 3/1,00,000 population, while the Bhusawal city is free from dysentery.

4.7 DIARRHOEA :

Diarrhoea is one of the commonest ailments of infants and children. Probably no child escapes suffering from it at one stage or the other. Because of poverty, ignorance and

insanitary livings, diarrhoea is more common in India than in other developed countries. Children of all ages suffer from diarrhoea, but it is more common amongst infants, especially amongst those who are artificially fed than in those who are breast fed. The infants are naturally deficient in respect of the acid barrier of the stomach. Apart from the adequancy of diet, the preparation, storage and nature of food, governed as they are by local and natural habits may have considerable influence on the transmission of the infections. Dysentery and diarrhoea together occupy the third place in mortality rate amongst all diseases. In India, nearly 5 percent of the deaths occur due to dysentery and diarrhoea. It is mainly a rural disease and caused due to contaminated water and food, poverty, ignorance and insanitary conditions of living. This disease may be divided into two type - i) Non-infective diarrhoea and ii) Infective diarrhoea (Vakil,1973).

i) Non-infective diarrhoea :

It occurs due to the allergy or intolerance to certain foods. The digestive disturbance due to the indigestion of certain milk or food to children cause non-infective diarrhoea. This may also due to insufficient digestive juice such as saliva, gastric juice and intestinal juices.

ii) Infective diarrhoea :

Infection occurs through contaminated water and food with bacteria such as B.coli, Shigella bacilli and Salmonella

groups, (Mahajan B.K.,1972). Acute diarrhoea is set by irritating the intestine by these germs.

It is generally observed that the effect of climate is less on non-infectious diarrhoea but in the case of infectious diarrhoea, the climatic factors do effect largely. Use of contaminated water is directly related with its spread. Water from rivers and streams is in general, potentially dangerous. Indirectly the influence of climate on dietary needs and habits provide varying opportunities for infection in different areas through a variety of agencies in which the important role of the vectors is played by house flies or the fomoites. These flies do the work of carrier of the organisms through faces and the food of the infected person.

4.8 DIARRHCEA SPREAD IN MAHARASHTRA :

It seems that, diarrhoea is common disease found all over Maharashtra State. But the average death rate for the last two decades is declining substantially. The author has calculated the death rate of Maharashtra for rural and urban areas separately for 1965-83.

4.8.1 Factors affecting diarrhoea in Maharashtra :

The terrain of the region mainly affects the spread and distribution of disease. The physical and socio-cultural factors govern the distribution and spread of disease. The low lying regions, with high temperature and polluted water conditions allow the disease vector to develop fastly. High

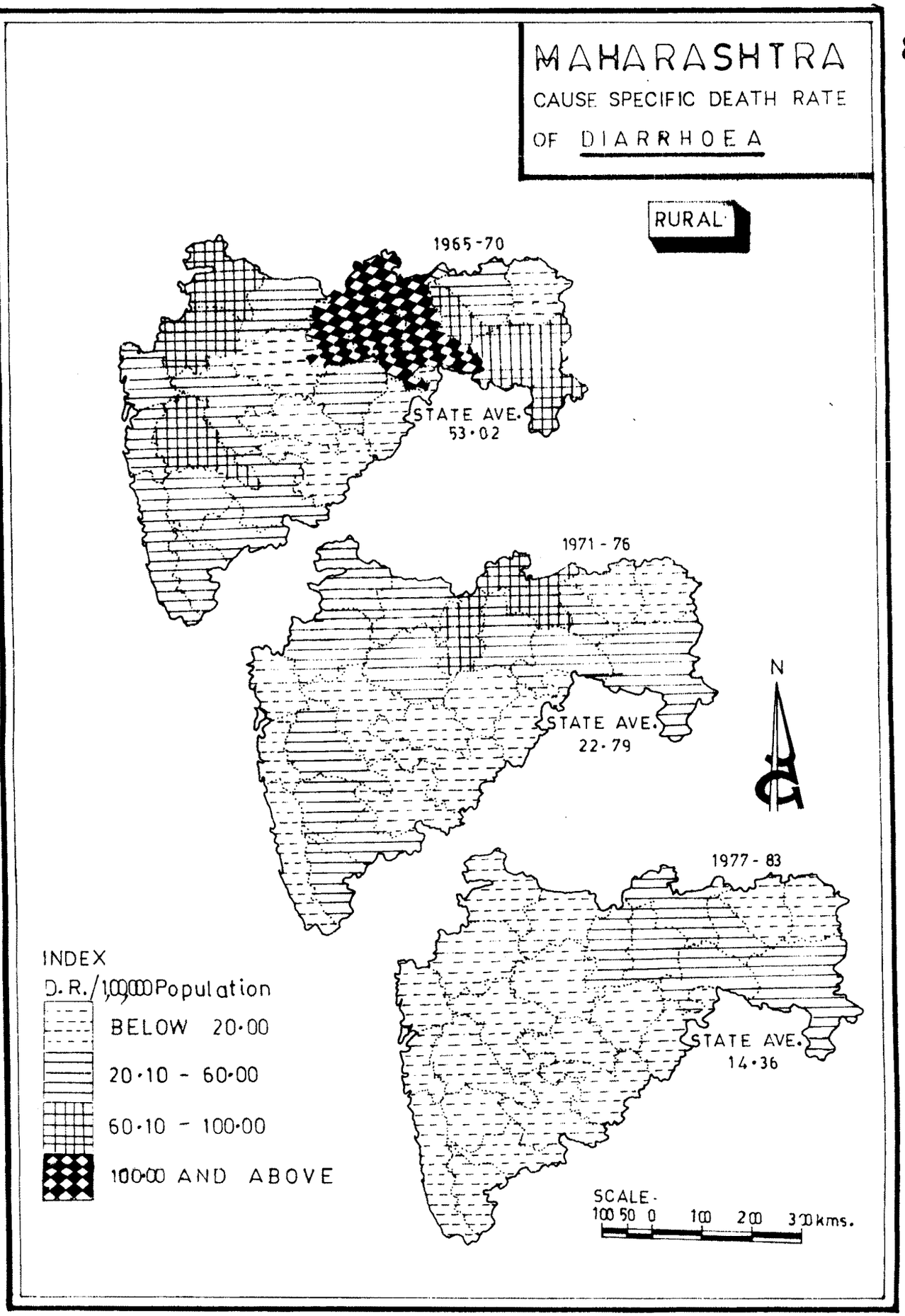
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DIARRHOEA
RURAL
1965-70
STATE AVE.
53·02
1971-76
STATE AVE.
22·79
1977-83
STATE AVE.
14·36
N
INDEX
D.R./1,00,000 Population
BELOW 20·00
20·10 - 60·00
60·10 - 100·00
100·00 AND ABOVE
SCALE-
100 50 0 100 200 300 kms.

FIG. 4·7

altitudes with low temperature and clear air conditions show the low spread of the disease. In Maharashtra almost all rivers flow in their second stage. The slope of the river basins is moderate, water become stagnated and this water sluggishness give rise to disease vectors.

4.9 DISTRICTWISE SPREAD OF DIARRHOEA :

The author has collected mortality data districtwise for the span of 19 years in this Maharashtra State from 1965-83 and it has also split up in rural and urban areas. The yearly death rates were calculated under three periodical groups - i) 1965-70 ii) 1971-76 and iii) 1977-83 to study the temporal changes. It shows that, diarrhoea is most common disease in all districts of Maharashtra State.

The choropleth map of rural area (Fig.4.7) shows that during 1965-70, the highest intensity of diarrhoea is found in the districts like Buldhana, Akola, Amraoti and Yeotmal of Vidarbha and Nagpur division. The average death rate of the state during the said period was 53/1,00,000 pop. Two times more rate is observed in above region than state average. Dhule, Nasik, Poona, Wardha and Chandrapur districts were of moderate intensity and the remaining districts show low mortality rate. The rural mortality rates have decreased in the second period (1971-76) but comparitively the rates are higher in Buldhana and Amraoti than in other districts of Maharashtra State. In the third period (1977-83), the rates have gone substantially

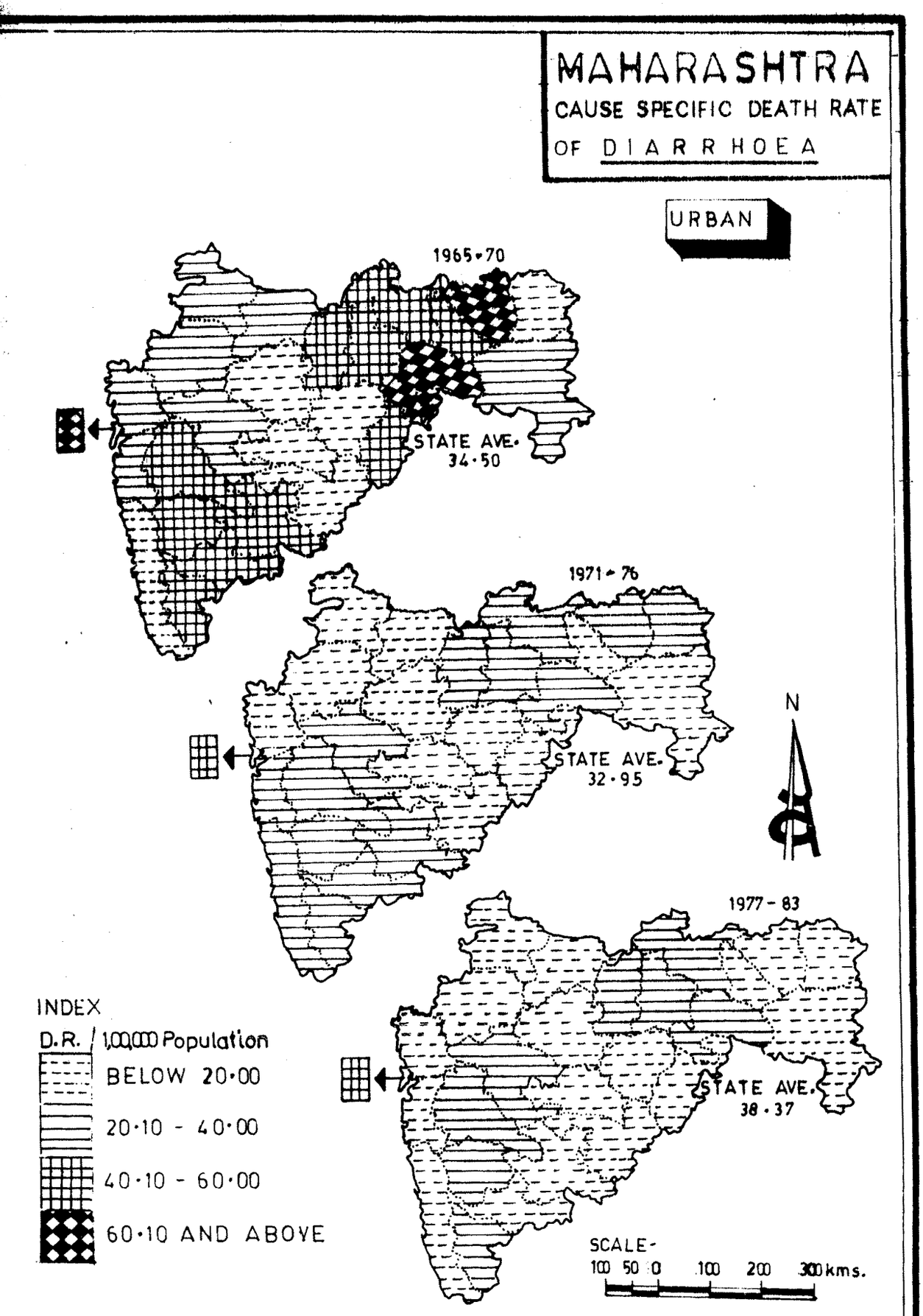
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DIARRHOEA
URBAN
1965-70
STATE AVE.
34·50
1971-76
STATE AVE.
32·95
N
1977-83
STATE AVE.
38·37
INDEX
D.R. / 1,00,000 Population
BELOW 20·00
20·10 - 40·00
40·10 - 60·00
60·10 AND ABOVE
SCALE-
100 50 0 100 200 300 kms.

FIG. 4·8

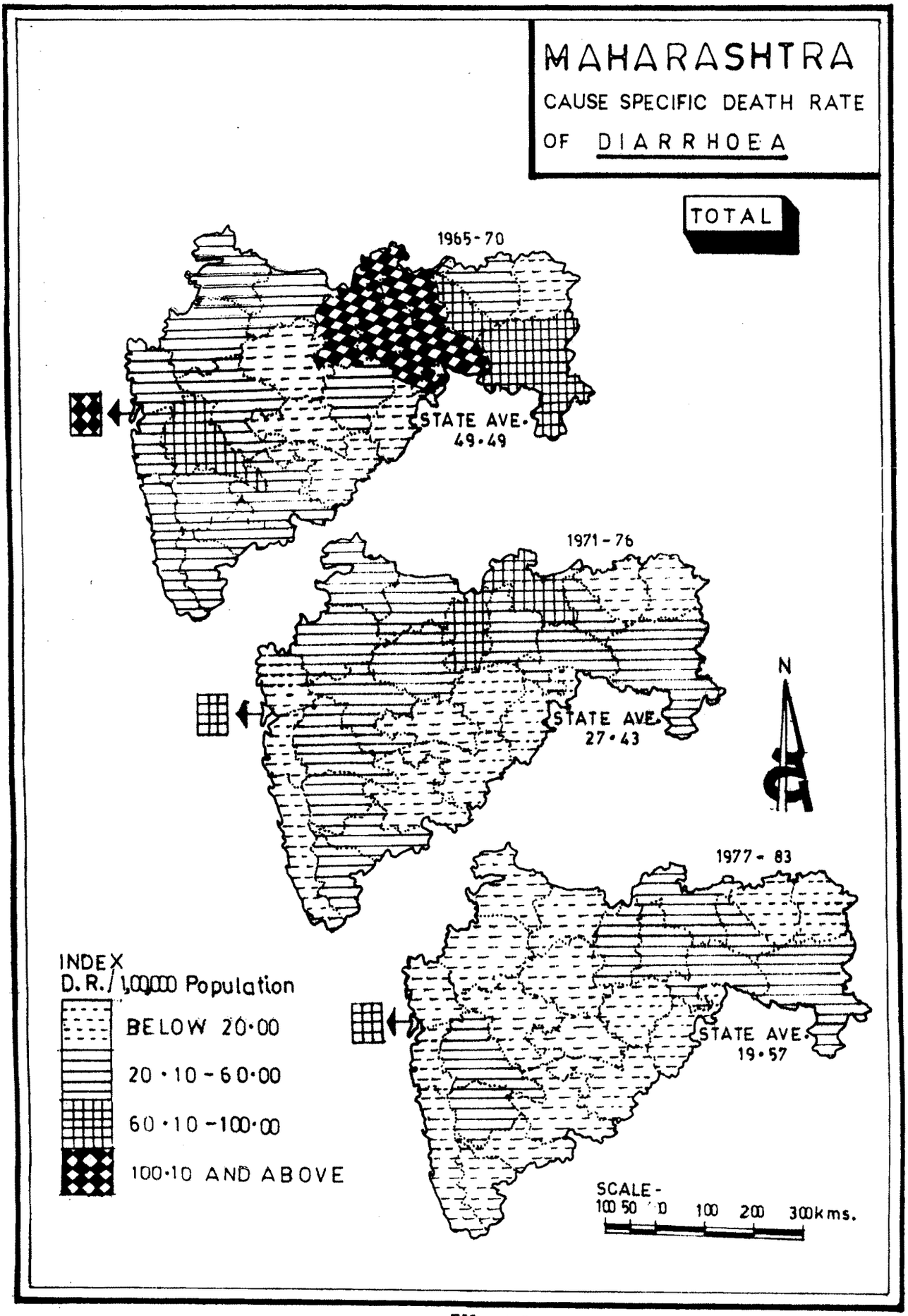
MAHARASHTRA
CAUSE SPECIFIC DEATH RATE
OF DIARRHOEA
TOTAL
1965-70
STATE AVE.
49.49
1971-76
STATE AVE.
27.43
1977-83
STATE AVE.
19.57
N
INDEX
D.R./1,00,000 Population
BELOW 20.00
20.10-60.00
60.10-100.00
100.10 AND ABOVE
SCALE-
100 50 0 100 200 300kms.

FIG. 4.9

down in all districts with state average as 1.15/1,00,000 pop. but the districts of Vidarbha division show high mortality rates.

The choropleth map for urban areas (Fig.4.8) shows that during first period (1965-70), the cities of all districts were affected by diarrhoea. The average death rate of diarrhoea in urban area was 34.50/1,00,000 pop. The highest urban mortality was observed in the cities of Bombay, Yeotmal and Nagpur districts. While the Pune, Satara, Sangli, Solapur, Kolhapur, Buldhana, Akola, Amraoti, Wardha, Nanded districts have moderate urban mortality rates. The cities of all other districts have low mortality rate. The mortality rate has decreased in the second period (1971-76) as the state average rate has declined upto 32.95/1,00,000 pop. The cities of Bombay, Raigad, Ratnagiri, Ahmednagar, Poona, Satara, Sangli, Solapur, Kolhapur, Buldhana, Akola, Amraoti, Nagpur, Bhandara, Yeotmal show highest mortality than other districts' cities. In third period also Bombay, Ahmednagar, Poona, Satara, Sangli, and Vidarbha division cities show higher intensity of diarrhoea than other districts.

The general districtwise (rural + urban) death rate of diarrhoea in Maharashtra State is shown in Fig.4.9. The high mortality rate is observed in districts like Buldhana, Akola, Amraoti and Yeotmal of Vidarbha division which are located in Wardha - Wainganga basin. High density of population of Bombay city show high mortality rate. In second period (1971-76), disease mortality

MAHARASHTRA

CAUSE SPECIFIC DEATH RATE OF DIARRHOEA (CITIWISE) (1971-83)

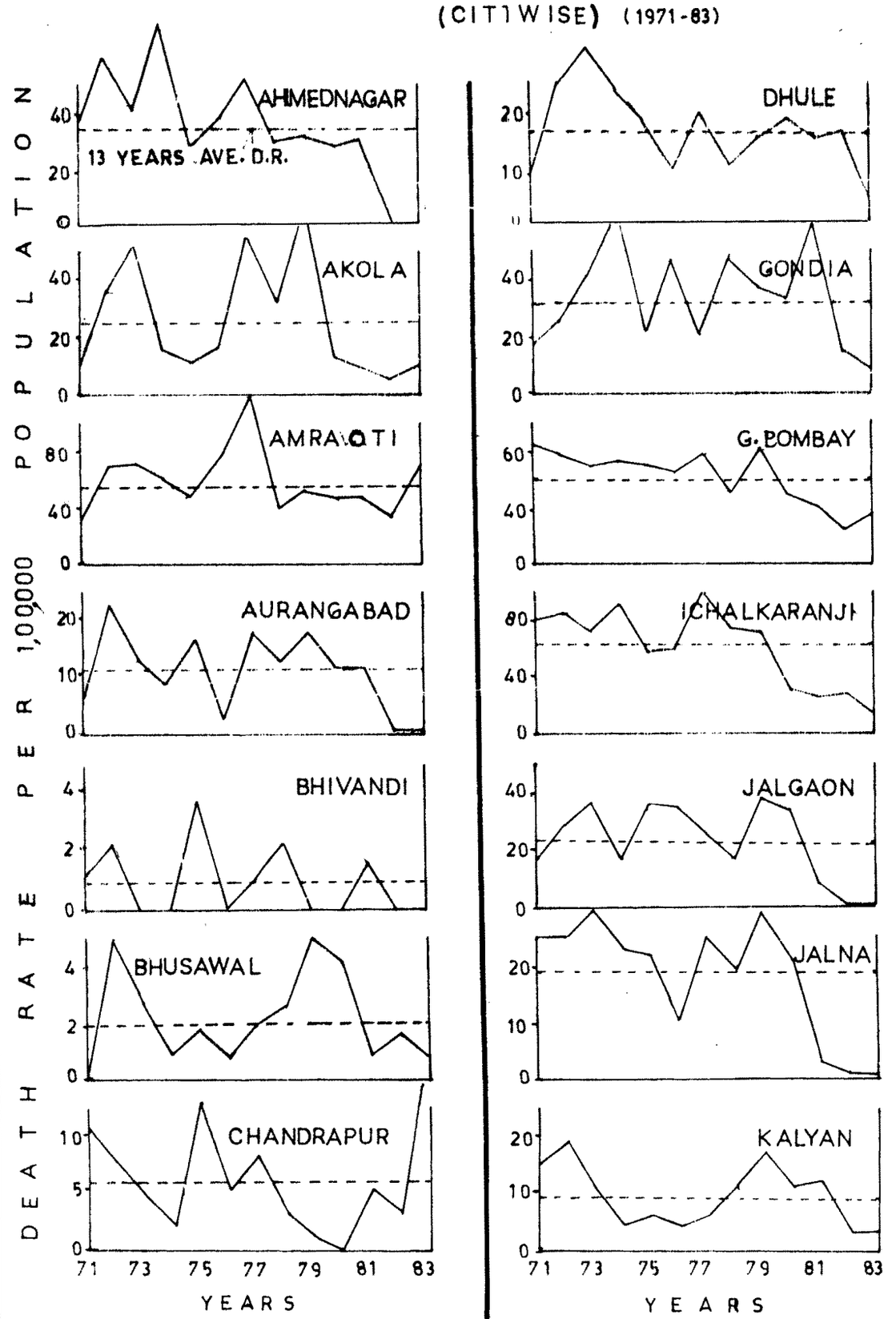

FIG. 4·10

MAHARASHTRA

CAUSE SPECIFIC DEATH RATE OF DIARRHOEA

(CITIWISE 1971-83)

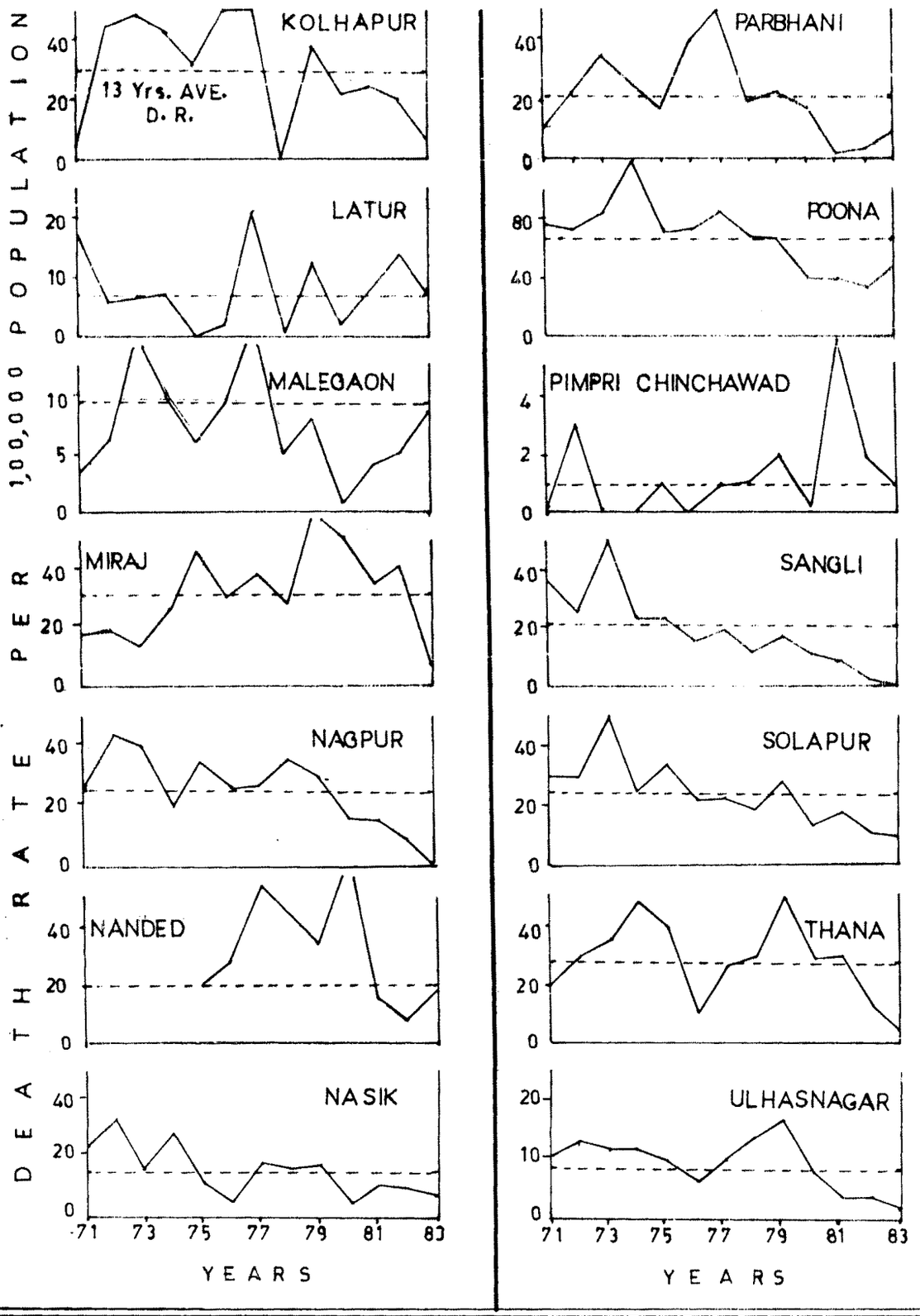

FIG. 4.11

has sharply decreased but Buldhana, Amroti and Gr.Bombay show high mortality rates. In the third period (1977-83), overall mortality rates have decreased.

4.10 CITYWISE SPREAD OF DIARRHOEA :

The citywise data is collected for the period of 13 years (1971-83) and is shown with help of line graphs in Figs.4.10 and 4.11. The cities selected for the study are twenty eight in numbers. The yearwise cause specific mortality rates per one lakh population have been calculated and the dotted lines on each graph shows the average death rate of diarrhoea of a city for the last 13 years (1971-83).

The graph shows that diarrhoea was most prominant disease in all cities. The highest mortality rate of diarrhoea is observed in Ahmednagar (70/1,00,000 pop. in 1974), followed by Amraoti (100/1,00,000 pop. in 1977), Ichalkaranji (9001,00,000 in 1977)and in Poona (100/1,00,000 pop. in 1974). These cities supply drinking water by pipeline and possibility of contamination of water is more. The possibility of water pollution might be more in Latur, Nasik, Ulhasnagar, Malegaon, Aurangabad, Dhule, Jalna, Kalyan, as the death rate varies between 5 and 30/1,00,000 population. It is observed that more concentration of disease in cities of Wardha-Wainganga, Tapi river basin and Godawari river basin areas might be because of low precipitation and use of unsafe drinking water. The high density of population might be mainly affecting in metropolitan cities like Gr.Bombay, Thana and Poona.

4.11 CONCLUSION :

The spatial distribution of diseases is mainly related to physico and socio-cultural environment. The land terrain and percentage of rainfall might be determining the spread of these diseases. The spread and concentration of dysentery in districts like Gr.Bombay, Raigad, and Ratnagiri of Konkan division as well as Amraoti and Wardha districts of Vidarbha division of Wardha-Wainganga basin are the endemic focii of dysentery. The terrain slope is gentle which leads to stagnation of water. The other socio-cultural factors like density of population, water supply, pollution (urbanization and industralization) might also be responsible for the spread.

The citywise spatial analysis of dysentery shows that highest infection is found in cities like, Miraj, Gondia and Gr. Bombay. High density of population, lack of sanitation, lack of personal hygiene, unsafe water supply for drinking purposes are the leading factors.

The spatial pattern of diarrhoea shows the highest mortality in the districts of Wardha-Wainganga basin of Vidarbha division. Buldhana, Akola and Amraoti districts are much affected. These regions are the low lying areas with gentle terrain slope thereby causing stagnation of water.

The citywise spatial analysis of diarrhoea studied in this chapter, shows that the diarrhoea is a major disease in the major cities of Maharashtra State. It is mainly found

in cities like Gr. Bombay, Thana, Raigad, Nasik of Konkan division and Ahmednagar, Amraoti, Ichalkaranji and Poona cities. The polluted river water used for drinking purposes in cities might be responsible for it's spread.

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