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A STUDY OF EFFECT OF PHYSICAL ENVIRONMENT ON HEALTH IN CITIES OF SOLAPUR DISTRICT (M.S)

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ABSTRACT

Health is an important aspect of human life. Good health or ill health is related in several ways to different environment situations. The health status of an individual, or a community, or a nation is determined by the interplay and integration of two ecological universes; the internal environment of man himself and the external environment which is surrounded to him. There are various geographical factors which influence and sometimes even determine the health and reproductive capacity of living beings including man. While studying the environment and its effect on distribution of diseases in Solapur district, many possible correlations have been established. Physiography, drainage and climate are the important factors influencing the human health. Present study area is situated at the south eastern fringe of the Deccan Plateau. Solapur district lies entirely in the Bhima basin, a major tributary of river Krishna. The district comprised of 11 tahasils with 142 inhabited villages & only JO towns. The aim of this study is to establish the relation of physical factors responsible for distribution of different diseases. For this study the data has been collected from various sources. It was further analysed and interpreted. The results show that higher altitudes have low death rates compared to the low lands. Geology also plays important role for some diseases. Water borne diseases are more common in the floodplains of rivers.

KEYWORDS :*Physical Environment , human life , environment situations.*

INTRODUCTION

The environment provides man with the essential life support systems. It also presents him with a variety of hazards which may prejudice his health. Health is defined as "a state of complete physical, mental and social well beings and not merely the absence of disease or infirmity". It represents a balanced relationship of the body and mind and complete adjustment to the total environment (WHO, 1965). hi the modern concept, causation of disease is due to the disturbances in the delicate balance between man and his environment. A disease is a maladjustment or mal-adaptation in an environment. The response of the individual to the adverse environmental influence is conditioned by his genetic makeup or internal environment. The health status of an individual, or

community, or nation is determined by the interplay and integration of two ecological universes; the internal environment of man himself and the external environment which is surrounded to him. The disease producing agents are markedly influenced by the external environment. Man's physique is directly exposed to the environment and hence the relationship between environment and health of the man would be a valuable study for a medical geographer. Environment may be categorized as i) Physical environment ii) Socio-cultural environment. Physical environment consists of several factors such as physiography, drainage, climate and soil. Certain diseases are found in certain physiographic regions and the geological conditions also play an important role.

STUDY AREA

Solapur district lies entirely in the Bhima basin; a major tributary of River Krishna. It lies between 170 10 N to l80 32' N latitudes and 740 42' E to 760 15' E longitudes. The district is surrounded by Ahmednagar district to the north, Osmanabad district to the north-east, Karnataka state to the south-east Sangli district to the south-west, Satara district to the west and Pune districts to the North West. It is a part of the Deccan Plateau. Solapur district has an area of 14895 km and total population of

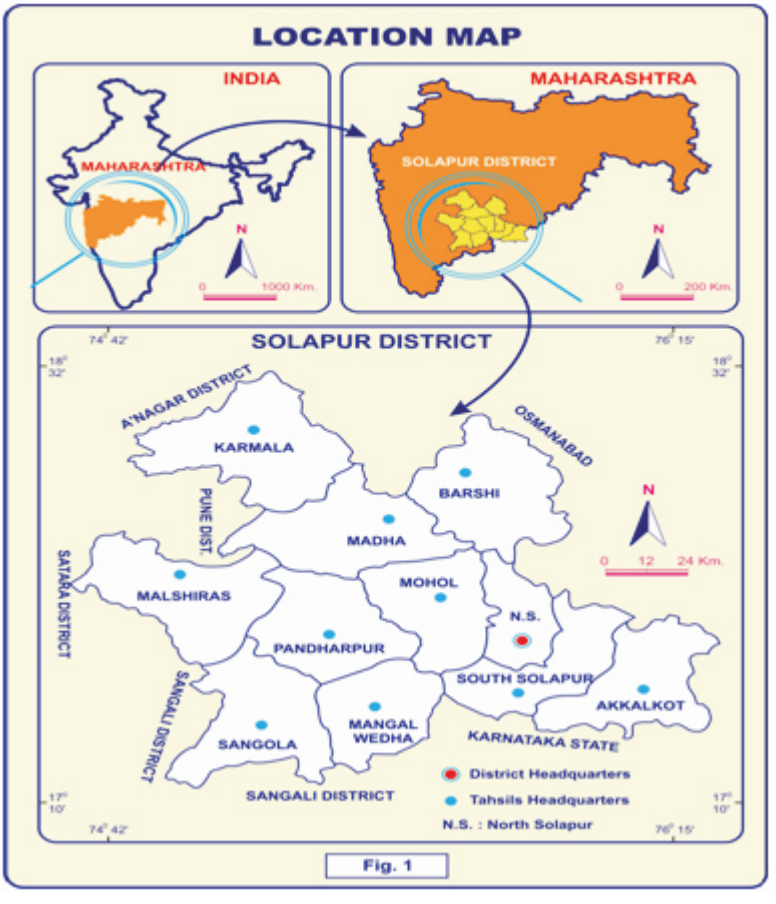


Fig. 1

38, 49,543 as per 2001 census. It ranks 5 in area and 8th in population amongst the 35 districts in the state. The river Bhima is the main river of the district. On an average the climate of the district is dry and comparatively extreme. The summers are hot and the winters are warm. In summer mean maximum temperature raises up to 40.7^{0} c, while in winter it decreases up to 17.1^{0}c. The annual average rainfall of the district is 677 mm (Fig. 1)

Present study includes the ten cities of the Solapur district namely Solapur, Barshi, Karmala,

Kurduwadi, Mangalvedha, Pandharpur, Sangola, Maindargi, Dudhani and Akkalkot. These are located at different parts of the district. They represent different physiographic units also. Three tahasils of the district namely Malshiras, South Solapur and Mohol do not have any urban center.

Objectives

The present paper aims at

i)To study the effect of physical environment on health in cities of Solapur district,
ii)To prepare a map of relation between monthly rainfall, temperature and number of deaths in cities.
iii)To analyze the distribution of diseases in relation to physical environment existed in the different tahasils of the Solapur district.

DATABASE AND METHODOLOGY

The study is based on secondary sources of data. The data relating to various aspects of climatic like temperature, monthly and annual rainfall has been obtained from the socio economic abstract of Solapur district for the year 1981, 1991 and 2001. The details of mortality and wherever possible morbidity statistics is collected from the records of the municipal corporation and municipalities located in the ten cities of the district. The data used in the analysis of year 2000 to 2009 for 11 tahasils has been collected from the local weather report of Solapur. A map of relation between monthly rainfall temperature and number of deaths in cites of Solapur district is prepared (fig. 3)

Analysis

In this paper the major physical factors like physiographic, drainage and climate are taken into consideration to study the variations in the death rate of the ten cities.

i) Physiography:

While considering the effect of Physiography on the spread of diseases the relief features of the Solapur district are to be studied. It lies between the Mahadeo range in the west and the Balaghat range in the east. The main physiographic divisions of the Solapur district are as follows-

I) The Western foot hill region in the southern part of Malshiras and western Sangola tahasils; it is a part of the Mahadeo range. The region has bare rock exposed on the surfaces with thin soil cover. Buried pediments are also present.
ii) The Nira river basin situated in the Malshiras tahasils. The river flows from west to east in the district and confluences with the Bhima river. This basin has canal irrigation facilities up to Pandharpur.
iii) The Bhima basin in Sangola-Mangalvedha and Pandharpur tahasils has a thick alluvial deposition near the river Bhima; while thin layers of alluvium are present in the Sangola tahasil. It is drained by the tributaries of Bhima river namely Maan and Korada.
iv) The plateau region includes Karmala, Malshiras, Pandharpur, Mangalvedha, and South Solapur tahasils. This region has average height 480 meters with low relative relief. There are barren stony wastes at number of places. Tributaries originating at the Balaghat range drain this region. Most of the tributaries flow to the west to join the main river Bhima.
v) The eastern hilly region in Barshi tahasils, a part of the Balaghat range. It is a water divide between the Krishna and Godavari basins. Bhogavati and Nagzari are the two important rivers originating and flowing to the river Sina.
vi) Akkalkot plains and the Bori river basin. This region has average height 480 meters. It is drained by

the small tributaries which flow to the main river Bhima as 3rd ordered streams. The average height decreases to 440 meters near the river Bhima.

In the eastern parts of the district Barshi, Mohol, Malshiras and Sangola tahasil are present .There are few hills and even there are some isolated, residual resistant remnants, The knolls are Vadshin ghat in Barshi, Waghoba and Bodki in Karmala in the eastern part of the district. Chinchagaon in Madha, Gurvad in Malshiras, Mahadeo range in Malshiras and the Khanapur Jath hills of Sangola tahasils are located in the western part of the tahasil. The highest peak of the district is Shinganapur in the Mahadeo range (1050 rn). This part of the district receives low rainfall. The scarcity of water is throughout the year. The basalt exposed on the surface and very thin cover of the soils is unable to store rain water. People have to use the available water. Considering the geology of the Mangalvedha and Sangola tahasils, there are radioactive minerals exposed in the stone mines which are proved by the School of Earth sciences, Solapur University.

The abundant stone mines of this region are filled with rain water. Due to scarcity of water, this water is used by the local people for domestic use. Thus they are exposed to contaminated water. These sights provide breading grounds for the mosquitoes and other vectors of various

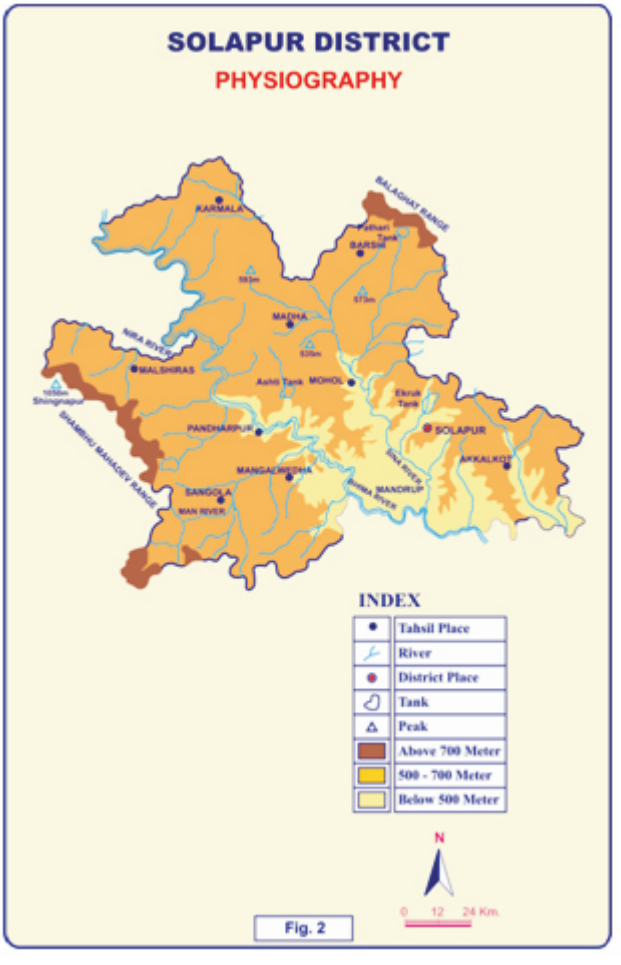
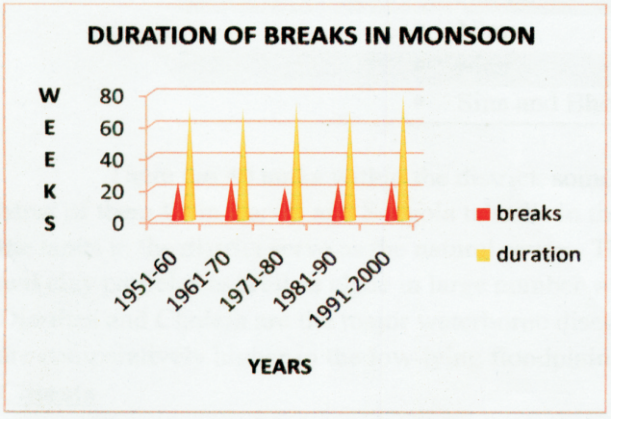


Fig. 2

diseases. The communicable diseases such as Malaria, Tuberculosis, Cholera and Leprosy are more common in this part of the district. It has been noted that there are number of patients with bone tuberculosis. According to the experts in the medical field and geologists, the contaminated water used

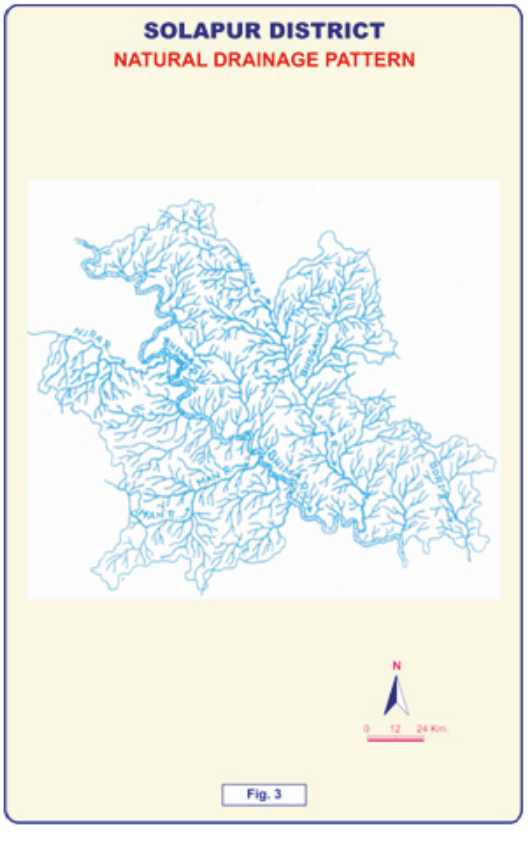
from the stone quarries is responsible for bone tuberculosis.



Drainage

Drainage plays a vital role in the distribution of the infectious waterborne disease in a region. Of all the environmental factors, water perhaps is the single most important factor that has always played a prominent role in the spread of infectious diseases. The role of rivers in the spread of disease is important.

The Solapur district lies in the basins of River Bhima and her tributaries Most of the Malshiras Tehsil in the west drains northwards into the Nira river, which joins into Bhima at the western part of the district. The Bhima river which flows to the south east direction through the district has tahasils Karmala, Madha, Pandharpur, Mohol and South Solapur and at the left banks, while tahasils Malshiras, Sangola, Pandharpur and Mangalvedha are situated at the right banks. The river Sina, a major tributary of the Bhima river flows in south east direction ,



parallel to the Bhima in Karmala, Madha, Barshi, Mohol and Solapiu North and South Solapur tahasils. The Solapur district has average altitude 500 meters above the mean sea level. All of the rivers are non perennial. Most of the surface comprises of low relief, with shallow basins of tributary nallas and small streams become dry just after the wet season, while the major rivers have water up to March.

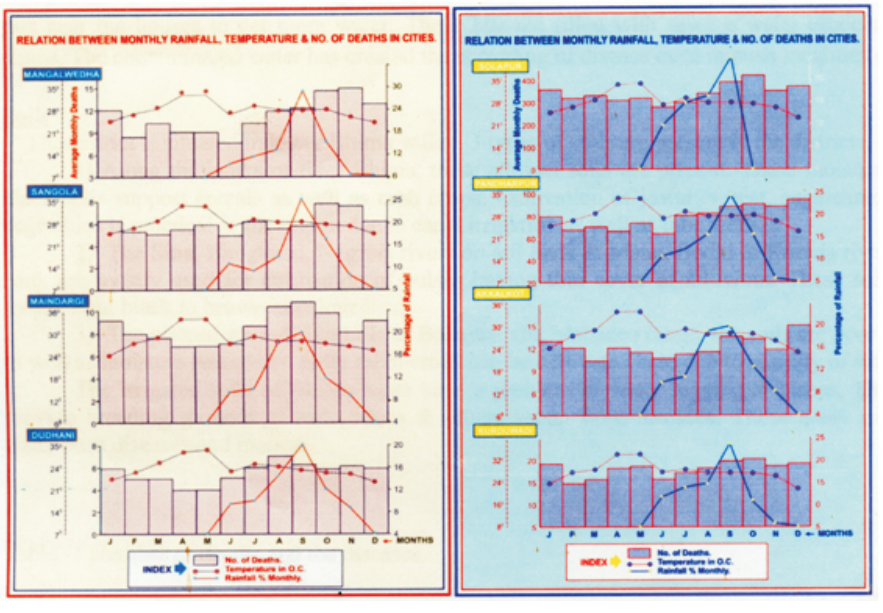
Major river basins of the study region

River	Length in kilometer
▪ Bhima	289
▪ Nira	48
▪ Man	80
▪ Sina and Bhogavati	177

There are 40 tanks within the district, some of which are used for irrigating the farmlands. Most of them lie in Barshi and Sangola tahasils in the foot-hill zone of the Balaghat range. Most of the tanks in the district serve as the natural severs. They contain suspended materials including silt and clay particles as well as algae in large number which invite number of diseases. Dysentery, Diarrhea and Cholera are the major waterborne diseases found in this district and the mortality rates are comparatively higher in the low-lying floodplain areas of the Bhima basin.

Climate

The climate of Solapur district as a whole is agreeable and is characterized by general dryness in the major period of the year. In summer maximum temperature rises above 40^0 C and in winter the minimum temperature is 14.8°C. The rainfall throughout the district is scanty and uneven. The annual average rainfall of the district is 677 mm with only 42 rainy days. However the frequency of droughts is high. The data of rainfall for 50 years shows that only 27 years had average rainfall. There is a high frequency of breaks during the monsoon period. The data of last 50 years shows that at least 20 breaks with duration of 70 weeks in a decade are experienced.



The relation between temperature, rainfall and number of deaths in different cities of Solapur district have been studied and shown in Figs.4 and 5. These maps show the variations of climatic condition so that the deaths are also varying from place to place and from season to season.

The maximum deaths occur in rainy season i.e. in the months of August and September and in early winter season when the temperature is less and humidity is more. Fig. 4 shows that maximum deaths occur in August and September months when the average monthly temperature ranges between 28°C to 29°C whereas 34% to 38% of the annual rainfall is observed in Solapur city. The maximum deaths in Pandharpur, Akkalkot and Kurduwadi cities also seem to the occurring in rainy season and in early winter season. The maximum deaths in these cities occur in August and September when the average monthly temperature is 26 °C to 28 °C with 22% to 34% of the annual rainfall. In Solapur district cholera epidemics breaks in the rainy season.

Fig. 5 shows the correlation between temperature and number of deaths in Mangalvedha, Sangoia, Maindargi and Dudhani cities. This map also shows the maximum occurrence of deaths in the months of August and September when temperature is less and amount of rainfall is more. The major infectious diseases are predominant in high rainfall, high humidity and unhealthy climate. The records of past two decades show that the epidemic of cholera has been regular feature in this district. In the year 2009-10 major swine flu deaths occur in the late winter and early summer season when the temperature is high. The maximum cholera and jaundice deaths occur in rainy season. The epidemic of cholera has been regular feature specially Sangoia, Pandharpur, Akkalkot, South Solapur, Mohol and Madha which are situated on the river banks. Contaminated stagnant water is responsible for these water born diseases. (table no. 1)

Solapur city experienced the epidemic of cholera in the year 2010 (from February to April) due to i)Alternate day water supply for last 10 years, ii)Parallel drainage and Sewage lines, iii)Leakage of contaminated sewage water, iv)Low pressure of water supply. Therefore people dig pits near the houses to get more water. These pits are filled with sewage water especially in the slums. The contaminated water has created the spreading of disease even in posh localities of the city.

Soils

The district is situated in lower Bhima valley. 3 types of soils are present in the district:

1)Along the banks of river Bhima, these alluvial soils are present. These moisture retentive black soils support cereals as well as cash crops. Cultivation of jowar, wheat, sugarcane, grapes & vegetables is practical in the region due to canal irrigation as well as tube wells.

2)The Sina, Bhogavati, Nagzari rivers on left bank & Maan, Bodki & Korada rivers on right bank are mostly used for cultivation of pulses having thin cover of alluvium. These soils are less fertile, light black to brown in colour

3)The plateau area of foot hills of Balaghat and Mahadeo range, the soils are poor in fertility as well as moisture retentivity. Only rabbi crops can be cultivated here due to scarcity of water.

The irrigated soils of Bhima basin have a problem of water logging at places. This helps to provide breeding grounds of mosquitoes & others vector born diseases. These areas are prone to water born diseases and malaria.

Table – 1 Number of Deaths and the diseases

Sr.No	Causes of death	2001	2002	2003	2004
1	Gastro enteritis	34	30	31	26
2	Typhoid	15	16	13	09
3	Respiratory diseases	629	518	641	332
4	Accidental deaths	575	860	481	371
5	Tuberculosis	--	538	556	463
6	Malaria	10	04	07	06

CONCLUSION

The present study can give a picture regarding environment and its effects in Solapur, many positive correlations have been established -

I) Physiographic determines the distribution of diseases in an area. Effect of altitude on the spread of vectors of the diseases has proved the correlation,

ii) Waterborne diseases are more common in the lowlands-river plains.

iii) More deaths are recorded during rainy season and early winter season. The low temperature, high humidity are responsible for unhealthy weather conditions. Maximum deaths occur in the month of August and September. However there is Declining death rate because of-

1) Increased medical facility

2) Awareness of people

3) Eradication of tuberculosis - Solapur city has fewer death rates compared to other cities in the district

4) Lack of safe drinking water is major reason of waterborne diseases in the cities.

5) Geological conditions also play important role in contamination of water.

6) Due to dry climate and low humidity and more percentage of dust particles in air respiratory disease are more e.g. Bronchitis, Pneumonia may lead to death.

SUGGESTIONS

1)Need of safe drinking water-uninterrupted water supply.

2)Drainage lines and sewage lines should be away from each other.

3)Small cities have open drainage system- leads to growth of mosquitoes throughout the year.

REFERENCES

1)Akhtar Rais (1978): Spatial distribution of growth of health facilities in Rajasthan. Geogr. Review of India vol.40, no. 3, pp 206-214.

2)District Census Handbook Series 14 Maharashtra Partl2 A & B.

3)Hovegm (1972) : Man, Environment and diseases in Britain. Penguin Books pages 1.

4)Miss. F.M.A. Shaikh (1989): Spatial Distribution of Some Diseases in Cities of Solapur District-A Study in Urban Medical Geography, unpublished Ph.D Thesis, Shivaji University Kolhapur pp 25-36.

5)Pandurkar R.G. (1981): Spatial Distribution of Some Diseases in Maharashtra-A Study in Medical Geography, unpublished Ph.D. Thesis, Shivaji University Kolhapur.

6)WHO (1965): Basic Document 16th Edition World Health Organization.

7)K R Dikshit (1986) Maharashtra in Maps - P 177-Maharashtra state board of Literature culture Publications.
8)Personal discussions with Dr. R R Patil, Professor & Head School of earth sciences, Solapur University, Solapur.