

CHAPTER - II

ENVIRONMENT AND ITS INFLUENCE ON HEALTH

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R e f e r e n c e s

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2.1 INTRODUCTION :

It is well known fact that man is controlled by the nature in which he resides. It is true that environment shapes the health of the individual and of society. " In the modern concept, disease is nothing but a disturbance in the delicate balance between man and his environment. The key of the nature, occurrence, prevention and control of the disease lies in the environment. Without this knowledge, this key may not be available to the physician who desires to cure disease, prevent or control it," (Park and Park, 1979). Eventhough, genotypical factors which are fixed in nature are responsible for the cause of disease but they are not responsible for the spread of disease in the community. The phenotypical factors which are variable in nature are responsible for the spread and proliferation of the diseases in the society. Environment consists of all the phenotypical factors which are also called as geographical factors. Man's physique is directly exposed to the environment and hence medical geographer is mainly concerned with the relation between environment and health of man. Medical geographer is mainly concerned with these phenotypical factors which are responsible for the spread of diseases in any region. The systematic study of these phenotypical factors becomes the focal theme of studies in Medical Geography.

While considering the above preposition, the researcher has attempted to analyse the effect of environment on the pattern

of distribution of major diseases in various districts of Vidarbha division. The analysis made by the researcher in this chapter is based on the physical and socio-cultural factors which are responsible for the distribution of diseases in the eight districts of Vidarbha region. These factors have been analysed districtwise and citywise for major diseases in general as main aim of the researcher is to concentrate his attention on the districtwise distribution of diseases.

Environment has two aspects - i) physical and ii) socio-cultural. Physical environment consists of several factors like physiography, drainage, climate etc, while socio-cultural environment consists of population, growth, education, sex, age, housing, standard of living, food habits, diet, water supply, pollution, social customs etc. " Indeed man is very largely a product of his social and cultural environment which he shapes and is shaped by it," (Park and Park, 1979).

It is rather difficult to collect all reliable data about all depending variables of environment at district and city level. The researcher has selected some of the important aspects for his studies about which reliable and continuous data were made available. Amongst the physical environmental factors physiography and climate (rainfall and temperature) have been selected and correlated with disease distribution in the cities, and at district level and from the socio-cultural variables literacy, age and sex have been correlated. While relating

climatic factors (i.e. monthly rainfall, temperature) with monthly attack rate of certain infectious diseases in Vidarbha region. The researcher has found out that some water-borne diseases like cholera, dysentery and diarrhoea have taken more toll in the particular months i.e. in August and September, the months of rainy season.

The early age of human life is an important state in human life span. The problem of infant mortality is very seriously faced in many developing countries including India. It seems that the problem is increasing in the rural areas rather than in urban areas. " Being so tender and defenceless, the human infants depend for it's survival upon the ability of the parents to nurse and protect him from natural as well as social factors unfavourable to his physical and mental health," (Mishra R.P.,1970). In underdeveloped countries, much of the people live below povertyline, where attention to the infants is poor and unscientific. Hence, large number of infants die in first year of their birth. While considering the statement of Prof.Mishra as quoted above, it may not be improper to study infant mortality in relation to socio-cultural factors in various districts of Vidarbha Division. Hence, in the section of infant mortality (Table 2.2) the researcher has analysed this aspect to show the divisionwise and statewide inequalities in infant mortality rates of Vidarbha division.

A study of disease ranking is very useful in understanding the distributional pattern of diseases in any area, because it

provides an idea of the relative dominance of different diseases in order of importance (Pandurkar, 1981). The ranking technique is based on percentage of deaths of particular diseases like cholera, dysentery, diarrhoea, tuberculosis, leprosy, tetanus, small pox, measles, jaundice, malaria, cancer, and pneumonia in this division. The detailed disease ranking technique is discussed at the appropriate place.

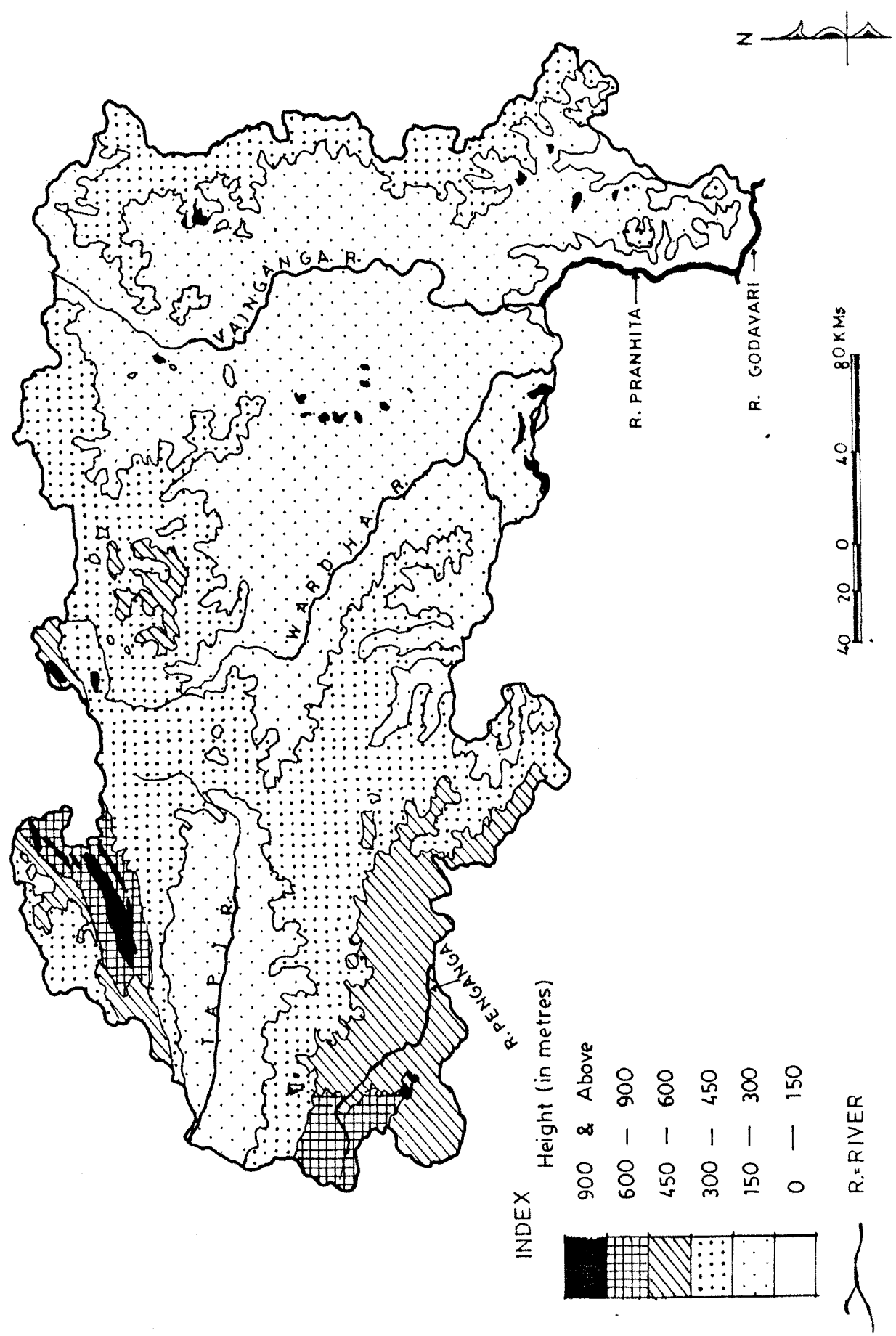
2.2 EFFECT OF PHYSICAL ENVIRONMENT ON THE DISEASES :

As stated earlier, environment may be divided into two types i) physical and ii) socio-cultural. Physical environment consist of non-living things and certain physical factors viz. physiography, drainage, soil, climate etc. Man is in constant interaction with this physical environment. The effect of physical environment on the health of man can be studied with physiography, drainage and climate as they are the dominant factors.

2.2.1 Physiography :

The physiography determines the distribution of diseases in the area. Some specific diseases are found at specific physiographic features. The effect of altitude on the spread of vectors of the diseases has certainly proved its correlation. This correlation is negative. When altitude increases spread of disease decreases because cold climate, clean air and abundant sunlight do not allow to survive many vectors causing disease.

VIDARBHA DIVISION (Physiography)



INDEX
Height (in metres)

	900 & Above
	600 — 900
	450 — 600
	300 — 450
	150 — 300
	0 — 150
	R.= RIVER

Fig. 2.1

The Vidarbha region is located on the north-eastern corner of Maharashtra Plateau which is part of Deccan Plateau. This region can be divided into three parts physiographically (Fig.2.1).

- i) The hilly area of Melghat and Ajanta hills,
- ii) Plateau region - Buldhana plateau and eastern part of the region,
- iii) Lowlying region of Wardha-Wainaganga river valleys.

The part of Satpura mountain emerges in the northern part of Amraoti district which is locally known as "Gavilgad hills". " It is arcuate in form, 20 to 40 kms in width. The southern slopes of these ranges fall from a height of about 1200 meters to below 300 meters," (Arunachalam B., 1967); while, very steep slope can be observed in the southern side. The range of Ajantha hills has gone through Buldhana and Yeotmal districts towards northern side locally known as 'Satmala hills' which lie between the height of 600 m. and 450 m. above mean sea level. In the extreme eastern part, especially east and South of Nagpur, occasional residual hills reach as high as 450 meters.

The Purna river flows between Satmala to the south and Melghat-Gavilgad to the north, which is tributary of Tapi river goes towards westward side at the height of 450 to 300 metre above main sea level. Wardha-Wainaganga river valley is located at a height of 450 to 300 metre above main sea level. Penganga originates in the hilly area of Satmala, runs towards eastern

side and joins the Wardha river. Wardha river valley is located in the central part of Vidarbha. 'The Umar hills and the Chimur hills form the water divide between Wardha and Wainaganga river valleys and attain a height of 418 and 450 metre respectively. Elsewhere the land is much lower and in the flood plains, the land descends to a level of 150 metres,' (Dikshit K.R.,1986). Indravati river valley lies below 150 metre above main sea level. These rivers (Wardha, Wainganga, Penganga and Indravati) are the tributaries of Pranhita river which is tributary of Godavari river.

2.2.2 Drainage :

Rivers in the Vidarbha region generally run eastward and southward except Purna river. Purna is a tributary of Tapi river, drains some part of Amraoti district. The most important tributary that forms part of the larger Godavari system is Wardha-Wainaganga river which joins to form the Pranhita river. " Wardha river emerges from the southern slopes of Satpura hills and drains central part of Vidarbha region. The total length of Wardha is of 455 kilometers and it joins the Wainganga. Wainganga drains a much larger area and has developed the broad plain which runs north-south. It rises from M.P. hills and has a southernly course of about 295 kilometers before it joins Wardha. The Penganga is it's principal tributary in the west, which drains most of the Buldhana-Yeotmal plateau," (Deshpande C.D.,1971). In the eastern part of Vidarbha, streams follow the dendritic type of

pattern. Tanks are found in Chandrapur and Bhandara district which are used for irrigation purposes.

According to this physiography and drainage the distribution of major diseases may be found vividly. The researcher could not establish perfect relationship between physiography, drainage and distribution of diseases, but the general pattern of distribution of major diseases shows that the death rate is low in a hilly region especially in the Ajantha and Gavilgad hilly area of Buldhana, Yeotmal, Amraoti district and eastern part of hilly region of Bhandara and Chandrapur district. People seem to be sturdy and healthy in hilly regions, while in the river valleys like Wardha-Wainganga, Purna and Painaganga the disease death rate is comparatively high.

In the Wardha-Wainganga and Purna river basins of Amraoti, Wardha, Yeotmal, Nagpur and Chandrapur districts drainage is mainly responsible for the spread of water-borne diseases like dysentery, cholera and diarrhoea, where the water of the rivers have been contaminated with human activities. Man made pollution of the river water is seriously affecting the health of man. Drainage plays an important role in distributing infectious water-borne diseases in a region.

2.2.3 Climate :

It may be stated that climatic conditions greatly influence the health of man. Climatic conditions and health have positive type of correlation. The seasonal variation

VIDARBHA DIVISION

CHOLERA - RELATION BETWEEN MONTHLY RAINFALL, TEMPERATURE & MONTHLY ATTACK RATE.

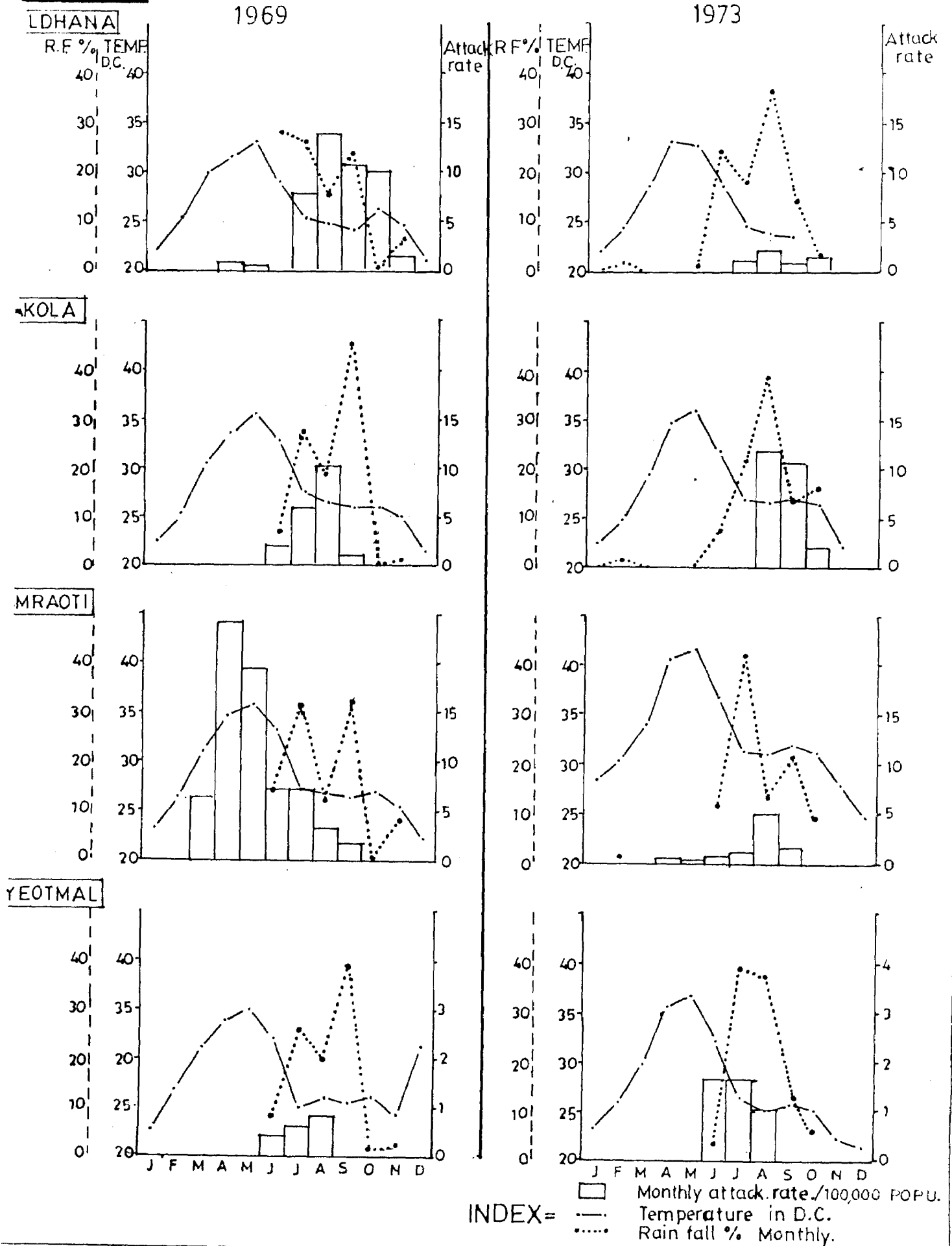


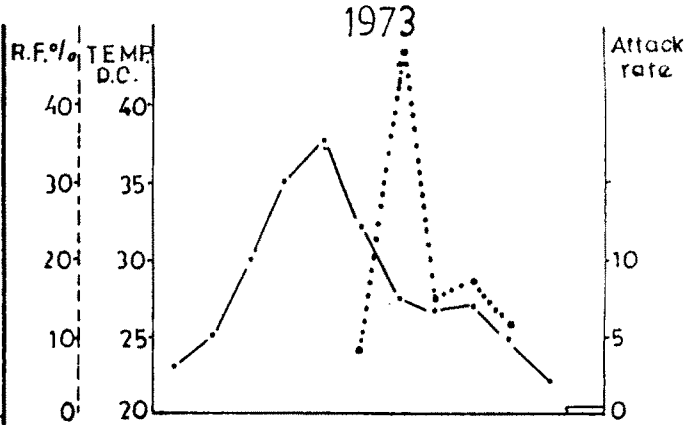
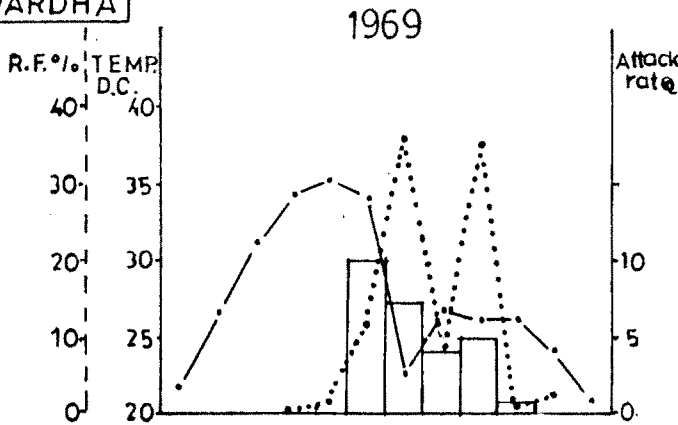
Fig 2.2

VIDARBHA DIVISION

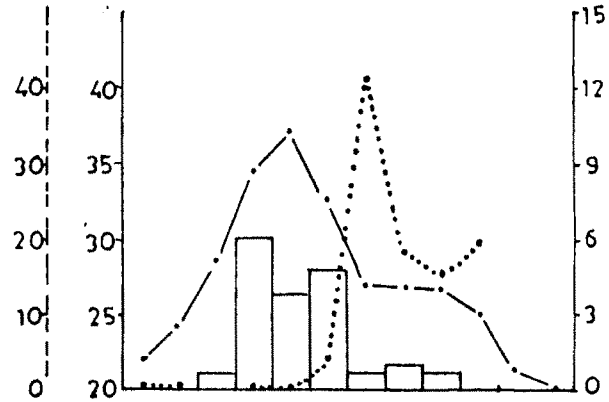
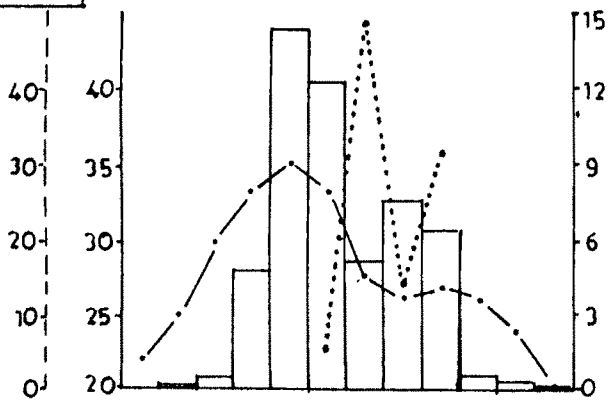
CHOLERA

RELATION BETWEEN MONTHLY RAINFALL, TEMPERATURE & MONTHLY ATTACK RATE.

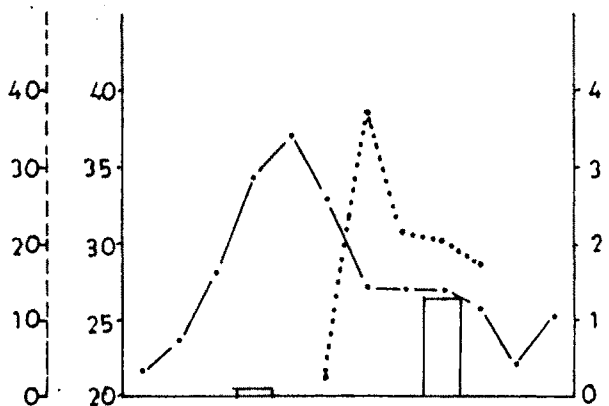
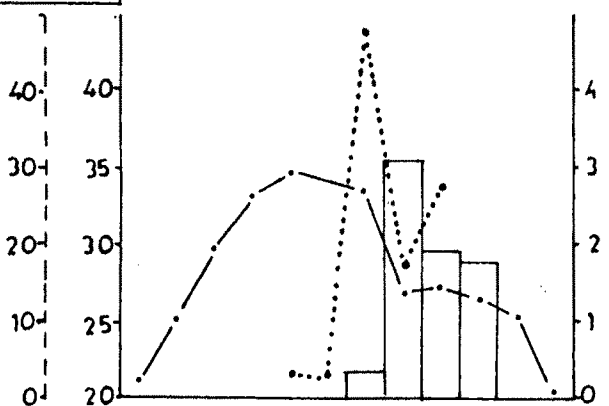
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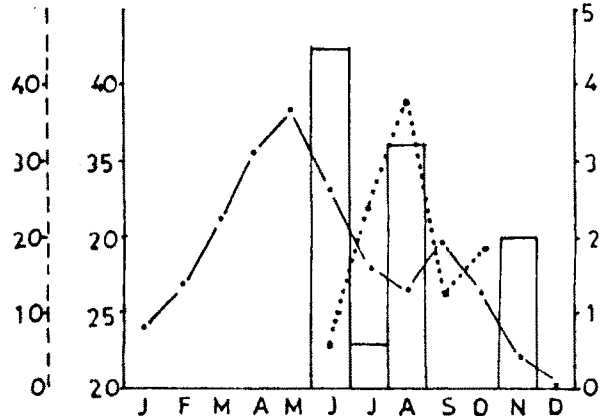
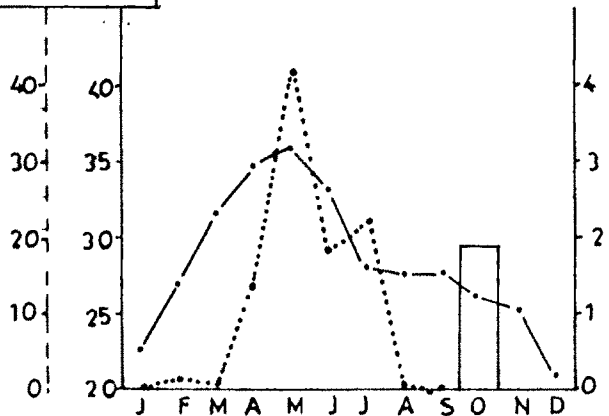
NAGPUR



BHANDARA



CHANDRAPUR



Monthly attack rate / 100,000 POPULATION.
 Temperature in D.C.
 Rainfall % monthly.

Fig. 2.3

in climatic conditions give rise to various types of diseases in any region. The chief elements of climate i.e. temperature, rainfall, pressure, humidity and some others modify the health of man. The occurrence of high temperature and high humidity produces the rapid growth of the disease organism. Temperature plays an important role in causing certain infectious diseases. Temperature varies in the various parts of Vidarbha division. It is very high in the interior parts of Nagpur, Wardha and Amravati districts and becomes low on Buldhana plateau and in the hilly regions of Bhandara and Chandrapur districts. Due to climatic variation within the region, death rate also varies from place to place.

Amongst the chief elements of climate, rainfall alone can easily modify the health of man and of society. Many diseases like cholera, dysentery and diarrhoea occur during rainy season. The monthly distribution of rainfall and temperature may effect the seasonal distribution of water-borne diseases in any region. With considering this presumption, the author has correlated the monthly distribution of rainfall and mean monthly temperature with monthly attack rate of cholera in various districts of Vidarbha division (Fig.2.2 and 2.3). The monthwise and district-wise attack rate of cholera have been calculated and related to percentage of yearly rainfall occurring in specific months and mean monthly temperature.

The southwest monsoon starts in the month of June and more than 80 percent of the annual rainfall occurs in four rainy

months viz. June, July, August and September. Rainfall increases and reaches to its peak in the months of August and September in Vidarbha, while the eastern part of Vidarbha receives rainfall from northeast monsoon as well as from southwest monsoon. It has been found out that the attack rate of cholera starts increasing by the onset of monsoon and the attack rate decreases when amount of rainfall starts declining. The graph shows the positive relationship between monthly attack rate of cholera and amount of rainfall and mean monthly temperature. It seems that spread of cholera also occurs in non-rainy months but the percentage of attacks occurring during the rainy season are comparatively more.

2.3 SOCIO-CULTURAL ENVIRONMENT :

The relationship between socio-cultural factors and health has been recognised recently. These factors are variable in nature. They can be altered or modified with systematic efforts for wellbeing of human health. A study of socio-cultural environment is valuable and important in the underdeveloped countries like India where, majority of people live in rural areas and urban population is relatively small. In this part of study, author proposes to examine some important socio-cultural elements in the context of health and diseases in Vidarbha division namely literacy, age and sex, infant mortality, water supply etc.

2.3.1 Vital statistical rates :

The study of different statistical rates may be the perfect yardstick to measure the health conditions of any region. The overall well-being of any region can be judged by studying different rates of health statistics. Due to this, researcher has calculated the Birth Rate (BR), general Death Rate (DR), Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR) and Still Birth Rate (SBR) for Vidarbha division for a span of 13 years i.e. 1971 to 1983 and has been shown in Table 2.1.

The general birth rate shows a gradual decrease throughout the span of 13 years but there are variations in the pattern of decrease in birth rate. Table 2.1 shows divisional average and state averages of various statistical rates in the rural and urban areas.

The general birth rate of Vidarbha division decreased from 35.1 in 1971 to 19.4 in 1983. Within this period the birth rate has declined even less than 50% in the rural parts of the region (In 1971 35.3 and in 1983, 16.1). But in the urban areas birth rate has not reduced as compared to rural area (In 1971, 33.5 and in 1981, 27.3). In 1971 the birth rate of Vidarbha is higher than the state average. But in 1983 the division birth rate average is lower than the state average. It shows that the efforts made by state government to decrease the birth rate have become fruitful in this area especially due to launching of



Year	Average	Birth Rate			Death Rate			Infant Mortality Rate			Maternal Mortality Rate			Still Birth Rate		
		Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
1971	Division Average	35.50	33.50	35.10	12.80	8.20	11.40	90	43	77	3.00	2.00	2.60	19.40	17.00	19.50
	State Average	27.90	29.20	28.40	10.90	8.60	10.00	70	56	65	3.20	1.20	2.40	16.30	28.90	21.30
1972	Division Average	31.30	32.40	31.30	13.10	8.70	11.80	97	50	84	3.40	1.70	3.00	17.80	15.80	18.30
	State Average	24.50	28.60	26.00	10.20	8.50	9.60	71	57	66	3.30	1.20	2.40	15.20	28.20	20.60
1973	Division Average	26.90	31.30	28.40	14.30	9.50	12.90	105	48	87	3.10	1.90	2.80	19.40	14.10	18.50
	State Average	21.20	28.90	24.10	10.80	9.10	10.20	78	58	69	3.20	1.30	2.30	16.80	26.60	21.30
1974	Division Average	24.80	28.30	26.80	10.50	8.10	9.90	79	43	66	2.80	1.40	2.30	17.10	13.10	16.20
	State Average	21.00	27.40	23.50	8.80	8.50	8.70	60	53	57	2.80	0.90	2.00	15.40	25.10	19.80
1975	Division Average	27.40	30.10	28.30	10.80	8.10	10.00	82	46	72	2.40	1.50	2.40	19.10	11.20	17.10
	State Average	21.40	27.90	24.00	8.70	8.60	8.70	61	55	58	2.80	1.20	2.10	16.70	24.30	20.30
1976	Division Average	25.90	31.30	27.60	9.70	7.90	9.20	70	39	61	2.70	1.60	2.30	18.80	12.90	17.20
	State Average	20.40	28.70	23.60	8.20	8.40	8.30	54	52	53	2.70	1.20	2.00	16.40	25.10	20.50
1977	Division Average	20.90	30.50	24.00	11.00	8.10	9.10	85	39	69	2.80	1.20	2.20	17.60	15.40	16.70
	State Average	16.90	29.00	21.40	9.10	9.10	9.10	62	52	57	2.80	1.00	1.90	14.70	25.50	20.10
1978	Division Average	20.30	30.30	23.30	8.20	7.30	7.90	66	35	55	2.80	1.30	2.30	20.00	14.20	18.70
	State Average	16.70	29.60	21.30	7.10	8.60	7.60	47	48	48	2.80	0.90	1.90	15.70	26.00	20.90
1979	Division Average	20.80	33.60	24.40	9.30	8.10	9.00	75	36	61	2.80	1.90	2.50	18.60	26.70	17.80
	State Average	17.20	31.60	22.20	7.90	9.10	8.30	56	51	53	2.90	1.20	2.10	15.50	26.00	20.70
1980	Division Average	17.00	32.10	22.50	7.30	6.90	7.30	62	30	50	2.20	3.30	2.50	18.80	19.80	18.70
	State Average	17.70	28.40	21.70	6.40	7.40	6.70	42	44	43	2.10	1.50	1.80	15.40	25.80	20.50
1981	Division Average	18.90	30.40	21.40	6.90	6.90	7.00	61	36	51	2.20	3.10	2.20	18.90	16.70	17.80
	State Average	17.20	28.30	21.30	6.00	7.30	6.50	42	42	42	2.00	1.30	1.60	15.00	24.20	19.50

1982	Division Average	17.10	31.50	20.90	5.90	6.50	6.00	49	31	42	1.70	2.80	1.80	17.50	12.30	15.70
	State Average	17.40	28.20	21.50	5.50	7.00	6.10	34	40	37	1.70	1.20	1.40	13.60	21.50	17.50
1983	Division Average	16.10	27.30	19.40	7.30	6.70	6.70	51	37	47	2.00	3.40	2.30	17.80	12.60	16.80
	State Average	16.60	27.10	20.70	6.00	7.30	6.50	37	43	40	1.80	1.50	1.70	13.50	24.90	19.30

SOURCE : Compiled by Author, based on Vital Statistics, Maharashtra State, Pune.

family planning programmes in this region.

The general death rate also shows constant decrease in the division. It has been checked and decreased in the year 1971 and 1972. Then, it increased in 1973 upto 12.9. In 1973, 1975 and in 1979 the death rate has increased and from 1980 it has come down upto 1983. Generally death rate is higher in rural areas than in the urban areas. It might be because of availability of better medical facilities, in the urban areas than in the villages.

Another specific characteristics of death rate found in Vidarbha is that the state average death rate is lower than the divisional average, and this increase of divisional death rate over the state death rate remains continuously throughout the period of study i.e. for thirteen years. The general pattern of gradual decline in the death rate indicates the overall well-being of the region regarding availability of medical facilities.

The problems related to infant mortality are more severe and serious in the Vidarbha division. The infant mortality rates (IMR) have been calculated per 1000 live births which indicates that there is rapid decline in infant mortality in the Vidarbha region. It has decreased from 77 per 1000 live births in 1971 to 47 per 1000 live births in 1983. Here it is observed that rural infant mortality rate is much higher than the urban rate, and state averages are lower than the divisional averages. It is obviously true that the availability of medical aid to infants

in villages is rare while the urban infants may get good medical aids when they ask for. Maternal mortality itself becomes the major cause of infant mortality in the under-developed countries like India. But it is often ignored. There are several causes of maternal mortality namely biological, economical, social or cultural causes. The health, altitude, ability and understanding of the mother are directly concerned with the welfare of the baby. The death of the mother during labour or before the baby reaches its first birthday has profound effect on its survival and welfare. The maternal mortality rate in Vidarbha region has showed declining trend from 2.6 in 1971 to 2.3 in 1983. This divisional maternal mortality rate is much higher than the rate of Maharashtra State.

In the rural area of Vidarbha maternal mortality rate shows declining trend from 3 in 1971 to 2 in 1983. In the urban areas the rate has been declined upto 1979 but from 1980 it shows increasing tendency from 1.9 in 1979 to 3.4 in 1983 per 1000 live births.

The still birth rate of Vidarbha division shows constant decrease from 1971 to 1983 except in 1973, 1978 and in 1980 where it is considerably high. It is observed that the still birth rate of state is higher than the divisional average and it is higher in the rural areas than in urban areas in the region.

In general, the region shows the decrease in birth rate, death rate, infant mortality rate, maternal mortality rate and

and still birth rate barring maternal mortality rate in urban areas of Vidarbha Division within the span of 13 years. The improvement in medical facilities in this region especially by locating the primary health centres for the benefits of rural population might be the answer to this constant decline in the different rates. The region shows the improvement in the medical status of individual and that of community.

2.3.2 Literacy :

Literacy focusses on the attitude of the people towards the disease and health. The uneducated people know very little about scientific causes of occurrence of various diseases. The personal and public hygiene, beliefs, customs, traditions, sanitation, etc. are much more dependent on the literacy factor. " As far as nutritional diseases are concerned, the education level of woman acts as a prime indicator," (Pandurkar, 1981). Illiteracy amongst female is responsible for wrong way of cooking and thereby throwing precious vitamins of foods in waters. Literacy and educational level of woman also determines the standard of health care taken by women of her infants and children. Infant mortality is directly associated with illiteracy. More deficiency diseases are found amongst tribal population where level of illiteracy is more. In India, majority of the population receive no formal education. According to 1961 census, 78 percent of rural population of India is illiterate.

The districtwise relation between death rate and percentage of literacy has been discussed and is shown in Fig.2.4.

VIDARBHA DIVISION

RELATION BETWEEN LITERACY & DEATH RATE

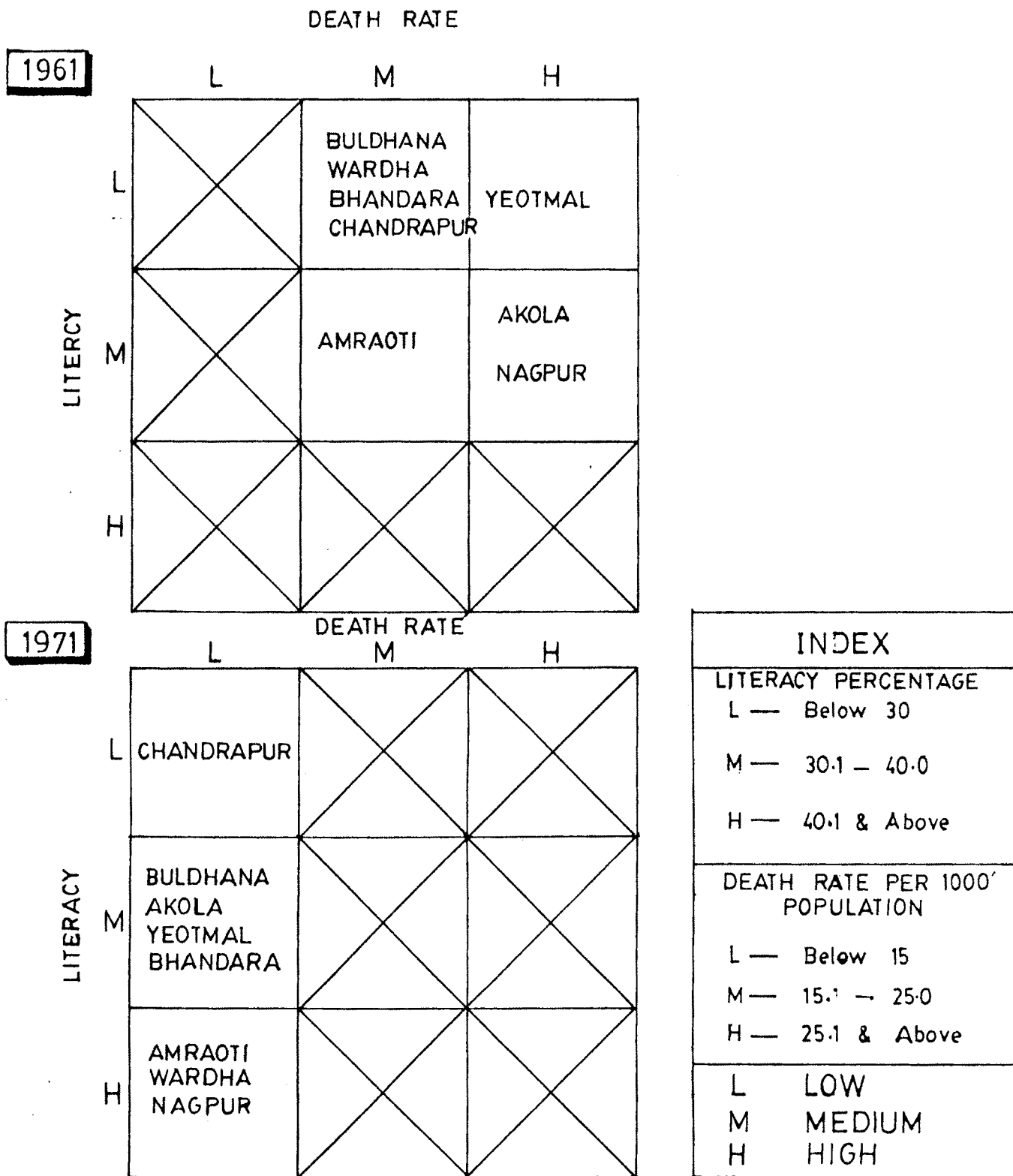


Fig. 2.4

It has been found out that when percentage of literacy increases death rate decreases. In 1961 the percentage of literacy of Yeotmal district is below 30%, due to which high death rate is found. Akola and Nagpur districts have medium literacy percentage and high death rate. But in 1971 there is decrease in death rate throughout the Vidarbha region, due to increase in the percentage of literacy. Everywhere low death rate is observed.

2.3.3 Age and Sex :

The age groups in which majority of population of country falls, determine their working capacity. We can predict about the general health condition of the region by studying the age pyramids. But it is rather difficult to find out the relation between incidence of particular disease and the age. Still the study of age pyramids may give a general reading about the mortality pattern in any area. Certain diseases are more frequent in certain age groups than others. It is assumed generally that in any region in India, the deaths below 4 years of age and above 60 years of age are more, while the population in working age group (15 to 59 age group) which is directly exposed to the diseases show more number of deaths.

The sex ratio has some relationship with the general health of the people. Generally women are better equipped than the males to get over the diseases. Women are less exposed to the environmental hazards than male. " In that sense

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AGE & SEXWISE PERCENTAGE OF DEATHS

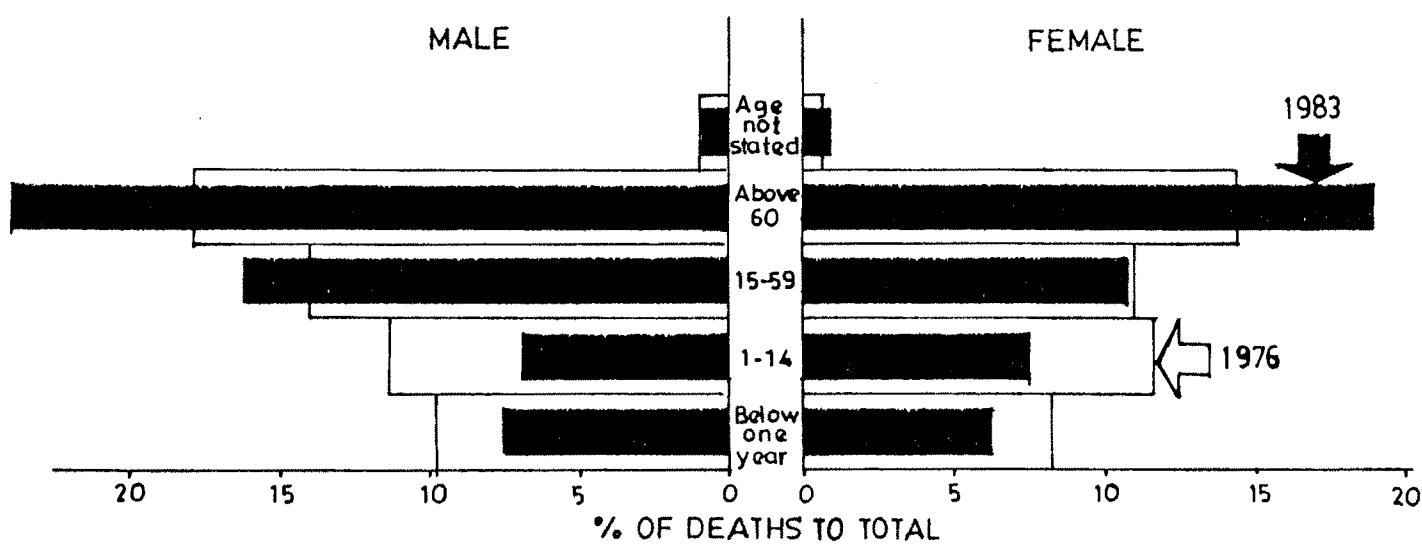
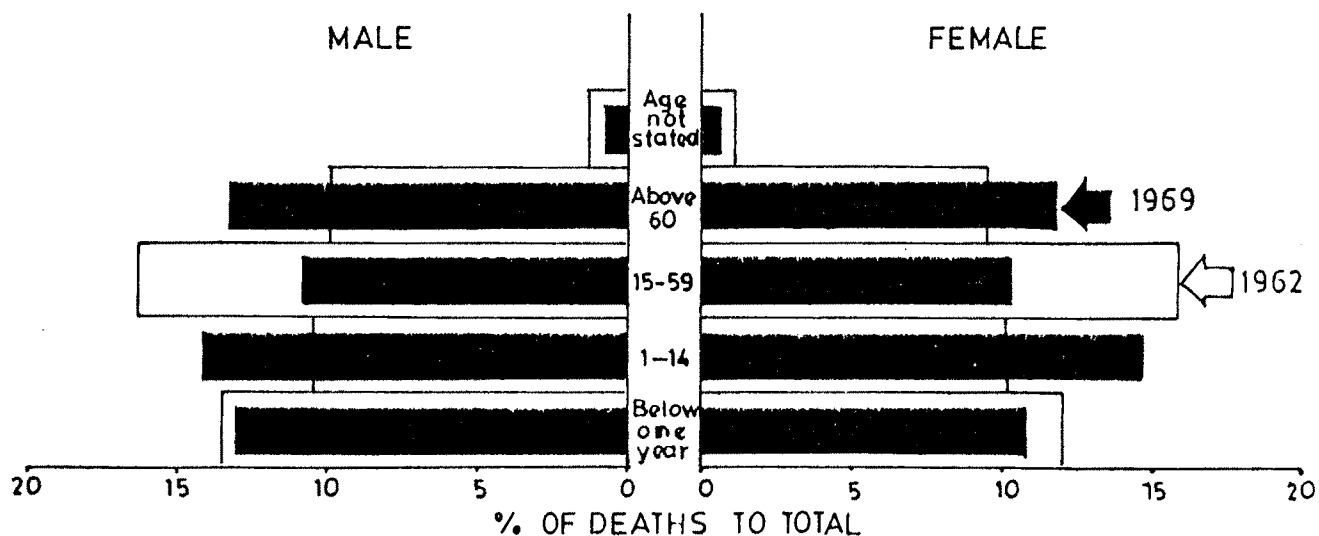


Fig. 2.5

it is not woman but man who is in weaker vessel," (Mishra, 1970). The findings quoted by Mishra, tallies with rural area of Vidarbha region. Fig.2.5 deals with age and sexwise percentage of deaths in Vidarbha division in a span of 23 years. This figure depicts the age and sex pyramids of 7 years interval.

It is stated that the deaths below 1 year and above 60 years of age are more in both male and female in 1976 and 1983. In the age group of 60 years and above both the deaths (i.e. male and female) have increased in 14 years period (i.e. 1969 to 1983).

Deaths below 1 year of male and female have decreased by 50 percent or less in the span of 22 years (from 13.4 percent to 7.5 of male and from 12.00 percent to 6.2 percent of female). There is constant decrease in the percentage of deaths in the young population who are between 1 and 14 years age group. While deaths of working age group (15 to 59) have been increased within the span of 22 years. As compared to male deaths in the working age group, female deaths are not more. The percentage of deaths of both male and female sex occurred in the age group of 60 and above during 1962 was 9.8 and 9.6 respectively. This percentage of death has increased upto 23.90 of male and 18.90 of female in 1983. It means, during 22 years the deaths of male and female above 60 years age group have been increased more than twice. It seems that the infants and young population is more safer than working and

old population. The working group of different villages is much exposed to the environmental alteration and because of this they are the victims of environmental hazards.

2.3.4 Infant mortality :

This is an age specific death rate for infants under one year of age. Infant mortality is a challenging problem in India. India is a second largest country in respect of population in the world. One baby gets its birth every second and half. Death rate which is observed in India is very high as compared to other advanced countries. Every year, in India 8 million people are dying, out of which 2 millions are the infants. " The child is more likely to die on the first day, first week and first month of its life. It is a common belief in most of the Indian homes that a child who has passed first month of it's life is likely to reach first birthday," (Mathur J.S., 1971).

For a detailed and systematic study of infant mortality of any region, the adequate information about biological, economical, social and cultural factors affecting the death rate of infants are necessary. To study the infant mortality in a region, the data about dependent variables are needed. But our vital statistical reports supply very little information due to which detailed study is not conducted.

Table 2.2, shows sexwise infant mortality of Vidarbha region and of Maharashtra State. Infant mortality rate shows

TABLE 2.2 : Vidarbha Division Infant Mortality Rate (sexwise).

Year	Vidarbha Division			Maharashtra State		
	Male	Female	Total	Male	Female	Total
1961	127	116	121	93	87	90
1962	123	119	121	97	92	95
1963	126	115	121	96	89	93
1964	123	116	120	93	87	91
1965	105	93	100	83	76	80
1966	116	110	113	86	80	84
1967	121	114	118	89	83	86
1968	106	94	100	78	71	74
1969	95	85	90	80	72	76
1970	82	81	87	74	66	70
1971	79	71	77	67	62	65
1972	86	81	84	67	64	66
1973	88	83	87	70	67	69
1974	71	66	66	58	55	57
1975	73	68	72	60	56	58
1976	67	58	61	54	52	53
1977	70	64	69	59	56	57
1978	56	52	55	50	46	48
1979	62	58	61	55	52	53
1980	56	46	50	45	41	43
1981	52	49	51	44	41	42
1982	43	40	42	39	35	37
1983	49	45	47	41	39	40

SOURCE : Compiled by Author, based on Vital Statistics Maharashtra State, Pune.

the declining trend in Vidarbha throughout the span of 23 years. In 1961 infant mortality rate of Vidarbha was 121 per 1000 live births which has reduced upto 47 per 1000 live births in 1983. But this rate is always much higher than the average rates of Maharashtra State.

The male infant mortality rate seems to be higher than female in Vidarbha as well as in Maharashtra. The educational level of the parents, the standard of living, the monthly income and the tendency of nourishment of infants might be some of the reasons behind this high mortality. The important factor responsible for higher infant mortality is illiteracy of mothers in the region. During the span of 23 years, the trend of infant mortality is declining. This gradual decline might be because of improved medical facilities made available by state government in different parts of rural area. Primary health centres are available every where and services are rendered to rural population. Eventhough the rate is lower, there is a need to check it. Repeated deliveries, early marriages, lack of immunization and vaccination, lack of knowledge of mother in taking care of children might be some of the reasons behind this rate. Planned parenthood, increase in maternal and paediatrics centres in rural areas, prompt and proper immunization and vaccination might be some of solutions for solving this serious problem of infant mortality of this region.

2.3.5 Water supply :

Water is one of the very essential requirements of human being, water is used for the drinking purpose and for domestic use also influences the health of the individual and the community. Many of the infectious diseases are spreaded through water. It is estimated that the nearly 30 percent of the mortality and 60 percent of the morbidity in India is due to the water-borne diseases. Much of the ill health in the underdeveloped countries like India is due to lack of safe drinking water. Safe and wholesome water is defined by WHO (1970) as water that is i) free from pathogenic agents ii) free from harmful chemicals iii) pleasant to the taste iv) usable for domestic purpose. If water supply is insufficient in quantity, people seek some other sources like well, river, dam, stream etc, where there is every possibility of water being contaminated. Quality, quantity and continuity in water supply cause many water-borne diseases.

Communicable diseases like cholera, enteric fever, various types of dysenteries etc. results from the unsafe and contaminated water. The infective agents of typhoid, cholera, dysentery, T.B., can be transmitted through waters. Most of the villages have no good source of drinking water. The water is contaminated by bathing, washing clothes and animals and by poor sanitation.

Deaths due to malaria occurs more in Chandrapur district.

Chandrapur, Bhandara and Wardha are the districts where deaths due to cholera are more. Dysentery is major disease in Amraoti district, while diarrhoea is an acute disease faced by Buldhana, Amraoti and Chandrapur districts as death rate due to diarrhoea is higher. In the cities, water supply is made after the filtration of the water that is why in Nagpur, Akola, Kamptee, Karanja death rate due to water-borne diseases is very low. While cities like Yeotmal, Wardha and Khamgaon show more deaths due to dysentery and diarrhoea. Deaths due to Jaundice occurs more in the cities like Yeotmal, Chandrapur, Akot and Khamgaon etc. Due to lack of data about the quality and quantity of water supply in each district and in each city, the researcher could not establish the perfect relationship between water supply and the intensity of spread of water-borne diseases.

2.4 DISEASE INTENSITY AND RANKING :

2.4.1 Introduction and Methodology :

The study of disease intensity and ranking may be very useful in understanding the disease distribution in any area. This study may provide an idea of relative dominance of different diseases in order of importance.

The ranking technique is based on percentage of deaths of twelve major diseases in particular year. Cause specific death rates of various diseases have been calculated for the period of 22 years per 100,000 population. Total 22 years have been classed into four groups. These groups are 1962 to 1967,

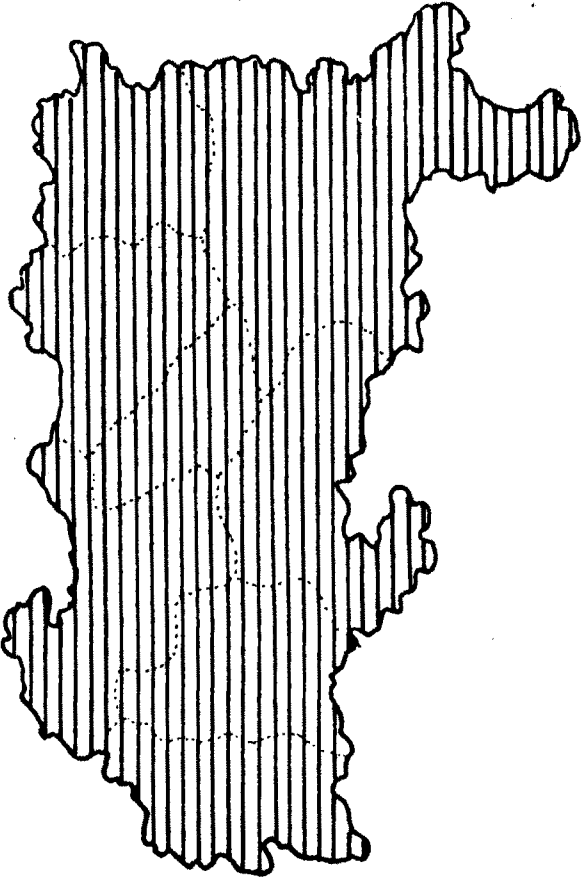
1968 to 1973, 1974 to 1978 and 1979 to 1983. Districtwise average death rates have been calculated for each group. While considering percentage of deaths by each disease, ranks have been given for that particular disease from I rank to XII rank. From each group of year highest rank of various diseases has been calculated in Vidarbha division (districtwise). Various shades have been used for 12 major diseases which are selected by author for studying the intensity of diseases in Vidarbha division. The author has also calculated percentage of deaths for selected 18 cities from 1972 to 1983. These twelve years have been classed into 3 groups, these are 1972 to 1975, 1976 to 1979 and 1980 to 1983. For cities, diseases selected by author are same which are mentioned in the districtwise ranking of diseases. For cities cause specific death rates have been calculated per 100,000 population. Choropleth method has been used for showing the ranking of diseases of various cities in Vidarbha division.

2.4.2 Districtwise ranking of diseases :

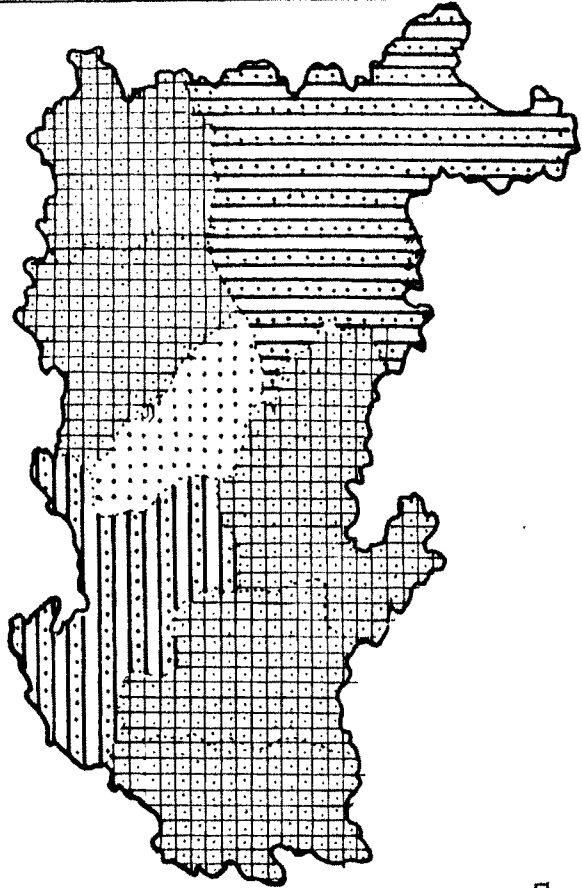
The ranking techniques used here is based on mortality rates calculated for particular disease in a particular group of year, for example in 1962-67 group the deaths due to diarrhoea were showing highest mortality rate amongst all other diseases in various districts of Vidarbha division, hence this disease has given the first rank in 1962-1967 group. While the death rate of T.B. in Buldhana, Akola, Yeotmal, Nagpur, Bhandara, the

VIDARBHA DIVISION THE RANKING OF DISEASES 1962-67

① FIRST RANKING



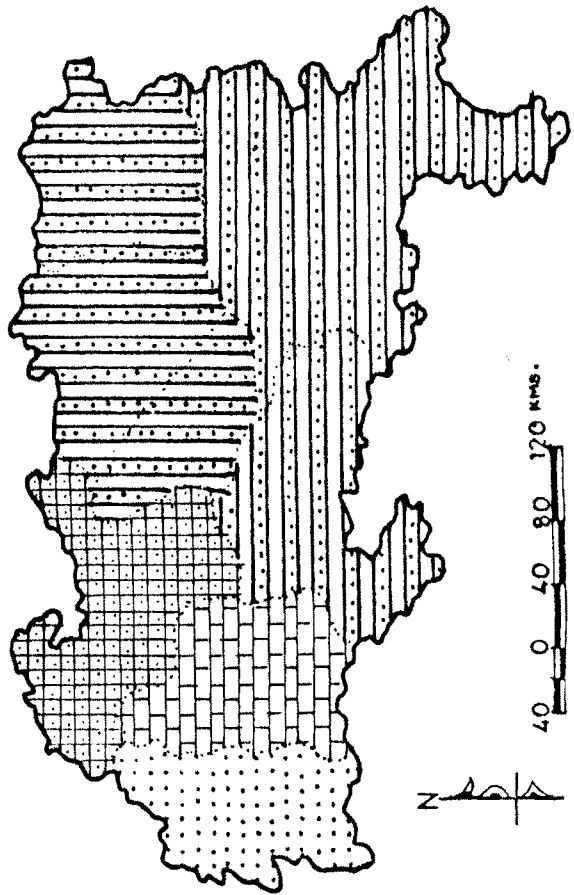
② SECOND RANKING



INDEX

	Cholera
	Small-pox
	Measles
	Malaria
	Pneumonia
	Tuberculosis
	Dysentery
	Diarrhoea
	Leprosy
	Cancer
	Telanus
	Jaundice

③ THIRD RANKING



④ FOURTH RANKING

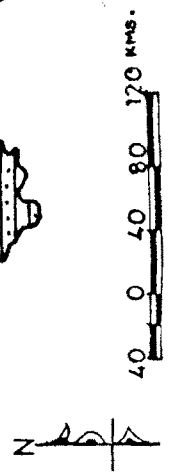
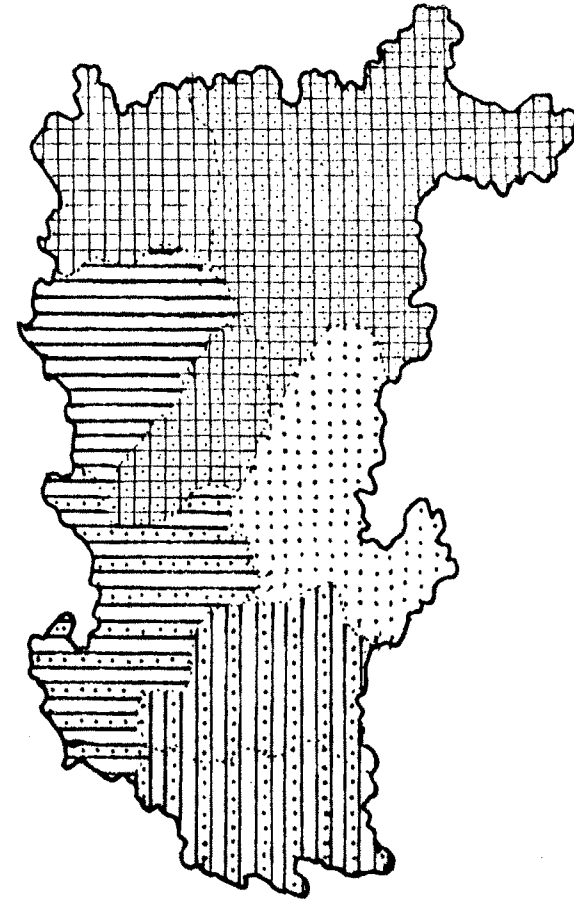
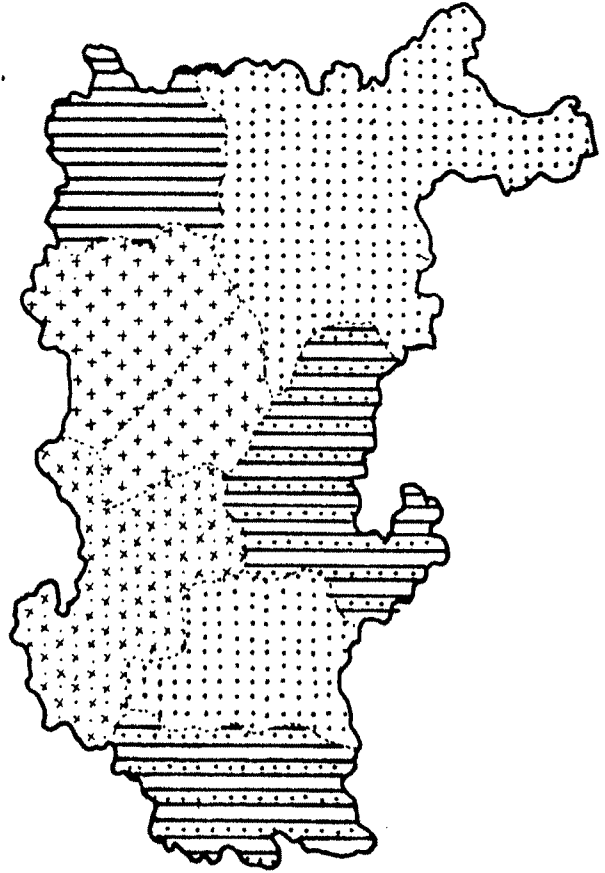


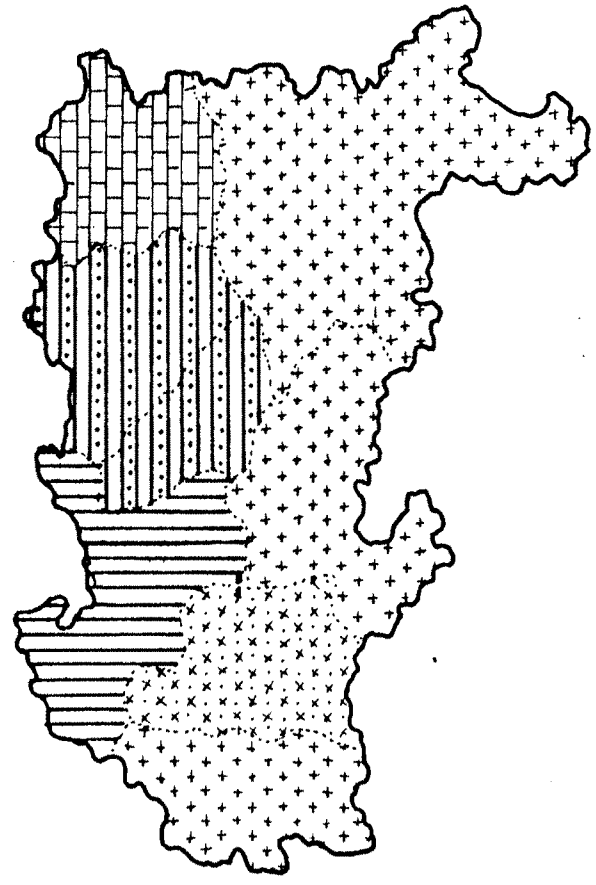
Fig. 2.6

VIDARBHA DIVISION
THE RANKING OF DISEASES 1962-67

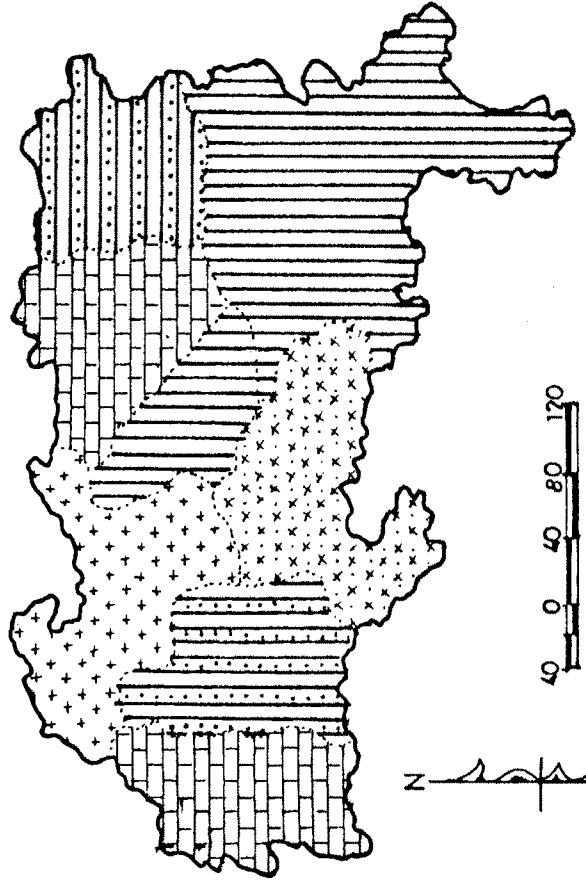
⑤ FIFTH RANKING



⑥ SIXTH RANKING



⑦ SEVENTH RANKING



⑧ EIGHTH RANKING

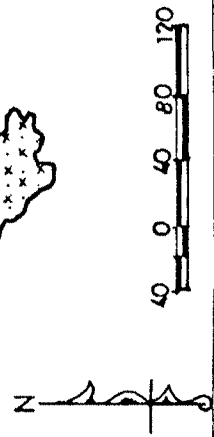
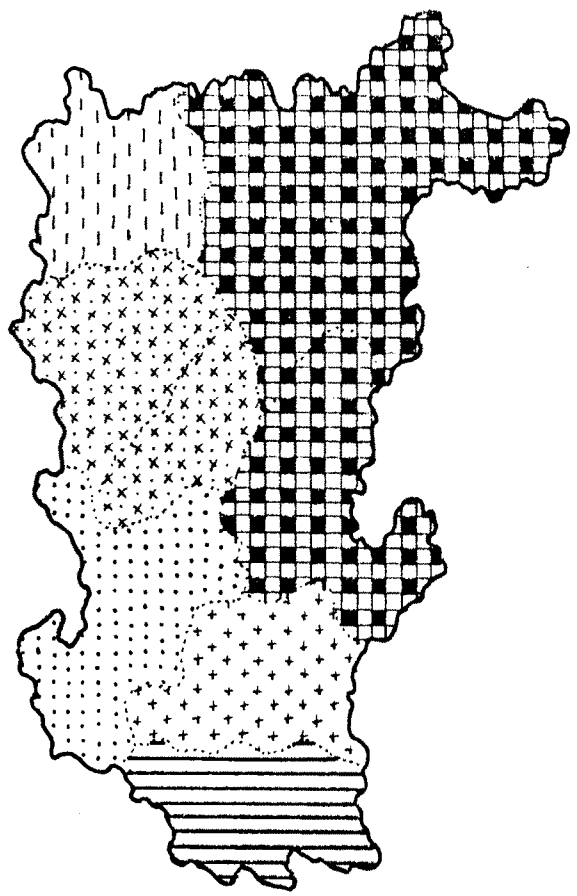
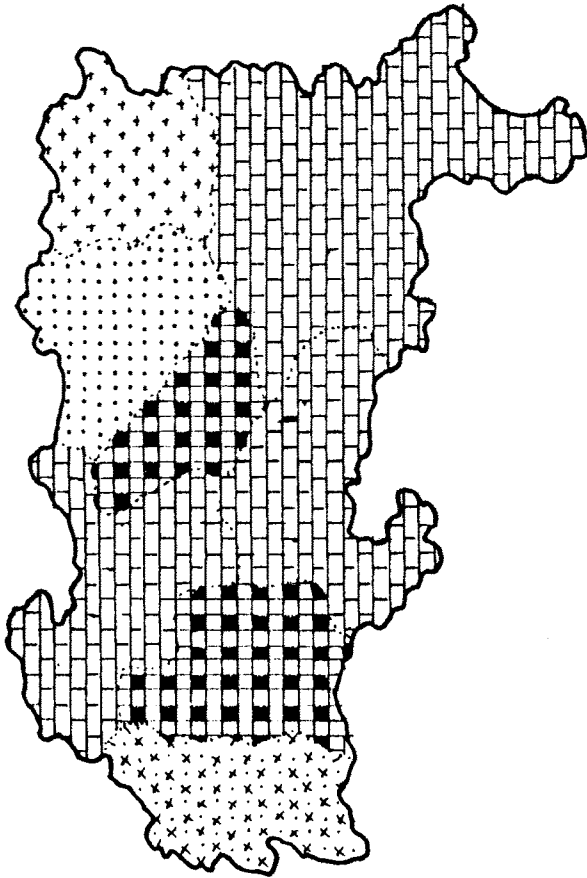


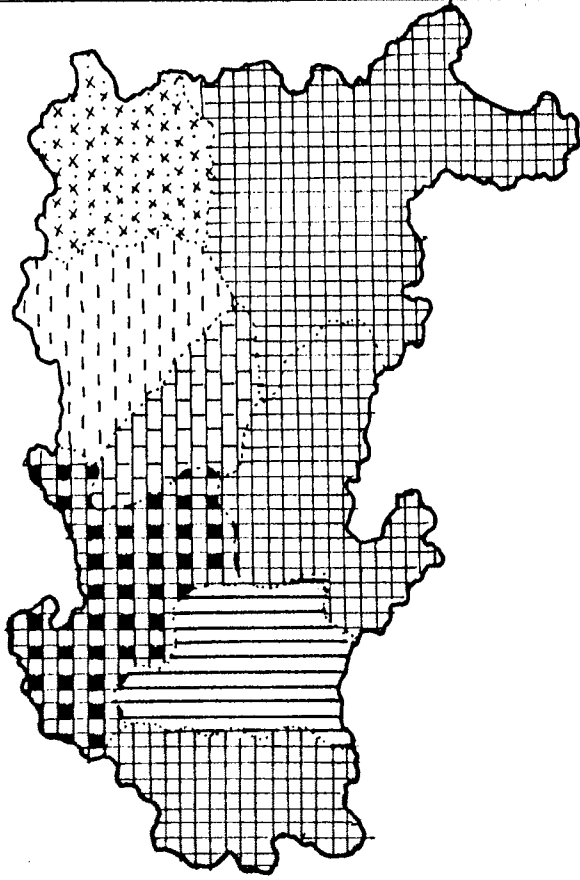
Fig. 2.7

VIDARBHA DIVISION
THE RANKING OF DISEASES 1962-67

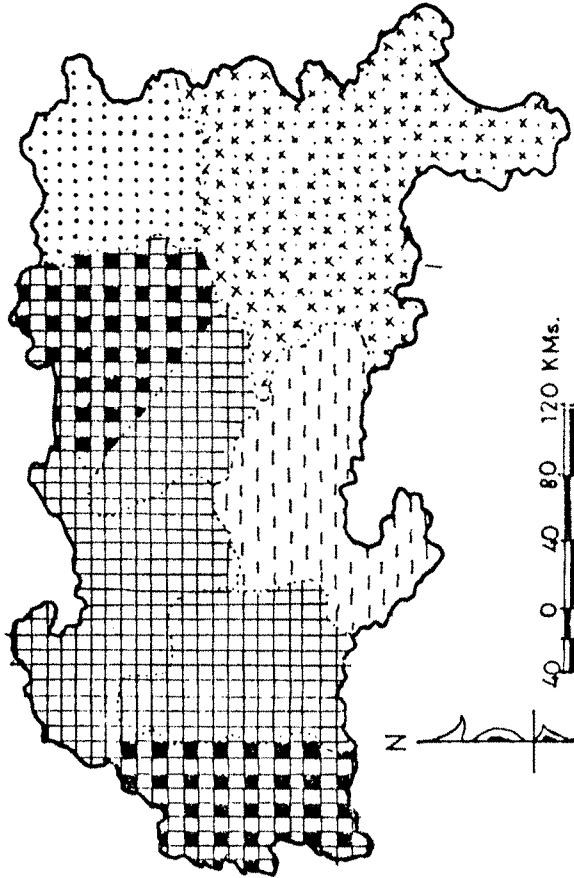
⑨ NINTH RANKING



⑩ TENTH RANKING



⑪ ELEVENTH RANKING



⑫ TWELFTH RANKING

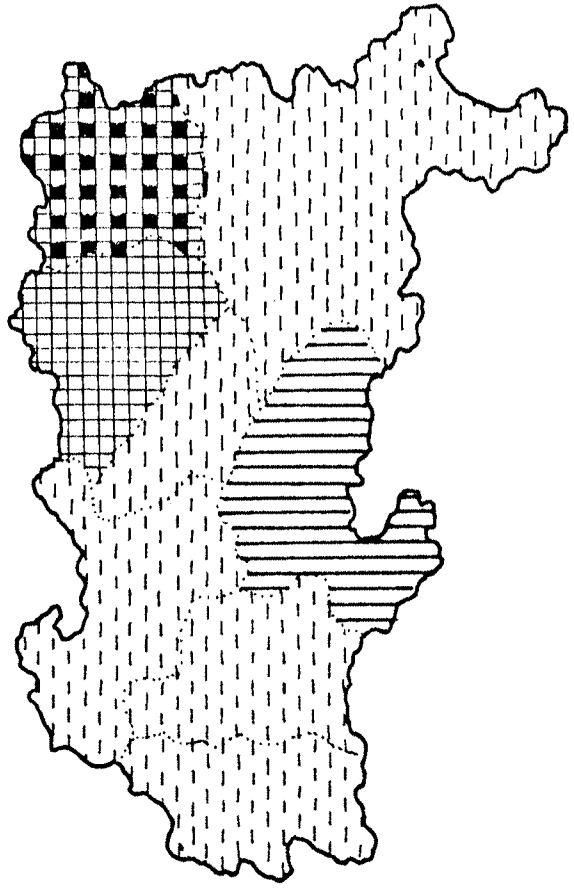
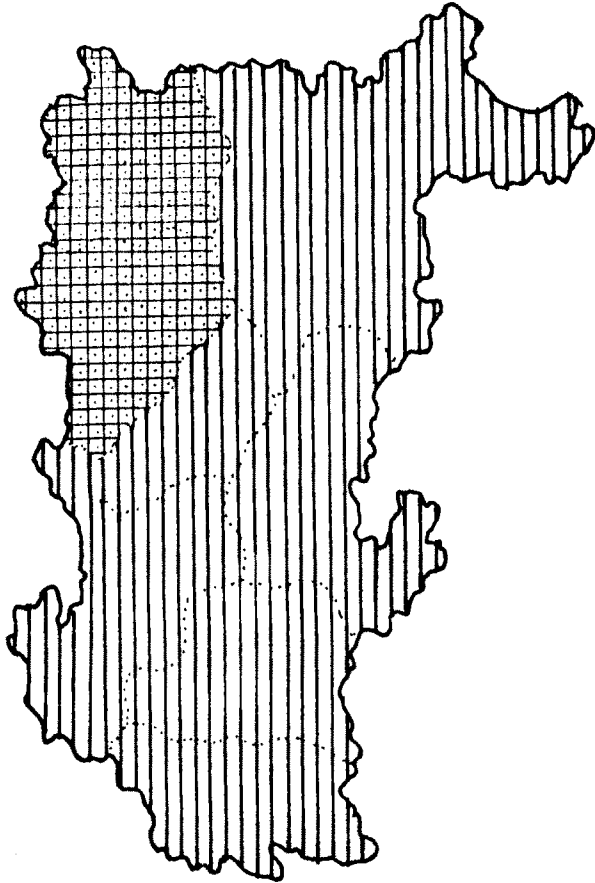


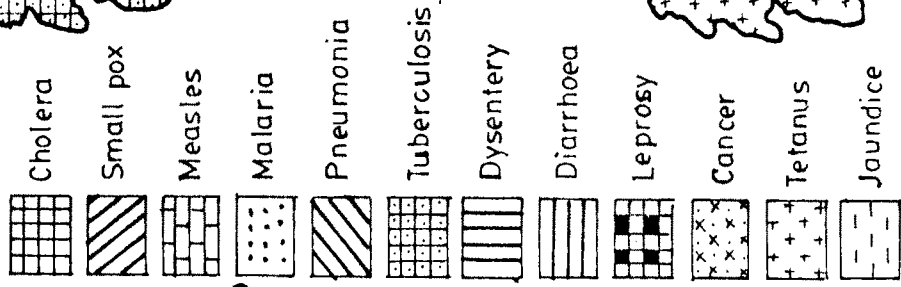
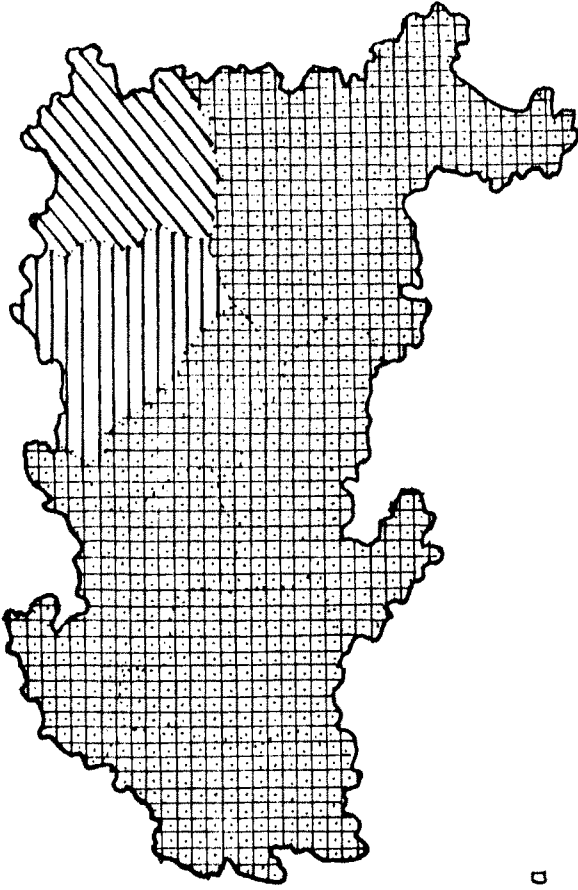
Fig 2.8

VIDARBHA DIVISION THE RANKING OF DISEASES 1968-73

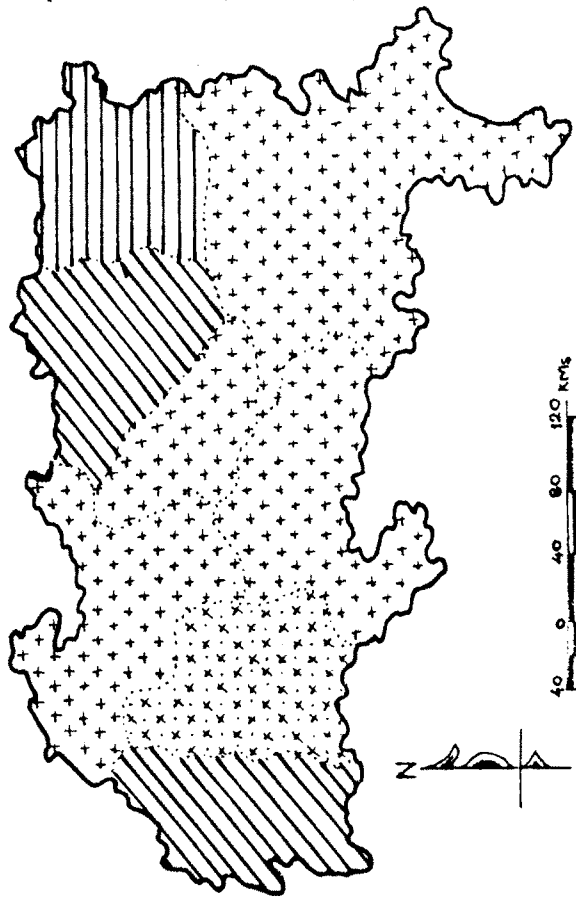
① FIRST RANKING



② SECOND RANKING



③ THIRD RANKING



④ FOURTH RANKING

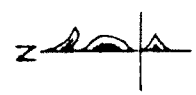
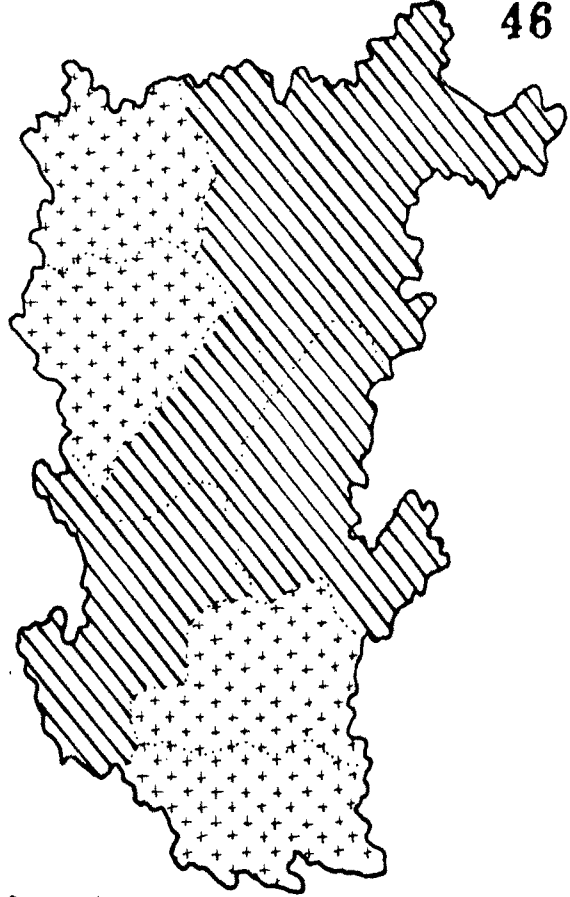
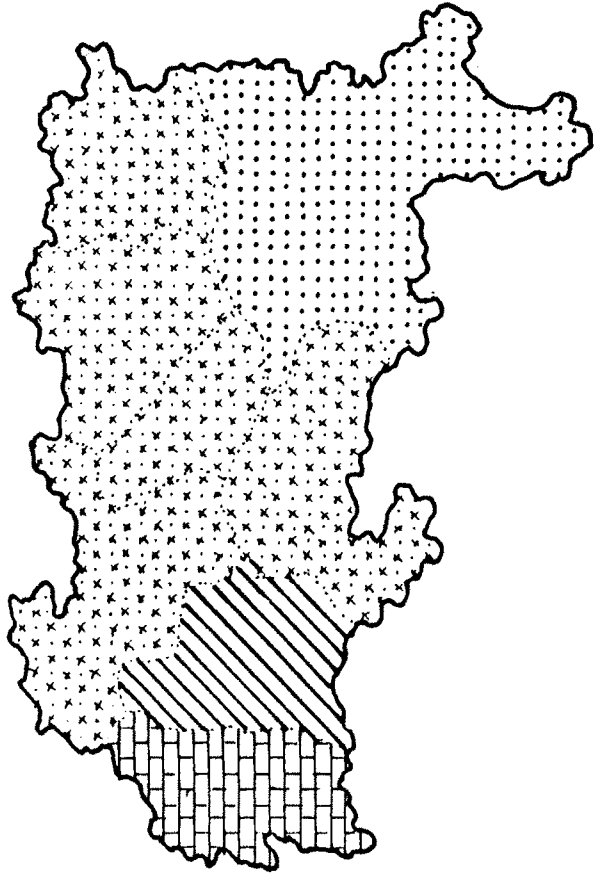


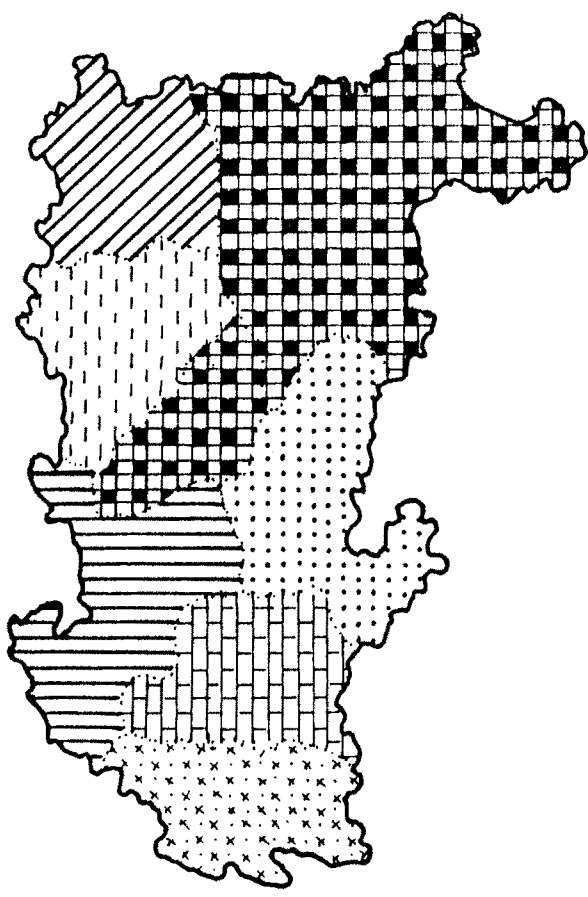
Fig 2.9

VIDARBHA DIVISION THE RANKING OF DISEASES 1968-73

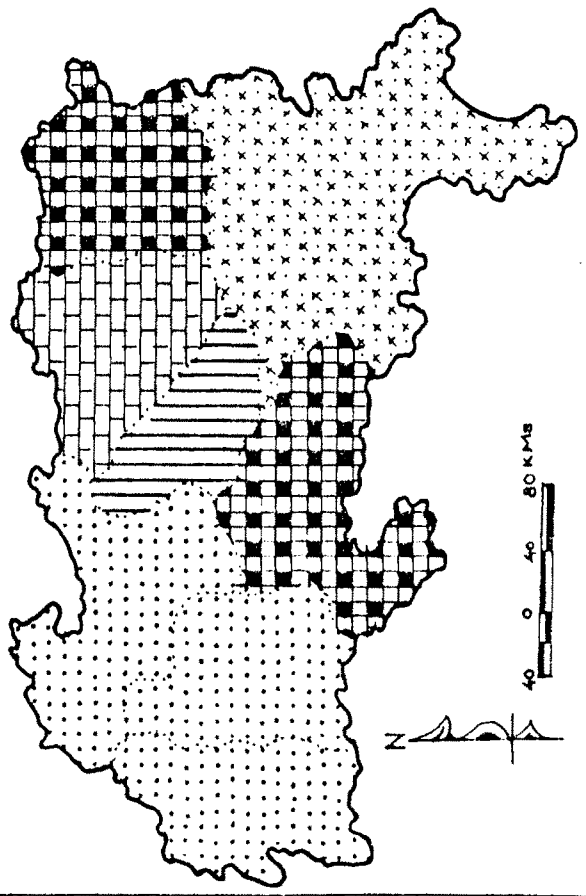
⑤ FIFTH RANKING



⑥ SIXTH RANKING



⑦ SEVENTH RANKING



⑧ EIGHTH RANKING

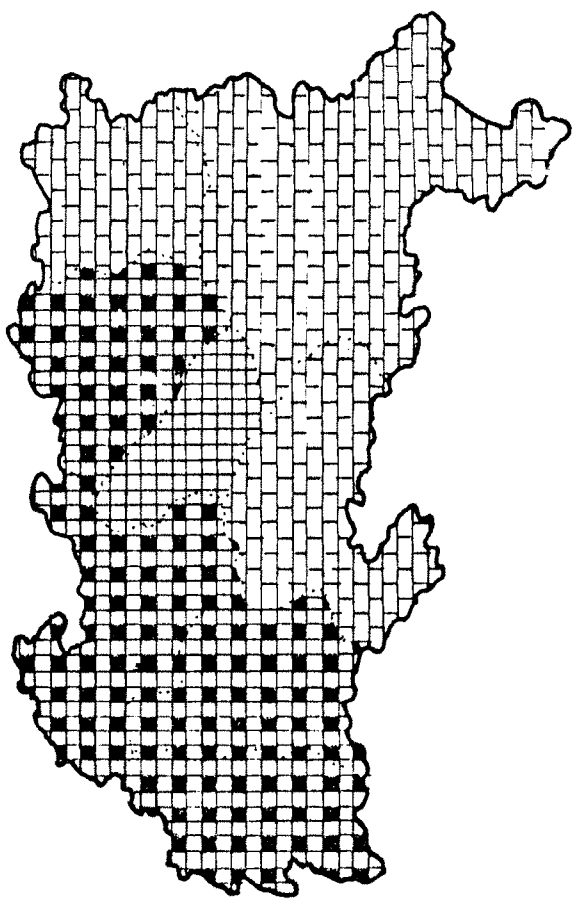
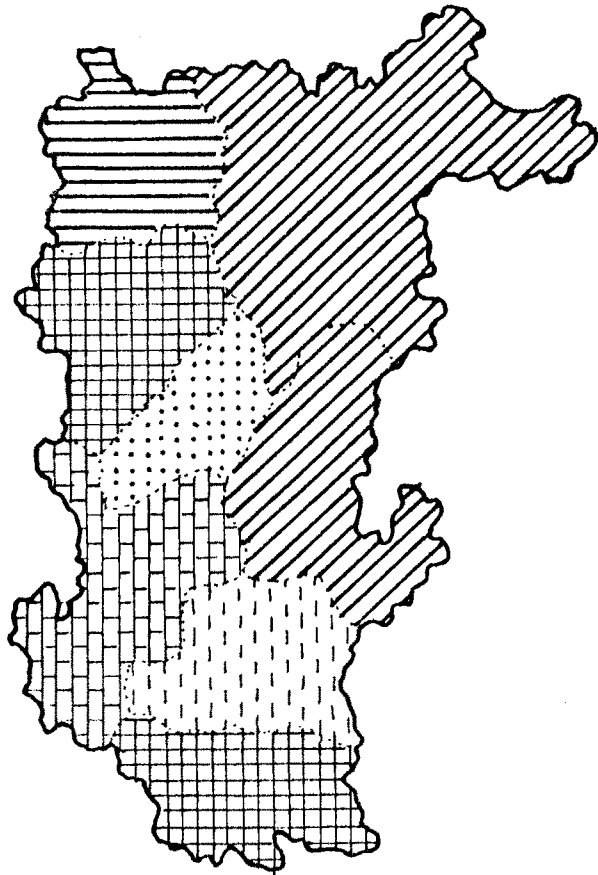


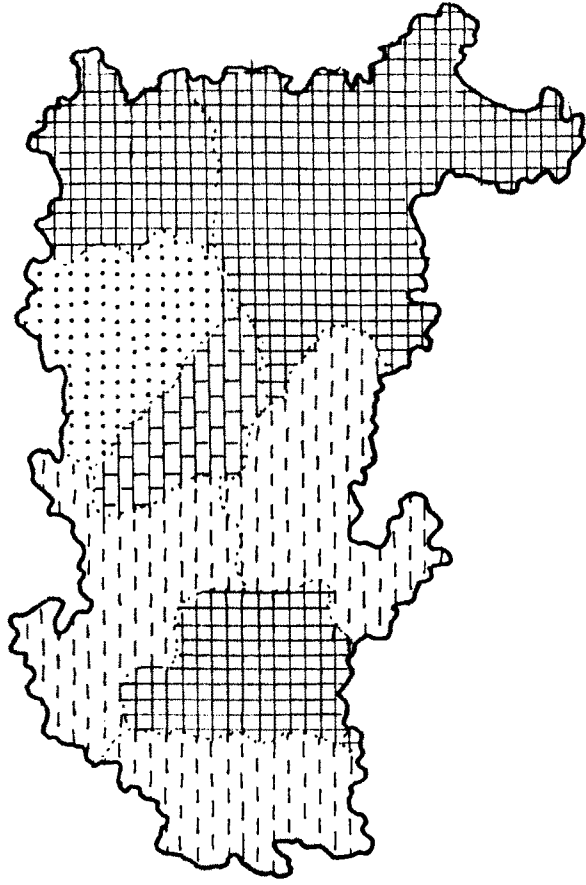
Fig. 2-10

VIDARBHA DIVISION
THE RANKING OF DISEASES 1968-73

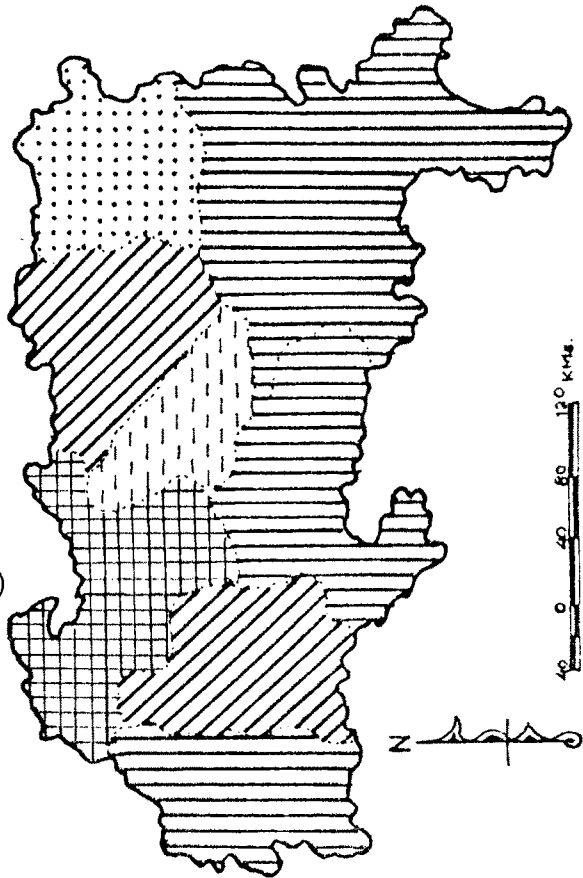
⑨ NINTH RANKING



⑩ TENTH RANKING



⑪ ELEVENTH RANKING



⑫ TWELFTH RANKING

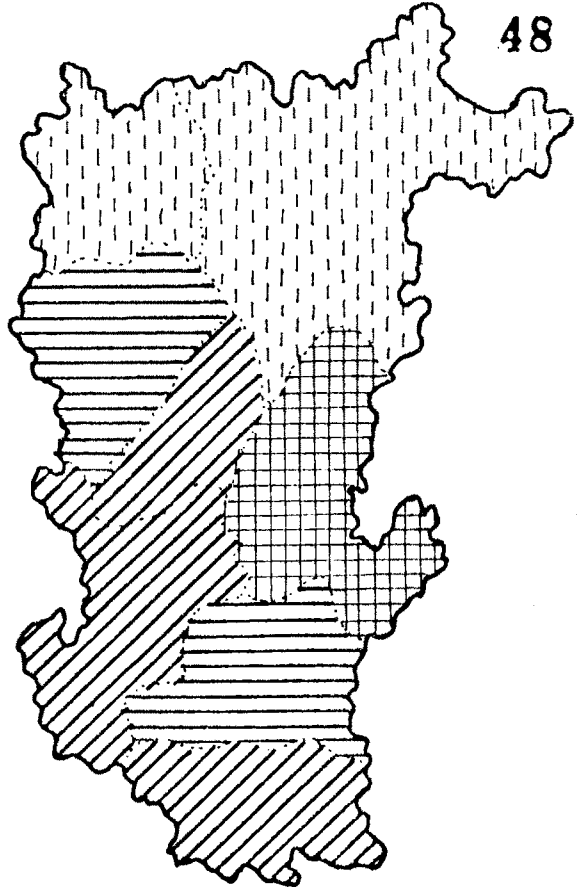


Fig. 2-11

VIDARBHA DIVISION THE RANKING OF DISEASES 1974-78

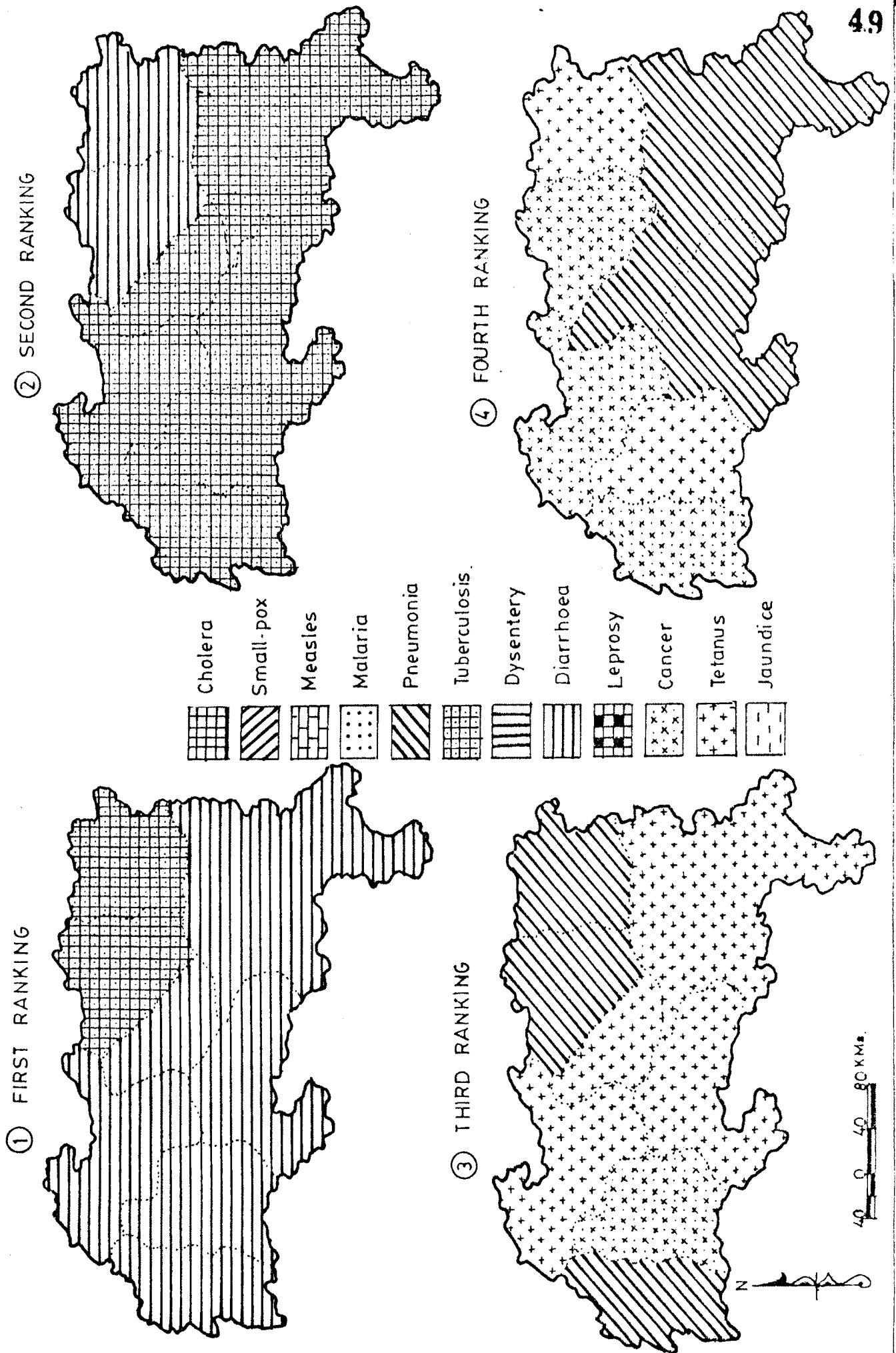
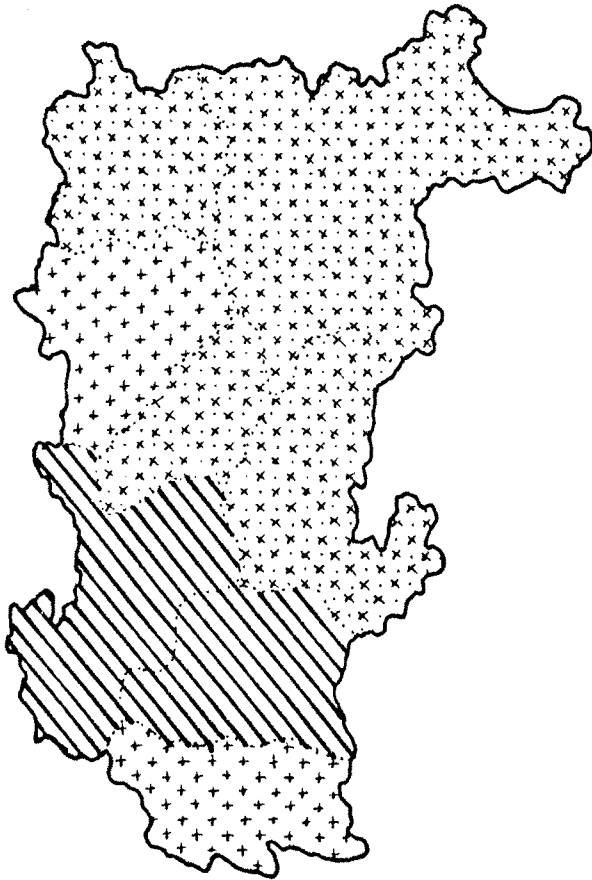


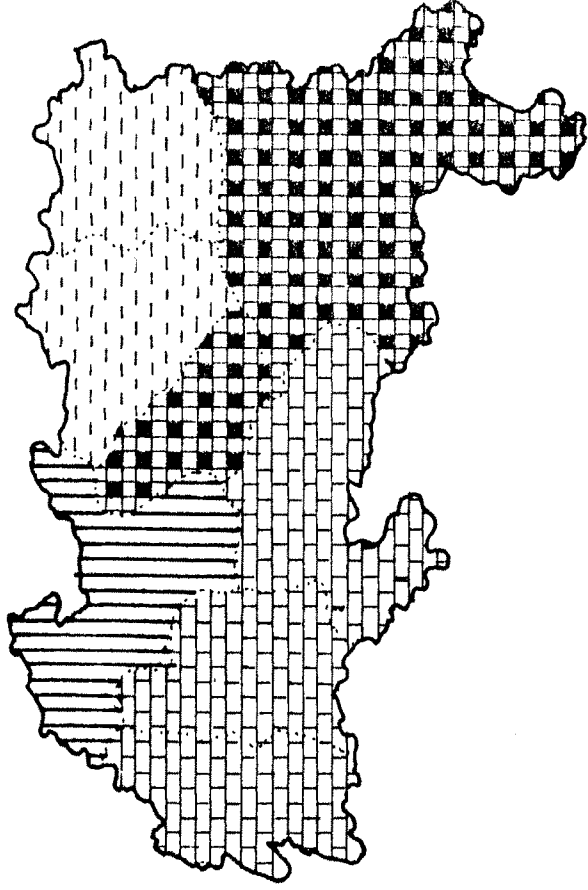
Fig 2 • 12

VIDARBHA DIVISION
THE RANKING OF DISEASES 1974-78

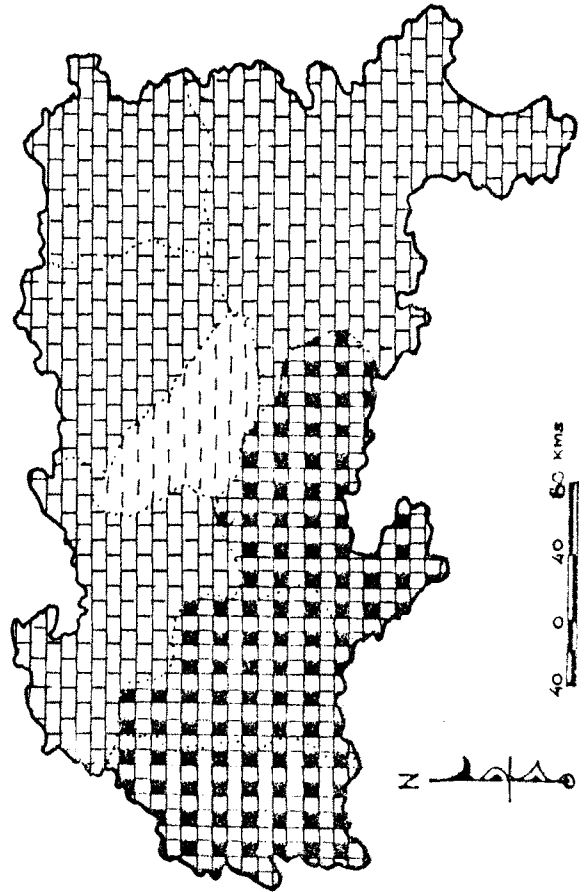
⑤ FIFTH RANKING



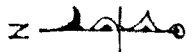
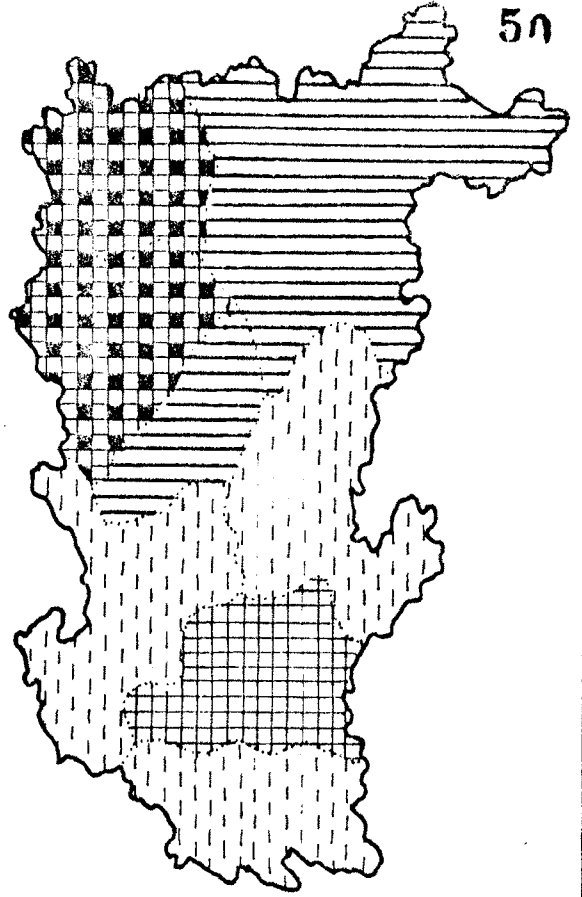
⑥ SIXTH RANKING



⑦ SEVENTH RANKING



⑧ EIGHTH RANKING

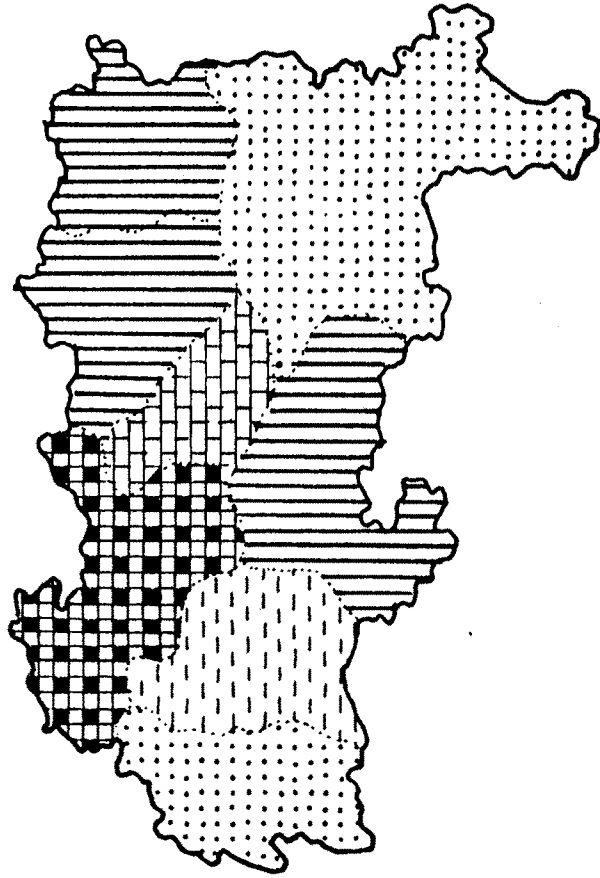


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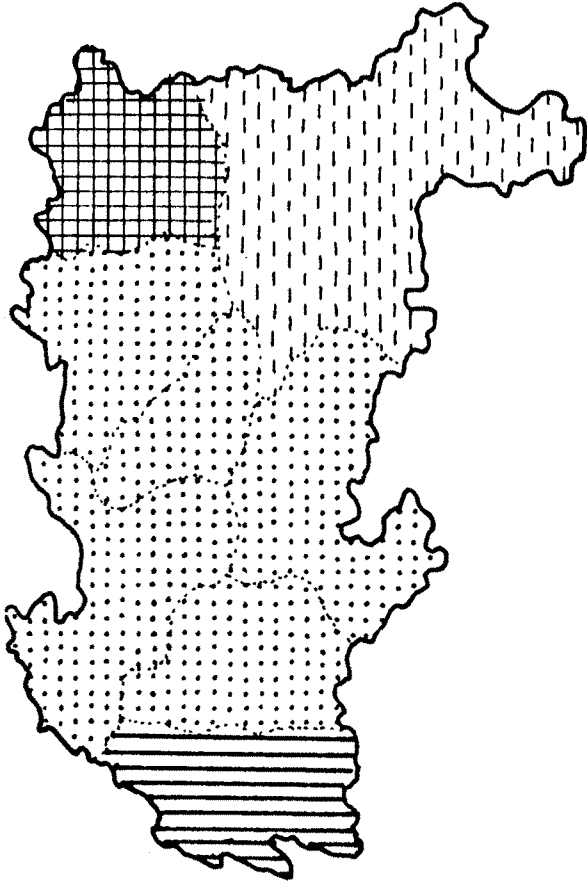
Fig 2-13

VIDARBHA DIVISION
THE RANKING OF DISEASES 1974-78

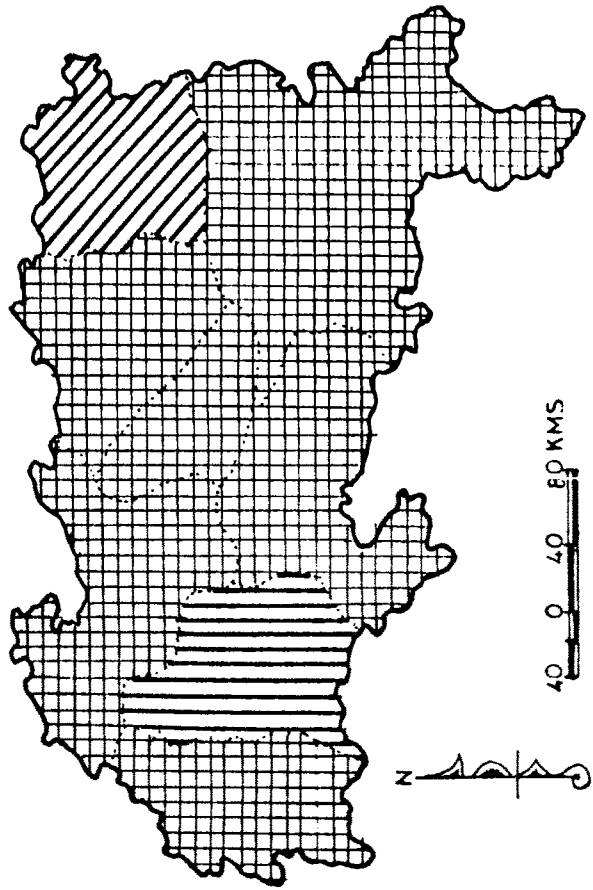
⑨ NINTH RANKING



⑩ TENTH RANKING



⑪ ELEVENTH RANKING



⑫ TWELFTH RANKING

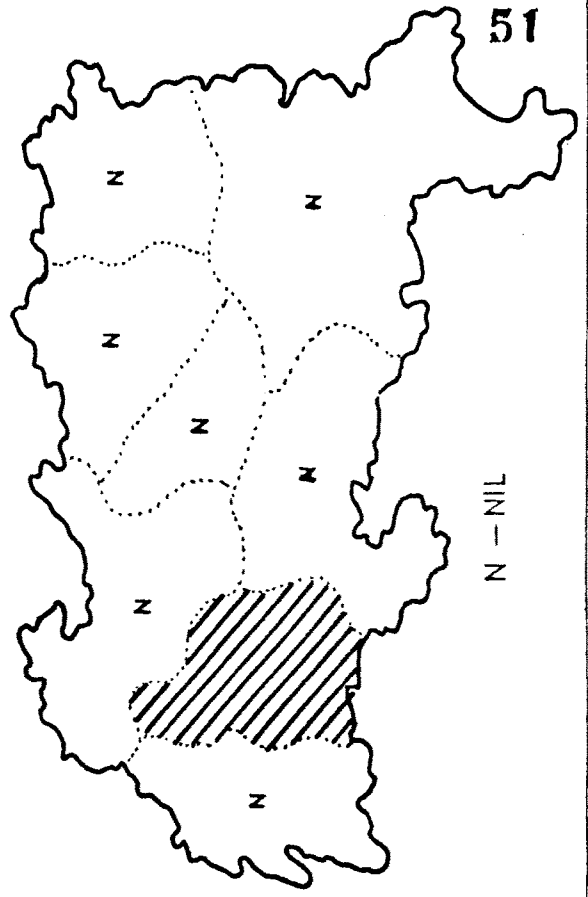
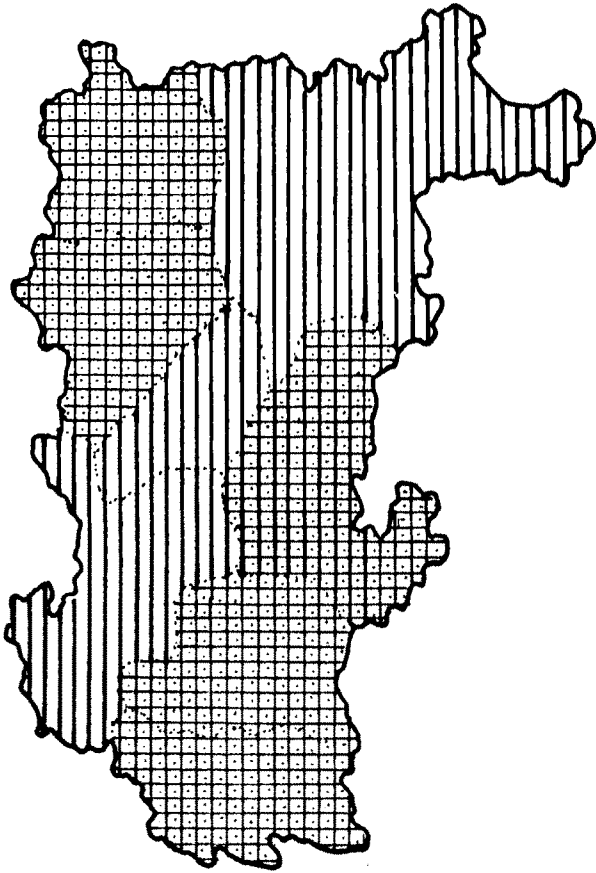


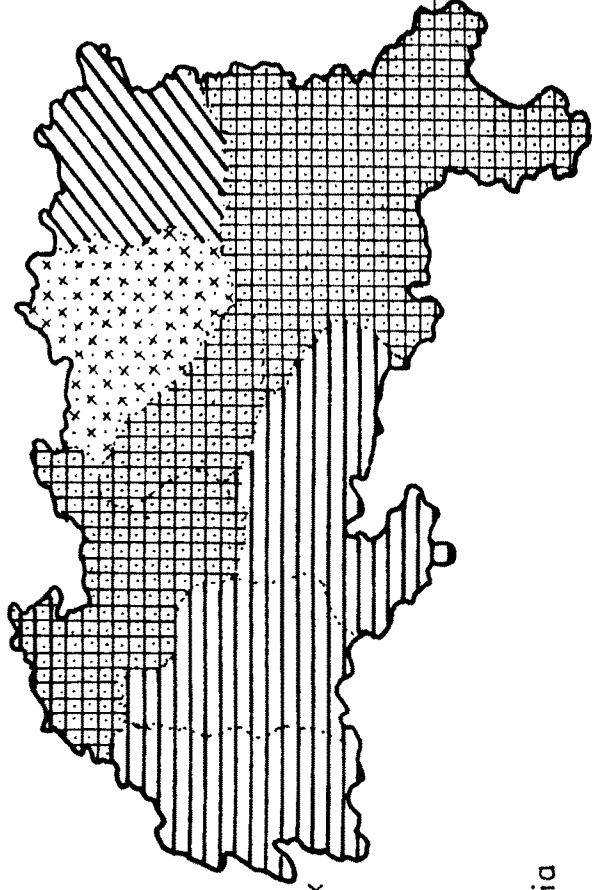
Fig.2.14

VIDARBHA DIVISION THE RANKING OF DISEASES 1979-83

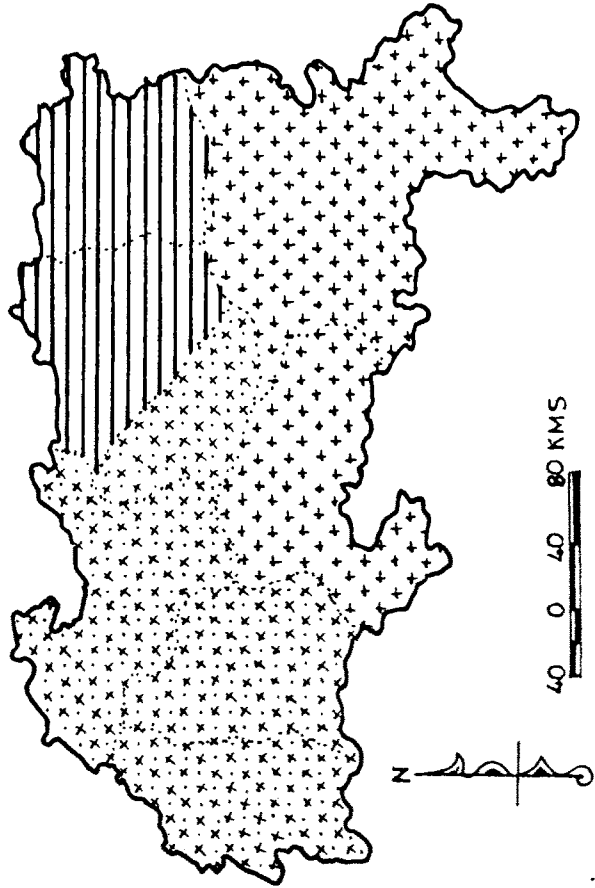
① FIRST RANKING



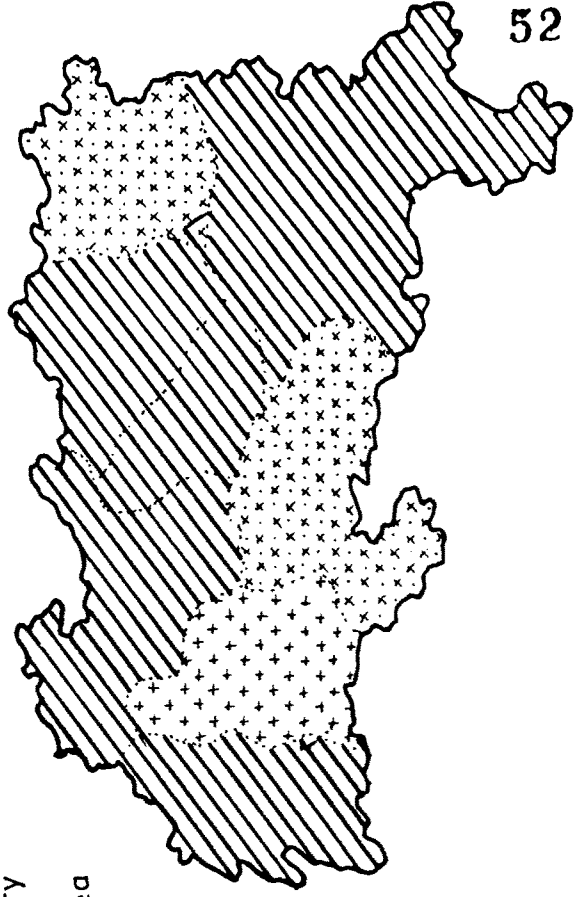
② SECOND RANKING



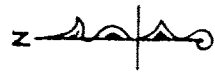
③ THIRD RANKING



④ FOURTH RANKING



	Cholera
	Small pox
	Measles
	Malaria
	Pneumonia
	Tuberculosis
	Dysentery
	Diarrhoea
	Leprosy
	Cancer
	Tetanus
	Jaundice

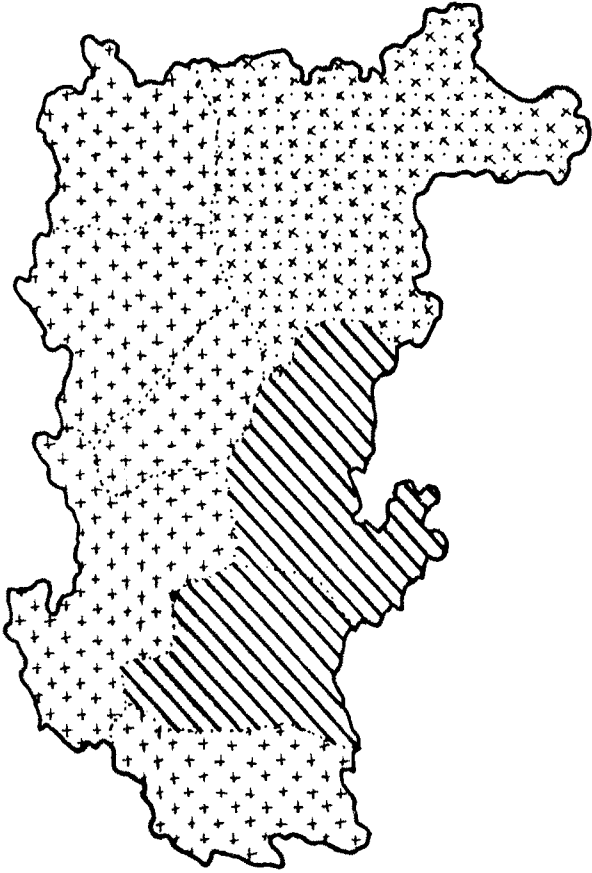


40 0 40 80 KMS

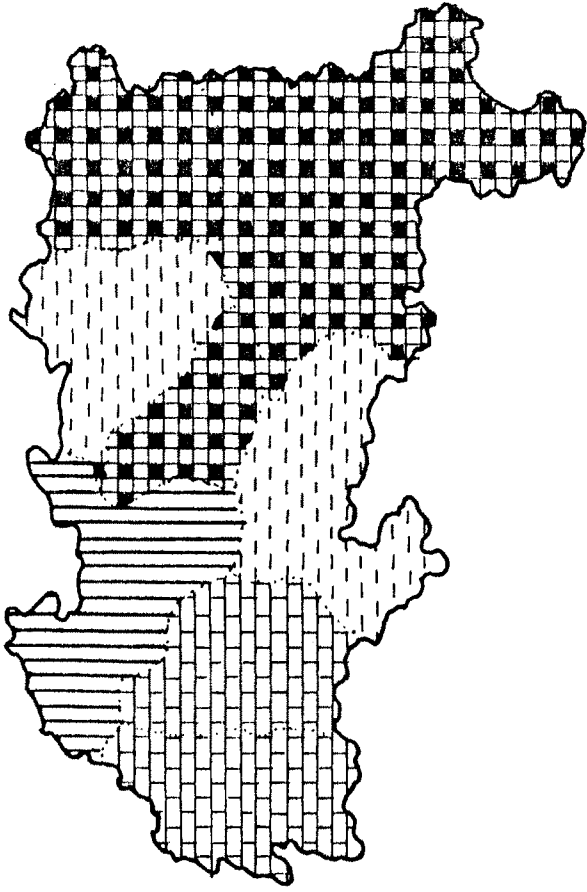
Fig 2.15

VIDARBHA — DIVISION
THE RANKING OF DISEASES.1979-83

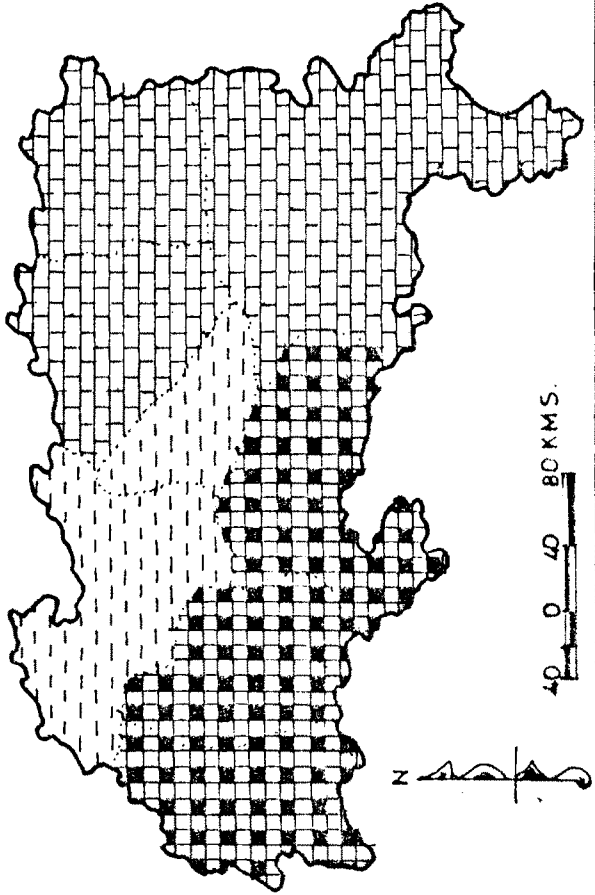
⑤ FIFTH RANKING



⑥ SIXTH RANKING



⑦ SEVENTH RANKING



⑧ EIGHTH RANKING

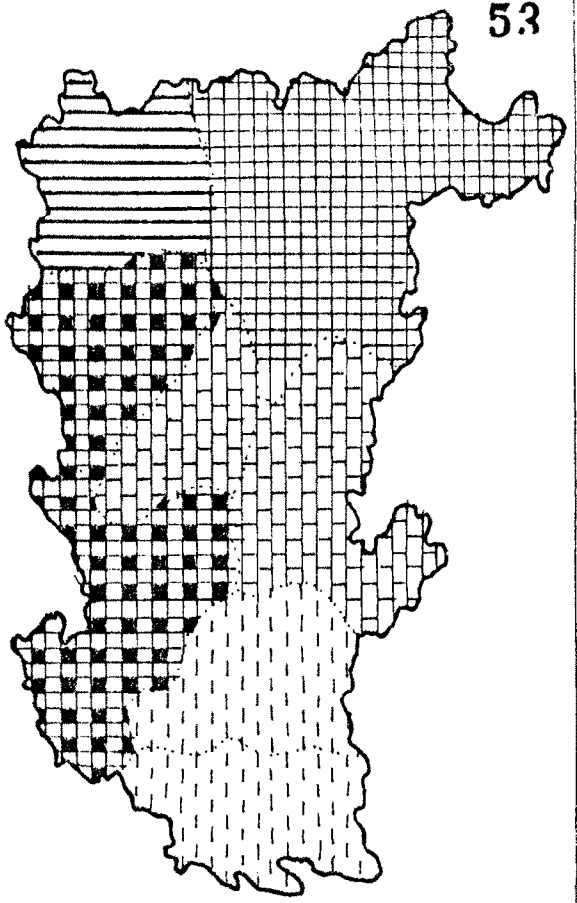
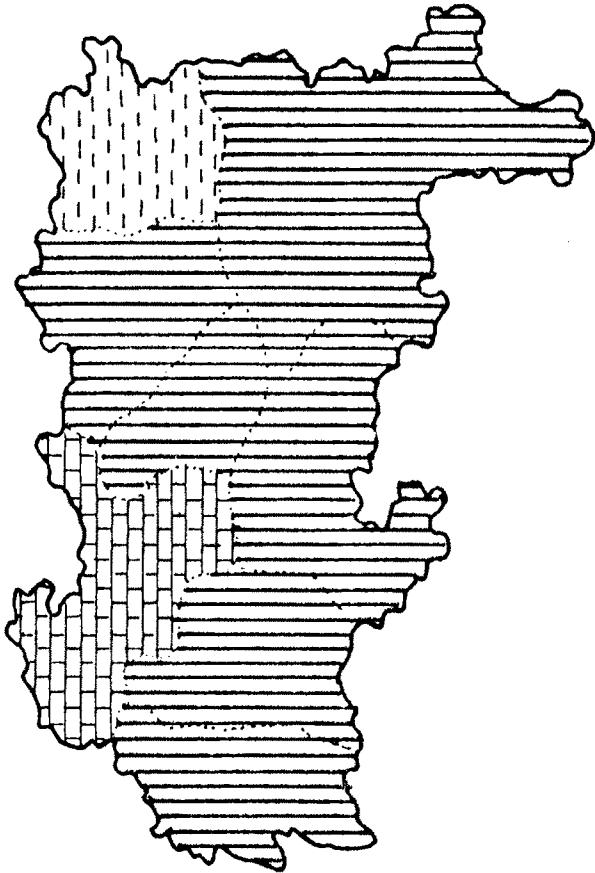


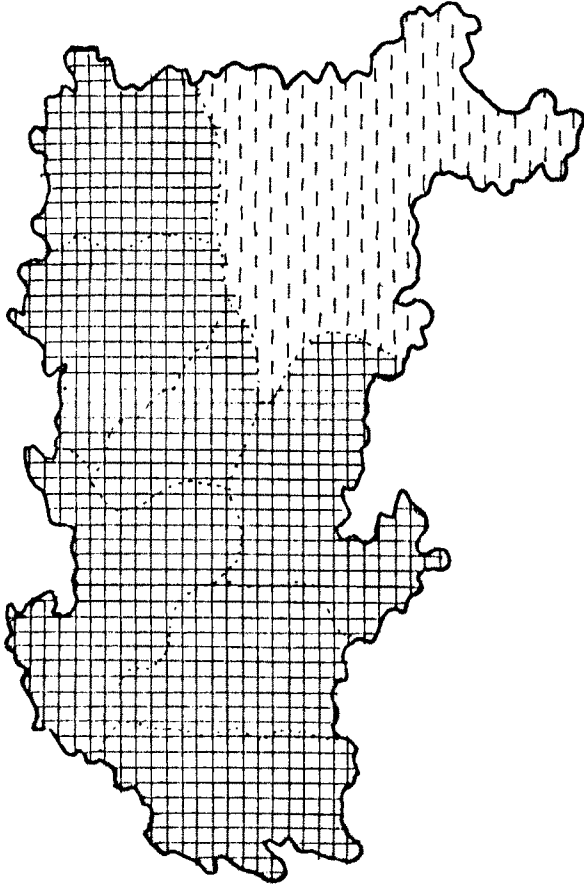
Fig 2.16

VIDARBHA DIVISION THE RANKING OF DISEASES 1979-83

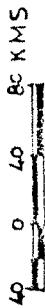
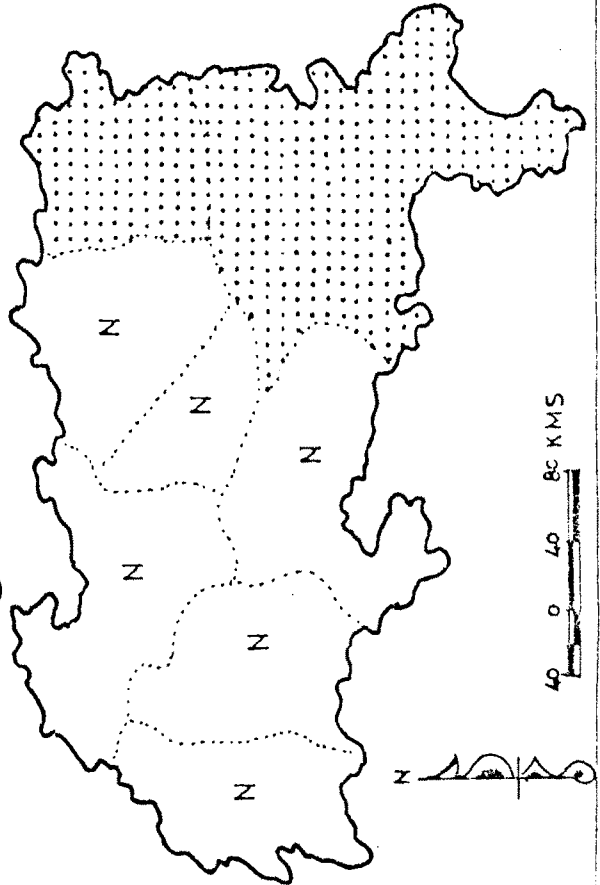
⑨ NINTH RANKING



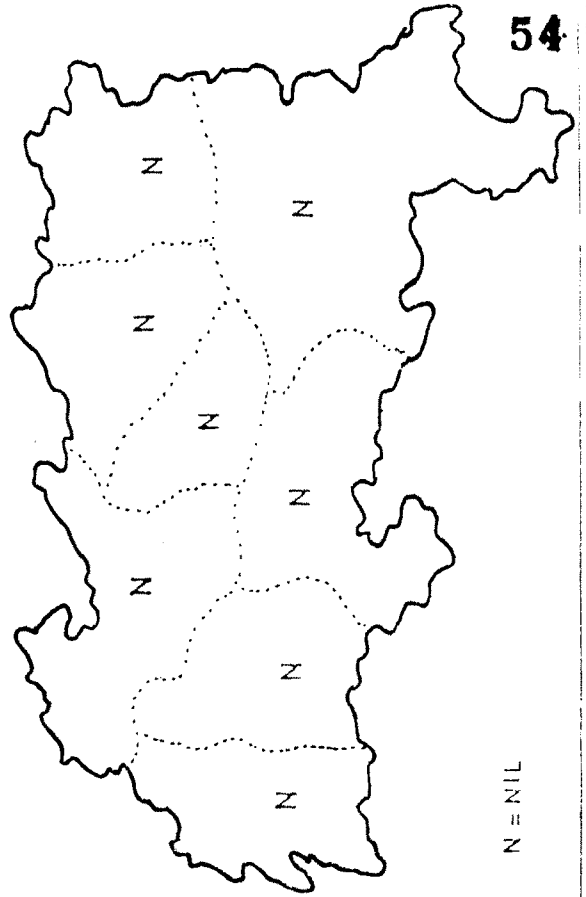
⑩ TENTH RANKING



⑪ ELEVENTH RANKING



⑫ TWELFTH RANKING



N = NIL

Fig. 2-17

death rate of pneumonia in Chandrapur district, the death rate of malaria in Wardha and death rate of small pox in Amravati district is higher amongst the other disease, which is lower than diarrhoea. These various diseases in aforesaid districts rank II hence, shown in II rank. Accordingly, for remaining diseases, ranks have been calculated for various districts upto XII rank. The same method is used for remaining groups of years also. The displacement in the rank order has been shown in Fig.2.6 to 2.17 and 2.22.

This ranking technique shows diarrhoea, tuberculosis, small pox, malaria, pneumonia are the diseases which have highly emerged out in this area in the period of 1962-1967. Diarrhoea remains a disease of first rank in 1962-67 in all districts of Vidarbha division. Then tuberculosis occupies first rank in two, two and five districts of Vidarbha division in the period of 1968-73, 1974-78, and 1979-83 respectively. It clearly indicates that diarrhoea and tuberculosis are the serious diseases of the region which remains first in its rank in the 22 years period. The diseases like pneumonia, cancer and tetanus also show remarkable influence in the region. Small pox was the major disease in the period 1962-67 but it has been completely eradicated throughout the region from 1979. The eradication of malaria has been noted in the Vidarbha division except Chandrapur and Bhandara district since 1979. The leprosy, whose death rate is gradually increasing has occupied VI rank in Chandrapur, Bhandara and Wardha district.

This might be due to clinics of Anandvan, Sevagram in Chandrapur and Wardha district run by the eminent social worker Shri Baba Amte and others. Leprosy patients are more in number in Wardha and Chandrapur districts during the period of 1979 to 1983.

As per 1979-83 group ranking order, the following three groups of diseases can be visualised.

- 1) Diseases of higher ranking order (roughly from I to IV rank)
 - I) Diarrhoea II) Tuberculosis III) Cancer IV) Pneumonia.
- 2) Diseases of moderate ranking order (roughly from V to VIII rank)
 - V) Tetanus VI) Jaundice VII) Measle VIII) Leprosy.
- 3) Diseases of low ranking order (roughly from IX to XII rank)
 - IX) Cholera X) Dysentery XI) Malaria.
- 4) Small pox has been completely eradicated since 1979 and Malaria shows its appearance only in the districts like Bhandara and Chandrapur whose death rate is very negligible.

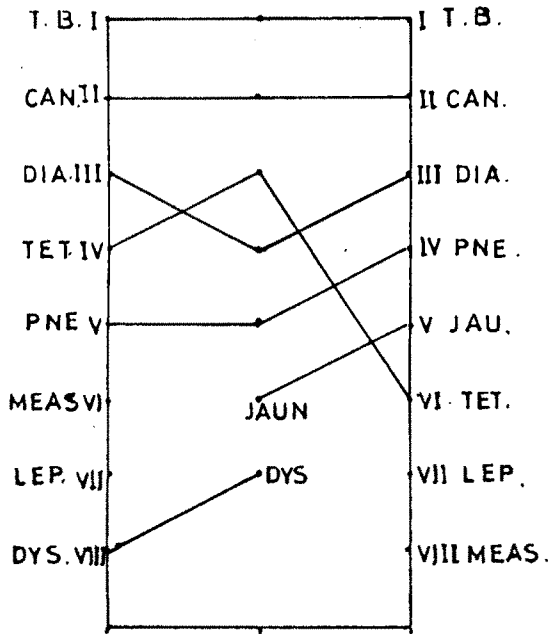
2.4.3 Citywise ranking of diseases :

The author has selected eighteen cities from Vidarbha division for which cause specific death rates per 100,000 population have been calculated. The data are available for 18 cities from 1972 onwards upto 1983, hence these 12 years have been classed into 3 periods i.e. 1972-75, 1976-79 and 1980-83. For these three periods, average death rates have been calculated. Higher cause specific death rate of specific disease occupies the higher rank e.g. in Achalpur city the

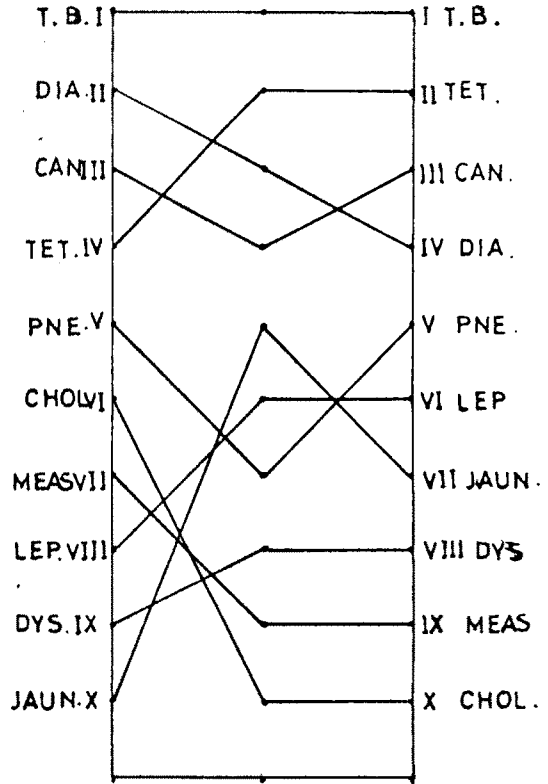
VIDARBHA DIVISION

MAJOR CAUSES OF MORTALITY IN ORDER OF IMPORTANCE

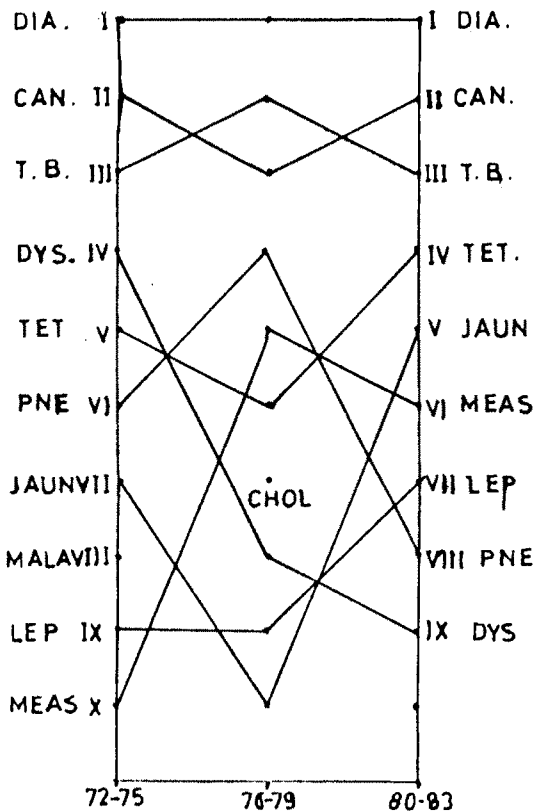
① ACHALPUR CITY



② AKOLA CITY



③ AKOT CITY



④ AMRAOTI CITY

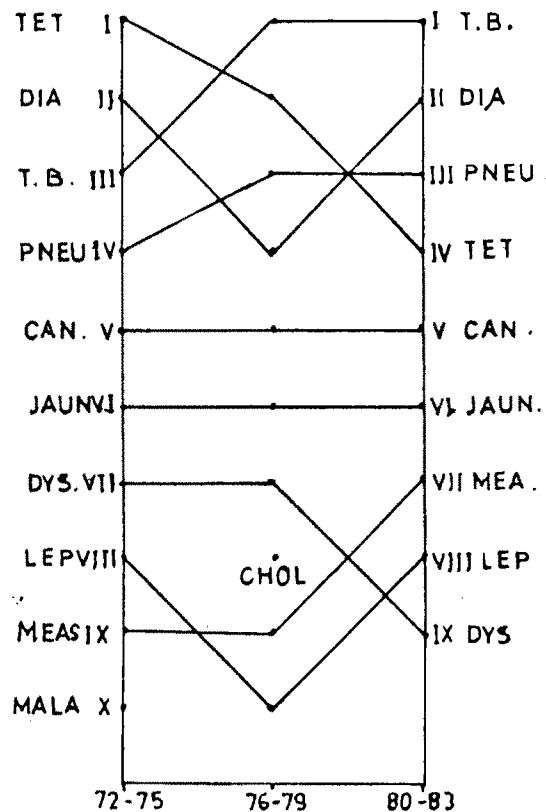
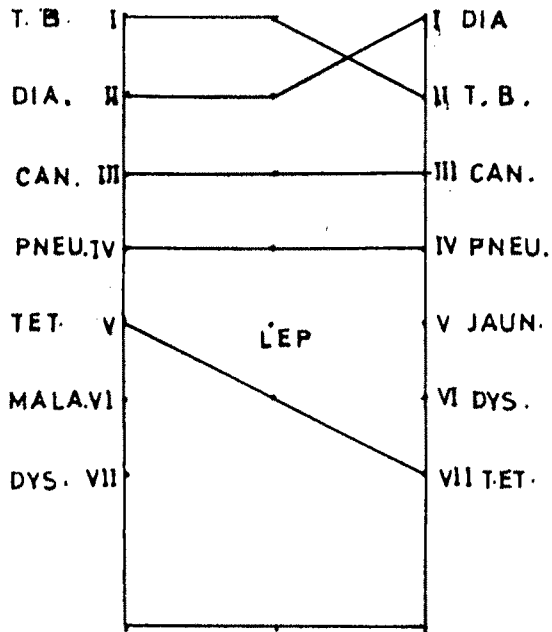


Fig. 2-18

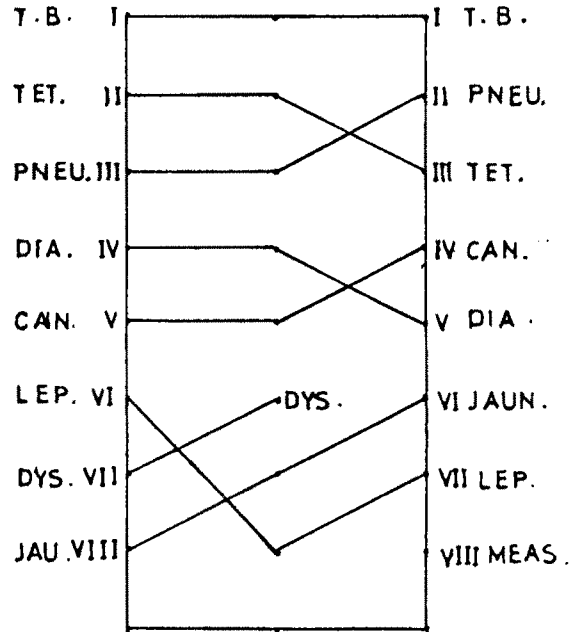
VIDARBHA DIVISION

MAJOR CAUSES OF MORTALITY IN ORDER OF IMPORTANCE.

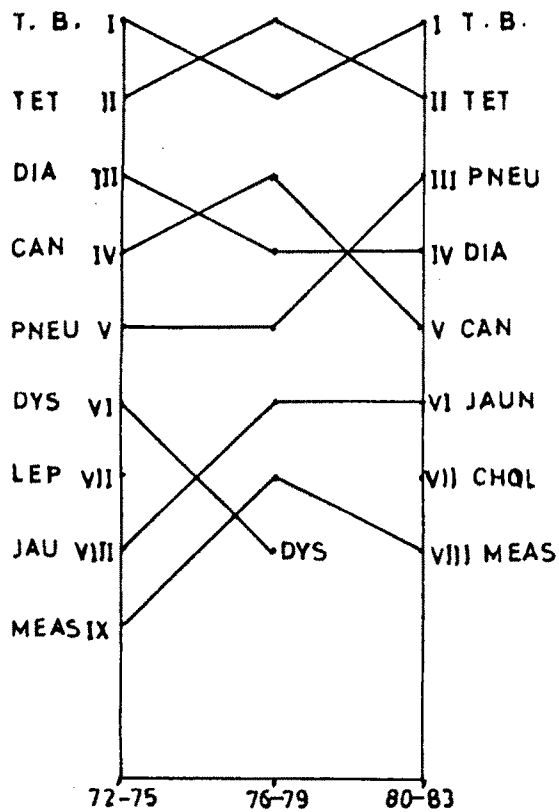
⑤ BALLARPUR CITY



⑥ BHANDARA CITY



⑦ CHANDRAPUR CITY



⑧ GONDIA CITY

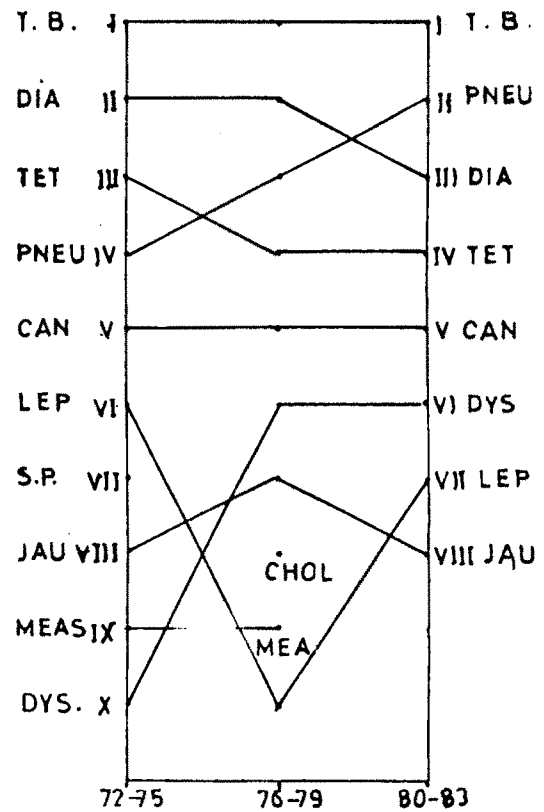
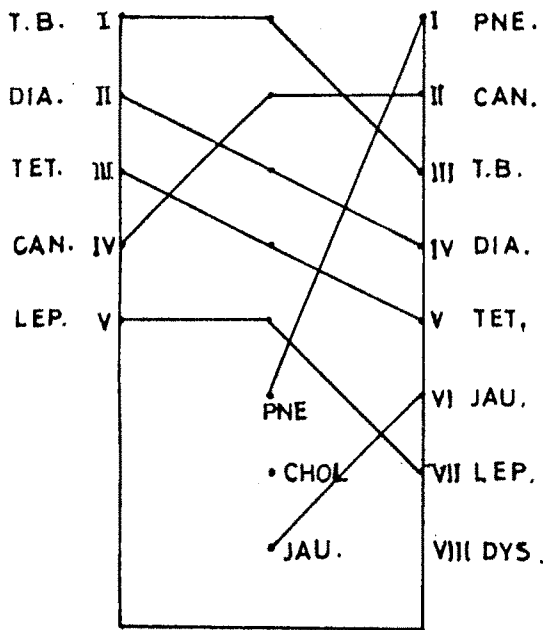


Fig 2.19

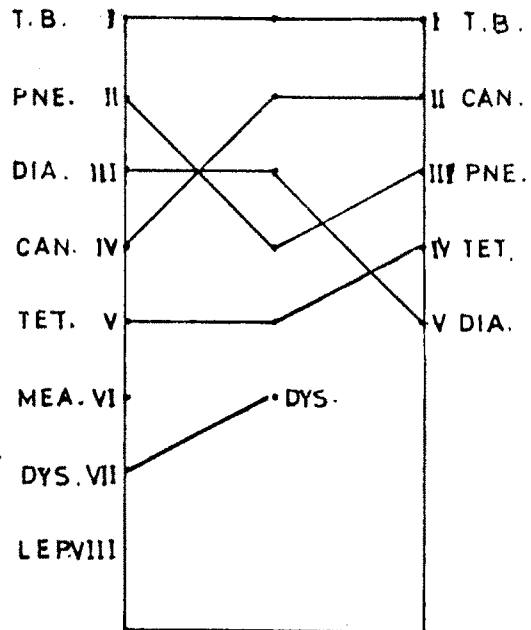
VIDARBHA DIVISION

MAJOR CAUSES OF MORTALITY IN ORDER OF IMPORTANCE

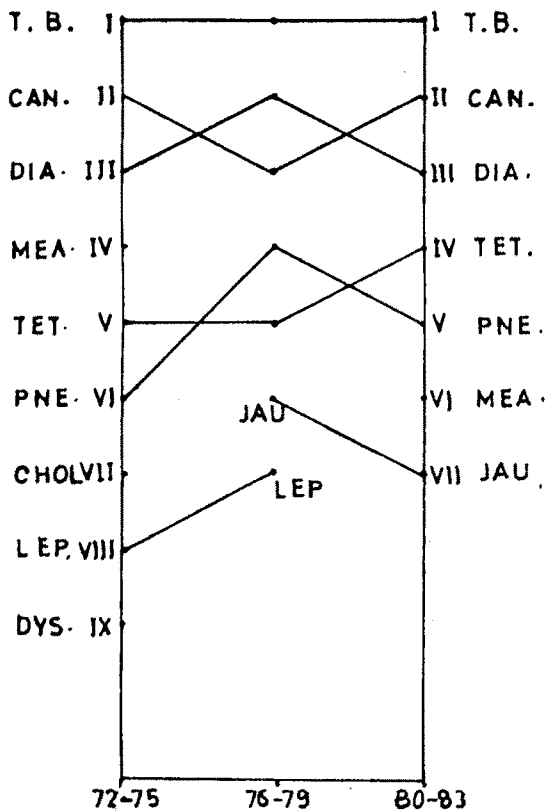
⑨ HINGANGHAT CITY



⑩ KAMPTEE CITY



⑪ KARNJA CITY



⑫ KHAMGAON CITY

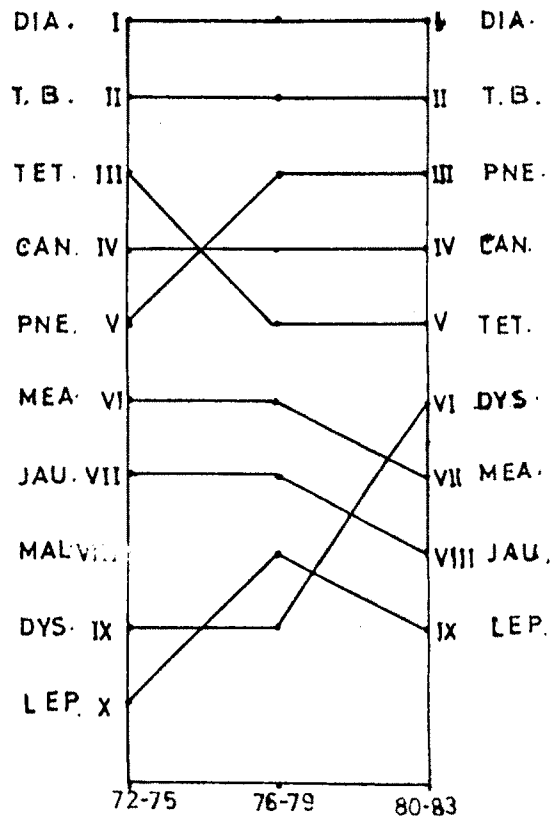
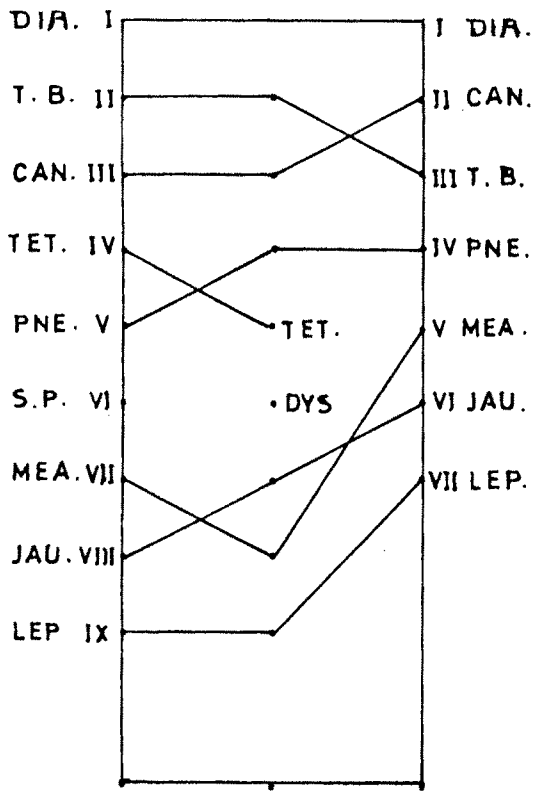


Fig. 2.20

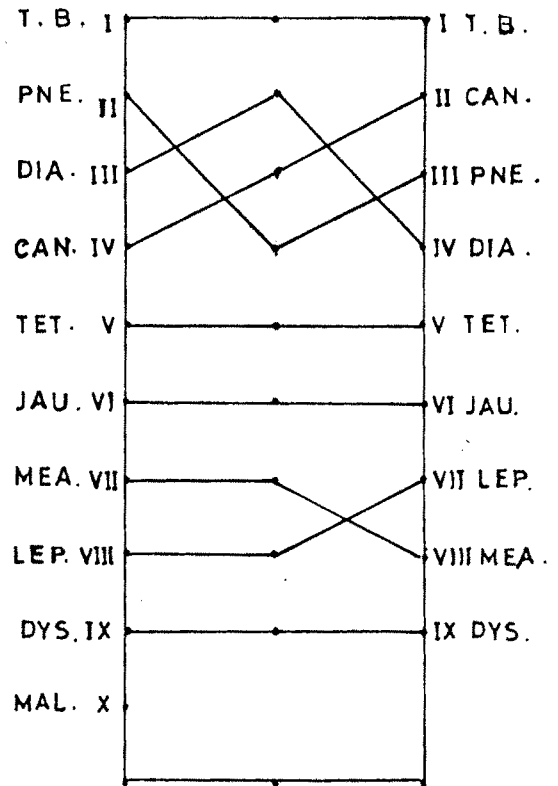
VIDARBHA DIVISION

MAJOR CAUSES OF MORTALITY IN ORDER OF IMPORTANCE

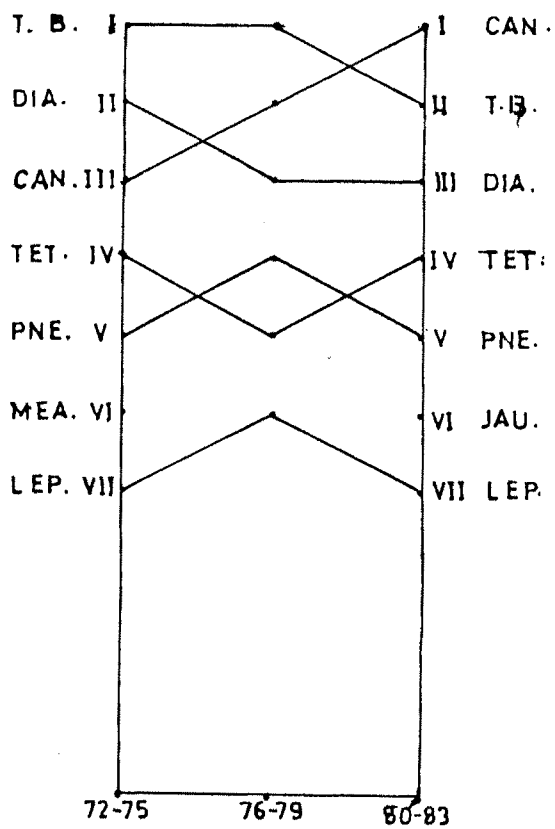
⑬ MALKAPUR CITY



⑭ NAGPUR CITY



⑮ PULGAON CITY



⑯ WARDHA CITY

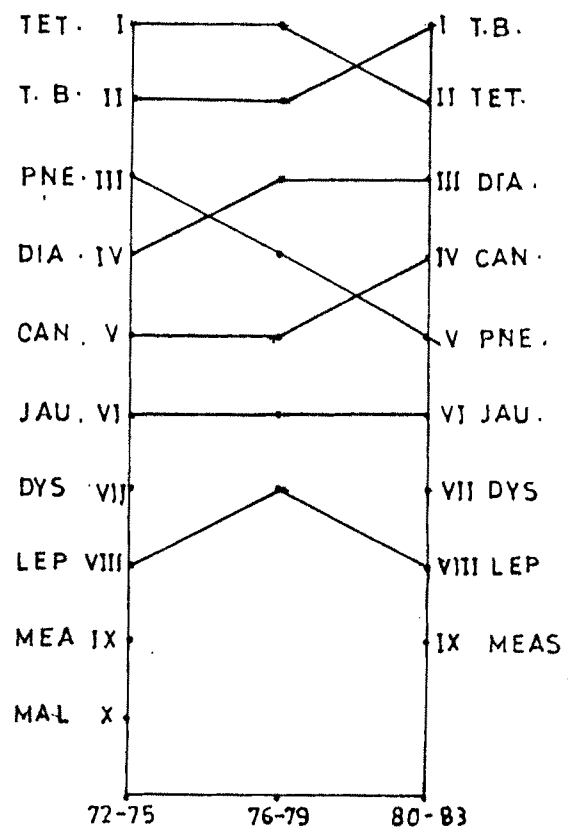
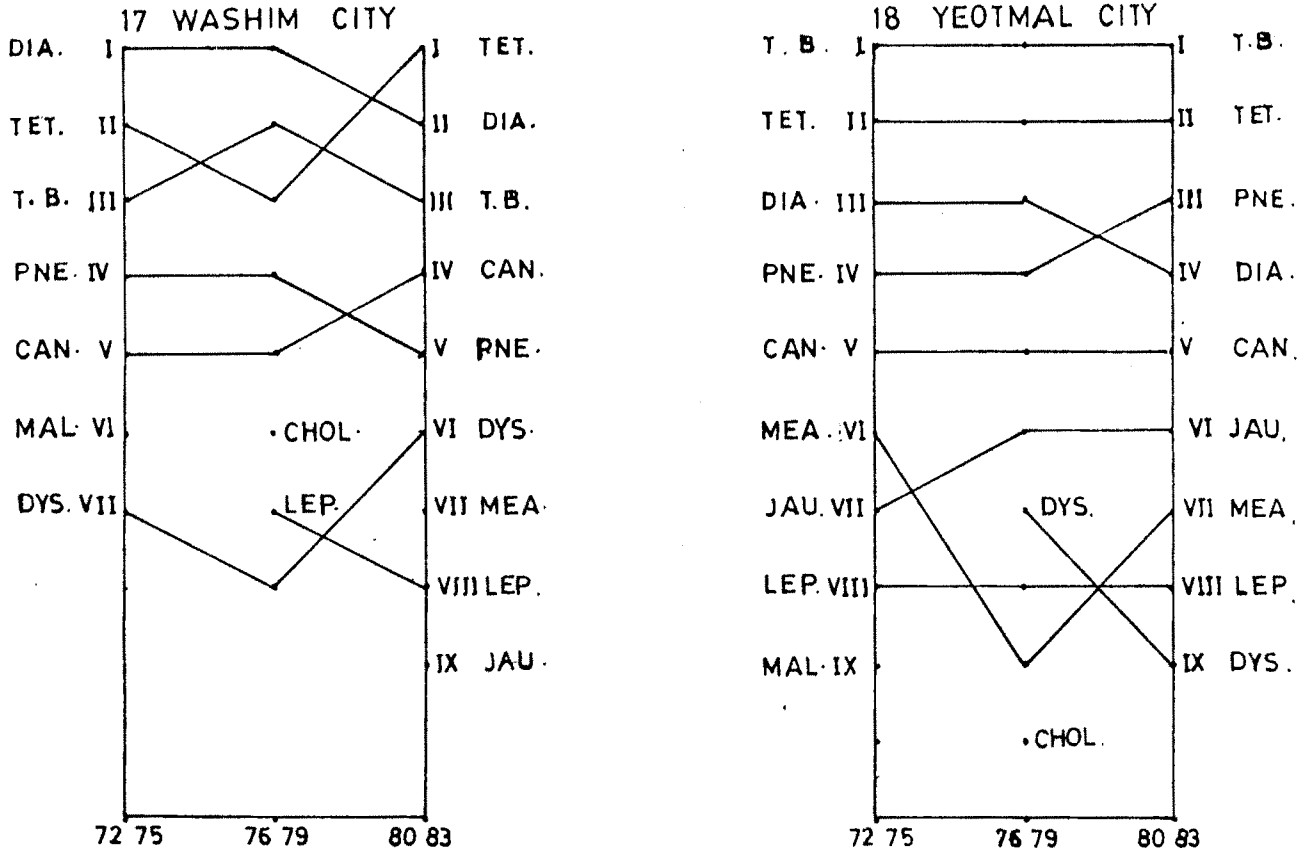


Fig 2.21

VIDARBHA DIVISION

MAJOR CAUSES OF MORTALITY IN ORDER OF IMPORTANCE



VIDARBHA DIVISION RANKING OF DISEASES

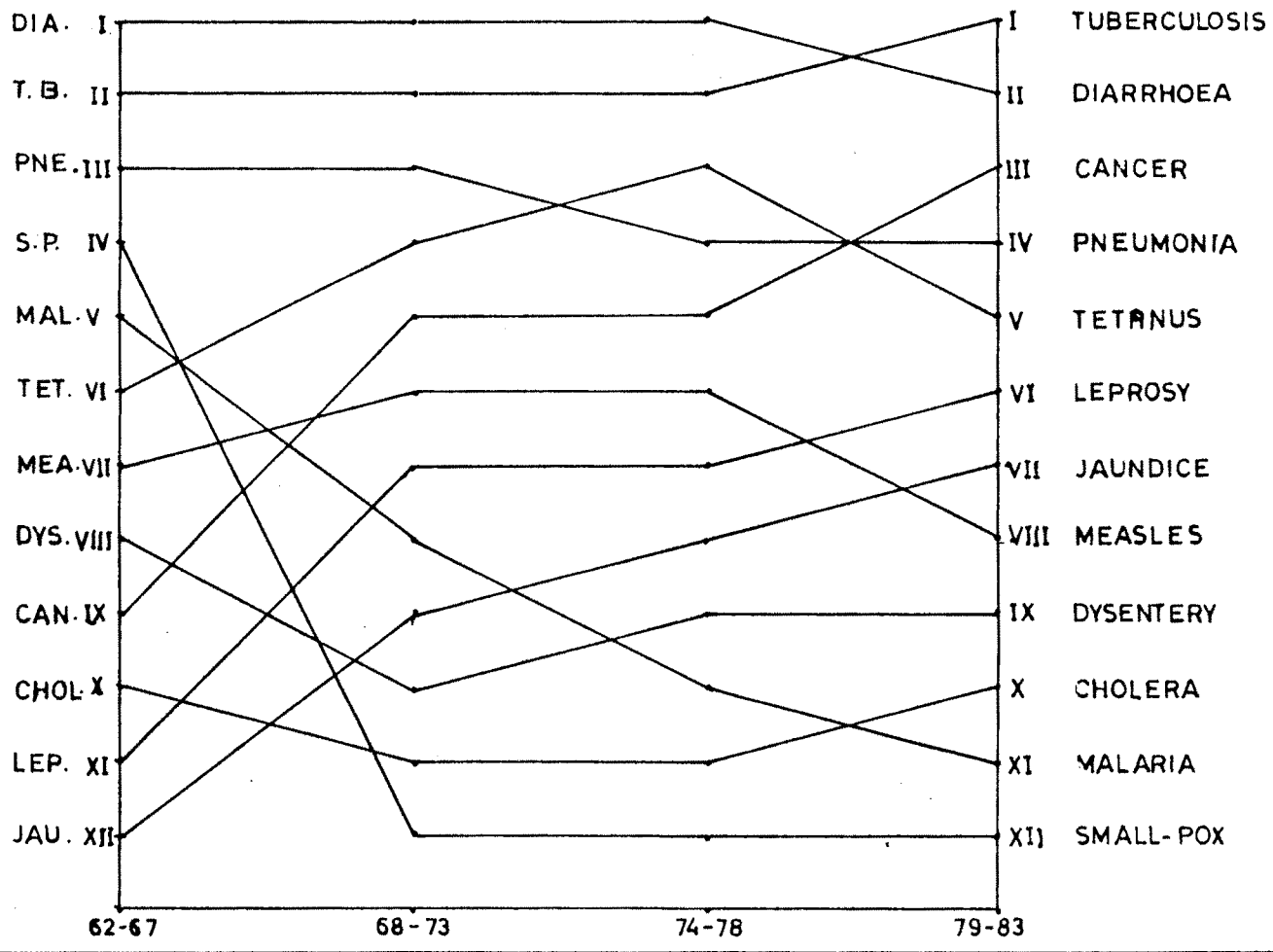


Fig. 2-22

death rate is highest due to tuberculosis within the span of 12 years, so tuberculosis has given I rank. Death rate of dysentery of Achalpur in 1972-75 is lowest, hence it has given VIII rank. Accordingly for all the cities the rank orders have been calculated and are shown in figures 2.18 to 2.22.

This ranking technique shows that some diseases are severely affecting in the cities which occupy highest ranks. Tuberculosis is a disease which is seriously affecting and ranking I in the cities like Bhandara, Gondia, Nagpur, Kamptee, Karanja, Achalpur, Akola and Yeotmal in the span of 12 years period. Death rate due to diarrhoea is highest and occupies the I rank in Khamgaon and Akot cities. In almost all cities tuberculosis, diarrhoea, pneumonia, cancer and tetanus are the major diseases which are responsible for increasing higher order mortality. In Washim city diarrhoea occupies I rank in 1972-75 period but in 1980-83 tetanus is on top rank. Deaths due to tetanus are more in the cities like Wardha, Chandrapur, Bhandara and Akola. Deaths due to pneumonia are increasing day by day in every cities of Vidarbha division. However, the detailed study of ranking of diseases at district and city level is made in chapter no. III and IV under the section no. 3.14 and 4.21 respectively.

2.5 CONCLUSION :

While studying the environment and its effect on the distribution of diseases in Vidarbha division, it is found out

that the low death rate is remarkably found in the south-eastern and northeastern hilly region of Buldhana, Amraoti, district and in the hilly area of Bhandara and Chandrapur district. While river plains have its high incidence. The water-borne diseases show their higher prevalence in the river basins like Wardha-Wainganga, Purna and Painsaganga river valleys. It is also found out that climate plays an important role in distributing the diseases seasonally. The number of deaths start increasing by the onset of monsoon when the occurrence and spread of water-borne diseases is more. The number of deaths are more in rainy season than in non rainy season.

While studying the impact of socio-cultural factors; it is noted that number of deaths in the working age group and that of old age above 60 years is rapidly increasing. While the infants and young population is much more safer. It is interesting to note that 1 to 14 years age group of male population and female infants is the most safest age group in Vidarbha division as the number of deaths are minimum.

Due to negligence of parents, the female deaths in the age group of 1-14 years is much more than male of that age. The factor literacy (especially of woman) gives very high impact on the infant mortality. Increase in the percentage of literacy, decrease the death rate of infants. It is observed that maximum infant deaths are occurring within one month of their lives.

It might be due to illiteracy of the women. Health education, immunization and vaccination to the children, and special clinics for mother and child is needed in the villages to reduce the high incidence of infant mortality. The working population is much victimised by some major diseases like tuberculosis, cancer, diarrhoea, pneumonia and tetanus.

The districtwise and citywise cause specific death rates and the ranking technique show that diarrhoea, tuberculosis and cancer are the major diseases of the Vidarbha division. Deaths due to tetanus and pneumonia cannot be ignored as they occupy the dominant position in the ranking list. On the other hand the small pox has been completely eradicated from the Vidarbha division. Malaria is found in the districts like Bhandara and Chandrapur where the death rate is very low.



REFERENCES

1. Akhtar, R. and Learmonth, A.T.A. (1985) : Geographical aspects of health and diseases in India. Concept publishing company, New Delhi, pp.159-167.
2. Arunachalam, B. (1967) : Maharashtra - A study in physical and regional setting and resource development. A.R. Sheth and Co.133, Princess street, Bombay-2, p.10.
3. Deshapande, C.D. (1971) : Geography of Maharashtra National Book Trust, India, New Delhi, pp.22-23.
4. Dikshit, K.R. (1986) : Maharashtra in maps, Secretary, Maharashtra State Board for Literature and Culture Mantralay, Bombay 400032, p.24,25,27.
5. Mathur, J.S. (1971) : Introduction to social and preventive medicine. Oxford and IBH publishing Co., Oxford Bldg., No.88, Connaught circus, New Delhi-1, p.286.
6. Mishra, R.P. (1970) : Medical Geography of India. National Book Trust India, New Delhi, p.56, 65.
7. Pandurkar, R.G. (1981) : Spatial distribution of some diseases in Maharashtra - A study in medical geography. Unpublished Ph.D. Thesis, Shivaji University, Kolhapur, p.56,57,132.
8. Park, J.E. and Park, K. (1979) : Textbook of preventive and social medicine. Mrs.Bevarasidas Bhanot, Jabalpur, p.26, 163-164.