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It is generally stated that "Health is Wealth". Health is one of the important aspects of man's life. But man, very rarely enjoys the sound health throughout the span of his life. The health of man is closely related to geographical factors, social factors and as well to other factors like mental etc. Besides air, water, food and shelter, health is a basic need of man's day-to-day activities. 'The man with poor health or ill health is a liability to the community where he lives in', (R.P.Mishra, 1970). Man's good health or bad health are related in different ways in different environmental conditions. There are several disciplines like public health, sociology and medicine which study the health of the individual and that of the community. Geography also deals with health aspect of man's life. There are many geographical factors which influence and determine the health of the man and that of the society.

Recently, the new branch of geography known as 'Medical Geography' has developed which deals with man's health in relation to different types of environments.

### 1.1 IMPORTANCE OF STUDY OF MEDICAL GEOGRAPHY :

Medical geography is concerned with the study of areal distribution of diseases and their relationship to the existing environment. Physico-socio cultural factors are the major aspects which serve to explain the spatial distribution and diffusion of certain diseases and other conditions of the health. Medical geography is the scientific discipline combining medicine

and geography. It is also known as Geography of diseases, Geography of health, Geography of life and death, Geographical pathology, Medical ecology, Disease ecology and so on (Park and Park, 1979).

Medical geography is a study of the relationship between pathological factors which cause the diseases and the geographical factors which give rise to those pathological factors (R.P.Mishra, 1970). The pathological factors are causative agents, vectors, intermediate hosts and reservoirs; while geographical factors are other physical or biological or sociocultural.

It is true that the genotypical (pathological) factors are too rigid and are not changeable. They are fixed and are available already in the body of man, while phenotypical factors are variable in nature and are elastic and changeable in nature. The environment governs these factors which are responsible for giving rise to the pathological factors. Environment consists of all physico-socio-cultural factors in which men and other animals live together. These factors influence the health of man and the reproductive capacity of living beings. Physical factors are unchangeable in nature but environmental factors can change from place to place. Socio-cultural are man made factors, hence they are more variable in nature. As medical geography is a borderline discipline between medicine and geography, it studies both i.e. geogens and pathogens.

The main aim of the studies in medical geography is to analyse the geographical factors which are responsible for the areal distribution of diseases and health conditions. Health is defined as " A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity," (WHO, 1965). The state of completeness of health is relative term and it varies from individual to individual depending upon the physiological characters and the impact of the environment in which the individual resides.

Disease is a departure from the state of health. It has been defined as " A state which limits life in its power, duration or enjoyment." It makes the changes in living tissues which are essential for living being in a particular condition of environment and hence disease is nothing but temporary maladjustment between man and his environment (R.G.Pandurkar,1981).

The scientists in the medical field have not taken much cognisance of the relationship between medicine and geography, hence medical geographer's have given more attention on the geographical factors which are responsible for the distribution of diseases and the health conditions. Thus, this branch of geography deals with distribution of human diseases in relation to environment of man and society.

## 1.2 REVIEW OF WORK DONE IN MEDICAL GEOGRAPHY :

The medical geography is as old as Hippocrates, who has explained the relationship between environment and spread of

diseases. The influences of environment on health of man were known to the scientists. Hippocrates in the 4th century has discussed it in detail in his famous article "On Airs, Water and Places."

Medical geography is an interdisciplinary branch of geography and medicine. Recently geographers have paid more attention in the development of medical geography. Realizing the importance of study of interdisciplinary nature, many foreign geographers like Audy J.R., Howe G.M., Learmonth A.T.A., Brownlee A.A., Hunter J.M., Hyma B., Ignatyev, Light R.V., May J.M., McGlashan N.D., Murray M.A., Pyle G.F., Stamp L.D. and some others have shown great interest in developing this branch of geography.

But in India, Medical Geography has not developed much. It is still in its infancy stage. Hesterlow A.M.V. (1929) was the first researcher who studied the possible relationship between environmental factors and disease in Southern India. Later, Arthur Geddes made a very valuable contribution. When he has studied the relationship between the general conditions of health and population growth in India. Prof. A.T.A. Learmonth has provided a scientific base to the new researchers in the field of medical geography, and till today almost all the work done by various scholars in this country has been inspired by his pioneering studies.

The 21st International Geographical Congress which was held at New Delhi in the year 1968 provided good opportunity to

Indian medical geographers to contribute and present papers in the field of medical geography. Prof. Indrapal and Prof. A.K. Tiwar have presented research paper on 'Trachoma and Guineaworm disease in Rajasthan'. Soon after the 21st congress, Prof. R.P. Mishra (1970) has published a book, 'Medical Geography of India', which has provided a systematic approach for the work in India. It helped Indian geographers in understanding the general theme of medical geography. Dr. B. Bannerjee and J. Hazra (1974) have contributed on 'Geo-Ecology of Cholera in West Bengal'. S.C. Sinha submitted research paper on 'trends of cholera epidemics in U.P. at the 23rd International Geographical Congress, held in Moscow. Besides these some research work has been published by the Indian geographers. Dr. A. Ramesh and Dr. B. Hyma (1977), on the geographical distribution and trends in malaria incidences in Tamilnadu. R. Akhtar and A.T.A. Learmonth have published 'Malaria Annual Parasite Index Maps of India' for malaria control unit areas 1965-1976 (1979). Choubey Kailash (1971) on the environmental factors and deficiency diseases in Sagar city. A joint paper by R. Akhtar and Nilofar Ishaq on 'Environmental factors and cancer distribution in India was discussed in 7th meeting of the French Society of Environment and Geocancerology held at Paris in 1981. Dr. R.G. Pandurkar's study (1981) on the 'Spatial distribution of some diseases in Maharashtra', is a detailed study and analysis of different diseases in a state at district level.

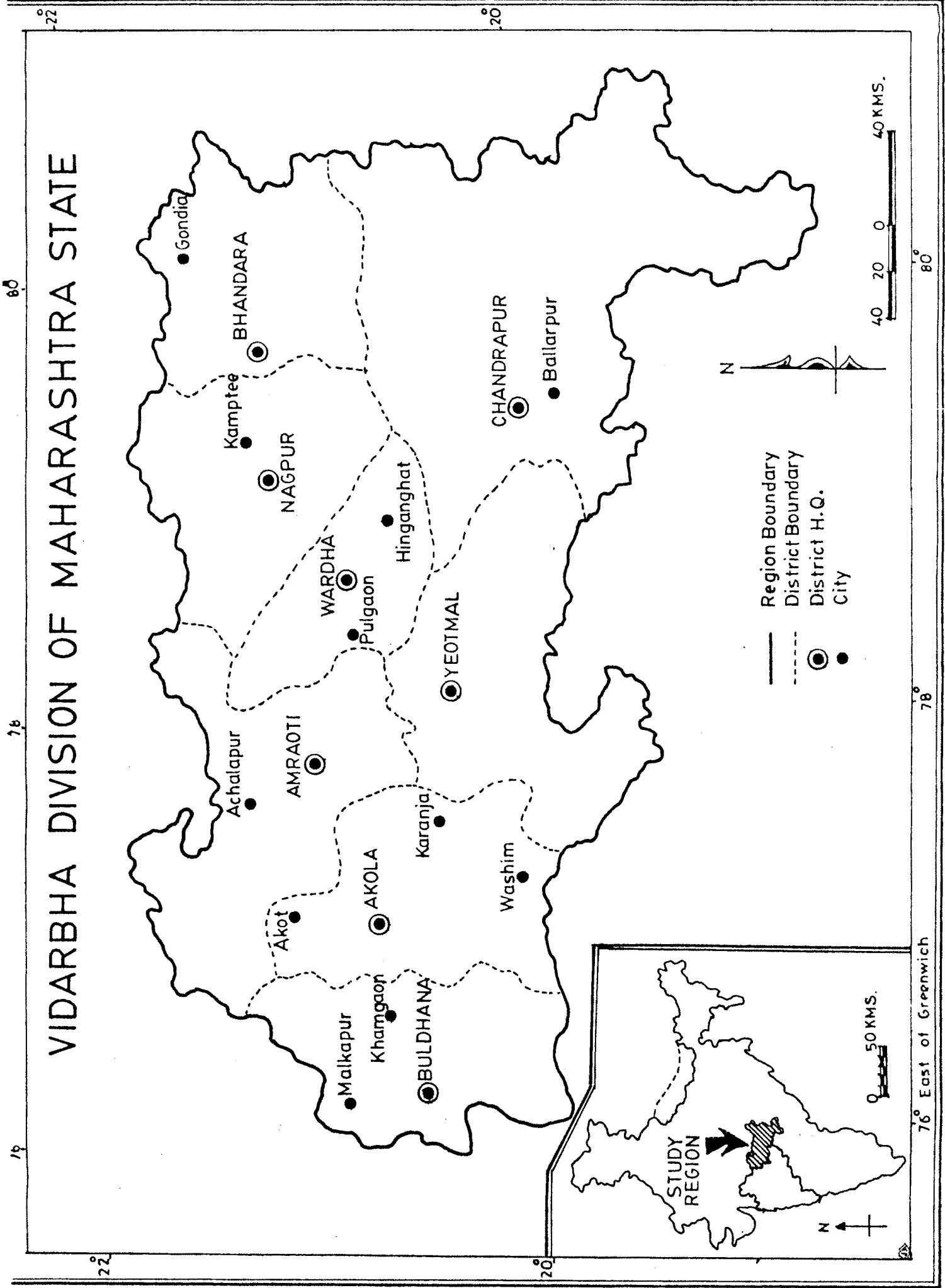


Fig 1.1

### 1.3 CHOICE OF THE REGION AND TOPIC :

The author proposes to work on "Spatio temporal analysis of major diseases in Vidarbha." The author has selected Vidarbha division with specific purpose. A medical geography is concerned with the study of areal distribution of diseases and their relationship to the existing environment. There are many factors like physical, social and cultural which are responsible for or serve to explain the spatial distribution and diffusion of certain diseases and other conditions of the health.

In view of above, the present study deals with different environmental problems in relation to some diseases in Vidarbha division of Maharashtra State. Here in Vidarbha division existing environmental conditions are typical. This region lies to north-east corner of Maharashtra State (Fig.1.1). The area under study comprises of eight districts of Nagpur division namely 1) Buldhana 2) Akola 3) Amraoti 4) Yeotmal 5) Wardha 6) Nagpur 7) Bhandara and 8) Chandrapur. The latitudinal and longitudinal extent of the region is 18°42' North to 21°48' North and 75°48' East to 80°54' E respectively. It covers 31.6 percent area and 23.30 percent population of Maharashtra State as per 1981 census. Vidarbha region has covered maximum area of the state. The total area covered by this division is 97,409 sq.kms. and the population is 14,343,210 as per 1981 census.

The data related to major infectious and parasitic diseases has been collected districtwise from 1961 onwards continuously for



23 years (upto 1983). Now, Chandrapur district has been divided into two districts namely Chandrapur and Gadchiroli. However, the data is from 1961 hence the old Chandrapur district is taken into consideration.

The title of the topic reflects that the author has concentrated his attention on different environmental problems in relation to major diseases, which have spreaded easily from man to man or animal to man and caused by different organisms. Major parasitic or infectious diseases caused by infectious agents are transmitted directly from an infected person or animal to the non-diseased person, or indirectly through the agency of an intermediate host, carrier, vector, or the inanimate environments like air, water, food, dust and fomites (B.K.Mahajan, 1972). The author has selected twelve major diseases viz. Cholera, Dysentery and Diarrhoea, Tuberculosis, Diptheria, Tetanus, Small pox, Measles, Jaundice, Malaria, Cancer and Pneumonia and are studied citywise and districtwise. The disease distribution of 18 cities is studied from Vidarbha division which are demarcated as cities per 1981 census (Fig.1.1).

#### 1.4.A OBJECTIVES OF THE STUDY :

The present study deals with following specific objectives.

- 1) To map and analyse the spatio-temporal distribution of major diseases in relation to different environmental conditions (physico-socio-cultural environment) in Vidarbha division.

- 2) To study the spatial analysis of major diseases in the districts and in the cities of Vidarbha division.
- 3) To study availability/nonavailability of medical facilities of Vidarbha division and to suggest the new probable localizations of medical facilities in the districts.

#### 1.4.B HYPOTHESIS :

It is logical to mention that the occurrence of water-borne infectious diseases might be more in the rural areas and physical factors are more responsible than the socio-cultural factors. The impact of physical environment on the spread of diseases might be in positive correlation in the area under study. Secondly, it seems that in any area the distribution of medical facilities is uneven. Lion's share is always taken by urban areas and the rural areas are deprived off.

#### 1.4.C METHODOLOGY :

The author proposes to analyse the available data at various stages. The collected data will be correlated with different types of physical and socio-cultural variables. The data are collected for more than 20 years. It will be grouped into four periods of time at district level and three periods of time at city level. The account will be given about the temporal change in the pattern of distribution within these three, four period of times. The data so collected at district level and for selected city level will be depicted with the help of different line graphs, and by Choropleth methods at appropriate places with suitable cartographic techniques.

### 1.5 DATA SOURCES :

The major task of a medical geographer is to portray the information which is related to space and he has to prepare the distribution maps of morbidity and mortality. These maps needs to be correlated with the environmental setup. For this, correct and reliable data are required. The researcher has collected the data from different secondary sources.

Annual vital statistics is the prime source of data. The data collected from Annual Vital Statistics of Maharashtra State is districtwise and citywise of Vidarbha division. The aut or has collected data for selected diseases with age and sex differences and about specific cause of diseases. Some additional information have been collected regarding independent variables of environment such as physical features, population statistics etc; from census reports, census atlases and from district statistical abstracts of Vidarbha division for the period of 1961 to 1984. Citywise data are collected from various district gazetteers. The secondary data regarding availability of medical facilities have been extracted from the annual Health Establishment of Maharashtra State. The information about districtwise mean monthly temperature and rainfall have been taken from socio-economic abstracts which have been collected from Meteorological Department of India.

The data so collected have been tabulated in concised form and has been analysed with the help of different statistical

techniques and findings are noted at appropriate places in the text. The data whatever are collected from secondary sources have been accepted without testing it's reliability for obvious reasons for which researcher fully accepts his limitations.

#### 1.6 PROPOSED OUTLINE OF WORK :

The entire text is divided into six chapters. Chapter I, deals with importance of study of the medical geography, review of work done in the field of medical geography, organisation, choice of the region and topic, objectives of the problem, methodology etc. Chapter II, entitled "Environment and it's influence on health", comprises of physical and socio-cultural factors which are responsible for the incidence, proliferation and distribution of major diseases in the Vidarbha division. Certain physical factors have been correlated with the mortality rates. Age, sex and literacy attributes have been also compared with male female and infant mortality rates. For this, the researcher has selected some major diseases for eight districts and eighteen urban centres of Vidarbha division.

Chapter III, deals with spatio-temporal analysis of diseases (districtwise). The mortality data have been collected districtwise for 22 years (1962-83) for specific diseases and have been correlated with certain environmental factors. Ranking technique of diseases is also used in this chapter.

Chapter IV, deals with spatial patterns of diseases in 18 major cities of the Vidarbha division, viz. 1) Khamgaon

2) Malkapur 3) Akola 4) Akot 5) Karanja 6) Washim 7) Achalpur  
8) Amraoti 9) Yeotmal 10) Hinganghat 11) Pulgaon 12) Wardha  
13) Kamptee 14) Nagpur 15) Bhandara 16) Gondia 17) Ballarpur  
and 18) Chandrapur (Refer Map 1.1).

Chapter V, deals with "Analysis of health care system in Vidarbha division", where the author has calculated various ratios to show the uneven distribution of medical facilities. The author has calculated work-load factor and districtwise distribution of beds in Vidarbha division (Map 5.2).

Chapter VI, deals with summary of the work done and general conclusion and suggestions made by the author.

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