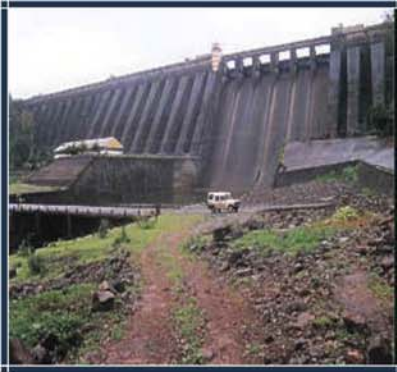
GOVERNMENT OF INDIA
INDIA METEOROLOGICAL DEPARTMENT

Climate of Maharashtra



ISSUED BY
NATIONAL CLIMATE CENTRE
OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL
OF METEOROLOGY (RESEARCH)
INDIA METEOROLOGICAL DEPARTMENT
PUNE - 411 005

PREFACE

The importance of meteorology and its economic and social benefits are being increasingly realised all over the world. In our country also, various sectors like agriculture, aviation, energy, industry require climatological information pertaining to different regions of the country, for planning and executing projects, with a view to derive maximum advantage from meteorological and/or climatological conditions. Keeping these requirements in view, it was decided by India Meteorological Department to publish the series "Climatological Summaries" for each state in the country incorporating the district climatological summaries. The first in the series of 'State Climatological Summaries' is "Climate of Maharashtra State". The present publication is the updated version of earlier one, published in the year 1971.

The publication contains extensive information on rainfall in various districts in Maharashtra based on the available rainfall data for the period 1941-1990. The climatological data in respect of temperature, wind, clouds and other weather parameters for the period from 1961-1990 are also given. Information relating to droughts, excessive rainfall, depressions and cyclonic storms are also included in the publication.

The publication was initiated by Dr. U.S.De and brought to completion by Dr. S.K. Dikshit, Shri. Shravan Kumar and Dr. N. Jayanthi.

The climatological summary and related maps were prepared at the "Revision of Climatological Publications" section of the Office of the Additional Director General of Meteorology (Research), India Meteorological Department, Pune. The publication was prepared by Smt. P.G.Gore and assisted by Smt. P.R. Joshi and Shri B.V. Potdar. The contributions made by Shri S.M. Deshpande, Smt. U.S. Satpute, Smt. P. R. Iyer, Shri R.S. Wayal and Shri A.B. Dhule were vital. The designing and printing has been done by the DTP Unit under the supervision of Shri A.Philipose.

NEW DELHI
1st August 2005

B. Lal
LACD DIRECTOR GENERAL OF METEOROLOGY

CLIMATE OF MAHARASHTRA

INTRODUCTION

The meteorological conditions of Maharashtra state as a whole are described in the first chapter followed by detailed description of the climate of each district in the succeeding chapters. The district summaries are grouped under the respective meteorological sub-divisions and arranged alphabetically.

The normals of meteorological elements used for describing the climate are generally based on data for the period 1961 to 1990, except in the case of rainfall. For rainfall, normals using all available data for 1941 to 1990 have been used. The extreme values of temperature and rainfall presented in the publication are based on the data upto the year 1996.

CLIMATE OF MAHARASHTRA

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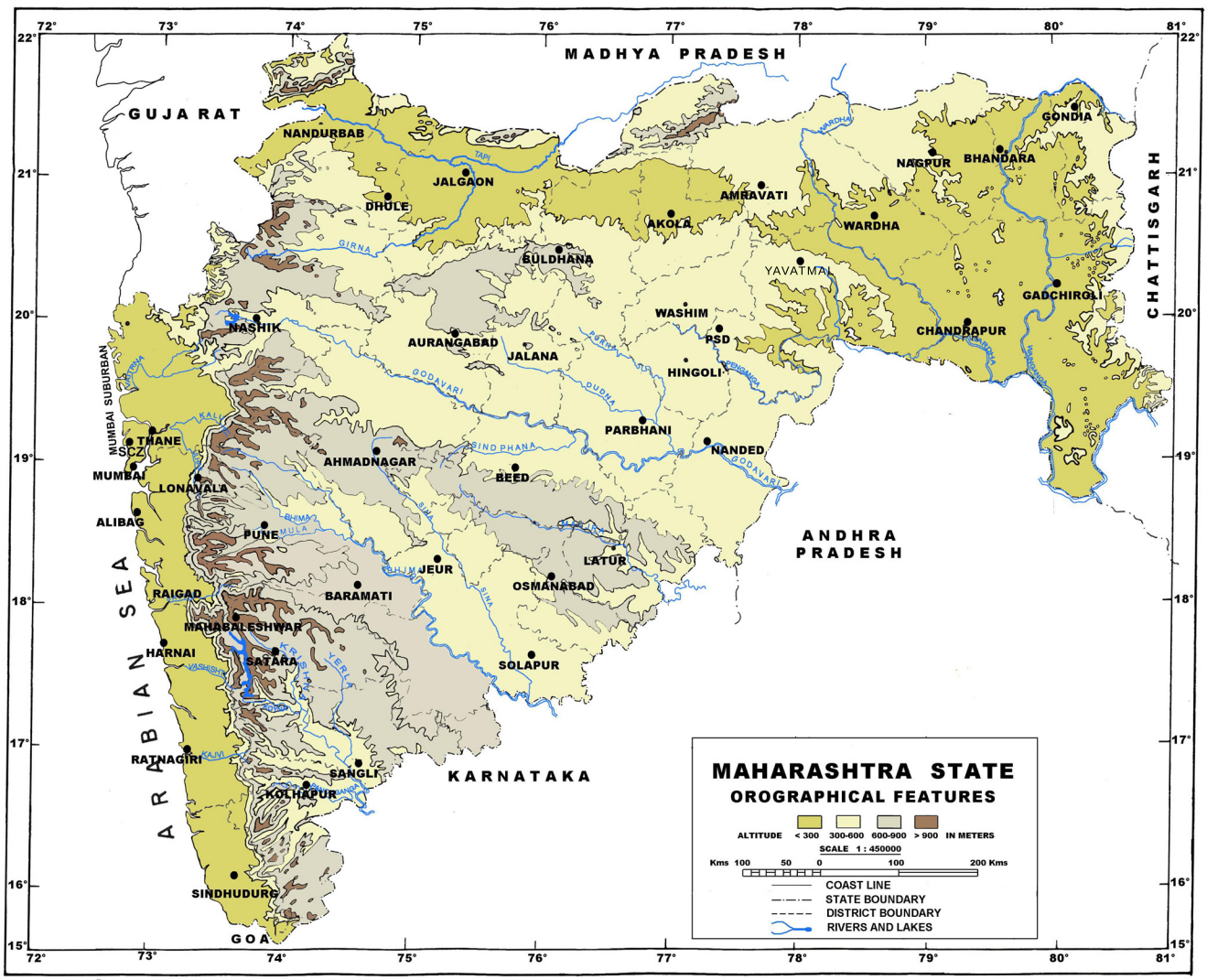

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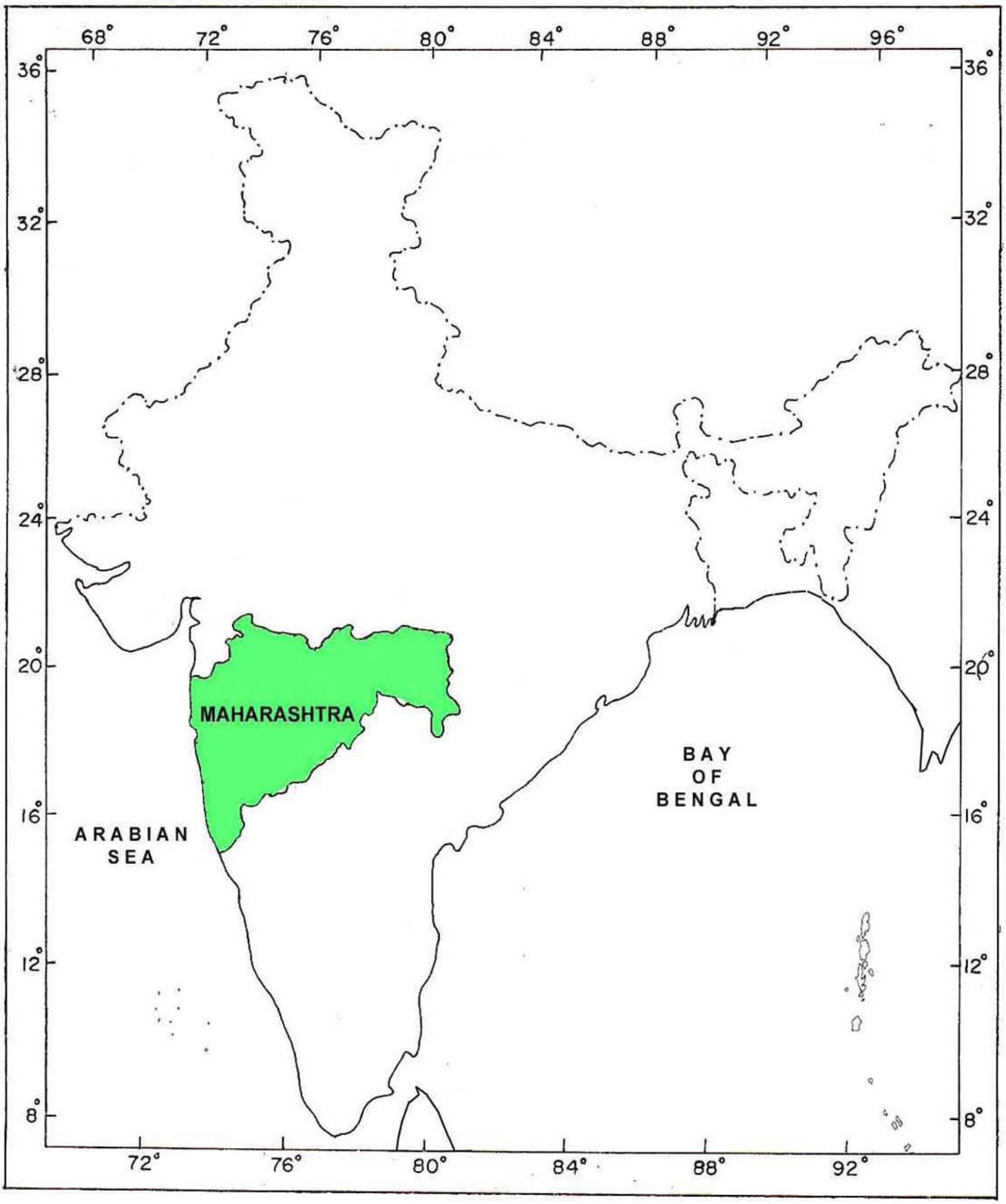
68°
72°
76°
80°
84°
88°
92°
96°
36°
32°
28°
24°
20°
16°
12°
8°
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ARABIAN SEA
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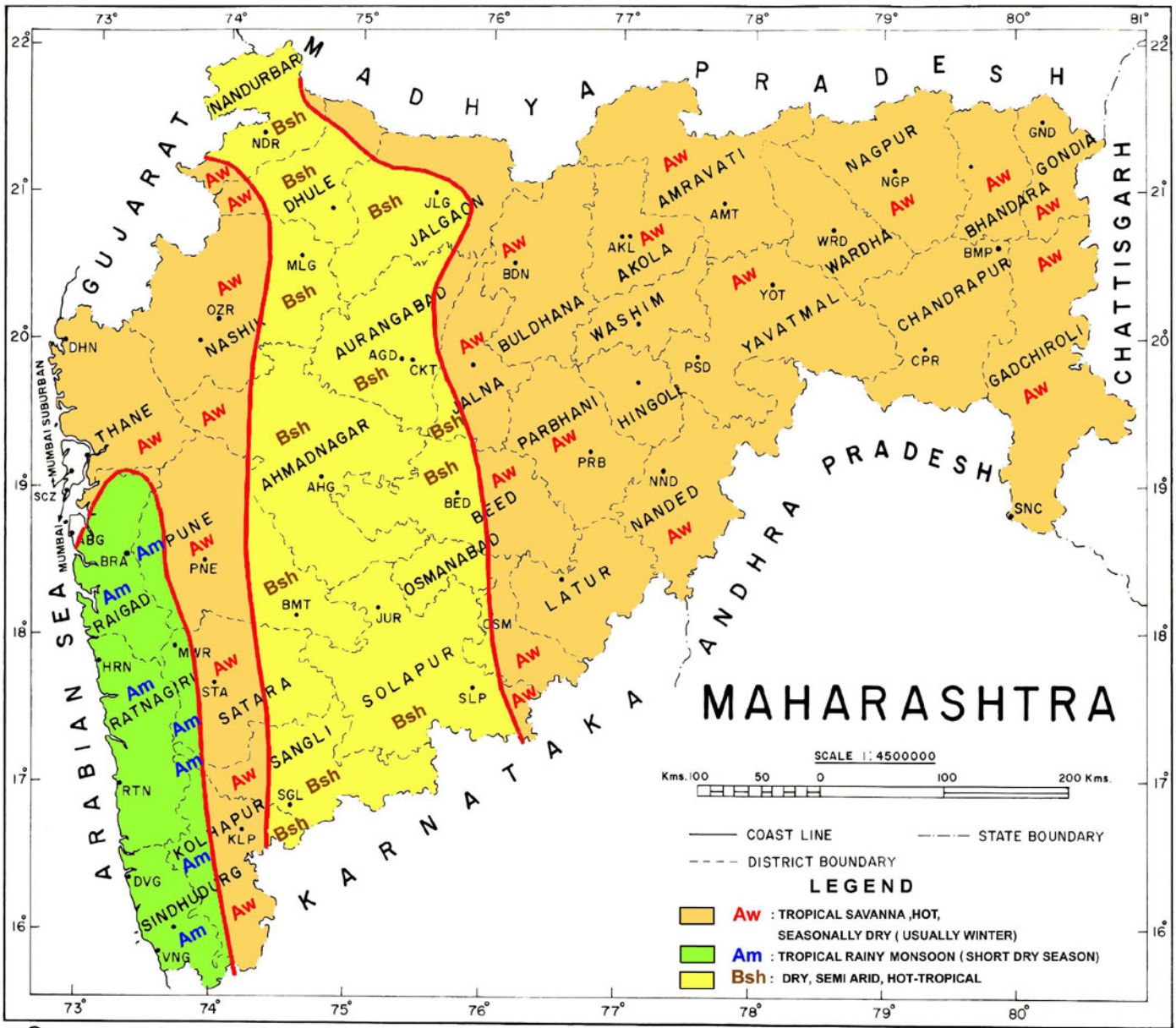

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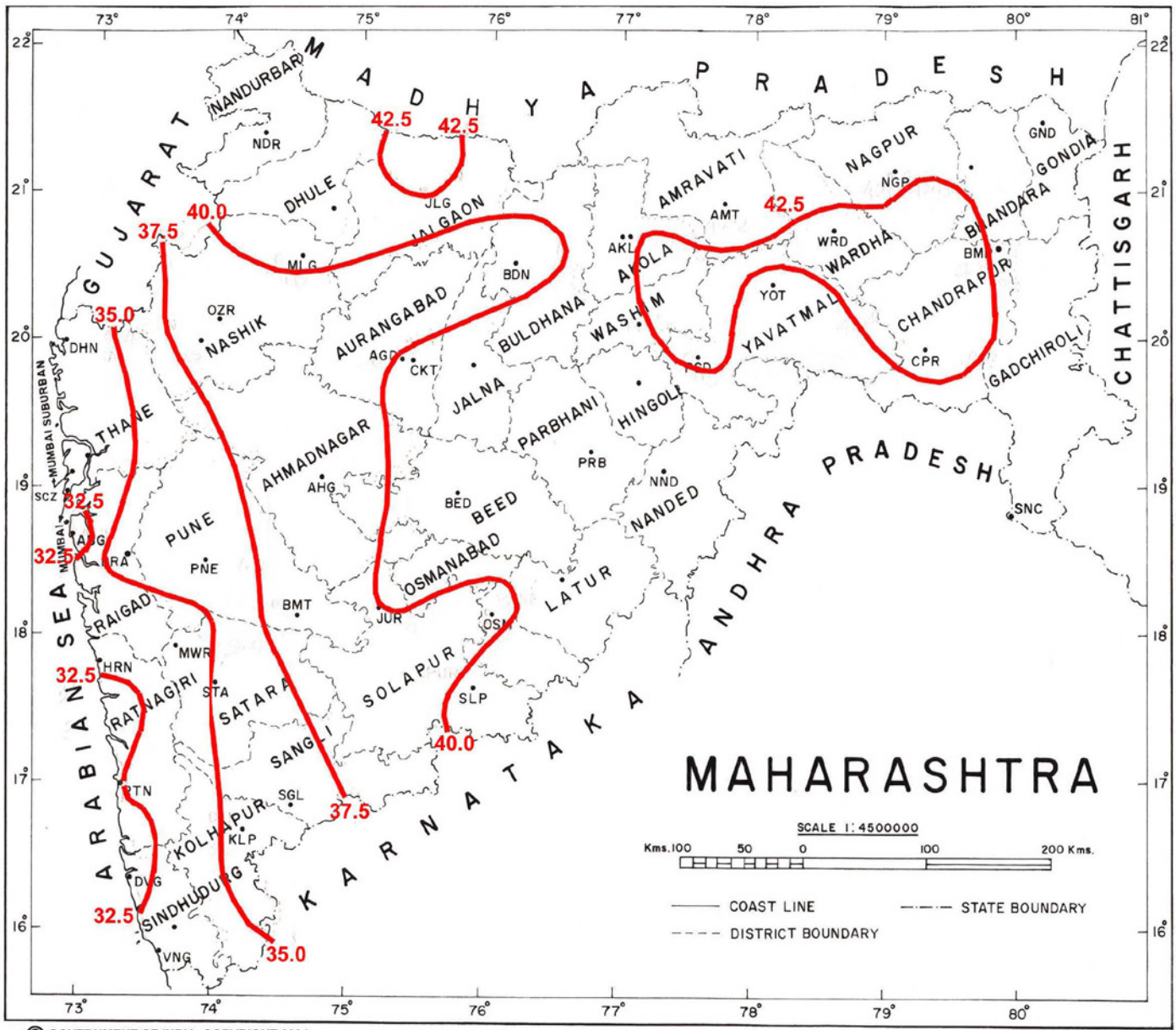

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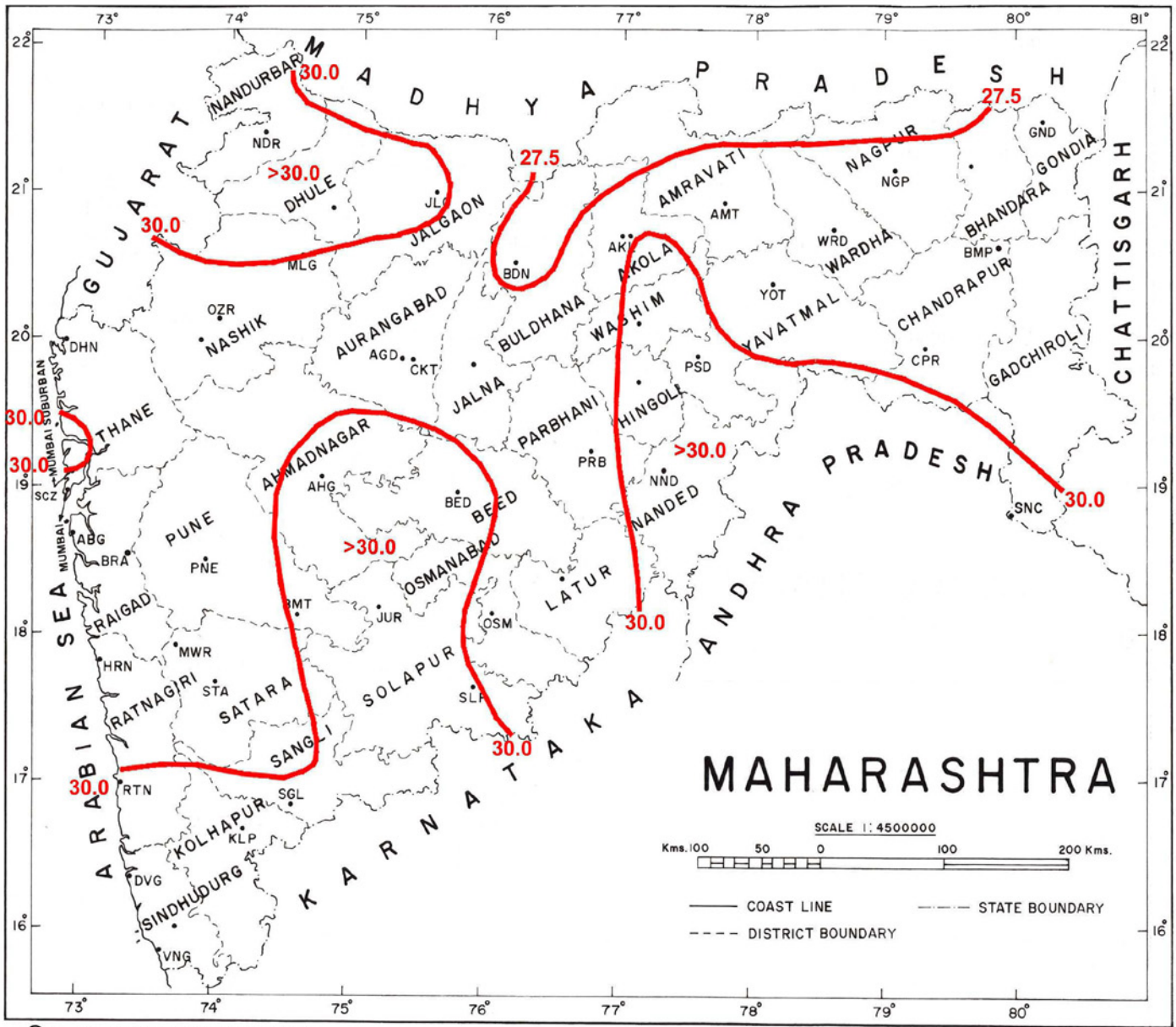

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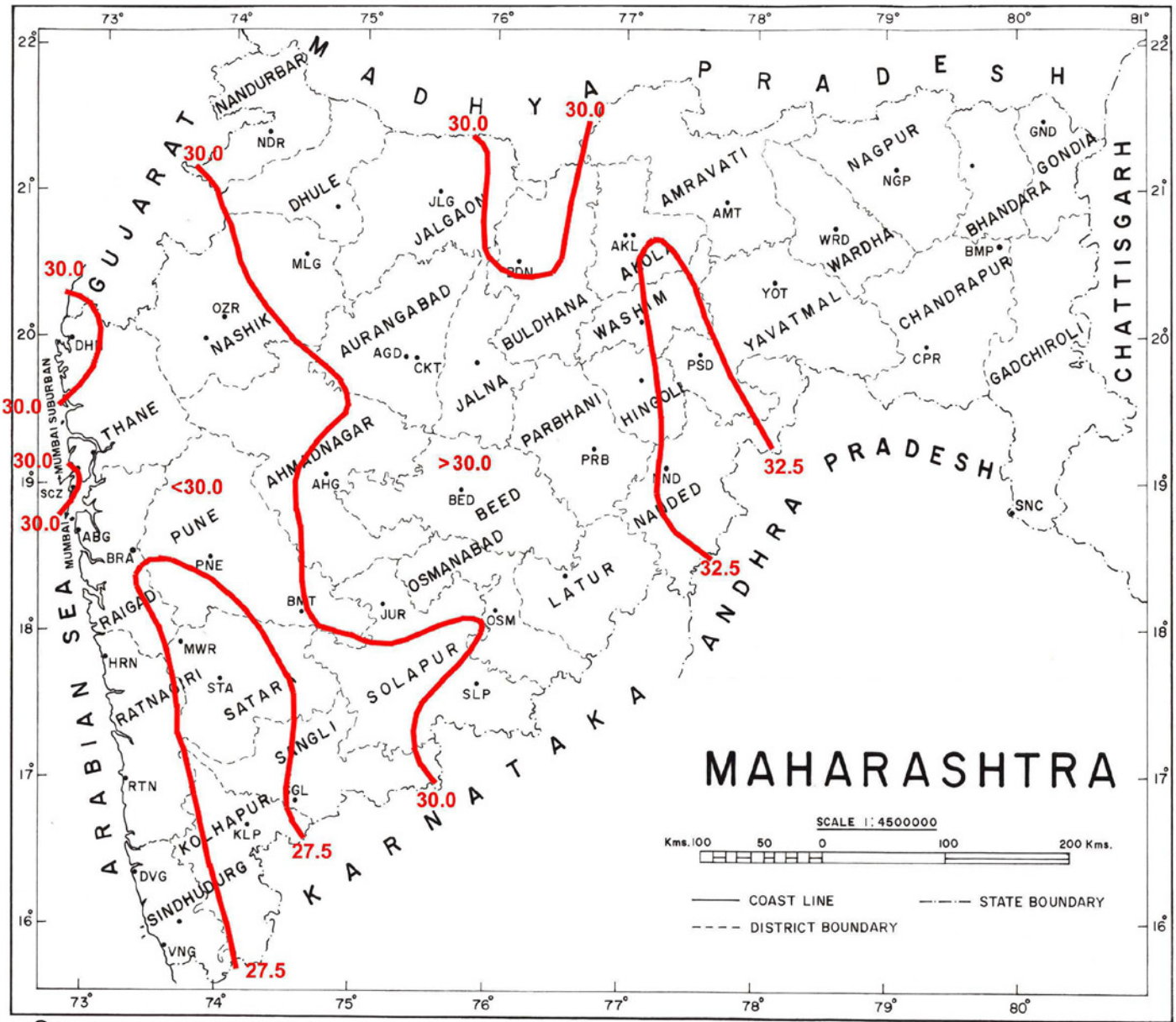

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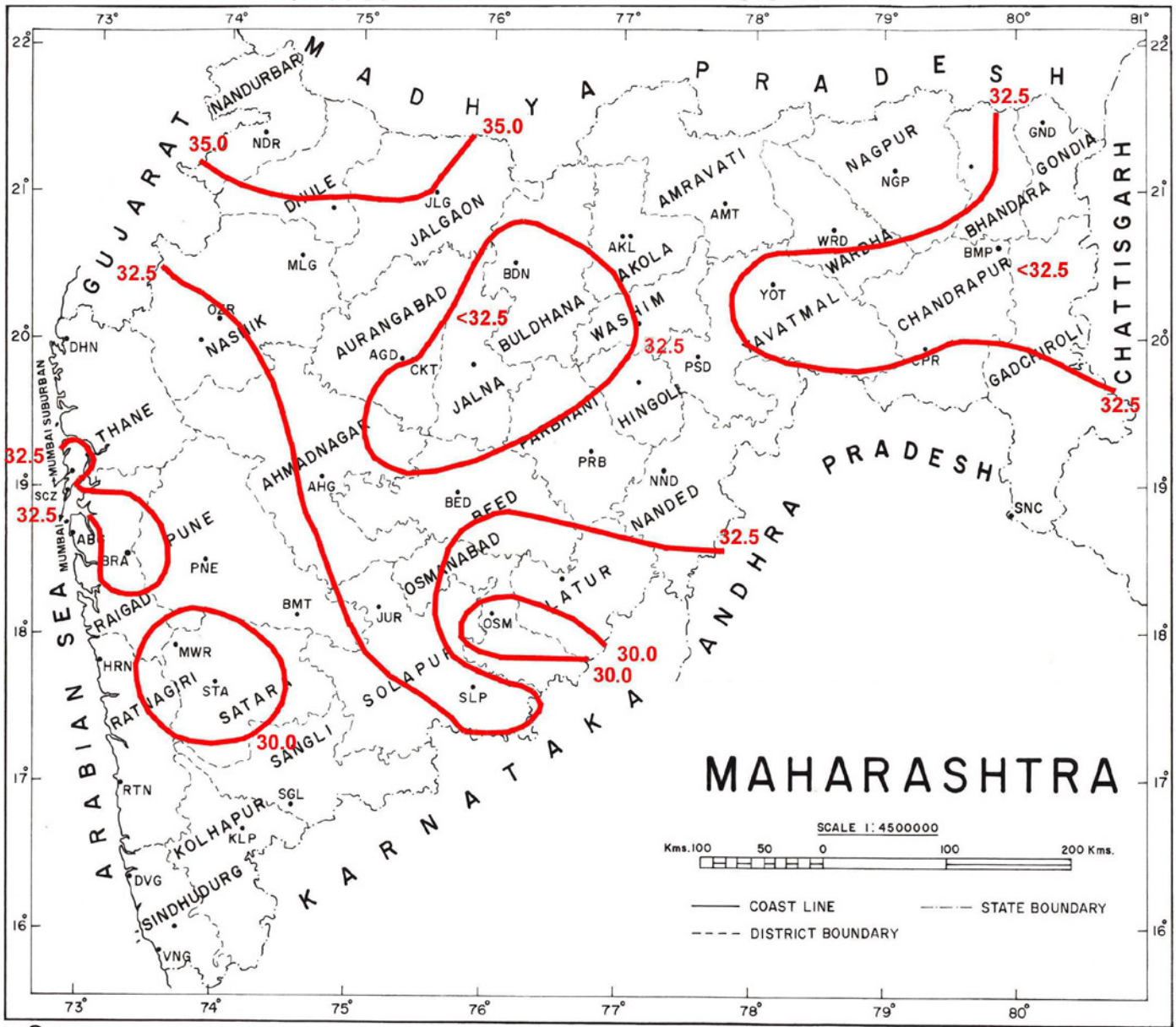

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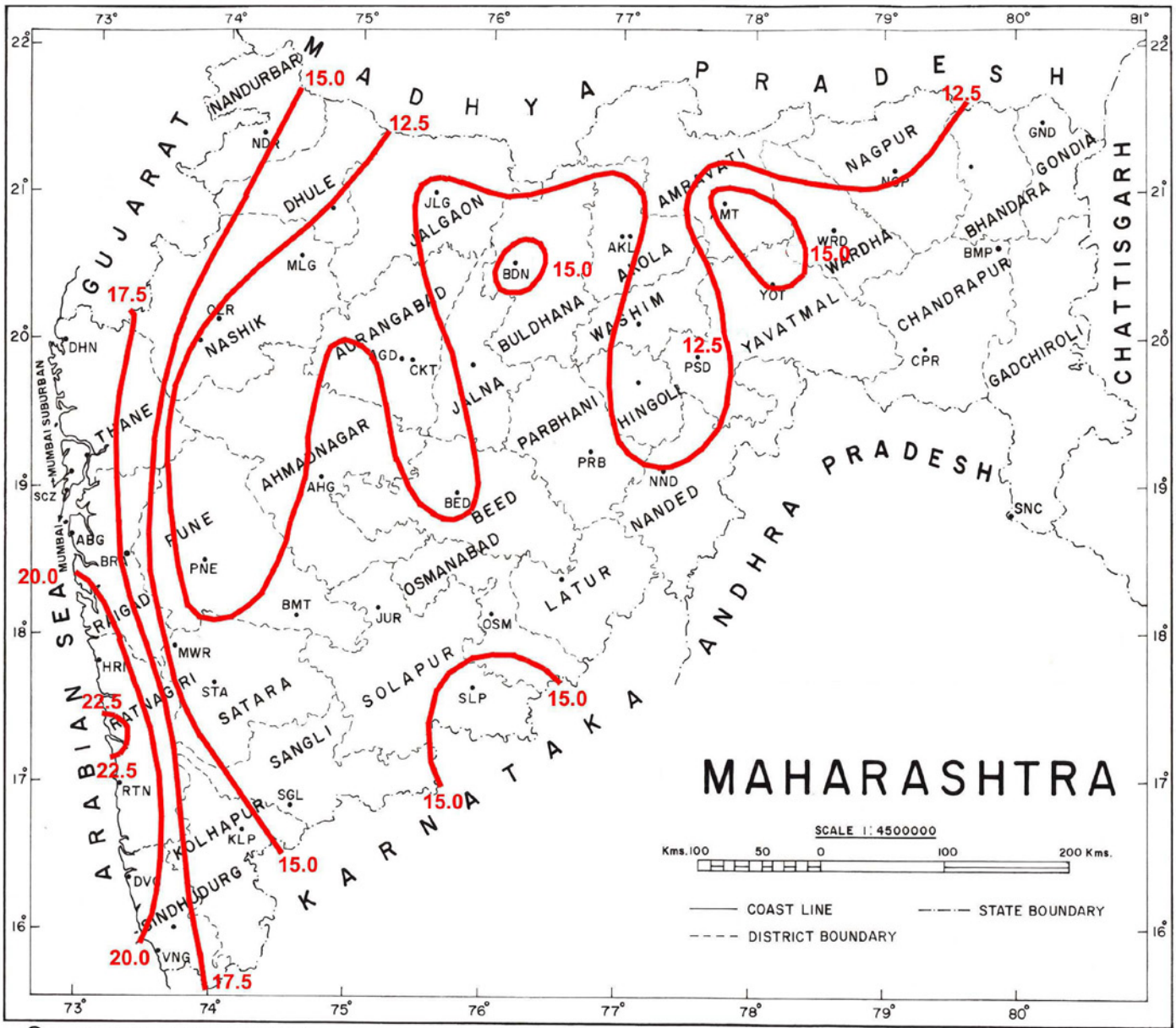

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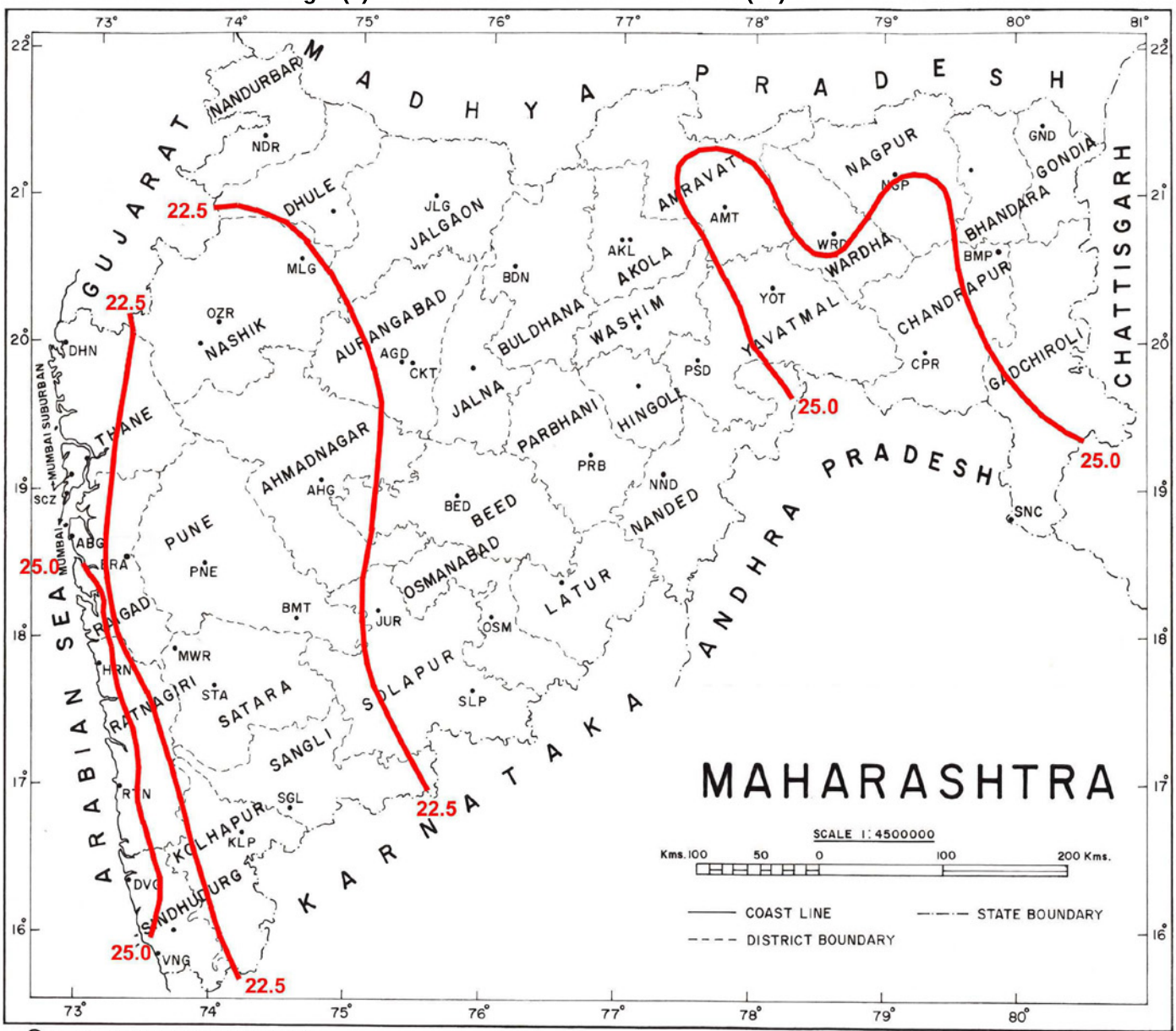

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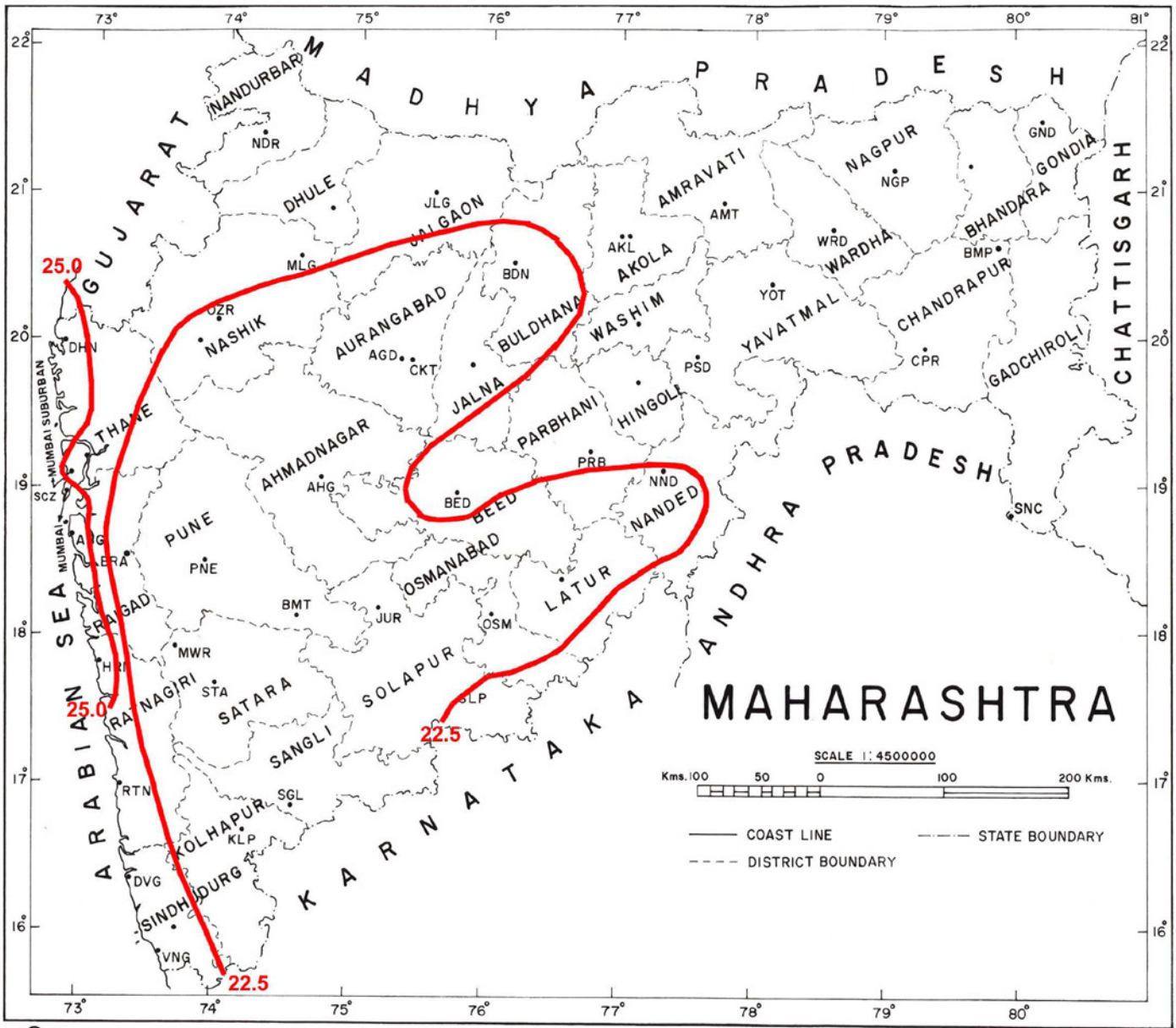

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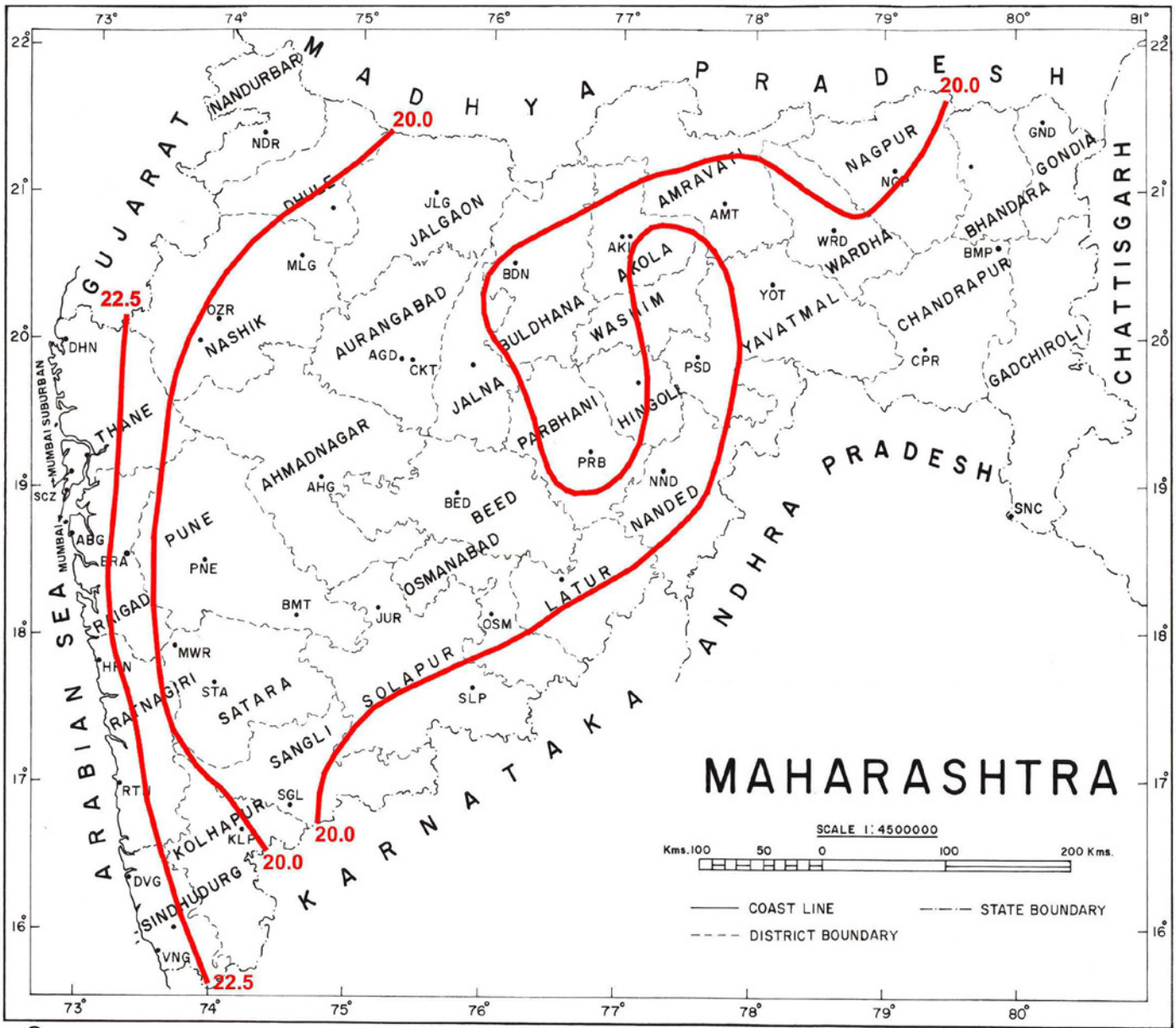

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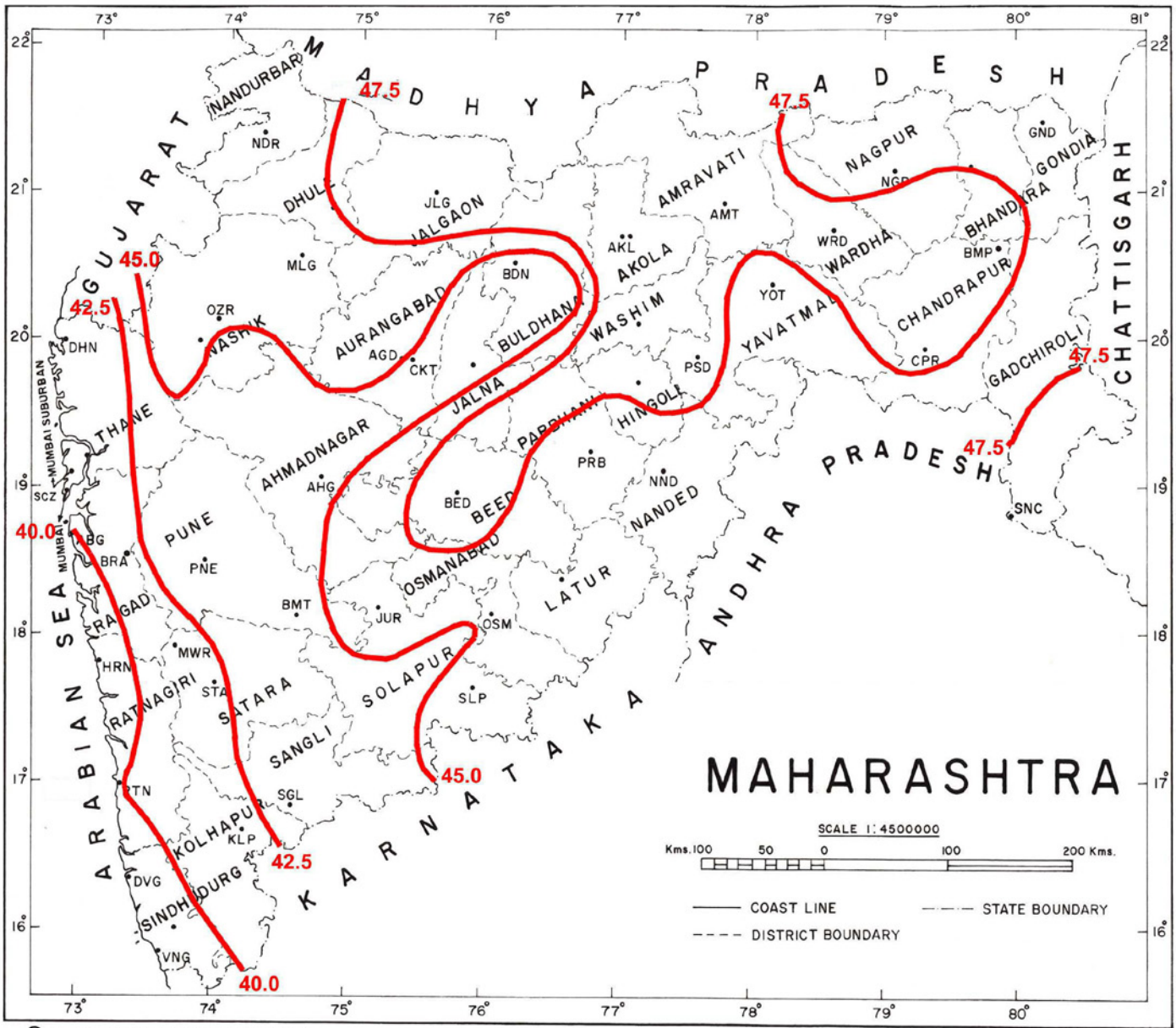

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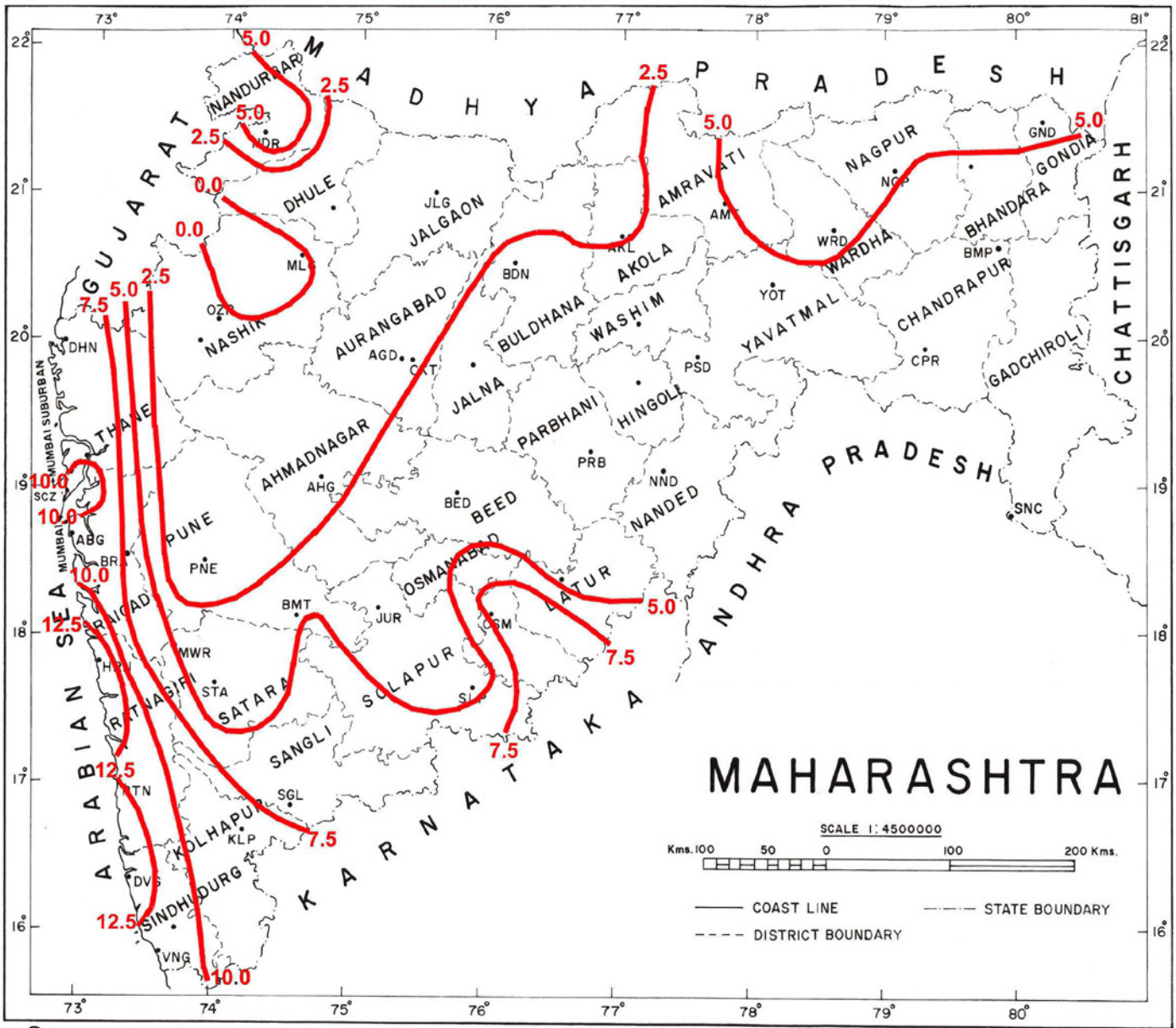

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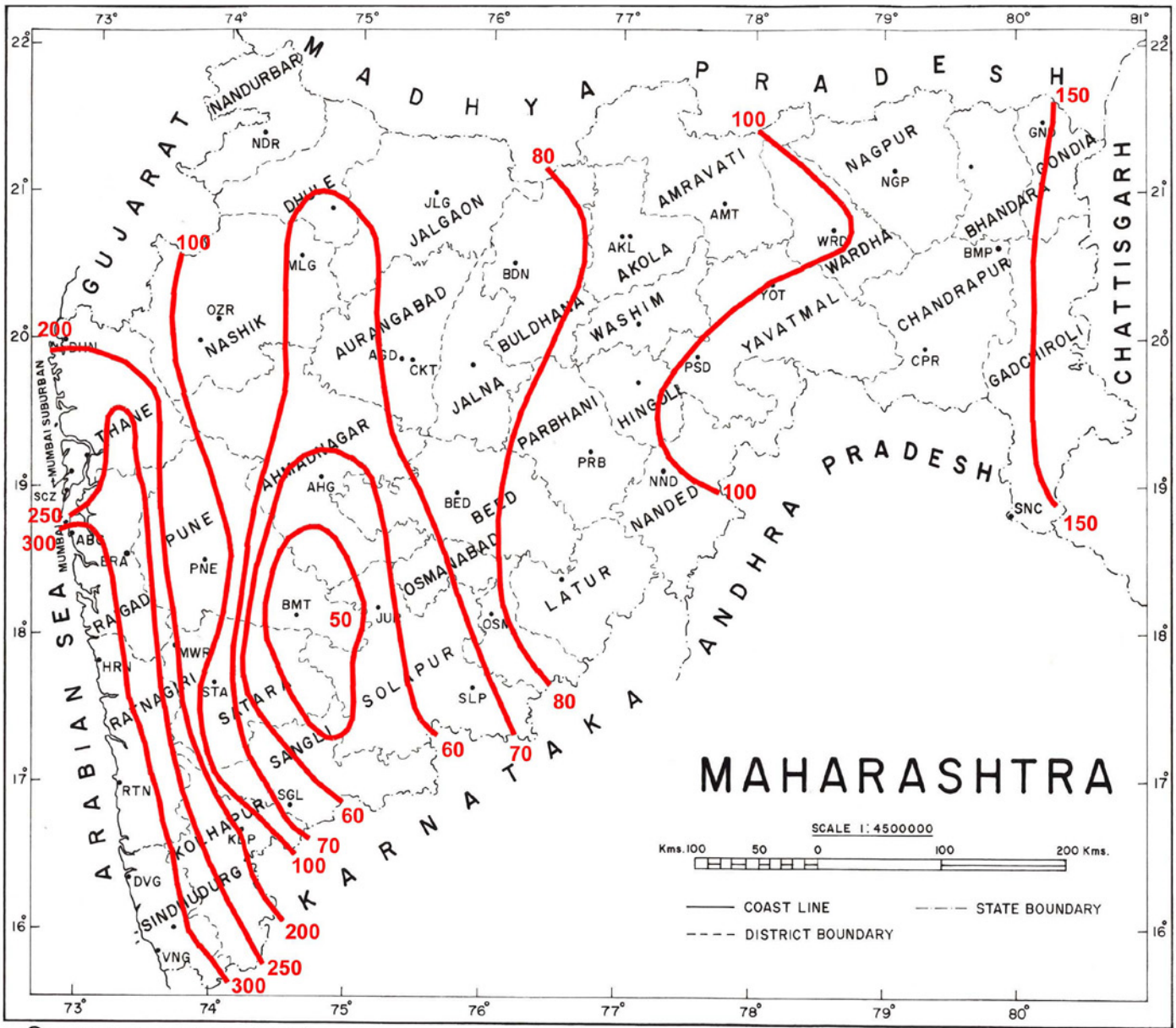

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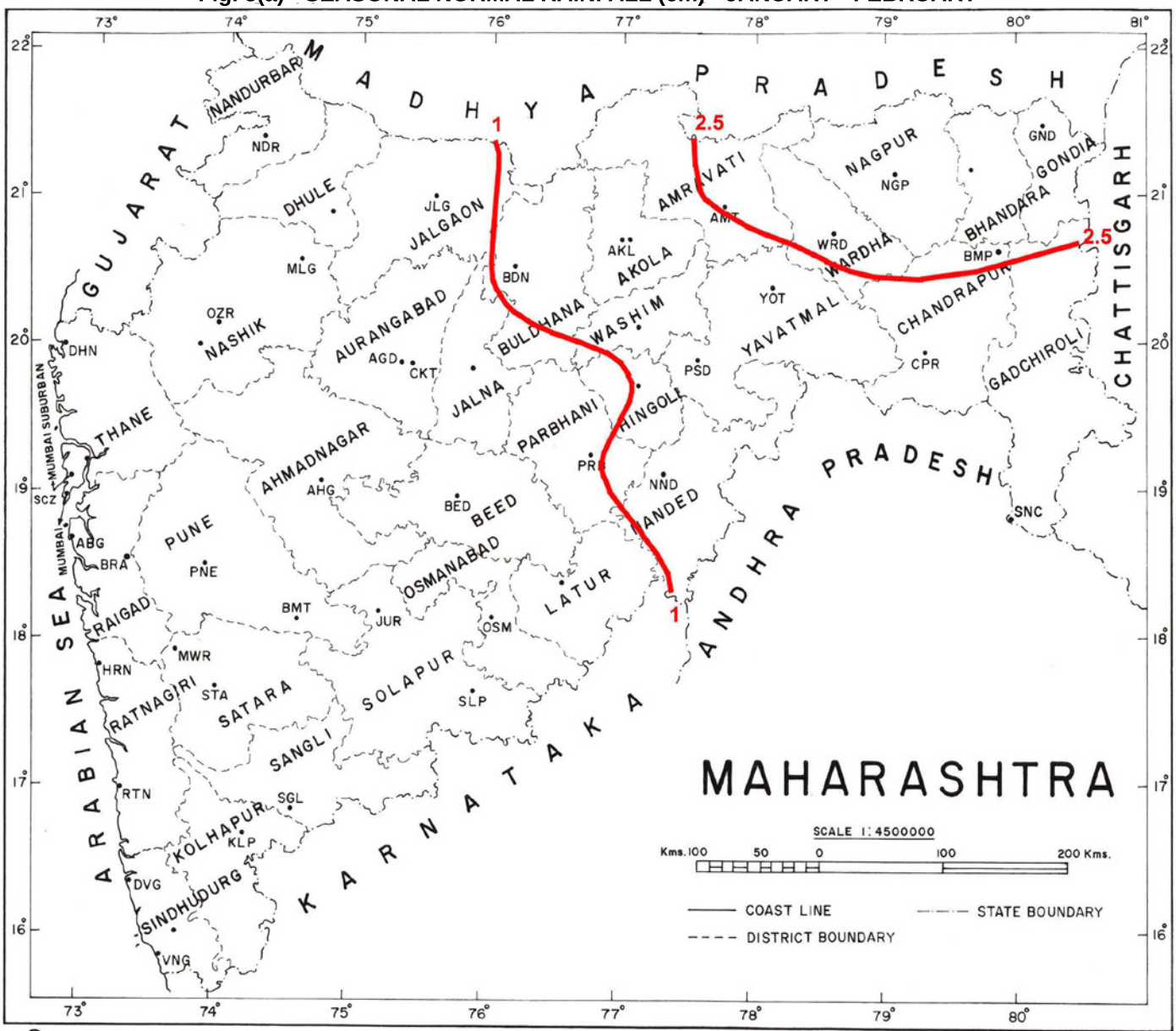

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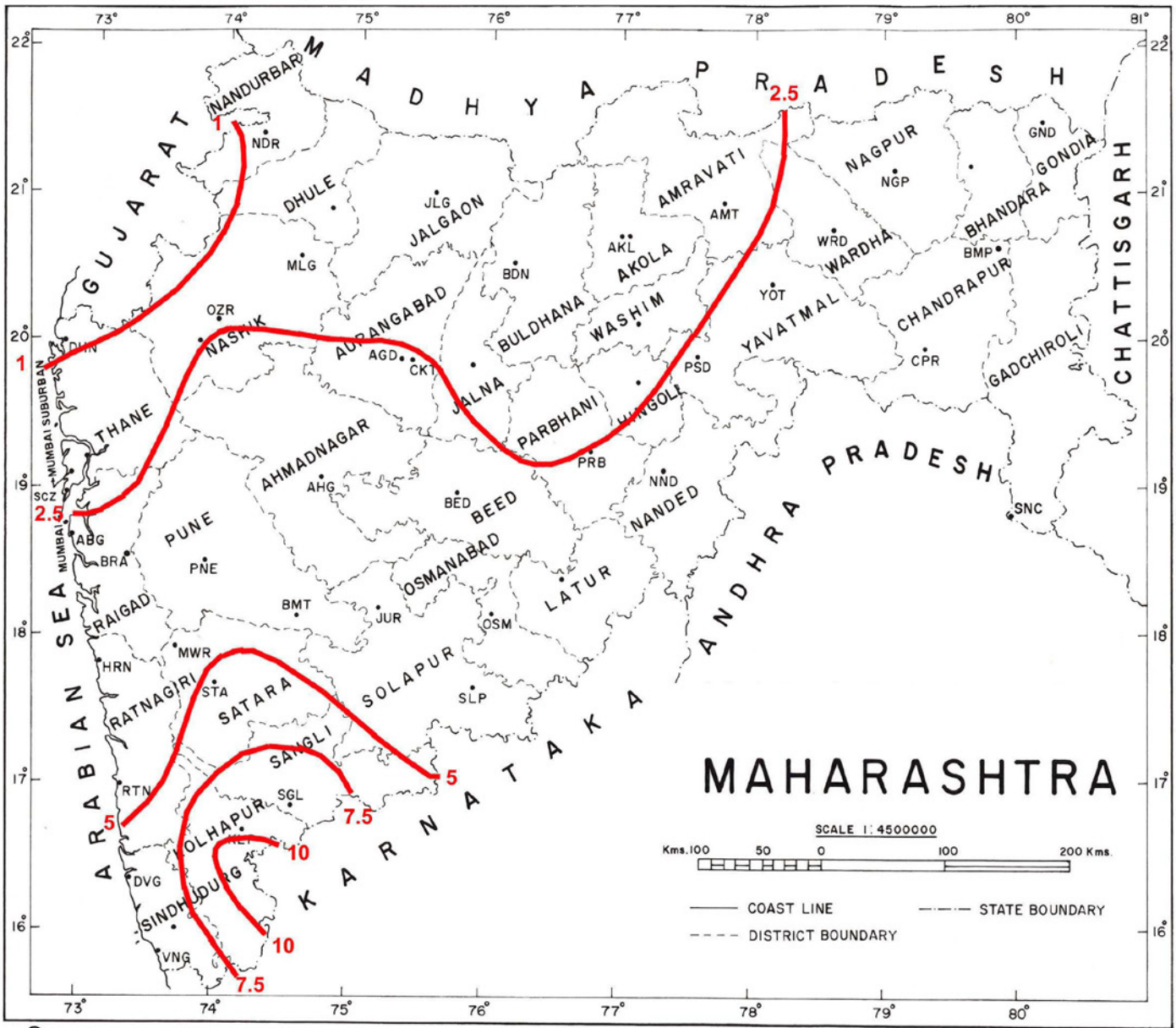

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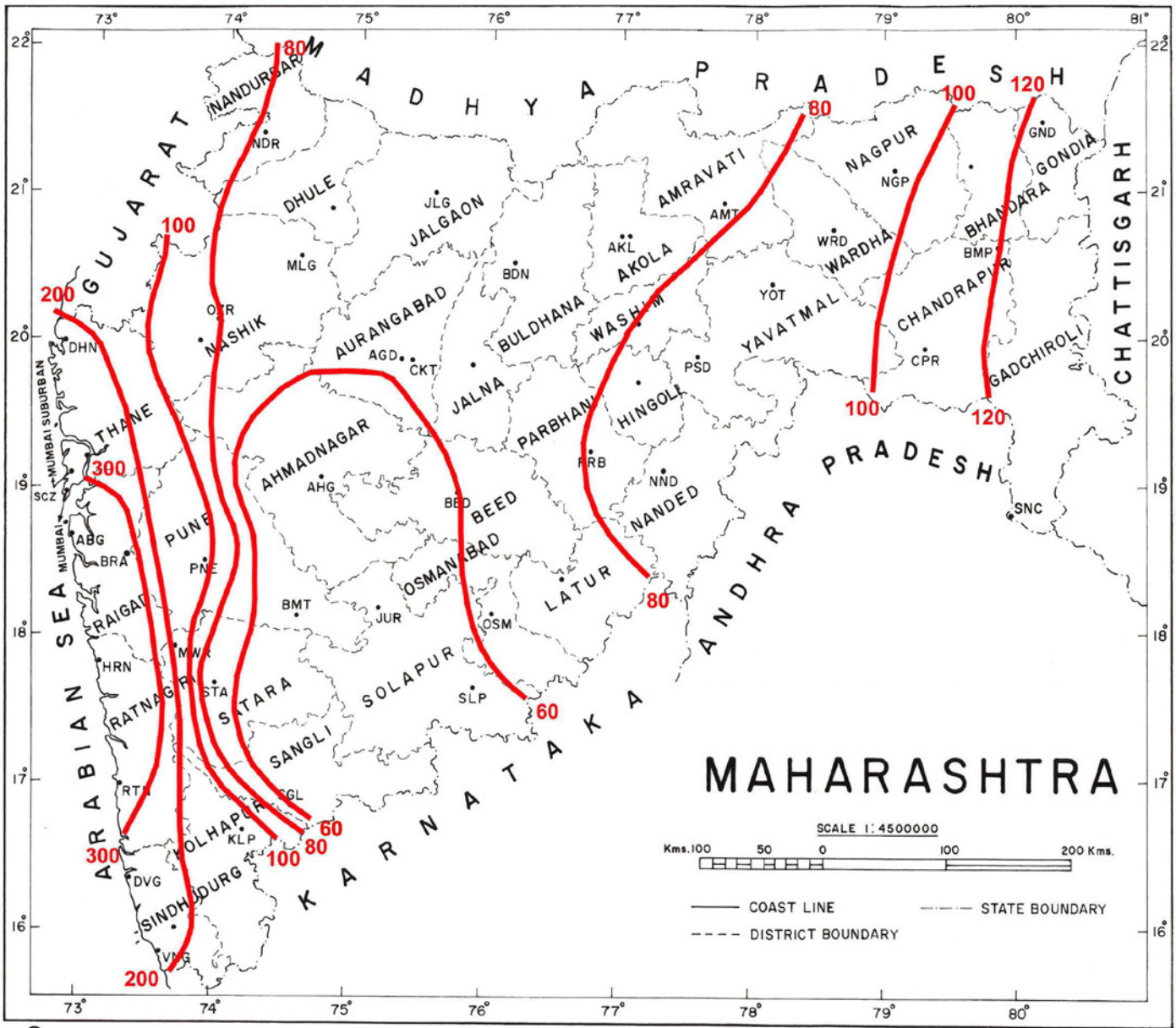

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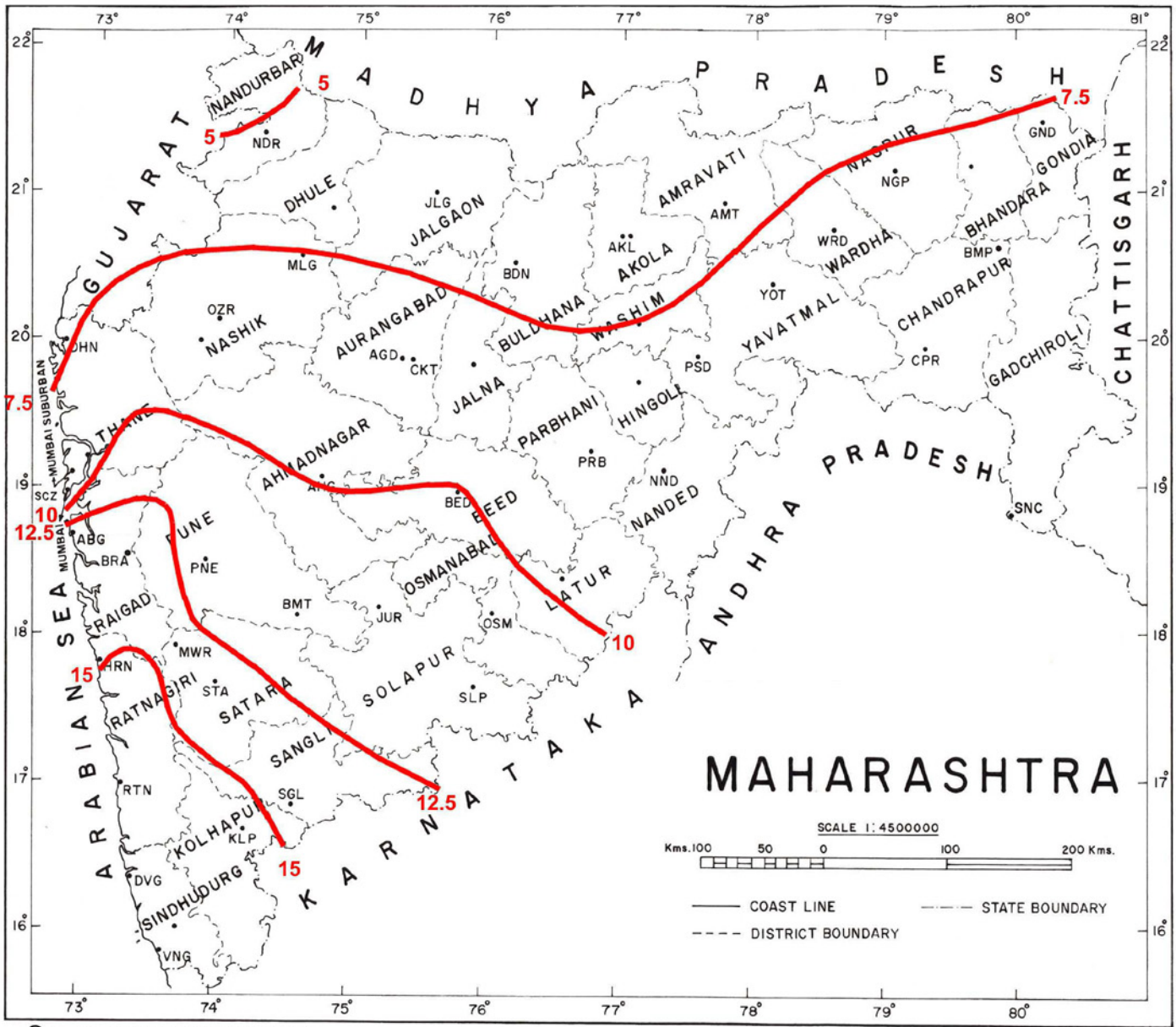

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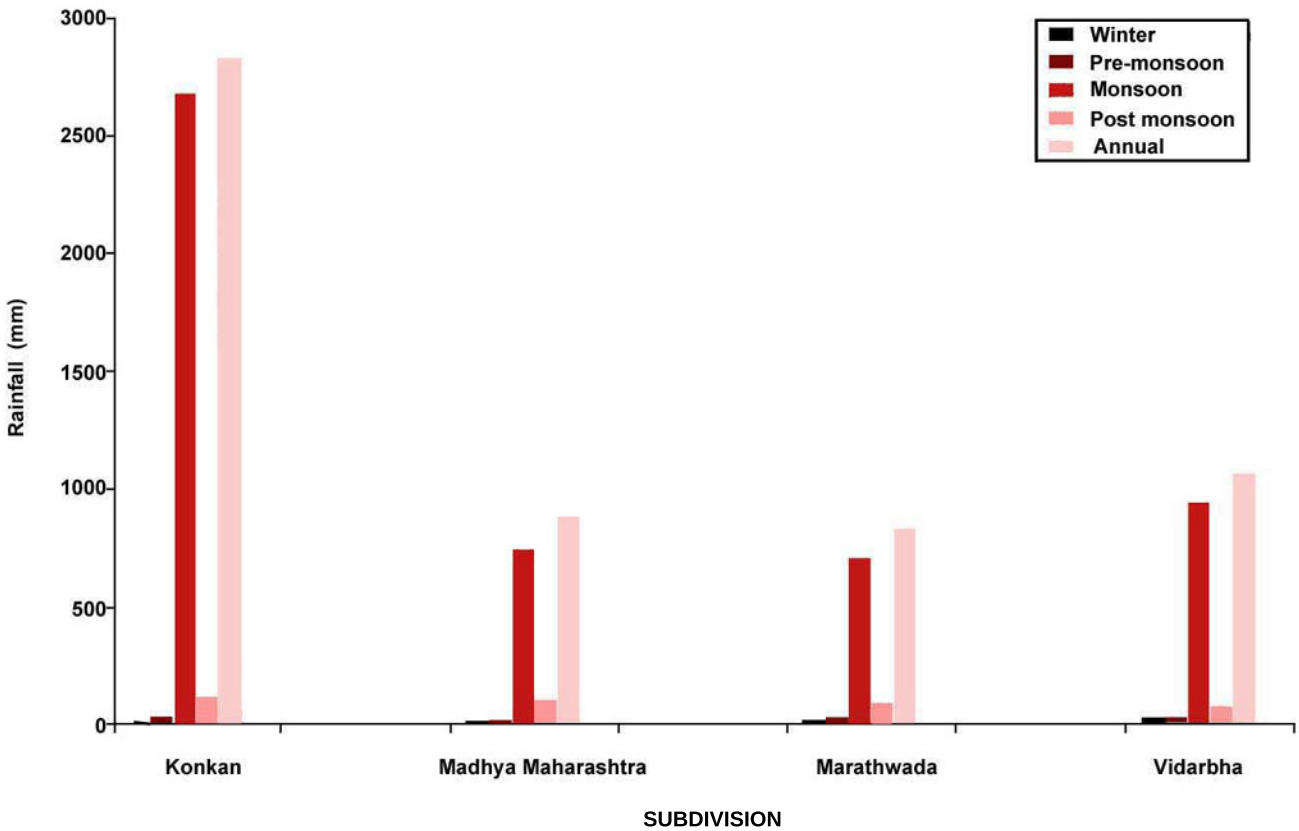

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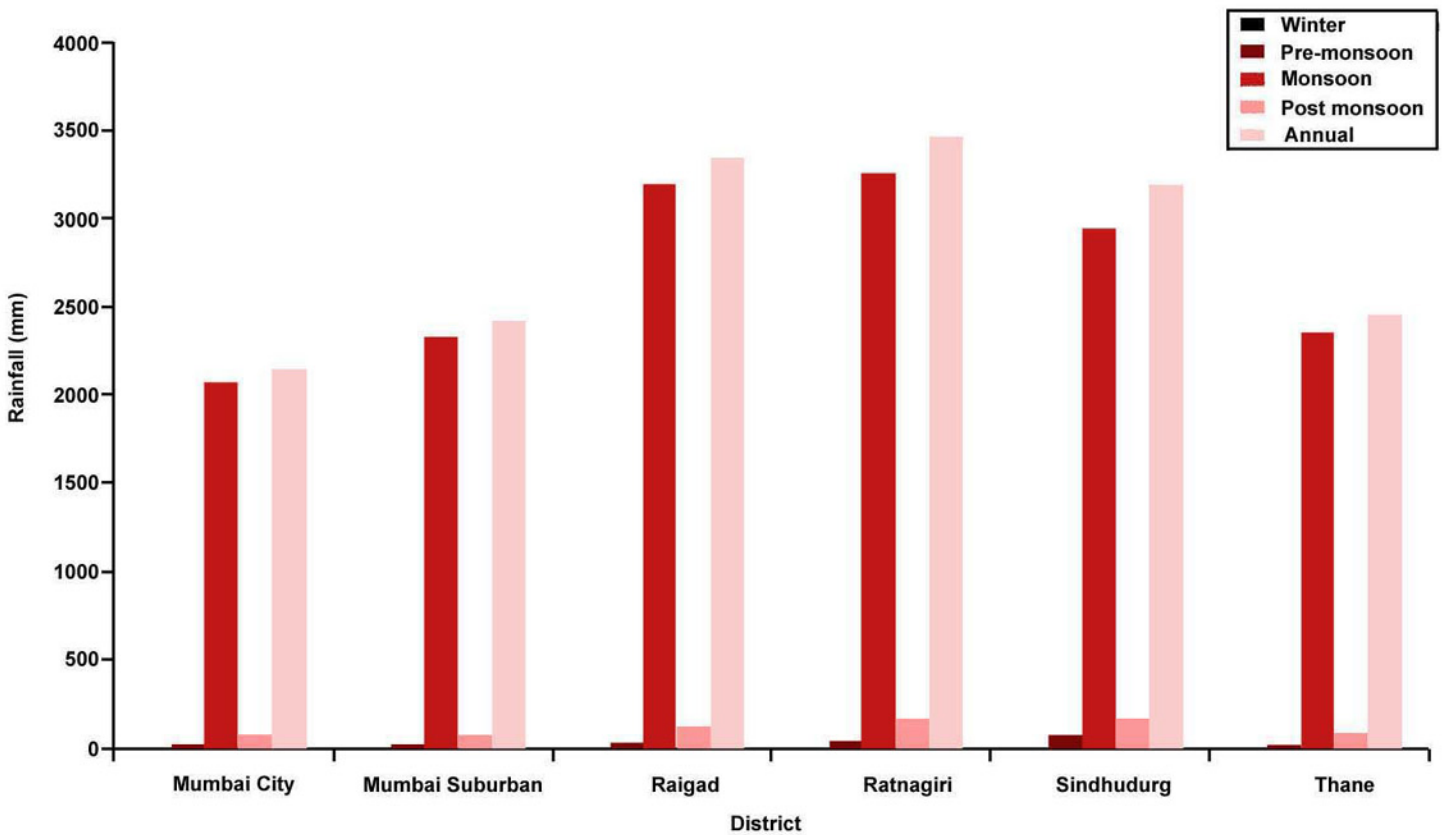

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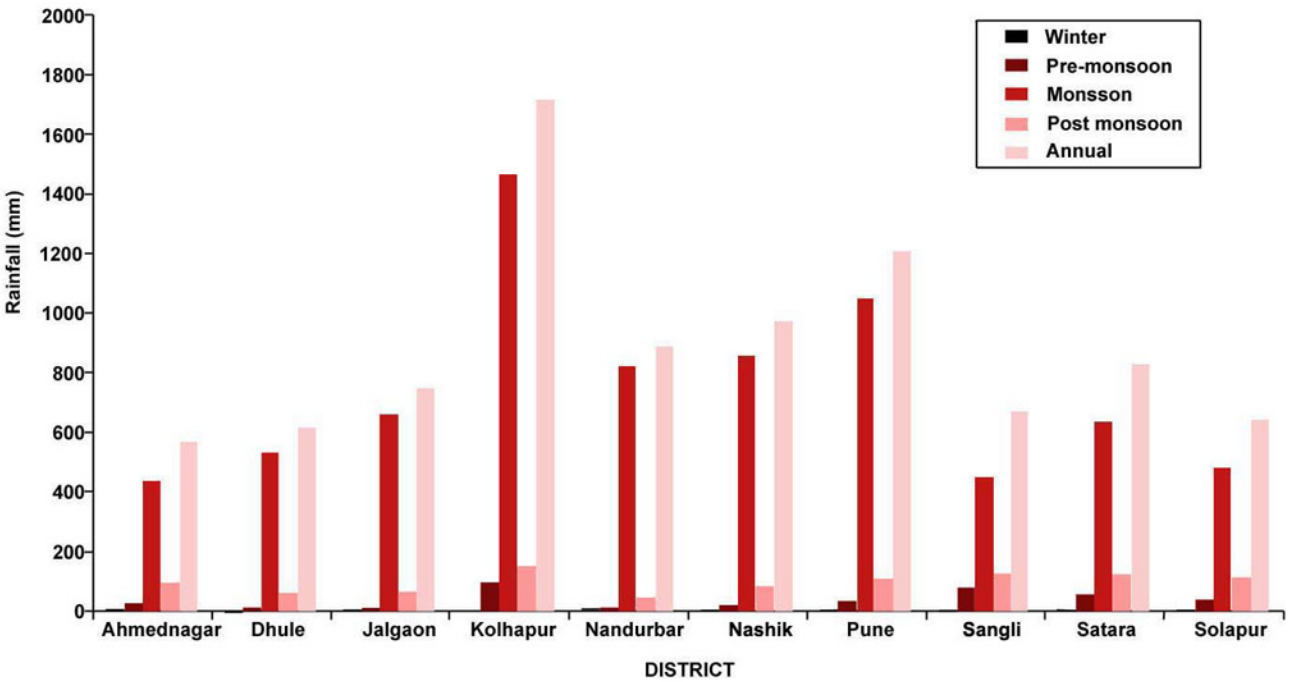

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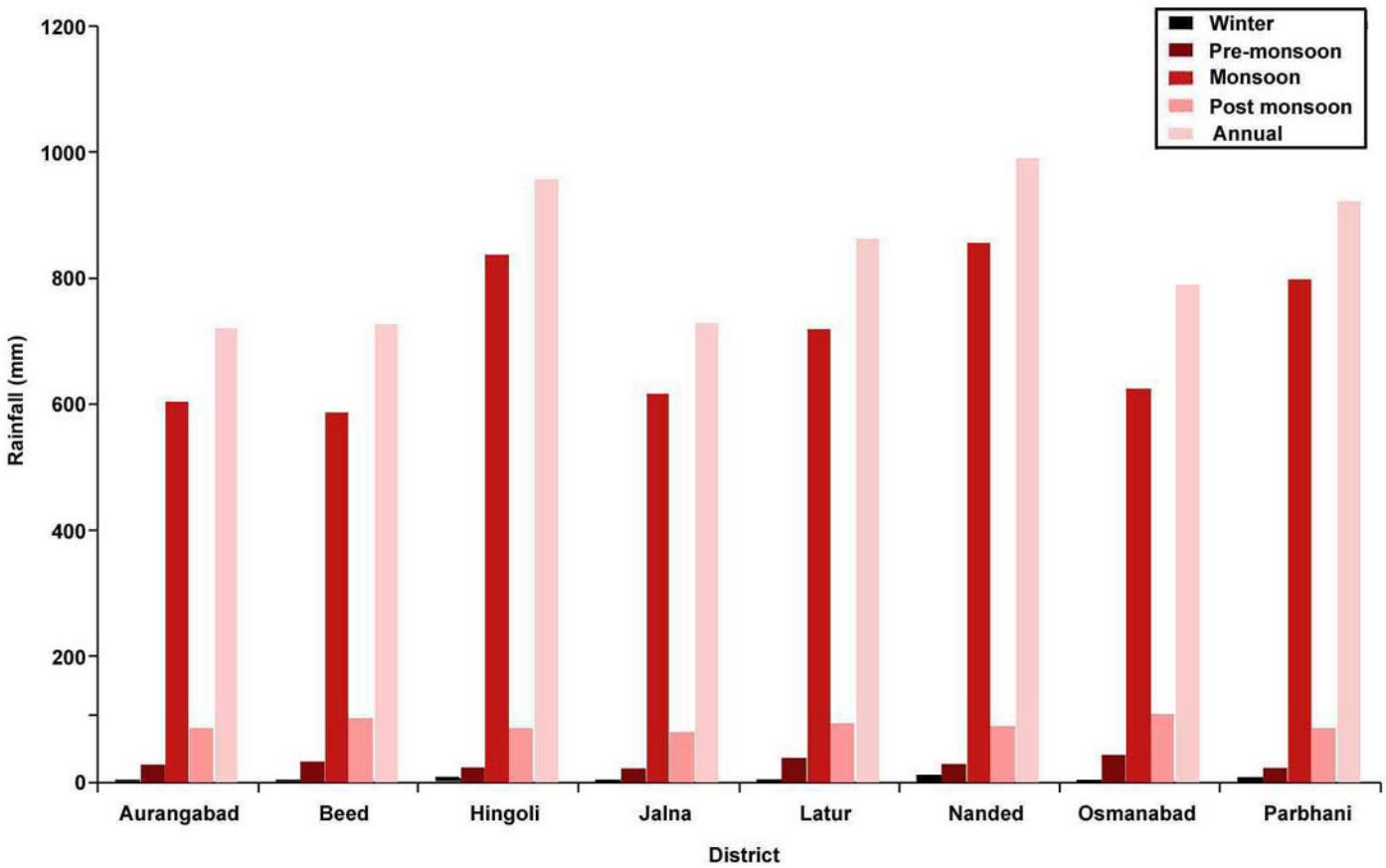

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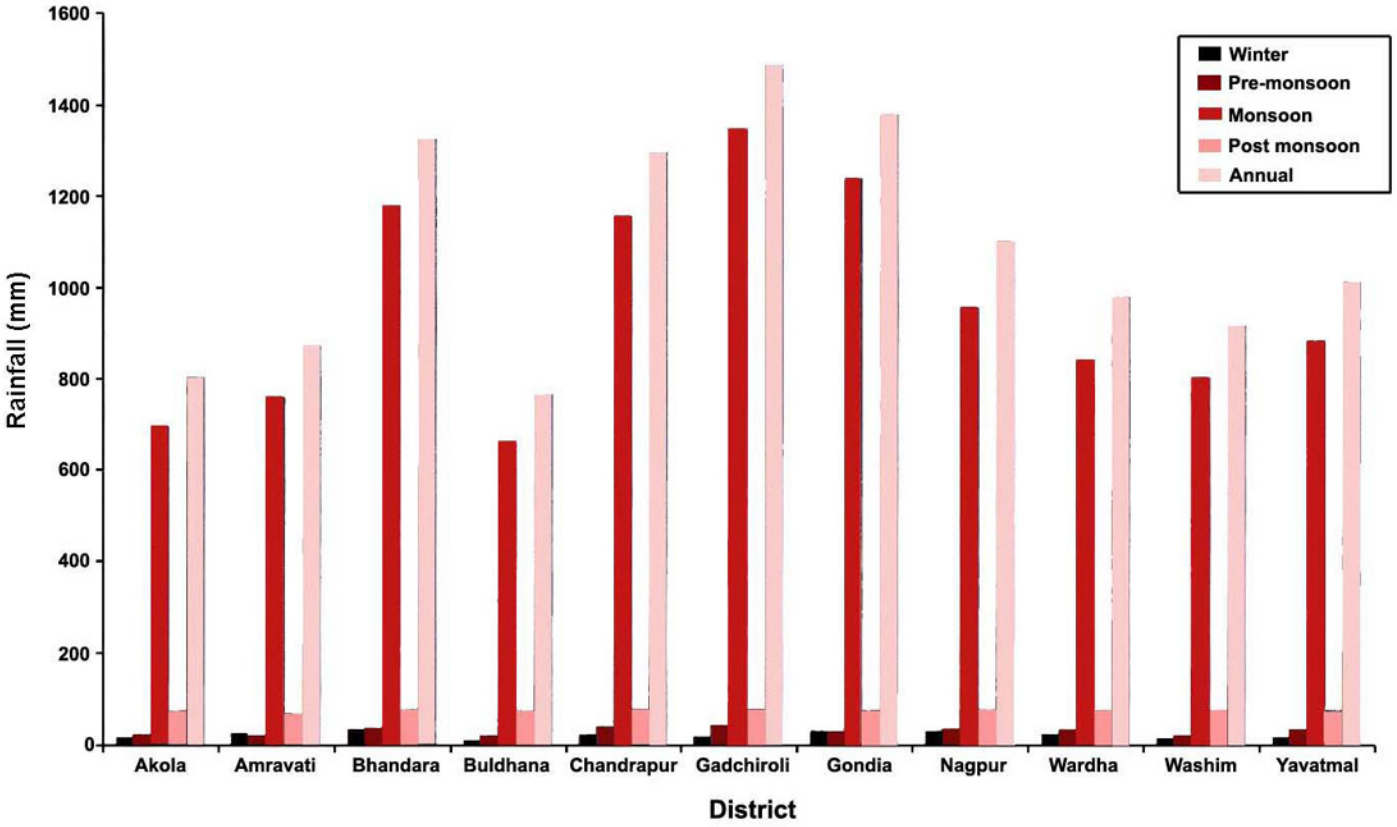

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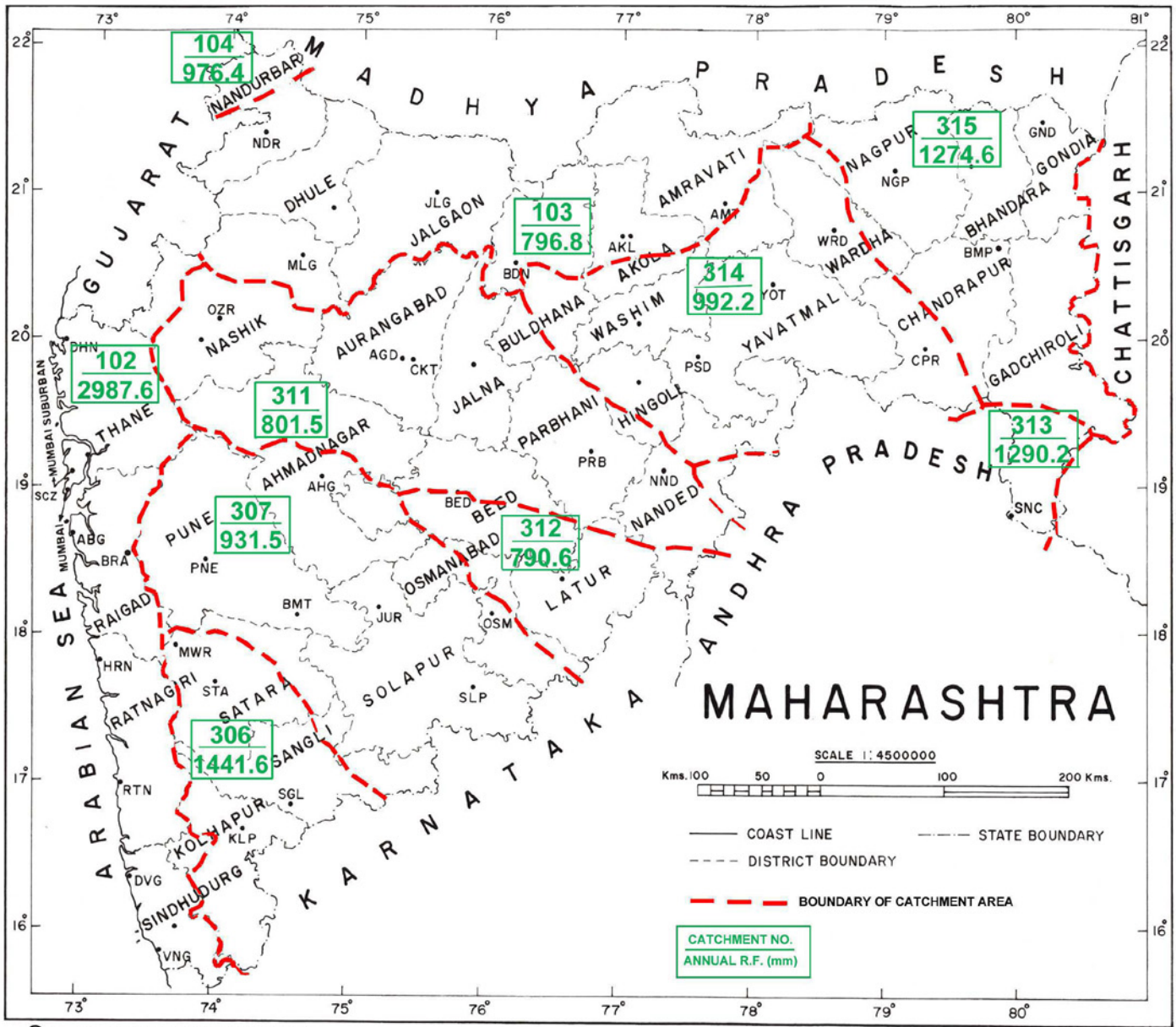

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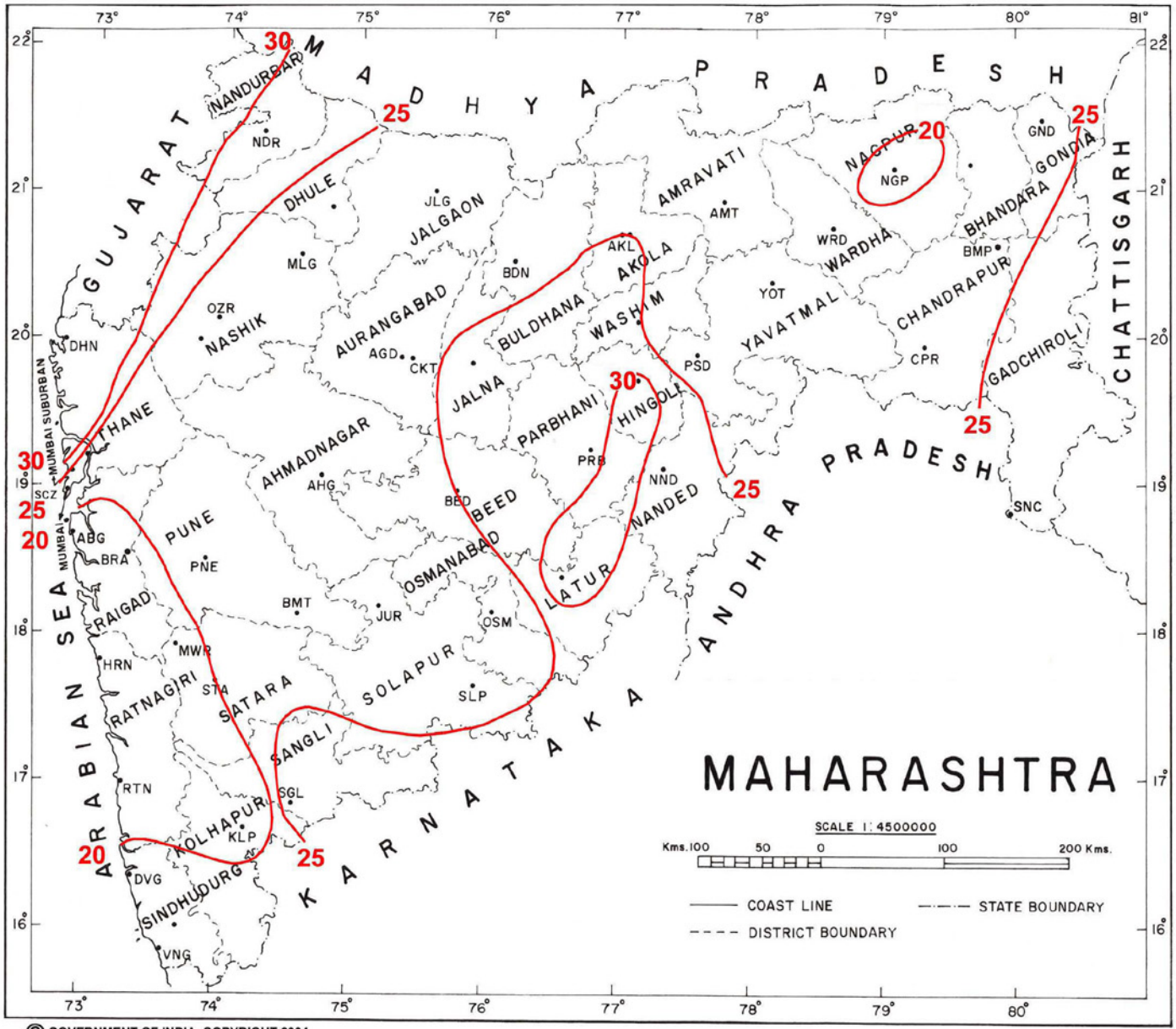

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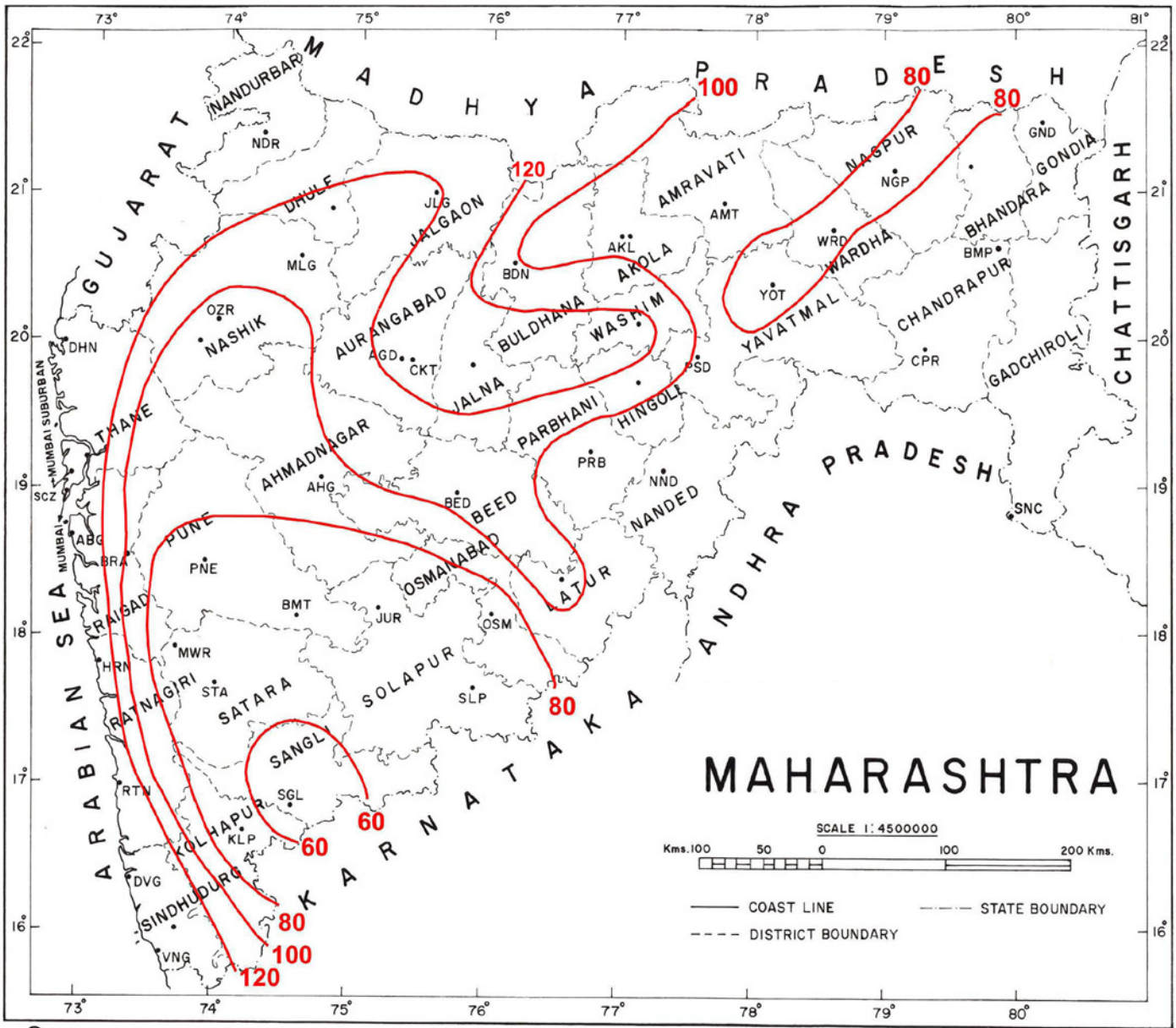

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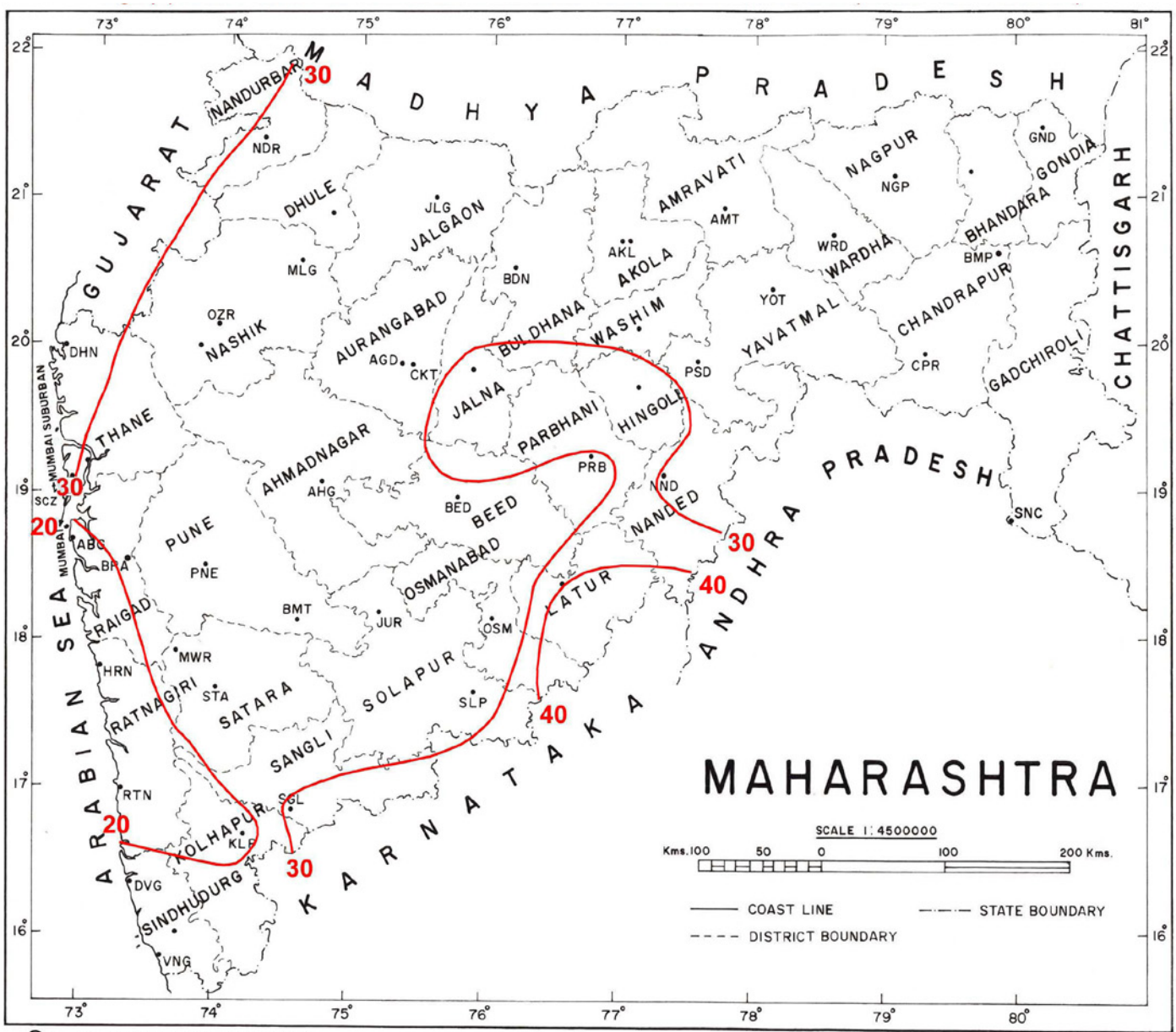

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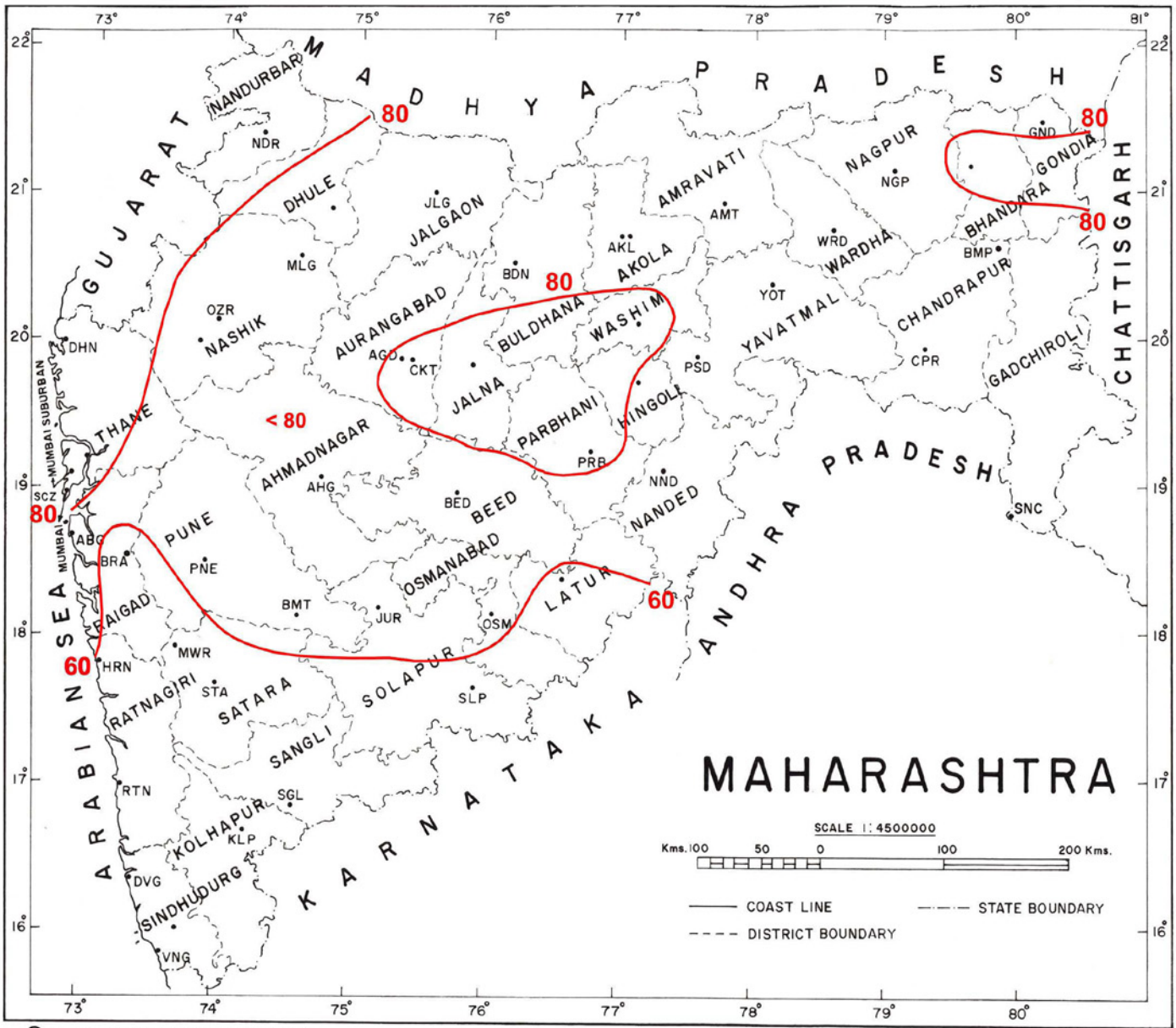

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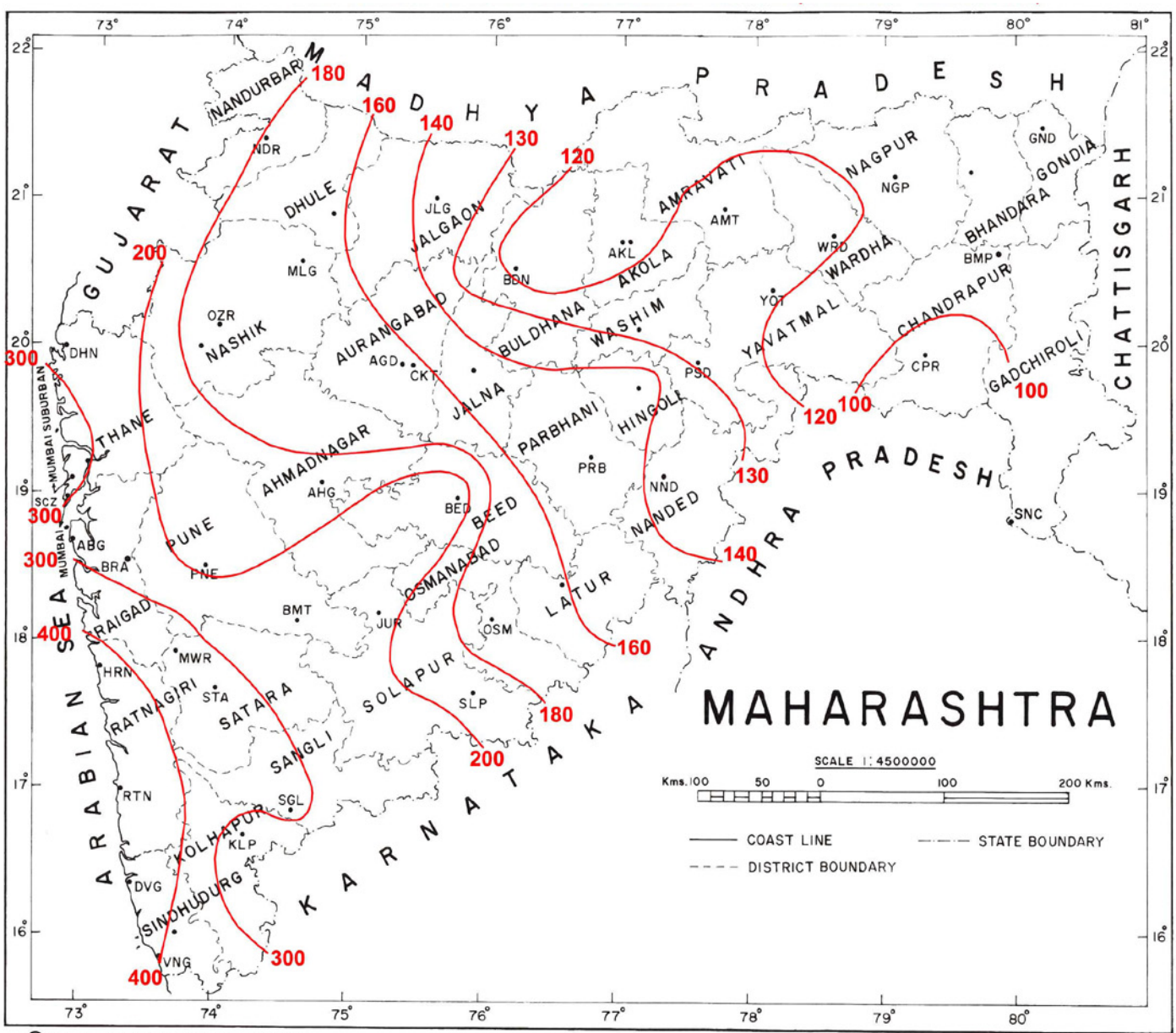

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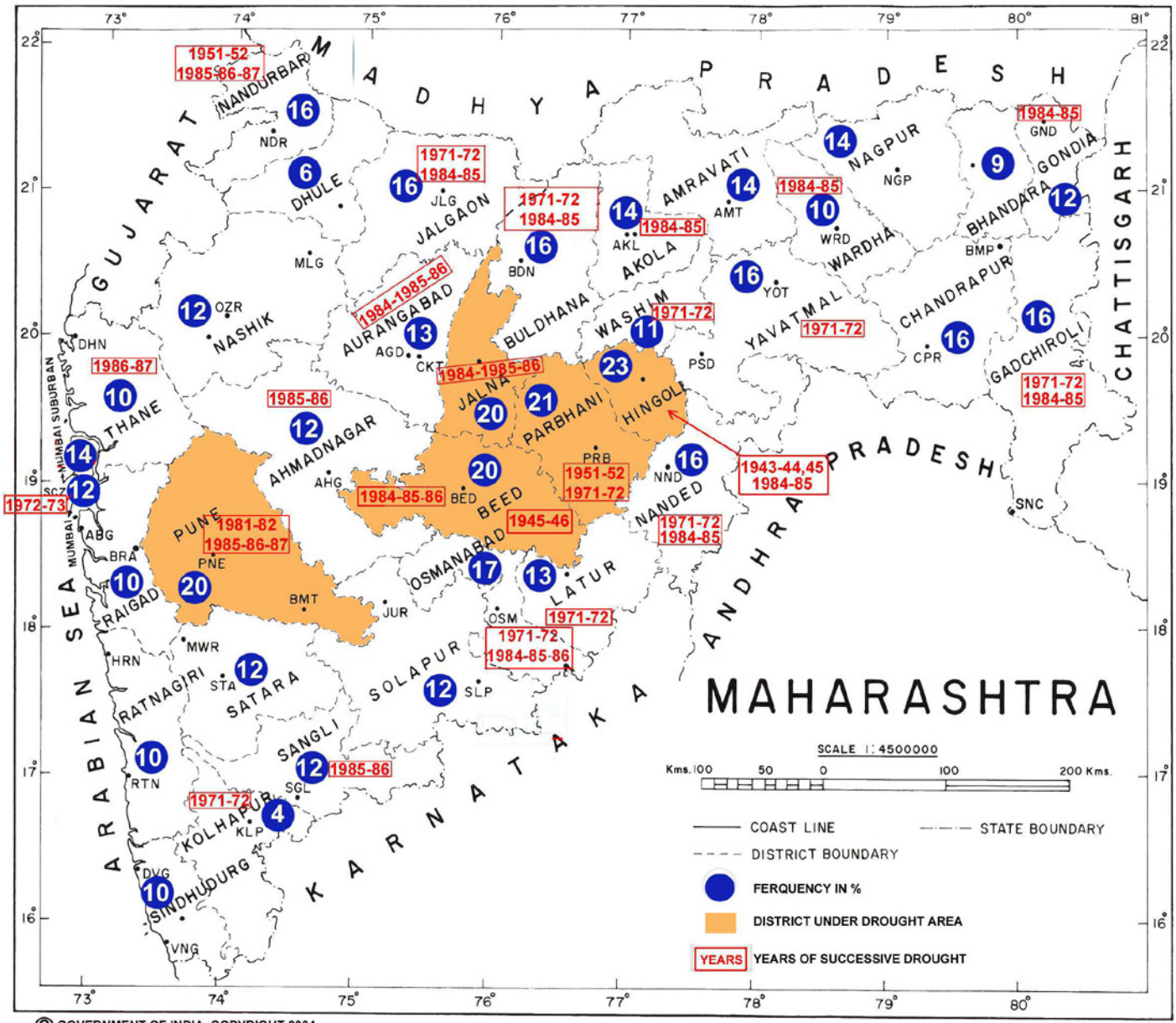

BASED UPON SURVEY OF INDIA MAP WITH THE PERMISSION OF THE SURVEYOR GENERAL OF INDIA.
THE RESPONSIBILITY FOR THE CORRECTNESS OF INTERNAL DETAILS RESTS WITH THE PUBLISHER.
THE TERRITORIAL WATERS OF INDIA EXTEND INTO SEA TO A DISTANCE OF TWELVE NAUTICAL MILES MEASURED FROM THE APPROPRIATE BASE LINE.

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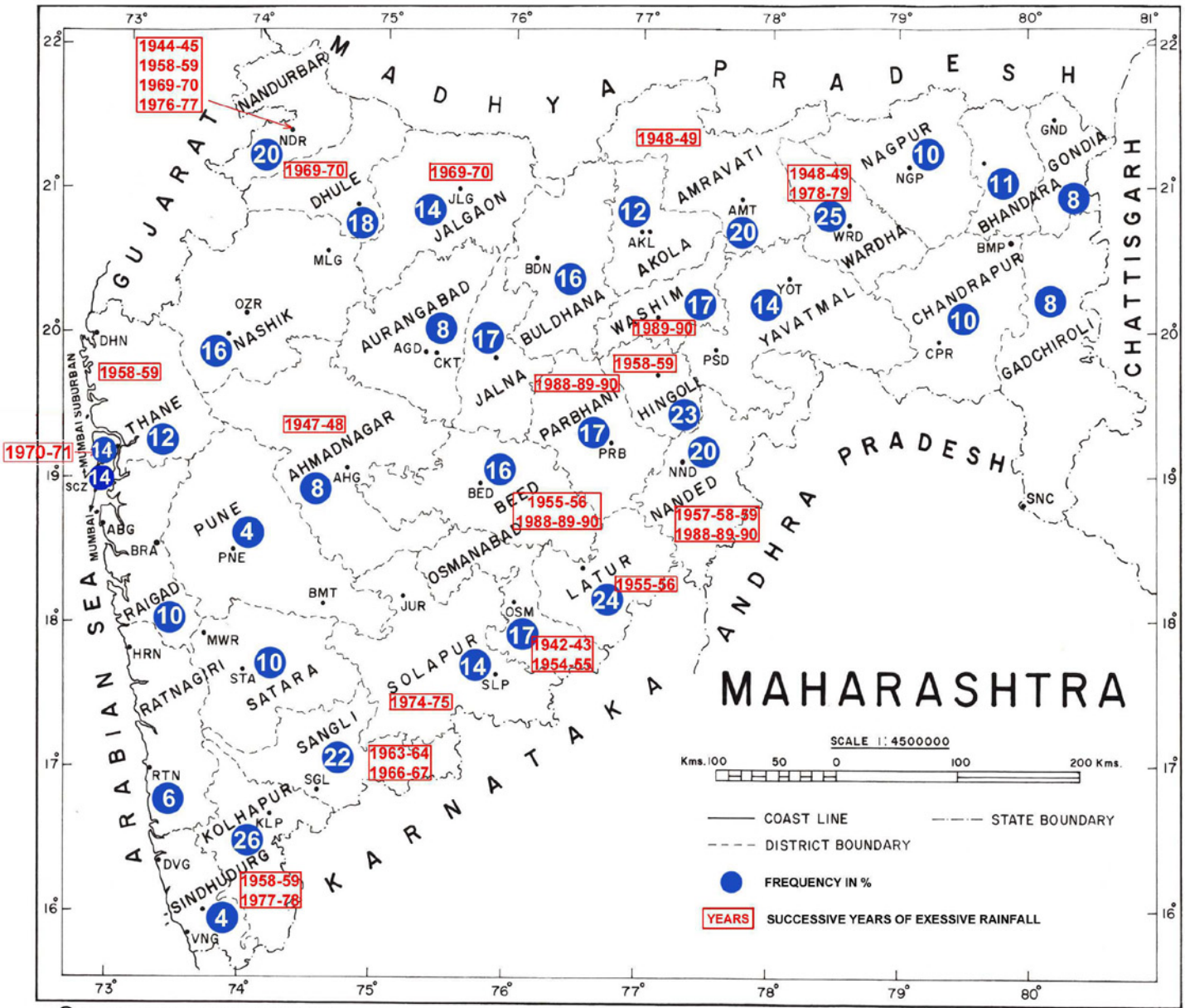

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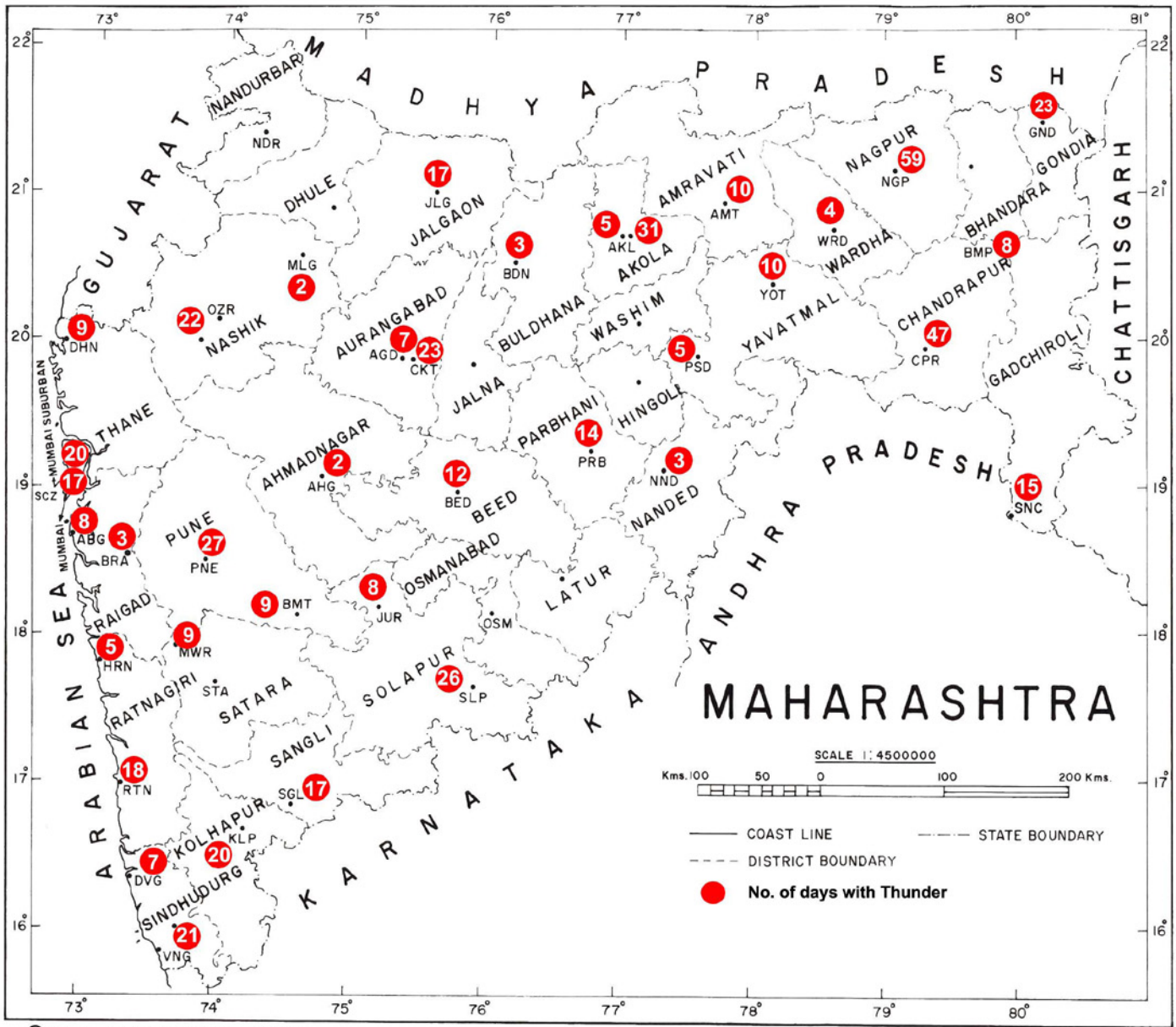

STATE SUMMARY

THE CLIMATE OF MAHARASHTRA STATE

Introduction

Located in the north centre of peninsular India, Maharashtra State is situated north of 14°N and south of 22°N. It is bounded by Arabian sea on its western side. The state of Gujarat, lies north of it, while Madhya Pradesh and Chattisgarh lie on the northern and eastern sides of Maharashtra respectively. On the southern side, it is bounded by Karnataka and Andhra Pradesh. The physical features of the state are shown in Fig.I. The inset (Fig.II) indicates its position in the country. The Western Ghats (Sahyadri) run north to south separating the coastal districts of Thane, Mumbai City, Mumbai Suburban, Raigad, Ratnagiri and Sindhudurg from the rest of Maharashtra. The average height of the range is about 1 km. West to east the region stretches across a distance of 800 kms. As the ridge runs across at right angles to the monsoon stream, it forms an important climatic divide. The western slopes and the coastal districts get very heavy monsoon rains, while to the east of the Ghats rainfall drops to less than a tenth within a short distance from the Ghats. The state receives rainfall mainly during the southwest monsoon season (June to September). There is heavy rainfall in coastal region (about 2000 mm), scanty rains in the rain shadow areas in central parts (about 500 mm) and medium rains in eastern parts (about 1000 mm) of the state. Fortunately, all the important rivers like Godavari, Bhima and Krishna which originate from the water sheds of the Ghats flow east across these drier regions and contribute to their economic benefit. The influence of the smaller and less cohesive east west oriented ranges of Satpura and Ajanta is not so marked.

There are four meteorological subdivisions, viz. Konkan, Madhya Maharashtra, Marathwada and Vidarbha in the state. The state consists of 35 districts as on 1st January 2002, viz. Mumbai City, Mumbai Suburban, Raigad, Ratnagiri, Sindhudurg and Thane from Konkan; Ahmednagar, Dhule, Jalgaon, Kolhapur, Nandurbar, Nashik, Pune, Sangli, Satara and Solapur from Madhya Maharashtra; Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad and Parbhani from Marathwada; Akola, Amravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim and Yavatmal from Vidarbha.

Climate

The climate of Maharashtra can be classified under the following main types:

I. ***Monsoon*****:** This type characterised by an annual rainfall of more than 100 cms is confined to the coastal belt and the adjoining Ghats region covering the districts of Thane, Raigad, Ratnagiri, Sindhudurg and the western hilly parts of Pune, Satara and Kolhapur districts. The coastal region experiences very small annual range of temperature, not exceeding 5°C. The mean daily temperature is above 22°C throughout the year. The mean daily relative humidity is high, generally above 60 percent. The coastal belt is thus hot and humid with plentiful rain during the southwest monsoon season. Over the remaining portion covered by this climate type, the mean daily temperature of the coldest month is between 18°C and 22°C. Relative humidity is reduced, but remains above 50 percent for more than 8 months in a year.

II. ***Dry climate:*** This type covers the semi-arid portions of Jalgaon, Nashik, Aurangabad, Pune, Beed, Satara, Osmanabad and Kolhapur and almost the whole of Dhule, Nandurbar, Ahmednagar, Solapur and Sangli districts. Mean daily temperature is between 18°C and 22°C during winter and above 22°C during remaining months. Annual rainfall is low being 60 to 90 cms and is confined mainly to southwest monsoon season. Mean daily relative humidity is less than 50 percent throughout the year, except in monsoon season, falling below 30 percent for 2 to 3 months during summer in the central parts of the region.

III. ***Tropical Rainy:*** Parts of Nashik, Jalgaon districts, eastern portions of Aurangabad, Jalna, Beed and Osmanabad, as well as the remaining districts of Marathwada viz. Hingoli, Latur, Parbhani and Nanded and entire Vidarbha have tropical rainy climate. The precipitation is confined to the monsoon season and is above 70 cms. The average relative humidity is above 60 percent except during summer when it is even less than 30 percent for 1 or 2 months. Mean daily temperature is between 18°C and 22°C during winter and above 22°C during the remaining months.

Areas in the state under each climatic pattern based on Koppen's classification are shown in Fig. III. This broad classification is based on the variation of temperature and rainfall. The state mainly comes under the climatic type Tropical Savanna, hot, seasonally dry, usually winter (Aw). However, some central region has climatic type: Dry, Semi arid, Hot Tropical (Bsh) and coastal belt and adjoining Ghats come under tropical rainy monsoon with short dry season (Am).

Sea Level Pressure and Winds

During January, atmospheric pressure is higher over India and decreases southwards. But the gradient is weaker. Over Maharashtra, the pressure is uniform along the coast. Over the interior, pressure gradient is weak and is oriented in a north-south direction. Accordingly, winds are light and mainly from north or northeast. Pressure begins to decrease after January and the pressure gradient also weakens. During March, pressure is uniform throughout the state. A reversal of the pressure gradient occurs in April with the establishment of a low over north India. Over Maharashtra alignment of isobars is in north to south direction. Winds are northwesterly to westerly. With the advance of summer, the isobars gradually orient themselves in a west to east direction. The winds strengthen and the pressure gradient remains strong throughout the monsoon season till September. Winds are from the westerly direction. October is the month of transition when the pressure gradient weakens considerably and reverses gradually to the winter pattern. Winds are weak and mostly north-northeasterly over the state.

Pressure continues to rise thereafter till January, winds remaining northerly. It may be mentioned that due to the sea breeze effect, winds are from a westerly/northwesterly direction over the coastal belt throughout the year during evening. Table 1 gives the mean wind speed in kmph for each month for four meteorological subdivisions, together with predominant wind direction both in the morning and in the evening for individual stations.

Temperature

The mean maximum and mean minimum temperature at various stations and the subdivisions are given in Table 2. May is generally the hottest month when the mean maximum temperature for the coastal belt is 33^{o}C while for the interior it increases from about 38^{o}C in the western parts to 43^{o}C in the extreme east. Plains of Vidarbha and adjacent east parts of Madhya Maharashtra experience severe summers with mean maximum temperature of 42 to 43^{o}C in May. As there are gaps in the Western Ghats, sea breeze can penetrate through them into the parts of Madhya Maharashtra. In this region, therefore, high temperatures persist for lesser duration and evenings tend to become sufficiently pleasant. Temperatures begin to fall with the onset of southwest monsoon in June. The drop in day temperatures after May till August is 3-4^{o}C over Konkan, while for the interior it ranges from 10 to 12^{o}C. The fall in night temperature is less rapid. After the withdrawal of the monsoon there is a tendency for a rise in the temperatures till October in the interior and till November in the coastal belt due to increased insolation. During winter, cold waves in the wake of

western disturbances passing across north India affect the northern parts of the state particularly in north Madhya Maharashtra resulting in a rapid and appreciable fall in temperatures. Heavy damage may be caused to horticulture at times in association with passing of cold waves. December is the coldest month for the interior with the mean minimum temperature of 13^{o}C and January for Konkan with the mean minimum of 18^{o}C. Both day and night temperatures then begin to rise rapidly from February to April. Over the coast, however, increase in the night temperatures is more marked being 5-6^{o}C, while over the interior the rise in both day and night temperatures is 8 to 9^{o}C.

The diurnal range of temperature over the coast is small during April to October, being less than 8^{o}C due to maritime influence. It, however, increases to as much as 10 to 12^{o}C during November to March under the influence of northerly dry winds of land origin. Over the interior the range is always high and generally decreases from west to east. It is the least during rainy months (about 7 to 9^{o}C) reaching a maximum value of about 18^{o}C over Madhya Maharashtra and Marathwada and 15 to 16^{o}C over Vidarbha during January to March.

The mean annual range of temperature (i.e. the variation of the mean daily temperature through the year) is only 6^{o}C for the coastal region, while for the interior it varies from 10^{o}C for Madhya Maharashtra to 14^{o}C for Vidarbha. Similarly, the mean change from the winter minimum (i.e. morning temperatures) to the summer maximum (i.e. afternoon temperatures) is 15^{o}C for the coastal belt while for the interior it varies from 26^{o}C for Madhya Maharashtra to 29^{o}C for Vidarbha.

The lowest minimum temperature ever recorded in the state (upto 1994) was –0.6^{o}C at Malegaon on 1st February 1929 and the highest maximum temperature ever recorded was 48.4^{o}C at Jalgaon on 28th May 1989 and at Wardha on 17th May 1989. Fig. 1 and Fig. 2 give the distribution of mean maximum temperature in May and the mean minimum temperature in December which are generally the hottest and the coldest months respectively.

Fig. 1(a, b, c) give the distribution of mean maximum temperatures in January, July and October respectively which can be considered to be representative of winter, monsoon and post monsoon conditions. Fig. 2(a, b, c) give the distribution of mean minimum temperature for April, July and October respectively.

Fig. 3 and Fig. 4 give the highest maximum temperatures and the lowest minimum temperatures ever recorded in the state.

Humidity

Table–3 gives the mean relative humidity at 0830 and 1730 hours IST for the individual observatory stations and the four subdivisions.

Over the coast, humidity is generally high. During June to October it is more than 80 percent. It is least during winter afternoons when it may come down to about 60 percent at most places. High humidity, in association with the warm temperatures from April to October render the weather uncomfortable, in the absence of wind.

Over the interior, the period February to April is very dry when humidity in the afternoons may be lower than 20 percent on individual days. With the onset of monsoon, humidity increases rapidly and remains high till October. During initial and later stages of the monsoon, weather can be oppressive. Humidity markedly decreases during day time after October and with fall in temperature also the days are rendered refreshingly cool.

Over the high altitude stations, humidity increases towards the afternoons, except during winter, as a result of the moist air rising above the valleys below.

Sunshine and Cloudiness

Skies are clear to lightly clouded from December to March throughout the state, with gradual increase thereafter till May. Over the interior, cloud development is more marked towards the afternoon during the premonsoon months of April and May. With the advance of the monsoon current in June there is a sharp increase in the cloudiness, when, on an average, skies are overcast over Konkan on 11 to 12 days in a month and clear on hardly a day. Over the interior, it is overcast on 3 to 8 days and clear on 1 to 5 days particularly in the mornings. Skies remain heavily clouded till September. Tables 4 and 4 (a) give the daily mean cloud amounts during each month and monthly mean number of days with clear and overcast skies at 0830 and 1730 hours IST for individual stations and for each subdivision as a whole. As a supplement to the information about clouding, Table 4 (b) gives the mean duration of bright sunshine at individual stations equipped with sunshine recorders.

Rainfall

Maharashtra state experiences extremes of rainfall ranging from 600 cm over the Ghats to less than 60 cm in Madhya Maharashtra. The coastal strip and the adjoining

Western Ghats exposed to the southwest monsoon receive the heaviest rains exceeding 200 cm. Rainfall over the Ghats may exceed 500 cm annually. Rainfall decreases very rapidly, towards the eastern slopes and the plateau area where it is a minimum. It again increases as we proceed further eastwards. Thus Madhya Maharashtra is the region of lowest rainfall. In this region, the annual rainfall is less than 60 cm at most places. Within this strip lies the area of lowest rainfall of less than 50 cm running from Dhond-Baramati sector to Indapur-Mhaswad sector to the southeast of Pune district. July is generally the rainiest month except in the central region of the state comprising of the districts of Ahmednagar, Beed, Solapur, Osmanabad and Latur where September is the rainiest.

The state gets its rainfall chiefly in the southwest monsoon season (June to September). Konkan receives 95 percent and Vidarbha 88 percent of annual total during the monsoon season. Madhya Maharashtra and Marathwada receive around 83 percent of the annual rain during the monsoon and about 11 percent during the post-monsoon months of October and November. The post monsoon showers are of considerable economic importance. Table 5 gives the mean monthly rainfall amount and the number of rainy days for each district and for each of the subdivision. For the hilly regions, rainfall data of individual hill stations (elevations exceeding 1067 m) are given in Table 5 (a).

The advent of the monsoon is generally sudden, the rainfall increases from 1 to 2 percent of the annual normal in May to 15 to 23 percent in June. The rainfall becomes heavy to vigorous on occasions in association with the cyclonic storms and depressions. The monsoon advances from south to north and reaches Mumbai by about 10th June.

Some of the notable heavy rainfall amounts ever recorded in 24 hours in the state is given below:

Heaviest Rainfall In 24 Hours (ever recorded)

Sr. No.	Station	District	Rainfall (in mm)	Date
1.	Andheri	Mumbai Suburban	652.0	04.07.1974
2.	Bhira (Obsy)	Raigad	713.0	24.07.1989
3.	Chiplun	Ratnagiri	533.4	04.06.1882
4.	Colaba (Obsy)	Mumbai City	575.6	05.07.1974
5.	Dapoli	Ratnagiri	535.4	03.06.1882
6.	Devgad	Sindhudurg	530.0	16.06.1992
7.	Gaganbawada	Kolhapur	499.0	24.07.1989
8.	Jawahar	Thane	553.7	05.08.1968

9.	Karjat	Raigad	605.0	18.07.1958
10.	Khandala (Obsy)	Pune	516.4	19.07.1958
11.	Khyrbund	Bhandara	620.0	01.08.1983
12.	Lonavala	Pune	578.0	23.07.1989
13.	Matheran	Raigad	657.3	24.07.1921
14.	Pen	Raigad	500.0	07.09.1973
15.	Roha	Raigad	629.9	18.06.1886
16.	Santacruz	Mumbai Suburban	944.2	27.07.2005
17.	Sriwardhan	Raigad	742.0	26.06.1968

The number of rainy days in a year varies from 70 to 100 in Konkan to 34 to 75 in the interior to the east of the Western Ghats.

Fig. 5 gives the distribution of annual rainfall over the state. Fig. 5(a) to Fig. 5(d) give the distribution of rainfall during the four seasons viz. winter, premonsoon, monsoon and post monsoon.

Fig. 6 shows the subdivision-wise seasonal and annual rainfall. Fig. 7(a) to 7(d) show the districtwise seasonal and annual rainfall for each of the four subdivisions and provide a measure for comparison of seasonal rainfall with the annual rainfall. Table 6 gives monthly and annual rainfall for various river catchments (Nos. 102, 103, 104, 306, 307, 311, 312, 313, 314, 315) in the state. The annual rainfall of these river catchments is shown in Fig. 8.

Rainfall Variability

Coefficient of Variation (C.V.) which is expressed as percentage is defined as:

$$CV = \frac{Standard\ \ Deviation\ (\sigma)}{Normal\ (N)}\ x\ 100$$

Coefficient of Variation (C.V.) of annual rainfall is more than 25% in southeastern, eastern, and extreme northwestern parts of the state. In western parts of the state, it is less than 20%. In other parts of the state, it ranges between 20 to 25%. In the months of January and February, the C.V. is extremely high and it ranges from 100 to 400. It increases from east to west. During the summer months i.e. March, April and May, it is the lowest in the southeastern parts of the state, adjacent to Karnataka state boundary and increases to its northern and western coastal sides even greater than 120%. In the coastal region of Thane and Mumbai, it is more than 200%. In the northeastern parts of the state, lower values of

C.V. are noticed and range 80 to 100%. During the southwest monsoon season C.V. is more than 30% in the southeastern and extreme northwestern parts of the state. In extreme western parts, it is less than 20% and in other parts of the state, it ranges between 20 and 30%. During the post monsoon season, central part of the state comprising parts of districts of Aurangabad, Jalna, Parbhani, Hingoli, Washim and Buldhana and northwestern and some eastern parts of the state, C.V. is greater than 80%. In the southern parts of the state, C.V. is less than 60%. In the remaining parts of the state, it ranges from 60 to 80%.

The above discussion gives the picture of rainfall variability in different seasons as well as year as a whole. The annual pattern of C.V. resembles to the southwest monsoon pattern. Fig. 9 and Fig. 9(a) to 9(d) indicate the rainfall variability for the whole year, premonsoon, southwest monsoon, post monsoon and winter seasons respectively.

Drought and Excessive Rainfall

Drought

A period of drought is defined as a year or season in which the total rainfall is less than 75 percent of the normal. It may further be classified as a year or season of 'moderate drought' if rainfall deficit is between 26 percent and 50 percent and a year or season of 'severe drought' when it is more than 50 percent. When, during a long period of years, droughts as defined above, occur on atleast 20 percent of the years over an area, that area may be classified as a 'drought area'. If the frequency is 40 percent or more the area may be termed as 'chronically drought area'.

Drought conditions which prevailed over Maharashtra state during the 50 year period 1941-1990 are given below:

The details about the occurrence of droughts for individual districts are: Ahmednagar (6), Akola (7), Amravati (7), Aurangabad (6), Beed (10), Bhandara (4), Buldhana (8), Chandrapur (8), Dhule (3), Gadchiroli (8), Gondia (6), Hingoli (10), Jalgaon (8), Jalna (8), Kolhapur (2), Latur (5), Mumbai City (6), Mumbai Suburban (6), Nagpur (7), Nanded (8), Nandubar (8), Nashik (6), Osmanabad (8), Parbhani (10), Pune (10), Raigad (5), Ratnagiri (5), Sangli (6), Satara (6), Sindhudurg (5), Solapur (6), Thane (5), Wardha (5), Washim (5), Yavatmal (8).

Severity of drought not only depends upon the order of rainfall deficiency in a single year, but also upon continued occurrence of deficient rain in successive years even though

the deficiency in each such successive years may not be as high as in a single year. Table (i) gives districtwise years of successive drought during the 50 year period (1941-1990).

Table (i)

Years of successive Drought	Name of districts affected
1985-1986	Ahmednagar
1984-1985	Akola
1984-1985-1986	Aurangabad
1945-1946, 1984-1985-1986	Beed
1971-1972, 1984-1985	Buldhana
1971-1972, 1984-1985	Gadchiroli
1984-1985	Gondia
1943-1944-1945, 1984-1985	Hingoli
1971-1972, 1984-1985	Jalgaon
1984-1985-1986	Jalna
1971-1972	Kolhapur
1971-1972	Latur
1972-1973	Mumbai City
1971-1972, 1984-1985	Nanded
1951-1952, 1985-1986-1987	Nandurbar
1971-1972, 1984-1985-1986	Osmanabad
1951-1952, 1971-1972	Parbhani
1981-1982, 1985-1986-1987	Pune
1985-1986	Sangli
1986-1987	Thane
1984-1985	Wardha
1971-1972	Washim
1971-1972	Yavatmal

Further, rainfall of less than 50 percent of the annual normal representing severe drought conditions occurred in various districts as indicated in Table (ii), where actual rainfall expressed as percentage of normal rainfall is given in brackets against each district.

Table (ii)

Years of severe Drought	Affected Districts
1972	Ahmednagar (38%)
1972	Aurangabad (46%)
1972	Beed (40%)
1941,1950	Hingoli (40%, 43%)
1972	Jalna (41%)
1972	Latur (34%)
1941	Mumbai City (42%)
1972	Nanded (41%)
1972	Osmanabad (36%)
1985	Pune (49%)
1968	Satara (45%)
1972	Solapur (37%)
1965	Washim (45%)

Incidence of widespread drought over the state in any particular year is not so uncommon. In the years 1941, 1952, 1972, 1984 and 1986, fairly widespread drought affected the state. In the years 1952, 1972 and 1984, the number of districts affected by drought were 22, 32 and 18 respectively. In the years 1941 and 1986, 12 and 17 districts were under the grip of drought respectively.

There was no drought anywhere in the state in 16 years namely, 1948, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1961, 1963, 1967, 1969, 1977, 1980, 1983 and 1988.

Probabilities of occurrence of low rainfall in 4 meteorological subdivisions is also described below:

KONKAN

Each district had 5-6 years of drought during 50 year period under consideration. Severe drought condition was experienced only once at Mumbai district in the year 1941.The probability of occurrence of less than 75% of annual or monsoon normal rain is about 11%. Occurrence of severe drought was very rare.

MADHYA MAHARASHTRA

Pune district experienced drought in 10 years out of 50 years. As such Pune is drought prone area. The remaining districts except Kolhapur and Dhule had 6-8 such years. The Pune district experienced severe drought in 1985. Ahmednagar and Solapur districts had severe drought in the year 1972 and Satara had severe drought in 1968.

The probability of occurrence of annual rainfall less than 75 percent of normal over this subdivision is about 14 percent, while the probability of occurrence of rainfall less than 50 percent of the normal is about 1 percent. The corresponding figures for occurrence of drought and severe drought during southwest monsoon are also about the same as above, being slightly higher.

MARATHWADA

Beed, Hingoli and Parbhani districts experienced drought in 10 years. Therefore these districts come under drought prone area. Other districts in the subdivision experienced 5-8 years of drought. Severe drought was experienced in the year 1972 by most of the districts. Severe drought was experienced by Hingoli in 1941 and 1950.

The probability of occurrence of drought is about 16 percent and for severe drought, it is about 2 percent. The corresponding probability values for the southwest monsoon season are also about the same.

VIDARBHA

Each district experienced 4-8 years of drought. Washim had experienced severe drought in the year 1965. The probability of occurrence of drought is 13 percent and occurrence of severe drought was rare.

Fig. 10 shows percentage frequency of drought, years of successive drought and districts under drought area during the period 1941-1990. The districts Pune, Jalna, Beed, Hingoli and Parbhani fall under drought area. Dhule and Kolhapur districts experienced drought occasionally and remaining districts were affected by drought moderately.

Excessive Rainfall

It may generally be said that rainfall, sufficiently in excess of the normal is a predominant factor for occurrence of floods. For the purpose of this description annual rainfall exceeding 125 percent of the normal is considered as excessive rain.

The following Table (iii) gives the district wise excessive rainfall years, highest annual rainfall (expressed as percentage of normal) with the year of occurrence.

Table (iii)

District	Years of Excessive Rainfall	Highest amount of rainfall (expressed as % of normal) with year
KONKAN		
Mumbai City	1949, 1954, 1956, 1958, 1983, 1988, 1990	356.0 cm in 1958 (166%)
Mumbai Suburban	1958, 1970, 1971, 1975, 1978, 1983	515.9 cm in 1975 (213%)
Raigad	1954, 1958, 1961, 1963, 1990	447.7 cm in 1963 (134%)
Ratnagiri	1955, 1958, 1983	505.3 cm in 1955 (146%)
Sindhudurg	1955, 1961	398.1 cm in 1961 (125%)
Thane	1954, 1956, 1958, 1959, 1961, 1976	386.9 cm in 1958 (158%)
MADHYA MAHARASHTRA		
Ahmednagar	1943, 1947, 1948, 1956	87.6 cm in 1956 (154%)
Dhule	1944, 1946, 1949, 1956, 1958, 1967, 1969, 1970, 1976	100.2 cm in 1976 (163%)
Jalgaon	1944, 1946, 1949, 1956, 1958, 1969, 1970	104.4 cm in 1949 (139%)
Kolhapur	1946, 1950, 1953, 1956, 1958, 1959, 1961, 1963, 1975, 1977, 1978, 1980, 1988	266.4 cm in 1961 (155%)

Table (iii) (Contd…)

District	Years of Excessive Rainfall	Highest amount of rainfall (expressed as % of normal) with year
Nandurbar	1944, 1945, 1956, 1958, 1959, 1969, 1970, 1976, 1977, 1981	163.8 cm in 1976 (184%)
Nashik	1944, 1946, 1950, 1954, 1956, 1958, 1967, 1976	143.5 cm in 1967 (147%)
Pune	1956, 1961	178.9 cm in 1956 (148%)
Sangli	1946, 1956, 1959, 1961, 1963, 1964, 1966, 1967, 1975, 1979, 1981	99.2 cm in 1975 (148%)
Satara	1944, 1959, 1966, 1973, 1979	113.5 cm in 1944 (137%)
Solapur	1948, 1956, 1974, 1975, 1978, 1981, 1988	102.9 cm in 1975 (160%)
MARATHWADA		
Aurangabad	1946, 1955, 1958, 1990	109.3 cm in 1990 (152%)
Beed	1949, 1955, 1956, 1975, 1983, 1988, 1989, 1990	105.3 cm in 1983 (145%)
Hingoli	1955, 1958, 1959, 1961, 1963, 1970, 1973, 1975, 1983, 1990	156.1 cm in 1990 (163%)
Jalna	1955, 1958, 1963, 1969, 1975, 1988, 1990	108.4 cm in 1988 (149%)
Latur	1955, 1956, 1961, 1963, 1970, 1975, 1983, 1988, 1990	142.2 cm in 1955 (165%)
Nanded	1955, 1957, 1958, 1959, 1963, 1975, 1983, 1988, 1989. 1990	192.3 cm in 1983 (194%)
Osmanabad	1942, 1943, 1949, 1954, 1955, 1959, 1988, 1990	112.1 cm in 1990 (142%)
Parbhani	1942, 1955, 1961, 1963, 1975, 1988, 1989, 1990	137.4 cm in 1989 (149%)

Table (iii) (Contd…)

District	Years of Excessive Rainfall	Highest amount of rainfall (expressed as % of normal) with year
VIDARBHA		
Akola	1944, 1949, 1959, 1970, 1988, 1990	131.5 cm in 1988 (164%)
Amravati	1944, 1948, 1949, 1955, 1959, 1961, 1967, 1970, 1988, 1990	141.9 cm in 1944 (163%)
Bhandara	1942, 1947, 1959, 1961, 1975	199.8 cm in 1961 (151%)
Buldhana	1944, 1949, 1956, 1959, 1961, 1979, 1983, 1988	121.5 cm in 1949 (159%)
Chandrapur	1949, 1959, 1961, 1975, 1990	213.7 cm in 1959 (165%)
Gadchiroli	1959, 1986, 1988, 1990	240.7 cm in 1990 (162%)
Gondia	1942, 1944, 1959, 1961	245.4 cm in 1961 (178%)
Nagpur	1942, 1944, 1947, 1959, 1961	158.6 cm in 1944 (144%)
Wardha	1942, 1944, 1948, 1949, 1955, 1959, 1961, 1970, 1978, 1979, 1981, 1990	143.8 cm in 1979 (147%)
Washim	1949, 1959, 1961, 1970, 1973, 1983, 1989, 1990	143.7 cm in 1959 (157%)
Yavatmal	1955, 1959, 1963, 1981, 1983, 1988, 1990	154.9 cm in 1959 (153%)

From the above table, it may be seen that during the period under consideration, there were 38 years in which some districts or the other in the state recorded excessive rainfall. The maximum amount being 213% of the normal annual rainfall in the year 1975 for the district Mumbai (Suburban). Kolhapur district has got maximum number of years (i.e. 13) of excessive rainfall. Sindhudurg and Pune have got minimum number of years (i.e. 2) of excessive rainfall. In the year 1959, 20 districts of the state experienced excessive rainfall while in the years 1961 and 1990, 17 districts experienced excessive rainfall. Successive years of excessive rainfall are shown against each district in Table (iv) as below:-

Table (iv)

Successive years of Excessive Rainfall (Districtwise)

Successive Years of Excessive Rainfall	Districts
1947-1948	Ahmednagar
1948-1949	Amravati
1955-1956, 1988-1989-1990	Beed
1969-1970	Dhule
1958-1959	Hingoli
1969-1970	Jalgaon
1958-1959, 1977-1978	Kolhapur
1955-1956	Latur
1970-1971, 1973-1974	Mumbai (Suburban)
1957-1958-1959, 1988-1989-1990	Nanded
1944-1945, 1958-1959, 1969-1970, 1976-1977	Nandurbar
1942-1943, 1954-1955	Osmanabad
1988-1989-1990	Parbhani
1963-1964, 1966-1967	Sangli
1974-1975	Solapur
1958-1959	Thane
1948-1949, 1978-1979	Wardha
1989-1990	Washim

The details of subdivisionwise excessive rainfall over Maharashtra during 50 year period 1941-1990 are given below:

KONKAN

The districts of Raigad, Thane, Mumbai (Suburban) and Mumbai City experienced 5, 6, 6 and 7 years of excessive rainfall and the districts Sindhudurg and Ratnagiri had 2 and 3 such years respectively. The probability of excessive rainfall in Konkan is about 10%.

MADHYA MAHARASHTRA

Kolhapur had 13 years of excessive rainfall. The districts Dhule, Jalgaon, Nandurbar, Nashik, Solapur and Sangli had 7-11 such years, while Pune, Ahmednagar and Satara had

2, 4 and 5 such years respectively. The probability of excessive rainfall in Madhya Maharashtra is about 15%.

MARATHWADA

Most of the districts experienced excessive rainfall in 7-10 years while Aurangabad had 4 such occasions. The probability of excessive rainfall in Marathwada is 16%.

VIDARBHA

The districts Amravati and Wardha had 10 and 12 years of excessive rainfall, while the remaining districts had 4 to 8 such years. The probability of excessive rainfall in Vidarbha is 13%.

The probability values for occurrence of excessive rainfall over various subdivisions are about 10 -16 percent and those are nearly same as those given for the occurrence of drought. Fig. 11 shows percentage frequency of excessive rainfall years and successive years of excessive rainfall.

Weather Hazards

Storms and Depressions

In June, a few of the depressions which originate in the Bay of Bengal and travel westward affect the weather in the east or northeast Vidarbha. Also, in June, troughs in the Arabian sea off Konkan coast cause heavy rain over the coastal region and sometimes even in the interior. The Bay depressions progressively take more southerly track till September, when the course of depressions is across the state, through Marathwada. This is one of the reasons why this part of the state has the rainiest weather in September. These depressions, if and when they recurve towards north or northeast, cause very heavy and prolonged spells of rain. The withdrawal of the monsoon normally takes place by 1st October. During October, some depressions from the Bay of Bengal cross the Peninsula through the southern states and emerge into the Arabian sea. Some of the depressions intensify into cyclonic storms and move northeastward inland. They cause heavy rainfall and gales leading to damage to life and property in the coastal region. Table–7 depicts the number of storms and depressions affecting Maharashtra state during the period 1891-1990.

Thunderstorms and Hailstorms

Thunderstorm activity is more pronounced before and during the advance of the southwest monsoon in May and June. When the monsoon gets fully established during July and August, the activity reduces considerably. With the withdrawal of the monsoon, air mass characteristics change again leading to the revival of the thunderstorm activity during September and October. Over the interior, premonsoon thunderstorms during March to May are occasionally accompanied by hail. The following table (v) gives the frequency of thunder over the four subdivisions.

Table (v)
No. of days of thunder

Subdivision	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Konkan	0.0	0.1	0.1	0.6	1.2	2.9	1.0	0.6	2.2	2.5	0.9	0.1	12.1
Madhya Maharashtra	0.1	0.2	0.8	1.8	2.1	2.1	0.8	0.5	2.1	1.6	0.4	0.1	12.5
Marathwada	0.1	0.2	0.7	1.0	1.3	2.3	0.9	0.9	1.6	0.7	0.2	0.1	9.9
Vidharbha	0.3	0.6	1.1	1.6	1.6	3.5	2.5	2.0	2.5	0.9	0.2	0.2	16.9

Fig. 12 shows mean annual days with thunder for Maharashtra state.

Squall

Squalls are generally rare, but they occasionally occur during the monsoon over the coastal region and during the premonsoon period over the interior region.

In the coastal region, Mumbai area has an annual frequency for squall ranging between 7-15 days in a year. In the interior region, Nagpur shows the highest frequency, about 20. Pune district has 5, as the annual frequency of the squall.

Duststorms

Duststorms are rare and one or two duststorms may occur, if at all, during April and May or early June in the interior of the state, particularly in Vidarbha and Madhya Maharashtra.

Fog

Fog occurs rarely throughout the state, except over the mountainous terrain where it is frequent during the rainy months of July to September. Soon after the withdrawal of the monsoon and during the period November to March, radiation fog is more common over Madhya Maharashtra and the hilly regions than elsewhere in the state.

TABLE – 1
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN														
Alibag	a	7.7	8.6	9.9	11.6	14.0	21.8	27.8	25.6	13.5	7.8	7.2	6.8	13.5
	m	C/NE/E	C/NE	C/NE	C/SE	C/NW	SW	SW	SW	C/SE	C/NE	C/E	E	
	e	NW	NW	NW	NW	NW	SW	SW	SW	NW	NW	NW	NW	
Bhira	a	2.2	2.1	2.6	4.0	3.4	2.1	2.3	2.2	1.3	3.0	2.1	2.1	2.5
	m	C/E/SE	C	C	C	C/Var	C	C/Var	C/SE	C	C	C/E	C/Var	
	e	C/SW	C/SW	C/SW/W	C/SW/W	C/SW	C/SW	C/SW	C/SW	C/SW	C/SW	C	C	
Dahanu	a	10.4	10.9	11.8	12.7	14.6	17.2	20.5	21.0	12.9	9.1	8.7	9.0	13.2
	m	E	E	E	SE	SW/W	SW	SW	SW/W	SE/E	E	E	E	
	e	N/NW	NW	NW	W	W	SW	SW	SW	W	NW	N/NW	N	
Devgarh	a	11.7	13.3	13.5	15.4	16.8	19.5	26.4	23.9	13.2	9.8	10.1	10.2	15.3
	m	E	E	E	NE/N	NW	W/NW	W	W	E/W	E	E	E	
	e	NW	NW	NW	NW	NW	W/NW	W	W/NW	NW	NW	NW	NW	
Harnai	a	12.1	13.9	14.4	16.0	16.1	15.2	20.6	20.2	12.1	9.8	11.0	10.4	14.3
	m	C/E	C/NE	C/N	N/C	N	W/C	W	W	C/W	C/E/NE	E	E/C	
	e	NW	NW	NW	NW	NW	W	W	W	NW/W	NW	NW	NW	
Mumbai/Colaba	a	7.2	8.0	8.5	8.3	8.4	10.6	12.4	11.9	8.0	6.3	6.7	7.0	8.6
	m	NE	NE/N	N/NE	SE/N	NW	W/SW	W	W	W/SE	E/NE	E/NE	NE/E	
	e	NW	NW	NW	NW	W/NW	W	W	W	W/NW	NW	NW	NW	
Mumbai/Santacruz	a	7.0	8.0	8.7	9.7	11.3	14.5	16.6	15.0	9.0	6.2	6.3	6.3	9.9
	m	C/E/NE	C/E	C/NE	C/NE/NW	C/W	W/SW	W	W	C/W	C/E	C/E	C/E	
	e	NW	NW	NW	NW	W/NW	W	W	W	NW/W	NW	NW	NW	

TABLE – 1 (contd…..)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
Ratnagiri	a	7.0	7.2	7.6	8.4	9.5	11.7	15.8	13.3	7.2	6.0	6.7	7.0	9.0
	m	E	E/C	C/E/N	C/N/SE	NW	SW/W	W	W	C/SE	E	E	E	
	e	NW	NW	NW	NW/W	NW	W/SW	W	W	NW/W	NW	NW	NW	
Vengurla	a	4.7	5.5	6.1	7.4	9.1	7.5	9.1	8.5	5.4	4.1	3.8	4.0	6.3
	m	C/N	C/N	C/N	C/N	C/N	C/W	W	W/C	C/N	C/N	C/N	C/N	
	e	W	W	W	W	W	W	W	W	W	W	W	W	
Sub-Div.Means	a	7.7	8.6	9.2	10.3	11.4	13.3	16.8	15.7	9.1	6.9	6.9	6.9	10.2
MADHYA MAHARASHTRA														
Ahmednagar	a	5.2	6.0	6.9	7.9	9.5	10.3	10.6	9.5	7.0	6.4	5.8	4.8	7.5
	m	C/NW	NW/C	NW	NW	NW	SW/NW	SW	SW	NW	NW/C	C/SE	C/NW	
	e	C/NE/SW	NW	NW	NW	NW	NW/SW	SW	SW/NW	NW	NE	NE	NE	
Baramati	a	5.8	6.8	7.9	9.6	12.9	14.9	14.4	14.2	10.5	6.9	6.3	5.8	9.7
	m	NW/E	NW	NW	NW	NW/W	W	W	W	W	NW/W	E	E/C	
	e	E/SE	W/S	S/W	NW/W	NW/W	W	W	W	W	E/NE	E	E/SE	
Jalgaon	a	8.8	9.6	11.4	14.4	22.4	21.8	15.4	13.5	11.5	7.8	8.2	8.7	12.8
	m	E	E	W	W	W	W	W	W	W	E	E	E	
	e	W/E	W	W	W	W	W	W	W	W	E/NE	E	E	
Jeur	a	5.0	6.2	7.3	9.3	14.2	16.1	15.5	14.2	10.5	6.4	5.6	4.8	9.6
	m	C/N	C/N	C/N	NW/W	NW	W	W	W	W/NW	C/N/NE	C/E	C/E	
	e	C/E/S	W	W/N	W/NW	W/NW	W	W	W	W	E/NE	E	E/C	
Kolhapur	a	6.2	7.0	8.0	9.4	12.1	13.2	13.7	12.2	8.5	6.4	6.5	6.3	9.1
	m	C/E	C/E	C/W	W/C	W	W	W	W	W/C	C/E	C/E	C/E	
	e	E	W	W	W	W	W	W	W	W	W/E	E	E	

TABLE – 1 (contd…..)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
Malegaon	a	4.0	5.0	6.1	8.0	11.6	12.3	11.6	10.1	7.1	4.8	3.9	3.4	7.3
	m	C/W/NW	C/W/NW	C/NW	C/NW	W	W	W	W/C	C/W	C/NW	C/W/NW	C/NW	
	e	C/NE	C/NE/NW	C/NW/N	NW/C	NW	W	W	W	NW/W	NE/C	C/NE	C/NE	
Nandurbar	a	5.7	7.3	7.4	9.8	14.6	15.4	13.2	12.3	9.8	6.0	4.8	5.3	9.3
	m	SE/E	SW/SE	SW	SW	SW	SW	SW	SW	SW	SW	SE	SE/E	
	e	NE/SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SE/NE	NE/C	
Ozar	a	6.7	8.4	10.4	12.7	17.1	18.9	18.7	17.5	11.9	6.9	5.9	5.6	11.7
	m	C/Var	C/NW	C/NW	NW	W/NW	W	W	W	W	C/NW	C/E	C	
	e	W/NW	W	NW	NW	NW/W	W	W	W	W	NW	C/E	C/E	
Pune	a	2.7	3.7	4.8	6.5	9.9	11.9	11.2	10.0	6.5	3.5	2.9	2.5	6.3
	m	C	C	C	C/W	W	W	W	W	W	C/W	C	C	
	e	C/W	W	W	W	W	W	W	W	W	C/W	C/E	C/E	
Sangli	a	4.3	5.2	6.1	7.9	10.6	12.7	12.8	12.0	8.6	5.8	4.7	4.9	8.0
	m	C/Var	C/W/NW	C/W	C/W	W	W	W	W	W	C/W	C/E	C/E	
	e	C/E	C/W	W	W	W	W	W	W	W	C/W	C/E/NE	C/E	
Solapur	a	7.0	7.1	7.4	8.0	10.1	10.6	10.2	9.4	7.8	7.8	8.5	7.6	8.5
	m	SE/C	C/NE/SE	C/NE/SE	C/NW/N	NW	SW	SW	SW/W	W/C	C/NE	C/NE	C/E/SE	
	e	C/SE	C/SE	C/SE/SW	C/NW/NE	NW/W	SW/W	SW/W	W/SW	W	NE/C	NE/C	C/E	
Sub-Div.Means	a	5.6	6.6	7.6	9.4	13.2	14.4	13.4	12.3	9.1	6.2	5.7	5.4	9.1
HILL STATION														
Mahabaleswar	a	9.9	10.7	12.7	13.4	14.1	17.8	22.0	20.1	13.4	12.1	13.8	12.5	14.4
	m	NE	NE	NE	NE	NE	SW	SW	SW	SW	NE	NE	NE	
	e	NE/NW	NW	NW	NW	NW	SW	SW	SW	SW	NE	NE	NE	

TABLE – 1 (contd…..)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MARATHWADA														
Aurangabad	a	6.5	8.1	9.4	10.5	16.0	18.7	16.9	15.2	11.1	7.4	5.9	5.6	10.9
	m	E	E/C	E/C	W	W	W	W	W	W	E/C	E	E	
	e	W/E	W	W	W	W	W	W	W	W	NE	E	E	
Aurangabad/	a	6.1	7.6	9.6	12.0	17.5	20.6	18.0	17.8	12.6	7.6	6.3	5.5	11.8
Chikalthana	m	C/E	C/W	C/W/NW	W/NW	W/NW	W	W	W	W	C/E	C/E	C/E/SE	
	e	W/C	W	W/NW	NW	NW	W	W	W	W	NE/N	E/NE	E	
Beed	a	2.7	3.4	4.2	5.7	8.7	9.3	8.4	7.6	5.1	3.8	3.2	2.6	5.4
	m	C/SE	C/SW	C/NW	NW	NW	NW/SW	SW	SW/NW	NW/C	C/NW	C/SE	C/SE	
	e	NE/C	C/NE/NW	NW/C	NW	NW	NW	NW/SW	NW	NW/C	NE	NE	NE	
Nanded	a	4.0	4.1	4.5	5.1	7.0	9.9	8.4	7.6	5.7	3.9	4.1	3.4	5.6
	m	C/Var	C/W	C/W	C/W	W/NW	W/SW	SW/W	W	W/C	C/W	C/Var	C/Var	
	e	C/NE	C/NE/W	C/W/NW	C/NW	C/NW	SW/C	SW/C	W/C	C/SW	C/NE	C/NE	C/NE	
Osmanabad	a	11.1	11.6	7.7	12.6	10.0	9.4	10.7	13.5	9.7	9.5	6.2	5.9	9.8
	m	SE	SE/NE	NE/SE	NE/SE	NW	W	W	W/NW	NW	NE/SE	SE	SE	
	e	E	W	W	W/N	W/N	W	W	W	W	E	E	E	
Parbhani	a	4.4	5.3	6.1	6.9	9.9	12.0	10.8	9.3	7.1	5.2	4.8	4.0	7.2
	m	C/NE/W	C/W	W	W/NW	W/NW	W	W	W	W	C/NE/W	C/NE	C/NE	
	e	C/NE	C/W/NE	C/W	W/NW	NW	W	W	W	W/NW	NE	NE	C/NE/E	
Sub-Div.Means	a	5.8	6.6	6.9	8.8	11.5	13.3	12.2	11.8	8.5	6.2	5.0	4.5	8.4

TABLE – 1 (contd…..)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
VIDARBHA														
Akola	a	4.2	4.7	5.6	6.7	11.3	12.3	10.1	9.9	7.6	4.2	3.5	3.6	7.0
	m	C/E	C/E	C/E/W	W	W	W	W	W	W	C/W	C/E	C/E	
	e	C/NE/NW	C/W/NW	C/W/NW	NW	W/NW	W	W	W	W/NW	C/NE/NW	C/NE	C/NE	
Akola (A)	a	7.6	7.9	8.8	9.9	14.0	15.8	13.3	12.5	9.3	7.0	7.1	6.9	10.0
	m	E/NE	E/NE	W/SW	W	W	W	W	W	W	W/E	E	E	
	e	NE/NW	NW	NW/W	W	W/NW	W	W	W	W	NW/NE	NE	NE/N	
Amravati	a	8.7	9.2	9.4	9.9	11.8	15.4	14.1	12.6	9.5	7.5	8.2	8.2	10.4
	m	NE	NE	NE	SW	W	W/SW	SW/W	SW/W	SW/W	NE	NE	NE	
	e	NW/SE	SW	SW	SW/W	NW/SW	SW	SW	SW	SW/NW	NE/N	NE	NE/SE	
Buldhana	a	6.9	7.6	8.4	9.9	12.8	13.0	11.4	9.7	8.5	6.1	5.7	6.0	8.8
	m	NW/SE	NW	NW	NW	NW	NW	SW/NW	NW	NW	NW	SE/S	SE/S	
	e	NW/NE	NW	NW	NW	NW	NW	NW	NW	NW	NW	NE/NW	NE	
Brahmapuri	a	3.7	4.5	5.1	6.7	7.6	8.7	8.2	7.3	4.9	3.3	3.3	3.2	5.5
	m	N/C	N/C	S/N	S	S	W	W	W	S/W	C/N	N/C	N/C	
	e	C/N/S	N	N	S/N	N/S	W/S	W/S	W/C	C/N/W	N/C	N/C	N/C	
Chandrapur	a	4.4	6.0	6.9	9.2	11.4	14.2	10.1	9.4	6.7	4.2	4.1	3.9	7.5
	m	E/C	E/SE	SE/E	S/SE	NW/S	W	W	W	W/NW	C/N/NW	C/E/N	C/N/E	
	e	E/NE	E/N	N/NW	S/NW	NW/N	W/NW	W	W	W/NW	E	E/NE	NE/E	
Gondia	a	1.9	2.5	3.1	3.8	4.6	5.4	5.2	5.0	3.3	2.3	1.7	1.5	3.4
	m	C/N	C/N	C/N	C/SW	SW/NW	SW	SW	SW	C/SW	C/N	C/N	C/N	
	e	C/N	C/N	C/SW	C/SW/NW	NW/N	SW/W	SW	SW	C/SW/N	C/N	C/N	C/N	

TABLE – 1 (contd…..)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
Nagpur/Sonegaon	a	7.1	8.3	8.7	9.5	13.0	13.5	11.2	10.9	9.1	7.5	7.3	6.6	9.4
	m	N/C	N/NE	N/NE	NW/N	NW	W/NW	W/SW	W	NW/W	N/NW	N/NE	N	
	e	E/C	NE/E	NW/SW	NW/W	NW	W	W	W	W/NW	NE/E	NE	E	
Pusad	a	3.5	4.7	5.0	6.1	9.1	11.4	10.0	8.5	6.4	4.3	3.8	3.0	6.3
	m	C/NW	C/NW	C/NW	NW/C	NW	NW/SW	SW	SW	NW	C/NW	C/NW	C/NW	
	e	C/NE	C/NE/NW	NW/SW	NW	NW	SW/NW	SW/NW	NW/SW	NW	NE	NE/C	NE/C	
Sironcha	a	3.5	4.5	5.1	6.5	6.8	7.2	6.0	5.5	4.5	3.9	3.6	2.8	5.0
	m	SE/E	SE	SE	SE	SE	W/SW	SW/W	W/SW	SE/SW	SE/N	N/NE	N/C	
	e	E/SE	SE/E	SW/SE	SW/SE	NW/SE	SW/W	SW/W	W/SW	SE/W	NE/E	NE/M	C/N/NE	
Wardha	a	4.5	5.4	5.9	6.6	9.0	10.5	9.2	8.8	6.5	4.7	4.9	4.3	6.7
	m	NE/E	NE/E	NE/E	W/SW	W	W	W/SW	W	W	NE/E	NE	NE	
	e	E/NE	W/E	W/NW	W/NW	W/NW	W	W	W	W/NW	NE/C	NE/E	NE/E	
Yavatmal	a	7.7	8.6	9.3	11.1	15.1	18.7	17.2	15.7	10.5	6.5	6.8	6.9	11.2
	m	E	E/NE	NE/E	W/NW	W/NW	W	W	W	W	NE/N	NE/E	E	
	e	NE	NE/W	W	W	W/NW	W	W	W	W	NE	NE	NE	
Sub-Div. Means.	a	5.3	6.1	6.7	7.9	10.5	12.1	10.5	9.6	7.2	5.1	5.0	4.7	7.6

a : Mean wind speed in kms per hour
m : Predominant wind direction in the morning
e : Predominant wind direction in the evening
Var : Variable
C : Calm
Hill station not considered for subdivisional means

TABLE - 2
MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE (^{0}C)

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN														
Alibag	Max.	28.6	28.9	30.5	31.6	32.3	31.1	29.5	29.1	29.8	31.9	32.0	30.2	30.5
	Min.	17.3	18.1	21.1	24.0	26.4	26.0	25.2	24.8	24.4	23.6	21.0	18.9	22.6
Bhira	Max.	33.6	35.4	38.5	39.9	38.6	31.8	27.7	27.1	29.6	33.7	34.0	33.2	33.6
	Min.	14.6	15.1	18.5	22.2	24.0	23.8	21.8	22.6	22.4	21.4	18.6	17.0	20.1
Dahanu	Max.	27.5	28.2	30.4	32.3	33.4	32.5	30.3	29.7	30.3	32.3	32.0	29.7	30.7
	Min.	16.5	17.4	20.7	24.0	26.8	26.5	25.2	24.8	24.1	23.2	20.6	18.1	22.3
Devgarh	Max.	30.0	30.0	30.9	32.0	32.8	30.4	28.9	28.4	29.0	31.0	32.1	31.3	30.6
	Min.	20.2	21.0	23.3	25.6	26.6	24.7	24.3	24.0	23.8	23.8	22.3	21.0	23.4
Harnai	Max.	28.1	28.0	29.1	30.0	30.7	30.1	28.8	28.2	28.7	30.6	31.6	29.9	29.5
	Min.	21.3	21.7	23.6	25.5	26.8	25.5	24.6	24.5	24.5	24.9	24.2	22.9	24.2
Mumbai/Colaba	Max.	29.4	29.5	31.0	32.2	33.3	32.0	30.0	29.7	30.4	32.5	32.9	31.4	31.2
	Min.	19.2	20.0	22.7	25.0	26.9	26.3	25.3	25.0	24.8	24.8	23.1	21.0	23.7
Mumbai/Santacruz	Max.	30.4	31.1	32.6	33.0	33.3	32.0	29.9	29.5	30.2	33.1	33.4	31.9	31.7
	Min.	16.6	17.7	20.9	23.8	26.2	26.0	24.9	24.6	24.2	23.4	20.8	18.5	22.3
Ratnagiri	Max.	30.9	30.8	31.5	32.2	32.7	30.6	29.0	28.6	29.4	31.9	33.1	32.4	31.1
	Min.	18.9	19.5	22.3	25.1	26.4	24.8	24.2	24.0	23.6	23.5	21.5	20.3	22.8
Vengurla	Max.	31.7	31.8	32.2	32.9	33.2	30.5	29.2	29.0	29.6	31.7	33.2	32.7	31.5
	Min.	17.6	18.1	21.0	23.8	25.4	24.3	24.0	23.9	23.3	22.8	20.6	18.6	22.0
Sub Div. Means	Max.	30.0	30.4	31.8	32.9	33.3	31.2	29.2	28.8	29.6	32.0	32.7	31.4	31.1
	Min.	18.0	18.7	21.5	24.3	26.1	25.3	24.3	24.2	23.9	23.4	21.4	19.5	22.6
MADHYA MAHARASHTRA														
Ahmednagar	Max.	30.8	33.3	36.7	39.5	39.6	34.1	30.4	29.6	31.0	32.8	31.0	30.2	33.2
	Min.	12.2	14.0	17.9	21.6	22.6	22.3	21.6	20.9	20.2	18.9	15.4	12.5	18.3
Baramati	Max.	30.1	32.9	36.6	38.9	38.9	33.3	30.0	29.4	30.8	32.3	30.6	29.4	32.8
	Min.	13.0	14.8	18.7	22.2	22.9	22.7	22.2	21.5	21.0	20.0	16.3	13.6	19.1
Jalgaon	Max.	30.3	33.3	38.0	41.7	42.7	38.2	33.2	31.1	32.8	35.0	32.6	30.1	34.9
	Min.	11.9	13.9	18.7	24.3	27.0	25.8	24.1	23.4	22.8	19.4	15.3	12.6	19.9
Jeur	Max.	31.1	34.0	37.7	40.1	40.5	35.6	32.2	31.1	31.9	32.9	31.2	30.2	34.0
	Min.	12.8	14.7	18.9	22.9	23.8	22.6	21.6	21.1	20.7	19.4	16.6	13.7	19.1
Kolhapur	Max.	30.7	33.2	36.1	37.5	36.0	30.2	26.9	26.6	28.8	31.4	30.6	29.8	31.5
	Min.	14.6	16.1	19.3	21.5	22.3	22.0	21.4	21.0	20.7	20.1	17.3	15.2	19.3
Malegaon	Max.	30.0	32.3	36.6	39.7	40.6	35.9	31.4	30.2	31.7	33.6	31.6	29.8	33.6
	Min.	10.9	12.2	16.8	21.3	24.0	23.9	22.7	21.9	20.9	18.5	14.6	11.7	18.3
Miraj	Max.	31.0	33.4	36.5	38.1	37.2	31.5	28.5	28.4	30.1	31.9	30.9	30.3	32.3
	Min.	13.3	14.9	18.4	21.2	22.4	22.0	21.5	21.1	20.5	19.9	16.2	14.0	18.8
Nandurbar	Max.	30.2	32.8	37.0	40.1	40.3	36.2	31.2	29.9	31.9	35.2	33.1	30.3	34.0
	Min.	15.4	17.3	21.5	24.7	25.8	25.4	24.0	23.2	23.0	22.2	19.1	16.4	21.5

TABLE - 2 (Contd….)
MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE (^{0}C)

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Ozar	Max.	28.9	31.2	35.1	37.8	37.8	33.1	29.0	27.7	29.6	32.2	30.4	28.6	31.8
	Min.	10.1	11.6	15.9	19.5	21.5	22.4	21.6	20.8	19.8	17.4	13.3	10.8	17.1
Pune	Max.	29.8	32.3	35.8	37.9	37.2	32.0	28.4	27.5	29.3	31.7	30.2	29.1	31.8
	Min.	10.8	12.1	16.0	20.2	22.4	22.9	22.1	21.4	20.6	18.4	14.2	11.6	17.7
Satara	Max.	28.4	31.4	34.2	35.4	35.8	30.3	26.5	25.1	27.0	28.8	27.8	27.7	29.9
	Min.	13.6	14.9	19.3	21.2	22.4	22.3	21.4	20.8	19.9	18.9	15.1	14.4	18.7
Solapur	Max.	30.9	34.1	37.6	39.9	40.2	35.0	31.8	31.1	31.9	32.7	31.1	30.1	33.9
	Min.	16.1	18.3	21.9	24.8	25.3	23.4	22.5	21.9	21.7	21.0	18.1	15.9	20.9
Sub Div. Means	Max.	30.1	32.8	36.4	38.8	38.9	33.7	29.9	28.9	30.5	32.5	30.9	29.6	32.8
	Min.	12.8	14.5	18.6	22.1	23.5	23.1	22.2	21.5	20.9	19.5	15.9	13.5	19.0
HILL STATION														
Mahabaleswar	Max.	25.8	28.0	30.2	31.4	29.9	22.5	19.6	19.3	21.1	25.0	25.0	24.7	25.2
	Min.	13.1	14.5	17.2	18.7	18.1	16.9	16.5	16.4	16.0	16.3	14.8	13.8	16.0
Hill station not considered for sub divisional mean.														
MARATHWADA														
Aurangabad	Max.	29.7	32.4	36.1	39.2	40.0	35.1	30.6	29.3	30.6	32.9	31.0	29.1	33.0
	Min.	14.0	16.0	20.0	23.4	24.2	22.9	21.8	21.1	20.8	19.6	16.5	13.9	19.5
Aurangabad/	Max.	28.9	31.7	35.6	38.6	39.6	34.9	30.6	29.3	30.5	32.1	30.0	28.4	32.5
Chikalthana	Min.	10.7	12.8	17.5	21.7	23.6	22.6	21.5	20.8	20.3	17.8	13.5	10.7	17.8
Beed	Max.	30.2	32.8	36.5	39.6	40.3	35.8	31.6	30.6	31.4	32.6	30.5	29.0	33.4
	Min.	12.5	14.3	18.2	22.7	24.7	24.0	23.1	22.4	21.7	19.4	15.0	12.3	19.2
Nanded	Max.	30.7	33.9	37.7	40.7	41.8	37.1	32.5	31.2	31.9	33.1	31.1	30.0	34.3
	Min.	13.4	15.7	19.1	23.0	25.6	23.8	22.5	21.9	21.8	19.4	15.0	12.5	19.5
Osmanabad	Max.	28.9	31.7	35.7	37.9	39.0	33.7	30.0	29.1	29.2	29.9	28.9	28.6	31.9
	Min.	15.3	17.1	20.5	23.2	24.7	22.5	21.1	20.7	20.7	19.0	15.3	14.7	19.6
Parbhani	Max.	29.9	33.2	37.3	40.4	41.6	36.5	32.0	30.7	31.5	32.6	30.6	29.1	33.8
	Min.	14.2	16.6	20.5	24.2	26.3	24.4	23.1	22.5	22.2	20.2	16.3	13.9	20.4
Sub Div. Means	Max.	29.7	32.6	36.4	39.4	40.3	35.5	31.2	30.0	30.8	32.2	30.3	29.0	33.1
	Min.	13.3	15.4	19.3	23.0	24.8	23.3	22.1	21.5	21.2	19.2	15.2	13.0	19.3

TABLE - 2 (Contd….)
MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE (^{0}C)

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
VIDARBHA														
Akola	Max.	29.7	32.8	37.2	40.8	42.0	37.5	32.3	30.5	32.3	34.0	31.5	29.3	34.2
	Min.	13.7	15.7	20.0	24.7	27.8	26.1	24.2	23.4	23.1	20.2	16.1	13.4	20.7
Akola (A)	Max.	30.0	33.0	37.5	41.2	42.5	37.7	32.5	30.5	32.5	34.2	31.7	29.5	34.4
	Min.	12.5	14.9	19.3	24.0	26.9	25.0	23.1	22.5	22.1	19.1	14.9	12.1	19.7
Amravati	Max.	29.3	32.4	36.9	40.6	42.2	37.2	31.6	29.9	31.7	33.4	31.1	28.9	33.8
	Min.	15.4	17.6	21.4	25.3	27.6	25.8	23.7	23.1	22.9	21.3	18.1	15.4	21.5
Buldhana	Max.	27.3	29.8	33.9	37.3	38.2	33.8	29.1	27.4	28.9	30.7	28.7	27.0	31.0
	Min.	15.0	16.9	20.9	24.5	25.1	23.1	21.7	20.8	20.9	20.4	17.4	15.2	20.1
Brahmapuri	Max.	28.7	31.9	36.4	40.3	42.3	37.3	31.1	30.0	31.2	32.3	30.3	28.0	33.3
	Min.	13.5	15.9	19.9	24.6	27.2	26.1	23.8	23.5	23.4	21.1	16.0	12.8	20.7
Chandrapur	Max.	29.8	33.1	37.5	40.9	42.8	37.7	31.8	30.7	31.8	32.5	30.6	28.9	34.0
	Min.	14.4	16.9	21.1	25.6	28.2	26.8	24.5	24.0	23.8	21.0	15.9	12.8	21.3
Gondia	Max.	27.7	30.6	35.5	39.9	42.1	37.4	31.2	30.1	31.4	32.3	30.1	27.5	33.0
	Min.	13.5	15.8	20.0	24.9	28.1	26.7	24.3	24.0	23.9	21.3	16.6	13.2	21.0
Nagpur	Max.	28.6	31.4	35.6	40.1	42.5	37.6	31.8	30.5	32.0	33.0	30.7	28.1	33.5
(Mayo Hospital)	Min.	14.0	16.5	20.5	25.2	28.6	26.7	24.3	23.4	23.2	20.8	16.8	13.9	21.2
Nagpur/Sonegaon	Max.	28.6	31.7	36.3	40.3	42.4	37.6	31.8	30.4	31.9	32.8	30.5	28.0	33.5
	Min.	12.7	15.0	19.0	24.0	27.7	26.2	24.1	23.6	22.9	19.7	15.1	12.3	20.2
Pusad	Max.	30.6	33.6	37.8	41.0	42.5	37.7	32.8	31.2	32.5	33.5	31.3	29.7	34.5
	Min.	12.7	15.3	19.6	24.6	27.8	25.8	23.8	23.4	22.8	19.8	14.8	12.0	20.2
Sironcha	Max.	30.3	33.6	37.6	40.4	42.2	37.3	32.1	31.1	32.2	32.8	31.0	29.4	34.2
	Min.	15.5	18.8	22.4	26.3	28.4	26.2	24.6	24.1	23.6	21.9	17.9	14.6	22.0
Wardha	Max.	28.8	32.0	36.7	40.9	42.7	37.1	31.7	30.1	31.7	32.8	30.4	28.2	33.6
	Min.	14.3	16.7	20.4	24.5	27.5	25.6	23.5	22.8	22.5	20.0	16.3	13.5	20.6
Yavatmal	Max.	28.8	32.0	36.5	40.2	41.8	36.7	31.0	29.3	30.9	31.9	29.8	27.9	33.1
	Min.	15.5	17.5	21.6	25.3	27.6	24.9	23.1	22.4	22.0	20.4	17.3	15.0	21.1
Sub Div. Means	Max.	29.0	32.1	36.5	40.3	42.0	37.1	31.6	30.1	31.6	32.7	30.5	28.4	33.5
	Min.	14.0	16.4	20.4	24.8	27.5	25.7	23.7	23.1	22.8	20.5	16.4	13.5	20.7

TABLE - 3
MEAN RELATIVE HUMIDITY (%)

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN														
Alibag	M	72	71	74	75	76	86	89	89	89	81	72	72	79
	E	64	64	66	72	75	83	86	85	81	73	66	65	73
Bhira	M	74	75	68	72	73	89	95	96	95	83	72	70	80
	E	40	34	32	38	48	78	91	91	85	71	64	59	61
Dahanu	M	66	65	67	73	75	83	88	88	87	76	66	66	75
	E	67	66	64	67	70	77	84	83	78	70	69	70	72
Devgarh	M	71	72	77	76	76	87	89	90	90	83	69	67	79
	E	60	64	67	69	69	82	87	87	84	77	65	60	73
Harnai	M	59	61	68	76	78	87	88	89	87	75	59	57	74
	E	70	73	75	78	79	84	87	86	83	78	70	68	78
Mumbai/Colaba	M	75	74	75	75	73	82	87	88	87	83	76	75	79
	E	62	60	62	67	68	77	84	83	79	72	65	64	70
Mumbai/Santacruz	M	64	62	64	69	69	81	87	87	86	74	61	61	72
	E	49	47	51	60	65	75	83	82	77	65	56	53	64
Ratnagiri	M	65	66	72	73	74	87	90	90	89	78	62	59	75
	E	57	59	64	68	69	82	87	86	82	73	63	58	71
Vengurla	M	80	79	78	73	73	87	88	90	90	86	77	77	82
	E	57	59	62	65	67	82	86	85	81	76	64	60	70
Sub Div. Means	M	70	69	71	74	74	85	89	90	89	80	68	67	77
	E	58	58	60	65	68	80	86	85	81	73	65	62	70
MADHYA MAHARASHTRA														
Ahmednagar	M	58	49	38	36	49	75	82	83	82	68	62	62	62
	E	34	28	21	20	27	57	69	70	65	48	45	41	44
Baramati	M	60	51	42	45	56	73	79	80	80	69	63	63	63
	E	32	24	19	22	28	53	64	65	60	43	40	37	41
Jalgaon	M	62	50	42	40	56	73	85	89	85	68	61	66	65
	E	32	24	18	16	21	45	65	73	60	38	34	38	39
Jalgaon	M	62	50	42	40	56	73	85	89	85	68	61	66	65
	E	32	24	18	16	21	45	65	73	60	38	34	38	39
Jeur	M	63	54	49	52	58	76	81	85	85	71	68	66	67
	E	39	32	29	27	27	53	64	66	62	48	47	42	45
Kolhapur	M	67	59	57	66	74	85	91	91	88	77	67	67	74
	E	33	26	29	40	50	72	83	83	75	56	44	38	52
Malegaon	M	61	49	39	34	49	71	80	82	80	64	60	65	61
	E	31	21	18	17	25	50	67	70	62	38	34	35	39
Miraj	M	67	62	62	67	74	83	87	87	86	77	70	69	74
	E	36	32	30	31	42	66	76	75	68	52	45	42	50

TABLE - 3 (Contd…)
MEAN RELATIVE HUMIDITY (%)

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Nandurbar	M	51	45	43	48	61	73	85	88	82	59	49	50	61
	E	34	27	24	25	31	52	73	77	65	39	38	36	43
Ozar	M	61	51	41	41	57	75	85	87	84	67	59	64	64
	E	30	23	19	21	31	59	76	79	70	44	36	36	44
Pune	M	76	64	50	47	58	75	83	85	83	76	72	75	70
	E	32	24	21	25	37	63	76	78	72	49	41	38	46
Satara	M	68	53	44	46	54	77	83	86	83	74	70	71	67
	E	36	26	27	37	45	69	78	80	72	54	46	42	51
Solapur	M	59	48	42	48	59	76	81	82	80	68	62	62	64
	E	31	25	22	23	27	49	60	60	55	41	36	35	39
Sub Div. Means	M	63	53	46	48	59	76	84	85	83	70	64	65	66
	E	33	26	23	25	33	57	71	73	66	46	41	38	44
HILL STATION														
Mahabaleshwar	M	56	44	39	40	61	97	100	100	96	72	63	63	69
	E	49	38	41	52	68	94	99	100	97	76	64	58	70
Hill station not considered for sub divisional mean														
MARATHWADA														
Aurangabad	M	54	44	36	34	47	75	85	87	82	60	56	57	60
	E	30	22	19	19	23	49	68	70	64	41	35	35	40
Aurangabad/	M	56	45	36	33	47	73	83	85	79	58	55	57	59
Chikalthana	E	31	25	22	20	24	49	66	69	60	40	37	37	40
Beed	M	69	60	50	45	52	74	81	82	84	73	68	72	68
	E	39	33	30	27	29	51	64	66	64	49	45	44	45
Nanded	M	62	50	41	37	43	68	79	81	79	69	64	65	62
	E	36	28	24	23	26	47	65	69	64	49	42	41	43
Osmanabad	M	66	55	52	50	59	83	90	91	90	73	65	67	70
	E	45	38	40	38	38	66	76	78	77	60	53	48	55
Parbhani	M	56	44	35	34	42	70	80	82	80	66	59	58	59
	E	31	23	19	19	21	46	62	65	61	44	39	37	39
Sub Div. Means	M	61	50	42	39	48	74	83	85	82	67	61	63	63
	E	35	28	26	24	27	51	67	70	65	47	42	40	44

TABLE - 3 (Contd….)
MEAN RELATIVE HUMIDITY (%)

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
VIDARBHA														
Akola	M	58	45	36	32	42	67	80	84	79	64	58	59	59
	E	31	24	19	17	20	44	66	70	59	41	37	36	39
Akola (A)	M	54	43	32	30	40	65	79	83	78	61	52	55	56
	E	30	24	17	15	17	42	64	69	59	39	34	34	37
Amravati	M	49	41	35	34	42	68	82	85	79	59	49	51	56
	E	29	24	21	18	23	48	67	72	62	39	33	34	39
Buldhana	M	56	47	40	39	52	74	84	87	83	62	57	57	62
	E	36	29	24	23	26	49	70	76	66	45	41	40	44
Brahmapuri	M	75	65	51	45	43	67	85	87	85	79	74	75	69
	E	42	33	24	21	23	50	75	77	72	55	45	43	47
Chandrapur	M	72	60	45	40	39	65	81	84	82	76	73	74	66
	E	37	29	22	20	21	49	70	74	70	58	49	44	45
Gondia	M	69	59	46	36	35	63	84	85	82	74	67	69	64
	E	41	32	23	18	19	48	76	78	71	53	44	44	46
Nagpur/Sonegaon	M	65	52	38	32	33	62	82	84	80	67	61	65	60
	E	39	30	21	18	20	48	71	75	68	50	45	44	44
Pusad	M	63	53	43	38	40	65	78	81	78	69	68	68	62
	E	36	29	25	23	24	47	65	70	61	47	41	39	42
Sironcha	M	75	68	57	56	50	67	84	86	83	77	74	76	71
	E	42	33	25	25	25	50	72	75	70	58	51	47	48
Wardha	M	58	47	36	31	35	66	82	85	81	65	56	55	58
	E	35	26	19	17	20	48	68	73	66	46	39	36	41
Yavatmal	M	50	41	32	29	35	66	82	85	78	61	50	50	55
	E	32	25	19	17	19	47	69	74	66	47	39	37	41
Sub Div. Means	M	62	52	41	37	41	66	82	85	81	68	62	63	62
	E	36	28	22	19	21	48	69	74	66	48	42	40	43

M: Morning
E: Evening

TABLE - 4

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 0830 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN														
Alibag	a	21	19	20	12	3	0	1	0	1	10	16	17	120
	b	0	0	0	0	1	11	20	20	9	3	1	1	66
	c	1.0	0.7	1.1	1.8	3.3	6.0	7.1	7.1	5.5	2.7	1.6	1.5	3.3
Bhira	a	23	24	25	22	14	5	4	5	5	15	22	21	185
	b	1	0	0	0	1	13	23	22	12	2	1	1	76
	c	0.8	0.5	0.6	1.0	1.8	5.2	7.0	6.7	5.0	2.1	1.2	1.2	2.8
Dahanu	a	21	19	20	13	5	2	0	2	2	11	18	18	131
	b	1	0	0	1	2	9	16	16	7	2	1	1	56
	c	1.1	1.0	1.2	1.9	3.3	5.8	6.9	6.9	5.2	2.4	1.7	1.5	3.2
Devgarh	a	18	17	14	4	1	1	0	1	0	6	12	14	88
	b	0	0	0	1	3	14	18	15	9	4	2	1	67
	c	1.4	1.1	1.7	3.1	4.1	6.5	7.0	6.6	5.7	3.8	2.5	2.2	3.8
Harnai	a	22	21	20	12	6	1	2	2	1	11	18	19	135
	b	0	0	0	1	2	11	15	15	8	3	1	1	57
	c	1.0	0.8	1.3	2.2	3.4	6.0	7.0	6.9	5.7	3.2	1.9	1.7	3.4
Mumbai /Colaba	a	17	16	14	8	0	0	0	0	0	5	12	13	85
	b	0	0	0	0	1	9	15	15	6	2	1	0	49
	c	1.4	1.2	1.7	2.6	3.7	6.0	7.0	7.0	5.8	3.3	2.1	1.9	3.6
Mumbai/Santacruz	a	18	17	17	8	1	0	0	1	0	7	13	13	95
	b	0	0	0	0	1	8	14	12	6	1	1	0	43
	c	1.4	1.1	1.5	2.5	4.2	6.3	7.2	7.1	6.1	3.2	2.1	1.9	3.7
Ratnagiri	a	18	17	13	6	1	0	0	0	0	5	11	13	84
	b	0	0	0	1	3	13	17	17	9	3	2	1	66
	c	1.5	1.3	1.9	3.2	4.4	6.7	7.3	7.2	6.2	4.0	2.6	2.3	4.1
Vengurla	a	22	22	20	12	5	0	1	2	1	8	13	19	125
	b	0	0	0	1	2	15	15	13	10	4	2	1	63
	c	1.1	0.7	1.3	2.3	3.6	6.5	6.9	6.6	5.5	3.3	2.2	1.7	3.5
Sub Div. Means	a	20.0	19.1	18.1	10.8	4.0	1.0	0.9	1.4	1.1	8.7	15.0	16.3	116.4
	b	0.2	0.0	0.0	0.5	1.7	11.4	17.0	16.1	8.4	2.6	1.3	0.7	60.3
	c	1.1	0.9	1.3	2.2	3.5	6.1	7.0	6.9	5.6	3.1	1.9	1.7	3.4

TABLE - 4 (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 0830 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Ahmednagar	a	23	23	24	21	20	5	2	3	6	15	19	20	181
	b	1	0	0	1	2	7	11	10	7	3	3	2	47
	c	1.1	0.7	0.9	1.4	1.6	5.0	6.2	6.0	4.6	2.4	1.9	1.7	2.8
Baramati	a	21	22	22	18	15	4	1	2	3	11	16	18	153
	b	0	0	0	0	1	3	6	6	3	1	1	1	22
	c	1.0	0.6	0.8	1.2	1.7	4.4	5.4	5.3	4.1	2.3	1.7	1.5	2.5
Jalgaon	a	18	20	20	18	17	2	1	1	2	12	16	17	144
	b	1	0	0	1	1	6	13	16	8	2	2	2	52
	c	1.7	1.2	1.4	1.5	1.5	4.7	6.6	6.9	5.3	2.5	2.0	2.1	3.1
Jeur	a	20	21	21	16	14	4	3	4	5	11	14	17	150
	b	0	0	0	0	1	4	6	5	3	2	1	1	23
	c	1.3	0.9	1.1	1.6	2.0	4.5	5.1	5.0	4.3	2.7	2.1	1.8	2.7
Kolhapur	a	19	18	19	12	5	0	1	0	0	7	12	14	107
	b	0	0	0	0	1	8	12	12	5	2	1	1	42
	c	1.5	1.0	1.2	1.9	3.2	6.2	6.9	6.8	5.7	3.5	2.6	2.2	3.6
Malegaon	a	21	23	24	21	22	8	2	1	7	17	19	21	186
	b	1	0	0	0	1	5	13	14	6	2	2	2	46
	c	1.1	0.7	0.9	1.0	0.9	3.6	5.6	5.6	3.8	1.7	1.5	1.4	2.3
Miraj	a	19	18	19	14	8	1	1	2	2	8	12	14	118
	b	0	0	0	0	1	8	10	9	6	2	2	1	39
	c	1.8	1.5	1.5	2.3	3.4	6.2	6.8	6.6	5.7	3.9	2.7	2.4	3.7
Nandurbar	a	28	26	27	27	24	10	5	5	12	24	23	26	237
	b	0	0	0	0	0	4	11	11	4	1	1	0	32
	c	0.5	0.3	0.4	0.4	0.8	3.4	5.6	5.2	3.2	0.9	1.1	0.7	1.9
Ozar	a	17	17	18	15	12	1	1	0	1	9	14	14	119
	b	0	0	0	0	0	5	12	12	4	1	1	1	36
	c	1.5	1.1	1.3	1.5	1.9	5.5	6.8	6.8	5.2	2.6	2.1	2.0	3.2
Pune	a	17	18	18	13	8	0	0	1	1	8	13	13	110
	b	0	0	0	0	1	6	14	14	6	2	2	1	46
	c	1.9	1.4	1.5	2.0	3.0	6.2	7.1	7.0	6.0	3.4	2.7	2.6	3.7
Satara	a	17	20	21	18	13	5	1	1	1	9	15	14	135
	b	1	0	0	0	1	6	12	14	4	3	2	1	44
	c	1.4	0.9	1.1	1.2	2.0	5.4	6.6	6.9	5.2	3.0	2.0	2.0	3.1

TABLE - 4 (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 0830 HOURS IST

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MADHYA MAHARASHTRA														
Solapur	a	20	19	21	15	11	2	0	0	2	9	16	16	131
	b	0	0	0	0	1	5	9	8	6	2	1	1	33
	c	1.4	1.0	1.2	1.8	2.8	5.3	6.1	5.8	5.1	3.1	2.3	1.8	3.1
Sub Div. Means	a	20.0	20.4	21.2	17.3	14.1	3.5	1.5	1.7	3.5	11.7	15.8	17.0	147.5
	b	0.3	0.0	0.0	0.1	0.9	5.5	10.7	10.9	5.1	1.9	1.5	1.1	38.5
	c	1.3	0.9	1.1	1.4	2.0	5.0	6.2	6.1	4.8	2.6	2.0	1.8	2.9
HILL STATION														
Mahabaleshswar	a	23	23	23	18	11	7	9	9	7	12	17	19	178
	b	0	0	0	0	4	21	22	22	20	5	2	1	97
	c	1.0	0.7	0.8	1.2	3.0	7.4	8.0	8.0	6.9	2.8	1.7	1.4	3.6
MARATHWADA														
Aurangabad	a	18	17	18	16	14	3	0	1	2	10	12	14	125
	b	0	0	0	0	1	2	6	7	3	1	1	1	22
	c	1.7	1.2	1.4	1.7	1.9	4.8	6.2	6.1	4.9	2.8	2.3	2.1	3.1
Aurangabad/	a	17	17	18	15	14	1	1	0	2	8	14	14	121
Chikalthana	b	0	0	0	0	1	4	10	11	4	1	1	1	33
	c	1.8	1.2	1.4	1.6	1.9	5.0	6.6	6.6	5.2	2.9	2.3	2.2	3.2
Beed	a	19	19	21	18	15	4	0	0	2	9	15	15	137
	b	0	0	0	0	1	4	9	9	6	3	1	2	35
	c	1.6	1.1	1.3	1.6	2.1	4.9	6.0	5.8	5.1	3.2	2.2	2.2	3.1
Nanded	a	25	24	26	25	21	10	6	7	9	19	23	25	220
	b	1	0	0	0	1	6	11	9	6	2	1	1	38
	c	0.9	0.5	0.6	0.8	1.4	4.0	5.1	4.9	3.9	1.7	1.2	0.9	2.2
Osmanabad	a	23	22	24	22	17	4	0	0	2	12	19	20	165
	b	1	0	0	0	1	5	9	8	5	3	1	0	33
	c	1.0	0.7	0.8	0.9	1.7	4.8	5.8	5.6	4.8	2.6	1.4	1.3	2.6

TABLE - 4 (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 0830 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MARATHWADA														
Parbhani	a	18	18	19	16	13	5	1	1	1	10	15	15	132
	b	1	0	0	1	2	6	11	12	6	3	1	1	44
	c	1.6	1.3	1.4	1.7	2.3	4.7	6.0	6.0	4.7	2.9	2.2	2.0	3.1
Sub Div. Means	a	20.0	19.5	21.0	18.7	15.7	4.5	1.3	1.5	3.0	11.3	16.3	17.2	150.0
	b	0.5	0.0	0.0	0.1	1.1	4.5	9.3	9.3	5.0	2.1	1.0	1.0	34.1
	c	1.4	1.0	1.1	1.3	1.8	4.7	5.9	5.8	4.7	2.6	1.9	1.7	2.8
VIDARBHA														
Akola	a	19	20	21	19	21	6		1	5	17	19	19	169
	b	2	1	1	1	1	6	12	14	6	2	2	2	50
	c	1.5	1.1	1.2	1.3	1.6	4.3	6.0	6.1	4.2	2.0	1.7	1.7	2.7
Akola (A)	a	15	16	16	15	14	3	1	0	2	10	14	14	120
	b	1	0	0	0	0	5	11	14	5	1	1	1	39
	c	2.1	1.5	1.6	1.8	2.0	5.1	6.4	6.7	4.9	2.7	2.2	2.3	3.3
Brahmapuri	a	19	18	19	17	16	4	0	1	3	11	16	18	142
	b	3	2	2	2	2	11	20	19	11	4	2	2	80
	c	1.8	1.6	1.8	1.9	2.2	5.3	6.9	6.8	5.3	2.8	2.0	2.0	3.4
Buldhana	a	21	22	22	21	21	5	2	1	6	16	20	20	177
	b	1	1	1	1	1	9	17	18	10	4	2	2	67
	c	1.5	0.9	1.3	1.4	1.6	5.0	6.7	6.7	5.0	2.3	1.7	1.6	3.0
Chandrapur	a	18	16	18	14	12	2	0	2	3	10	16	16	127
	b	1	1	1	1	1	8	15	14	6	2	1	1	52
	c	1.7	1.4	1.5	1.7	2.3	5.1	6.5	6.3	4.9	2.7	1.7	1.9	3.1
Gondia	a	19	17	19	18	18	4	1	2	5	15	19	19	156
	b	2	2	1	1	1	7	17	14	7	2	2	2	58
	c	1.6	2.5	1.6	1.5	1.7	4.6	6.7	6.2	4.6	2.3	1.5	1.6	3.0
Nagpur/Sonegaon	a	15	13	15	14	11	1	0	0	1	8	13	14	105
	b	1	1	1	0	0	6	12	12	5	2	1	1	42
	c	2.1	1.9	1.8	1.9	2.4	5.3	6.8	6.8	5.3	2.8	2.2	2.2	3.5
Pusad	a	23	22	24	23	20	10	6	3	9	17	22	22	201
	b	1	0	1	0	1	4	7	9	4	3	1	1	32
	c	1.2	0.9	1.0	1.1	1.4	3.6	4.7	5.2	3.7	1.8	1.3	1.2	2.3

TABLE - 4 (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 0830 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
VIDARBHA														
Sironcha	a	14	12	15	12	8	2	1	0	1	6	12	13	96
	b	2	2	1	1	2	9	17	16	8	3	2	2	65
	c	2.2	2.1	1.9	2.4	2.9	5.3	6.6	6.6	5.2	3.4	2.6	2.2	3.6
Wardha	a	21	19	22	21	18	7	3	4	7	16	20	20	178
	b	2	2	1	1	2	9	15	16	7	3	2	2	62
	c	1.6	1.5	1.4	1.3	1.9	4.8	6.3	6.2	4.2	2.1	1.7	1.5	2.9
Yavatmal	a	17	16	18	16	11	3	0	0	2	10	14	14	121
	b	2	1	1	1	2	9	18	17	8	4	3	3	69
	c	1.8	1.5	1.6	1.9	2.3	5.1	6.6	6.6	4.9	2.8	2.1	2.2	3.3
Sub Div.	a	18.2	17.3	18.8	17.2	15.4	4.2	1.3	1.2	4.0	12.3	16.8	17.2	143.7
Means	b	1.5	1.0	0.9	0.8	1.1	7.2	14.3	14.5	6.8	2.5	1.6	1.6	54.4
	c	1.7	1.4	1.5	1.6	2.0	4.8	6.3	6.3	4.7	2.4	1.8	1.8	3.0

a : Days with clear sky
b : Days with sky overcast
c : Mean cloud amount
** : Okta = Unit, equal to area of one eighth of the sky used in specifying cloud amount. For example: 1 Okta means 1/8th of the sky covered.
Hill station not considered for subdivisional means.

TABLE - 4(a)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN														
Alibag	a	24	23	25	20	8	0	0	0	1	12	19	22	154
	b	0	0	0	0	1	12	20	19	8	2	1	0	63
	c	0.6	0.5	0.7	1.1	2.4	6.0	7.2	7.0	5.3	2.5	1.4	1.0	3.0
Bhira	a	24	24	26	23	19	7	3	4	4	15	20	22	191
	b	1	0	0	1	2	14	24	24	15	5	2	1	89
	c	0.7	0.5	0.5	0.8	1.6	5.6	7.1	6.8	5.9	2.8	1.5	1.1	2.9
Dahanu	a	21	20	22	18	8	3	1	1	2	13	17	18	144
	b	0	0	0	0	1	8	15	15	7	1	1	1	49
	c	1.0	0.8	1.0	1.3	2.1	5.4	6.8	6.7	4.8	2.2	1.7	1.5	2.9
Devgarh	a	18	18	17	10	4	0	0	1	1	4	11	12	96
	b	0	0	0	1	2	14	18	14	9	4	2	1	65
	c	1.2	0.9	1.2	1.9	3.2	6.3	7.1	6.7	5.7	3.8	2.6	2.2	3.6
Harnai	a	22	22	22	14	7	3	1	2	2	9	17	19	140
	b	0	0	0	1	1	10	16	15	8	3	1	1	56
	c	0.8	0.6	1.1	2.0	3.1	6.0	7.0	6.8	5.7	3.1	2.0	1.5	3.3
Mumbai /Colaba	a	17	18	18	13	5	0	1	1	0	6	13	14	106
	b	0	0	0	0	0	8	14	14	5	1	0	0	42
	c	1.2	0.9	1.0	1.4	2.6	5.9	7.0	6.9	5.5	2.9	2.0	1.8	3.3
Mumbai/Santacruz	a	17	18	18	13	4	1	0	1	0	6	12	13	103
	b	0	0	0	0	0	7	14	12	5	1	1	0	40
	c	1.3	0.9	1.2	1.5	3.0	6.1	7.2	7.1	5.8	3.0	2.2	2.0	3.4
Ratnagiri	a	16	17	15	8	2	0	0	0	0	4	10	13	85
	b	1	0	0	1	2	14	19	18	9	4	2	1	71
	c	1.5	1.2	1.7	2.9	4.6	6.8	7.4	7.3	6.4	4.4	3.0	2.4	4.1
Vengurla	a	23	23	21	14	7	0	1	3	1	6	13	19	131
	b	0	0	0	1	2	14	13	11	6	5	3	1	56
	c	1.1	0.6	1.2	1.9	3.1	6.6	6.9	6.6	5.5	4.0	2.7	1.8	3.5
Sub Div. Means	a	20.2	20.3	20.4	14.8	7.1	1.6	0.8	1.4	1.2	8.3	14.7	16.9	127.7
	b	0.2	0.0	0.0	0.5	1.2	11.2	17.0	15.7	8.0	2.8	1.4	0.6	59.0
	c	1.0	0.7	1.0	1.6	2.8	6.0	7.0	6.8	5.6	3.1	2.1	1.7	3.3

TABLE - 4(a) (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Ahmednagar	a	21	19	18	15	13	5	1	2	4	12	16	19	145
	b	1	0	1	2	2	7	12	10	8	4	3	2	52
	c	1.4	1.1	1.8	2.4	2.9	5.6	6.2	6.1	5.6	3.3	2.3	1.8	3.4
Baramati	a	17	16	14	8	6	1	1	0	0	4	13	15	95
	b	0	0	0	1	1	4	7	7	5	2	1	0	28
	c	1.2	0.9	1.7	2.6	2.9	5.0	5.9	5.9	5.2	3.4	2.2	1.7	3.2
Jalgaon	a	17	17	16	13	9	2	0	0	1	8	14	15	112
	b	0	0	1	0	1	5	12	14	5	1	1	1	41
	c	1.6	1.4	1.7	2.1	2.5	5.2	6.8	6.9	5.6	3.0	2.1	2.1	3.4
Jeur	a	17	16	13	8	6	2	2	2	1	6	12	15	100
	b	0	0	0	1	1	4	7	5	4	2	1	1	26
	c	1.6	1.3	2.4	3.3	3.5	5.3	5.7	5.6	5.3	3.8	2.4	2.0	3.5
Kolhapur	a	13	14	11	6	5	0	0	0	0	3	7	8	67
	b	0	0	0	1	2	7	12	11	6	2	1	1	43
	c	1.9	1.5	2.4	3.1	3.6	6.2	7.0	6.8	6.0	4.6	3.3	2.8	4.1
Malegaon	a	19	20	19	16	14	4	2	1	3	11	18	21	148
	b	0	0	1	1	1	5	11	12	6	2	1	1	41
	c	1.3	1.0	1.4	1.8	2.0	4.3	5.6	5.7	4.7	2.4	1.7	1.5	2.8
Miraj	a	14	14	9	8	4	1	1	1	1	4	10	12	79
	b	0	0	0	1	3	7	9	9	6	2	2	1	40
	c	2.1	2.0	3.0	3.9	4.5	6.2	6.7	6.6	6.0	4.7	3.2	2.8	4.3
Nandurbar	a	28	26	28	25	26	13	6	7	12	23	24	27	245
	b	0	0	0	0	0	4	9	8	3	1	1	0	26
	c	0.4	0.3	0.4	0.6	0.6	2.8	5.0	4.6	3.1	1.1	1.1	0.7	1.7
Ozar	a	14	15	14	12	8	2	0	1	0	5	10	12	93
	b	0	0	0	0	1	5	11	11	4	1	1	0	34
	c	1.7	1.3	1.8	2.1	2.3	5.6	6.9	6.8	5.8	3.5	2.5	2.3	3.6
Pune	a	13	14	12	8	6	0	0	0	1	3	10	9	76
	b	0	0	0	1	2	8	15	14	7	3	1	1	52
	c	2.5	1.9	2.5	3.1	3.8	6.4	7.2	7.2	6.5	4.9	3.5	3.1	4.4
Satara	a	12	16	12	11	8	1	0	1	0	5	15	11	92
	b	1	0	1	1	1	7	11	11	4	3	1	1	42
	c	1.9	1.4	2.3	2.3	2.8	5.7	6.4	6.7	5.7	4.1	2.5	2.5	3.7

TABLE - 4(a) (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Solapur	a	14	13	10	3	3	1	0	0	1	3	11	10	69
	b	0	0	0	1	1	6	12	11	7	3	1	1	43
	c	1.9	1.7	2.4	3.6	4.2	6.2	6.8	6.7	6.2	4.2	3.0	2.5	4.1
Sub Div. Means	a	16.6	16.7	14.7	11.1	9.0	2.7	1.1	1.3	2.0	7.3	13.3	14.5	110.0
	b	0.1	0.0	0.3	0.8	1.3	5.7	10.6	10.2	5.4	2.1	1.2	0.8	39.0
	c	1.6	1.3	1.9	2.5	2.9	5.3	6.3	6.3	5.4	3.5	2.4	2.1	3.5
HILL STATION														
Mahabaleshswar	a	22	21	22	17	10	8	9	9	8	10	17	18	171
	b	0	0	0	1	4	22	22	22	22	8	2	1	104
	c	1.0	0.7	1.1	1.4	3.2	7.5	8.0	8.0	7.6	3.7	2.1	1.5	3.8
MARATHWADA														
Aurangabad	a	15	14	14	6	3	2	0	2	0	5	10	12	82
	b	0	0	0	0	1	2	5	5	3	1	0	1	18
	c	2.0	1.7	2.3	3.3	3.7	5.6	6.3	6.2	5.6	3.7	2.8	2.4	3.8
Aurangabad/	a	13	14	12	8	4	0	0	0	0	5	10	11	77
Chikalthana	b	0	0	0	0	1	4	10	11	5	1	1	1	34
	c	2.1	1.8	2.4	3.1	3.7	6.0	6.9	6.9	6.1	4.0	2.8	2.4	4.0
Beed	a	16	16	14	10	6	0	0	0	1	6	13	16	98
	b	0	0	1	1	1	6	10	10	6	3	1	1	40
	c	1.9	1.6	2.3	2.8	3.6	5.8	6.5	6.3	5.8	3.7	2.3	2.2	3.7
Nanded	a	27	24	25	23	19	12	10	12	13	22	24	24	235
	b	0	0	0	0	1	5	8	6	4	1	0	1	26
	c	0.6	0.5	0.8	1.1	1.7	3.6	4.3	4.0	3.2	1.1	0.9	0.8	1.9
Osmanabad	a	19	18	18	16	9	1	0	1	1	11	19	19	132
	b	0	0	1	2	2	10	14	12	10	2	2	1	56
	c	1.3	1.2	1.8	2.1	3.3	5.9	6.5	6.2	5.6	3.0	1.6	1.6	3.3

TABLE - 4(a) (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MARATHWADA														
Parbhani	a	13	14	10	5	4	1	1	0	0	5	11	12	76
	b	1	0	1	1	2	6	12	13	7	3	1	2	49
	c	2.1	2.0	2.7	3.3	4.1	5.8	6.8	6.7	5.9	3.9	2.9	2.6	4.1
Sub Div. Means	a	17.2	16.7	15.5	11.3	7.5	2.5	1.8	2.5	2.5	9.0	14.5	15.7	116.6
	b	0.1	0.0	0.6	0.6	1.3	5.5	9.8	9.5	5.8	1.8	0.8	1.1	37.1
	c	1.6	1.4	2.0	2.6	3.3	5.4	6.2	6.0	5.3	3.2	2.2	2.0	3.4
VIDARBHA														
Akola	a	18	18	18	15	12	4	1	1	2	11	18	20	138
	b	1	1	1	1	1	7	13	13	7	2	2	1	50
	c	1.5	1.4	1.8	2.0	2.6	4.9	6.4	6.5	5.2	2.9	2.0	1.8	3.3
Akola(A)	a	12	13	12	9	4	0	0	0	0	4	10	11	75
	b	0	0	0	0	1	4	12	11	5	1	1	1	36
	c	2.2	1.9	2.2	2.8	3.4	5.7	6.9	6.8	5.8	3.5	2.6	2.4	3.9
Amravati	a	17	11	16	13	8	2	1	1	2	8	15	17	111
	b	0	0	0	0	1	3	8	8	4	1	0	1	26
	c	1.5	1.4	1.6	2.2	2.8	4.9	6.1	6.0	4.9	2.9	1.7	1.5	3.1
Brahmapuri	a	16	15	15	10	9	2	1	0	2	8	14	15	107
	b	2	1	2	2	2	10	18	18	11	5	3	2	76
	c	1.8	1.8	2.2	2.8	3.2	5.7	7.0	6.9	5.9	3.2	2.4	2.3	3.8
Buldhana	a	19	19	20	17	15	4	1	0	4	12	18	18	147
	b	1	1	1	1	2	9	19	18	10	3	2	2	69
	c	1.8	1.4	1.8	2.2	2.5	5.6	7.1	6.9	5.6	2.9	2.0	2.0	3.5
Chandrapur	a	13	13	12	7	6	1	2	0	2	7	13	12	88
	b	1	0	0	1	1	7	13	14	7	3	1	1	49
	c	1.8	1.7	2.2	2.9	3.2	5.6	6.7	6.7	5.5	3.1	2.1	2.0	3.6
Gondia	a	20	17	16	13	12	3	2	1	4	13	18	19	138
	b	1	1	1	1	1	6	13	12	6	2	1	1	46
	c	1.5	1.5	1.7	2.2	2.6	4.9	6.5	6.1	4.9	2.4	1.7	1.7	3.1
Nagpur/Sonegaon	a	11	10	8	6	2	0	1	0	0	5	10	10	63
	b	0	0	1	0	1	7	11	12	5	1	1	1	40
	c	2.2	2.1	2.6	3.3	4.0	6.2	7.0	7.0	6.0	3.5	2.5	2.5	4.1
Pusad	a	21	17	17	15	11	3	1	2	4	14	18	19	142
	b	0	1	1	1	2	6	8	9	5	2	1	1	37
	c	1.3	1.5	2.0	2.4	3.1	5.0	5.7	5.8	4.8	2.5	1.7	1.7	3.1

TABLE - 4(a) (Contd….)

MEAN CLOUD AMOUNT ** (OKTA OF THE SKY) AND MEAN NUMBER OF DAYS OF CLEAR AND OVERCAST SKIES AT 1730 HOURS IST

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
VIDARBHA														
Sironcha	a	10	10	10	5	4	1	0	1	0	4	9	10	64
	b	2	1	1	1	2	7	13	14	8	4	2	1	56
	c	2.2	2.0	2.1	3.1	3.5	5.4	6.4	6.5	5.7	4.0	3.0	2.5	3.9
Wardha	a	21	17	17	14	10	5	5	5	7	14	19	21	155
	b	1	1	1	1	3	10	15	15	9	3	1	1	61
	c	1.6	1.6	2.1	2.5	3.5	5.6	6.5	6.4	5.2	2.7	2.0	1.7	3.5
Yavatmal	a	14	12	12	8	4	0	1	1	0	5	12	13	82
	b	1	0	1	1	2	9	16	16	9	4	2	2	63
	c	1.9	1.9	2.3	3.0	3.6	5.9	6.9	6.9	5.7	3.2	2.3	2.2	3.8
Sub Div. Means	a	16.0	14.3	14.4	11.0	9.8	2.1	1.3	1.0	2.3	8.8	14.5	15.4	103.0
	b	0.8	0.5	0.8	0.8	1.5	7.0	13.2	13.3	7.1	2.5	1.4	1.2	46.9
	c	1.7	1.6	2.0	2.6	3.1	5.4	6.6	6.5	5.4	3.0	2.1	2.0	3.5

a : Days with clear sky
b : Days with sky overcast
c : Mean cloud amount
** : Okta = Unit, equal to area of one eighth of the sky used in specifying cloud amount.
For example: 1 Okta means 1/8th of the sky covered.
Hill station not considered for subdivisional means.

TABLE - 4 (b)
MEAN NUMBER OF HOURS OF BRIGHT SUNSHINE PER DAY

STATION	*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
KONKAN													
Mumbai/Colaba	8.7	9.2	9.0	9.5	9.6	5.0	2.4	2.4	5.5	7.8	8.3	8.3	7.1
Mumbai/Santacruz	9.5	10.1	9.7	10.0	9.7	5.7	2.8	2.8	5.4	8.4	9.0	9.2	7.6
Karjat	9.1	9.6	9.4	9.6	9.7	4.5	1.8	1.6	4.1	7.5	8.6	8.8	7.0
MADHYA MAHARASHTRA													
Jalgaon	9.7	10.2	10.3	10.7	10.8	7.5	4.7	4.0	7.3	9.2	9.4	9.5	8.6
Niphad	9.8	10.3	10.2	10.4	10.6	7.3	4.0	3.4	6.5	8.6	9.3	9.6	8.3
Pune	9.7	10.2	9.7	10.2	10.4	6.3	3.9	3.6	6.0	8.1	9.0	9.3	8.0
Solapur	9.6	10.3	10.1	10.0	9.6	5.9	4.0	4.2	6.2	8.3	8.3	9.0	7.0
MARATHWADA													
Parbhani	10.1	10.7	10.6	10.7	10.3	6.9	4.9	4.6	6.9	9.2	9.8	9.7	8.7
VIDARBHA													
Akola (A)	8.8	9.5	9.6	10.2	9.9	7.1	4.4	4.0	7.0	8.7	8.7	8.8	8.0
Nagpur/Sonegaon	8.8	9.4	9.3	9.8	9.6	6.2	3.7	3.7	6.1	8.5	8.8	8.7	7.7

TABLE - 5
MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS

DISTRICT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
KONKAN														
Mumbai City	a	0.7	0.6	0.1	1.2	11.3	531.9	744.5	476.9	300.8	58.3	14.4	3.9	2144.6
	b	0.1	0.0	0.0	0.2	0.8	14.3	22.5	20.4	12.7	3.0	0.9	0.3	75.2
Mumbai Suburban	a	0.4	0.2	0.0	2.9	15.3	532.5	872.6	566.9	347.4	62.2	12.4	0.8	2413.6
	b	0.0	0.0	0.0	0.1	0.6	13.2	22.7	19.7	12.7	2.7	0.5	0.1	72.3
Raigad	a	0.6	0.3	0.2	2.7	23.2	654.6	1240.9	879.4	410.7	101.5	23.4	3.9	3341.4
	b	0.1	0.0	0.0	0.2	1.3	16.8	27.1	25.8	15.8	4.5	1.3	0.2	93.1
Ratnagiri	a	0.8	0.0	0.3	4.3	37.3	833.3	1201.2	847.3	370.0	129.3	32.3	5.2	3461.3
	b	0.0	0.0	0.0	0.3	2.0	19.8	27.7	26.4	15.9	5.7	1.7	0.2	99.7
Sindhudurg	a	1.1	0.1	0.9	6.0	70.0	890.1	1062.2	656.1	328.5	126.0	35.6	8.5	3185.1
	b	0.1	0.0	0.0	0.5	2.9	21.5	27.2	24.6	15.5	6.5	2.0	0.3	101.9
Thane	a	0.7	0.3	0.2	2.0	11.9	433.4	960.3	632.7	321.3	67.6	16.8	1.5	2448.7
	b	0.1	0.0	0.0	0.1	0.7	13.2	25.2	23.5	13.5	3.3	0.8	0.1	80.5
Sub Div. Means	a	0.7	0.3	0.3	3.2	28.2	646.0	1013.6	676.5	346.5	90.8	22.5	4.0	2832.5
	b	0.1	0.0	0.0	0.2	1.4	16.5	25.4	23.4	14.3	4.3	1.2	0.2	87.0
MADHYA MAHARASHTRA														
Ahmednagar	a	2.0	1.4	2.9	5.0	21.3	101.1	99.6	87.2	148.3	65.6	27.0	7.3	568.7
	b	0.2	0.1	0.3	0.5	1.5	5.8	6.7	6.0	7.5	3.6	1.4	0.5	34.1
Dhule	a	3.0	1.8	3.6	1.5	10.5	117.6	170.0	139.6	105.2	36.2	21.1	4.6	614.7
	b	0.3	0.2	0.2	0.1	0.7	5.8	10.3	8.8	6.0	2.1	1.1	0.4	36.0
Jalgaon	a	3.8	3.2	3.7	1.6	8.8	123.7	201.5	203.1	133.5	41.6	20.1	6.5	751.1
	b	0.4	0.3	0.3	0.1	0.6	6.4	11.8	11.2	7.3	2.1	1.0	0.5	42.0
Kolhapur	a	1.5	1.1	6.5	27.5	65.5	278.9	619.2	391.7	172.4	111.4	35.4	7.7	1718.8
	b	0.1	0.1	0.5	1.9	3.7	11.7	20.4	18.0	10.2	6.2	2.2	0.4	75.4
Nandurbar	a	1.8	0.3	1.0	1.9	11.0	120.0	301.9	242.2	159.1	35.4	12.4	3.0	890.0
	b	0.1	0.0	0.1	0.2	0.7	5.7	15.4	14.4	8.0	2.0	0.8	0.2	47.6
Nashik	a	1.9	1.0	1.6	6.0	17.5	135.1	316.9	234.5	170.8	58.0	27.1	5.2	975.6
	b	0.2	0.1	0.1	0.4	1.1	6.9	13.6	12.2	8.7	3.2	1.3	0.4	48.2
Pune	a	1.6	0.5	2.0	8.1	29.2	176.8	408.4	282.0	183.3	82.2	29.2	5.2	1208.5
	b	0.1	0.1	0.2	0.6	1.9	8.0	14.2	12.3	9.2	4.5	1.6	0.3	53.0

TABLE - 5 (Contd….)
MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS

DISTRICT		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
MADHYA MAHARASHTRA														
Sangli	a	2.5	1.0	5.1	23.3	55.5	94.0	133.8	94.5	128.6	96.6	29.8	5.4	670.1
	b	0.1	0.1	0.4	1.8	3.5	6.6	10.9	8.7	7.3	5.8	1.9	0.4	47.5
Satara	a	2.8	0.9	4.0	16.6	40.6	121.2	240.1	142.3	131.6	84.7	36.2	7.4	828.4
	b	0.1	0.1	0.3	1.3	2.7	7.3	12.2	10.1	7.5	5.0	2.0	0.4	49.0
Solapur	a	3.7	1.6	4.1	9.6	28.5	100.3	95.6	100.3	182.3	84.2	26.4	6.6	643.2
	b	0.2	0.1	0.4	0.9	2.1	5.9	6.8	6.6	8.5	4.6	1.6	0.4	38.1
Sub Div. Means	a	2.5	1.3	3.5	10.1	28.8	136.9	258.7	191.7	151.5	69.6	26.5	5.9	887.0
	b	0.2	0.1	0.3	0.8	1.9	7.0	12.2	10.8	8.0	3.9	1.5	0.4	47.1
MARATHWADA														
Aurangabad	a	2.6	2.1	3.9	2.9	18.9	125.4	160.1	161.8	156.2	53.3	23.6	8.5	719.3
	b	0.2	0.2	0.4	0.3	1.2	7.0	10.2	10.1	8.0	2.8	1.2	0.6	42.2
Beed	a	2.5	2.7	4.6	6.7	21.5	123.7	142.6	141.5	178.9	68.5	24.1	8.7	726.0
	b	0.2	0.2	0.4	0.6	1.4	7.0	8.3	8.1	8.8	3.6	1.3	0.5	40.4
Hingoli	a	4.4	5.5	5.4	5.0	13.0	180.4	241.5	251.5	163.9	59.5	20.1	7.3	957.5
	b	0.4	0.4	0.4	0.5	1.0	8.6	12.3	11.0	7.6	3.0	0.9	0.4	46.5
Jalna	a	3.0	1.8	4.4	2.6	16.9	136.0	163.8	166.2	150.2	55.9	22.5	4.4	727.7
	b	0.3	0.2	0.4	0.3	1.0	7.3	9.7	9.8	7.6	2.7	1.0	0.4	40.7
Latur	a	3.0	2.0	8.6	6.7	25.1	147.7	185.4	193.4	193.4	73.0	17.8	5.6	861.7
	b	0.2	0.2	0.4	0.7	1.7	8.2	10.4	10.6	9.4	3.7	1.0	0.4	46.9
Nanded	a	6.5	6.3	7.8	7.3	16.7	155.6	256.1	251.6	193.1	68.9	17.1	4.5	991.5
	b	0.4	0.4	0.5	0.6	1.2	8.2	12.7	11.8	9.0	3.3	1.1	0.3	49.5
Osmanabad	a	3.4	3.4	7.7	8.8	29.6	139.9	148.1	152.3	187.1	77.8	27.8	3.8	789.7
	b	0.2	0.3	0.4	0.9	2.0	7.9	9.7	9.8	9.8	4.4	1.5	0.2	47.1
Parbhani	a	3.8	6.2	6.3	5.5	13.4	152.1	229.0	221.6	196.7	56.8	23.4	7.7	922.5
	b	0.3	0.4	0.5	0.6	1.2	7.7	11.4	10.3	8.6	2.8	1.1	0.4	45.3
Sub Div. Means	a	3.6	3.7	6.1	5.7	19.4	145.1	190.8	192.5	177.4	64.2	22.0	6.3	836.8
	b	0.3	0.3	0.4	0.6	1.3	7.7	10.6	10.2	8.6	3.3	1.1	0.4	44.8

TABLE - 5 (Contd….)
MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS

DISTRICT		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
VIDARBHA														
Akola	a	9.6	7.1	7.6	3.6	9.9	134.4	227.3	194.1	137.3	44.7	18.3	7.8	801.7
	b	0.8	0.6	0.7	0.4	0.8	7.0	12.0	10.5	7.2	2.3	0.9	0.6	43.8
Amravati	a	13.5	11.9	7.2	4.2	7.8	132.9	248.9	225.7	150.8	43.4	17.0	7.2	870.5
	b	1.0	0.8	0.7	0.5	0.8	7.4	12.8	11.1	8.2	2.4	0.8	0.5	47.0
Bhandara	a	19.2	16.5	16.9	8.7	8.9	169.2	402.4	399.6	205.8	54.7	13.2	8.3	1323.4
	b	1.2	1.2	1.3	0.9	0.8	8.2	16.8	15.8	9.7	2.9	0.6	0.5	59.9
Buldhana	a	6.6	4.8	5.7	2.9	9.6	138.3	197.0	193.3	131.4	46.6	19.7	8.2	764.1
	b	0.6	0.4	0.5	0.3	0.8	6.9	11.7	10.9	7.1	2.4	0.9	0.6	43.1
Chandrapur	a	10.9	12.3	15.8	11.1	12.0	179.5	395.7	373.8	205.6	60.4	11.0	7.0	1295.1
	b	0.8	0.8	1.2	1.0	0.9	8.5	16.8	15.0	9.4	3.0	0.6	0.4	58.4
Gadchiroli	a	8.6	11.6	14.9	12.7	14.3	201.4	481.4	448.1	215.2	64.6	9.1	4.2	1486.1
	b	0.6	0.8	1.0	1.0	1.0	9.0	18.1	16.5	10.3	3.4	0.6	0.2	62.5
Gondia	a	17.2	16.9	14.9	8.2	7.2	174.7	427.7	424.8	211.5	53.7	11.2	10.6	1378.6
	b	1.3	1.3	1.3	0.7	0.6	8.3	17.2	16.3	9.8	3.1	0.7	0.5	61.1
Nagpur	a	18.5	15.7	15.2	10.2	10.2	160.9	326.1	285.9	181.1	51.8	14.9	10.9	1101.4
	b	1.3	1.2	1.3	1.0	0.9	8.2	15.0	13.3	8.9	2.8	0.7	0.6	55.2
Wardha	a	13.7	12.8	12.4	7.6	13.2	165.2	280.7	249.2	146.6	48.1	14.7	14.0	978.2
	b	1.1	1.0	1.1	0.8	1.2	8.4	14.1	12.1	8.1	2.9	0.7	0.9	52.4
Washim	a	8.2	7.8	7.7	3.9	9.5	158.2	264.4	219.7	161.0	51.7	16.4	7.2	915.7
	b	0.7	0.6	0.6	0.5	0.8	8.0	13.2	11.7	8.0	2.8	0.9	0.4	48.2
Yavatmal	a	10.0	9.1	11.2	8.5	13.6	170.9	294.2	250.3	167.4	54.6	14.3	8.0	1012.1
	b	0.8	0.7	1.0	0.9	1.2	8.6	14.5	12.2	8.2	3.0	0.8	0.5	52.4
Sub Div. Means	a	12.4	11.5	11.8	7.4	10.5	162.3	322.3	296.8	174.0	52.2	14.5	8.5	1084.2
	b	0.9	0.9	1.0	0.7	0.9	8.0	14.7	13.2	8.6	2.8	0.7	0.5	52.9

a: Normal rainfall
b: Average number of rainy days (i.e. days with rainfall of 2.5 mm or more)

TABLE – 5(a)
MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
HILL STATIONS														
Chikhalda	a	8.5	10.3	4.3	4.1	8.5	190.2	512.3	560.6	303.0	66.1	29.3	6.2	1703.4
	b	0.7	0.8	0.4	0.5	0.9	9.1	20.1	21.0	12.1	3.2	1.1	0.5	70.4
Chikhalda (Hydro)	a	22.9	17.1	7.7	5.2	14.0	223.9	408.1	733.1	192.7	22.2	41.0	14.0	1701.9
	b	1.2	1.0	0.5	0.3	1.4	9.1	19.9	22.9	9.5	1.4	1.7	0.9	69.8
Mahabaleshwar	a	2.0	0.3	8.1	26.2	63.5	846.0	2369.3	1798.2	595.0	123.8	42.8	11.7	5886.9
	b	0.2	0.0	0.5	1.8	4.0	21.3	30.1	29.8	20.9	6.9	2.6	0.6	118.7
Panchgani	a	2.8	1.2	9.9	33.2	64.7	311.0	775.2	523.8	249.3	145.3	71.1	8.2	2195.7
	b	0.2	0.1	0.8	2.2	3.7	13.4	25.0	24.0	13.6	6.6	3.1	0.3	93.0

TABLE - 6
MEAN RAINFALL (mm) OVER DIFFERENT CATCHMENTS OF MAHARASHTRA

JAN	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
1) **Streams from the Tadri to, but excluding the Tapti : (Catchment No. 102)** Districts/Parts of districts within this catchment:- **Konkan** : Thane, Mumbai City, Mumbai Suburban, Raigad, Ratnagiri **Madhya Maharashtra** : Nashik, Kolhapur, Jalgaon												
0.7	0.4	0.3	4.0	29.9	618.6	1086.0	748.0	370.1	102.1	23.7	3.8	2987.6
2) Rivers Tapti : (Catchment No. 103) Districts/Parts of districts within this catchment:- **Madhya Maharashtra** : Dhule, Jalgaon, Nandurbar, Nashik **Vidarbha** : Buldhana, Akola, Amravati, Washim												
6.3	5.1	4.8	3.1	10.4	128.2	219.8	211.7	139.6	41.5	19.9	6.4	796.8
3) RiverNarmada : (Catchment No. 104) Districts/Parts of districts within this catchment:- **Madhya Maharashtra** : Nandurbar												
1.7	0.3	0.9	0.7	12.2	132.7	310.0	284.2	178.0	40.6	9.9	5.2	976.4
4) River Krishna upto its confluence with river Bhima excluding river Bhima: (Catchment No. 306) Districts/Parts of districts within this catchment:- **Madhya Maharashtra** : Satara, Sangli, Kolhapur												
0.3	1.2	6.4	23.7	58.2	220.1	486.8	318.6	178.3	96.9	43.9	7.2	1441.6

TABLE - 6 (Contd….)
MEAN RAINFALL (mm) OVER DIFFERENT RIVER CATCHMENTS OF MAHARASHTRA

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
5) River Bhima : (Catchment No. 307) Districts/Parts of districts within this catchment:- **Konkan** : Raigad **Madhya Maharashtra** : Ahmednagar, Pune, Solapur, Sangli, Satara **Marathwada** : Beed, Osmanabad												
2.2	1.3	3.1	8.9	28.8	147.8	243.7	198.3	182.2	80.3	28.9	6.0	931.5
6) River Godavari upto its confluence with river Manjira (excluding river Manjira): (Catchment No. 311) Districts/Parts of districts within this catchment:- **Madhya Maharashtra** : Nashik, Ahmednagar **Marathwada** : Aurangabad, Parbhani, Nanded, Beed **Vidarbha** : Buldhana												
3.4	1.9	3.9	5.0	16.8	130.7	199.5	184.2	162.3	65.2	21.8	6.8	801.5
7) River Manjira : (Catchment No. 312) Districts/Parts of districts within this catchment:- **Marathwada** : Nanded, Beed, Osmanabad												
2.3	2.6	5.5	6.6	20.1	134.5	171.7	178.9	171.5	70.8	20.7	5.4	790.6
8) River Godavari from its confluence with river Manjira upto its confluence with river Wainganaga (excluding the Wainganga) : (Catchment No. 313) Districts/Parts of districts within this catchment:- **Vidarbha** : Chandrapur												
8.7	10.7	12.0	13.3	16.2	165.4	412.3	376.6	200.4	59.5	10.5	4.6	1290.2

TABLE – 6 (Contd….)
MEAN RAINFALL (mm) OVER DIFFERENT CATCHMENTS OF MAHARASHTRA

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
9) **River Panganga : (Catchment No. 314)** Districts/Parts of districts within this catchment: **Marathwada** : Hingoli **Vidarbha** : Buldhana, Akola, Amravati, Yavatmal, Wardha, Nagpur, Chandrapur, Washim												
10.2	10.1	10.2	7.2	11.6	167.5	282.4	250.5	165.7	53.2	15.1	8.5	992.2
10) River Wainganga (excluding Panganga) : (Catchment No. 315) Districts/Parts of districts within this catchment:- **Vidarbha** : Nagpur, Bhandara, Gondia, Chandrapur												
14.9	14.1	15.1	11.6	10.8	175.7	395.1	365.5	195.8	53.8	12.7	9.5	1274.6

TABLE – 7
STORMS/DEPRESSIONS AFFECTING MAHARASHTRA STATE DURING 1891-1990

MONTH	*KONKAN*	*MADHYA MAHARASHTRA*	*MARATHWADA*	*VIDARBHA*
January	-	-	-	-
February	-	-	-	-
March	-	-	-	-
April	2	1	1	-
May	6	1	2	2
June	6	3	1	14
July	-	1	1	30
August	2	3	2	26
September	9	19	14	55
October	11	12	11	20
November	10	11	8	5
December	2	-	-	-
TOTAL	**48**	**51**	**40**	**152**

DISTRICT CLIMATOLOGICAL SUMMARIES

KONKAN

MUMBAI (CITY) DISTRICT

The climate of Mumbai district is characterised by an oppressive summer, dampness in the atmosphere nearly throughout the year and heavy southwest monsoon rainfall. The cold season from December to February is followed by the summer season from March to beginning of June. The period from June to about the end of September constitutes the southwest monsoon season. October and November form the post monsoon season.

Rainfall

Records of rainfall for Mumbai are available for three raingauge stations for periods ranging from 20 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall is 2144.6 mm. The variation in the rainfall from year to year is quite appreciable. In the 50 year period from 1941-1990, the highest annual rainfall amounting to 166% of the annual normal occurred in 1958. The lowest annual rainfall which was only 42% of the normal occurred in 1941. In this 50 year period the annual rainfall in Mumbai was less than 80% of the normal in 7 years, two consecutive years of such low rainfall occurred once. About 96% of the annual rainfall in Mumbai is received during the southwest monsoon months June to September. July is the rainiest month when about one third of the annual rainfall is received. Some rainfall mostly as thundershowers is also received during May and the post monsoon months. During the period December to April there is very little rainfall. It will be seen from Table 2 that the annual rainfall in Mumbai was between 1801 and 2800 mm in 36 years out of 49.

On an average there are 75 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 71 at Podar Medical College (Obsy) to 80 at Santacruz (Obsy).

The heaviest rainfall in 24 hours recorded in Mumbai was 944.2 mm at Santacruz (Obsy) on 27th July 2005.

Temperature

There are two meteorological observatories at Colaba and Santacruz for which long period data is available. In general Santacruz is slightly warmer during day and colder during nights than Colaba, especially in the cold season and early summer. After February there is a steady increase of temperature till May which is generally the hottest month. The mean daily maximum temperature in May is 33.3°C at Colaba and Santacruz. The mean daily minimum temperature in May is 26.9°C at Colaba and 26.2°C at Santacruz. Due to prevailing high humidities the weather during summer is very oppressive. On some days the maximum temperature goes upto 42°C. The afternoon sea breezes bring some welcome relief from heat. After the onset of the monsoon by about the beginning of June, the weather becomes progressively cooler. But, towards the end of the southwest monsoon season, day temperatures begin to increase slightly and a secondary maximum in day temperature is reached in November. Nights however, become progressively cooler after the withdrawal of the monsoon. After November, the day temperatures also begin to decrease. January is generally the coldest month when the mean daily maximum temperature is 29.4°C at Colaba and 30.4°C at Santacruz. The mean daily minimum temperature is 19.2°C at Colaba and 16.6°C at Santacruz. In the cold season, in association with passing western disturbances across north India, the minimum temperature occasionally drops down upto about 7°C.

The highest maximum temperature recorded at Colaba was 40.6°C on 19th April 1955 and that at Santacruz was 42.2°C on 14th April 1952. The lowest minimum temperature was 11.7°C at Colaba on 15th January 1935 and 1st February 1929 and that at Santacruz was 7.4°C on 22nd January 1962.

Humidity

In general Colaba is slightly more humid than Santacruz. Usually mornings are more humid than the afternoons over Mumbai. In the period June to October the relative humidity is above 80%. The driest part of the year is the afternoons during the period November to February with relative humidity between 47 and 65%.

Cloudiness

During the southwest monsoon months, the skies are generally heavily clouded or overcast. Cloudiness decreases after the withdrawal of the southwest monsoon towards the end of September. During the period December to March clear or lightly clouded skies prevail generally. Later cloudiness increases with the progress of the season.

Winds

Winds are generally moderate with appreciable increase in speed during the monsoon months. Winds during the southwest monsoon season are mainly from directions between southwest and west. From post monsoon season till May wind is calm or from east-northeast direction in mornings and from northwest in afternoons.

Special Weather Phenomena

During the latter part of summer and post monsoon months some of the storms and depressions from the Arabian sea affect the weather causing widespread heavy rain and gusty winds. Thunderstorms occur throughout the year with more frequency during the latter part of summer and in September, October. Rain in the monsoon season is often associated with thunder and squall. In latter part of the winter season, fog occurs.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Colaba and Santacruz observatories.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Colaba	50	a	1.3	0.6	0.3	2.6	13.3	551.7	720.3	450.6	303.2	61.6	16.6	3.0	2125.1	164	43	575.6	05 July 1974
(obsy)		b	0.1	0.0	0.1	0.3	0.9	14.6	22.0	19.8	12.6	3.1	0.8	0.2	74.5	(1954)	(1941)		
Podar Medical College (obsy)	20	a	0.4	0.0	0.0	0.5	7.7	496.7	657.7	421.1	273.4	46.3	12.9	4.5	1921.2	131	49	434.8	05 July 1974
		b	0.0	0.0	0.0	0.1	0.7	13.7	21.5	19.5	11.8	2.6	1.0	0.4	71.3	(1974)	(1973)		
Santacruz	42	a	0.5	1.2	0.1	0.6	13.0	547.2	855.6	558.9	325.9	67.0	13.7	4.2	2387.9	159	57	944.2	27 July 2005
(Obsy)		b	0.1	0.1	0.0	0.1	0.9	14.5	23.9	21.8	13.8	3.2	0.9	0.4	79.7	(1958)	(1986)		
Mumbai		a	0.7	0.6	0.1	1.2	11.3	531.9	744.5	476.9	300.8	58.3	14.4	3.9	2144.6	166	42		
(District)		b	0.1	0.0	0.0	0.2	0.8	14.3	22.5	20.4	12.7	3.0	0.9	0.3	75.2	(1958)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 2005.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(MUMBAI CITY)

Range in mm	No. of years	Range in mm	No. of years
901 – 1000	1	2301 – 2400	4
1001 – 1100	0	2401 – 2500	3
1101 – 1200	0	2501 – 2600	2
1201 – 1300	1	2601 – 2700	3
1301 – 1400	1	2701 – 2800	3
1401 – 1500	0	2801 – 2900	1
1501 – 1600	3	2901 – 3000	0
1601 – 1700	1	3001 – 3100	0
1701 – 1800	2	3101 – 3200	0
1801 – 1900	4	3201 – 3300	1
1901 – 2000	2	3301 – 3400	0
2001 – 2100	7	3401 – 3500	1
2101 – 2200	7	3501 – 3600	1
2201 – 2300	1		

(Data available for 49 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(COLABA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.4	19.2	37.0	1991 Jan 28	11.7	1935 Jan 15	75	62
February	29.5	20.0	38.3	1949 Feb 28	11.7	1929 Feb 01	74	60
March	31.0	22.7	40.4	1981 Mar 05	16.3	1982 Mar 03	75	62
April	32.2	25.0	40.6	1955 Apr 19	20.0	1905 Apr 01	75	67
May	33.3	26.9	39.7	1972 May 24	22.8	1951 May 25	73	68
June	32.0	26.3	37.2	1901 Jun 10	21.1	1936 Jun 28	82	77
July	30.0	25.3	35.6	1902 Jul 11	21.7	1945 Jul 07	87	84
August	29.7	25.0	33.8	1977 Aug 23	20.7	1993 Aug 11	88	83
September	30.4	24.8	35.6	1992 Sep 27	20.0	1947 Sep 29	87	79
October	32.5	24.8	39.5	1968 Oct 22	20.6	1954 Oct 29	83	72
November	32.9	23.1	38.4	1978 Nov 07	17.8	1881 Nov 20	76	65
December	31.4	21.0	36.0	1992 Dec 16	12.8	1929 Dec 21	75	64
Annual	31.2	23.7					79	70

TABLE - 4
Mean Wind Speed in km/hr.
(COLABA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.2	8.0	8.5	8.3	8.4	10.6	12.4	11.9	8.0	6.3	6.7	7.0	8.6

TABLE - 5
Special Weather Phenomena
(COLABA)

Mean No.of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	0.1	0.2	1.2	4.3	1.8	1.3	4.4	2.8	0.9	0.1	17.3
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duststorm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.1	0.0	0.0	0.2	3.6	5.8	3.6	1.4	0.5	0.1	0.0	15.3
Fog	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(SANTACRUZ)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.4	16.6	37.1	1990 Jan 26	7.4	1962 Jan 22	64	49
February	31.1	17.7	39.6	1966 Feb 25	10.0	1950 Feb 10	62	47
March	32.6	20.9	41.7	1956 Mar 28	13.8	1968 Mar 30	64	51
April	33.0	23.8	42.2	1952 Apr 14	16.9	1968 Apr 01	69	60
May	33.3	26.2	41.0	1979 May 12	18.4	1986 May 20	69	65
June	32.0	26.0	37.1	1995 Jun 15	19.8	1980 Jun 21	81	75
July	29.9	24.9	34.8	1960 Jul 22	21.2	1974 Jul 08	87	83
August	29.5	24.6	33.5	1969 Aug 26	19.4	1950 Aug 01	87	82
September	30.2	24.2	36.4	1972 Sep 23	20.7	1993 Sep 28	86	77
October	33.1	23.4	37.9	1972 Oct 23	16.7	1952 Oct 30	74	65
November	33.4	20.8	37.4	1979 Nov 04	13.3	1950 Nov 19	61	56
December	31.9	18.5	39.8	1987 Dec 04	10.6	1949 Dec 20	61	53
Annual	31.7	22.3					72	64

TABLE – 4(a)
Mean Wind Speed in km/hr.
(SANTACRUZ)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.0	8.0	8.7	9.7	11.3	14.5	16.6	15.0	9.0	6.2	6.3	6.3	9.9

TABLE – 5(a)
Special Weather Phenomena
(SANTACRUZ)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	0.1	0.2	1.0	5.6	2.9	1.4	5.0	3.0	1.0	0.1	20.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.0	0.1	0.2	1.1	3.5	1.4	0.7	0.4	0.1	0.0	7.5
Fog	0.9	0.9	0.6	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.4	3.4

MUMBAI-SUBURBAN DISTRICT

The climate of Mumbai Suburban is characterised by an oppressive summer, dampness in the atmosphere nearly throughout the year and heavy southwest monsoon rainfall. The cold season from December to February is followed by the summer season from March to May. The period from June to about the end of September constitutes the southwest monsoon season. October and November form the post monsoon season.

Rainfall

Records of rainfall for Mumbai Suburban are available for three stations for period ranging from 13 to 25 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall is 2413.6 mm. The variation in the annual rainfall from year to year is quite appreciable. In the 50 year period 1941 to 1990, the highest annual rainfall amounting to 213% of the annual normal occurred in 1975 and the lowest annual rainfall which was only 45% of the normal occurred in 1941. In this 50 year period, the annual rainfall in Mumbai Suburban was less than 80% of the normal in 6 years and no consecutive years of such low rainfall occurred. About 96% of the annual rainfall in Mumbai Suburban is received during the southwest monsoon months June to September. July is the rainiest month when about one third of the annual rainfall is received. Some rainfall mostly as thundershowers is also received during May and the post monsoon months. During the period December to April there is very little rainfall. It will be seen from Table 2 that the annual rainfall in Mumbai Suburban was between 1701 and 2700 mm in 24 years out of 43.

On an average there are 72 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 66 at Andheri to 78 at Borivali.

The heaviest rainfall in 24 hours recorded at any station in Mumbai Suburban was 652.0 mm at Andheri on 4th July 1974.

Temperature

There is no meteorological observatory in Mumbai Suburban. The observatories Santacruz and Colaba in the neighbouring district are taken as representative for the description as follows. After February there is a steady increase of temperature till May which is generally the hottest month. The mean daily maximum temperature in May is about 33.3^{0}C and the mean daily minimum temperature is about 26.5^{0}C. Due to prevailing high humidities the weather during summer is very oppressive. On some days the maximum temperature may go upto 42^{0}C. The afternoon sea breezes bring some welcome relief from the heat. After the onset of the monsoon by about the beginning of June, the weather becomes progressively cooler. But, towards the end of the southwest monsoon season, day temperatures begin to increase slightly and a secondary maximum in day temperature is reached in November. Nights however become progressively cooler after the withdrawal of the monsoon. After November the day temperatures also begin to decrease. January which is generally the coldest month with the mean daily maximum temperature is at about 30^{0}C and the mean daily minimum temperature is at about 18^{0}C. In the cold season, in association with passing western disturbances across north India, the minimum temperature occasionally drops down upto about 7^{0}C.

Humidity

Usually mornings are more humid than the afternoons over Mumbai Suburban. In the period June to October the relative humidity is above 80%. The driest part of the year is the afternoons during the period November to February with relative humidity between 47 and 65%.

Cloudiness

During the southwest monsoon months the skies are generally heavily clouded or overcast. Cloudiness decreases after the withdrawal of the southwest monsoon towards the end of September. During the period December to March clear or lightly clouded skies prevail generally. Later cloudiness increases with the progress of the season.

Winds

Winds are generally moderate with appreciable increase in speed during the monsoon months. Winds during the southwest monsoon season are mainly from directions between southwest and west. From post monsoon season till May wind is calm or from east-northeast direction in mornings and from northwest in afternoons.

Special Weather Phenomena

During the latter part of summer, southwest monsoon and post monsoon months, some of the storms and depressions from the Arabian sea affect the weather causing widespread heavy rain and gusty winds. Thunderstorms occur throughout the year, more frequently during the latter part of summer and in September to October. Rain in the monsoon season is often associated with thunder. In interior part of the district fog occurs, occasionally in winter.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Andheri	25	a	0.1	0.0	0.0	0.0	19.9	669.5	893.3	610.9	317.8	58.1	3.4	0.0	2573.0	200	38	652.0	04 Jul 1974
		b	0.0	0.0	0.0	0.0	0.3	13.3	20.8	18.4	10.2	2.4	0.2	0.0	65.6	(1975)	(1987)		
Borivali	21	a	0.0	0.5	0.0	0.0	6.2	519.5	910.5	718.2	370.6	73.3	5.2	2.1	2606.1	163	64	385.3	16 Jul 1965
		b	0.0	0.0	0.0	0.0	0.4	14.1	24.0	22.6	13.0	3.2	0.5	0.2	78.0	(1958)	(1986)		
Kurla	13	a	1.0	0.0	0.0	8.8	19.8	408.6	814.1	371.6	353.9	55.2	28.7	0.3	2062.0	125	53	354.3	27 Jun 1915
		b	0.1	0.0	0.0	0.4	1.0	12.3	23.2	18.0	15.0	2.4	0.8	0.1	73.3	(1962)	(1941)		
Mumbai Suburban		a	0.4	0.2	0.0	2.9	15.3	532.5	872.6	566.9	347.4	62.2	12.4	0.8	2413.6	213	45		
(District)		b	0.0	0.0	0.0	0.1	0.6	13.2	22.7	19.7	12.7	2.7	0.5	0.1	72.3	(1975)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(MUMBAI SUBURBAN)

Range in mm	No. of years	Range in mm	No. of years
1401 – 1500	1	3301 – 3400	2
1501 – 1600	1	3401 – 3500	4
1601 – 1700	1	3501 – 3600	1
1701 – 1800	3	3601 – 3700	0
1801 – 1900	3	3701 – 3800	0
1901 – 2000	2	3801 – 3900	0
2001 – 2100	4	3901 – 4000	1
2101 – 2200	3	4001 – 4100	0
2201– 2300	3	4101 – 4200	0
2301– 2400	0	4201 – 4300	1
2401 – 2500	2	4301 – 4400	0
2501 – 2600	2	4401 – 4500	0
2601 – 2700	2	4501 – 4600	1
2701 – 2800	1	4601 – 4700	1
2801 – 2900	0	4701 – 4800	0
2901 – 3000	0	4801 – 4900	0
3001 – 3100	1	4901 – 5000	0
3101 – 3200	0	5001 – 5100	0
3201 – 3300	0	5101 – 5200	1

(Data available for 43 years only)

RAIGAD DISTRICT

The climate of this district is typical of that on the west coast of India, with plentiful and regular seasonal rainfall, oppressive weather in the hot months and high humidity throughout the year. The summer season from March to May is followed by the southwest monsoon season from June to September. October and November form the post monsoon or retreating monsoon season. The period from December to February is the cold season.

Rainfall

The district has 17 raingauge stations with records for the period ranging from 21 to 50 years. Tables 1 and 2 give the rainfall data for these stations and for the district as a whole. The southwest monsoon commences by about the first week of June and the rains continue till about the beginning of October. The average annual rainfall for the district as a whole is 3341.4 mm. The rainfall increases rapidly from the coast towards the Western Ghats on the eastern border of the district. In the coastal strip the annual rainfall decreases from the south to north. Uran and Alibag at the northern end of the coast get annually 2301.7 mm and 2141.7 mm of rain respectively. Matheran on the Ghats get as much as 5275.9 mm of rain annually. Nearly 95% of the annual rainfall is received during the southwest monsoon months and the rainfall in October forms the major portion of the rest. July is the month with the heaviest rainfall which is as much as 37% of the annual rainfall. The variation from year to year of the annual rainfall in the district is large. During the fifty year period 1941 to 1990, the highest annual rainfall for the district as a whole amounting to 134% of the normal occurred in 1963, while the year 1941 had the lowest annual rainfall in the fifty year period and was only 54% of the normal. In seven years out of fifty the rainfall was less than 80% of the normal, two of them being consecutive. It will be seen from Table 2 that in 26 years out of 50 the annual rainfall in the district was between 2801 and 3500 mm.

On an average there are 93 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 78 at Uran and Alibag (obsy) to 107 at Matheran and Bhira (Obsy).

The heaviest rainfall in 24 hours recorded at any station in the district was 742.0 mm at Sriwardhan on 26th June 1968.

Temperature

There are two meteorological observatories in the district at Alibag and Bhira for which long period data is available. The data for the stations Alibag and Bhira may be taken as representative of the conditions in the district generally. Being a coastal district, the diurnal and seasonal variations of temperature at Alibag are not large. At Alibag on the coast, May is the hottest month, with the mean daily maximum temperature at 32.3°C and the mean daily minimum temperature at 26.4°C. At Bhira, eastward of the district, April is the hottest month with the mean daily maximum temperature at 39.9°C and the mean daily minimum temperature at 22.2°C. Fresh breezes from the sea relieve the oppressive heat particularly in the coastal regions in the afternoons. The onset of the southwest monsoon early in June brings down the temperatures in the interior part of the district. After the withdrawal of the southwest monsoon by the end of September, the day temperatures increase slightly and the weather in October and November is almost as in the summer months near coast. In interior towards east, mean daily maximum temperatures in October and November are 5-6°C less than in the summer months. In the period December to February the weather is cooler than in the post monsoon months.

The highest maximum temperature ever recorded at Alibag was 40.0°C on 19th April, 1955 and on 12th March, 1985 and the lowest minimum temperature ever recorded was 9.4°C on 13th January 1934. The highest maximum temperature ever recorded at Bhira was 45.5°C on 28th April, 1995 and the lowest minimum temperature ever recorded was 6.3°C on 28th January 1973.

Humidity

The air is humid throughout the year. Relative humidity is on an average 86% during the southwest monsoon season. In the rest of the year the relative humidity is between 64 and 75% in coastal regions. In interior parts the humidity is about 40% in summer afternoons.

Cloudiness

During the southwest monsoon season the skies are generally heavily clouded or overcast. In May and October the clouding is moderate near coastal region. Clear or very lightly clouded skies are common in the rest of the year.

Winds

Winds are very strong and blow from southwest or west during the monsoon season. During the period October to March, winds are moderate and blow from directions between northeast and east in the mornings and from northwest in the afternoons. In April-May there is strengthening in wind and it blows mostly from northwest.

Special Weather Phenomena

In association with cyclonic storms in the Arabian sea in the post monsoon months and to a lesser extent in May, the district experiences very strong winds, sometimes reaching gale force and heavy widespread rain, particularly very near the coast. Occasionally these storms may cross coast in the northern part of the district and cause heavy damage. Thunderstorms occur in April to May, just before the onset of the monsoon and in the late September to the middle of November. Fog occurs occasionally during the post monsoon season, in the interior part of the district.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and special weather phenomena respectively for Alibag and Bhira observatories.

TABLE 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Alibag	50	a	1.0	1.6	0.2	1.8	13.3	544.8	712.0	470.1	311.7	64.5	17.2	3.5	2141.7	190	32	396.2	23 Sep 1949
(Obsy)		b	0.2	0.1	0.0	0.2	1.0	15.1	22.9	21.0	13.1	3.2	1.2	0.2	78.2	(1983)	(1941)		
Alibag	21	a	2.1	0.2	0.1	3.4	9.6	473.9	794.6	526.8	349.1	54.0	24.7	3.2	2241.7	151	32	407.7	23 Sep 1949
(Civil)		b	0.3	0.0	0.0	0.3	0.8	14.5	24.5	21.0	13.9	3.1	1.3	0.3	80.0	(1958)	(1941)		
Bhira	29	a	0.2	0.4	0.5	5.3	27.3	821.6	1984.9	1423.9	551.5	130.5	41.2	8.5	4995.8	119	63	713.0	24 Jul 1989
(Obsy)		b	0.1	0.1	0.0	0.4	1.5	19.7	29.6	29.7	18.5	5.6	2.2	0.4	107.8	(1987)	(1972)		
Karjat	46	a	0.6	0.0	0.3	2.2	21.7	548.7	1373.1	934.0	435.7	93.2	17.8	0.3	3427.6	140	58	605.0	18 Jul 1958
		b	0.1	0.0	0.0	0.3	1.4	15.6	28.5	27.1	17.1	4.7	1.0	0.1	95.9	(1961)	(1972)		
Khalapur	34	a	0.0	0.0	0.0	1.0	20.0	563.4	1318.1	1026.0	458.3	119.1	17.3	4.5	3527.7	170	49	415.0	13 Jul 1991
		b	0.0	0.0	0.0	0.1	1.1	16.1	28.2	26.8	16.4	4.8	1.2	0.2	94.9	(1964)	(1972)		
Mahad	49	a	1.2	0.0	0.2	5.9	43.9	657.1	1340.1	919.6	419.1	115.1	31.3	4.8	3538.3	175	54	388.6	19 Jul 1923
		b	0.1	0.0	0.0	0.4	2.0	18.1	28.5	26.8	16.5	5.1	1.6	0.3	99.4	(1969)	(1941)		
Mangaon	50	a	1.6	0.0	0.1	4.9	32.8	670.2	1271.8	884.3	392.9	128.9	30.7	2.3	3420.5	152	61	460.0	05 Jul 1946
		b	0.2	0.0	0.0	0.3	1.5	17.6	27.6	26.5	16.6	5.2	1.4	0.1	97.0	(1975)	(1941)		
Matheran	50	a	1.1	1.2	0.5	4.2	25.7	807.7	2058.9	1534.8	670.9	138.0	29.2	3.7	5275.9	143	62	657.3	24 Jul 1921
		b	0.1	0.0	0.1	0.4	1.6	19.2	29.9	29.0	19.6	5.9	1.3	0.2	107.3	(1956)	(1972)		

TABLE 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Mhasla	32	a	0.0	0.0	0.0	1.8	23.8	803.6	1276.6	935.7	394.6	101.6	16.6	2.1	3556.4	150	56	375.0	09 Jun 1991
		b	0.0	0.0	0.0	0.1	1.3	17.7	28.5	27.8	15.3	4.0	1.0	0.1	95.8	(1975)	(1960)		
Murud	30	a	0.0	0.0	0.0	0.0	21.5	607.6	822.3	574.7	327.5	86.8	17.3	4.4	2462.1	157	53	362.0	09 Jun 1991
		b	0.0	0.0	0.0	0.0	1.4	16.0	23.7	22.8	13.6	3.7	1.2	0.3	82.7	(1974)	(1986)		
Panvel	47	a	0.5	0.1	0.1	3.4	13.6	567.6	1128.7	790.4	402.1	94.5	18.4	2.1	3021.5	143	57	458.5	17 Jul 1885
		b	0.1	0.0	0.0	0.3	0.8	15.6	27.0	25.9	14.9	4.4	0.9	0.2	90.1	(1954)	(1941)		
Pen	45	a	0.4	0.5	0.0	1.4	10.5	576.4	1135.3	774.1	398.8	101.1	21.3	2.3	3022.1	147	43	500.0	07 Sep 1973
		b	0.1	0.0	0.0	0.2	0.7	15.7	27.1	25.1	14.8	4.8	1.2	0.2	89.9	(1983)	(1941)		
Poladpur	36	a	0.0	0.0	0.8	2.8	35.8	728.4	1371.1	1050.8	412.2	129.5	35.4	6.5	3773.3	146	62	378.0	28 Jul 1991
		b	0.0	0.0	0.1	0.3	1.9	18.6	28.8	27.9	17.7	5.8	2.0	0.3	103.4	(1963)	(1972)		
Roha	50	a	1.1	0.6	0.2	3.2	21.7	705.0	1265.1	827.6	366.5	98.5	27.1	3.1	3319.7	146	50	629.9	18 Jun 1886
		b	0.1	0.0	0.0	0.2	1.0	17.0	28.6	26.9	16.0	4.6	1.2	0.1	95.7	(1958)	(1941)		
Sriwardhan	34	a	0.0	0.0	0.0	1.4	30.9	771.2	970.1	654.4	314.5	91.2	17.2	8.0	2858.9	279	59	742.0	26 Jun 1968
		b	0.0	0.0	0.0	0.0	1.5	16.9	24.8	24.1	14.4	4.0	1.0	0.3	87.0	(1968)	(1986)		
Sudhagad	36	a	0.0	0.1	0.0	2.5	27.5	735.5	1484.0	1067.7	452.1	118.7	27.7	6.4	3922.2	136	54	342.0	12 Jul 1962
		b	0.0	0.0	0.0	0.1	1.2	18.2	28.7	27.8	16.7	5.0	1.5	0.2	99.4	(1963)	(1972)		

TABLE - I (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Uran	48	a	0.5	1.1	0.0	0.5	15.5	545.1	789.2	555.7	324.8	60.7	7.4	1.2	2301.7	167	45	418.0	02 Jul 1984
		b	0.1	0.0	0.0	0.1	0.7	14.3	23.5	22.7	13.1	3.0	0.5	0.1	78.1	(1954)	(1941)		
Raigad		a	0.6	0.3	0.2	2.7	23.2	654.6	1240.9	879.4	410.7	101.5	23.4	3.9	3341.4	134	54		
(District)		b	0.1	0.0	0.0	0.2	1.3	16.8	27.1	25.8	15.8	4.5	1.3	0.2	93.1	(1963)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(RAIGAD)

Range in mm	No. of years	Range in mm	No. of years
1701 – 1800	1	3101 – 3200	4
1801 – 1900	0	3201 – 3300	3
1901 – 2000	0	3301 – 3400	4
2001 – 2100	0	3401 – 3500	5
2101 – 2200	2	3501 – 3600	1
2201 – 2300	0	3601 – 3700	0
2301 – 2400	2	3701 – 3800	2
2401 – 2500	0	3801 – 3900	1
2501 – 2600	0	3901 – 4000	2
2601 – 2700	2	4001 – 4100	2
2701 – 2800	2	4101 – 4200	2
2801 – 2900	4	4201 – 4300	2
2901 – 3000	2	4301 – 4400	2
3001 – 3100	4	4401 - 4500	1

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(ALIBAG)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.6	17.3	35.9	1965 Jan 13	9.4	1934 Jan13	72	64
February	28.9	18.1	37.8	1943 Feb 22	11.4	1961 Feb 08	71	64
March	30.5	21.1	40.0	1985 Mar 12	14.2	1982 Mar 03	74	66
April	31.6	24.0	40.0	1955 Apr 19	17.6	1968 Apr 01	75	72
May	32.3	26.4	38.6	1990 May 26	21.7	1943 May 25	76	75
June	31.1	26.0	37.1	1996 Jun 10	18.3	1945 Jun 14	86	83
July	29.5	25.2	33.5	1995 Jul 07	20.0	1949 Jul 14	89	86
August	29.1	24.8	33.4	1995 Aug 25	21.1	1949 Aug 01	89	85
September	29.8	24.4	34.9	1972 Sep 30	21.0	1994 Sep 21	89	81
October	31.9	23.6	38.1	1991 Oct 29	16.2	1990 Oct 22	81	73
November	32.0	21.0	37.1	1977 Nov 02	14.5	1981 Nov 25	72	66
December	30.2	18.9	35.3	1965 Dec 06	12.7	1968 Dec 28	72	65
Annual	30.5	22.6					79	73

TABLE - 4
Mean Wind Speed in km/hr.
(ALIBAG)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.7	8.6	9.9	11.6	14.0	21.8	27.8	25.6	13.5	7.8	7.2	6.8	13.5

TABLE - 5
Special Weather Phenomena
(ALIBAG)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	0.1	0.3	0.6	1.5	0.3	0.6	2.2	1.9	0.4	0.0	8.0
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(BHIRA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	33.6	14.6	39.2	1991 Jan 30	6.3	1973 Jan 28	74	40
February	35.4	15.1	41.8	1980 Feb 24	7.4	1972 Feb 15	75	34
March	38.5	18.5	44.5	1982 Mar 31	12.0	1973 Mar 03	68	32
April	39.9	22.2	45.5	1995 Apr 28	14.8	1968 Apr 01	72	38
May	38.6	24.0	45.0	1995 May 07	17.6	1968 May 06	73	48
June	31.8	23.8	44.0	1967 Jun 01	19.3	1969 Jun 13	89	78
July	27.7	21.8	35.4	1966 Jul 10	19.8	1973 Jul 15	95	91
August	27.1	22.6	34.4	1965 Aug 14	19.8	1972 Aug 09	96	91
September	29.6	22.4	37.0	1972 Sep 30	17.6	1972 Sep 23	95	85
October	33.7	21.4	39.5	1969 Oct 10	14.3	1971 Oct 30	83	71
November	34.0	18.6	39.5	1965 Nov 08	9.5	1972 Nov 27	72	64
December	33.2	17.0	38.2	1972 Dec 13	6.8	1968 Dec 27	70	59
Annual	33.6	20.1					80	61

TABLE – 4(a)
Mean Wind Speed in km/hr.
(BHIRA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.2	2.1	2.6	4.0	3.4	2.1	2.3	2.2	1.3	3.0	2.1	2.1	2.4

TABLE – 5(a)
Special Weather Phenomena
(BHIRA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.0	0.1	0.5	0.2	0.0	0.2	0.6	0.8	0.2	0.0	2.6
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.5

RATNAGIRI DISTRICT

The climate of this district is generally moist. The rainfall is plentiful and regular. The year may be divided into four seasons, the summer season from March to May, the southwest monsoon season from June to September, the post monsoon season from October to November and the winter season from December to February.

Rainfall

Records of rainfall in the district are available for 11 stations for the period ranging from 32 to 50 years. Tables 1 and 2 give the rainfall data for individual stations and for the district as a whole. The monsoon bursts over the district generally by the beginning of June and the rains continue with little intermission till about the middle of October. The average annual rainfall for the district as a whole is 3461.3 mm. The rainfall increases rapidly from the coast towards the Western Ghats on the eastern border of the district. In and near the Ghats, rainfall is very heavy. Practically the entire annual rainfall occurs during the months June to October. The rainiest month is July when one third of the annual rainfall is received. The variation from year to year in the rainfall is large. During the fifty year period 1941 to 1990,the highest annual rainfall for the district as a whole amounting to 146% of the normal occurred in 1955 while the lowest annual rainfall which was only 53% of the normal occurred in 1968. During the fifty year period there were eight years with less than 80% of the normal rainfall and one occasion each of two and three consecutive years of low rainfall. It will be seen from Table 2 that in 31 years out of 50 the rainfall in the district was between 3001 and 3900 mm.

On an average there are 100 rainy days (i.e. days with rainfall of 2.5 mm or more) in the year. As in the case of the amount of rainfall the number of rainy days are lower near the coast than in the eastern portion of the district near the Ghats. This number varies from 87 at Harnai (Obsy) to 110 at Devrukh.

The heaviest rainfall in 24 hours which occurred at any station in the district was 535.4 mm at Dapoli on 3rd June 1882.

Temperature

Meteorological data are available for two observatories in the district, i.e. Harnai and Ratnagiri. Being a coastal district, the variation of temperature during the day and through the season is not large.

In the hot season, temperatures rise slowly from March and May is the hottest month. With the onset of the monsoon, temperature drops by three to four degrees. Day temperatures during the monsoon are lower than those in the cold season. In the post monsoon months of October and November day temperatures increase and days in November are as hot as in May. Night temperatures are the lowest in January. Areas within 20 to 25 kilometres of the coast the sea breeze gives welcome relief in the hot months during the day time. Further inland during the hot months, both days and nights are oppressive and more so in the tract at the foot of the Western Ghats. Along the coast maximum temperatures rarely go beyond 38°C but in the interior they may reach 40 or 41°C. Highest maximum temperature ever recorded at Ratnagiri was 40.6°C on 29th March 1982 and the lowest minimum temperature ever recorded was 11.5°C on 2nd January, 1991. Highest and lowest temperature values at Harnai were 39.0°C on 30th May, 1991 and 12.8°C on 12th January, 1995 respectively.

Humidity

Owing to the proximity of the sea the district is on the whole very humid. Even during the winter and summer months the relative humidity is above 65%.

Cloudiness

During the monsoon season skies are heavily clouded to overcast. But in the rest of the year skies are clear or very lightly clouded.

Winds

Winds are moderate to strong and are mainly westerly or southwesterly during the monsoon months. In the rest of the year winds blow from directions between north and east in the mornings and between west and northwest in the afternoons.

Special Weather Phenomena

During the pre and post monsoon months the district experiences very strong winds sometimes reaching gale force particularly very near the coast and heavy rain in association with cyclonic storms which develop in the Arabian sea and move in close proximity to the coast. Thunderstorms are common during April to June and September to November.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and special weather phenomenon respectively for Harnai and Ratnagiri observatories.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Chiplun	49	a	2.0	0.0	0.7	6.5	37.8	792.1	1383.0	968.7	431.8	157.2	34.5	4.2	3818.5	183	61	533.4	04 Jun 1882
		b	0.1	0.0	0.0	0.6	2.2	18.9	28.6	27.4	17.4	6.6	2.0	0.2	104.0	(1955)	(1941)		
Dapoli	47	a	0.5	0.0	0.0	5.0	38.4	904.4	1301.6	950.2	409.6	101.8	27.5	2.9	3741.9	146	41	535.4	03 Jun 1882
		b	0.1	0.0	0.0	0.2	1.6	19.9	28.5	28.0	16.0	4.4	1.3	0.2	100.2	(1985)	(1941)		
Devrukh	46	a	2.0	0.0	1.1	6.3	41.6	853.8	1444.8	1023.8	419.5	171.2	47.4	6.3	4017.8	137	57	478.0	09 Jun 1991
		b	0.1	0.0	0.1	0.6	2.6	20.7	29.2	27.7	17.7	8.5	2.4	0.3	109.9	(1946)	(1973)		
Guhagar	47	a	0.2	0.0	0.1	2.2	31.7	707.1	899.5	635.7	350.0	101.7	20.8	2.9	2751.9	168	46	280.0	24 Jul 1993
		b	0.0	0.0	0.0	0.1	1.6	19.5	26.0	24.3	13.9	4.4	1.4	0.2	91.4	(1955)	(1968)		
Harnai	40	a	0.0	0.0	0.3	2.3	29.9	692.9	815.1	576.5	284.7	90.4	17.6	7.1	2516.8	155	53	436.5	25 Jun 1985
(Obsy)		b	0.0	0.0	0.0	0.1	1.6	17.9	24.6	23.3	14.0	3.8	1.0	0.3	86.6	(1974)	(1986)		
Khed	49	a	0.1	0.0	0.5	5.2	22.2	831.7	1378.3	927.4	410.9	154.8	31.5	4.8	3767.4	137	75	391.6	16 Jul 1965
		b	0.0	0.0	0.0	0.3	1.4	19.5	28.6	27.1	17.3	6.8	1.8	0.2	103.0	(1955)	(1972)		
Lanja	42	a	0.8	0.0	0.8	7.0	49.9	866.8	1281.1	900.1	360.9	150.7	42.6	8.5	3669.2	141	68	330.2	25 Jun 1958
		b	0.0	0.0	0.1	0.6	2.6	21.5	28.8	27.5	16.7	7.0	2.3	0.3	107.4	(1955)	(1986)		
Mandangad	46	a	0.5	0.0	0.0	4.8	31.5	937.1	1547.7	1113.5	414.9	127.6	27.7	4.3	4209.6	153	58	453.0	08 Jun 1991
		b	0.0	0.0	0.0	0.2	1.3	18.8	29.3	28.1	16.1	5.4	1.6	0.3	101.1	(1955)	(1941)		
Rajapur	49	a	1.0	0.0	0.1	2.0	40.0	851.5	1241.1	868.4	362.5	144.4	35.3	3.8	3550.1	167	43	354.0	01 Jul 1984
		b	0.1	0.0	0.0	0.2	2.2	20.9	28.8	26.4	15.1	6.0	2.0	0.2	101.9	(1990)	(1967)		

TABLE - I (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ratnagiri	32	a	0.0	0.0	0.0	2.8	45.0	897.3	991.6	725.9	302.5	115.1	32.5	5.6	3118.3	131	58	385.1	20 Jun 1992
		b	0.0	0.0	0.0	0.2	2.4	20.6	26.2	26.1	15.3	5.2	1.6	0.2	97.8	(1955)	(1972)		
Ratnagiri	50	a	1.5	0.1	0.2	3.6	42.7	831.7	929.7	629.8	322.2	107.2	38.3	6.7	2913.7	140	48	385.1	20 Jun 1992
(Obsy)		b	0.1	0.0	0.0	0.4	2.3	20.0	26.3	24.7	15.1	5.1	1.6	0.3	95.9	(1955)	(1941)		
Ratnagiri		a	0.8	0.0	0.3	4.3	37.3	833.3	1201.2	847.3	370.0	129.3	32.3	5.2	3461.3	146	53		
(District)		b	0.0	0.0	0.0	0.3	2.0	19.8	27.7	26.4	15.9	5.7	1.7	0.2	99.7	(1955)	(1968)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(RATNAGIRI)

Range in mm	No. of years	Range in mm	No. of years
1801 – 1900	1	3501 – 3600	1
1901 – 2000	0	3601 – 3700	2
2001 – 2100	1	3701 – 3800	8
2101 – 2200	2	3801 – 3900	4
2201 – 2300	0	3901 – 4000	1
2301 – 2400	0	4001 – 4100	0
2401 – 2500	1	4101 – 4200	2
2501 – 2600	1	4201 – 4300	3
2601 – 2700	2	4301 – 4400	1
2701 – 2800	0	4401 – 4500	1
2801 – 2900	1	4501 – 4600	0
2901 – 3000	1	4601 – 4700	0
3001 – 3100	4	4701 – 4800	0
3100 – 3200	1	4801 – 4900	0
3201 – 3300	2	4901 – 5000	0
3301 – 3400	5	5001 – 5100	1
3401 – 3500	4		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(HARNAI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.1	21.3	35.9	1990 Jan 22	12.8	1995 Jan 12	59	70
February	28.0	21.7	37.3	1966 Feb 24	13.9	1950 Feb 11	61	73
March	29.1	23.6	38.0	1981 Mar 06	16.1	1945 Mar 06	68	75
April	30.0	25.5	36.1	1949 Apr 22	17.8	1950 Apr 24	76	78
May	30.7	26.8	39.0	1991 May 30	20.0	1978 May 02	78	79
June	30.1	25.5	37.0	1978 Jun 21	13.3	1971 Jun 25	87	84
July	28.8	24.6	35.1	1974 Jul 15	17.8	1950 Jul 11	88	87
August	28.2	24.5	32.2	1947 Aug 16	20.6	1950 Aug 08	89	86
September	28.7	24.5	33.6	1969 Sep 02	20.8	1996 Sep 21	87	83
October	30.6	24.9	37.0	1977 Oct 26	19.0	1977 Oct 03	75	78
November	31.6	24.2	37.6	1969 Nov 16	17.6	1981 Nov 28	59	70
December	29.9	22.9	35.0	1976 Dec 24	15.0	1980 Dec 26	57	68
Annual	29.5	24.2					74	78

TABLE - 4
Mean Wind Speed in km/hr.
(HARNAI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
12.1	13.9	14.4	16.0	16.1	15.2	20.6	20.2	12.1	9.8	11.0	10.4	14.3

TABLE - 5
Special Weather Phenomena
(HARNAI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.1	0.2	0.6	1.0	0.4	0.2	0.4	1.5	0.3	0.2	4.9
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(RATNAGIRI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.9	18.9	37.0	1991 Jan 30	11.5	1991 Jan 02	65	57
February	30.8	19.5	38.3	1945 Feb 25	13.3	1901 Feb 13	66	59
March	31.5	22.3	40.6	1982 Mar 29	15.9	1971 Mar 06	72	64
April	32.2	25.1	37.5	1974 Apr 23	16.1	1905 Apr 01	73	68
May	32.7	26.4	37.8	1883 May 31	21.4	1972 May 14	74	69
June	30.6	24.8	39.0	1969 Jun 05	19.2	1987 Jun 25	87	82
July	29.0	24.2	32.8	1969 Jul 26	18.4	1976 Jul 19	90	87
August	28.6	24.0	34.2	1977 Aug 01	21.1	1931 Aug 06	90	86
September	29.4	23.6	35.7	1980 Sep 29	20.6	1962 Sep 10	89	82
October	31.9	23.5	37.5	1977 Oct 20	17.8	1903 Oct 30	78	73
November	33.1	21.5	37.2	1976 Nov 02	15.5	1964 Nov 27	62	63
December	32.4	20.3	36.3	1972 Dec 14	13.9	1968 Dec 27	59	58
Annual	31.1	22.8					75	71

TABLE – 4(a)
Mean Wind Speed in km/hr.
(RATNAGIRI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.0	7.2	7.6	8.4	9.5	11.7	15.8	13.3	7.2	6.0	6.7	7.0	9.0

TABLE – 5(a)
Special Weather Phenomena
(RATNAGIRI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.1	1.3	2.2	4.6	0.9	0.1	2.6	4.3	2.0	0.1	18.2
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.9

SINDHUDURG DISTRICT

The climate of this district is generally moist. The rainfall is plentiful and regular. The year may be divided into four seasons, the summer season from March to May, the southwest monsoon season from June to September, the post monsoon season from October to November and the winter season from December to February.

Rainfall

Records of rainfall in the district are available for 9 stations for the period ranging from 10 to 47 years. Tables 1 and 2 give the rainfall data for individual stations and for the district as a whole. The average annual rainfall for the district as a whole is 3185.1mm. The rainfall increases rapidly from the coast towards the Western Ghats on the eastern border of the district and also increases from north to south. In and near the Ghats, rainfall is very heavy. Practically the entire annual rainfall occurs during the months June to October. The rainiest month is July when one third of the annual rainfall is received. The variation from year to year in the rainfall is large. During the fifty year period 1941 to 1990, the year 1961 was one with the highest annual rainfall amounting to 125% of the normal. Rainfall amounting to only 52% of the normal occurred in 1941, the year with the lowest amount of rainfall. During the fifty year period there were six years with less than 80% of the normal rainfall. It will be seen from Table 2 that in 33 years out of 50 years the rainfall in the district was in between 2501 and 3500 mm.

On an average there are 101 rainy days in the year (i.e days with rainfall of 2.5 mm or more). As in the case of the amount of rainfall the number of rainy days are lower near the coast than in the eastern portion of the district near the Ghats. This number varies from 87 at Malvan to 113 at Banda and Sawantwadi.

The heaviest rainfall in 24 hours which occurred at any station in the district was 530.0 mm at Devgarh on 16th June 1992.

Temperature

Meteorological data are available for two observatories in the district at Deogarh and Vengurla. Being a coastal district, the variation of temperature during the day and through the seasons is not large.

In the hot season, temperatures rise slowly from March and May is the hottest month. With the onset of the monsoon temperature drops by two to three degrees. Day temperatures during the monsoon are low than those in the cold season. In the post monsoon months of October and November, day temperatures increase and days in November are as hot as in May. Night temperatures are the lowest in January. Areas within 20 to 25 kilometres of the coast are the most pleasant, particularly in the hot months with the sea breeze blowing, nearly throughout the day hours. Further inland, during the hot months, both days and nights are oppressive and more so in the tract at the foot of the Western Ghats. Along the coast maximum temperatures rarely go beyond 38°C. Highest maximum temperature ever recorded at Devgarh was 39.2°C on 5th March 1981 and the lowest minimum temperature ever recorded was 14.1°C on 17th November 1988. Highest and lowest temperature values for Vengurla were 40.0°C on 16th April, 1956 and 10.6°C on 30th December 1954 respectively.

Humidity

Owing to the proximity of the sea, the district is on the whole very humid. Even during the winter and summer months the relative humidity is above 60% in the afternoons. It is more in the mornings on most of the occasions.

Cloudiness

During the monsoon season skies are heavily clouded to overcast. But in the rest of the year skies are clear or very lightly clouded.

Winds

Winds are moderate to strong and are mainly westerly or northwesterly during the monsoon months. They are more strong towards north in the district. In the rest of the year

winds blow from directions between north and east in the mornings and between west and northwest in the afternoons.

Special Weather Phenomena

During the pre and post monsoon months, the district experiences very strong winds sometimes reaching gale force particularly very near the coast and heavy rain in association with cyclonic storms which develop in the Arabian Sea and move in close proximity to the coast. Thunderstorms are common in the post monsoon months and the latter part of the hot season. Occasional fog occurs in the post monsoon and latter part of winter season.

Tables 3, 4, 5 and Tables 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Devgarh and Vengurla observatories.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Banda	10	a	2.1	0.0	1.6	13.1	95.0	960.8	1293.9	642.3	413.0	163.6	49.9	8.6	3643.9	128	54	363.0	26 Jul 1931
		b	0.2	0.0	0.1	1.0	3.8	23.0	29.1	26.1	18.4	8.4	2.9	0.4	113.4	(1950)	(1941)		
Devgarh	46	a	2.7	0.1	0.5	3.6	58.1	741.1	764/1	510.2	290.0	92.8	19.3	5.7	2488.2	143	58	530.0	16 Jun 1992
		b	0.2	0.0	0.0	0.4	2.6	20.3	24.9	22.1	13.6	4.8	1.4	0.2	90.5	(1948)	(1941)		
Devgarh	37	a	0.7	0.1	0.5	5.0	52.0	833.8	827.7	517.8	258.6	108.9	36.8	10.8	2652.7	134	60	467.8	19 Jun 1971
(Obsy)		b	0.0	0.0	0.1	0.5	2.4	19.9	25.5	22.9	14.0	5.8	1.7	0.3	93.1	(1977)	(1972)		
Kankavli	42	a	0.0	0.0	2.2	5.6	62.2	874.6	1312.5	899.3	395.3	161.5	44.5	4.4	3762.1	148	61	325.0	30 Jun 1984
		b	0.0	0.0	0.1	0.3	2.9	21.4	29.0	27.1	17.2	8.0	2.3	0.2	108.5	(1957)	(1989)		
Kudal	45	a	0.6	0.0	1.0	4.3	62.9	906.0	1101.8	732.5	328.3	107.5	39.2	12.0	3296.1	166	51	345.0	20 Jun1981
		b	0.1	0.0	0.0	0.4	2.4	21.3	28.4	25.7	15.4	6.0	2.0	0.3	102.0	(1981)	(1976)		
Malvan	46	a	1.1	0.3	0.9	6.1	65.3	729.1	745.6	495.4	264.8	80.5	24.9	2.8	2416.8	156	47	427.2	16 Jun 1992
		b	0.1	0.0	0.0	0.3	2.6	19.7	23.7	21.3	12.8	4.4	1.4	0.2	86.5	(1955)	(1941)		
Sawantwadi	47	a	1.3	0.0	0.3	8.5	67.7	1085.0	1464.4	933.0	410.6	184.5	32.9	12.4	4200.6	158	50	340.2	02 Aug 1981
		b	0.1	0.0	0.0	0.6	3.3	23.3	29.5	27.9	17.5	8.9	2.0	0.3	113.4	(1952)	(1941)		
Vengurla	44	a	0.9	0.0	0.0	4.1	83.8	940.1	1011.0	578.2	300.0	114.0	33.3	5.2	3070.6	144	50	345.4	19 Jun 1901
		b	0.1	0.0	0.0	0.4	3.3	22.1	26.9	24.1	15.5	5.8	1.9	0.2	100.3	(1955)	(1941)		
Vengurla	36	a	0.2	0.1	0.7	3.9	83.2	940.2	1039.2	596.3	295.6	120.7	39.2	14.9	3134.2	131	62	334.0	25 Jun 1985
(Obsy)		b	0.0	0.0	0.1	0.4	3.0	22.5	27.4	24.4	15.1	6.5	2.4	0.4	102.2	(1961)	(1979)		
Sindhudurg		a	1.1	0.1	0.9	6.0	70.0	890.1	1062.2	656.1	328.5	126.0	35.6	8.5	3185.1	125	52		
(District)		b	0.1	0.0	0.0	0.5	2.9	21.5	27.2	24.6	15.5	6.5	2.0	0.3	101.1	(1961)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(SINDHUDURG)

Range in mm	No. of years	Range in mm	No. of years
1601 – 1700	1	2801 – 2900	1
1701 – 1800	0	2901 – 3000	3
1801 – 1900	0	3001 – 3100	6
1901 – 2000	1	3101 – 3200	2
2001 – 2100	0	3201 – 3300	5
2101 – 2200	2	3301 – 3400	5
2201 – 2300	0	3401 – 3500	3
2301 – 2400	1	3501 – 3600	2
2401 – 2500	0	3601 – 3700	1
2501 – 2600	4	3701 – 3800	5
2601 – 2700	1	3801 – 3900	2
2701 – 2800	3	3901 – 4000	2

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(DEVGARH)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.0	20.2	36.4	1991 Jan 29	15.4	1991 Jan 03	71	60
February	30.0	21.0	36.9	1993 Feb 10	16.7	1961 Feb 08	72	64
March	30.9	23.3	39.2	1981 Mar 05	18.4	1983 Mar 01	77	67
April	32.0	25.6	37.2	1956 Apr 16	19.7	1984 Apr 05	76	69
May	32.8	26.6	37.4	1985 May 10	19.4	1985 May 10	76	69
June	30.4	24.7	37.2	1948 Jun 03	17.8	1945 Jun 12	87	82
July	28.9	24.3	32.4	1966 Jul 08	18.0	1988 Jul 17	89	87
August	28.4	24.0	33.0	1965 Aug 14	17.3	1988 Aug 30	90	87
September	29.0	23.8	32.9	1966 Sep 27	17.3	1988 Sep 28	90	84
October	31.0	23.8	36.6	1980 Oct 05	15.5	1988 Oct 26	83	77
November	32.1	22.3	39.1	1983 Nov 27	14.1	1988 Nov 17	69	65
December	31.3	21.0	35.2	1967 Dec 07	14.5	1982 Dec 09	67	60
Annual	30.6	23.4					79	73

TABLE - 4
Mean Wind Speed in km/hr.
(DEVGARH)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
11.7	13.3	13.5	15.4	16.8	19.5	26.4	23.9	13.2	9,8	10.1	10.2	15.3

TABLE - 5
Special Weather Phenomena
(DEVGARH)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.1	0.7	1.0	1.2	0.4	0.1	0.6	2.3	0.9	0.2	7.5
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Fog	0.0	0.1	0.0	0.4	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	1.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(VENGURLA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	31.7	17.6	37.4	1990 Jan 21	11.3	1995 Jan 12	80	57
February	31.8	18.1	38.9	1952 Feb 24	12.8	1950 Feb 11	79	59
March	32.2	21.0	38.8	1984 Mar 02	14.4	1971 Mar 06	78	62
April	32.9	23.8	40.0	1956 Apr 16	17.0	1983 Apr 01	73	65
May	33.2	25.4	36.8	1978 May 03	21.4	1976 May 06	73	67
June	30.5	24.3	37.3	1977 Jun 04	20.0	1956 Jun 18	87	82
July	29.2	24.0	33.0	1983 Jul 12	18.6	1985 Jul 06	88	86
August	29.0	23.9	33.5	1965 Aug 14	21.6	1987 Aug 20	90	85
September	29.6	23.3	33.2	1979 Sep 19	20.1	1994 Sep 23	90	81
October	31.7	22.8	36.8	1986 Oct 26	16.9	1985 Oct 31	86	76
November	33.2	20.6	37.3	1980 Nov 13	12.8	1975 Nov 13	77	64
December	32.7	18.6	36.3	1989 Dec 03	10.6	1954 Dec 30	77	60
Annual	31.5	22.0					82	70

TABLE – 4(a)
Mean Wind Speed in km/hr.
(VENGURLA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.7	5.5	6.1	7.4	9.1	7.5	9.1	8.5	5.4	4.1	3.8	4.0	6.3

TABLE – 5(a)
Special Weather Phenomena
(VENGURLA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	0.3	2.0	2.9	4.9	1.5	0.9	1.4	5.1	1.6	0.5	21.3
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.2	0.1	1.8

THANE DISTRICT

The climate of this district is characterised by high humidity nearly all the year round, an oppressive summer season, well distributed and heavy rainfall during the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the summer season from March to May. The southwest monsoon season is from June to September. October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 14 stations for the period ranging from 10 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 2448.7 mm. The rainfall in the district increases from the coast towards the interior. The rainfall in the district varies from 2051.1 mm at Dahanu on the coast to 3121.1 mm at Jawhar in the interior. The rainfall during the southwest monsoon season, June to September constitutes about 96% of the annual rainfall. July is the rainiest month with rainfall of about 39% of the annual total. The variation in the annual rainfall from year to year in the district is large. In the fifty year period 1941 to 1990 the highest annual rainfall in the district amounting to 158% of the normal occurred in 1958 while 1972 was the year with the lowest annual rainfall which was only 63% of the normal. In the same fifty year period the annual rainfall in the district was less than 80% of the normal in 8 years, three being consecutive. It will be seen from Table 2 that the annual rainfall in the district was between 1701 mm and 2900 mm in 42 years out of 49.

On an average, there are 81 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 67 at Dahanu on the coast to 90 at Jawhar.

The heaviest rainfall recorded in 24 hours at any station in the district was 553.7 mm at Jawhar on 5th August 1968.

Temperature

There is a meteorological observatory in the district at Dahanu. The records of this observatory may be taken as fairly representative of the meteorological conditions in the district. But in the interior parts of the district, temperatures are likely to be slightly lower in the cold season and higher in the hot season than at Dahanu. Being a coastal district the variation of temperature during the day and the seasons is not large. After February, temperatures progressively increase till May, which is the hottest month with the mean daily maximum temperature at 33.4°C and mean daily minimum temperature at 26.8°C. In the summer season and in June before the onset of the monsoon day temperatures may sometime go above 37°C in the coastal parts while in the interior it may be a couple of degrees higher. The oppressive heat is on most days relieved by cool sea breezes particularly in the coastal regions. The afternoon thundershowers on some days during the hot season also bring welcome relief. With the onset of the southwest monsoon by about the first or second week of June the temperatures decrease a little. From about the beginning of October, when the southwest monsoon withdraws day temperatures increase and in October and November days are nearly as hot as in the summer, while nights become progressively cooler. After November temperatures decrease and in January, which is the coldest month, the mean daily maximum temperature is 27.5°C and the mean daily minimum temperature is 16.5°C. In the cold season , cold waves sometimes affect the district when the night temperatures may go down to less than 10°C.

The highest maximum temperature ever recorded at Dahanu was 40.6°C on 19th April 1955 and the lowest minimum temperature ever recorded was 8.3°C on 8th January 1945.

Humidity

Owing to the proximity of the sea, the district is on the whole very humid nearly all the year round. Even in winter, which is the driest part of the year, the relative humidity is between 65 and 70 percent.

Cloudiness

During the southwest monsoon season the skies are heavily clouded to overcast. In the rest of the year skies are mostly clear or lightly clouded.

Winds

Winds are generally strong except in winter and post monsoon season when they are moderate. During the southwest monsoon season, the wind speed is maximum. Winds during May and the monsoon months are mainly from directions between southwest and west. In the rest of the year winds blow from directions between east and southeast in the mornings. While in the afternoon wind blows from directions between north and northwest in winter and from west and northwest in the summer season.

Special Weather Phenomena

Some of the cyclonic storms in the Arabian Sea in the latter part of the summer and the post monsoon season either move in a northerly direction in the vicinity of the coast or cross the coast in this district or its neighbourhood. On such occasions the district experiences torrential rains and winds sometimes reaching gale force, particularly in the coastal regions. Thunderstorms occur in the latter part of the summer and in September - October. In the beginning and end of the southwest monsoon season rainfall is often associated with thunder. Fog appears rarely during winter season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Dahanu observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bassein	47	a	0.6	0.7	0.3	2.3	8.8	506.1	806.4	509.1	327.2	65.3	15.5	0.7	2243.0	143	49	358.4	11 Sep 1898
		b	0.0	0.1	0.0	0.2	0.7	13.7	23.7	20.9	12.5	2.9	0.7	0.1	75.5	(1983)	(1972)		
Bhiwandi	45	a	0.2	0.7	0.0	3.2	14.0	471.5	966.0	646.2	337.4	73.6	9.8	1.2	2523.8	142	61	469.1	17 Jul 1885
		b	0.0	0.1	0.0	0.2	0.7	13.8	25.5	23.9	13.8	3.4	0.6	0.1	82.1	(1954)	(1968)		
Dahanu	48	a	0.6	0.1	0.0	2.7	7.5	434.1	771.0	473.1	293.3	43.5	21.5	3.7	2051.1	179	47	481.0	01 Sep 1958
		b	0.1	0.0	0.0	0.1	0.4	11.6	22.0	18.9	11.3	2.0	0.8	0.2	67.4	(1954)	(1986)		
Dahanu (Obsy)	40	a	0.2	0.2	0.1	0.2	9.2	465.3	733.7	500.6	299.6	50.2	16.8	1.4	2077.5	178	47	481.0	01 Sep 1958
		b	0.0	0.0	0.0	0.0	0.5	12.4	21.5	19.8	11.0	2.2	0.9	0.1	68.4	(1954)	(1986)		
Jawhar	35	a	0.0	0.0	0.0	1.1	16.6	436.4	1272.8	898.9	397.7	71.0	24.1	2.5	3121.1	154	58	553.7	05 Aug 1968
		b	0.0	0.0	0.0	0.1	0.9	14.7	28.3	27.1	14.5	3.5	1.1	0.1	90.3	(1959)	(1987)		
Kalyan	44	a	0.8	0.7	0.0	1.8	10.8	477.8	1023.4	660.6	305.0	91.0	24.2	0.4	2596.5	163	55	458.5	17 Jul 1885
		b	0.1	0.0	0.0	0.1	0.7	13.8	25.6	23.7	13.7	3.7	0.8	0.0	82.2	(1958)	(1989)		
Mahim	43	a	1.4	0.0	0.6	3.6	8.6	439.7	827.9	515.9	305.9	61.9	13.0	0.0	2178.5	168	46	356.6	21 Sep 1923
		b	0.1	0.0	0.0	0.1	0.5	12.6	23.1	20.3	12.4	2.6	0.6	0.0	72.3	(1958)	(1986)		
Mokhada	47	a	1.9	0.8	0.4	3.6	17.1	325.8	1009.1	655.5	374.4	73.8	21.5	2.0	2485.9	141	59	394.7	02 Jul 1941
		b	0.1	0.1	0.0	0.3	1.0	12.8	27.3	25.5	15.8	4.3	1.1	0.2	88.5	(1956)	(1972)		
Murbad	45	a	1.1	0.4	0.9	3.3	20.1	376.9	969.4	641.5	352.0	86.0	14.9	2.4	2468.9	146	43	386.6	23 Jul 1921
		b	0.1	0.1	0.1	0.3	1.3	13.5	26.0	23.8	15.2	4.0	0.8	0.2	85.4	(1956)	(1985)		

TABLE -1 (Contd….)
Normals and Extremes of rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Shahapur	47	a	0.5	0.1	0.7	1.5	15.7	412.8	1102.2	703.5	334.3	69.3	18.9	0.6	2660.1	166	62	441.2	06 Jul 1905
		b	0.1	0.0	0.1	0.1	0.8	13.8	26.9	26.3	15.3	3.8	0.8	0.0	88.0	(1961)	(1972)		
Talasari	10	a	0.0	0.0	0.0	0.0	9.6	302.0	872.1	609.1	249.9	43.8	11.5	0.4	2098.4	147	68	217.0	17 Jul 1988
		b	0.0	0.0	0.0	0.0	0.3	10.4	25.0	24.9	12.4	3.1	0.6	0.1	76.8	(1983)	(1987)		
Thane	44	a	1.1	0.4	0.0	2.2	16.4	525.0	961.0	641.2	355.8	71.4	16.6	1.7	2592.8	169	64	391.7	26 Jun 1958
		b	0.1	0.0	0.0	0.2	0.9	15.1	27.0	25.1	15.6	3.8	0.6	0.1	88.5	(1958)	(1974)		
Ulhasnagar	10	a	0.0	0.0	0.0	0.0	2.0	453.0	953.1	643.6	202.5	60.4	3.0	1.8	2319.4	117	74	210.0	23 Jul 1981
		b	0.0	0.0	0.0	0.0	0.2	13.3	24.5	23.7	10.8	3.3	0.5	0.2	76.5	(1983)	(1989)		
Vada	49	a	1.0	0.2	0.2	2.6	10.5	441.9	1176.3	759.1	362.7	85.2	24.4	2.7	2866.8	171	62	459.2	19 Jun 1953
		b	0.1	0.0	0.0	0.2	0.6	13.8	26.2	25.0	15.0	3.7	1.0	0.1	85.7	(1959)	(1982)		
Thane		a	0.7	0.3	0.2	2.0	11.9	433.4	960.3	632.7	321.3	67.6	16.8	1.5	2448.7	158	63		
(District)		b	0.1	0.0	0.0	0.1	0.7	13.2	25.2	23.5	13.5	3.3	0.8	0.1	80.5	(1958)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(THANE)

Range in mm	No. of years	Range in mm	No. of years
1501 – 1600	1	2701 – 2800	4
1601 – 1700	0	2801 – 2900	4
1701 – 1800	4	2901 – 3000	0
1801 – 1900	2	3001 – 3100	0
1901 – 2000	2	3101 – 3200	2
2001 – 2100	5	3201 – 3300	0
2101 – 2200	3	3301 – 3400	0
2201 – 2300	1	3401 – 3500	3
2301 – 2400	4	3501 – 3600	0
2401 – 2500	3	3601 – 3700	0
2501 – 2600	5	3701 – 3800	0
2601 – 2700	5	3801 – 3900	1

(Data available for 49 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(DAHANU)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	27.5	16.5	35.4	1967 Jan 17	8.3	1945 Jan 08	66	67
February	28.2	17.4	38.6	1966 Feb 26	8.8	1961 Feb 09	65	66
March	30.4	20.7	40.5	1982 Mar 30	12.8	1945 Mar 06	67	64
April	32.3	24.0	40.6	1955 Apr 19	17.8	1968 Apr 01	73	67
May	33.4	26.8	38.3	1944 May 08	19.9	1966 May 08	75	70
June	32.5	26.5	38.3	1951 Jun 11	15.0	1969 Jun 30	83	77
July	30.3	25.2	36.8	1966 Jul 02	18.4	1960 Jul 25	88	84
August	29.7	24.8	33.1	1983 Aug 23	20.6	1951 Aug 31	88	83
September	30.3	24.1	36.7	1966 Sep 07	20.8	1976 Sep 19	87	78
October	32.3	23.2	37.6	1969 Oct 27	17.2	1954 Oct 30	76	70
November	32.0	20.6	37.8	1948 Nov 23	12.8	1988 Nov 30	66	69
December	29.7	18.1	35.9	1966 Dec 18	10.0	1968 Dec 28	66	70
Annual	30.7	22.3					75	72

TABLE - 4
Mean Wind Speed in km/hr.
(DAHANU)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
10.4	10.9	11.8	12.7	14.6	17.2	20.5	21.0	12.9	9.1	8.7	9.0	13.2

TABLE - 5
Special Weather Phenomena
(DAHANU)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.2	0.1	0.0	0.5	2.6	0.8	0.4	2.3	1.1	0.5	0.0	8.5
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2

MADHYA MAHARASHTRA

AHMEDNAGAR DISTRICT

The climate of this district is characterized by a hot summer and general dryness during the major part of the year except during the southwest monsoon season. The cold season is from December to the end of February. The period from March to the first week of June is the hot season. It is followed by the southwest monsoon season which lasts till the end of September. October and November constitute the post monsoon or the retreating southwest monsoon season.

Rainfall

Records of rainfall in the district are available for 14 raingauge stations for the period ranging from 34 to 50 years. Tables 1 and 2 give the details of the rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 568.7 mm. The district is mostly in rain shadow region to the east of Western Ghats. From the western border of the district the rainfall decreases rapidly as one proceeds towards east. But from a line roughly north south in the central parts of the district the rainfall gradually increases towards the east. About 77% of the annual rainfall in the district is received during the southwest monsoon season, September being the rainiest month. The variation in the annual rainfall from year to year is not large. The highest annual rainfall amounting to 154% of the normal occurred in 1956, while 1972 was the year with the lowest annual rainfall, which was 38% of the normal. In the fifty year period from 1941 to 1990 the annual rainfall in the district was less than 80% of the normal in 10 years with two and three consecutive years of such rainfall occurring once. It will be seen from Table 2 that the annual rainfall in the district was between 401 and 700 mm in 40 years out of 50.

On an average there are 34 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 30 at Rahuri and Sangamner to 40 at Jamkhed.

The heaviest rainfall in 24 hours recorded at any station in the district was 418.0 mm at Nevasa on 31st August 1974.

Temperature

There is a meteorological observatory in the district at Ahmednagar functioning from 1890. The records of this observatory may be taken as representative of the meteorological conditions prevailing over the district. The cold season commences by about the middle of November and continues till the end of February. December is the coldest month of the year with the mean daily maximum temperature at 30.2°C and the mean daily minimum temperature at 12.5°C. During the cold season the district is sometimes affected by cold waves in association with the passage of western disturbances across North India, causing drop of minimum temperature to 2 to 3°C. From March to the onset of southwest monsoon, the day temperatures increase progressively, the nights remaining comparatively cool. In the hot season, the sweltering heat of the afternoons is sometimes relieved by thundershowers. May is the hottest month of the year with the mean daily maximum temperature at 39.6°C and the mean daily minimum temperature at 22.6°C. On individual days during the hot weather period maximum temperature occasionally goes upto about 44°C. With the onset of the southwest monsoon in the district there is an appreciable drop in temperature and weather becomes pleasant. With the withdrawal of the monsoon by about the first week of October day temperatures increase slightly and a secondary maximum in day temperatures is recorded in October. However the night temperatures decrease steadily after the withdrawal of the monsoon.

The highest maximum temperature ever recorded at Ahmednagar was 43.9°C on 11th May 1967 and the lowest minimum temperature ever recorded was 2.2°C on 7th January 1945.

Humidity

The air is generally dry during the months from February to May, particularly in the afternoons, when the humidity is about 24% on an average. The values of relative humidity during southwest monsoon period are between 65 and 80%. Thereafter they decrease rapidly.

Cloudiness

Skies are generally heavily clouded to overcast during monsoon months. In the post monsoon months the cloudiness decreases. In the rest of the year the skies are clear or lightly clouded.

Winds

Winds are generally light to moderate with some strengthening in the southwest monsoon season. In the southwest monsoon season, winds are from directions between southwest and northwest. In the post monsoon season winds from the northwest and southeast are common in the mornings while in the afternoons the winds blow from northeast. In the cold season winds between northwest and northeast are more common. In the summer season northwesterly winds are more common, but after May westerlies-southwesterlies also begin to blow in the afternoons.

Special Weather Phenomena

Thunderstorms occur during summer and from June to October months. Dust storms are very rare in the district. The district experiences cloudy to overcast skies with widespread heavy rain in association with the monsoon depressions that form in Bay of Bengal and move across central parts of the country.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Ahmednagar observatory.

TABLE - 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ahmednagar	50	a	2.3	1.0	3.9	7.0	23.0	100.7	91.7	92.1	177.8	65.5	32.4	10.4	607.8	189	34	190.0	18 Sep 1970
(Obsy)		b	0.2	0.1	0.4	0.7	1.7	6.3	6.1	5.5	8.4	3.7	1.7	0.6	35.4	(1990)	(1972)		
Akola	50	a	0.8	0.1	1.6	6.7	17.3	87.2	150.1	86.6	115.4	65.0	30.0	3.9	564.7	199	32	256.0	05 Jun 1976
		b	0.1	0.0	0.2	0.7	1.4	5.6	10.4	7.9	6.4	3.4	1.4	0.3	37.8	(1956)	(1985)		
Jamkhed	49	a	3.3	2.2	3.5	8.5	25.7	126.9	131.2	118.2	194.7	64.7	23.3	9.2	711.4	189	31	213.4	07 Sep 1893
		b	0.2	0.1	0.4	0.8	1.9	7.1	8.0	7.1	8.9	4.0	1.3	0.6	40.4	(1983)	(1972)		
Karjat	49	a	2.1	1.2	5.0	7.8	30.1	98.5	84.8	78.8	173.0	78.1	25.0	5.6	588.5	194	39	171.7	19 May 1960
		b	0.2	0.2	0.4	0.8	2.0	5.4	5.8	5.6	8.3	4.3	1.3	0.4	34.7	(1948)	(1976)		
Kopargaon	46	a	1.7	0.8	2.5	2.7	15.6	95.9	93.2	73.6	112.4	60.5	23.1	9.1	491.1	204	37	330.2	15 Oct 1951
		b	0.2	0.2	0.2	0.3	1.0	5.8	7.4	5.9	7.0	3.1	1.2	0.6	32.9	(1956)	(1972)		
Mirajgaon	39	a	2.6	1.5	2.1	6.0	22.0	98.1	81.6	69.5	134.7	55.2	21.7	9.6	504.6	200	31	190.5	19 Apr 1937
		b	0.2	0.1	0.2	0.5	1.6	5.5	6.1	5.5	6.6	3.0	1.1	0.8	31.2	(1948)	(1972)		
Nevasa	49	a	2.7	0.4	2.6	2.7	18.9	103.7	102.3	97.3	152.7	58.2	27.1	7.4	576.0	154	32	418.0	31 Aug 1974
		b	0.3	0.0	0.3	0.3	1.1	5.9	6.4	6.9	7.4	3.3	1.3	0.6	33.8	(1956)	(1982)		
Par ner	48	a	1.8	1.5	0.5	6.1	27.7	95.6	89.1	84.1	144.0	65.9	33.4	8.2	557.9	153	36	150.1	14 Sep 1902
		b	0.1	0.1	0.1	0.6	2.0	5.8	7.2	6.5	8.3	4.0	1.9	0.5	37.1	(1956)	(1972)		
Pathardi	47	a	2.7	3.1	2.2	4.9	18.2	108.3	112.9	104.6	163.8	60.0	26.8	7.4	614.9	162	33	163.8	12 Sep 1926
		b	0.2	0.3	0.2	0.6	1.4	6.2	7.3	6.6	8.0	3.1	1.3	0.5	35.7	(1943)	(1972)		

TABLE – 1 (Contd…….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Rahuri	48	a	1.9	1.8	2.0	2.0	15.2	93.5	95.3	80.8	142.6	79.5	29.4	6.2	550.2	207	26	180.0	02 Jul 1973
		b	0.2	0.1	0.2	0.3	1.2	5.1	5.2	4.8	6.9	3.9	1.4	0.4	29.7	(1974)	(1972)		
Sangamner	48	a	3.0	0.3	1.4	4.2	17.7	76.9	87.0	65.1	121.9	58.3	28.7	3.3	467.8	175	24	125.2	15 Sep1889
		b	0.2	0.0	0.2	0.5	1.2	4.7	6.5	5.1	6.6	3.5	1.3	0.3	30.1	(1956)	(1972)		
Shevgaon	46	a	1.8	2.3	3.0	2.4	17.1	113.5	115.3	104.7	171.7	57.4	21.1	9.0	619.3	166	28	269.0	02 Sep 1962
		b	0.2	0.2	0.3	0.2	1.4	6.5	6.5	6.6	7.9	3.5	1.2	0.6	35.1	(1962)	(1972)		
Shrigonda	47	a	0.6	0.8	4.4	7.2	27.3	101.1	68.3	69.6	156.6	86.8	25.6	5.2	553.5	170	45	188.0	22 Jul 1958
		b	0.1	0.1	0.4	0.6	1.7	5.5	5.4	4.9	7.5	4.7	1.6	0.4	33.0	(1948)	(1945)		
Shrirampur	34	a	0.3	3.2	5.4	1.8	22.8	114.3	93.5	94.3	115.6	64.6	29.9	6.2	551.9	232	37	218.6	13 Nov 1966
		b	0.0	0.1	0.2	0.2	1.3	5.9	6.0	5.6	6.7	3.1	1.1	0.3	30.5	(1987)	(1972)		
Ahmednagar		a	2.0	1.4	2.9	5.0	21.3	101.1	99.6	87.2	148.3	65.6	27.0	7.3	568.7	154	38		
(District)		b	0.2	0.1	0.3	0.5	1.5	5.8	6.7	6.0	7.5	3.6	1.4	0.5	34.1	(1956)	(1972)		

a : Normal rainfall in mm.

b : Average number of rainy days (days with rainfall of 2.5 mm or more)

* : Based on all available data upto 1996.

** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(AHMEDNAGAR)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	601 – 700	13
301 – 400	3	701 – 800	4
401 – 500	9	801 – 900	2
501 – 600	18		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(AHMEDNAGAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.8	12.2	36.1	1897 Jan 19	2.2	1945 Jan 07	58	34
February	33.3	14.0	38.9	1897 Feb 19	2.8	1911 Feb 02	49	28
March	36.7	17.9	41.0	1973 Mar 29	7.5	1980 Mar 17	38	21
April	39.5	21.6	43.5	1979 Apr 28	9.5	1981 Apr 17	36	20
May	39.6	22.6	43.9	1967 May 11	15.2	1982 May 19	49	27
June	34.1	22.3	43.3	1920 Jun 03	18.3	1907 Jun 18	75	57
July	30.4	21.6	37.7	1966 Jul 11	17.8	1944 Jul 19	82	69
August	29.6	20.9	39.5	1982 Aug 02	16.1	1913 Aug 29	83	70
September	31.0	20.2	38.2	1972 Sep 15	10.7	1979 Sep 16	82	65
October	32.8	18.9	39.7	1981 Oct 22	10.6	1914 Oct 24	68	48
November	31.0	15.4	35.6	1898 Nov 10	5.6	1892 Nov 21	62	45
December	30.2	12.5	35.0	1980 Dec 20	3.3	1926 Dec 28	62	41
Annual	33.2	18.3					62	44

TABLE - 4
Mean Wind Speed in km/hr.
(AHMEDNAGAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.2	6.0	6.9	7.9	9.5	10.3	10.6	9.5	7.0	6.4	5.8	4.8	7.5

TABLE - 5
Special Weather Phenomena
(AHMEDNAGAR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	0.4	0.3	0.3	0.7	0.1	0.1	0.2	0.2	0.0	0.0	2.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1

DHULE DISTRICT

The climate of this district, is on the whole dry except during the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The southwest monsoon season which follows thereafter lasts till September. October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 6 raingauge stations for the period ranging from 14 to 49 years. Tables 1 and 2 give the details of the rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 614.7 mm. Shirpur near the northeastern border has an annual rainfall of 708.9 mm. The rainfall during the southwest monsoon constitutes about 87% of the annual rainfall, July being the rainiest month. Some rainfall is received mostly as thundershowers in the post monsoon season. There are not much variations in the rainfall from year to year. In the fifty year period 1941-1990 the highest annual rainfall in the district amounting to 163% of the normal occurred in 1976 while the lowest annual rainfall which was only 54% of the normal occurred in 1986. In the same fifty year period, the rainfall in the district as a whole was less than 80% of the normal in 4 years. It will be seen from Table 2 that the annual rainfall in the district was between 501 and 800 mm in 34 years out of 50.

On an average there are about 36 rainy days (i.e. days with rainfall 2.5 mm or more) in a year in the district. This number varies from 32 at Sakri to 40 at Pimpalner.

The heaviest rainfall in 24 hours recorded at any station in the district was 236.2 mm at Sakri on 26th July 1896.

Temperature

There is no meteorological observatory in the district, so the description which follows is that of Nadurbar observatory in the neighbouring district where similar climatic conditions prevail. From about the latter half of February temperatures increase steadily till May which is the hottest month of the year with the mean daily maximum temperature at 40.3°C and the mean daily minimum temperature at 25.8°C. Hot dry winds blow during April and May and the heat is intense with the maximum temperatures going upto 46°C on some days. Thundershowers occur during the afternoons and bring welcome relief from the heat on some days. With the onset of the southwest monsoon by about the second week of June there is an appreciable drop in day temperatures and the weather is pleasant in the southwest monsoon season. By about the beginning of October when the southwest monsoon withdraws day temperatures begin increasing and a secondary maximum in day temperature is reached in October. The night temperatures however steadily decrease. From November both day and night temperatures drop rapidly till January which is the coldest month with the mean daily maximum temperature at about 30.2°C and the mean daily minimum temperature at about 15.4°C. During cold waves, which sometimes affect the district in association with western disturbances passing across north India in the cold season, the minimum temperature may drop down upto 7°C.

Humidity

Except during the southwest monsoon season when the humidity is above 70%, the air is rather dry over the district during the year. The driest part of the year is the summer season, when the relative humidity is about 25% in the afternoons, in the months March and April.

Cloudiness

During the southwest monsoon season the skies are heavily clouded to overcast. In the rest of the year, the skies are mostly clear or lightly clouded.

Winds

Winds are generally light to moderate with some strengthening in force during the summer and monsoon seasons. In the summer and southwest monsoon season

winds are mainly southwesterly to westerly. In the post monsoon season, winds are light and change in wind direction from southwest to northeast/southeast takes place and predominates in the winter season. After February winds blow mostly from directions between southwest and west.

Special Weather Phenomena

As there is no observatory in the district, the description which follows is based on observatory in the neighbouring district. In association with the westward passage of depressions from the Bay of Bengal in the southwest monsoon season and to a lesser extent, storms or depressions from the Arabian sea in the post monsoon season the district gets widespread heavy rain and strong wind. Thunderstorms occur in the summer and monsoon months. Fog on few occasions is noticed during the post monsoon and winter months.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Dhule	49	a	2.7	0.4	2.9	0.5	13.1	136.1	152.1	137.9	130.9	37.8	22.2	7.5	644.1	217	40	173.7	05 Aug 1968
		b	0.3	0.0	0.1	0.1	0.8	6.9	9.5	8.6	6.4	2.1	1.1	0.4	36.3	(1949)	(1952)		
Gidhade	14	a	2.4	2.9	6.2	1.3	4.0	119.5	152.1	150.2	72.7	29.2	25.9	2.6	569.0	159	68	168.9	06 Jun 1976
(Hydro)		b	0.2	0.2	0.4	0.1	0.4	5.4	9.9	9.4	5.2	1.9	1.5	0.3	34.9	(1976)	(1984)		
Pimpalner	44	a	2.5	3.4	3.1	1.7	14.7	109.2	187.5	129.7	121.8	44.0	25.2	6.0	648.8	207	53	209.5	16 Aug 1944
		b	0.3	0.2	0.2	0.3	0.9	5.3	12.4	10.1	6.6	2.5	1.2	0.3	40.3	(1976)	(1972)		
Sakri	46	a	3.9	1.9	4.5	3.0	11.8	108.6	133.1	107.3	101.0	36.7	21.5	6.7	540.0	209	51	236.2	26 Jul 1896
		b	0.3	0.2	0.2	0.2	0.7	5.7	8.2	6.7	6.0	2.3	1.1	0.6	32.2	(1976)	(1986)		
Shirpur	48	a	2.8	1.2	4.2	2.2	13.5	117.2	229.9	174.1	111.4	36.2	14.2	2.0	708.9	166	47	208.3	16 Jul 1920
		b	0.2	0.2	0.2	0.2	0.8	5.6	11.4	10.1	6.1	2.1	0.9	0.3	38.1	(1958)	(1952)		
Sindkheda	49	a	3.6	1.0	0.9	0.3	5.9	115.0	165.2	138.3	93.2	33.1	17.4	2.8	576.7	169	40	203.2	17 Aug 1944
		b	0.3	0.1	0.1	0.0	0.5	5.7	10.3	8.1	5.6	1.7	0.9	0.2	33.5	(1944)	(1952)		
Dhule		a	3.0	1.8	3.6	1.5	10.5	117.6	170.0	139.6	105.2	36.2	21.1	4.6	614.7	163	54		
(District)		b	0.3	0.2	0.2	0.1	0.7	5.8	10.3	8.8	6.0	2.1	1.1	0.4	36.0	(1976)	(1986)		

a : Normal rainfall in mm.
b : Average number of rainy days (i.e. days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1995
** : Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(DHULE)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	3	701 – 800	6
401 – 500	5	801 – 900	5
501 – 600	17	901 – 1000	3
601 – 700	11		

(Data available for 50 years only)

JALGAON DISTRICT

The climate of Jalgaon district is generally dry except during the southwest monsoon season (June to September). The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. June to September is the southwest monsoon season and October and November form the post monsoon season.

Rainfall

Records of rainfall in the district are available for 13 stations for sufficiently long period ranging from 47 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 751.1mm. About 88% of the annual rainfall is received during the monsoon months June to September. July and August are the months with the highest rainfall. The central parts of the district comprising of the talukas of Raver, Jamner and Pachora get more rain than the rest of the district. Jamner and Pachora receive the highest rainfall of about 818 mm while Edalabad, the station with the least rainfall receives 670.6 mm. The variation of rainfall over the district from year to year is not large. During the 50 year period 1941 to 1990, the year 1949 was the one with the highest rainfall amounting to 139% of the normal. In 1952, the year with the lowest rainfall, only 50% of the normal was received. In the same 50 year period there were 11 years when the district as a whole received less than 80% of the normal rainfall. Rainfall less than 80% of the normal occurred in two and three consecutive years, once each. It will be seen from Table 2 that in 46 out of 50 years, the annual rainfall in the district was between 501 and 1000 mm.

On an average, the district receives rainfall of 2.5 mm or more on 42 days in a year. This number varies from 39 at Amalner and Edalabad to 45 at Jalgaon observatory.

The heaviest rainfall in 24 hours at any station in the district which amounted to 298.5 mm, occurred at Jamner on 1st July 1941.

Temperature

Jalgaon is the only meteorological observatory in the district. The data for this observatory may be taken to be fairly representative of conditions over the whole district. January is the coldest month with the mean daily minimum temperature at 11.9°C and the mean daily maximum temperature at 30.3°C. In association with the cold waves, which affect the district in the wake of western disturbances, minimum temperatures may drop down upto about 2°C and slight frost may also occur. Temperatures begin to rise steadily from the beginning of March and by May, which is the hottest month of the year, the mean daily maximum temperature reaches about 42.7°C. The highest maximum temperature ever recorded at Jalgaon is 48.4°C on 28th May 1989. Temperatures drop appreciably with the onset of the monsoon after the first week of June. The monsoon period is generally pleasant. With the withdrawal of the monsoon by the end of September, day temperatures rise a little in October and both day and night temperatures begin to drop rapidly by November. The lowest minimum temperature ever recorded at Jalgaon was 1.7°C on 3rd December 1937 and 7th January 1945.

Humidity

Except during the monsoon months the air is generally dry particularly in the afternoons. During the southwest monsoon season the humidity is high and is about 83% in the mornings. Summer is the driest part of the year, the humidity being 15-20% in the afternoons.

Cloudiness

Skies are generally clear or lightly clouded except during the monsoon season when heavily clouded to overcast conditions prevail.

Winds

In summer and southwest monsoon season winds are moderate to strong in strength and are mostly from westerly direction. During the post monsoon and winter season winds are moderate and are from easterly/northeasterly direction. Westerlies appear from January/February months in the afternoons and predominate till September.

Special Weather Phenomena

In association with monsoon depressions and to a lesser extent post monsoon storms, the district experiences strong winds and widespread rain. Thunderstorms occur at any time of the year, but they are more common in the summer and monsoon months. In cold season fog occurs occasionally.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Jalgaon observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Amalner	49	a	3.6	2.7	4.6	1.8	6.1	118.1	201.8	182.1	119.5	45.3	23.0	5.7	714.3	212	54	216.0	06 Aug 1968
		b	0.3	0.3	0.3	0.1	0.5	6.1	11.1	10.2	6.1	2.4	1.1	0.4	38.9	(1976)	(1962)		
Bhadgaon	49	a	3.4	1.8	3.8	2.0	11.4	125.2	179.2	211.3	153.0	39.1	22.9	8.8	761.9	169	57	234.4	25 Jul 1896
		b	0.3	0.1	0.3	0.2	0.7	6.6	11.4	11.3	7.7	2.1	1.0	0.7	42.4	(1958)	(1978)		
Bhusaval	50	a	2.9	4.9	2.1	1.2	7.2	111.7	211.2	193.3	119.0	36.4	19.7	6.1	715.7	166	46	237.6	13 Jun 1970
		b	0.4	0.3	0.2	0.2	0.6	6.2	12.5	11.2	7.2	2.2	0.9	0.4	42.3	(1948)	(1971)		
Chalisgaon	50	a	5.1	2.1	5.1	1.3	15.0	125.8	173.9	185.5	176.9	51.2	24.4	8.8	775.1	178	61	213.9	25 Jul 1896
		b	0.6	0.1	0.4	0.1	0.9	6.6	10.0	9.9	8.8	2.5	1.2	0.5	41.6	(1956)	(1950)		
Chopada	47	a	4.5	2.2	2.6	1.6	5.2	131.7	219.4	221.0	122.1	33.9	12.9	4.2	761.3	154	52	250.0	06 Aug 1968
		b	0.4	0.3	0.2	0.1	0.5	6.6	12.3	11.7	7.0	1.9	0.8	0.4	42.2	(1970)	(1952)		
Edalabad	49	a	3.7	6.1	3.4	0.6	7.0	105.0	179.8	179.8	123.5	39.4	16.3	6.1	670.6	177	48	233.9	31 Jul 1933
		b	0.5	0.4	0.3	0.1	0.5	5.7	10.7	10.2	6.9	2.0	0.9	0.5	38.7	(1944)	(1952)		
Erandol	47	a	4.2	2.7	2.0	0.9	6.0	110.8	197.1	191.2	107.5	39.4	15.2	4.6	681.6	167	39	274.4	17 Aug 1990
		b	0.5	0.2	0.3	0.1	0.5	6.1	11.7	11.3	6.1	1.8	0.9	0.4	39.9	(1990)	(1982)		
Jalgaon (Obsy)	49	a	4.2	2.8	5.0	2.7	8.2	133.6	232.0	203.5	118.9	37.1	18.3	9.7	776.0	147	59	190.8	06 Aug 1968
		b	0.4	0.3	0.6	0.2	0.8	6.2	13.8	12.3	7.0	2.0	0.9	0.7	45.2	(1959)	(1952)		
Jamner	49	a	4.1	2.9	4.1	0.5	11.2	132.4	220.7	228.2	140.6	47.9	22.7	3.4	818.7	170	35	298.5	01 Jul 1941
		b	0.3	0.3	0.3	0.1	0.7	6.3	13.0	12.2	7.4	2.3	1.0	0.3	44.2	(1979)	(1971)		

TABLE - I (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Pachora	49	a	2.1	3.5	4.6	1.7	12.3	128.4	197.6	223.8	168.7	42.8	25.1	7.4	818.0	159	46	215.0	08 Aug 1986
		b	0.3	0.2	0.3	0.2	0.7	6.8	12.1	11.7	8.0	2.0	1.2	0.6	44.1	(1956)	(1971)		
Parola	47	a	3.3	2.1	1.7	4.2	7.1	122.1	185.1	193.8	119.2	37.8	16.2	6.3	698.9	182	45	224.0	06 Aug 1968
		b	0.4	0.2	0.3	0.2	0.5	6.3	11.2	10.7	7.2	1.9	0.9	0.4	40.2	(1983)	(1950)		
Raver	47	a	5.4	4.8	6.5	0.9	11.6	137.0	192.1	214.9	132.6	54.3	25.0	7.1	792.2	158	54	226.0	13 Jun 1970
		b	0.4	0.5	0.4	0.1	0.7	7.4	10.6	11.3	8.0	2.7	1.1	0.6	43.8	(1970)	(1984)		
Yaval	50	a	3.2	3.0	2.1	1.4	6.1	125.8	229.2	211.8	134.4	36.0	19.3	6.7	779.0	169	48	262.0	06 Aug 1968
		b	0.3	0.3	0.3	0.2	0.4	6.5	12.8	11.6	7.5	1.9	0.9	0.4	43.1	(1944)	(1952)		
Jalgaon		a	3.8	3.2	3.7	1.6	8.8	123.7	201.5	203.1	133.5	41.6	20.1	6.5	751.1	139	50		
(District)		b	0.4	0.3	0.3	0.1	0.6	6.4	11.8	11.2	7.3	2.1	1.0	0.5	42.0	(1949)	(1952)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(JALGAON)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	1	701 – 800	11
401 – 500	2	801 – 900	13
501 – 600	8	901 – 1000	7
601 – 700	7	1001 – 1100	1

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(JALGAON)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.3	11.9	35.9	1973 Jan 06	1.7	1945 Jan 07	62	32
February	33.3	13.9	41.2	1974 Feb 27	3.9	1943 Feb 01	50	24
March	38.0	18.7	43.9	1953 Mar 26	8.2	1971 Mar 01 1982 Mar 03	42	18
April	41.7	24.3	47.2	1970 Apr 26	13.1	1968 Apr 01	40	16
May	42.7	27.0	48.4	1989 May 28	19.0	1974 May 25	56	21
June	38.2	25.8	46.6	1979 Jun 10	19.3	1978 Jun 13	73	45
July	33.2	24.1	42.4	1976 Jul 05	20.7	1979 Jul 05	85	65
August	31.1	23.4	40.4	1966 Aug 10	20.0	1942 Aug 27	89	73
September	32.8	22.8	39.8	1987 Sep 27	12.3	1972 Sep 25	85	60
October	35.0	19.4	39.5	1982 Oct 14	9.5	1964 Oct 27	68	38
November	32.6	15.3	37.7	1978 Nov 04	5.3	1981 Nov 23	61	34
December	30.1	12.6	35.4	1984 Dec 20	1.7	1937 Dec 03	66	38
Annual	34.9	19.9					65	39

TABLE - 4
Mean Wind Speed in km/hr.
(JALGAON)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
8.8	9.6	11.4	14.4	22.4	21.8	15.4	13.5	11.5	7.8	8.2	8.7	12.8

TABLE - 5
Special Weather Phenomena
(JALGAON)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	0.5	0.8	0.4	1.0	3.8	3.6	1.6	2.8	1.4	0.6	0.0	16.8
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.9	1.9

KOLHAPUR DISTRICT

The climate of this district is on the whole agreeable and is characterised by general dryness except during the southwest monsoon season. The year may be divided into four seasons. The period from about December to about the middle of February is the cold season. The summer season which follows lasts till the end of May. June to September is the southwest monsoon season. October and November constitute the post monsoon or retreating monsoon season.

Rainfall

Records of rainfall in the district are available for 16 raingauge stations for periods ranging from 10 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1718.8 mm. The variation in space of the rainfall in this district is very large. The western portions of the district on the Western Ghats and neighbourhood get very high rainfall while near the eastern borders of the district, the rainfall is very much less. The rainfall decreases from west to east. Gaganbawada on the Western Ghats receives as much as 5860.4 mm in a year while Kurundwad near the eastern border gets only 607.5 mm annually. The southwest monsoon arrives over the district by about the first week of June. July is generally the rainiest month when more than 1/3 of the annual rainfall is received. The rainfall in the southwest monsoon constitutes about 85% of the annual rainfall. The monsoon withdraws generally by about the first week of October. Even after the withdrawal of the monsoon some rain continues to occur, mainly in the form of thundershowers, in October and to a lesser extent in November. The variation in the annual rainfall from year to year is not large. During the period 1941 to 1990, the district received the highest annual rainfall in 1961 amounting to 155% of the normal. The lowest annual rainfall which was 61% of the normal occurred in 1971. During the fifty year period annual rainfall less than 80% of the normal occurred only in

two consecutive years. It will be seen from Table 2 that the annual rainfall in the district was between 1601 and 2200 mm in 35 years out of 50.

On an average there are 75 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 122 at Gaganbawada to 43 at Kurundwad near the eastern border.

The heaviest rainfall in 24 hours recorded at any station in the district was 499.0 mm at Gaganbawada on 24th July, 1989.

Temperature

The only meteorological observatory in the district is at Kolhapur. The records of this observatory are fairly representative of the climatic conditions in the district in general except those places at higher elevations in the proximity of the Ghats may be cooler than the rest of the district. The cold season starts from December and lasts till about the middle of February. December is the coldest month with the mean daily maximum temperature at 29.8^{0}C and the mean daily minimum temperature at 15.2^{0}C at Kolhapur. During the cold season the night temperature may sometimes drop to about 9^{0}C at Kolhapur. In the hilly parts it may be colder. From about mid-February both day and night temperatures increase rapidly till April which is the hottest month with the mean daily maximum temperature at 37.5^{0}C and the mean daily minimum temperature at 21.5^{0}C. However nights are slightly warmer during May and June than in April. During the summer season on individual days the day temperatures often go above 40^{0}C. With the onset of the monsoon by about the first week of June the temperatures, especially day temperatures decrease by 5-6 degrees and the weather becomes pleasant. It is during the monsoon season that the days are the coolest. With the withdrawal of the monsoon early in October, there is slight rise in the day temperatures but the nights become progressively cooler.

The highest maximum temperature ever recorded at Kolhapur was 42.3^{0}C on 9th May 1988 while the lowest minimum temperature ever recorded was 8.6^{0}C on 28th December 1968.

Humidity

The relative humidity during the southwest monsoon season is high, being between 70 and 90%. The driest part of the year is the period December to April when the humidity is generally between 26 and 40% in the afternoons.

Cloudiness

During the southwest monsoon season the skies are generally heavily clouded or overcast. Cloudiness decreases rapidly during the post monsoon months of October and November. During the period December to March the skies are mostly clear or lightly clouded. Thereafter cloudiness increases.

Winds

The winds are generally moderate in strength with increase in force in the southwest monsoon season. During the southwest monsoon season the winds blow mostly from westerly directions. Easterlies are common in the post monsoon and cold seasons. By February westerlies appear and these become predominant in summer.

Special Weather Phenomena

Thunderstorms occur in the hot season and in the post monsoon months. In the beginning and end of the southwest monsoon season rainfall is often associated with thunder. In post monsoon and winter months fog occurs.

Tables 3, 4 and 5 give the temperature and relative humidity, mean wind speed and frequency of special weather phenomena respectively for Kolhapur observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ajra	36	a	0.4	0.3	4.6	32.2	63.2	389.0	795.0	458.2	147.4	91.6	32.9	8.0	2022.8	157	60	273.0	28 Jun 1983
		b	0.1	0.0	0.3	2.3	3.7	15.4	24.7	23.0	12.1	5.6	2.1	0.4	89.7	(1961)	(1987)		
Chandgad	49	a	0.7	1.6	9.4	36.7	75.6	534.0	1182.9	697.1	194.8	122.5	35.7	8.3	2899.3	159	66	353.4	27 Jun 1983
		b	0.1	0.1	0.8	2.3	4.3	18.0	27.3	24.9	12.8	7.3	2.5	0.4	100.8	(1961)	(1987)		
Gadhinglaj	47	a	1.9	1.1	9.4	40.8	74.6	162.6	327.6	173.5	110.8	117.5	30.7	5.8	1056.3	283	55	210.0	10 Oct 1985
		b	0.1	0.1	0.6	2.8	4.3	10.3	18.2	14.8	8.8	7.0	2.3	0.3	69.6	(1961)	(1945)		
Gaganbawada	47	a	1.9	0.1	4.0	17.6	79.3	1100.0	2096.4	1563.4	707.6	238.7	44.5	6.9	5860.4	160	41	499.0	24 Jul 1989
		b	0.1	0.0	0.2	1.4	3.6	23.1	30.2	29.4	21.4	9.8	2.7	0.4	122.3	(1975)	(1972)		
Gargoti	48	a	2.1	0.2	4.5	30.0	60.3	259.6	632.2	347.4	129.3	112.8	34.3	6.6	1619.3	154	63	200.9	28 Jun 1983
		b	0.2	0.0	0.4	2.2	3.8	13.9	23.3	21.1	10.3	6.0	2.2	0.4	83.8	(1961)	(1979)		
Hatkanangale	38	a	0.1	3.5	5.3	26.9	59.7	96.6	176.1	116.6	108.7	83.3	34.0	7.9	718.7	146	44	168.1	24 Sep 1960
		b	0.0	0.1	0.4	1.7	3.0	7.2	14.4	12.1	7.3	4.9	2.2	0.4	53.7	(1955)	(1972)		
Kagal	36	a	0.0	2.5	6.4	33.9	59.2	102.6	261.5	155.6	108.8	104.7	40.3	9.9	885.4	185	48	174.0	19 Oct 1975
		b	0.0	0.1	0.4	2.0	3.2	7.6	16.7	14.3	7.6	5.3	2.1	0.5	59.8	(1975)	(1990)		
Kapashi	32	a	1.9	0.4	12.3	40.9	87.6	124.0	349.4	174.5	126.2	119.3	27.2	10.2	1073.9	154	53	182.4	22 Sep 1960
		b	0.1	0.0	0.9	2.7	4.5	8.4	18.7	13.1	8.1	7.0	1.6	0.7	65.8	(1961)	(1945)		
Kolhapur	30	a	2.9	0.9	8.7	24.9	67.1	125.4	400.4	206.6	108.1	107.4	31.6	5.8	1089.8	160	52	198.1	12 Jul 1894
		b	0.3	0.1	0.6	2.0	4.3	8.6	20.4	17.1	8.5	6.5	2.0	0.3	70.7	(1961)	(1972)		
Kolhapur	45	a	1.2	1.8	8.5	30.1	66.4	145.6	339.3	212.5	121.6	100.1	37.8	8.4	1073.3	160	53	205.0	14 Nov 1966
(Obsy)		b	0.2	0.1	0.6	2.3	3.9	9.9	19.0	17.9	8.9	6.0	2.0	0.4	71.2	(1961)	(1972)		

TABLE - I (Contd…)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Kurundwad	22	a	3.9	0.0	9.5	21.0	67.9	65.4	146.2	77.4	75.0	100.7	36.0	4.5	607.5	208	54	118.4	05 Aug 1914
		b	0.1	0.0	0.7	1.4	3.1	5.1	11.8	7.2	5.1	5.7	2.0	0.3	42.5	(1990)	(1942)		
Panhala	33	a	0.6	1.5	3.2	19.0	58.8	269.9	583.7	396.9	165.9	90.1	37.1	8.2	1634.9	186	57	206.0	24 Jul 1993
		b	0.1	0.1	0.3	1.7	3.8	14.2	23.8	22.0	12.3	5.6	2.3	0.4	86.6	(1961)	(1972)		
Radhanagari	47	a	0.7	1.3	4.4	16.2	53.3	603.8	1556.1	1050.4	257.1	88.7	39.1	8.9	3680.0	141	59	390.0	24 Jul 1989
		b	0.1	0.1	0.4	1.3	3.5	18.2	28.1	27.1	15.2	5.7	2.3	0.5	102.5	(1950)	(1972)		
Shahuwadi	33	a	0.0	0.0	2.4	16.4	51.5	307.3	688.4	434.1	158.1	98.6	24.5	9.9	1791.2	153	60	229.0	21 Jul 1965
		b	0.0	0.0	0.2	1.1	3.0	13.2	24.5	23.0	11.1	5.4	1.8	0.3	83.4	(1961)	(1972)		
Shirol	48	a	2.4	2.6	4.7	21.9	56.3	82.4	126.1	88.6	121.8	101.0	36.9	5.3	650.0	183	30	155.0	05 Sep 1981
		b	0.1	0.1	0.4	1.6	3.5	6.4	11.0	8.6	7.1	5.3	2.1	0.4	46.6	(1975)	(1972)		
Wadgaon	10	a	3.4	0.5	6.0	30.8	67.5	93.9	246.0	113.8	117.0	105.8	43.2	8.3	836.2	163	66	159.0	28 Jul 1946
		b	0.3	0.1	0.5	2.1	4.3	7.0	15.1	12.5	7.0	5.8	2.4	0.6	57.7	(1946)	(1947)		
Kolhapur		a	1.5	1.1	6.5	27.5	65.5	278.9	619.2	391.7	172.4	111.4	35.4	7.7	1718.8	155	61		
(District)		b	0.1	0.1	0.5	1.9	3.7	11.7	20.4	18.0	10.2	6.2	2.2	0.4	75.4	(1961)	(1971)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(KOLHAPUR)

Range in mm	No. of years	Range in mm	No. of years
1001 – 1100	1	1901 – 2000	5
1101 – 1200	1	2001 – 2100	2
1201 – 1300	0	2101 – 2200	6
1301 – 1400	0	2201 – 2300	3
1401 – 1500	1	2301 – 2400	2
1501 – 1600	3	2401 – 2500	2
1601 – 1700	4	2501 – 2600	1
1701 – 1800	8	2601 – 2700	1
1801 – 1900	10		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(KOLHAPUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.7	14.6	35.4	1973 Jan 08	8.7	1962 Jan 06	67	33
February	33.2	16.1	37.4	1969 Feb 28	9.3	1961 Feb 13	59	26
March	36.1	19.3	40.4	1959 Mar 29	12.4	1978 Mar 12	57	29
April	37.5	21.5	41.7	1956 Apr 29	13.8	1989 Apr 13	66	40
May	36.0	22.3	42.3	1988 May 09	16.6	1976 May 04	74	50
June	30.2	22.0	40.0	1987 Jun 01	18.9	1956 Jun 26	85	72
July	26.9	21.4	33.3	1966 Jul 09	18.9	1955 Jul 31	91	83
August	26.6	21.0	32.2	1950 Aug 25	18.9	1956 Aug -	91	83
September	28.8	20.7	35.0	1951 Sep 25	14.9	1995 Sep 09	88	75
October	31.4	20.1	36.2	1965 Oct 10	13.9	1952 Oct 31	77	56
November	30.6	17.3	34.6	1965 Nov 09	9.7	1964 Nov 27	67	44
December	29.8	15.2	34.6	1992 Dec 01	8.6	1968 Dec 28	67	38
Annual	31.5	19.3					74	52

TABLE - 4
Mean Wind Speed in km/hr.
(KOLHAPUR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.2	7.0	8.0	9.4	12.1	13.2	13.7	12.2	8.5	6.4	6.5	6.3	9.1

TABLE - 5
Special Weather Phenomena
(KOLHAPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	1.3	4.6	5.5	1.7	0.2	0.1	2.6	3.4	0.3	0.2	20.0
Hail	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Fog	1.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.8	0.7	5.4

NANDURBAR DISTRICT

The climate of this district, is on the whole dry except during the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The southwest monsoon season which follows thereafter lasts till September. October and November constitute the post monsoon season.

Rainfall

There are 8 raingauge stations in the district. Records of rainfall data are available for these stations for period ranging from 27 to 49 years which are given in Tables 1 and 2. The average annual rainfall in the district is 890.0 mm. The rainfall is heavier in the hills in the regions of Western Ghats and the Satpura range. Navapur near the western border has an annual rainfall of 1184.6 mm. The rainfall during the southwest monsoon constitutes to about 92% of the annual rainfall, July being the rainiest month. Some rainfall is received mostly as thundershowers in the post-monsoon season. There are not much variations in the rainfall from year to year. In the fifty year period 1941-1990, the highest annual rainfall in the district amounting to 184% of the annual occurred in 1976 while the lowest annual rainfall which was only 54% of the normal occurred in 1986. In the same fifty year period the rainfall in the district as a whole was less than 80% of the normal in 12 years. The rainfall less than 80% of the normal for two and three consecutive years occurred twice and once respectively. It will be seen from Table 2 that the annual rainfall in the district was between 501 and 1200 mm in 43 years out of 50.

On an average there are about 48 rainy days (i.e. days with rainfall 2.5 mm or more) in a year in the district. This number varies from 42 at Nandurbar observatory to 54 at Navapur.

The heaviest rainfall in 24 hours recorded at any station in the district was 343.0 mm at Navapur on 5th August 1968.

Temperature

There is one meteorological observatory in the district, which is located at Nadurbar. The records of this observatory may be taken as fairly representative of the meteorological conditions in the district as a whole. From about the latter half of February temperatures increase steadily till May, which is the hottest month of the year with the mean daily maximum temperature at 40.3°C and the mean daily minimum temperature at 25.8°C. Hot dry winds blow during April and May and the heat is intense with the maximum temperatures going upto 46°C on some days. Thundershowers occur during the afternoons and bring welcome relief from the heat on some days. With the onset of the southwest monsoon by about the second week of June there is an appreciable drop in day temperatures and the weather is pleasant in the southwest monsoon season. By about the beginning of October, when the southwest monsoon withdraws, day temperatures begin increasing and a secondary maximum in day temperature is reached in October. The night temperatures however, steadily decrease. From November both day and night temperatures drop rapidly till January which is the coldest month with the mean daily maximum temperature at about 30.2°C and the mean daily minimum temperature at 15.4°C. During cold waves which sometimes affect the district in association with western disturbances which pass across north India in the cold season, the minimum temperature may drop down upto 7°C.

The highest maximum temperature ever recorded at Nandurbar was 46.1°C on 19th May 1955. The ever recorded lowest minimum temperature was 7.3°C on 14th February 1972.

Humidity

Except during the southwest monsoon season when the humidity is above 70%, the air is rather dry over the district during the year. The driest part of the year is the summer season when the relative humidity is about 25% in the afternoons, in the months March and April.

Cloudiness

During the southwest monsoon season the skies are heavily clouded to overcast. In the rest of the year the skies are mostly clear or lightly clouded.

Winds

Winds are generally light to moderate with some strengthening in force during the summer and monsoon seasons. In the summer and southwest monsoon season, winds are mainly southwesterly to westerly. In the post monsoon season, winds are light and change in wind direction from southwest to northeast/southeast takes place and predominates in the winter season. After February winds blow mostly from directions between southwest and west.

Special Weather Phenomena

As the special weather phenomena data for Nandurbar observatory is not available for sufficient period, the description which follows is based on the data of observatory of the neighbouring district. In association with the westward passage of depressions from the Bay of Bengal in the southwest monsoon season and to a lesser extent storms or depressions from the Arabian sea in the post monsoon season the district gets widespread heavy rain and strong wind. Thunderstorms occur in the summer and monsoon months. Fog on few occasions is noticed during the post monsoon and winter season.

Tables 3 and 4 give the temperature and relative humidity and mean wind speed respectively for Nandurbar observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Akkalkuwa	33	a	0.5	0.2	0.3	0.3	9.5	139.8	359.2	342.6	157.8	32.3	13.2	4.1	1059.8	192	41	218.0	07 Jun 1976
		b	0.0	0.0	0.0	0.1	0.5	5.9	16.8	17.3	8.4	2.1	0.8	0.2	52.1	(1976)	(1987)		
Dhadgaon	27	a	2.8	0.2	2.1	1.0	13.6	123.8	248.1	208.7	181.1	44.3	6.5	5.3	837.5	171	59	270.0	06 Sep 1970
(Hydro)		b	0.3	0.0	0.1	0.1	1.1	6.5	14.2	13.7	9.2	2.0	0.5	0.4	48.1	(1959)	(1951)		
Nandurbar	49	a	4.0	0.8	0.8	3.1	9.8	114.6	240.0	183.9	118.0	29.3	15.5	3.9	723.7	187	42	276.4	05 Aug 1968
		b	0.2	0.1	0.1	0.2	0.7	5.5	13.9	12.5	6.3	1.9	0.9	0.3	42.6	(1976)	(1987)		
Nandurbar	33	a	3.6	0.4	1.7	3.2	13.3	93.1	229.5	164.2	129.4	36.9	11.9	1.7	688.9	170	56	176.4	06 Aug 1968
(Obsy)		b	0.2	0.0	0.2	0.2	1.0	5.2	13.4	11.7	7.1	2.0	0.7	0.1	41.8	(1976)	(1952)		
Navapur	47	a	0.9	0.1	0.1	2.1	4.5	145.2	455.7	329.2	192.1	35.3	17.1	2.3	1184.6	189	53	343.0	05 Aug 1968
		b	0.1	0.0	0.0	0.1	0.3	5.9	18.2	17.1	9.5	2.0	0.8	0.2	54.2	(1976)	(1941)		
Shahada	48	a	1.0	0.3	1.1	2.1	12.6	110.4	246.1	180.4	144.1	36.2	10.3	2.9	747.5	290	46	185.0	20 Aug 1989
		b	0.1	0.0	0.1	0.2	0.7	5.2	14.3	12.2	7.3	2.0	0.8	0.3	43.2	(1981)	(1972)		
Taloda	48	a	0.3	0.4	0.8	1.7	11.5	108.2	285.3	224.4	155.2	26.5	12.8	1.2	828.3	158	50	195.2	17 Aug 1990
		b	0.0	0.1	0.0	0.3	0.6	6.0	16.8	14.9	7.8	1.8	0.8	0.1	49.2	(1976)	(1986)		
Visarwadi	28	a	1.6	0.1	0.7	1.7	13.2	125.1	351.5	304.0	194.8	42.2	12.0	2.8	1049.7	141	58	307.0	06 Aug 1968
(Hydro)		b	0.2	0.0	0.1	0.1	0.6	5.1	15.4	15.9	8.5	2.1	0.8	0.1	48.9	(1956)	(1951)		
Nandurbar		a	1.8	0.3	1.0	1.9	11.0	120.0	301.9	242.2	159.1	35.4	12.4	3.0	890.0	184	54		
(District)		b	0.1	0.0	0.1	0.2	0.7	5.7	15.4	14.4	8.0	2.0	0.8	0.2	47.6	(1976)	(1986)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(NANDURBAR)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	1	1101 – 1200	5
501 – 600	6	1201 – 1300	2
601 – 700	5	1301 – 1400	2
701 – 800	8	1401 – 1500	1
801 – 900	6	1501 – 1600	0
901 – 1000	7	1601 – 1700	1
1001 – 1100	6		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(NANDURBAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.2	15.4	35.9	1958 Jan 06	8.1	1964 Jan 25	51	34
February	32.8	17.3	40.6	1955 Feb 22	7.3	1972 Feb 14	45	27
March	37.0	21.5	43.3	1956 Mar 31	13.3	1971 Mar 01	43	24
April	40.1	24.7	45.6	1958 Apr 25	18.6	1965 Apr 03	48	25
May	40.3	25.8	46.1	1955 May 19	20.1	1964 May 31	61	31
June	36.2	25.4	43.8	1979 Jun 06	19.6	1977 Jun 28	73	52
July	31.2	24.0	39.0	1966 Jul 12	19.5	1977 Jul 26	85	73
August	29.9	23.2	39.6	1972 Aug 28	19.5	1977 Aug 18	88	77
September	31.9	23.0	38.6	1974 Sep 16	19.2	1976 Sep 19	82	65
October	35.2	22.2	40.2	1980 Oct 12	15.1	1964 Oct 27	59	39
November	33.1	19.1	38.2	1977 Nov 02	10.6	1964 Nov 27	49	38
December	30.3	16.4	36.6	1979 Dec 29	9.1	1968 Dec 26	50	36
Annual	34.0	21.5					61	43

TABLE - 4
Mean Wind Speed in km/hr.
(NANDURBAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.7	7.3	7.4	9.8	14.6	15.4	13.2	12.3	9.8	6.0	4.8	5.3	9.3

NASHIK DISTRICT

The climate of this district is characterised by dryness except in the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The southwest monsoon season is from June to September. October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for a good network of 22 stations for periods ranging from 14 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 975.6 mm. In the narrow strip of the district in the close proximity of the Western Ghats, the rainfall is very much heavier than in the rest of the district. On an average, the rainfall in this narrow strip increases from 2010.0 mm at Surgana in the north to 3351.9 mm at Igatpuri in the south. In the plateau region to the east of the Western Ghats the rainfall in general decreases from the west towards the east, with some local variations due to topography. The rainfall in this region varies from 534.0 mm at Satana to 813.2 mm at Dindori. About 88% of the annual rainfall in the district is received during the southwest monsoon season, June to September. July is the rainiest month. During May and the post monsoon months of October and November some rainfall, mainly in the form of thundershowers occurs. The variation in the annual rainfall from year to year in the district is not large. In this fifty year period 1941 to 1990, the highest annual rainfall amounting to 147% of the normal occurred in 1967 while, the lowest annual rainfall which was only 52% of the normal was recorded in 1989. In the same fifty year period the annual rainfall in the district as a whole was less than 80% of the normal in 9 years. Two consecutive years of such low rainfall occurred once during this period.

It will be seen from Table 2 that the annual rainfall in the district was between 701 and 1200 mm in 37 years out of 50.

On an average there are 48 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. As in the case of rainfall, the number of rainy days is high in the narrow strip of the district in close proximity to the Western Ghats and varies from 80 days at Surgana in the north to 98 days at Igatpuri in the south. Over the plateau region the number of rainy days decreases in general, from the west to the east and varies from 52 at Dindori to 30 at Somthane.

The heaviest rainfall in 24 hours recorded at any station in the district was 474.5 mm at Peint on 2nd July 1941.

Temperature

There are two meteorological observatories in the district at Malegaon and Ozar. The records of these observatories may be taken as representative of the climatic conditions in the district. Malegaon is situated in the eastern part of the district which is at a slightly lower elevation than the rest of the district. The temperatures at this station are about 2°C higher than at Ozar in summer and about one or two degree higher in the cold season. In the region of the Western Ghats, the temperatures may be much lower than at Ozar depending on the elevations. Temperatures begin to increase rapidly from about the latter half of February. May is the hottest month with the mean daily maximum temperature at 40.6°C at Malegaon and 37.8°C at Ozar. The heat is intense in the height of summer and on some days the maximum temperatures may go upto 47°C in the eastern parts of the district with comparatively lower elevations. The oppressiveness, during May and in June till the onset of the southwest monsoon, is relieved on some days by afternoon thundershowers. Night temperatures during June are slightly higher than during May at Ozar. With the onset of the southwest monsoon early in June day temperatures decrease appreciably and the weather throughout the southwest monsoon season is pleasant. Early in October the southwest monsoon withdraws from the district and the day temperatures increase by 2 to 3°C on an average in October. However, night temperatures decrease progressively after September. From November temperatures decrease rapidly. January is the coldest month with the mean daily minimum temperature at 10.9°C at Malegaon and 10.1°C at Ozar. The mean daily maximum temperature in this month is 30.0°C at Malegaon and 28.9°C at Ozar. In association with western disturbances, which move across north India in the cold season, cold waves affect the district and minimum temperature sometimes drop to the freezing point of water and frosts occur causing damage to crops.

The highest maximum temperature ever recorded was 46.7°C on 23rd May 1916 at Malegaon and 43.3°C on 2nd June 1991 at Ozar. The lowest minimum temperature ever recorded was -0.6°C at Malegaon on 1st February 1929 and 0.4°C at Ozar on 28th January 1973.

Humidity

The relative humidity is high (70-80%) in the southwest monsoon season. In the post monsoon, cold and summer seasons the air is dry. The summer season is the driest part of the year with the relative humidity between 20 and 25% only in the afternoons.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the rest of the year skies are mostly clear or lightly clouded.

Winds

Winds are generally light to moderate with some strengthening in wind force during the latter part of the summer season and in the southwest monsoon season. Winds are southwesterly or westerly in the southwest monsoon season. In the post monsoon season winds are light and variable in direction in the mornings and northeasterly or easterly in the afternoons. In the cold season wind is mostly calm in mornings and blows mostly between northeast and east directions in the afternoons. In the hot season winds are from directions between west and northwest.

Special Weather Phenomena

Some of the storms and depressions from the Arabian sea in the latter half of summer and in the post monsoon season affect the district and its neighbourhood causing widespread heavy rain. Thunderstorms occur in the latter half of the hot season and in the post monsoon season and sometimes they are associated with squall. Even in southwest monsoon season rainfall is sometimes associated with thunder. Occasional dust storms are noticed during summer and post monsoon seasons. Fog on few occasions is noticed during the post monsoon and winter season.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Malegaon and Ozar observatories.

TABLE - 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bolthan	38	a	4.9	1.5	1.3	2.1	20.5	106.0	159.2	127.6	147.9	58.2	32.9	8.0	670.1	169	31	182.6	24 Jul 1989
		b	0.2	0.1	0.1	0.2	1.0	5.7	9.9	8.2	6.5	3.0	1.4	0.5	36.8	(1956)	(1972)		
Chandor	47	a	1.8	1.6	1.0	5.1	19.3	115.7	143.3	121.5	140.0	53.0	23.9	4.5	630.7	170	55	247.5	10 Sep 1969
		b	0.2	0.1	0.2	0.4	1.4	6.4	11.3	9.8	8.0	3.1	1.3	0.3	42.5	(1976)	(1974)		
Devlali	15	a	0.4	0.2	8.7	12.4	31.3	93.4	217.2	132.5	111.3	58.8	28.6	0.2	695.0	152	82	157.0	25 Jul 1952
IAF		b	0.0	0.0	0.4	1.1	1.9	6.7	14.2	12.0	8.3	4.1	1.1	0.0	49.8	(1956)	(1953)		
Dindori	47	a	0.9	0.5	0.6	6.9	17.5	114.0	256.5	182.1	143.4	59.3	26.7	4.8	813.2	197	43	198.0	31 Jul 1976
		b	0.1	0.1	0.1	0.5	1.3	6.4	15.8	14.6	8.2	3.4	1.3	0.4	52.2	(1981)	(1986)		
Igatpuri	45	a	2.0	0.1	1.5	11.2	25.3	433.8	1277.2	1010.4	477.1	78.7	28.9	5.7	3351.9	150	63	450.9	21 Jul 1894
		b	0.2	0.0	0.1	0.6	1.0	15.6	28.4	27.7	18.0	4.8	1.4	0.3	98.1	(1959)	(1987)		
Kalvan	45	a	1.8	1.9	0.7	10.1	16.9	121.0	229.2	164.2	154.6	63.6	44.7	3.8	812.5	195	37	256.0	10 Sep 1969
		b	0.2	0.1	0.0	0.4	1.0	6.1	12.6	10.1	7.3	3.0	1.6	0.3	42.7	(1944)	(1957)		
Kolegaon	27	a	2.4	1.8	2.3	4.3	15.7	77.0	79.9	67.0	106.4	49.9	20.8	3.8	431.3	168	28	145.6	15 Jun 1980
Mal		b	0.2	0.1	0.2	0.3	1.2	4.9	6.4	5.8	6.4	3.0	1.3	0.3	30.1	(1956)	(1972)		
Malegaon	50	a	2.7	2.2	1.5	3.0	17.4	100.5	113.9	101.0	118.6	43.6	21.3	8.1	533.8	161	37	239.4	20 Jun 1982
(Obsy)		b	0.3	0.2	0.2	0.3	1.2	5.6	7.3	6.1	6.8	2.4	1.2	0.5	32.1	(1956)	(1972)		
Mulher	14	a	1.2	2.8	2.6	10.8	13.7	150.9	211.5	188.7	96.6	45.1	37.4	3.7	765.0	175	82	190.5	05 Jun 1976
Hydro		b	0.2	0.4	0.2	0.7	0.8	6.4	13.6	12.7	6.7	2.7	1.8	0.3	46.5	(1976)	(1982)		

TABLE – 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST / LOWEST ANNUAL RAINFALL AS % OF NORMAL & YEARS **		HEAVIEST RAINFALL in 24 HOURS * Amount (mm)	HEAVIEST RAINFALL in 24 HOURS * Date
Nandgaon	48	a	3.2	1.0	2.2	4.0	13.3	105.8	114.0	106.2	142.1	56.6	30.7	6.3	585.4	174	20	243.8	15 Oct 1951
		b	0.3	0.1	0.2	0.3	1.0	5.9	7.5	6.8	7.3	3.0	1.5	0.5	34.4	(1964)	(1972)		
Nashik	38	a	1.7	0.1	0.0	6.2	15.9	90.3	208.0	139.9	113.0	58.7	18.3	6.8	658.9	246	55	175.3	21 Sep 1923
		b	0.1	0.0	0.0	0.5	1.0	6.0	14.5	10.6	7.5	3.1	1.2	0.5	45.0	(1972)	(1953)		
Nashik (Obsy)	45	a	1.2	0.5	2.2	7.4	17.0	91.0	233.6	131.4	135.0	56.8	25.1	5.9	707.1	162	47	215.1	02 Jul 1941
		b	0.1	0.1	0.1	0.6	1.4	5.7	14.1	10.5	7.7	3.1	1.4	0.6	45.4	(1969)	(1984)		
Niphad	48	a	2.1	0.4	0.6	5.6	15.8	87.6	113.5	85.8	122.5	54.6	23.4	5.6	517.5	198	49	154.2	02 Sep 1947
		b	0.2	0.1	0.1	0.5	1.3	4.7	9.4	7.3	6.5	3.1	1.3	0.3	34.8	(1956)	(1952)		
Ozar Aero (Obsy)	26	a	1.1	0.5	1.7	4.9	18.2	95.9	146.7	119.6	127.7	37.9	27.8	8.1	590.1	190	52	191.8	16 Aug 1987
		b	0.1	0.0	0.2	0.3	1.3	5.6	11.3	10.6	7.3	2.3	1.5	0.5	41.0	(1976)	(1972)		
Peint	45	a	1.3	1.3	0.2	5.6	8.0	250.6	918.7	661.8	342.9	58.5	21.1	2.2	2272.2	176	20	474.5	02 Jul 1941
		b	0.1	0.1	0.0	0.4	0.6	10.9	26.1	25.2	15.0	3.3	1.2	0.1	83.0	(1990)	(1982)		
Pimpalgaon	44	a	2.8	0.4	1.1	3.8	22.0	102.5	186.9	122.5	142.1	58.3	19.9	2.7	665.0	175	51	238.8	25 Jul 1952
		b	0.3	0.1	0.1	0.3	1.4	5.4	11.1	8.5	6.4	2.9	1.1	0.3	37.9	(1944)	(1975)		
Satana	44	a	2.3	0.5	0.3	2.6	14.9	98.8	97.6	98.7	129.6	54.1	30.3	4.3	534.0	181	35	157.0	27 Jun 1914
		b	0.2	0.1	0.1	0.3	1.1	5.5	7.7	5.9	7.3	2.9	1.2	0.4	32.7	(1980)	(1972)		
Sinnar	46	a	1.3	1.2	2.5	4.5	17.9	90.0	157.0	105.7	144.1	60.5	32.1	9.1	625.9	153	41	259.0	11 Jul 1961
		b	0.1	0.1	0.2	0.5	1.1	5.5	11.8	10.4	7.3	3.8	1.7	0.4	42.9	(1969)	(1972)		

TABLE – 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Somthane	29	a	1.8	0.1	1.0	4.2	17.5	72.2	78.3	76.6	101.4	49.5	25.0	3.0	430.6	204	29	121.0	11 Sep 1984
		b	0.2	0.0	0.1	0.3	1.2	4.4	6.8	6.4	6.2	2.8	1.3	0.3	30.0	(1956)	(1972)		
Surgana	33	a	0.4	0.7	0.6	2.6	13.4	221.2	747.0	608.4	310.9	75.3	23.4	6.1	2010.0	171	60	375.0	31 Jul 1976
		b	0.0	0.1	0.1	0.2	0.7	9.5	24.6	25.2	14.3	3.6	1.2	0.3	79.8	(1981)	(1974)		
Trimbak	29	a	2.9	0.7	0.3	12.8	14.7	236.5	1178.6	717.4	323.5	83.1	26.0	3.8	2600.3	142	58	410.7	02 Jul 1941
		b	0.2	0.1	0.0	0.7	1.0	12.1	27.3	26.1	16.0	4.8	1.2	0.3	89.8	(1950)	(1987)		
Yeola	48	a	2.5	2.0	1.2	1.7	18.0	117.5	103.0	89.6	126.1	61.5	26.9	6.9	556.9	187	37	275.8	15 Oct 1951
		b	0.2	0.2	0.1	0.3	1.2	6.0	7.8	6.9	7.0	3.2	1.4	0.4	34.7	(1943)	(1952)		
Nashik		a	1.9	1.0	1.6	6.0	17.5	135.1	316.9	234.5	170.8	58.0	27.1	5.2	975.6	147	52		
(District)		b	0.2	0.1	0.1	0.4	1.1	6.9	13.6	12.2	8.7	3.2	1.3	0.4	48.2	(1967)	(1989)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(NASHIK)

Range in mm	No. of years	Range in mm	No. of years
501 – 600	3	1001 – 1100	3
601 – 700	2	1101 – 1200	9
701 – 800	7	1201 – 1300	3
801 – 900	7	1301 – 1400	2
901 – 1000	11	1401 – 1500	3

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(MALEGAON)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.0	10.9	35.0	1932 Jan 31	0.6	1935 Jan 16	61	31
February	32.3	12.2	39.4	1953 Feb 26	-0.6	1929 Feb 01	49	21
March	36.6	16.8	45.6	1889 Mar 28	5.6	1898 Mar 04	39	18
April	39.7	21.3	44.6	1958 Apr 27	9.4	1905 Apr 01	34	17
May	40.6	24.0	46.7	1916 May 23	16.7	1881 May 04	49	25
June	35.9	23.9	44.4	1915 Jun 11	17.8	1932 Jun 19	71	50
July	31.4	22.7	39.4	1971 Jul 24	18.3	1953 Jul 14	80	67
August	30.2	21,9	37.2	1899 Aug 02	16.1	1899 Aug 16	82	70
September	31.7	20.9	39.0	1987 Sep 26	14.4	1972 Sep 26	80	62
October	33.6	18.5	40.9	1964 Oct 31	9.8	1991 Oct 31	64	38
November	31.6	14.6	39.4	1964 Nov 05	5.6	1910 Nov 25	60	34
December	29.8	11.7	35.0	1896 Dec 02	2.6	1968 Dec 28	65	35
Annual	33.6	18.3					61	39

TABLE - 4
Mean Wind Speed in km/hr.
(MALEGAON)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.0	5.0	6.1	8.0	11.6	12.3	11.6	10.1	7.1	4.8	3.9	3.4	7.3

TABLE - 5
Special Weather Phenomena
(MALEGAON)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.2	0.0	0.2	0.3	0.3	0.0	0.2	0.3	0.1	0.0	1.6
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(OZAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.9	10.1	34.3	1974 Jan 27	0.4	1973 Jan 28	61	30
February	31.2	11.6	36.5	1985 Feb 28	0.6	1972 Feb 14	51	23
March	35.1	15.9	40.3	1984 Mar 31	5.7	1971 Mar 01	41	19
April	37.8	19.5	42.4	1973 Apr 21	12.3	1995 Apr 01	41	21
May	37.8	21.5	43.1	1973 May 05	13.5	1972 May 06	57	31
June	33.1	22.4	43.3	1991 Jun 02	18.4	1986 Jun 05	75	59
July	29.0	21.6	35.4	1966 Jul 11	17.0	1976 Jul 10	85	76
August	27.7	20.8	34.3	1965 Aug 15	17.0	1968 Aug 31	87	79
September	29.6	19.8	36.5	1987 Sep 26	13.5	1972 Sep 24	84	70
October	32.2	17.4	38.5	1986 Oct 30	9.8	1971 Oct 31	67	44
November	30.4	13.3	34.7	1987 Nov 02	5.0	1983 Nov 23	59	36
December	28.6	10.8	32.8	1972 Dec 19	2.2	1983 Dec 27	64	36
Annual	31.8	17.1					64	44

TABLE – 4(a)
Mean Wind Speed in km/hr.
(OZAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.7	8.4	10.4	12.7	17.1	18.9	18.7	17.5	11.9	6.9	5.9	5.6	11.7

TABLE – 5(a)
Special Weather Phenomena
(OZAR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.4	0.3	0.8	1.8	2.4	5.0	1.1	0.9	5.2	3.0	0.8	0.2	21.9
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3
Fog	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.6	0.6	3.1

PUNE DISTRICT

The climate of Pune is on the whole dry. The cold season from November to February is followed by the hot season lasting upto early June. The period from early June to about the beginning of October constitute the southwest monsoon season. The succeeding period upto November is the post monsoon or transition season.

Rainfall

Records of rainfall in the district are available for 20 stations for the period ranging from 34 to 50 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1208.5 mm. The district which has the Sahyadris along the western border with some peaks rising upto about 1500 metres, many scattered hills sloping eastwards to about 300 metres has variable rainfall according to aspect and elevation. The rainfall is very heavy in the narrow strip of the district in the immediate neighbourhood of the Western Ghats and decrease rapidly eastwards. Thus the rainfall decreases from 4612.5 mm at Khandala observatory near the western border to 471.5 mm at Jejuri. About 87% of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month generally. Some rainfall, mostly in the form of thundershowers is received during the premonsoon months of April and May and during the post monsoon months. The variation in the annual rainfall from year to year is not large. In the 50 year period 1941 to 1990, the highest annual rainfall for the district was 148% of the normal and occurred in 1956. The lowest annual rainfall which was only 49% of the normal occurred in 1985. In this fifty year period the annual rainfall in the district was less than 80% of the normal in 14 years. Consecutive 3 and 2 years of such a low rainfall occurred once during this period. It will be seen from Table 2 that the annual rainfall in the district was between 901 and 1300 mm in 33 years out of 49.

On an average, there are 53 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 30 at Daund and Jejuri to 104 at Khandala.

The heaviest rainfall in 24 hours recorded at any station in the district was 578.0 mm at Lonavala on 23rd July, 1989.

Temperature

There are two meteorological observatories in the district, viz. at Pune and Baramati for which temperature and other climatological records are available. These may be taken as representative of the climatic conditions in the district in general. In the Western Ghats region, at higher elevations the temperatures are a few degrees lower. After February, temperatures rise rapidly till April and May which are usually the hottest months. While days are generally hottest during April with a mean daily maximum temperature of about 38 or 39°C, nights are usually warmer during May or June than in April, with a mean daily minimum temperature of about 22 or 23°C. The days are hot during the summer with the maximum temperature on individual days rising sometimes upto 43 or 44°C. With the onset of the monsoon early in June, there is a rapid drop in the day temperatures but nights still continue to be as warm as during the latter part of the summer and with the increased humidity of the monsoon air, are at times uncomfortable. Towards the end of the monsoon season, in September and October, there is a slight increase in the day temperatures but the nights become progressively cooler. After the withdrawal of the monsoon early in October, the nights become rapidly colder but there is no appreciable drop in day temperatures. December is generally the coldest month with the mean daily maximum temperature at about 29°C and the mean daily minimum temperature at about 12 to 14°C. The district is occasionally affected by cold waves in the wake of western disturbances passing eastwards across north India and the minimum temperature at times drops down to about a degree or two about the freezing point of water, especially in the northern and western parts of the district and slight frosts are likely then.

The highest maximum temperature ever recorded at Pune was 43.3°C on 30th April 1897 and on 7th May 1889. The lowest minimum temperature ever recorded was 1.7°C on 17th January 1935. Corresponding data for Baramati, which is comparatively a recent station are 43.8°C on 9th May 1988 and 5.0°C on 21st December 1971.

Humidity

During the monsoon season the humidity is usually between 70 and 80% on an average. The humidity is comparatively less in the rest of the year. Mornings are generally more humid than the afternoons. Summer afternoons with 20-40% humidity are the driest.

Cloudiness

During the monsoon season, the skies are generally heavily clouded or overcast. During the rest of the year, the skies are mostly clear or lightly clouded. However, in the cold season, for brief spells of a day or two, occasionally, passing western disturbances cause cloudy weather. In the latter part of the summer season, especially in the afternoons, clouding increases.

Winds

Winds are generally light to moderate with an increase in force during the monsoon season. Winds are variable in direction during October. Winds during November and December are generally calm or blow mainly from east or southeast. In the rest of the year, winds are mainly from directions between west and northwest, the westerlies being more common during monsoon season than remaining parts of the year.

Special Weather Phenomena

Depressions in the Arabian Sea, during May and June, which move northwards near the coast and depressions from the Bay of Bengal, during the monsoon season, moving across Madhya Pradesh affect the weather over the district causing locally heavy rain and gusty winds. Occasionally depressions from the Bay of Bengal during October move westwards across the peninsula, emerge into the Arabian Sea and move towards the Gulf of Cambay. Such depressions also affect the weather over the district. Thunderstorms mostly occur during the period March to June and September to November. The premonsoon or post monsoon thunderstorms are at times accompanied with hail and squall. Morning fog occurs at times during October and the cold season.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and special weather phenomena respectively for Baramati and Pune observatories.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Alandi	35	a	2.2	1.3	1.8	8.1	27.8	104.8	175.6	108.9	121.8	65.0	25.0	5.6	647.9	148	53	135.1	24 Jul 1989
		b	0.2	0.1	0.3	0.7	1.8	6.3	12.6	9.5	7.8	4.4	1.2	0.3	45.2	(1956)	(1952)		
Baramati	48	a	3.5	0.5	1.8	4.2	30.1	75.6	56.4	60.4	161.7	91.7	25.8	4.8	516.5	183	24	158.5	07 Sep 1895
		b	0.2	0.1	0.3	0.5	2.0	4.9	5.0	4.4	7.9	4.7	1.6	0.4	32.0	(1956)	(1972)		
Baramati (Obsy)	37	a	2.1	1.3	2.6	8.1	33.1	78.5	56.5	67.7	151.8	87.8	30.8	5.5	525.8	164	29	122.8	26 Sep 1979
		b	0.1	0.2	0.4	0.6	2.2	5.2	4.7	4.4	7.8	4.5	1.7	0.6	32.4	(1981)	(1972)		
Bhor	49	a	1.8	0.0	0.9	12.2	31.8	138.8	381.6	237.5	130.1	78.8	26.7	3.6	1043.8	172	50	401.0	25 Aug 1993
		b	0.1	0.0	0.1	0.9	2.0	8.5	20.2	17.9	9.3	4.7	1.9	0.3	65.9	(1976)	(1972)		
Dhond	49	a	1.9	1.4	2.1	5.4	21.7	78.6	63.5	50.9	151.9	93.3	25.6	5.8	502.1	171	37	210.0	26 Oct 1990
		b	0.1	0.0	0.1	0.4	1.3	5.0	5.6	4.4	7.0	4.7	1.4	0.3	30.3	(1974)	(1972)		
Ghoda Ambegaon	47	a	1.8	0.0	1.5	8.0	28.3	112.9	265.3	143.9	131.2	73.0	36.1	5.7	807.7	193	60	176.5	25 Aug 1939
		b	0.1	0.0	0.2	0.6	1.6	7.3	15.8	12.0	8.1	4.0	1.6	0.3	51.6	(1984)	(1974)		
Indapur	48	a	3.8	0.5	1.9	7.4	23.2	94.3	67.0	68.5	144.5	83.1	27.3	4.0	525.5	191	20	166.9	05 Nov 1946
		b	0.2	0.1	0.3	0.9	1.8	5.4	5.3	5.2	7.3	4.5	1.4	0.3	32.7	(1979)	(1945)		
Jejuri	43	a	1.9	0.2	3.4	5.4	26.0	73.0	92.9	54.4	111.1	74.7	24.2	4.3	471.5	199	36	200.0	26 Jul 1979
		b	0.1	0.1	0.3	0.4	1.5	4.4	7.1	4.5	6.1	4.2	1.5	0.2	30.4	(1979)	(1974)		
Junnar	48	a	1.5	0.4	1.8	7.0	20.4	101.1	250.5	147.3	112.5	67.0	39.5	6.6	755.6	241	39	241.0	09 Jun 1991
		b	0.2	0.1	0.2	0.6	1.4	6.7	15.0	11.7	7.4	4.2	1.4	0.4	49.3	(1956)	(1985)		

TABLE – 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Khandala	34	a	0.6	0.3	0.1	5.3	21.7	597.9	1875.8	1363.9	594.9	133.0	13.8	5.3	4612.6	143	60	516.4	19 Jul 1958
(Obsy)		b	0.1	0.1	0.0	0.3	1.7	16.5	29.3	29.0	19.2	6.0	1.1	0.4	103.7	(1959)	(1972)		
Khed	49	a	0.9	0.3	1.3	5.4	40.0	103.2	186.3	115.0	136.9	69.6	29.7	5.7	694.3	177	52	171.0	16 Aug 1983
		b	0.1	0.1	0.1	0.4	2.3	6.7	12.7	9.6	7.6	4.2	1.5	0.3	45.6	(1956)	(1985)		
Lonavala	40	a	1.0	0.0	0.0	6.3	25.2	658.1	1824.1	1365.6	493.0	96.2	34.2	0.5	4504.2	167	59	578.0	23 Jul 1989
		b	0.1	0.0	0.0	0.6	1.2	17.8	29.4	28.3	18.7	4.8	1.2	0.0	102.1	(1990)	(1987)		
Paud	48	a	1.0	0.1	2.4	8.6	28.9	237.0	669.4	440.8	153.9	83.1	34.8	4.7	1664.7	196	59	230.4	26 Jun 1961
		b	0.2	0.0	0.2	0.7	1.8	10.3	23.6	22.3	10.3	4.8	1.8	0.3	76.3	(1976)	(1972)		
Pune	50	a	1.3	1.1	3.6	14.7	37.6	112.0	191.1	118.9	126.2	74.5	30.0	6.1	717.1	165	53	178.0	19 Sep 1964
(Obsy)		b	0.2	0.1	0.4	1.1	2.6	7.5	12.6	9.7	7.5	4.3	1.9	0.4	48.3	(1956)	(1972)		
Sasvad	47	a	1.9	0.3	2.9	12.0	30.0	96.7	137.6	88.2	134.4	87.6	31.6	8.8	632.0	179	49	263.0	29 Sep 1992
		b	0.2	0.0	0.3	1.0	2.0	6.5	10.4	7.2	7.2	4.7	1.8	0.5	41.8	(1988)	(1972)		
Sirur	49	a	1.6	0.6	1.0	5.4	27.2	89.2	73.1	57.8	157.2	77.5	27.0	6.5	524.1	180	55	181.6	26 Oct 1916
		b	0.1	0.1	0.2	0.4	2.0	5.2	5.8	4.4	7.5	4.5	1.7	0.4	32.3	(1956)	(1961)		
Talegaon	35	a	1.7	0.1	2.9	8.6	38.3	79.6	90.4	64.0	122.2	74.8	30.4	7.2	520.2	194	55	135.9	19 Apr 1937
Dumdere		b	0.3	0.0	0.3	0.7	2.5	4.7	7.7	6.5	6.2	4.2	1.3	0.4	34.8	(1981)	(1953)		
Vadgaon	47	a	1.2	0.1	0.8	8.8	25.4	188.1	498.4	308.4	148.9	77.8	35.4	3.8	1297.1	198	36	253.0	17 Jul 1976
Maval		b	0.2	0.0	0.1	0.8	1.6	9.7	22.1	19.8	9.8	4.4	1.7	0.3	70.5	(1976)	(1987)		
Velhe	34	a	0.0	0.0	2.6	8.5	35.4	417.2	1047.2	679.9	258.5	91.0	34.7	4.9	2579.9	176	58	345.0	29 Jul 1994
		b	0.0	0.0	0.1	0.6	2.2	14.6	26.9	25.8	14.1	4.7	2.0	0.3	91.3	(1961)	(1972)		

TABLE – 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Wanorie	40	a	0.2	1.3	5.1	13.5	32.1	99.2	165.3	97.5	123.7	64.4	20.4	4.2	626.9	197	52	263.7	21 Jul 1951
AFMC (Obsy)		b	0.0	0.1	0.4	0.7	2.1	5.8	11.9	9.5	7.5	4.0	1.5	0.3	43.8	(1956)	(1972)		
Pune		a	1.6	0.5	2.0	8.1	29.2	176.8	408.4	282.0	183.3	82.2	29.2	5.2	1208.5	148	49		
(District)		b	0.1	0.1	0.2	0.6	1.9	8.0	14.2	12.3	9.2	4.5	1.6	0.3	53.0	(1956)	(1985)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(PUNE)

Range in mm	No. of years	Range in mm	No. of years
501 – 600	1	1201 – 1300	6
601 – 700	3	1301 – 1400	3
701 – 800	2	1401 – 1500	1
801 – 900	4	1501 – 1600	0
901 – 1000	8	1601 – 1700	0
1001 – 1100	13	1701 – 1800	2
1101 – 1200	6		

(Data available for 49 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(BARAMATI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.1	13.0	34.8	1973 Jan 08	5.4	1991 Jan 03	60	32
February	32.9	14.8	38.4	1973 Feb 27	6.3	1972 Feb 08	51	24
March	36.6	18.7	40.9	1972 Mar 28	9.6	1991 Mar 01	42	19
April	38.9	22.2	43.6	1983 Apr 29	13.3	1955 Apr 15	45	22
May	38.9	22.9	43.8	1988 May 09	15.8	1968 May 07	56	28
June	33.3	22.7	42.4	1991 Jun 02	15.8	1989 Jun 30	73	53
July	30.0	22.2	36.7	1966 Jul 09	14.0	1976 Jul 22	79	64
August	29.4	21.5	38.6	1969 Aug 30	17.7	1956 Aug 29	80	65
September	30.8	21.0	39.0	1976 Sep 23	16.8	1964 Sep 27	80	60
October	32.3	20.0	39.8	1976 Oct 22	12.7	1954 Oct 31	69	43
November	30.6	16.3	36.8	1971 Nov 19	8.8	1971 Nov 17	63	40
December	29.4	13.6	34.6	1963 Dec 14	5.0	1971 Dec 21	63	37
Annual	32.8	19.1					63	41

TABLE - 4
Mean Wind Speed in km/hr.
(BARAMATI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.8	6.8	7.9	9.6	12.9	14.9	14.4	14.2	10.5	6.9	6.3	5.8	9.7

TABLE - 5
Special Weather Phenomena
(BARAMATI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	1.1	1.4	1.4	1.8	0.3	0.3	1.4	0.5	0.1	0.0	8.5
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(PUNE)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.8	10.8	35.0	1938 Jan 30	1.7	1935 Jan 17	76	32
February	32.3	12.1	38.9	1953 Feb 28	3.9	1934 Feb 01	64	24
March	35.8	16.0	42.8	1892 Mar 28	7.2	1908 Mar 02	50	21
April	37.9	20.2	43.3	1897 Apr 30	10.6	1903 Apr 02	47	25
May	37.2	22.4	43.3	1889 May 07	13.8	1968 May 06	58	37
June	32.0	22.9	41.7	1897 Jun 06	17.0	1979 Jun 01	75	63
July	28.4	22.1	36.0	1966 Jul 12	18.9	1920 Jul 06	83	76
August	27.5	21.4	35.0	1950 Aug 23	17.2	1920 Aug 09	85	78
September	29.3	20.6	36.1	1951 Sep 29	13.2	1994 Sep 21	83	72
October	31.7	18.4	39.3	1997 Oct 10	9.4	1968 Oct 29	76	49
November	30.2	14.2	36.1	1896 Nov 07	4.6	1964 Nov 27	72	41
December	29.1	11.6	35.0	1896 Dec 23	3.3	1968 Dec 27	75	38
Annual	31.8	17.7					70	46

TABLE – 4(a)
Mean Wind Speed in km/hr.
(PUNE)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.7	3.7	4.8	6.5	9.9	11.9	11.2	10.0	6.5	3.5	2.9	2.5	6.4

TABLE – 5(a)
Special Weather Phenomena
(PUNE)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.2	1.3	3.3	4.9	4.4	0.7	0.8	5.4	4.4	1.2	0.3	27.1
Hail	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.5	1.2	1.9	0.8	0.1	0.0	0.4	0.0	0.1	0.0	5.0
Fog	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.6	1.3	0.9	5.1

SANGLI DISTRICT

The climate of this district is on the whole agreeable and is characterised by general dryness in the major part of the year. The cold season is from December to about the middle of February. The hot season which follows lasts till the end of May. June to September is the southwest monsoon season and the two months, October and November constitute the post monsoon or retreating monsoon season.

Rainfall

Records of rainfall in the district are available for nine stations for the period ranging from 13 to 46 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 670.1 mm. The rainfall in the western portion of the district, near the Western Ghats is considerably higher than in the rest of the district. The rainfall generally decreases from the Western Ghats towards the eastern portions of the district, Shirala near the western border of the district getting 1026.8 mm and Jath in the eastern part getting only 571.4 mm. Some rainfall in the form of thundershowers occurs in May but the main rainy season is from June to September. The rainfall in the southwest monsoon months is about 63% of the annual total. July is the month with the heaviest rainfall. About 19% of the annual rainfall is received in the post monsoon season. In the fifty year period 1941 to 1990, the annual rainfall in the district was the highest in 1975 when it amounted to 148% of the normal and 1972 was the year with the lowest rainfall which was only 55% of the normal. In the same fifty year period, the annual rainfall was less than 80% of the normal in 11 years. There is one occasion each when such a low rainfall occurred in consecutive two and four years. It will be seen from Table 2 that in 40 years out of 50, rainfall in the district was between 501 and 900 mm.

On an average there are 47 rainy days (i.e. days with rainfall of 2.5 mm or more) in the district. As in the case of the amount of rainfall, this number varies from 67 at Shirala near the Western Ghats to 39 at Jath in the eastern parts of the district.

The heaviest rainfall in 24 hours recorded at any station in the district was 261.6 mm on 26th July 1898 at Shirala.

Temperature

The meteorological observatory in the district is at Sangli. The records of this observatory may be taken as representative of the climatic conditions over the district in general. The cold weather starts by about the end of November and lasts till about the middle of February, December being the coldest month. In this month the mean daily maximum temperature is about 30°C while the mean daily minimum temperature is about 14°C. The minimum temperatures may sometimes go below 7°C. The period from about the middle of February to the end of May is one of continuous increase of temperature. In April, the hottest month, the mean daily maximum temperature is 38.1°C and the mean daily minimum temperature is about 21.2°C. The heat is intense and the maximum temperature may sometimes go upto 43.0°C. Afternoon thundershowers bring welcome relief from the heat on some days. The onset of the southwest monsoon by the first week or second week of June brings down the day temperatures appreciably, but night temperatures continue to be nearly the same as in summer. During the southwest monsoon months the weather is cool and pleasant. Sometimes the day temperatures are even less than in the cold season. After the withdrawal of the southwest monsoon by the end of September, day temperatures increase slightly. After about mid-November both the day and night temperatures begin to drop. Except during the southwest monsoon season the daily range of temperature is large and is of the order of 12 to 18°C.

The highest maximum temperature ever recorded at Sangli was 43.0°C on 14th April 1973 and the lowest minimum temperature ever recorded was 6.5°C on 10th December 1970.

Humidity

In the southwest monsoon months the air is highly humid. In the post monsoon, summer and cold seasons the air is dry particularly in the afternoons.

Cloudiness

Skies are generally clear or lightly clouded during the months November to March. Cloudiness begins to increase progressively from April and afternoons are more clouded than the mornings. During the monsoon months the skies are heavily clouded to overcast.

Winds

Winds are light except in the southwest monsoon season when the speed increases a little. In the southwest monsoon season winds are from directions between southwest and west and the westerlies being more frequent. In the latter half of post monsoon season and winter season, they are predominantly from northeast or east. Easterlies and northeasterlies are common in the cold season. By February westerlies and northwesterlies appear and these predominate in the summer.

Special Weather Phenomena

Thunderstorms occur in the hot season and in the post monsoon season. In the beginning and end of the southwest monsoon season rainfall is often associated with thunder. Fog occurs in January to March more than in the post monsoon season. Dust raising winds are occasionally observed from February to June and during August to September.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Sangli observatory.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST ANNUAL RAINFALL AS % OF NORMAL & YEARS **	LOWEST ANNUAL RAINFALL AS % OF NORMAL & YEARS **	HEAVIEST RAINFALL in 24 HOURS * Amount (mm)	HEAVIEST RAINFALL in 24 HOURS * Date
Islampur	46	a	3.1	0.6	5.3	26.4	59.0	102.7	173.3	97.2	94.2	94.4	31.2	6.0	693.4	171	45	161.0	14 Nov 1966
		b	0.1	0.0	0.3	1.7	3.3	6.6	12.6	9.0	6.3	5.5	1.9	0.4	47.7	(1975)	(1972)		
Jath	45	a	1.2	0.8	5.0	16.5	47.5	77.7	67.9	72.1	161.1	90.0	27.3	4.3	571.4	193	39	198.6	23 Sep 1938
		b	0.1	0.0	0.5	1.2	3.6	5.5	6.1	5.8	7.6	6.1	1.7	0.3	38.5	(1975)	(1983)		
Miraj	13	a	0.6	2.7	3.8	19.3	58.5	102.9	71.5	73.7	133.8	64.8	31.4	1.4	564.4	150	64	170.4	19 Jun 1993
		b	0.1	0.2	0.2	1.2	3.2	6.8	7.6	7.2	6.5	4.2	2.9	0.2	40.3	(1979)	(1986)		
Miraj (Obsy)	30	a	2.8	2.4	4.7	24.8	59.5	72.6	123.4	89.3	112.4	107.7	36.3	7.7	643.6	152	61	150.9	17 Aug 1932
		b	0.1	0.1	0.5	2.0	3.8	5.6	11.7	8.3	6.7	6.5	2.0	0.5	47.8	(1955)	(1941)		
Sangli	30	a	4.1	0.0	9.8	28.3	48.8	59.8	119.4	84.7	117.1	111.9	31.1	6.5	621.5	148	50	133.0	14 Nov 1966
		b	0.1	0.0	0.4	1.9	3.4	5.4	11.2	8.2	7.3	6.0	1.8	0.5	46.2	(1975)	(1945)		
Sangli (Obsy)	21	a	0.0	0.0	5.8	24.3	55.7	88.3	101.2	76.9	149.7	120.7	14.3	4.6	641.5	130	82	113.0	19 Oct 1975
		b	0.0	0.0	0.5	1.9	3.9	7.1	10.7	8.3	7.8	7.3	0.6	0.6	48.7	(1977)	(1970)		
Shirala	48	a	4.1	0.2	4.4	24.6	63.6	159.0	322.1	196.1	116.9	94.8	35.6	5.4	1026.8	154	66	261.6	26 Jul 1898
		b	0.1	0.0	0.3	2.0	3.7	10.0	18.2	16.1	8.5	5.8	2.3	0.4	67.4	(1961)	(1943)		
Tasgaon	45	a	3.8	1.0	5.4	27.0	58.2	95.3	119.5	79.3	127.2	104.6	31.4	8.0	660.7	148	35	156.0	12 Sep 1944
		b	0.1	0.1	0.5	2.4	3.5	6.1	10.3	8.3	7.5	6.0	2.2	0.5	47.5	(1981)	(1972)		
Vita/Khanapur	46	a	3.1	1.2	1.6	18.9	49.1	88.1	106.1	80.8	144.7	80.2	29.9	5.0	608.7	199	37	211.0	10 Sep 1981
		b	0.1	0.1	0.2	1.5	3.0	6.3	9.6	7.1	7.1	4.8	1.8	0.3	41.9	(1981)	(1972)		
Sangli (District)		a	2.5	1.0	5.1	23.3	55.5	94.0	133.8	94.5	128.6	96.6	29.8	5.4	670.1	148	55		
		b	0.1	0.1	0.4	1.8	3.5	6.6	10.9	8.7	7.3	5.8	1.9	0.4	47.5	(1975)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(SANGLI)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	2	701 – 800	8
401 – 500	4	801 – 900	12
501 – 600	8	901 – 1000	4
601 – 700	12		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(SANGLI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	31.0	13.3	36.1	1990 Jan 31	7.0	1984 Jan 22	67	36
February	33.4	14.9	40.0	1983 Feb 26	8.6	1972 Feb 15	62	32
March	36.5	18.4	42.3	1996 Mar 30	11.1	1971 Mar 05	62	30
April	38.1	21.2	43.0	1973 Apr 14	15.2	1976 Apr 04	67	31
May	37.2	22.4	42.9	1993 May 06	15.5	1976 May 04	74	42
June	31.5	22.0	41.5	1989 Jun 09	19.1	1993 Jun 19	83	66
July	28.5	21.5	35.8	1968 Jul 16	19.5	1975 Jul 09	87	76
August	28.4	21.1	33.6	1995 Aug 12	18.7	1972 Aug 31	87	75
September	30.1	20.5	35.4	1972 Sep 28	14.1	1994 Sep 20	86	68
October	31.9	19.9	39.2	1969 Oct 02	13.3	1968 Oct 26	77	52
November	30.9	16.2	35.1	1988 Nov 05	8.7	1983 Nov 16	70	45
December	30.3	14.0	34.0	1991 Dec 02	6.5	1970 Dec 10	69	42
Annual	32.3	18.8					74	50

TABLE - 4
Mean Wind Speed in km/hr.
(SANGLI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.3	5.2	6.1	7.9	10.6	12.7	12.8	12.0	8.6	5.8	4.7	4.9	8.0

TABLE - 5
Special Weather Phenomena
(SANGLI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	1.2	3.9	4.0	1.9	0.8	0.7	1.8	2.7	0.4	0.0	17.5
Hail	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.8
Fog	1.8	1.5	1.1	0.3	0.0	0.0	0.0	0.1	0.0	0.4	0.6	0.7	6.5

SATARA DISTRICT

The climate of this district is on the whole agreeable. The year may be divided broadly into four seasons. The cold season is from December to about the middle of February. The hot season, which follows, lasts till the end of May. June to September is the southwest monsoon season and the two months October and November form the post monsoon or the retreating monsoon season.

Rainfall

The district has a good network of 16 raingauge stations, (including 2 hill stations), for most of which records are available for the period ranging from 19 to 50 years. The details of the rainfall at these stations and for the district excluding the hilly portions along the western border are given in Tables 1 and 2. The annual rainfall in the district is 828.4 mm excluding hill stations. The rainfall in the belt, roughly 25 to 35 kms wide parallel to the crest of the Sahyadri Range, is considerably higher than in the rest of the district. While Mahabaleshwar at an elevation of 1372 metres gets an average annual rainfall of 5886.9 mm, other stations in this belt get annual rainfall ranging between 1684 and 2195 mm. The rainfall generally decreases first rapidly and then gradually from the Western Ghats towards the eastern boundary of the district. Some rainfall in the form of thundershowers occurs in May, but the main rainy season is from June to September. The rainfall in the southwest monsoon months is about 77% of the annual total. July is the month with the heaviest rainfall. About 18% of the annual rainfall is received in the post monsoon months of October and November. Considering the district as a whole excluding the narrow strip along the western border which generally gets heavier rainfall, the variations in the annual rainfall have not been large. In the fifty year period 1941 to 1990, the annual rainfall was the highest in 1944 and amounted to 137% of the normal. The year 1968 was the year with the lowest rainfall which was only 47% of the normal. In the same fifty year period the annual rainfall was less than 80% of the normal in 10 years. There was one occasion each, when such a low rainfall occurred for two and three consecutive years. It will be seen from Table 2 that in

38 years out of 50 the rainfall in the district excluding the hilly area along the western boundary was between 601 and 1000 mm.

On an average there are 49 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district excluding the western hilly region. As in the case of the amount of rainfall, the number of rainy days are highest in the Ghats region and least in the eastern border region. While Mahabaleshwar on the hills has on an average 119 rainy days in a year, Mhaswad near the eastern border has only 30 rainy days in a year.

At Mahabaleshwar the highest rainfall in 24 hours ever recorded was 458.5 mm on 30th July 1896. In the plains of the district, the highest rainfall in 24 hours at any station was 330.3 mm at Mhaswad on 18th June 1961.

Temperature

There are two meteorological observatories in the district at Satara and Mahabaleshwar, for which meteorological records are available for a long period of years. The meteorological conditions at Mahabaleshwar represent only those on the Western Ghats. The data for the Satara station may well be taken as representative of the conditions over the plains of the district. The cold weather starts by about the end of November and continues till the middle of February, December being the coldest month. In December the mean daily maximum temperature in the plains is 27.7°C while the mean daily minimum temperature is 14.4°C. At Mahabaleshwar the mean daily maximum temperature in December is only 24.7°C and the mean daily minimum temperature is 13.8°C. The period from the middle of February to the end of May is one of continuous increase in temperatures. The rise in temperatures is more marked in the plains than on the hills. In May, the hottest month, the mean daily maximum temperature in plains is 35.8°C. The heat is sometimes relieved by afternoon thundershowers. The onset of the southwest monsoon in the first or second week of June brings down the day temperatures appreciably. The day temperatures in the southwest monsoon months are even lower than in the cold season. After the withdrawal of the southwest monsoon, day temperatures show an increase in October. Thereafter both day and the night temperatures begin to drop. Except during the southwest monsoon season the daily range of temperature is large and is of the order of 8 to 13°C at Mahabaleshwar and 10 to 16°C at Satara.

At Mahabaleshwar the highest maximum temperature ever recorded was 37.6°C on 21st April 1976 and the lowest minimum temperature ever recorded was 3.9°C on 1st February 1942. At Satara the highest maximum temperature ever recorded was 41.4°C on

9th May 1988 and 24th April 1993 and the lowest minimum temperature ever recorded was 4.8°C on 2nd January 1991.

Humidity

In the southwest monsoon months the air is highly humid, but in the summer and the cold seasons the air is dry particularly in the afternoons. In the plains, the dryness is more marked than in the hills.

Cloudiness

During the southwest monsoon season skies are heavily clouded to overcast being markedly so on the hills. After the withdrawal of the monsoon cloudiness rapidly decreases and skies are clear or lightly clouded in the winter and the summer months. Clear skies are most common from February to April.

Winds

Winds are moderate in force, particularly on the hills, about 20 km/hr in the southwest monsoon season. In the rest of the year they are light to moderate. Southwesterly or westerly winds prevail in the southwest monsoon months. In the post monsoon months, they are predominantly from northeasterly or easterly direction. During the cold season, winds are from directions between northeast in the hilly parts and variable in plains. Northeasterly winds are common in the mornings during the hot season. While in the afternoons winds are mainly northwesterly in hilly areas and west-southwesterly in the plains.

Special Weather Phenomena

Thunderstorms occur in the hot season and in the post monsoon months, while fog occurs on most of the days of monsoon season on hilly areas.

Tables 3 and 3(a) give the temperature and humidity for Mahabaleshwar and Satara observatories respectively. Tables 4 and 5 give mean wind speed and special weather phenomena for Mahabaleshwar observatory only.

TABLE –1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Aundh	43	a	2.9	0.4	3.8	19.5	45.4	84.4	135.5	86.2	130.9	79.3	37.2	4.9	630.4	173	28	143.4	06 Jun 1976
		b	0.1	0.0	0.3	1.3	2.5	5.8	10.9	8.5	7.2	4.8	1.8	0.4	43.6	(1946)	(1972)		
Dahiwadi	46	a	3.7	0.7	3.0	12.4	42.5	84.5	65.4	54.1	175.1	103.9	44.8	6.9	597.0	194	36	180.0	22 Nov 1977
		b	0.1	0.1	0.3	1.0	2.5	5.2	5.4	4.4	7.1	5.3	2.2	0.3	33.9	(1987)	(1945)		
Karad	49	a	2.3	2.2	3.6	17.6	52.9	107.4	200.5	123.2	102.6	90.5	38.4	7.0	748.2	152	49	162.8	04 Jun 1882
		b	0.1	0.1	0.2	1.4	3.1	6.9	13.9	11.6	7.0	5.2	2.2	0.4	52.1	(1950)	(1972)		
Khandala	46	a	1.9	0.7	4.3	10.9	28.9	82.0	102.0	63.4	103.5	83.5	34.2	9.5	524.8	196	43	153.7	07 Nov 1922
		b	0.1	0.0	0.4	0.8	2.0	5.9	7.3	5.4	5.7	4.6	1.8	0.6	34.6	(1944)	(1972)		
Koregaon	45	a	2.6	1.8	7.8	15.4	43.1	124.7	202.5	111.8	132.6	80.0	35.2	9.9	767.4	147	42	169.0	06 Jun 1976
		b	0.1	0.1	0.3	1.4	2.8	8.1	13.8	10.4	7.6	4.9	2.3	0.6	52.4	(1961)	(1972)		
Medha Jaoli	39	a	3.8	1.0	4.3	23.6	48.0	233.6	701.5	378.6	144.1	97.1	41.4	7.3	1684.8	161	50	233.7	21 Jul 1894
		b	0.1	0.0	0.3	1.8	3.1	11.1	22.0	19.9	9.9	5.5	2.5	0.4	76.6	(1946)	(1972)		
Mhaswad	45	a	3.3	0.3	2.5	12.7	45.5	68.5	50.1	54.4	137.4	87.7	31.0	6.2	499.6	192	22	330.3	18 Jun 1961
		b	0.2	0.0	0.3	1.1	2.4	4.3	4.1	3.7	6.5	5.2	1.7	0.5	30.0	(1961)	(1972)		
Patan	46	a	2.1	0.4	3.9	18.2	45.4	267.2	783.5	453.1	152.4	85.5	33.9	4.7	1850.3	157	54	304.7	02 Jul 1966
		b	0.1	0.1	0.3	1.5	2.9	11.7	23.1	21.2	9.9	5.0	2.1	0.2	78.1	(1946)	(1986)		
Phaltan	48	a	4.2	1.7	3.8	7.1	28.0	75.4	61.7	56.1	143.6	74.4	26.2	6.6	488.8	175	53	169.0	26 Sep 1979
		b	0.2	0.1	0.4	0.7	2.1	5.0	5.3	4.8	7.0	4.8	1.7	0.4	32.5	(1979)	(1972)		
Pusesauli	39	a	3.5	0.0	1.3	10.6	25.4	47.4	100.8	50.7	73.9	53.0	18.5	2.4	387.5	225	33	170.2	17 Oct 1889
		b	0.1	0.0	0.1	1.1	2.3	4.3	8.6	6.4	6.0	4.4	1.6	0.3	35.2	(1946)	(1972)		

TABLE 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Satara	44	a	2.2	1.1	4.3	31.0	45.0	155.9	371.5	208.7	142.8	99.8	43.9	8.3	1114.5	162	57	216.0	06 Jun 1976
		b	0.2	0.1	0.3	2.0	3.2	9.3	18.7	16.2	9.0	5.2	2.6	0.3	67.1	(1946)	(1951)		
Satara (Obsy)	19	a	0.9	0.8	6.0	23.1	38.0	175.2	243.5	154.4	154.4	85.5	49.2	13.0	944.0	137	-	168.2	06 Jun 1976
		b	0.1	0.1	0.4	1.1	3.4	11.6	15.9	13.6	8.1	4.8	2.1	0.4	61.6	(1979)			
Vaduj	48	a	3.9	1.1	3.4	11.2	40.2	75.6	83.3	52.3	136.6	75.5	30.0	7.0	520.1	204	41	169.7	17 Oct 1889
		b	0.2	0.1	0.3	1.0	2.7	5.4	7.2	5.0	6.9	4.9	1.7	0.5	35.9	(1966)	(1972)		
Wai	49	a	1.9	0.8	3.2	18.7	40.3	114.5	258.9	145.1	112.1	90.6	42.3	9.5	837.9	226	47	214.0	19 Jun 1993
		b	0.1	0.0	0.4	1.3	2.6	7.6	14.2	10.5	6.9	5.1	2.2	0.5	51.4	(1956)	(1971)		
Satara (District)		a	2.8	0.9	4.0	16.6	40.6	121.2	240.1	142.3	131.6	84.7	36.2	7.4	828.4	137	47		
		b	0.1	0.1	0.3	1.3	2.7	7.3	12.2	10.1	7.5	5.0	2.0	0.4	49.0	(1944)	(1968)		
HILL STATIONS																			
Mahabaleshwar (Obsy)	50	a	2.0	0.3	8.1	26.2	63.5	846.0	2369.3	1798.2	595.0	123.8	42.8	11.7	5886.9	143	67	458.5	30 Jul 1896
		b	0.2	0.0	0.5	1.8	4.0	21.3	30.1	29.8	20.9	6.9	2.6	0.6	118.7	(1961)	(1968)		
Panchgani	47	a	2.8	1.2	9.9	33.2	64.7	311.0	775.2	523.8	249.3	145.3	71.1	8.2	2195.7	192	49	330.2	18 Jun 1993
		b	0.2	0.1	0.8	2.2	3.7	13.4	25.0	24.0	13.6	6.6	3.1	0.3	93.0	(1987)	(`1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(SATARA)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	1	801 – 900	15
401 – 500	1	901 – 1000	7
501 – 600	4	1001 – 1100	5
601 – 700	9	1101 - 1200	1
701 - 800	7		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(MAHABALESHWAR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	25.8	13.1	31.1	1995 Jan 23	5.6	1968 Jan 21	56	49
February	28.0	14.5	33.0	1976 Feb 22	3.9	1942 Feb 01	44	38
March	30.2	17.2	34.8	1977 Mar 23	7.7	1955 Mar 23	39	41
April	31.4	18.7	37.6	1976 Apr 21	11.1	1955 Apr 15	40	52
May	29.9	18.1	35.5	1988 May 09	12.5	1987 May 04	61	68
June	22.5	16.9	34.8	1993 Jun 07	12.0	1972 Jun 26	97	94
July	19.6	16.5	26.2	1975 Jul 01	12.2	1972 Jul 25	100	99
August	19.3	16.4	26.7	1950 Aug 25	12.2	1972 Aug 24	100	100
September	21.1	16.0	28.8	1977 Sep 28	10.5	1994 Sep 21	96	97
October	25.0	16.3	31.9	1989 Oct 23	10.0	1972 Oct 29	72	76
November	25.0	14.8	30.8	1976 Nov 08	7.4	1977 Nov 24	63	64
December	24.7	13.8	31.0	1976 Dec 26	6.4	1981 Dec 11	63	58
Annual	25.2	16.0					67	51

TABLE - 4
Mean Wind Speed in km/hr.
(MAHABALESHWAR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
9.9	10.7	12.7	13.4	14.1	17.8	22.0	20.1	13.4	12.1	13.8	12.5	14.4

TABLE - 5
Special Weather Phenomena
(MAHABALESHWAR)

Mean No. of Days with	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.4	1.6	2.2	1.2	0.2	0.2	0.5	1.7	0.5	0.1	8.6
Hail	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Duststorm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.2	0.2	0.1	1.0	4.9	20.0	22.0	24.0	18.0	7.0	1.6	1.0	100.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(SATARA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.4	13.6	35.4	1990 Jan 03	4.8	1991 Jan 02	68	36
February	31.4	14.9	37.1	1988 Feb 21	5.8	1990 Feb 19	53	26
March	34.2	19.3	40.5	1996 Mar 30	9.1	1980 Mar 10	44	27
April	35.4	21.2	41.4	1993 Apr 24	13.3	1990 Apr 02	46	37
May	35.8	22.4	41.4	1988 May 09	15.2	1976 May 04	54	45
June	30.3	22.3	40.7	1991 Jun 02	18.0	1976 Jun 14	77	69
July	26.5	21.4	36.4	1988 Jul 07	19.0	1974 Jul 01	83	78
August	25.1	20.8	32.1	1987 Aug 10	15.7	1981 Aug 12	86	80
September	27.0	19.9	34.6	1987 Sep 20	14.5	1976 Sep 15	83	72
October	28.8	18.9	37.7	1978 Oct 12	13.2	1991 Oct 27	74	54
November	27.8	15.1	36.0	1980 Nov 28	9.0	1993 Nov 27	70	46
December	27.7	14.4	34.0	1976 Dec 05	7.3	1992 Dec 26	71	42
Annual	29.9	18.7					67	51

SOLAPUR DISTRICT

The climate of this district is on the whole agreeable and is characterised by general dryness in the major part of the year. The cold season from December to about the middle of February is followed by the hot season which lasts upto the end of May. June to September is the southwest monsoon season. October and November constitute the post monsoon or retreating monsoon season.

Rainfall

Records of rainfall in the district are available for 12 stations for the period ranging from 32 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 643.2 mm. The rainfall in the district varies from 523.7 mm at Malsiras near the western border to 766.9 mm at Akalkot near the southeastern border of the district. Some rainfall in the form of thundershowers occurs during April, May, June and September. The rainfall during the southwest monsoon months, June to September amounts to about 74% of the annual normal. September is the rainiest month. About 17 % of the annual rainfall in the district is received in the post monsoon months of October and November. The variation in the annual rainfall from year to year is not large. In the 50 year period 1941 to 1990, the highest annual rainfall amounting to 160% of the normal occurred in 1975. The lowest annual rainfall which was only 37% of the normal occurred in 1972. In the same period, the annual rainfall in the district was less than 80% of the normal in 9 years. Two consecutive years of such low rainfall occurred twice during this period. It will be seen from Table 2 that the annual rainfall in the district was between 401 to 900 mm in 46 years out of 50.

On an average there are 38 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number increases from 32 at Malsiras near the western border of the district to 45 at Solapur near the southeastern border.

The heaviest rainfall in 24 hours recorded at any station in the district was 264.0 mm at Sangola on 23rd September 1974.

Temperature

There are two meteorological observatories in the district, one at Solapur and the other at Jeur. The records of these two observatories may be taken as fairly representative of the meteorological conditions in the district in general.

The cold season starts by about the end of November when temperatures, especially night temperatures, begin to fall rapidly. December is the coldest month with the mean daily maximum temperature at about 30°C and the mean daily minimum temperature about 14 to 16°C. The minimum temperature may occasionally drop down upto 3 to 4°C. The period from the middle of February to the end of May is one of continuous increase of temperature. May is the hottest month with the mean daily maximum temperature at about 40°C and the mean daily minimum temperature at about 24 to 25°C. The heat during the summer season is intense and the maximum temperatures may sometimes go upto 47°C. Afternoon thundershowers bring welcome relief from the heat. The onset of the southwest monsoon by about the first week of June brings down the temperatures appreciably. After the withdrawal of the southwest monsoon early in October, day temperatures increase slightly but the night temperatures steadily decrease. After mid-November both day and night temperatures begin to drop rapidly. Except during the southwest monsoon season the daily range of temperature is large and is of the order of 13 to 16°C at Solapur whereas for Jeur temperature range is 13 to 19°C.

The highest maximum temperature ever recorded at Solapur was 46.0°C on 10th May 1988 and the lowest minimum temperature ever recorded was 4.4°C on 7th January 1945. The highest maximum temperature ever recorded at Jeur was 46.6°C on 28th May 1989 and the lowest minimum temperature ever recorded was 3.2°C on 2nd January 1991.

Humidity

The air is highly humid during the southwest monsoon months and mostly dry during the rest of the year. The driest part of the year is the summer season when the humidity is between 22 to 29% on an average in the afternoons.

Cloudiness

During the southwest monsoon season the skies are heavily clouded or overcast. Skies are generally clear or lightly clouded during the period November to March. Cloudiness increases progressively from April and the afternoons are comparatively more clouded than the mornings.

Winds

Winds are light to moderate with some strengthening during the period May to August. In the southwest monsoon season winds are mainly from directions between southwest and west. From October to December winds blow from directions between east and northeast. In the next four months winds are variable in direction. In May winds are mostly from directions between west and northwest.

Special Weather Phenomena

Thunderstorms occur during the period from March to October, the highest incidences occurred during April to June and in September and October. Dust storms occur occasionally during the hot season.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and special weather phenomena respectively for Jeur and Solapur observatories.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Akalkot	50	a	2.6	1.6	4.1	11.7	30.0	114.3	140.5	152.9	194.1	83.1	26.6	5.4	766.9	180	29	155.0	12 Jun 1990
		b	0.2	0.1	0.4	1.0	2.2	6.5	9.0	8.9	9.3	4.4	1.4	0.4	43.8	(1956)	(1972)		
Akluj	32	a	6.0	1.2	4.6	10.6	29.4	92.0	61.6	62.4	146.5	74.4	34.5	6.8	530.0	151	49	180.9	20 Aug 1906
		b	0.3	0.1	0.4	0.8	2.1	5.2	5.5	4.6	7.2	4.8	1.7	0.3	33.0	(1947)	(1952)		
Barsi	49	a	2.8	1.1	5.9	8.2	26.8	109.0	128.5	120.0	180.6	64.4	28.2	3.9	679.4	154	40	153.7	07 Sep 1995
		b	0.2	0.1	0.6	0.9	2.2	6.9	8.8	7.6	9.4	4.3	1.8	0.4	43.2	(1948)	(1972)		
Jeur	40	a	1.5	2.2	3.7	11.7	28.7	99.6	102.7	90.8	168.6	81.0	29.0	9.9	629.4	179	46	209.0	23 Jun 1976
(Obsy)		b	0.1	0.2	0.4	1.2	2.2	5.7	6.4	6.5	8.0	4.4	1.6	0.6	37.3	(1975)	(1972)		
Karmala	50	a	6.1	0.8	3.7	10.0	25.2	107.3	98.8	82.2	195.0	74.6	24.7	6.8	635.2	180	45	231.4	07 Sep1895
		b	0.3	0.1	0.4	1.0	1.8	5.9	6.3	5.9	8.3	3.8	1.4	0.4	35.6	(1948)	(1952)		
Madha	48	a	4.1	1.4	2.9	7.2	22.6	97.6	93.2	85.3	196.1	76.5	26.9	4.0	617.8	165	59	210.8	08 Sep 1950
		b	0.4	0.2	0.2	0.8	1.5	5.7	7.4	6.0	9.0	4.6	1.5	0.4	37.7	(1988)	(1952)		
Malsiras	48	a	3.4	0.6	2.1	8.4	23.0	87.0	66.9	64.7	151.8	84.1	25.3	6.4	523.7	165	32	147.3	02 Nov 1931
		b	0.2	0.1	0.2	0.6	1.8	5.0	5.3	4.4	7.6	5.0	1.6	0.3	32.1	(1969)	(1972)		
Mangalvedha	34	a	2.6	3.7	2.6	6.8	29.3	89.8	69.2	94.8	185.9	95.6	19.2	7.0	606.5	182	25	190.0	18 Sep 1969
		b	0.2	0.2	0.1	0.8	2.1	5.1	5.6	6.7	8.3	4.7	1.6	0.5	35.9	(1981)	(1972)		
Mohol	36	a	1.8	1.7	5.4	9.2	27.9	81.8	90.0	115.6	184.1	76.8	25.1	6.8	626.2	146	43	124.0	22 Sep 1983
		b	0.1	0.2	0.5	1.1	1.8	5.9	6.6	7.4	9.1	4.5	1.8	0.5	39.5	(1987)	(1972)		

TABLE - I (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Pandharpur	49	a	4.9	1.2	3.5	9.5	24.9	98.6	88.3	107.5	200.0	102.6	22.0	7.5	670.5	181	23	251.5	07 Sep 1895
		b	0.3	0.1	0.3	0.8	2.0	6.0	6.7	6.6	8.4	5.1	1.3	0.4	38.0	(1974)	(1972)		
Sangola	49	a	3.7	0.4	5.1	12.5	41.1	107.0	77.7	91.1	191.9	104.4	34.6	8.1	677.6	217	42	264.0	23 Sep 1974
		b	0.3	0.0	0.5	1.3	2.7	5.9	5.4	5.6	8.0	4.9	1.9	0.5	37.0	(1974)	(1972)		
Solapur	50	a	5.0	3.4	5.6	9.7	32.8	119.0	130.3	136.8	192.7	92.7	20.6	6.7	755.3	172	41	191.0	12 Aug 1940
(Obsy)		b	0.2	0.3	0.5	1.0	2.6	7.1.	8.8	8.6	9.4	4.9	1.4	0.5	45.3	(1990)	(1972)		
Solapur		a	3.7	1.6	4.1	9.6	28.5	100.3	95.6	100.3	182.3	84.2	26.4	6.6	643.2	160	37		
(District)		b	0.2	0.1	0.4	0.9	2.1	5.9	6.8	6.6	8.5	4.6	1.6	0.4	38.1	(1975)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(SOLAPUR)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	701 – 800	11
301 – 400	1	801 – 900	5
401 – 500	7	901 – 1000	1
501 – 600	11	1001 – 1100	1
601 – 700	12		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(JEUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	31.1	12.8	37.4	1988 Jan 31	3.2	1991 Jan 02	63	39
February	34.0	14.7	40.1	1973 Feb 27	5.0	1950 Feb 11	54	32
March	37.7	18.9	42.9	1973 Mar 11	10.3	1971 Mar 01	49	29
April	40.1	22.9	46.4	1973 Apr 13	13.5	1968 Apr 01	52	27
May	40.5	23.8	46.6	1989 May 28	15.6	1989 May 18	58	27
June	35.6	22.6	44.6	1978 Jun 08	17.5	1977 Jun 16	76	53
July	32.2	21.6	42.1	1978 Jul 12	11.0	1977 Jul 31	81	64
August	31.1	21.1	39.8	1981 Aug 01	13.4	1975 Aug 22	85	66
September	31.9	20.7	38.6	1987 Sep 21	11.2	1991 Sep 04	85	62
October	32.9	19.4	38.2	1987 Oct 02	10.2	1975 Oct 23	71	48
November	31.2	16.6	35.5	1989 Nov 01	5.3	1970 Nov 30	68	47
December	30.2	13.7	35.4	1984 Dec 31	4.2	1991 Dec 28	66	42
Annual	34.0	19.1					67	45

TABLE - 4
Mean Wind Speed in km/hr.
(JEUR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.0	6.2	7.3	9.3	14.2	16.1	15.5	14.2	10.5	6.4	5.6	4.8	9.6

TABLE - 5
Special Weather Phenomena
(JEUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.1	0.7	1.5	1.4	1.3	0.5	0.3	1.2	0.8	0.2	0.0	8.0
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(SOLAPUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.9	16.1	36.7	1897 Jan 31	4.4	1945 Jan 07	59	31
February	34.1	18.3	39.4	1886 Feb 25	6.1	1911 Feb 02	48	25
March	37.6	21.9	43.9	1892 Mar 28	12.2	1886 Mar 10	42	22
April	39.9	24.8	44.7	1973 Apr 27	13.9	1905 Apr 02	48	23
May	40.2	25.3	46.0	1988 May 10	16.1	1885 May 26	59	27
June	35.0	23.4	45.6	1923 Jun 01	17.2	1922 Jun 27	76	49
July	31.8	22.5	38.9	1912 Jul 01	16.7	1996 Jul 08	81	60
August	31.1	21.9	40.0	1965 Aug 10	15.0	1956 Aug 30	82	60
September	31.9	21.7	37.2	1972 Sep 28	17.5	1959 Sep 16	80	55
October	32.7	21.0	38.5	1965 Oct 07	12.8	1882 Oct 27	68	41
November	31.1	18.1	36.1	1915 Nov 28	7.8	1881 Nov 24	62	36
December	30.1	15.9	34.4	1896 Dec 26	6.7	1945 Dec14	62	35
Annual	33.9	20.9					64	39

TABLE – 4(a)
Mean Wind Speed in km/hr.
(SOLAPUR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.0	7.1	7.4	8.0	10.1	10.6	10.2	9.4	7.8	7.8	8.5	7.6	8.5

TABLE – 5(a)
Special Weather Phenomena
(SOLAPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.4	1.4	4.6	3.6	4.4	1.4	1.6	4.9	2.6	0.5	0.1	25.7
Hail	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Fog	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4

MARATHWADA

AURANGABAD DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except during the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The period from June to September constitutes the southwest monsoon season. October and November form the post monsoon season.

Rainfall

The district has 9 stations with records of rainfall ranging from 29 to 43 years. The details of the rainfall at these stations are given in Tables 1 and 2. The average annual rainfall for Aurangabad is 719.3 mm. About 84% of the annual rainfall is received during June to September. July and August are the rainiest months. Some amount of rainfall occurs during May, October and November and is mainly in the form of thundershowers. The variation in the annual rainfall from year to year is not large. During the fifty year period 1941 to 1990, the highest annual rainfall which was 152% of the normal occurred in 1990 while the lowest annual rainfall which was only 46% of the normal occurred in 1972. During the same fifty years, rainfall was less than 80% of the normal in 9 years. The rainfall less than 80% of the normal for three consecutive years occurred once. The annual rainfall at Aurangabad was between 501 and 900 mm in 42 years out of 48.

On an average there are 42 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year at Aurangabad. This number varies from 32 at Vijapur to 52 at Khaldabad.

The heaviest rainfall recorded in 24 hours at any station in the district was 245.1 mm at Aurangabad observatory on 2nd September 1891.

Temperature

There are two meteorological observatories in the district at Aurangabad and Chikalthana and the records of these observatories may be taken as representative of the meteorological conditions prevailing in the district in general. Cold weather commences by about the end of November, when temperatures begin to fall rapidly. December is the coldest month with the mean daily maximum temperature at about 29°C and the mean daily minimum temperature at about 12°C. In the cold season the district is sometimes affected by cold waves in association with the eastward passage of western disturbances across north India, when the minimum temperature may drop down upto about 1-2°C. From about the beginning of March there is a rapid rise in both day and night temperatures. May is the hottest month of the year with the mean daily maximum temperature at about 40°C and the mean daily minimum temperature at about 24°C. During the hot season the heat is often intense and the day temperatures on individual days may rise above 45°C. There is relief from the heat on some days when thundershowers occur during the afternoons. With the advance of the southwest monsoon season into the district by about the second week of June there is an appreciable drop in both the day and night temperatures and the weather is pleasant. With the withdrawal of the monsoon by about the end of September the day temperatures increase a little and a secondary maximum in day temperature is recorded in October. But night temperatures decrease progressively after the withdrawal of the monsoon. After October both day and night temperatures steadily decrease.

The highest maximum temperature ever recorded at Aurangabad was 45.6°C on 25th May 1905 and the lowest minimum temperature ever recorded was 2.2°C on 2nd February 1911. The highest maximum temperature ever recorded at Chikalthana was 43.6°C on 26th April 1958 and 20th May 1984 and the lowest minimum ever recorded was 1.2°C on 28th December and 17th January 1968.

Humidity

Except during the southwest monsoon season when the relative humidity is high, the air is generally dry over the district. The summer months are the driest when the relative humidity is generally between 19 and 24% in the afternoons.

Cloudiness

During the southwest monsoon season, the skies are generally heavily clouded or overcast. In the post monsoon season, the sky is moderately clouded with increased amount in afternoons. In the rest of the year, the skies are mostly clear or lightly clouded.

Winds

Winds are generally moderate with increase in speed during the latter half of the hot season and in the southwest monsoon season. The winds blow predominantly from directions between west and northwest during the hot season. They are mostly from west during the southwest monsoon season. They blow mostly from the directions between northeast and east during post monsoon season. In cold season it is mostly calm or easterly. By February and March westerly and northwesterly winds start blowing.

Special Weather Phenomena

Thunderstorms occur in all months of the year. They occur more frequently during summer and monsoon season and are sometimes accompanied with hail. Dust storms occur sometimes during late summer afternoons.

Tables 3, 4, 5 and tables 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Aurangabad and Chikalthana (A) observatories.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Aurangabad	43	a	5.8	3.4	5.2	5.5	22.2	125.8	167.1	155.9	162.9	53.0	33.6	8.0	748.4	162	37	245.1	02 Sep 1891
(Obsy)		b	0.5	0.2	0.6	0.6	1.4	7.4	11.8	10.1	8.5	3.3	1.7	0.7	46.8	(1979)	(1972)		
Chikalthana	40	a	2.9	2.8	7.4	3.7	25.5	120.3	157.1	148.7	141.7	57.2	28.6	10.8	706.7	200	34	186.1	03 Sep 1992
(Aero Obsy)		b	0.2	0.3	0.8	0.4	1.8	7.5	10.3	10.3	8.2	3.1	1.3	0.8	45.0	(1990)	(1972		
Gangapur	38	a	1.0	1.7	3.3	3.7	18.3	127.7	130.0	115.1	176.7	73.2	20.4	10.0	681.1	191	50	213.0	12 Oct 1990
		b	0.1	0.2	0.3	0.3	1.2	6.8	7.8	8.1	8.2	3.2	1.1	0.6	37.9	(1990)	(1972)		
Kannad	39	a	5.0	0.6	3.9	1.9	20.4	124.9	163.3	170.4	138.1	55.4	24.8	8.9	717.6	159	35	195.6	28 Sep 1954
		b	0.4	0.1	0.3	0.2	1.3	7.4	10.8	10.0	7.6	2.5	1.3	0.6	42.5	(1962)	(1985)		
Khaldabad	37	a	1.3	0.9	3.4	3.1	22.6	150.2	199.5	215.7	173.8	61.2	22.7	6.6	861.0	174	28	230.5	09 Jun 1991
		b	0.2	0.1	0.4	0.4	1.4	8.6	13.2	13.2	9.2	3.2	1.3	0.5	51.7	(1958)	(1972)		
Paithan	29	a	0.0	1.1	3.6	2.6	20.0	115.9	134.2	147.6	206.3	41.9	19.4	11.8	704.4	142	40	214.0	15 Sep 1983
		b	0.0	0.1	0.3	0.3	1.1	6.1	7.9	8.7	8.4	2.5	0.9	0.6	36.9	(1989)	(1972)		
Sillod	40	a	3.1	1.7	2.4	2.8	15.3	128.0	190.1	172.8	120.4	50.0	24.2	6.2	717.0	179	54	215.9	31 Aug 1958
		b	0.3	0.2	0.3	0.4	0.8	6.9	10.8	10.6	6.9	2.5	1.2	0.4	41.3	(1958)	(1985)		
Sonegaon	32	a	2.7	5.1	4.4	1.0	8.8	144.7	189.0	242.9	147.0	37.3	19.9	8.0	810.8	143	55	194.0	18 Jul 1984
		b	0.3	0.4	0.4	0.1	0.5	7.3	12.1	13.3	7.8	1.9	1.0	0.4	45.5	(1990)	(1985)		
Vijapur	36	a	1.6	1.4	1.1	1.8	17.0	91.5	110.2	86.7	138.5	50.3	19.2	6.4	525.7	175	41	205.7	29 Sep 1954
(Vaijapur)		b	0.1	0.2	0.1	0.1	1.1	5.3	7.1	6.4	7.1	3.0	1.1	0.5	32.1	(1990)	(1972)		
Aurangabad		a	2.6	2.1	3.9	2.9	18.9	125.4	160.1	161.8	156.2	53.3	23.6	8.5	719.3	152	46		
(District)		b	0.2	0.2	0.4	0.3	1.2	7.0	10.2	10.1	8.0	2.8	1.2	0.6	42.2	(1990)	(1972)		

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(AURANGABAD)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	2	701 – 800	5
401 – 500	1	801 – 900	15
501 – 600	7	901 – 1000	0
601 – 700	15	1001 – 1100	3

(Data available for 48 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(AURANGABAD)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.7	14.0	38.8	1973 Jan 03	3.9	1945 Jan 07	54	30
February	32.4	16.0	37.8	1953 Feb 28	2.2	1911 Feb 02	44	22
March	36.1	20.0	42.2	1892 Mar 28	8.9	1898 Mar 05	36	19
April	39.2	23.4	45.0	1896 Apr 27	10.0	1908 Apr 04	34	19
May	40.0	24.2	45.6	1905 May 25	17.2	1924 May 04	47	23
June	35.1	22.9	43.9	1923 Jun 01	17.2	1901 Jun 19	75	49
July	30.6	21.8	38.8	1972 Jul 23	18.3	1904 Jul 16	85	68
August	29.3	21.1	36.1	1950 Aug 23	17.2	1935 Aug 11	87	70
September	30.6	20.8	36.7	1896 Sep 29	16.1	1901 Sep 30	82	64
October	32.9	19.6	37.8	1911 Oct 10 1972 Oct 20	12.2	1903 Oct 27	60	41
November	31.0	16.5	36.6	1976 Nov 06	7.2	1910 Nov 25	56	35
December	29.1	13.9	34.4	1896 Dec 03	5.0	1902 Dec 30	57	35
Annual	33.0	19.5					60	40

TABLE - 4
Mean Wind Speed in km/hr.
(AURANGABAD)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.5	8.1	9.4	10.5	16.0	18.7	16.9	15.2	11.1	7.4	5.9	5.6	10.9

TABLE - 5
Special Weather Phenomena
(AURANGABAD)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	0.7	0.7	1.0	1.5	0.7	0.4	1.2	0.4	0.1	0.1	7.0
Hail	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.3
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(CHIKALTHANA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.9	10.7	34.1	1973 Jan 12	1.2	1968 Jan 17	56	31
February	31.7	12.8	37.8	1985 Feb 28	1.9	1972 Feb 14	45	25
March	35.6	17.5	40.6	1984 Mar 31	7.1	1957 Mar 07	36	22
April	38.6	21.7	43.6	1958 Apr 26	10.2	1968 Apr 01	33	20
May	39.6	23.6	43.6	1984 May 20	14.2	1985 May 02	47	24
June	34.9	22.6	43.0	1979 Jun 10	18.5	1986 Jun 04	73	49
July	30.6	21.5	37.1	1968 Jul 01	18.4	1972 Jul 26	83	66
August	29.3	20.8	35.6	1965 Aug 15	17.2	1967 Aug 22	85	69
September	30.5	20.3	37.0	1987 Sep 26	12.6	1972 Sep 24	79	60
October	32.1	17.8	37.6	1986Oct 24	8.3	1952 Oct 30	58	40
November	30.0	13.5	34.6	1965 Nov 03	1.9	1970 Nov 30	55	37
December	28.4	10.7	33.6	1963 Dec 12	1.2	1968 Dec 28	57	37
Annual	32.5	17.8					59	40

TABLE – 4(a)
Mean Wind Speed in km/hr.
(CHIKALTHANA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.1	7.6	9.6	12.0	17.5	20.6	18.0	17.8	12.6	7.6	6.3	5.5	11.8

TABLE – 5(a)
Special Weather Phenomena
(CHIKALTHANA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.5	0.5	1.4	1.7	3.0	5.5	2.3	2.0	3.8	1.7	0.6	0.4	23.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.4

BEED DISTRICT

The climate of this district is on the whole dry except in the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The period from June to September is the southwest monsoon season while October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 9 raingauge stations for the period ranging from 29 to 39 years. Tables 1and 2 give the rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 726.0 mm. The rainfall in the district increases from west to east, varying from 599.7 mm at Roti near the western border to 807.4 mm at Manjlegaon near the eastern border. About 81% of the annual rainfall is received in the southwest monsoon period. September is the rainiest month. The variation in the annual rainfall from year to year is not large. In the fifty year period 1941-1990, the highest annual rainfall which was 145% of the normal occurred in 1983. The lowest annual rainfall was in 1972, when it amounted to only 40% of the normal. In the same fifty year period there were as many as 13 years, when the annual rainfall was less than 80% of the normal. Of these, two consecutive years of such low rainfall occurred on two occasions and three consecutive years occurred once. It will be seen from Table 2 that the annual rainfall in the district was between 501and 800 mm in 32 years out of 49.

On an average there are 40 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 31 at Roti to 44 at Beed observatory.

The heaviest rainfall recorded in 24 hours at any station in the district was 346.0 mm at Beed observatory on 24th July 1989.

Temperature

The only meteorological observatory in the district is at Beed. The temperature and other meteorological description at this station may be taken as representative of the conditions over the district as a whole. The cold weather commences towards the end of November. December is the coldest month, with the mean daily minimum temperature at 12.3°C and the mean daily maximum temperature at 29°C. In the cold season the district is sometimes affected by cold waves in association with the passage of western disturbances across north India. On such occasions, the minimum temperatures may drop to about 4°C. Temperatures begin to rise appreciably only by about the beginning of March. May is the hottest month with the mean daily maximum temperature at about 40°C. On individual days the day temperature may be as high as 49°C. With the advance of the southwest monsoon into the district by about the second week of June the temperatures fall appreciably and the weather is pleasant throughout the southwest monsoon season. By about the first week of October the monsoon withdraws and the day temperatures increase slightly and a secondary maximum is reached in October. Thereafter the temperature begins to decrease gradually.

The highest maximum temperature ever recorded in the district at Beed was 48.5°C on 5th May 1983. The lowest minimum temperature ever recorded in the district at Beed was 4.0°C on 17th January 1968.

Humidity

The relative humidity is high (65-85%) during the southwest monsoon season. After September, the humidity decreases gradually and in the cold and summer seasons the air is dry, particularly in the afternoons when relative humidity may be less than 30%.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. There is a rapid decrease of cloudiness in the post monsoon months. In the rest of the year the skies are generally clear or lightly clouded.

Winds

Winds are mostly light and its speed increases in the latter half of the summer and in the southwest monsoon period. During the southwest monsoon season, winds blow

predominantly from directions between southwest and northwest. In the post monsoon and winter months winds are calm or from southeast direction in mornings and northeasterly in afternoons. In February winds are variable and during summer season winds are mostly northwesterly.

Special Weather Phenomena

Thundershowers occur in the summer and monsoon months, with the maximum frequency in June and September. Fog occurs occasionally during winter season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Beed observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ashti	37	a	0.5	1.8	2.9	5.3	28.0	119.2	106.5	109.2	170.3	70.9	27.5	5.9	648.0	178	25	174.0	13 Aug 1983
		b	0.1	0.2	0.3	0.7	2.0	7.2	7.9	7.3	8.9	3.9	1.6	0.5	40.6	(1983)	(1972)		
Beed	29	a	3.8	4.6	4.9	4.8	20.6	115.7	162.4	146.5	203.8	85.2	21.3	5.5	779.1	162	49	237.0	02 Sep 1992
		b	0.3	0.3	0.5	0.5	1.6	6.7	8.7	8.1	9.4	3.8	1.4	0.3	41.6	(1989)	(1976)		
Beed (Obsy)	29	a	3.6	5.3	5.6	13.6	22.1	115.1	137.0	162.7	188.4	75.0	17.1	22.2	767.7	173	53	346.0	24 Jul 1989
		b	0.4	0.4	0.6	1.2	1.7	6.8	8.3	8.4	9.3	4.0	1.3	1.5	43.9	(1989)	(1972)		
Chowsala	37	a	0.2	1.7	7.7	3.2	30.9	116.8	140.6	145.4	176.2	61.2	27.6	7.0	718.5	188	21	187.0	27 Sep 1989
		b	0.0	0.1	0.4	0.4	1.6	7.4	8.0	7.8	8.3	3.9	1.5	0.2	39.6	(1990)	(1972)		
Georai	37	a	2.6	2.5	4.0	1.5	14.1	138.3	170.5	151.8	170.4	56.1	17.2	15.2	744.2	184	42	140.0	02 Sep 1992
		b	0.2	0.2	0.3	0.1	0.9	6.8	9.0	8.4	8.5	3.0	1.1	0.7	39.2	(1975)	(1972)		
Manjlegaon	33	a	5.7	2.2	5.7	15.7	18.7	134.4	172.4	178.3	179.3	78.3	12.8	3.9	807.4	181	42	185.3	25 Aug 1971
		b	0.3	0.2	0.4	0.8	1.1	7.1	9.5	9.7	9.2	3.4	0.7	0.4	42.8	(1961)	(1972)		
Mominabad (Ambejogai)	39	a	3.1	2.7	4.2	7.3	13.0	136.2	160.8	174.1	190.2	61.5	26.1	5.6	784.8	152	50	250.0	24 Jun 1951
		b	0.1	0.2	0.2	0.6	0.8	7.6	9.0	10.1	9.2	3.2	1.5	0.2	42.7	(1956)	(1976)		
Patoda	39	a	3.4	1.1	4.2	5.5	35.2	120.6	131.3	118.1	158.3	60.6	36.5	9.7	684.5	167	23	190.0	24 Jul 1989
		b	0.3	0.1	0.4	0.4	2.2	7.7	8.6	7.9	8.6	3.2	1.4	0.5	41.3	(1962)	(1984)		
Roti	36	a	0.0	2.1	1.8	3.7	10.6	117.4	102.0	87.2	173.1	67.5	30.9	3.4	599.7	163	35	188.0	20 Sep 1962
		b	0.0	0.1	0.1	0.3	0.8	5.9	5.7	5.3	7.7	3.8	1.3	0.3	31.3	(1989)	(1973)		
Beed (District)		a	2.5	2.7	4.6	6.7	21.5	123.7	142.6	141.5	178.9	68.5	24.1	8.7	726.0	145	40		
		b	0.2	0.2	0.4	0.6	1.4	7.0	8.3	8.1	8.8	3.6	1.3	0.5	40.4	(1983)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (i.e. days with rainfall of 2.5 mm or more)
Based on all available data upto 1996.
* : Years of occurrence given in brackets
** :

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(BEED)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	701 – 800	14
301 – 400	0	801 – 900	5
401 – 500	3	901 – 1000	3
501 – 600	9	1001 – 1100	5
601 – 700	9		

(Data available for 49 years.)

TABLE - 3
Normals of Temperature and Relative Humidity
(BEED)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.2	12.5	35.0	1973 Jan 10	4.0	1968 Jan 17	69	39
February	32.8	14.3	38.4	1973 Feb 27	4.6	1961 Feb 09	60	33
March	36.5	18.2	43.6	1980 Mar 21	9.4	1971 Mar 01	50	30
April	39.6	22.7	44.6	1964 Apr 30	13.0	1981 Apr 09	45	27
May	40.3	24.7	48.5	1983 May 05	16.5	1968 May 07	52	29
June	35.8	24.0	44.2	1995 Jun 03	20.2	1964 Jun 08	74	51
July	31.6	23.1	38.9	1966 Jul 11	20.0	1963 Jul 25	81	64
August	30.6	22.4	38.8	1972 Aug 07	18.0	1968 Aug 28	82	66
September	31.4	21.7	37.8	1967 Sep 13	11.0	1981 Sep 25	84	64
October	32.6	19.4	37.7	1991 Oct 23	10.5	1960 Oct 31	73	49
November	30.5	15.0	34.6	1980 Nov 11	5.0	1970 Nov 30	68	45
December	29.0	12.3	34.0	1980 Dec 28	5.0	1970 Dec 10	72	44
Annual	33.4	19.2					68	45

TABLE - 4
Mean Wind Speed in km/hr.
(BEED)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2.7	3.4	4.2	5.7	8.7	9.3	8.4	7.6	5.1	3.8	3.2	2.6	5.4

TABLE - 5
Special Weather Phenomena
(BEED)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.2	0.6	1.3	1.4	3.0	1.0	1.0	2.5	1.3	0.1	0.0	12.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2

HINGOLI DISTRICT

The climate of this district is generally dry except during the southwest monsoon season. The year may be divided into four seasons. The cold season is from December to February. This is followed by the hot season from March to May. The period from June to September is the southwest monsoon season, while October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 2 raingauge stations viz. Hingoli and Kalmanoori for the period ranging from 35 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 957.5 mm. The variation in rainfall from year to year is considerable. Rainfall during the southwest monsoon season constitutes about 87% of the annual rainfall, July and August being the rainiest months. In the 50 year period from 1941-1990, the highest annual rainfall amounting to 163% of the normal occurred in 1990 and the lowest annual rainfall which was 40% of the normal occurred in 1941. During the same period the annual rainfall was less than 80% of the normal in 13 years. Two and three consecutive years of such a low rainfall occurred twice and once respectively. It will be seen from Table 2 that the annual rainfall in the district was between 601 and 1000 mm in 23 years out of 44 years.

On an average, there are 47 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district.

The heaviest rainfall in 24 hours recorded at any station in the district was 311.9 mm at Hingoli on 27th June 1960.

Temperature

There is no meteorological observatory in the district. The climatological description which follows is based on the meteorological data of Parbhani observatory in the neighbouring district, where similar climatological conditions prevail. The cold weather commences towards the end of November when the temperatures begin to fall. December is the coldest month with the mean daily minimum temperature at 13.9°C and the mean daily maximum temperature at 29.1°C. The temperatures are slightly higher in January and February. In the cold season, the district is sometimes affected by cold waves which are associated with the eastward passage of western disturbances across north India. On such occasions the minimum temperatures may drop down upto about 4-5°C. The period from March to May is one of the continuous increase in both day and night temperatures. May is the hottest month with the mean daily maximum temperature at 41.6°C and mean daily minimum temperature at 26.3°C. With the advance of the southwest monsoon into the district by about the second week of June temperatures fall appreciably and the weather is pleasant throughout the southwest monsoon season. By about the first week of October, the monsoon withdraws and the day temperature shows a slight increase in October. Thereafter the temperatures begin to drop gradually.

Humidity

The relative humidity is high during the southwest monsoon season and is about 60 to 80%. After September, the humidity decreases gradually and in the cold season and summer the air is generally dry. In the summer which is the driest part of the year, the relative humidity specially in the afternoons is less than 20%.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. The cloud amount decreases rapidly in the post monsoon months. In the rest of the year skies are generally clear or lightly clouded.

Winds

Winds are generally moderate in force in the latter half of the summer and in the southwest monsoon period. In the rest of the year, winds are light. During the southwest monsoon season winds are predominantly from the west. In the post monsoon and winter months, winds are mostly calm or blow from directions mainly between northeast and east.

From the beginning of summer, winds from directions between west and northwest appear and these predominate by May and continue till the onset of the monsoon.

Special Weather Phenomena

Thunderstorms occur in the summer and monsoon months, their frequency being higher in June and September. Dust raising winds are common in the summer afternoons.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Hingoli	49	a	3.3	5.1	7.0	5.8	11.1	171.1	246.0	237.6	174.4	57.6	20.6	8.7	948.3	167	41	311.9	27 Jun 1960
		b	0.3	0.4	0.4	0.5	0.8	8.2	12.2	10.5	7.7	3.1	0.9	0.4	45.4	(1988)	(1941)		
Kalmanoori	35	a	5.5	5.9	3.8	4.1	14.9	189.7	236.9	265.3	153.4	61.3	19.6	5.9	966.3	161	35	168.8	11 Aug 1983
		b	0.4	0.4	0.3	0.4	1.1	8.9	12.3	11.5	7.4	2.8	0.9	0.3	46.7	(1990)	(1988)		
Hingoli		a	4.4	5.5	5.4	5.0	13.0	180.4	241.5	251.5	163.9	59.5	20.1	7.3	957.5	163	40		
(District)		b	0.4	0.4	0.4	0.5	1.0	8.6	12.3	11.0	7.6	3.0	0.9	0.4	46.5	(1990)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(HINGOLI)

Range in mm	No. of years	Range in mm	No. of years
301 – 400	1	1001 – 1100	3
401 – 500	1	1101 – 1200	4
501 – 600	2	1201 – 1300	3
601 – 700	6	1301 – 1400	2
701 – 800	7	1401 - 1500	4
801 – 900	5	1501 – 1600	1
901 – 1000	5		

(Data available for 44 years only)

JALNA DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except during the southwest monsoon season. The year may be divided into four seasons. The cold season from December to February is followed by the hot season from March to May. The period from June to September constitutes the southwest monsoon season. October and November form the post monsoon season.

Rainfall

The district has 5 stations with records ranging for the period from 32 to 36 years. The details of the rainfall at these stations are given in Tables 1 and 2. The average annual rainfall for Jalna is 727.7 mm. About 85% of the annual rainfall is received during June to September. July and August are the rainiest months. Some amount of rainfall occurs during May, October and November which is mainly in the form of thundershowers. The variation in the annual rainfall from year to year is not large. During the fifty year period from 1941to 1990, the highest annual rainfall which was 149% of the normal occurred in 1988 while the lowest annual rainfall which was only 41% of the normal occurred in 1972. During the same fifty years the rainfall was less than 80% of the normal in 9 years. The rainfall less than 80% of the normal for three consecutive years occurred once. The annual rainfall at Jalna was between 501 and 1000 mm in 37 years out of 40.

On an average there are 41 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 39 at Ambad and Bhokardan to 43 at Partur.

The heaviest rainfall recorded at any station in the district in 24 hours was 216.0 mm on 1st September 1977 at Jalna.

Temperature

There is no meteorological observatory in the district at Jalna and the records for this district may be taken as the meteorological conditions prevailing in the neighbouring district Aurangabad in general. Cold weather commences by about the end of November when the temperatures begin to fall rapidly. December is the coldest month with the mean daily maximum temperatrure at about 29°C and the mean daily minimum temperature at about 13.0°C. In the cold season the district is sometimes affected by cold waves in association with the eastward passage of western disturbances across north India, when the minimum temperature may drop down upto about 1-2°C. From about the beginning of March there is a rapid rise in both the day and night temperatures. May is the hottest month of the year with the mean daily maximum temperature at about 40°C and the mean daily minimum at about 24.0°C. During the hot season, the heat is often intense and the day temperatures on individual days may rise upto 45°C. There is relief from the heat on some days when thundershowers occur during the afternoons. With the advance of the southwest monsoon season into the district by about the second week of June, there is an appreciable drop in both the day and night temperatures and the weather is pleasant. With the withdrawal of the monsoon by about the end of September, the day temperatures increase a little and a secondary maximum in day temperature is recorded in October. But night temperatures decrease progressively after the withdrawal of the monsoon. After October, both day and night temperatures steadily decrease.

Humidity

Except during the southwest monsoon season, when the relative humidity is high, the air is generally dry over the district. The summer months are the driest when the relative humidity is generally between 19 and 24% in the afternoons.

Cloudiness

DurIng the southwest monsoon season the skies are generally heavily clouded or overcast. In the post monsoon season the sky is moderately clouded with increased amount in afternoons. In the rest of the year the skies are mostly clear or lightly clouded.

Winds

Winds are generally moderate with increase in force during the latter half of the hot season and in the monsoon season. The winds blow predominantly from direction between

west and northwest during the hot season. They are mostly from west during the southwest monsoon season. They blow mostly from directions between northeast and east during post monsoon season. In cold season it is mostly calm or easterly. By February and March, westerly and northwesterly winds start blowing.

Special Weather Phenomena

Thunderstorms occur in all months of the year. They occur more frequently during summer and monsoon season and are sometimes accompanied with hail. Dust storms occur sometimes during late summer afternoons.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ambad	32	a	2.0	0.6	4.7	2.3	16.5	128.1	139.5	152.3	172.4	56.3	25.9	1.4	702.0	168	69	168.2	03 Aug 1993
		b	0.2	0.1	0.5	0.2	0.8	7.1	8.5	8.8	8.3	3.1	1.1	0.2	38.9	(1988)	(1974)		
Bhokardan	36	a	1.9	2.2	1.2	2.3	16.2	134.9	161.5	152.5	116.9	53.2	19.5	6.2	668.5	156	40	165.0	10 Jun 1991
		b	0.2	0.3	0.2	0.2	0.8	7.1	9.7	9.8	6.5	2.8	1.0	0.5	39.1	(1975)	(1982)		
Jafferabad	33	a	4.3	1.8	4.2	3.4	13.0	131.6	167.1	164.3	128.4	51.0	25.4	6.9	701.4	168	34	160.2	10 Oct 1961
		b	0.4	0.2	0.4	0.3	0.9	6.9	10.2	9.9	6.6	2.3	1.1	0.6	39.8	(1970)	(1972)		
Jalna	35	a	4.3	2.2	4.6	1.5	18.7	152.5	177.9	157.8	158.0	52.5	24.7	3.2	757.9	168	64	216.0	01 Sep 1977
		b	0.4	0.1	0.4	0.2	1.4	8.0	10.4	9.3	8.2	2.6	1.1	0.3	42.4	(1977)	(1974)		
Partur	34	a	2.6	2.0	7.4	3.3	19.9	133.0	173.2	204.1	175.3	66.7	17.1	4.3	808.9	148	47	145.0	18 Jul 1986
		b	0.3	0.2	0.5	0.4	1.1	7.3	9.9	11.0	8.3	2.8	0.7	0.3	42.8	(1975)	(1972)		
Jalna		a	3.0	1.8	4.4	2.6	16.9	136.0	163.8	166.2	150.2	55.9	22.5	4.4	727.7	149	41		
(District)		b	0.3	0.2	0.4	0.3	1.0	7.3	9.7	9.8	7.6	2.7	1.0	0.4	40.7	(1988)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(JALNA)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	701 – 800	9
301 – 400	0	801 – 900	8
401 – 500	1	901 – 1000	6
501 – 600	8	1001 – 1100	1
601 – 700	6		

(Data available for 40 years only

LATUR DISTRICT

The climate of this district is on the whole dry except during the monsoon season. The year may be divided into four seasons. The cold season from December to about the middle of February is followed by the summer season which lasts upto the end of May. The period from June to September is the southwest monsoon season. October and November constitute the post monsoon or retreating monsoon season.

Rainfall

Records of rainfall in the district are available for 4 stations for the period ranging from 10 to 37 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 861.7 mm. The rainfall in the district in general increases from the southwest towards the northeast. About 84% of the annual rainfall in the district is received during the southwest monsoon season, the rainiest months being August and September. The variation in the annual rainfall from year to year is not large in the district. During the period 1941 to 1990, the highest annual rainfall amounting to 165% of the normal occurred in 1955 while the lowest annual rainfall amounting to 34% of the normal occurred in 1972. In the same period 1941 to 1990, the rainfall in the district was less than 80% of the normal in 8 years. Occasions of two consecutive years of such a low rainfall occurred thrice during this period. It will be seen from Table 2 that the annual rainfall in the district was between 601 and 1200 mm in 29 years out of 37.

On an average there are about 47 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 42 at Ausa to 49 at Ahmedpur and Udgir.

The heaviest rainfall in 24 hours recorded at any station in the district was 165.3 mm on 9th October 1961 at Ahmedpur.

Temperature

There is no meteorological observatory in the district. The description, which follows, is mainly based on the records of observatories in the neighbouring districts. The cold weather commences towards the end of November when temperatures begin to decrease rapidly. December is generally the coldest month with the mean daily maximum temperature at about 29.0^{O}C and the mean daily minimum temperature at about 13.5^{o}C. On some occasions the minimum temperature may drop down upto about 4^{o}C. The period from about the middle of February to May is one of continuous increase in temperatures. May is generally the hottest month with the mean daily maximum temperature at about 40^{o}C and the mean daily minimum temperature at about 25.0^{o}C. The heat during summer is intense and the maximum temperature may sometimes go upto 47^{o}C. Afternoon thundershowers, which occur on some days bring welcome relief though only temporarily. With the onset of the southwest monsoon in the district early in June there is an appreciable drop in temperature. With the withdrawal of the southwest monsoon early in October there is a slight increase in day temperature. However from November, both day and night temperatures begin to decrease.

Humidity

The air is very humid during the southwest monsoon season, particularly in the morning the values of relative humidity are at about 75 to 80% and mostly dry in the rest of the year. The driest part of the year is the summer season when the afternoon relative humidity is about 30%.

Cloudiness

In the southwest monsoon season the skies are generally heavily clouded or overcast. During the rest of the year skies are mostly clear or lightly clouded. There is some increase in cloudiness during the afternoons of the summer season.

Winds

Winds are generally moderate with some increase in force during the latter half of the summer and in the southwest monsoon season. Winds blow mostly from directions between

southwest and northwest during the southwest monsoon season. In the post monsoon and winter months wind is generally light and mostly blow from directions between northeast and southeast. From about the beginning of summer westerlies appear in the district and with the progress of the season, westerly and northwesterly winds predominate.

Special Weather Phenomena

Thunderstorms occur in the summer and monsoon months, their incidences being higher during the monsoon season. Fog occurs occasionally during winter season. Dust raising winds occur during the summer season.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ahmedpur	37	a	2.3	4.3	8.5	7.9	18.8	155.8	236.9	223.2	174.4	71.0	19.5	2.7	925.3	164	40	165.3	09 Oct 1961
		b	0.2	0.3	0.5	0.8	1.3	8.3	11.6	12.2	8.9	3.9	0.9	0.3	49.2	(1988)	(1972)		
Ausa	10	a	4.7	0.6	7.8	5.1	29.8	143.4	151.0	167.5	180.7	66.1	14.3	3.2	774.2	153	56	115.0	15 Aug 1990
		b	0.3	0.1	0.3	0.7	2.2	7.1	8.7	8.7	9.0	3.7	1.0	0.2	42.0	(1990)	(1982)		
Nilanga	10	a	2.1	0.0	9.6	3.1	28.9	138.3	146.0	166.3	235.2	76.9	14.8	9.8	831.0	150	49	132.0	15 Aug 1990
		b	0.1	0.0	0.3	0.5	1.7	8.3	9.7	9.9	11.2	3.4	0.8	0.6	46.5	(1983)	(1984)		
Udgir	34	a	3.0	3.1	8.5	10.5	22.9	153.4	207.8	216.6	183.3	78.0	22.4	6.7	916.2	163	24	157.7	27 Sep 1954
		b	0.2	0.2	0.6	0.8	1.4	9.1	11.6	11.6	8.5	3.6	1.2	0.5	49.3	(1955)	(1972)		
Latur		a	3.0	2.0	8.6	6.7	25.1	147.7	185.4	193.4	193.4	73.0	17.8	5.6	861.7	165	34		
(District)		b	0.2	0.2	0.4	0.7	1.7	8.2	10.4	10.6	9.4	3.7	1.0	0.4	46.9	(1955)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(LATUR)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	901 – 10 00	4
301 – 400	0	1001 – 1100	6
401 – 500	0	1101 – 1200	4
501 – 600	3	1201 – 1300	2
601 – 700	4	1301 – 1400	1
701 – 800	5	1401 – 1500	1
801 – 900	6		

(Data available for 37 years only)

NANDED DISTRICT

The climate of this district is generally dry except during the southwest monsoon season. The year may be divided into four seasons. The cold season is from November to the end of February. This is followed by the hot season which extends upto the first week of June. The southwest monsoon season which follows thereafter, lasts till about the first week of October. The rest of October and the first half of November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 9 stations, for a period ranging from 10 to 48 years. The statement of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 991.5 mm. About 86% of the annual rainfall is received during the southwest monsoon season. July and August are the rainiest months in the year. Considering the general pattern of rainfall in the district, it is seen that the rainfall increases from west to east in the district. The variation of rainfall from year to year in the district is large. In the fifty year period from 1941 to 1990, the highest annual rainfall in the district which was 194% of the normal occurred in 1983. The lowest annual rainfall which was 41% of the normal occurred in 1972. Rainfall less than 80% of the normal occurred in 10 years out of fifty, two and three consecutive years occurred once respectively. It is seen from Table 2 that the rainfall in the district was between 701 and 1200 mm in 34 years out of 50.

On an average there are 49 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 35 at Basar to 55 at Kinwat.

The heaviest rainfall in 24 hours recorded at any station in the district was 390.0 mm at Kinwat on 28th June 1989.

Temperature

There is one meteorological observatory in the district at Nanded. The description which follows is based on the records of this observatory. The cold weather commences by about the end of November when temperatures begin to fall. December is the coldest month, with the mean daily minimum temperature at about 13°C and the mean daily maximum temperature at about 30°C. In the cold season the district is sometimes affected by cold waves which are associated with the eastward passage of western disturbances across north India. On such occasions the minimum temperatures may go down upto about 4°C. The period from March to May is one of continuous rise in both day and night temperatures. May is the hottest month of the year with the mean daily maximum temperature at about 42°C and mean daily minimum temperature at about 26°C. On individual days the temperature sometimes goes upto 47°C. With the advance of the southwest monsoon into the district by about the second week of June, temperatures go down appreciably and the weather is pleasant throughout the southwest monsoon season. By about the first week of October the monsoon withdraws from the district and the day temperatures show a slight increase, a secondary maximum being recorded in October. Thereafter both day and night temperatures decrease.

The highest maximum temperature ever recorded at Nanded was 46.7°C on 4th June 1995 and lowest minimum temperature ever recorded was 3.6°C on 28th December 1983.

Humidity

The relative humidity is high during the southwest monsoon season and they are between 60 and 80% approximately. With the withdrawal of the southwest monsoon, humidity gradually decreases and in the cold and summer seasons the air is generally dry. The summer season is the driest part of the year when the relative humidity in the afternoons is generally less than 25%.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. The cloud amount decreases rapidly in the post monsoon months. In the rest of the year skies are clear or lightly clouded.

Winds

Winds are generally light throughout the year. They gain in strength in the latter half of the summer and southwest monsoon seasons. During the southwest monsoon season winds are predominantly from west or southwest. In the post monsoon and winter season they are light and variable in mornings and calm or from northeast in afternoons. From about the beginning of summer, winds from directions between west and northwest appear and these predominate by May and continue till the onset of the southwest monsoon.

Special Weather Phenomena

Thunderstorms occur in the summer and monsoon months, their frequency being higher in summer months. Fog occurs sometimes in winter season. Storms and depressions from the Bay of Bengal and the Arabian Sea seldom affect the district.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Nanded observatory.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Basar	10	a	5.3	14.5	4.2	3.9	6.1	95.1	215.4	159.9	215.2	19.7	18.3	0.0	757.6	117	59	158.7	24 Sep 1931
		b	0.2	0.8	0.4	0.2	0.3	5.5	11.5	6.8	7.1	1.5	1.1	0.0	35.4	(1947)	(1941)		
Bhokar	17	a	12.3	8.0	9.6	4.5	21.7	198.1	267.8	312.6	202.3	70.1	24.3	5.2	1136.5	203	58	218.0	29 Jun 1989
		b	0.5	0.4	0.4	0.5	1.4	8.4	12.6	13.3	8.7	3.1	1.4	0.3	51.0	(1988)	(1974)		
Billoli	39	a	5.5	6.2	6.7	9.6	20.2	162.1	294.4	290.2	182.0	80.1	19.8	4.7	1081.5	260	50	275.6	11 Aug 1983
		b	0.3	0.4	0.3	0.8	1.2	8.4	14.1	12.8	8.1	3.5	1.0	0.3	51.2	(1983)	(1972)		
Degloor	38	a	3.6	4.8	9.6	13.0	23.0	157.8	245.1	246.3	178.0	86.4	20.2	3.1	990.9	155	40	160.0	18 Sep 1962
		b	0.3	0.4	0.5	1.0	1.7	8.8	12.9	12.4	9.2	3.9	1.1	0.3	52.5	(1955)	(1972)		
Kandhar	37	a	4.3	4.0	8.3	5.1	17.4	145.1	227.4	209.9	169.5	65.6	14.3	3.0	873.9	193	54	264.4	06 Oct 1983
		b	0.3	0.4	0.5	0.5	1.0	8.9	11.8	10.8	8.9	3.3	0.9	0.4	47.7	(1983)	(1952)		
Kinwat	20	a	7.0	4.3	2.2	2.6	10.4	204.8	336.1	333.3	203.0	84.0	7.6	4.7	1200.0	175	56	390.0	28 Jun 1989
		b	0.6	0.3	0.3	0.4	0.8	8.4	14.2	15.1	9.8	3.8	0.6	0.2	54.5	(1955)	(1984)		
Mukhed	10	a	6.2	0.8	10.0	5.7	17.3	137.4	221.8	224.8	187.6	98.7	19.0	4.7	934.0	166	57	170.4	06 Oct 1983
		b	0.4	0.1	0.6	0.4	1.2	8.5	11.6	10.9	10.1	4.1	1.2	0.5	49.6	(1983)	(1986)		
Nanded	48	a	7.6	9.3	9.2	9.4	17.5	152.4	252.5	248.6	209.1	63.1	16.5	7.3	1002.5	193	36	254.0	20 Aug 1903
		b	0.6	0.7	0.7	0.8	1.4	8.3	13.3	12.0	9.4	3.5	1.1	0.4	52.2	(1988)	(1972)		
Nanded (Obsy)	30	a	7.1	4.9	10.8	11.7	16.6	147.5	244.4	238.9	191.5	52.1	13.5	8.1	947.1	161	34	252.6	12 Aug 1983
		b	0.5	0.4	0.8	0.9	1.7	8.3	12.7	12.4	9.5	3.1	1.1	0.4	51.8	(1983)	(1972)		
Nanded (District)		a	6.5	6.3	7.8	7.3	16.7	155.6	256.1	251.6	193.1	68.9	17.1	4.5	991.5	194	41		
		b	0.4	0.4	0.5	0.6	1.2	8.2	12.7	11.8	9.0	3.3	1.1	0.3	49.5	(1983)	(1972)		

a : Normal rainfall in mm.

b : Average number of rainy days (days with rainfall of 2.5 mm or more)

* : Based on all available data upto 1996.

** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(NANDED)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	1	1201 – 1300	3
501 – 600	1	1301 – 1400	4
601 – 700	4	1401 – 1500	1
701 – 800	8	1501 – 1600	0
801 – 900	10	1601 – 1700	1
901 – 1000	6	1701 – 1800	0
1001 – 1100	5	1801 – 1900	0
1101 – 1200	5	1901 – 2000	1

(Data available for 50 years.)

TABLE - 3
Normals of Temperature and Relative Humidity
(NANDED)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.7	13.4	36.0	1973 Jan 13	4.9	1983 Jan 03	62	36
February	33.9	15.7	38.8	1973 Feb 26	6.8	1981 Feb 11	50	28
March	37.7	19.1	42.0	1972 Mar 30	10.4	1979 Mar 10	41	24
April	40.7	23.0	45.5	1964 Apr 30	13.4	1968 Apr 01	37	25
May	41.8	25.6	46.6	1964 May 02	19.0	1968 May 07	43	26
June	37.1	23.8	46.7	1995 Jun 04	17.4	1983 Jun 26	68	47
July	32.5	22.5	39.5	1985 Jul 17	15.2	1970 Jul 21	79	65
August	31.2	21.9	39.0	1977 Aug 13	13.6	1970 Aug 14	81	69
September	31.9	21.8	38.2	1982 Sep 22	14.2	1972 Sep 25	79	64
October	33.1	19.4	38.8	1971 Oct 08	11.2	1983 Oct 23	69	49
November	31.1	15.0	36.0	1969 Nov 11	5.0	1983 Nov 24	64	42
December	30.0	12.5	34.8	1976 Dec 06	3.6	1983 Dec 28	65	41
Annual	34.3	19.5					62	43

TABLE - 4
Mean Wind Speed in km/hr.
(NANDED)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.0	4.1	4.5	5.1	7.0	9.9	8.4	7.6	5.7	3.9	4.1	3.4	5.6

TABLE - 5
Special Weather Phenomena
(NANDED)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.0	0.3	0.6	0.6	0.8	0.2	0.2	0.1	0.0	0.0	0.0	2.8
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.6

OSMANABAD DISTRICT

The climate of this district is on the whole dry except during the monsoon season. The year may be divided into four seasons. The cold season from December to about the middle of February is followed by the summer season which lasts upto the end of May. The period from June to September is the southwest monsoon season. October and November constitute the post monsoon or retreating monsoon season.

Rainfall

Records of rainfall in the district are available for 5 stations for the period ranging from 14 to 44 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 789.7mm. The rainfall in the district in general increases from the northwest towards the southwest. About 79% of the annual rainfall in the district is received during the southwest monsoon season, the rainiest month being September. The variation in the annual rainfall from year to year is not large in the district. During the 50 year period 1941 to 1990, the highest annual rainfall amounting to 142% of the normal occurred in 1990. The lowest annual rainfall amounting to 36% of the normal occurred in 1972. In the same 50 year period 1941 to 1990, the rainfall in the district was less than 80% of the normal in 8 years. Two and three consecutive years of such low rainfall occurred each during this period. It will be seen from Table 2 that the annual rainfall in the district was between 501 and 1100 mm in 43 years out of 46.

On an average there are 47 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 39 at Parenda to 55 at Osmanabad observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 247.1 mm on 7th September 1895 at Osmanabad.

Temperature

There is one meteorological observatory in the district at Osmanabad. The description which follows is mainly based on the records of this observatory. The cold weather commences towards the end of November when temperatures begin to decrease rapidly. December is generally the coldest month with the mean daily maximum temperature at about 28.6°C and the mean daily minimum temperature at about 14.7°C. On some occasions the minimum temperature drops down upto about 8°C. The period from about the middle of February to May is one of continuous increase in temperatures. May is generally the hottest month with the mean daily maximum temperature at about 39°C and the mean daily minimum temperature at about 24.7°C. The heat during summer is intense and the maximum temperature sometimes goes upto 45°C. Afternoon thundershowers which occur on some days bring welcome relief though only temporarily. With the onset of the southwest monsoon in the district early in June there is an appreciable drop in temperature. With the withdrawal of the monsoon early in October there is a slight increase in day temperature. Nights however progressively become colder.

The highest maximum temperature ever recorded at Osmanabad was 45.1°C on 31st May 1994. The lowest minimum temperature ever recorded was 8.4°C on 14th November 1983.

Humidity

The air is very humid during the southwest monsoon season and mostly dry in the rest of the year. The driest part of the year is the summer season when the afternoon relative humidity is about 38%.

Cloudiness

In the southwest monsoon season the skies are generally heavily clouded or overcast. During the rest of the year skies are mostly clear or lightly clouded. There is some increase in cloudiness during the afternoons of the summer season.

Winds

Winds are generally moderate with some increase in force during the latter half of the summer and in the southwest monsoon season. Winds blow mostly from directions between west and northwest during the monsoon season. In the period October to December winds

blow from directions between northeast and southeast. In the next four months winds are northeasterly or southeasterly in the mornings while westerly wind predominates in the afternoon. In May winds are mostly from directions between west and north.

Special Weather Phenomena

As the data for the special weather phenomena for Osmanabad observatory is not available, the description is written based on the neighbouring observatory Beed.

Thunderstorms occur in the summer and monsoon months, their incidence being higher during the monsoon season. Fog occurs occasionally during winter season.

Tables 3 and 4 give the temperature and humidity and mean wind speed respectively for Osmanabad observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Kallam	36	a	2.3	2.6	3.8	6.8	24.9	144.0	146.4	145.8	188.2	65.8	16.3	4.9	751.8	164	33	155.0	08 Jul 1991
		b	0.1	0.3	0.2	0.6	1.5	7.6	8.8	8.6	9.3	3.6	1.1	0.4	42.1	(1988)	(1972)		
Osmanabad	44	a	2.5	3.7	5.1	10.8	30.9	154.5	169.5	169.1	200.1	82.4	20.8	7.0	856.4	155	44	247.1	07 Sep 1895
		b	0.2	0.3	0.5	1.2	2.1	8.6	11.5	11.1	10.4	4.7	1.1	0.3	52.0	(1954)	(1972)		
Osmanabad	14	a	8.7	6.2	24.2	13.2	35.9	147.5	131.7	144.3	171.0	74.3	50.3	1.2	808.5	134	85	189.0	04 Nov 1979
(Obsy)		b	0.6	0.5	1.0	1.5	3.0	9.0	10.4	10.8	10.5	5.0	2.7	0.1	55.1	(1979)	(1985)		
Parenda	35	a	2.5	2.9	2.5	6.1	23.0	119.5	106.1	105.7	178.6	81.6	24.3	3.1	655.9	155	35	155.0	23 Sep 1977
		b	0.1	0.2	0.2	0.6	1.9	6.3	7.1	7.3	9.1	4.3	1.3	0.2	38.6	(1990)	(1972)		
Tuljapur	32	a	0.8	1.7	2.9	7.2	33.5	134.1	186.7	196.8	197.7	84.9	27.3	2.7	876.3	153	62	164.1	04 Nov 1979
		b	0.1	0.2	0.3	0.6	1.6	8.0	10.7	11.3	9.8	4.5	1.3	0.2	48.6	(1955)	(1976)		
Osmanabad		a	3.4	3.4	7.7	8.8	29.6	139.9	148.1	152.3	187.1	77.8	27.8	3.8	789.7	142	36		
(District)		b	0.2	0.3	0.4	0.9	2.0	7.9	9.7	9.8	9.8	4.4	1.5	0.2	47.1	(1990)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(OSMANABAD)

Range in mm	No. of years	Range in mm	No. of years
201 – 300	1	701 – 800	6
301 – 400	0	801 – 900	10
401 – 500	1	901- 1000	5
501 – 600	6	1001 – 1100	7
601 – 700	9	1101 – 1200	1

(Data available for 46 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(OSMANABAD)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.9	15.3	33.8	1993 Jan 30	8.8	1991 Jan 03	66	45
February	31.7	17.1	36.2	1985 Feb 28	10.2	1976 Feb 08	55	38
March	35.7	20.5	43.7	1976 Mar 29	13.0	1982 Mar 07	52	40
April	37.9	23.2	42.4	1993 Apr 24	16.4	1991 Apr 07	50	38
May	39.0	24.7	45.1	1994 May 31	18.7	1978 May 26	59	38
June	33.7	22.5	43.7	1995 Jun 04	19.4	1982 Jun 24	83	66
July	30.0	21.1	35.1	1977 Jul 14	19.4	1991 Jul 05	90	76
August	29.1	20.7	34.1	1995 Aug 27	18,8	1978 Aug 31	91	78
September	29.2	20.7	34.6	1977 Sep 27	17.4	1977 Sep 14	90	77
October	29.9	19.0	39.4	1991 Oct 13	12.4	1983 Oct 23	73	60
November	28.9	15.3	33.8	1995 Nov 13	8.4	1983 Nov 14	65	53
December	28.6	14.7	33.6	1995 Dec 23	9.3	1993 Dec 20	67	48
Annual	31.9	19.6					70	55

TABLE - 4
Mean Wind Speed in km/hr.
(OSMANABAD)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
11.1	11.6	7.7	12.6	10.0	9.4	10.7	13.5	9.7	9.5	6.2	5.9	9.8

PARBHANI DISTRICT

The climate of this district is generally dry except during the southwest monsoon season. The year may be divided into four seasons. The cold season is from December to February. This is followed by the hot season from March to May. The period from June to September is the southwest monsoon season, while October and November constitute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 5 raingauge stations for the period ranging from 10 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 922.5 mm. Considering the general pattern of rainfall in the surrounding districts, the rainfall increases from west to the east. Rainfall during the southwest monsoon season constitutes about 87% of the annual rainfall, July and August being the rainiest months. There is an appreciable variation in the rainfall from year to year. In the period of 50 years from 1941 to 1990, the highest annual rainfall was 149% of the normal and occurred in 1989. The lowest annual rainfall in the same period was in 1972 when it was only 51% of the normal. Rainfall less than 80% of the normal occurred in 16 years out of 48. Consecutive years with rainfall less than 80% of the normal for two and three years occurred twice during the same period. It will be seen from Table 2 that the rainfall in the district was between 601 and 1100 mm in 36 years out of 48 years.

On an average there are 45 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 40 at Purnea to 50 at Parbhani observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 401.3 mm at Parbhani observatory on 27th June 1914.

Temperature

The only meteorological observatory in the district is at Parbhani. The temperature and other meteorological data at this station may be taken as representative of the conditions over the district as a whole. The cold weather commences towards the end of November when the temperatures begin to fall. December is the coldest month with the mean daily minimum temperature at 13.9°C and the mean daily maximum temperature at 29.1°C. The temperatures are slightly higher in January and February. In the cold season the district is sometimes affected by cold waves which are associated with the eastward passage of western disturbances across north India. On such occasions the minimum temperatures may drop down upto about 4-5°C. The period from March to May is one of the continuous increase in both day and night temperatures. May is the hottest month with the mean daily maximum temperature at 41.6°C and mean daily minimum temperature at 26.3°C. With the advance of the southwest monsoon into the district by about the second week of June temperatures fall appreciably and the weather is pleasant throughout the southwest monsoon season. By about the first week of October the monsoon withdraws and the day temperature shows a slight increase in October. Thereafter the temperatures begin to drop gradually.

The highest maximum temperature ever recorded at Parbhani was 46.5°C on 10th May 1988. The lowest minimum temperature ever recorded was 4.4°C on 8th January 1945.

Humidity

The relative humidity is high during the southwest monsoon season and they are between 60 and 80%. After September the humidity decreases gradually and in the cold season and summer the air is generally dry. In the summer which is the driest part of the year the relative humidity specially in the afternoons is less than 20%.

Cloudiness

Skies are heavily clouded to overcast in the southwest monsoon season. The cloud amount decreases rapidly in the post monsoon months. In the rest of the year skies are generally clear or lightly clouded.

Winds

Winds are generally moderate in force in the latter half of the summer and in the southwest monsoon period. In the rest of the year winds are light. During the southwest monsoon season winds are predominantly from west. In the post monsoon and winter months, winds are mostly calm or blow from directions mainly between northeast and east. From the beginning of summer winds from directions between west and northwest appear and these predominate by May and continue till the onset of the monsoon.

Special Weather Phenomena

Thunderstorms occur in the summer and monsoon months, their frequency being higher in June and September. Dust raising winds are common in the summer afternoons.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Parbhani observatory.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Jintoor	36	a	6.2	3.6	6.0	5.1	16.5	149.1	221.3	233.0	154.9	57.1	18.2	5.7	876.7	151	48	190.0	19 Aug 1980
		b	0.5	0.3	0.5	0.6	1.1	7.6	12.0	11.0	8.1	3.1	1.0	0.4	46.2	(1990)	(1972)		
Parbhani	50	a	5.1	3.2	11.4	7.9	22.8	145.8	231.8	223.4	192.6	72.9	19.7	9.1	945.7	174	53	401.3	27 Jun 1914
(Obsy)		b	0.4	0.4	0.8	1.0	2.0	8.5	11.8	10.8	9.3	3.4	1.1	0.5	50.0	(1990)	(1972)		
Pathri	36	a	2.9	1.0	4.7	5.7	10.3	136.9	191.1	210.4	171.1	78.0	14.8	3.4	830.3	158	55	197.0	24 Aug 1994
		b	0.2	0.1	0.5	0.6	1.1	7.9	10.1	10.3	8.3	3.3	0.8	0.2	43.4	(1975)	(1972)		
Pur nea	10	a	0.0	20.7	0.0	0.0	3.7	159.2	285.5	226.1	308.0	18.8	48.2	7.0	1077.2	161	63	132.1	03 Aug 1942
		b	0.0	0.8	0.0	0.0	0.4	6.4	11.1	8.7	9.5	1.2	1.7	0.3	40.1	(1942)	(1950)		
Sidheshwar	27	a	4.8	2.4	9.2	9.0	13.8	169.6	215.2	215.1	157.1	57.4	16.0	13.2	882.8	149	55	205.0	09 Jun 1980
Camp		b	0.4	0.4	0.6	0.9	1.3	8.3	11.9	10.9	8.0	3.2	0.9	0.6	47.4	(1988)	(1972)		
Parbhani		a	3.8	6.2	6.3	5.5	13.4	152.1	229.0	221.6	196.7	56.8	23.4	7.7	922.5	149	51		
(District)		b	0.3	0.4	0.5	0.6	1.2	7.7	11.4	10.3	8.6	2.8	1.1	0.4	45.3	(1989)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(PARBHANI)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	1	901 – 1000	9
501 – 600	2	1001 – 1100	6
601 – 700	9	1101 – 1200	1
701 – 800	7	1201 – 1300	2
801 – 900	5	1301 – 1400	6

(Data available for 48 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(PARBHANI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.9	14.2	38.0	1982 Jan 18	4.4	1945 Jan 08	56	31
February	33.2	16.6	39.0	1982 Feb 28	6.1	1949 Feb 07	44	23
March	37.3	20.5	42.2	1996 Mar 30	11.6	1957 Mar 06	35	19
April	40.4	24.2	45.0	1958 Apr 25	16.6	1996 Apr 02	34	19
May	41.6	26.3	46.5	1988 May 10	19.7	1968 May 06	42	21
June	36.5	24.4	45.9	1995 Jun 04	20.0	1951 Jun 24	70	46
July	32.0	23.1	39.1	1966 Jul 12	19.0	1984 Jul 15	80	62
August	30.7	22.5	36.7	1950 Aug 23	19.4	1952 Aug 28	82	65
September	31.5	22.2	37.9	1987 Sep 20	15.2	1972 Sep 24	80	61
October	32.6	20.2	37.7	1986 Oct 14	10.0	1954 Oct 31	66	44
November	30.6	16.3	35.0	1977 Nov 05	8.3	1956 Nov 30	59	39
December	29.1	13.9	33.6	1976 Dec 25	4.8	1971 Dec 10	58	37
Annual	33.8	20.4					59	39

TABLE - 4
Mean Wind Speed in km/hr.
(PARBHANI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.4	5.3	6.1	6.9	9.9	12.0	10.8	9.3	7.1	5.2	4.8	4.0	7.2

TABLE - 5
Special Weather Phenomena
(PARBHANI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	1.0	1.4	2.0	3.0	1.3	1.6	2.2	0.8	0.1	0.2	13.8
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1

VIDARBHA

AKOLA DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except during the southwest monsoon season. The year may be divided into four seasons. The period from about the middle of November to the end of February constitutes the winter season. The period from March to the first week of June is the hot season. This is followed by the southwest monsoon season which extends upto the end of September. October and November constiute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 7 stations for the period ranging from 27 to 49 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall of the district is 801.7 mm. The rainfall generally increases from the northwest towards the south-southeast in the district and varies from 758.9 mm at Telhara near the northwestern border of the district to 861.4 mm at Patur and 866.7 mm at Murtajapur towards south and southeastern parts of the district respectively. The rainfall during the southwest monsoon months constitute about 86% of the annual rainfall, July being the rainiest month. During the fifty year period 1941 to 1990, the highest annual rainfall amounting to 164% of the normal occurred in 1988, while the lowest annual rainfall which was only 60% of the normal occurred in 1952. In the same fifty year period the annual rainfall in the district was less than 80 percent of the normal in 13 years, out of which two consecutive years of such a low rainfall occurred thrice. It will be seen from Table 2 that the annual rainfall in the district was between 501 and 1000 mm in 42 years out of 49.

On an average there are 44 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 39 at Balapur to 47 at Patur.

The heaviest rainfall recorded in 24 hours at any station in the district was 392.3 mm at Telhara on 14th September 1959.

Temperature

There are two meteorological observatories in the district at Akola and Akola(A). The data of these observatories may be taken as representative of the meteorological conditions obtained in the district in general. Temperatures rise rapidly after February till May which is the hottest month of the year. In May, the mean daily maximum temperature at Akola is at about 42°C and the mean daily minimum temperature is at about 27.3°C. The heat in the summer season is intense during the day and the nights are comparatively cooler. During the period April to June, on individual days, the day temperatures rise upto about 48°C. The afternoon heat is sometimes relieved by thundershowers. With the arrival of the southwest monsoon in the district by about the mid-June, there is an appreciable drop in the day temperatures and the weather becomes pleasant. After the withdrawal of the monsoon the day temperatures increase gradually and a secondary maximum in day temperature is observed in October. However, night temperatures decrease progressively after September. Both day and night temperatures decrease rapidly from October till December which is the coldest month in the year. The mean daily maximum temperature during this month is about 29.4°C and the mean daily minimum temperature is about 12.7°C. In the rear of the western disturbances which move across north India in the winter months, cold waves affect the district at times and night temperatures may go down upto about 2 to 4°C.

The highest maximum temperature ever recorded at Akola was 47.8°C on 22nd May 1947 and the lowest minimum temperature ever recorded was 2.2°C on 9th February 1887. The highest maximum temperature ever recorded at Akola (A) was 47.7°C on 25th May 1973 and the lowest minimum temperature ever recorded was 4.4ºC on 28th December 1968.

Humidity

Except during the southwest monsoon season when the humidity is between 60 and 85%, the air is generally dry over the district. The summer months are the driest when the relative humidity is even less than 20% in the afternoons on many days.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the latter half of the summer season and the post monsoon season there is moderate

cloudiness particularly in the afternoons. In the rest of the year clear or lightly clouded skies generally prevail.

Winds

Winds are generally light with some strengthening in speed in the latter part of the hot season and in the early part of the monsoon season. The winds are mostly calm or blow from northeast or east during the post monsoon and early cold weather seasons. By February winds become westerly to northwesterly and continue to be so till June. In the southwest monsoon season, winds from directions between southwest and northwest are most common.

Special Weather Phenomena

In association with the monsoon depressions which originate in the Bay of Bengal and move westnorthwestwards through the central parts of the country, the district experiences strong winds and widespread heavy rain. Thunderstorms occur in all the months of the year, their frequency being the least during the months of November to January and highest during the months of June, July and September. Less frequently, storms and depressions of post monsoon months also affect the weather over the district. Dust storms occur occasionally in summer months. Fog is noticed occasionally during post monsoon and winter seasons.

Tables 3, 4, 5 and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and frequency of special weather phenomena for Akola and Akola (A) observatories respectively.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Akola	49	a	12.8	8.4	9.8	3.7	8.2	144.4	231.2	200.4	142.1	41.0	16.6	13.9	832.5	151	68	365.4	15 Sep 1959
(Obsy)		b	1.1	0.7	1.0	0.4	0.8	7.2	12.6	10.4	7.6	2.2	0.8	0.8	45.6	(1988)	(1969)		
Akola (A)	27	a	10.9	6.2	7.8	3.7	10.8	152.2	219.4	210.0	105.3	41.9	17.2	12.0	797.4	152	67	212.0	18 Jul 1986
(Obsy)		b	0.9	0.7	0.9	0.4	1.1	7.8	11.1	11.1	6.0	2.1	0.9	1.0	44.0	(1970)	(1971)		
Akot	46	a	7.0	9.6	6.4	3.9	11.8	122.6	223.7	200.7	132.7	45.5	21.8	5.6	791.3	178	44	225.5	- Jul 1883
		b	0.7	0.8	0.6	0.3	0.9	6.7	12.5	11.0	7.4	2.4	1.1	0.7	45.1	(1944)	(1952)		
Balapur	46	a	5.8	4.8	2.9	0.5	4.7	116.6	200.1	177.3	130.9	33.7	17.5	8.3	703.1	201	56	304.8	13 Sep 1959
		b	0.5	0.5	0.3	0.1	0.4	6.3	11.4	9.0	6.7	1.9	0.8	0.7	38.6	(1988)	(1952)		
Murtajapur	43	a	13.2	6.4	7.2	6.1	11.6	146.4	252.2	190.4	151.5	52.0	23.7	6.0	866.7	172	63	233.0	27 Aug 1971
		b	1.0	0.6	0.8	0.6	0.9	7.3	12.7	10.3	7.6	2.7	0.8	0.5	45.8	(1990)	(1972)		
Patur	30	a	11.1	6.8	12.9	4.9	11.6	151.9	246.3	190.2	150.4	58.9	12.3	4.1	861.4	174	42	262.0	22 Jul 1988
		b	0.8	0.7	0.9	0.6	1.0	7.5	12.7	11.0	7.7	2.7	0.8	0.3	46.7	(1959)	(1984)		
Telhara	44	a	6.4	7.7	5.9	2.5	10.4	106.7	218.4	189.7	147.9	39.8	19.0	4.5	758.9	184	32	392.3	14 Sep 1959
		b	0.7	0.5	0.5	0.3	0.8	6.5	11.1	10.4	7.2	2.2	0.9	0.4	41.5	(1959)	(1964)		
Akola		a	9.6	7.1	7.6	3.6	9.9	134.4	227.3	194.1	137.3	44.7	18.3	7.8	801.7	164	60		
(District)		b	0.8	0.6	0.7	0.4	0.8	7.0	12.0	10.5	7.2	2.3	0.9	0.6	43.8	(1988)	(1952)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1995.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(AKOLA)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	901 – 1000	8
501 – 600	7	1001 – 1100	1
601 – 700	9	1101 – 1200	3
701 – 800	11	1201 – 1300	0
801 – 900	7	1301 – 1400	2

(Data available for 49 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(AKOLA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.7	13.7	36.2	1958 Jan 12	3.9	1937 Jan 08	58	31
February	32.8	15.7	40.0	1953 Feb 28	2.2	1887 Feb 09	45	24
March	37.2	20.0	44.4	1892 Mar 20	5.6	1908 Mar 02	36	19
April	40.8	24.7	46.1	1942 Apr 29	11.1	1905 Apr 01	32	17
May	42.0	27.8	47.8	1947 May 22	11.9	1960 May 19	42	20
June	37.5	26.1	47.2	1923 Jun 01	20.0	1916 Jun 16	67	44
July	32.3	24.2	40.6	1900 Jul 02	20.6	1975 Jul 05	80	66
August	30.5	23,4	40.0	1990 Aug 01	18.3	1944 Aug 27	84	70
September	32.3	23.1	40.0	1899 Sep 10	15.4	1972 Sep 24	79	59
October	34.0	20.2	40.0	1899 Oct 07	10.0	1889 Oct 26	64	41
November	31.5	16.1	38.5	1982 Nov 09	5.6	1912 Nov 29	58	37
December	29.3	13.4	36.7	1896 Dec 01	3.9	1883 Dec 08	59	36
Annual	34.2	20.7					59	39

TABLE - 4
Mean Wind Speed in km/hr.
(AKOLA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.2	4.7	5.6	6.7	11.3	12.3	10.1	9.9	7.6	4.2	3.5	3.6	7.0

TABLE - 5
Special Weather Phenomena
(AKOLA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	0.5	0.3	0.4	1.0	0.5	0.2	0.8	0.3	0.1	0.1	4.5
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(AKOLA (A))

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.0	12.5	35.4	1973 Jan 12	4.9	1969 Jan 15	54	30
February	33.0	14.9	39.1	1977 Feb 27	7.7	1967 Feb 02	43	24
March	37.5	19.3	43.0	1972 Mar 28	9.0	1971 Mar 01	32	17
April	41.2	24.0	45.9	1970 Apr 26	12.6	1990 Apr 10	30	15
May	42.5	26.9	47.7	1973 May 25	18.6	1966 May 05	40	17
June	37.7	25.0	46.9	1995 Jun 02	18.3	1975 Jun 17	65	42
July	32.5	23.1	40.5	1966 Jul 12	17.7	1967 Jul 16	79	64
August	30.5	22.5	39.3	1987 Aug 21	19.6	1972 Aug 18	83	69
September	32.5	22.1	38.4	1987 Sep 27	12.5	1972 Sep 24	78	59
October	34.2	19.1	39.0	1965 Oct 08	10.8	1974 Oct 29	61	39
November	31.7	14.9	36.5	1976 Nov 08	5.1	1970 Nov 30	52	34
December	29.5	12.1	34.3	1982 Dec 16	4.4	1968 Dec 28	55	34
Annual	34.4	19.7					56	37

TABLE – 4(a)
Mean Wind Speed in km/hr.
(AKOLA(A))

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.6	7.9	8.8	9.9	14.0	15.8	13.3	12.5	9.3	7.0	7.1	6.9	10.0

TABLE – 5(a)
Special Weather Phenomena
(AKOLA(A))

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	1.0	1.4	1.9	1.4	2.5	7.5	5.3	2.7	5.0	1.7	0.4	0.4	31.2
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	1.1

AMRAVATI DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except in the southwest monsoon season. The year may be divided into four seasons. The winter from December to February is followed by summer from March to May. June to September is the southwest monsoon season and October and November form the post monsoon season.

Rainfall

Records of rainfall in the district are available for 15 stations for periods ranging from 13 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 870.5 mm in the plains. The rainfall at Chikalda and Chikalda (H) which are hill stations is about twice as much as in the plains. The rainfall generally increases from the southwest towards the northeast of the district. Daryapur near the southwest border of the district receives 698.6 mm of rainfall and Barud near the northeastern border receives 992.9 mm of rainfall. The rainfall during June to September constitutes 87% of the annual rainfall, July being the rainiest month. The variation in the rainfall from year to year in the district is not large. During the fifty year period 1941 to 1990, the highest annual rainfall which amounted to 163% of the normal was recorded in 1944, while the lowest annual rainfall which was only 56% of the normal occurred in 1952. In the same 50 year period, the rainfall was less than 80% of the normal in 10 years. Rainfall less than 80% of the normal in two consecutive years have occurred on two occasions.

It will be seen from Table 2 that the annual rainfall in the district was between 601 and 1000 mm in 35 years out of 50.

On an average the number of rainy days (i.e. days with rainfall of 2.5 mm or more) in the plains of the district is 47 in a year. This number varies from 41 at Daryapur to 70 at Chikalda & Chikalda (Hydro).

The heaviest rainfall in 24 hours recorded in the plains of the district is 468.3 mm at Chandur Railway on 12th July 1994. The heaviest rainfall in 24 hours at the hill station Chikalda was 431.0 mm on 19th August 1886 and at Chikalda (Hydro) was 246.0 mm on 28th August 1978.

Temperature

There is a meteorological observatory at Amravati and the data of this station may be taken as fairly representative of the climate of the district in general, except over the hilly region around Chikalda.

After October, temperatures decrease progressively till December which is the coldest month. The mean daily maximum temperature is 28.9°C and the mean daily minimum temperature is 15.4°C. In the wake of western disturbances which move across north India in the winter months, cold waves affect the district at times and the night temperatures may go down to 5 or 6°C. Temperatures rise rapidly after February till May which is the hottest month of the year. In May the mean daily maximum temperature at Amravati is 42.2°C and the mean daily minimum temperature is 27.6°C. The heat in the summer season is severe during the day, the nights being comparatively cooler. The afternoon heat is sometimes relieved by thundershowers. With the arrival of the southwest monsoon by about mid June there is an appreciable drop in day temperature and the weather becomes pleasant. After the end of September when the southwest monsoon withdraws, the day temperatures increase slightly and there is a secondary maximum of temperature in October. The night temperature however, decreases progressively after September.

The highest maximum temperature ever recorded at Amravati was 48.3°C on 6th May 1988 and the lowest minimum temperature ever recorded was 5.0°C on 9th February 1887.

Humidity

Except during the monsoon season when the humidity is high in the mornings (more than 70%), the air is generally dry. The summer months are the driest in the afternoons with relative humidity between 18 and 23%.

Cloudiness

During the southwest monsoon months, skies are heavily clouded to overcast. During post monsoon season the cloud amount decreases. In the rest of the year clear or lightly clouded skies prevail.

Winds

Winds are generally moderate with some increase in speed in the latter part of the summer season and in the southwest monsoon season. In the post-monsoon and cold seasons, winds are mostly easterly or northeasterly. By February, southwesterlies and westerlies start blowing in the afternoons. In the summer winds are mostly from directions between southwest and northwest and it continues in the southwest monsoon season.

Special Weather Phenomena

In association with the monsoon depressions which originate in the Bay of Bengal and move westwards, the district experiences strong winds and widespread heavy rain. Less frequently, storms and depressions in the post monsoon months affect the weather over the district. Thunderstorms occur in all seasons, their frequency being least in the period November to February. Fog is noticed occasionally during post monsoon and winter.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively for Amravati observatory.

TABLE 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Achalpur	43	a	16.1	14.4	5.6	7.4	8.7	143.7	253.6	262.8	152.6	49.4	18.8	8.1	941.2	172	38	231.2	29 Aug 1978
		b	1.2	0.9	0.7	0.7	1.0	7.6	13.6	11.7	8.1	2.8	0.8	0.4	49.5	(1944)	(1952)		
Amravati (Obsy)	49	a	13.6	14.4	12.0	7.4	11.6	131.2	248.6	222.5	167.2	47.5	19.8	11.6	907.4	169	45	235.0	15 Sep 1933
		b	1.0	1.1	1.0	0.8	1.1	7.7	13.1	10.9	9.3	2.6	1.0	0.8	50.4	(1944)	(1971)		
Anjangaon	46	a	12.3	9.8	6.0	1.9	8.8	104.2	207.1	174.5	129.8	36.2	20.5	5.1	716.2	199	47	233.7	21 Aug 1944
		b	1.0	0.9	0.6	0.2	0.7	6.8	11.4	9.6	7.4	2.2	1.0	0.5	42.3	(1944)	(1985)		
Badnera	43	a	9.4	15.8	8.4	6.2	11.1	139.6	225.6	225.1	148.9	42.4	20.5	5.3	858.3	191	34	293.9	23 Jul 1921
		b	0.8	1.0	0.8	0.7	0.8	7.8	12.4	10.8	8.4	2.3	0.9	0.3	47.0	(1979)	(1964)		
Barud/ Warud	42	a	13.1	15.9	8.1	4.0	9.3	141.7	308.2	253.0	159.9	53.9	17.8	8.0	992.9	165	37	468.0	30 Jul 1991
		b	1.1	1.0	0.7	0.5	0.6	8.4	14.5	12.4	8.6	2.5	0.7	0.6	51.6	(1944)	(1952)		
Chandur Bazar	44	a	17.5	14.0	7.0	3.2	6.6	115.8	241.0	202.6	153.0	42.3	21.1	6.4	830.5	204	45	200.0	22 Jul 1971
		b	1.2	1.0	0.7	0.5	0.6	7.1	11.8	10.0	7.7	2.3	0.7	0.5	44.1	(1944)	(1952)		
Chandur Railway	49	a	13.2	8.4	8.3	5.0	6.3	150.3	245.4	211.7	151.3	61.2	12.5	10.7	884.3	158	55	468.3	12 Jul 1994
		b	0.8	0.7	0.8	0.4	0.7	7.3	12.8	10.2	7.9	2.8	0.6	0.6	45.6	(1959)	(1950)		
Daryapur	44	a	13.4	10.4	5.6	1.4	4.2	106.4	193.5	167.4	137.1	37.2	16.9	5.1	698.6	171	43	208.8	02 Jul 1905
		b	0.9	0.5	0.5	0.2	0.5	6.5	11.6	9.7	8.4	2.2	0.9	0.4	42.3	(1949)	(1987)		
Daryapur (Hydro)	13	a	26.3	12.3	3.4	2.1	12.1	131.6	168.8	220.8	93.6	32.5	15.4	9.2	728.1	126	75	216.0	30 Aug 1978
		b	1.3	0.5	0.4	0.1	1.5	7.0	10.7	10.3	6.0	1.8	1.0	0.7	41.3	(1979)	(1985)		
Dharni	42	a	5.0	4.7	4.9	1.5	3.2	159.7	396.7	396.4	228.4	36.1	16.7	5.9	1259.2	169	59	411.2	25 Aug 1965
		b	0.5	0.5	0.4	0.2	0.4	7.0	16.2	16.0	9.6	2.2	0.9	0.4	54.3	(1990)	(1952)		
Kholapur	48	a	11.7	12.0	7.3	3.9	7.5	115.0	212.5	173.1	132.2	45.9	17.5	6.3	744.9	165	45	212.1	15 Sep 1933
		b	1.0	1.0	0.7	0.5	0.8	7.5	11.7	10.3	8.0	2.8	0.8	0.5	45.6	(1961)	(1969)		

TABLE 1 (Contd….)
Normals and Extremes of Rainfall

															HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
STATION	**No. of Years of Data**		**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**ANNUAL**	**ANNUAL RAINFALL AS % OF NORMAL & YEARS ****		**Amount (mm)**	**Date**
Morsi	43	a	12.0	10.6	5.6	3.8	5.4	144.7	272.3	211.8	128.9	44.5	14.7	5.0	859.3	197	54	232.4	04 Sep 1876
		b	1.0	0.9	0.7	0.4	0.5	7.6	13.0	11.5	7.5	2.2	0.7	0.3	46.3	(1944)	(1971)		
Talegaon	31	a	11.3	11.6	11.8	6.6	6.1	143.5	262.5	212.5	176.9	35.3	9.1	6.5	893.7	179	26	224.3	15 Sep 1933
		b	0.9	0.8	1.0	0.9	0.7	7.6	13.9	10.6	9.2	2.6	0.7	0.7	49.6	(1970)	(1984)		
Amravati		a	13.5	11.9	7.2	4.2	7.8	132.9	248.9	225.7	150.8	43.4	17.0	7.2	870.5	163	56		
(District)		b	1.0	0.8	0.7	0.5	0.8	7.4	12.8	11.1	8.2	2.4	0.8	0.5	47.0	(1944)	(1952)		
HILL STATIONS																			
Chikalda	44	a	8.5	10.3	4.3	4.1	8.5	190.2	512.3	560.6	303.0	66.1	29.3	6.2	1703.4	151	61	431.0	19 Aug 1886
		b	0.7	0.8	0.4	0.5	0.9	9.1	20.1	21.0	12.1	3.2	1.1	0.5	70.4	(1948)	(1952)		
Chikalda	13	a	22.9	17.1	7.7	5.2	14.0	223.9	408.1	733.1	192.7	22.2	41.0	14.0	1701.9	143	71	246.0	28 Aug 1978
(Hydro)		b	1.2	1.0	0.5	0.3	1.4	9.1	19.9	22.9	9.5	1.4	1.7	0.9	69.8	(1990)	(1982)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1995.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(AMRAVATI)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	1	1001 – 1100	3
501 – 600	2	1101 – 1200	6
601 – 700	9	1201 – 1300	2
701 – 800	11	1301 – 1400	0
801 – 900	6	1401 – 1500	1
901- 1000	9		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(AMRAVATI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.3	15.4	35.0	1889 Jan 29	6.1	1934 Jan 14	49	29
February	32.4	17.6	38.9	1953 Feb 26	5.0	1887 Feb 09	41	24
March	36.9	21.4	43.9	1892 Mar 28	8.9	1898 Mar 04	35	21
April	40.6	25.3	46.1	1898 Apr 30	12.8	1905 Apr 01	34	18
May	42.2	27.6	48.3	1988 May 06	18.2	1992 May 28	42	23
June	37.2	25.8	46.7	1923 Jun 02	18.0	1990 Jun 18	68	48
July	31.6	23.7	40.3	1989 Jul 14	18.9	1890 Jul 27	82	67
August	29.9	23.1	40.5	1988 Aug 16	15.6	1944 Aug 10	85	72
September	31.7	22.9	38.9	1987 Sep 27	17.2	1893 Sep 02	79	62
October	33.4	21.3	42.6	1989 Oct 17	12.8	1889 Oct 26	59	39
November	31.1	18.1	37.4	1989 Nov 25	8.9	1884 Nov 29	49	33
December	28.9	15.4	33.9	1913 Dec 09	8.3	1937 Dec 03	51	34
Annual	33.8	21.5					56	39

TABLE - 4
Mean Wind Speed in km/hr.
(AMRAVATI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
8.7	9.2	9.4	9.9	11.8	15.4	14.1	12.6	9.5	7.5	8.2	8.2	10.4

TABLE - 5
Special Weather Phenomena
(AMRAVATI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	1.0	1.2	1.6	2.7	1.1	0.9	1.2	0.3	0.1	0.0	10.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.7	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	1.9

BHANDARA DISTRICT

The climate of this district is characterised by a hot summer, well distributed rainfall during the southwest monsoon season and generally dry weather during the rest of the year. The cold season is from December to February. This is followed by the hot season from March to about the middle of June. The southwest monsoon season is from about mid-June to early October. October and November form the post-monsoon season.

Rainfall

Records of rainfall in the district are available for eight stations for a period ranging from 33 to 48 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1323.4 mm. The variation in the annual rainfall from year to year is large. The southwest monsoon arrives over the district by about the second week of June. The rainfall during the period June to September constitutes about 89% of the annual normal. July and August are the months with heavy rainfall, July being the rainiest month. In the fifty year period 1941-1990, the highest annual rainfall amounting to 151% of the normal occurred in 1961 while 1965 was the year with the lowest annual rainfall which was 55% of the normal. The annual rainfall was less than 80% of the normal in 7 years. It is seen from Table 2 that the annual rainfall in the district was between 901 and 1600 mm in 39 years out of 47 years.

On an average, there are 60 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 57 at Tirora and Bodalkasa to 64 at Sakoli.

The heaviest rainfall in 24 hours recorded at any station in the district was 620.0 mm at Khyrbund on 1st August 1983.

Temperature

There is no meteorological observatory in the district. The climatological description, which follows, is mainly based on records of Gondia meteorological observatory in the neighbouring district. The cold season commences in the district towards the end of November when both day and night temperatures begin to decrease rapidly. December is the coldest month of the year with the mean daily maximum temperature at about 27.5°C and the mean daily minimum temperature at about 13.2°C. During cold waves which affect the district in association with the passage of western disturbances across north India, the minimum temperature may go down to about 7°C. From about the beginning of March both day and night temperatures rise rapidly. May is the hottest month with the mean daily maximum temperature at about 42.1°C and the mean daily minimum at about 28.1°C. In the summer season the heat is intense and on many days the temperature may go above 45°C. Thundershowers on some days during the afternoons bring welcome relief. With the onset of the southwest monsoon by about the middle of June both day and night temperatures drop down appreciably and the weather becomes pleasant. With the withdrawal of the monsoon by about the first week of October, day temperatures increase slightly and a secondary maximum in day temperature is reached in October. But the night temperatures decrease steadily after the withdrawal of the monsoon. After October day temperatures also decrease progressively.

Humidity

Except during the southwest monsoon season when the relative humidity is high (70-80%) the air is generally dry during the year. The summer season is the driest part of the year when the relative humidity goes down to 20% or less in the afternoons.

Cloudiness

Skies are mostly heavily clouded to overcast during the southwest monsoon season. In the post monsoon months cloud amount decreases. In the rest of the year, the skies are mostly clear or lightly clouded.

Winds

Winds are generally light with a little increase in wind force during the latter part of the summer and monsoon months. During the monsoon season the winds blow mostly from directions between southwest and west. In the period October to February, the winds are

mainly calm or blow from northerly to northeasterly. By March, winds from directions between southwest and northwest begin to blow and with the advance of the season become predominant.

Special Weather Phenomena

Depressions, which originate in the Bay of Bengal during the monsoon months, in their westward movement across the central parts of the country affect the district and its neighbourhood causing widespread heavy rain and strong winds. Storms and depressions from Bay of Bengal in the post monsoon season also occasionally affect the weather over the district. Thunderstorms occur throughout the year and their frequency being more in the latter part of summer and southwest monsoon season. They are occasionally associated with hail. Dust storms occur occasionally during the summer season. Fog is noticed occasionally during the winter season.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years Of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Bhandara	44	a	17.7	17.0	14.7	12.7	10.1	168.8	396.2	359.4	199.5	51.1	13.0	9.3	1269.5	154	34	307.3	06 Aug 1888
		b	1.2	1.2	1.2	1.3	0.8	8.5	17.0	15.3	9.8	2.9	0.5	0.4	60.1	(1961)	(1972)		
Bodalkasa	48	a	21.8	15.9	15.8	7.6	5.0	170.7	441.0	440.3	213.4	50.6	11.0	6.0	1399.1	183	52	375.9	31 Aug 1947
		b	1.2	1.2	1.1	0.7	0.4	7.7	16.5	15.2	9.1	2.6	0.6	0.4	56.7	(1961)	(1965)		
Chandpur	43	a	23.1	17.4	25.3	8.4	6.2	156.0	326.9	335.8	158.9	45.5	12.6	13.1	1129.2	151	61	311.1	25 Jul 1937
		b	1.5	1.4	1.6	0.9	0.7	8.8	16.5	15.6	9.2	2.8	0.7	0.6	60.3	(1967)	(1941)		
Chorkhamara	46	a	18.8	15.4	16.0	7.2	8.4	151.3	397.8	403.0	218.9	51.3	9.5	6.6	1304.2	197	61	335.0	06 Jul 1977
		b	1.2	1.2	1.0	0.7	0.7	7.9	16.3	15.6	9.7	2.5	0.5	0.4	57.7	(1961)	(1987)		
Khyrbund	47	a	22.2	18.6	11.2	5.1	5.3	174.3	406.1	442.0	196.5	45.7	11.4	8.2	1346.6	167	63	620.0	01 Aug 1983
		b	1.5	1.5	1.3	0.7	0.6	7.7	16.9	16.8	9.9	2.7	0.6	0.5	60.7	(1942)	(1989)		
Paoni	39	a	17.4	13.9	19.4	15.5	17.2	167.1	400.5	377.2	223.8	66.7	21.5	11.5	1351.7	160	55	370.0	11 Jul 1994
		b	0.9	0.8	1.5	1.3	1.1	8.5	16.5	15.5	9.8	3.5	0.9	0.7	61.0	(1959)	(1972)		
Sakoli	45	a	17.2	20.6	17.8	7.9	13.1	194.7	455.3	456.2	246.9	67.8	15.0	8.6	1521.1	159	61	383.5	26 Jun 1908
		b	1.1	1.5	1.3	0.9	1.0	9.2	17.6	16.8	10.7	3.3	0.5	0.5	64.4	(1959)	(1974)		
Tirora	33	a	15.2	13.1	14.6	5.3	6.0	170.4	395.6	382.9	188.1	59.2	11.9	3.2	1265.5	173	60	253.0	29 Aug 1906
		b	0.9	0.9	1.3	0.6	0.7	7.6	16.7	15.4	9.2	3.0	0.4	0.2	56.9	(1961)	(1979)		
Bhandara (District)		a	19.2	16.5	16.9	8.7	8.9	169.2	402.4	399.6	205.8	54.7	13.2	8.3	1323.4	151	55		
		b	1.2	1.2	1.3	0.9	0.8	8.2	16.8	15.8	9.7	2.9	0.6	0.5	59.9	(1961)	(1965)		

a : Normal rainfall in mm
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996
** : Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(BHANDARA)

Range in mm	No. of years	Range in mm	No. of years
701 – 800	1	1401 – 1500	5
801 – 900	0	1501 – 1600	4
901 – 1000	4	1601 – 1700	2
1001 – 1100	6	1701 – 1800	1
1101 – 1200	5	1801 – 1900	2
1201 – 1300	7	1901 – 2000	1
1301 – 1400	8	2001 – 2100	1

(Data available for 47 years only)

BULDHANA DISTRICT

The climate of this district is characterised by a hot summer, well distributed rainfall during the southwest monsoon season and generally dry weather during the rest of the year. Southern part of the district, which has higher elevation experiences milder summer. The cold season is from December to February. This is followed by the hot season from March to May. The southwest monsoon season is from June to September while October and November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for 14 raingauge stations for the period ranging from 11 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 764.1 mm. The Buldhana, Donegaon and Mehkar area, gets comparatively more rainfall (850-870mm) than the rest of the district. Hiwarkhed area gets less amount (613 mm) of rainfall in the district. The rainfall in the district during the main rainy season June to September constitutes about 86% of the annual rainfall. July and August are the rainiest months. The variation in the rainfall from year to year is not large. During the fifty year period 1941 to 1990, the highest annual rainfall over the district which amounted to 159% of the normal occurred in 1949, while the lowest which was only 59% of the normal was recorded in 1982. In the same 50 year period, the annual rainfall was less than 80% of the normal in 9 years, in which two consecutive years occurred twice. It will be seen from Table 2 that the annual rainfall in the district was between 501 and 1000 mm in 43 years out of 50.

On an average, there are 43 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 39 at Hiwarkhed to 49 at Buldhana.

The heaviest rainfall in 24 hours recorded at any station in the district was 337.6 mm at Buldhana on 9th September 1930.

Temperature

There is a meteorological observatory in the district at Buldhana. The records of this observatory are representative of the meteorological conditions prevailing in the southern half of the district, which is at a higher elevation than the northern half. Compared to the northern half, which has a climate similar to that of the neighbouring Akola district, the southern half has a milder summer. From November, temperatures decrease rapidly till January. December and January are generally the coldest months with the mean daily maximum temperature at about 27^0C and the mean daily minimum temperature at about 15^0C in the southern half of the district. In the northern portions, the mean daily maximum temperature is at about 29^0C and the mean daily minimum temperature is at about 13^0C. In association with western disturbances, which move across north India in the cold season, cold waves sometimes affect the district. On such occasions the minimum temperature on individual days may go down upto about 4^0C above the freezing point of water. Temperatures rise rapidly after February till May, which is the hottest month of the year. The mean daily maximum temperature in May in southern half of the district is 38.2^0C and the mean daily minimum temperature is 25.1^0C. In the northern half the mean daily maximum temperature is at about 42^0C and the mean daily minimum temperature is at about 27^0C. The heat in the summer is severe during the day particularly in the northern parts of the district. The day temperature may sometimes reach 47^0C in the northern parts of the district while in the southern half it may go upto 43^0C. The oppressive heat is relieved by thundershowers, which occur on some days in the afternoons. With the onset of the southwest monsoon by about the second week of June there is an appreciable drop in the temperatures. By about the beginning of October when the southwest monsoon withdraws from the district day temperatures begin to increase slightly and a secondary maximum in day temperature is reached during October. Thereafter both day and night temperatures fall rapidly.

The highest maximum temperature recorded at Buldhana was 43.3^0C on 26th May 1969. The lowest minimum temperature was 4.4^0C on 11th February 1950.

Humidity

Except during the southwest monsoon season when the relative humidity is high the air is generally dry over the district. The relative humidity is between 23 and 26% in the afternoons in the summer season, which is the driest part of the year.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the rest of the year clear or lightly clouded skies prevail.

Winds

Winds are generally moderate with some increase in the wind speed in the latter part of the summer and the monsoon season. In the post monsoon months and the earlier half of the cold season the winds blow mostly from northeast or northwest in the afternoons and from southeast or south in the mornings. By February, northwesterlies start blowing. With the progress of the season winds from this direction become predominant. During the southwest monsoon season winds are mainly from directions between southwest and northwest. The northwest direction is predominant for most of the period during the year.

Special Weather Phenomena

In association with the monsoon depressions, which originate in the Bay of Bengal and move westwards across the central parts of the country the district experiences gusty winds and widespread heavy rain. Less frequently storms and depressions from the Bay of Bengal during the post-monsoon months also affect the weather over the district. Occasional thunderstorms occur mainly in the hot season, while fog is noticed occasionally during winter season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Buldhana observatory.

TABLE - 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Buldhana	38	a	6.9	5.8	5.1	5.1	15.7	163.7	209.0	217.9	154.1	45.9	21.8	8.7	859.7	162	52	337.6	09 Sep 1930
		b	0.5	0.3	0.6	0.6	1.1	8.2	12.9	12.5	7.8	2.6	1.0	0.7	48.8	(1959)	(1984)		
Buldhana	42	a	8.6	5.5	8.5	5.3	13.6	158.3	203.1	211.8	148.1	52.0	21.9	8.3	845.0	152	60	218.2	17 Aug 1990
(Obsy)		b	0.6	0.4	0.9	0.6	1.3	7.6	12.0	11.9	7.5	2.7	1.1	0.7	47.3	(1988)	(1985)		
Chikhli	44	a	7.1	2.5	3.8	2.9	8.6	158.4	211.0	183.8	125.7	41.3	16.5	4.4	766.0	158	46	277.6	27 Jun 1914
		b	0.4	0.3	0.4	0.3	0.8	7.8	12.6	11.3	6.8	2.4	0.8	0.3	44.2	(1988)	(1982)		
Deolgaon	32	a	2.3	1.1	1.0	3.7	8.7	158.5	177.8	176.9	117.5	48.8	14.2	6.2	716.7	149	36	186.4	21 Aug 1903
Raja		b	0.3	0.2	0.2	0.3	0.5	7.2	10.7	10.0	6.5	2.1	0.7	0.4	39.1	(1988)	(1952)		
Dhamangaon	42	a	6.0	7.7	9.4	2.9	7.3	134.5	202.7	198.4	127.2	39.6	20.5	10.4	766.6	185	42	264.2	01 Oct 1928
		b	0.7	0.6	0.8	0.4	0.9	6.8	12.5	11.7	7.3	2.0	1.0	0.8	45.5	(1959)	(1985)		
Donegaon	44	a	5.0	4.8	6.6	3.6	9.4	160.8	253.4	219.9	129.7	45.6	20.4	10.7	869.9	165	41	175.5	09 Aug 1921
		b	0.5	0.4	0.5	0.4	0.8	8.7	13.0	12.1	7.5	2.5	1.0	0.6	48.0	(1963)	(1965)		
Hiwarkhed	20	a	3.9	5.0	4.8	2.0	9.4	115.0	171.1	130.8	113.1	32.8	16.3	9.6	613.8	196	58	121.9	09 Sep 1930
		b	0.5	0.4	0.4	0.3	0.8	6.2	11.7	8.3	6.5	1.9	0.9	0.6	38.5	(1949)	(1960)		
Jalgaon	47	a	5.5	5.2	4.4	1.2	7.8	112.3	188.1	191.4	150.7	55.2	15.5	7.9	745.2	202	39	261.0	15 Jul 1993
		b	0.6	0.5	0.4	0.1	0.5	6.1	10.9	10.3	7.5	2.2	0.8	0.6	40.5	(1990)	(1984)		
Khamgaon	44	a	4.9	4.0	5.8	2.0	9.7	133.0	187.8	191,6	140.8	49.8	25.9	5.4	760.7	173	52	175.0	24 Sep 1970
		b	0.4	0.3	0.5	0.2	0.7	6.3	11.7	10.4	7.7	2.6	0.9	0.4	42.1	(1988)	(1982)		

TABLE - 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Malkapur	46	a	4.3	4.5	3.1	1.5	7.7	114.9	191.5	199.3	132.2	38.9	16.5	6.3	720.7	207	47	227.3	15 Sep 1959
		b	0.5	0.3	0.3	0.2	0.8	5.8	10.7	10.9	6.9	2.0	0.7	0.5	39.6	(1949)	(1971)		
Mehkar	48	a	5.4	3.1	6.4	3.9	8.4	167.0	237.2	197.6	142.4	47.5	25.9	11.1	855.9	180	49	325.1	11 Sep 1892
		b	0.4	0.3	0.6	0.4	0.7	7.7	12.1	11.2	7.2	2..6	1.1	0.7	45.0	(1989)	(1972)		
Nandura	46	a	8.9	5.6	9.5	2.9	13.1	130.5	207.8	193.3	148.1	43.0	22.3	8.3	793.3	167	41	296.7	20 Jul 1894
		b	0.8	0.5	0.7	0.3	0.9	6.3	12.0	10.7	7.6	2.2	1.0	0.7	43.7	(1980)	(1971)		
Shegaon	50	a	10.0	7.3	7.6	3.9	7.2	108.4	190.5	184.8	128.4	42.9	17.6	10.1	718.7	187	23	288.0	14 Sep 1959
		b	0.8	0.6	0.7	0.4	0.7	6.4	11.5	10.0	7.0	2.4	0.9	0.7	42.1	(1959)	(1965)		
Yerli	11	a	13.2	5.4	3.1	0.0	8.2	121.4	126.8	208.0	82.0	68.4	20.6	6.8	663.9	138	62	103.0	16 Jun 1987
(Hydro)		b	1.3	0.4	0.6	0.0	0.7	5.6	9.6	11.4	5.2	2.9	0.9	0.6	39.2	(1983)	(1982)		
Buldhana		a	6.6	4.8	5.7	2.9	9.6	138.3	197.0	193.3	131.4	46.6	19.7	8.2	764.1	159	59		
(District)		b	0.6	0.4	0.5	0.3	0.8	6.9	11.7	10.9	7.1	2.4	0.9	0.6	43.1	(1949)	(1982)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(BULDHANA)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	3	901 – 1000	5
501 – 600	6	1001 – 1100	2
601 – 700	8	1101 – 1200	0
701 – 800	10	1201 – 1300	2
801 – 900	14		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(BULDHANA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	27.3	15.0	33.6	1994 Jan 23	5.0	1992 Jan 02	56	36
February	29.8	16.9	36.7	1953 Feb 28	4.4	1950 Feb 11	47	29
March	33.9	20.9	39.2	1973 Mar 28	11.2	1979 Mar 09	40	24
April	37.3	24.5	42.4	1970 Apr 25	15.9	1962 Apr 13	39	23
May	38.2	25.1	43.3	1969 May 26	15.1	1979 May 15	52	26
June	33.8	23.1	42.4	1979 Jun 10	17.5	1991 Jun 12	74	49
July	29.1	21.7	36.6	1966 Jul 11	14.2	1985 Jul 18	84	70
August	27.4	20.8	35.0	1950 Aug 23	16.4	1981 Aug 06	87	76
September	28.9	20.9	38.5	1989 Sep 21	15.0	1989 Sep 05	83	66
October	30.7	20.4	35.7	1966 Oct 01	13.4	1992 Oct 31	62	45
November	28.7	17.4	33.4	1977 Nov 07	11.0	1992 Nov 30	57	41
December	27.0	15.2	32.8	1948 Dec 29	6.2	1991 Dec 27	57	40
Annual	31.0	20.1					62	44

TABLE - 4
Mean Wind Speed in km/hr.
(BULDHANA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
6.9	7.6	8.4	9.9	12.8	13.0	11.4	9.7	8.5	6.1	5.7	6.0	8.8

TABLE - 5
Special Weather Phenomena
(BULDHANA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	0.4	0.6	0.3	0.8	0.3	0.3	0.1	0.1	0.0	0.0	3.2
Hail	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Duststorm	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3

CHANDRAPUR DISTRICT

The climate of this district is characterised by hot summer, well distributed rainfall during the southwest monsoon and general dryness except in the rainy season. The cold season is from December to February. This is followed by the hot season from March to May. The southwest monsoon season is from June to September. October and November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for 11 stations for period ranging from 23 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1295.1 mm. The rainfall in the district generally increases from the west towards the east and varies from 1151.4 mm at Warora to 1442.8 and 1448.4 mm at Sindewahi and Brahmapuri observatory. The rainfall during southwest monsoon season from June to September constitutes about 89% of the annual rainfall. July is the rainiest month. The variation in the rainfall from year to year is large. During the fifty year period 1941 to 1990 the highest annual rainfall in the district amounting to 165% of the normal occurred in 1959 and 1972 was the year with the lowest annual rainfall which was only 58% of the normal. In the same 50 years the annual rainfall was less than 80% of the normal in 11 years, two of which were consecutive. It will be seen from Table 2 that the annual rainfall in the district was between 1001 and 1600 mm in 37 years out of 50.

On an average there are 58 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 52 at Nalesar to 65 at Brahmapuri observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 448.2 mm at Warora on 14th August 1986.

Temperature

There are two meteorological observatories in the district, one each at Brahmapuri and Chandrapur, where Chandrapur has a long data record. The data of Chandrapur and Brahmapuri may be taken as representative of the southern and northern parts of the district respectively. After October, both day and night temperatures decrease progressively till December which is the coldest month. In the northern parts of the district, the mean daily maximum temperature in December is 28.0°C and the mean daily minimum temperature is 12.8°C. The mean daily maximum temperature in the southern half of the district is 28.9°C and the mean daily minimum is 12.8°C. During the cold season, cold spells affect the district in association with the passage of western disturbances across north India. The minimum temperature on such occasions may go down to about 3°C. Temperatures rise rapidly after February till May which is the hottest month of the year. The mean daily maximum temperature in May is about 42°C to 43°C and the mean daily minimum is about 27 to 28°C. The heat in summer is intense during the day especially in the southern parts of the district. Occasionally the day temperatures rise upto 48°C. The afternoon heat is sometimes relieved by thundershowers. With the onset of the southwest monsoon in the district by about the middle of June the temperatures decrease appreciably. Early in October when the southwest monsoon withdraws from the district the day temperatures increase a little and a secondary maximum is reached in October. Later both day and night temperatures decrease progressively. The decrease in night temperatures is rapid.

The highest maximum temperature ever recorded at Chandrapur was 48.3°C on16th May 1912 and the lowest minimum temperature ever recorded was 2.8°C on 10th January 1899. The maximum temperature ever recorded at Brahmapuri was 47.7°C on 27th May 1983 and the lowest minimum temperature ever recorded was 4.6°C on 22nd January 1993.

Humidity

The air is generally dry over the district except during the southwest monsoon season when the humidity is about 70-80%. The summer months are the driest when the relative humidity in the afternoons is between 20 and 25%.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the rest of the year skies are lightly clouded.

Winds

Winds are generally light with some increase in the wind force during the latter part of the summer season and in the southwest monsoon season. In the post-monsoon and cold seasons winds blow mostly from directions between north and northeast. In the first half of the summer season winds gradually change over to direction between east and southeast in the mornings and north-northwest in the afternoons and by May winds from directions between south and northwest become more common. During the southwest monsoon season the winds are mainly from the directions between south or west.

Special Weather Phenomena

In association with monsoon depressions which originate in the Bay of Bengal and move westwards the district experiences strong winds and widespread heavy rain. Less frequently storms and depressions from the Bay of Bengal during the post-monsoon also affect the weather over the district. Thunderstorms occur in all the months, their incidence being the highest during the summer and monsoon season and the lowest during the cold season. Occasional dust storms occur during the summer months. Fog sometimes occur in the post monsoon and cold seasons.

Tables 3, 4, 5 and Tables 3(a), 4(a), 5(a) give the temperature and relative humidity, mean wind speed and special weather phenomena respectively for Chandrapur and Brahmapuri observatories.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Asola	40	a	12.1	10.1	10.9	12.3	9.7	170.1	417.7	402.7	220.3	66.2	10.3	6.3	1348.7	165	47	384.2	22 Jul 1986
		b	0.8	0.7	0.9	1.0	0.6	7.9	17.3	15.9	9.7	3.0	0.5	0.2	58.5	(1959)	(1984)		
Brahmapuri	49	a	14.7	12.8	19.2	15.5	11.8	185.4	436.2	394.7	211.9	61.1	12.0	8.5	1383.8	180	58	323.6	31 Aug 1938
		b	1.0	0.9	1.4	1.3	0.9	9.0	17.8	16.0	9.7	3.2	0.5	0.6	62.3	(1959)	(1972)		
Brahmapuri (Obsy)	34	a	12.1	14.6	26.9	13.3	16.2	196.3	444.7	402.6	222.8	61.1	20.6	17.2	1448.4	171	55	237.5	08 Jul 1973
		b	0.9	1.2	2.0	1.4	1.1	9.2	17.5	16.3	9.9	3.2	0.8	1.0	64.5	(1959)	(1972)		
Chandrapur (Obsy)	49	a	7.9	17.2	21.0	14.7	15.9	159.3	370.6	373.4	218.5	60.3	12.7	6.2	1277.7	187	49	254.0	12 Jul 1884
		b	0.7	1.0	1.6	1.2	1.5	8.5	16.9	15.0	9.7	3.6	0.8	0.5	61.0	(1990)	(1972)		
Chimur	48	a	15.1	14.1	17.6	9.5	9.0	197.0	384.3	339.3	204.1	54.8	8.0	9.8	1262.6	197	34	335.5	09 Aug 1927
		b	1.0	0.8	1.2	1.0	0.8	8.9	16.8	14.4	8.9	2.8	0.6	0.5	57.7	(1970)	(1984)		
Ghorajheri	41	a	10.6	10.3	10.2	7.1	6.7	167.8	405.5	371.0	211.2	53.4	13.9	6.0	1273.7	221	52	399.8	19 Jul 1959
		b	0.7	0.6	0.8	0.6	0.4	7.7	17.2	15.6	9.8	2.6	0.5	0.3	56.8	(1959)	(1972)		
Khairee	45	a	7.2	10.8	10.3	9.1	10.6	182.4	365.4	364.5	187.3	61.3	7.5	3.0	1219.4	168	48	242.6	13 Aug 1949
		b	0.6	0.7	0.9	0.9	0.6	7.6	15.6	13.9	8.8	3.0	0.5	0.1	53.2	(1975)	(1969)		
Mul	23	a	9.9	12.4	15.4	12.7	12.4	148.0	414.7	362.0	181.2	66.6	10.6	3.3	1249.2	151	65	310.2	22 Aug 1990
		b	0.7	1.0	1.7	1.0	1.2	8.3	17.8	14.6	9.2	3.1	0.7	0.2	59.5	(1949)	(1941)		
Nalesar	45	a	7.6	7.0	7.0	5.0	9.7	172.9	349.1	378.5	188.3	56.1	5.6	1.4	1188.2	174	40	280.0	31 Aug 1961
		b	0.7	0.5	0.5	0.5	0.5	8.2	15.4	14.0	8.6	2.5	0.5	0.1	52.0	(1949)	(1965)		

TABLE 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Sindewahi	40	a	11.5	12.8	19.7	15.4	18.2	214.7	419.7	417.1	228.2	67.2	9.9	8.4	1442.8	177	60	334.0	27 Jun 1975
		b	0.8	1.0	1.4	1.4	1.2	9.2	16.9	15.6	10.1	3.3	0.7	0.5	62.1	(1959)	(1982)		
Warora	45	a	10.7	13.1	15.9	7.8	12.0	180.4	345.1	305.6	187.5	56.6	9.6	7.1	1151.4	168	40	448.2	14 Aug 1986
		b	0.8	0.9	1.2	0.9	1.0	8.8	16.0	13.6	9.1	3.1	0.7	0.3	56.4	(1959)	(1972)		
Chandrapur		a	10.9	12.3	15.8	11.1	12.0	179.5	395.7	373.8	205.6	60.4	11.0	7.0	1295.1	165	58		
(District)		b	0.8	0.8	1.2	1.0	0.9	8.5	16.8	15.0	9.4	3.0	0.6	0.4	58.4	(1959)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(CHANDRAPUR)

Range in mm	No. of years	Range in mm	No. of years
701 – 800	2	1501 – 1600	3
801 – 900	4	1601 – 1700	0
901 – 1000	2	1701 – 1800	3
1001 – 1100	5	1801 – 1900	1
1101 – 1200	5	1901 – 2000	0
1201 – 1300	5	2001 – 2100	0
1301 – 1400	10	2101 – 2200	1
1401 – 1500	9		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(CHANDRAPUR)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	29.8	14.4	35.8	1990 Jan 02	2.8	1899 Jan 10	72	37
February	33.1	16.9	39.4	1951 Feb 26	3.9	1905 Feb 02	60	29
March	37.5	21.1	44.4	1892 Mar 27	7.2	1898 Mar 05	45	27
April	40.9	25.6	46.4	1973 Apr 29	11.7	1905 Apr 01	40	20
May	42.8	28.2	48.3	1912 May 16	18.9	1919 May 09	39	21
June	37.7	26.8	47.8	1929 Jun 01	20.0	1919 Jun 18	65	49
July	31.8	24.5	40.6	1897 Jul 04	17.8	1954 Jul 31	81	70
August	30.7	24.0	37.2	1954 Aug 03	18.3	1954 Aug 26	84	74
September	31.8	23.8	38.4	1980 Sep 18	18.3	1904 Sep 28	82	70
October	32.5	21.0	40.1	1976 Oct 06	10.9	1968 Oct 26	76	58
November	30.6	15.9	36.1	1950 Nov 09	6.2	1968 Nov 23	73	49
December	28.9	12.8	38.7	1987 Dec 12	3.9	1883 Dec 19	74	44
Annual	34.0	21.3					66	45

TABLE - 4
Mean Wind Speed in km/hr.
(CHANDRAPUR)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.4	6.0	6.9	9.2	11.4	14.2	10.1	9.4	6.7	4.2	4.1	3.9	7.5

TABLE - 5
Special Weather Phenomena
(CHANDRAPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.5	1.3	3.0	5.5	4.2	8.9	7.3	6.5	6.5	3.1	0.2	0.2	47.2
Hail	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Duststorm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fog	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(BRAHMAPURI)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.7	13.5	37.4	1973 Jan 29	4.6	1993 Jan 22	75	42
February	31.9	15.9	37.8	1976 Feb 25	5.1	1993 Feb 04	65	33
March	36.4	19.9	42.1	1984 Mar 31	10.3	1962 Mar 02	51	24
April	40.3	24.6	45.6	1973 Apr 28	12.8	1968 Apr 02	45	21
May	42.3	27.2	47.7	1983 May 27	13.4	1962 May 11	43	23
June	37.3	26.1	46.5	1995 Jun 05	14.2	1990 Jun 21	67	50
July	31.1	23.8	40.2	1982 Jul 01	15.4	1990 Jul 24	85	75
August	30.0	23.5	37.0	1972 Aug 04	14.0	1992 Aug 21	87	77
September	31.2	23.4	37.6	1990 Sep 18	14.9	1990 Sep 13	85	72
October	32.3	21.1	36.6	1965 Oct 09	7.6	1990 Oct 26	79	55
November	30.3	16.0	36.3	1993 Nov 07	6.2	1981 Nov 24	74	45
December	28.0	12.8	37.2	1957 Dec 16	5.1	1981 Dec 10	75	43
Annual	33.3	20.7					69	47

TABLE – 4(a)
Mean Wind Speed in km/hr.
(BRAHMAPURI)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.7	4.5	5.1	6.7	7.6	8.7	8.2	7.3	4.9	3.3	3.3	3.2	5.5

TABLE – 5(a)
Special Weather Phenomena
(BRAHMAPURI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.0	0.4	0.6	0.9	0.6	1.8	1.3	1.0	1.3	0.3	0.0	0.1	8.3
Hail	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.0	0.0	0.2	0.3	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.8

GADCHIROLI DISTRICT

The climate of this district is characterised by a hot summer, well distributed rainfall during the southwest monsoon and general dryness except in the rainy season. The cold season is from December to February. This is followed by the hot season from March to May. The southwest monsoon season is from June to September. October and November constitute the post-monsoon season.

Rainfall

Records of rainfall in the district are available for 8 stations, for a period ranging from 21 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1486.1 mm. The rainfall in the district generally increases from the south towards the north and varies from 1304.7 mm at Sironcha to 1806.1 mm at Dhanora. The rainfall during the southwest monsoon season from June to September constitutes about 91% of the annual rainfall. July is the rainiest month. The variation in the rainfall from year to year is large. During the fifty year period from 1941-1990 the highest annual rainfall in the district amounting to 162% of the normal occurred in 1990. 1941 was the year with the lowest annual rainfall which was only 65% of the normal. In the same 50 years the annual rainfall was less than 80% of the normal in 10 years, two and three consecutive years occurred once. It will be seen from Table 2 that the annual rainfall in the district was between 1001 and 1700 mm in 38 years out of 50.

On an average there are 63 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 59 at Armori to 68 at Dhanora.

The heaviest rainfall in 24 hours recorded in the district was 478.0 mm at Kunghari on 11th August 1974.

Temperature

There is only one meteorological observatory in the district at Sironcha. The data of Sironcha may be taken as representative of the southern parts of the district. The data of Brahmapuri observatory situated in the neighbouring district Chandrapur, can be taken as representative for northern parts of the district. After October, both day and night temperatures decrease progressively till December which is the coldest month. In the northern parts of the district, the mean daily maximum temperature in December is 28.0°C and the mean daily minimum temperature is 12.8°C. The mean daily maximum temperature in the southern half of the district is 29.4°C and the mean daily minimum is 14.6°C. During the cold season, cold spells affect the district in association with the passage of western disturbances across north India. The minimum temperature on such occasions may go down to about 4°C particularly in the northern parts of the district. Temperatures rise rapidly after February till May which is the hottest month of the year. The mean daily maximum temperature in May is about 42°C and the mean daily minimum is about 27 to 28°C. The heat in summer is intense during the day especially in the southern parts of the district. Occasionally the day temperatures rise upto 48°C. The afternoon heat is sometimes relieved by thundershowers. With the onset of the southwest monsoon in the district by about the middle of June, the temperatures decrease appreciably. Early in October when the southwest monsoon withdraws from the district, the day temperatures increase a little and a secondary maximum is reached in October. Later both day and night temperatures decrease progressively. The decrease in night temperatures is rapid.

The highest maximum temperature ever recorded at Sironcha was 48.2°C on 10th May 1973 and the lowest minimum temperature ever recorded was 4.7°C on 23rd December 1984.

Humidity

The air is generally dry over the district except during southwest monsoon season when the humidity is about 70 to 80%. The summer months are the driest when the relative humidity in the afternoons is about 25%.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the post monsoon season the cloud amount decreases. In the rest of the year skies are lightly clouded or mostly clear.

Winds

Winds are generally light with some increase in the wind force during the latter part of the summer and southwest monsoon season. In the post monsoon and early winter season winds blow mostly from directions between north and northeast. In January and February winds blow mostly from east or southeast. In the first half of summer season winds gradually change over to direction between southeast and southwest and by May winds from directions between northeast and southeast become more common. During the southwest monsoon season the winds are mainly from the southwest or west.

Special Weather Phenomena

In association with monsoon depressions which originate in the Bay of Bengal and move westwards the district experiences strong winds and widespread heavy rain. Less frequently storms and depressions from the Bay of Bengal during the post monsoon also affect the weather over the district. Thunderstorms occur in all the months and their incidence being the highest during the summer (April to June) and September and the lowest during the cold season. Occasional dust storms occur during the summer season and occasional fog is noticed during the winter season.

Tables 3, 4 and 5 give the normals of temperature and relative humidity, mean wind speed and special weather phenomena respectively for Sironcha observatory.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL IN 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Ahiri	33	a	5.7	8.3	13.4	11.0	13.7	183.2	477.5	475.1	188.0	59.2	8.0	3.2	1446.3	170	48	319.0	14 Aug 1953
		b	0.4	0.7	1.0	1.0	1.0	8.5	18.7	18.0	9.9	3.5	0.5	0.2	63.4	(1990)	(1968)		
Armori	41	a	8.6	11.3	13.1	11.8	10.7	184.2	450.0	411.5	188.8	58.9	11.5	1.1	1361.5	154	50	337.3	05 Sep 1910
		b	0.6	0.7	1.1	0.9	0.9	8.9	17.5	15.7	8.9	3.1	0.5	0.2	59.0	(1990)	(1972)		
Dhanora	21	a	5.5	14.8	15.7	16.1	12.3	231.2	597.4	574.7	265.4	65.8	7.2	0.0	1806.1	138	64	286.3	31 Jul 1951
		b	0.5	1.1	1.1	0.9	1.0	10.0	19.7	17.8	11.8	3.4	0.3	0.0	67.6	(1959)	(1950)		
Gadchiroli	45	a	8.4	13.2	12.7	12.2	10.9	232.9	507.6	504.2	222.5	61.1	9.6	6.6	1601.9	208	56	384.2	22 Jul 1986
		b	0.7	1.0	1.0	0.9	0.8	9.0	18.7	17.2	9.8	2.9	0.7	0.3	63.0	(1990)	(1971)		
Garmuri	32	a	12.3	15.2	15.6	10.2	8.6	217.6	445.7	393.8	248.5	51.7	5.0	4.1	1428.3	169	57	334.0	27 Jun 1975
		b	1.0	0.9	1.2	1.0	0.8	9.1	18.3	15.5	10.8	3.0	0.4	0.2	62.2	(1975)	(1941)		
Kunghari	41	a	12.0	10.6	21.0	6.0	14.9	207.7	540.8	476.2	219.2	57.8	11.8	3.8	1581.8	143	57	478.0	11 Aug 1974
		b	0.7	0.7	1.1	0.6	0.7	9.0	18.1	16.4	10.1	2.8	0.7	0.2	61.1	(1990)	(1941)		
Sironcha	49	a	7.4	10.3	12.8	14.7	21.0	175.3	419.4	365.6	188.9	74.9	8.8	5.6	1304.7	152	58	253.0	18 Jul 1988
		b	0.4	0.8	0.8	1.0	1.4	8.7	17.3	15.6	10.3	4.1	0.8	0.3	61.5	(1990)	(1974)		
Sironcha (Obsy)	39	a	8.5	8.9	14.5	19.7	22.0	179.2	412.5	383.7	200.3	87.1	10.9	9.3	1356.6	145	60	253.0	18 Jul 1988
		b	0.6	0.8	0.9	1.5	1.8	8.9	16.6	16.1	10.9	4.5	1.0	0.4	64.0	(1953)	(1985)		
Gadchiroli (District)		a	8.6	11.6	14.9	12.7	14.3	201.4	481.4	448.1	215.2	64.6	9.1	4.2	1486.1	162	65		
		b	0.6	0.8	1.0	1.0	1.0	9.0	18.1	16.5	10.3	3.4	0.6	0.2	62.5	(1990)	(1941)		

a : Normal rainfall in mm.
b : Average number of rainy days (i.e. days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1995
** : Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(GADCHIROLI)

Range in mm	No. of years	Range in mm	No. of years
901 – 1000	3	1701 - 1800	1
1001 – 1100	5	1801 – 1900	5
1101 – 1200	2	1901 – 2000	1
1201 – 1300	7	2001 – 2100	0
1301 – 1400	6	2101 – 2200	1
1401 – 1500	6	2201 – 2300	0
1501 – 1600	7	2301 – 2400	0
1601 – 1700	5	2401 – 2500	1

(Data available for 50 years)

TABLE - 3
Normals of Temperature and Relative Humidity
(SIRONCHA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.3	15.5	34.4	1981 Jan 31	6.0	1993 Jan 22	75	42
February	33.6	18.8	38.8	1969 Feb 24	7.0	1993 Feb 22	68	33
March	37.6	22.4	45.6	1969 Mar 14	11.7	1985 Mar 02	57	25
April	40.4	26.3	46.8	1973 Apr 30	14.0	1992 Apr 25	56	25
May	42.2	28.4	48.2	1973 May 10	14.6	1984 May 28	50	25
June	37.3	26.2	47.9	1981 Jun 12	15.2	1985 Jun 21	67	50
July	32.1	24.6	40.5	1987 Jul 02	15.1	1981 Jul 11	84	72
August	31.1	24.1	37.4	1972 Aug 03	15.4	1992 Aug 21	86	75
September	32.2	23.6	37.7	1974 Sep 28	16.0	1992 Sep 19	83	70
October	32.8	21.9	37.0	1976 Oct 24	11.9	1978 Oct 15	77	58
November	31.0	17.9	36.9	1978 Nov 12	8.4	1992 Nov 27	74	51
December	29.4	14.6	35.4	1989 Dec 01	4.7	1984 Dec 23	76	47
Annual	34.2	22.0					71	48

TABLE - 4
Mean Wind Speed in km/hr.
(SIRONCHA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.5	4.5	5.1	6.5	6.8	7.2	6.0	5.5	4.5	3.9	3.6	2.8	5.0

TABLE - 5
Special Weather Phenomena
(SIRONCHA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	0.1	0.7	2.4	2.0	2.5	1.7	1.9	2.0	0.6	0.4	0.0	14.6
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dust storm	0.0	0.0	0.2	0.1	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Fog	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5

GONDIA DISTRICT

The climate of this district is characterised by a hot summer, well distributed rainfall during the southwest monsoon season and generally dry weather during the rest of the year. The cold season is from December to February. This is followed by the hot season from March to about the middle of June. The southwest monsoon season is from about mid-June to early October. October and November form the post monsoon season.

Rainfall

Records of rainfall in the district are available for four raingauge stations for the period ranging from 20 to 46 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1378.6 mm. The southwest monsoon arrives over the district by about the second week of June. The rainfall during the period June to September constitutes about 90% of the annual normal. July and August are the months with heavy rainfall, July being the rainiest month. The variation in the annual rainfall from year to year is large. In the fifty year period 1941 to 1990, the highest annual rainfall amounting to 178% of the normal occurred in 1961 while 1987 was the year with the lowest annual rainfall which was 62% of the normal. The annual rainfall was less than 80% of the normal in 9 years and out of them there were two occasions of two consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 901and 1700 mm in 44 years out of 50.

On an average there are 61 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 55 at Pangree to 64 at Gondia and Gondia observatory.

The heaviest rainfall recorded in 24 hours at any station in the district was 395.2 mm at Pangree on 25th July 1937.

Temperature

There is a meteorological observatory in the district at Gondia. The records of this observatory may be taken as representative of the meteorological conditions in the district in general. The cold season commences in the district towards the end of November when both day and night temperatures begin to decrease rapidly. December is the coldest month of the year with the mean daily maximum temperature at 27.5°C and the mean daily minimum temperature at 13.2°C. During cold waves which affect the district in association with the passage of western disturbances across north India, the minimum temperature may go down below 7°C. From about the beginning of March both day and night temperatures rise rapidly. May is the hottest month with the mean daily maximum temperature at 42.1°C and the mean daily minimum at 28.1°C. In the summer season the heat is intense and on many days the temperature may go above 45°C. Thundershowers on some days during the afternoons bring welcome relief. With the onset of the southwest monsoon by about the middle of June both day and night temperatures drop down appreciably and the weather becomes pleasant. With the withdrawal of the monsoon by about the first week of October, day temperatures increase slightly and a secondary maximum in day temperature is reached in October. But the night temperatures decrease steadily after the withdrawal of the monsoon. After October day temperatures also decrease progressively.

The highest maximum temperature ever recorded at Gondia was 47.3°C on 30th May 1988. The lowest minimum temperature ever recorded was 6.5°C on 29th December 1968.

Humidity

Except during the southwest monsoon season when relative humidity is high (70-80%) the air is generally dry during the year. The summer season is the driest part of the year when the relative humidity goes down to 20% or less in the afternoons.

Cloudiness

Skies are mostly heavily clouded to overcast during the southwest monsoon season. In the post monsoon months cloud amount decreases In the rest of the year the skies are mostly clear or lightly clouded.

Winds

Winds are generally light with a little increase in wind force during the latter part of the summer and monsoon months. During the monsoon season the winds blow mostly from directions between southwest and west. In the period October to February the winds are mainly calm or blow from northerly to northeasterly. By March winds from directions between southwest and northwest begin to blow and with the advance of the season become predominant.

Special Weather Phenomena

Depressions which originate in the Bay of Bengal during the monsoon months, in their westward movement across the central parts of the country affect the district and its neighbourhood causing widespread heavy rain and strong winds. Storms and depressions from Bay of Bengal in the post monsoon season also occasionally affect the weather over the district. Thunderstorms occur throughout the year and their frequency being more in the latter part of summer and southwest monsoon season. They are occasionally associated with hail. Duststorms occur occasionally during the summer season. Fog is noticed occasionally during the winter season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena for Gondia observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Deori	42	a	9.7	13.1	19.4	9.3	7.0	195.6	436.7	470.7	253.9	63.3	8.8	5.9	1493.4	187	47	301.0	28 Aug 1978
		b	0.8	1.1	1.2	0.6	0.5	8.3	17.1	15.9	10.2	3.3	0.6	0.4	60.0	(1961)	(1951)		
Gondia	20	a	30.7	27.0	10.4	8.6	8.6	167.8	451.2	423.7	181.9	52.8	16.6	7.9	1387.2	164	56	346.7	18 Jun 1918
		b	2.3	1.8	1.1	0.7	0.5	8.8	17.9	17.3	9.4	3.1	0.9	0.5	64.3	(1942)	(1987)		
Gondia	39	a	17.1	15.4	17.7	9.9	10.7	181.5	412.8	420.8	204.4	52.7	11.1	21.4	1375.5	169	67	281.4	02 Sep 1961
(Obsy)		b	1.1	1.4	1.8	1.1	0.9	8.7	17.4	17.0	10.1	3.3	0.6	0.8	64.2	(1961)	(1965)		
Pangree	46	a	11.2	12.1	12.0	4.8	2.6	153.9	410.0	383.8	205.8	45.9	8.4	7.2	1257.7	181	49	395.2	25 Jul 1937
		b	0.8	1.0	1.0	0.5	0.3	7.3	16.3	14.9	9.4	2.8	0.5	0.3	55.1	(1942)	(1984)		
Gondia		a	17.2	16.9	14.9	8.2	7.2	174.7	427.7	424.8	211.5	53.7	11.2	10.6	1378.6	178	62		
(District)		b	1.3	1.3	1.3	0.7	0.6	8.3	17.2	16.3	9.8	3.1	0.7	0.5	61.1	(1961)	(1987)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(GONDIA)

Range in mm	No. of years	Range in mm	No. of years
801 – 900	1	1701 – 1800	1
901- 1000	5	1801 – 1900	2
1001 – 1100	3	1901 – 2000	0
1101 – 1200	8	2001 – 2100	0
1201 – 1300	4	2101 – 2200	0
1301 – 1400	5	2201 – 2300	1
1401 – 1500	8	2301 – 2400	0
1501 – 1600	6	2401 – 2500	1
1601 – 1700	5		

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(GONDIA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	27.7	13.5	33.4	1987 Jan 31	6.7	1951 Jan 03	69	41
February	30.6	15.8	39.0	1983 Feb 16	6.7	1950 Feb 12	59	32
March	35.5	20.0	41.7	1953 Mar 27	11.2	1993 Mar 01	46	23
April	39.9	24.9	45.5	1973 Apr 28	11.6	1994 Apr 19	36	18
May	42.1	28.1	47.3	1988 May 30	13.8	1994 May 01	35	19
June	37.4	26.7	47.1	1995 Jun 05	20.4	1971 Jun 09	63	48
July	31.2	24.3	44.2	1992 Jul 07	19.8	1990 Jul 04	84	76
August	30.1	24.0	36.5	1991 Aug 05	18.3	1953 Aug 05	85	78
September	31.4	23.9	36.0	1987 Sep 28	19.2	1966 Sep 23	82	71
October	32.3	21.3	36.3	1965 Oct 09	11.0	1991 Oct 09	74	53
November	30.1	16.6	34.5	1965 Nov 04	8.9	1950 Nov 26	67	44
December	27.5	13.2	33.7	1991 Dec 09	6.5	1968 Dec 29	69	44
Annual	33.0	21.0					64	46

TABLE - 4
Mean Wind Speed in km/hr.
(GONDIA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1.9	2.5	3.1	3.8	4.6	5.4	5.2	5.0	3.3	2.3	1.7	1.5	3.4

TABLE - 5
Special Weather Phenomena
(GONDIA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.5	0.9	1.7	2.0	1.5	4.3	3.0	3.8	3.7	0.8	0.2	0.0	22.8
Hail	0.1	0.1	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.7
Dust storm	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Fog	0.3	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.2

NAGPUR DISTRICT

The climate of this district is characterised by a hot summer, well distributed rainfall and dryness except in the rainy season. The cold season is from December to February and is followed by the hot season from March to May. The southwest monsoon season is from June to September while the period October-November constitutes the post-monsoon season.

Rainfall

Records of rainfall in the district are available for 11 stations for periods ranging from 32 to 50 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1101.4 mm. The rainfall generally increases from the west to the east in the district. The southwest monsoon usually reaches the district in the second week of June. The rainfall during the period June to September constitutes about 87% of the annual total, July being the month with the highest rainfall. The variation in the annual rainfall from year to year is not large. In the fifty year period 1941 to 1990, the highest annual rainfall amounted to 144% of the normal for the district occurred in 1944. The lowest annual rainfall in the same fifty year period which was 57% of the normal occurred in 1972. The rainfall was less than 80% of the normal in 8 years out of fifty, out of which no years were consecutive. It will be seen from Table 2 that the rainfall in the district as a whole was between 701 and 1400 mm in 45 years out of 50.

On an average there are 55 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year. This number varies from 51 at Parseoni to 59 at Nagpur (Mayo Hospital) Observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 330.2 mm at Umrer on 14th August 1953.

Temperature

There are two meteorological observatories in the district, one at Nagpur and other is at Nagpur (Mayo Hospital), records of which are available for a long period of years. The data of these observatories may be taken as representative of the meteorological conditions in the district in general. The cold weather commences towards the end of November and December is usually the coldest month with the mean daily maximum temperature at about 28°C and the mean daily minimum temperature at about 13°C. In the wake of western disturbances which pass across north India in the cold season, the district is sometimes affected by cold waves when the minimum temperature may go down to 4°C. From the beginning of March, temperatures begin to rise rapidly. May is the hottest month with the mean daily maximum temperature at about 42.5°C. The heat during the summer season is severe during the day, the nights being comparatively cooler. The afternoon heat is sometimes relieved by thundershowers. The onset of the southwest monsoon by about the second week of June brings welcome relief from the heat, with a considerable drop in temperature. With the withdrawal of the southwest monsoon by about the beginning of October, the day temperature show a slight increase in October and thereafter begin to fall, while the night temperatures decrease after September.

The highest maximum temperature ever recorded at Nagpur was 47.8°C on 26th May 1954 and the lowest minimum temperature ever recorded was 3.9°C on 7th January 1937. The highest maximum temperature ever recorded at Nagpur (Mayo Hospital) was 47.3°C on 29th May 1973 and the lowest minimum temperature ever recorded was 7.4°C on 5th January 1991.

Humidity

Except during the monsoon season when the humidity is high (70-80%) the air is generally dry. The summer season is the driest part of the year when the relative humidity may go down to 20% or less particularly in the afternoons.

Cloudiness

Skies are mainly heavily clouded to overcast in the southwest monsoon season. In the post monsoon months, moderate cloudiness is common. In the rest of the year the skies are usually clear or lightly clouded. But cloudiness increases on many summer afternoons.

Winds

Winds are generally light to moderate with some increase in speed in the latter part of the summer season and the monsoon months. During the monsoon season winds are mostly from directions between southwest and northwest. In the period from October to December the winds are mainly northerly to northwesterly in the mornings and northeasterly to easterly in the afternoons. In January winds from directions between north and northeast are common in the mornings and from northeast, east and southeast in the afternoons. While the winds in the mornings in February and March are as in January, the afternoon winds become variable. In the rest of the summer season winds are mostly from directions between west and northwest.

Special Weather Phenomena

In the monsoon months, depressions from the Bay of Bengal move westwards across the central parts of the country and affect the district and its neighbourhood causing widespread heavy rain and strong winds. Thunderstorms occur in all seasons although their frequency is very small in the period November to January and maximum in monsoon months with average frequency about 10 days in a month. The frequency of squall is more in summer months being maximum (i.e. 4 to 6) in May and June. Occasional fog is noticed from August to February.

Tables 3, 4, and 5 give the temperature and humidity, mean wind speed and special weather phenomena for Nagpur/Sonegaon (A) observatory and Table 3(a) gives the temperature and relative humidity for Nagpur (Mayo Hospital) observatory.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Deolapur	32	a	24.5	20.6	14.3	13.4	11.1	165.2	340.9	315.0	202.9	46.7	17.4	6.1	1178.1	149	54	316.0	12 Aug 1986
		b	1.6	1.5	1.3	1.0	0.7	7.7	15.7	13.1	9.0	2.1	0.8	0.2	54.7	(1944)	(1950)		
Katol	48	a	16.7	17.5	12.1	11.4	9.2	154.6	269.4	240.5	152.2	51.9	15.7	6.7	957.9	174	60	261.6	01 Jun 1879
		b	1.2	1.2	1.0	1.1	0.9	8.6	13.6	12.2	8.5	3.0	0.8	0.5	52.6	(1944)	(1972)		
Kindsi	41	a	21.5	12.8	9.8	8.5	4.8	145.3	371.2	316.9	195.0	54.2	12.8	7.9	1160.7	155	48	279.4	12 Jul 1942
		b	1.4	1.3	0.9	0.8	0.6	7.3	16.1	14.5	9.7	3.1	0.6	0.3	56.6	(1959)	(1952)		
Nagpur	34	a	15.1	13.6	14.3	11.5	11.0	166.4	308.5	266.4	169.6	56.7	11.5	22.0	1066.6	134	61	195.2	14 Jul 1984
		b	1.2	0.9	1.3	1.3	1.1	8.5	14.6	13.8	8.6	3.1	0.7	1.0	56.1	(1961)	(1972)		
Nagpur	44	a	17.4	14.1	18.3	11.6	17.5	174.5	308.9	277.5	185.7	58.5	13.0	16.4	1113.4	140	54	304.0	12 Jul 1994
(Aero Obsy)		b	1.3	1.2	1.5	1.1	1.5	9.1	15.0	13.7	9.3	3.0	0.9	0.8	58.4	(1981)	(1972)		
Nagpur(Mayo	49	a	14.7	17.6	17.4	10.5	16.7	172.1	335.5	281.6	176.8	51.7	16.3	15.2	1126.1	133	51	315.0	12 Jun 1911
Hospital)Obsy		b	1.1	1.4	1.6	1.3	1.4	8.9	15.5	13.3	9.4	2.9	0.9	0.8	58.5	(1942)	(1982)		
Perseoni	40	a	17.0	12.9	16.0	6.4	6.8	144.7	317.2	271.7	165.6	50.0	14.7	7.6	1030.6	155	25	318.8	12 Jul 1942
		b	1.0	0.9	1.1	0.7	0.5	7.4	14.1	13.4	8.7	2.8	0.5	0.4	51.5	(1947)	(1965)		
Ramtek	47	a	20.3	14.5	19.2	8.8	6.9	170.6	351.0	306.1	182.4	56.2	15.3	7.4	1158.7	141	54	288.0	17 Jul 1985
		b	1.6	1.1	1.4	0.8	0.8	8.6	15.9	13.4	9.0	2.9	0.8	0.6	56.9	(1947)	(1965)		

TABLE - 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Saoner	50	a	18.8	14.6	15.2	7.5	8.7	160.8	279.5	251.1	164.8	43.0	14.8	9.5	988.3	150	55	215.7	11 Jul 1942
		b	1.5	1.2	1.3	0.8	0.9	8.4	14.0	12.2	7.7	2.5	0.6	0.6	51.7	(1949)	(1972)		
Tharsa	48	a	22.9	18.0	19.5	15.1	11.4	153.3	344.4	303.9	200.5	52.1	19.0	13.8	1173.9	152	57	222.0	07 Sep 1937
		b	1.5	1.4	1.4	1.3	1.1	8.4	15.6	14.1	9.2	2.9	0.8	0.6	58.3	(1942)	(1972)		
Umrer	49	a	14.7	16.1	11.4	7.6	8.1	162.4	361.1	314.6	196.8	48.9	13.2	7.1	1162.0	157	56	330.2	14 Aug 1953
		b	0.9	1.0	1.1	0.8	0.7	7.8	15.0	13.0	9.1	2.6	0.5	0.3	52.8	(1944)	(1982)		
Nagpur		a	18.5	15.7	15.2	10.2	10.2	160.9	326.1	285.9	181.1	51.8	14.9	10.9	1101.4	144	57		
(District)		b	1.3	1.2	1.3	1.0	0.9	8.2	15.0	13.3	8.9	2.8	0.7	0.6	55.2	(1944)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(NAGPUR)

Range in mm	No. of years	Range in mm	No. of years
601 – 700	1	1101 – 1200	11
701 – 800	6	1201 – 1300	5
801 – 900	2	1301 – 1400	5
901 – 1000	5	1401 – 1500	3
1001 – 1100	11	1501 – 1600	1

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(NAGPUR/SONEGAON)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.6	12.7	35.0	1900 Jan 29	3.9	1937 Jan 07	65	39
February	31.7	15.0	38.9	1887 Feb 28	5.0	1950 Feb 12	52	30
March	36.3	19.0	45.0	1892 Mar 28	8.3	1898 Mar 04	38	21
April	40.3	24.0	46.1	1942 Apr 30	13.9	1968 Apr 01	32	18
May	42.4	27.7	47.8	1954 May 26	19.4	1917 May 04	33	20
June	37.6	26.2	47.2	1931 Jun 10	20.0	1919 Jun 18	62	48
July	31.8	24.1	40.6	1966 Jul 12	19.4	1942 Jul 13	82	71
August	30.4	23.6	37.8	1899 Aug 25	18.3	1939 Aug 20	84	75
September	31.9	22.9	38.9	1899 Sep 29	16.6	1972 Sep 23	80	68
October	32.8	19.7	38.3	1899 Oct 08	11.6	1960 Oct 25	67	50
November	30.5	15.1	35.6	1977 Nov 07	6.7	1912 Nov 30	61	45
December	28.0	12.3	33.9	1941 Dec 25	5.5	1968 Dec 29	65	44
Annual	33.5	20.2					60	44

TABLE - 4
Mean Wind Speed in km/hr.
(NAGPUR/SONEGAON)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.1	8.3	8.7	9.5	13.0	13.5	11.2	10.9	9.1	7.5	7.3	6.6	9.4

TABLE - 5
Special Weather Phenomena
(NAGPUR/SONEGAON)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	1.1	1.8	3.5	4.8	6.1	12.2	9.9	7.3	9.2	2.6	0.4	0.5	59.4
Hail	0.9	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.2	0.8	1.7	2.5	4.0	5.6	2.4	0.8	1.2	0.4	0.1	0.1	19.8
Fog	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.5	1.6

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(NAGPUR MAYO HOSPITAL)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.6	14.0	34.7	1989 Jan 29	7.4	1991 Jan 05	Data not available	
February	31.4	16.5	38.1	1974 Feb 27	11.0	1972 Feb 09		
March	35.6	20.5	41.8	1969 Mar 27	11.0	1994 Mar 02		
April	40.1	25.2	45.9	1973 Apr 26	17.5	1982 Apr 13		
May	42.5	28.6	47.3	1973 May 29	18.0	1982 May 05		
June	37.6	26.7	46.3	1988 Jun 01	20.3	1987 Jun 16		
July	31.8	24.3	40.6	1982 Jul 03	19.5	1991 Jul 14		
August	30.5	23.4	36.6	1976 Aug 03	15.5	1981 Aug 06		
September	32.0	23.2	40.0	1974 Sep 15	17.0	1981 Sep 15		
October	33.0	20.8	38.1	1976 Oct 09	11.7	1985 Oct 22		
November	30.7	16.8	34.8	1969 Nov 01	10.0	1974 Nov 30		
December	28.1	13.9	32.9	1984 Dec 13	8.9	1987 Dec 19		
Annual	33.5	21.2						

WARDHA DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except during the southwest monsoon season. The year may be divided into four seasons. The winter is from December to February. The hot season is from March to May. This is followed by the southwest monsoon season till September. October and November constitute the post-monsoon season.

Rainfall

Records of rainfall are available for only seven stations in the district for the period ranging from 10 to 49 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 978.2 mm out of which the rainfall during the period from June to September amounts to about 86%, July being the rainiest month. The rainfall generally increases from west to east in the district. The rainfall during the year, outside monsoon months, even though low is well distributed among different months. During the fifty year period from 1941 to 1990, the highest annual rainfall over the district amounting to 141% of the normal occurred in 1979. The lowest annual rainfall which was only 63% of the normal occurred in 1972. In the same fifty year period the annual rainfall was less than 80% of the normal in 8 years out of which two years are consecutive. It will be seen from Table 2 that the annual rainfall in the district was between 701 and 1100 mm in 30 years out of 48.

On an average there are 52 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 48 at Sindi to 55 at Hinganghat, Wardha and Wardha observatory.

The heaviest rainfall in 24 hours recorded at any station in the district was 312.9 mm at Hinganghat on 18th July 1913.

Temperature

There is a meteorological observatory in the district at Wardha. The records of this observatory may be taken as representative of the meteorological conditions of the district. Temperatures increase steadily from about the beginning of March. May is the hottest month of the year with the mean daily maximum temperature at about 43°C and the mean daily minimum at about 27°C. On individual days the maximum temperature may sometimes rise to about 48°C. The heat in the summer season is severe during the day, but nights are comparatively cooler. The afternoon heat is sometimes relieved by thundershowers. With the onset of the southwest monsoon by about the middle of June, there is an appreciable drop in day temperatures. With the withdrawal of the southwest monsoon by about the first week of October the day temperatures increase slightly and there is a secondary maxima in day temperatures in October. The night temperatures however decrease progressively after September. After October both day and night temperatures decrease rapidly till the end of December, which is the coldest month with the mean daily maximum temperature at about 28°C and the mean daily minimum temperature at about 13°C. In the wake of western disturbances which move across north India in the cold season, the district is sometimes affected by cold waves and the night temperatures at times go down upto about 7°C.

The highest maximum temperature recorded at Wardha was 48.4°C on 17th May 1989 and the lowest minimum temperature was 7.0°C on 8th January 1986.

Humidity

The air is generally dry over the district except during the southwest monsoon season when the humidity is generally above 70%. The summer months are the driest when the relative humidity goes down to about 17 to 20% in the afternoons.

Cloudiness

During the southwest monsoon months the skies are heavily clouded to overcast. In the rest of the year the skies are mostly clear or lightly clouded. Cloud amounts are increased in the afternoons.

Winds

Winds are generally light to moderate with some strengthening in force during the latter part of the hot season and during the southwest monsoon season. In the post monsoon and cold seasons winds blow mainly from directions between northeast and east. In the summer season wind directions are variable, wind from west-northwest in the

afternoon is common. During the southwest monsoon season, winds blow mostly from directions between southwest and west and northwest on some occasions.

Special Weather Phenomena

In association with monsoon depressions which originate in the Bay of Bengal and move westwards across the central parts of the country, the district experiences strong winds and widespread heavy rain. Thunderstorms occur during the period from January to October, their frequency being the highest in June. Dust storms are very rare, but do occur sometimes during the hot season.

Tables 3, 4 and 5 give the temperature and humidity, mean wind speed and special weather phenomena respectively for Wardha observatory.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Arvi	49	a	11.9	12.2	10.4	6.7	16.0	154.1	288.6	248.4	159.0	43.5	16.4	15.7	982.9	175	52	290.8	19 Jun 1927
		b	0.9	0.9	0.8	0.6	1.1	8.0	13.8	11.8	8.2	2.5	0.8	0.9	50.3	(1979)	(1969)		
Arvi (Hydro)	11	a	31.0	23.9	9.3	4.8	11.0	197.0	265.2	285.4	92.7	36.4	18.9	21.5	997.1	161	69	245.6	26 Jun 1979
		b	2.5	2.0	0.6	0.5	1.0	9.2	13.1	12.1	6.5	3.0	1.2	1.4	53.1	(1979)	(1982)		
Hinganghat	49	a	11.0	14.9	12.4	10.2	8.5	158.8	339.2	298.4	179.8	46.9	12.8	12.7	1105.6	158	52	312.9	18 Jul 1913
		b	0.8	1.1	1.1	0.9	0.9	8.4	16.0	12.6	9.2	2.9	0.6	0.7	55.2	(1990)	(1984)		
Kharangha	10	a	5.4	6.4	18.3	8.3	20.9	129.6	187.6	154.3	89.0	52.7	14.7	3.6	690.8	169	52	213.4	30 Jul 1991
		b	0.7	0.7	1.6	0.8	2.2	8.4	12.7	11.2	6.8	3.4	0.8	0.6	49.9	(1990)	(1972)		
Sindi	10	a	3.9	6.4	8.8	2.9	6.9	167.0	294.9	244.3	158.2	58.1	6.9	13.8	972.1	151	71	225.2	08 Jul 1973
		b	0.5	0.7	0.8	0.4	0.4	7.5	13.8	13.0	7.9	2.4	0.2	0.8	48.4	(1970)	(1972)		
Wardha	33	a	15.5	11.7	12.7	11.0	16.4	165.1	312.8	243.8	175.5	48.0	18.4	12.5	1043.4	153	47	304.0	12 Jul 1994
		b	1.1	0.9	1.3	1.2	1.5	8.5	14.9	11.9	8.9	3.0	0.8	0.8	54.8	(1970)	(1965)		
Wardha (Obsy)	24	a	17.0	14.1	14.7	9.5	12.8	184.7	276.3	269.6	172.1	51.3	14.9	18.0	1055.0	152	69	266.4	13 Jul 1994
		b	1.1	1.0	1.2	1.2	1.3	9.0	14.3	12.2	9.3	2.8	0.8	1.1	55.3	(1970)	(1972)		
Wardha (District)		a	13.7	12.8	12.4	7.6	13.2	165.2	280.7	249.2	146.6	48.1	14.7	14.0	978.2	147	63		
		b	1.1	1.0	1.1	0.8	1.2	8.4	14.1	12.1	8.1	2.9	0.7	0.9	52.4	(1979)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(WARDHA)

Range in mm	No. of years	Range in mm	No. of years
601 – 700	3	1101 – 1200	2
701 – 800	7	1201 – 1300	5
801 – 900	5	1301 – 1400	6
901 – 1000	5	1401 – 1500	2
1001 – 1100	13		

(Data available for 48 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(WARDHA)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.8	14.3	35.0	1990 Jan 31	7.0	1986 Jan 08	58	35
February	32.0	16.7	39.8	1967 Feb 21	8.9	1993 Feb 06	47	26
March	36.7	20.4	43.9	1991 Mar 31	10.4	1995 Mar 23	36	19
April	40.9	24.5	46.4	1973 Apr 27	15.6	1983 Apr 23	31	17
May	42.7	27.5	48.4	1989 May 17	18.7	1991 May 30	35	20
June	37.1	25.9	46.9	1995 Jun 06	18.4	1986 Jun 26	66	48
July	31.7	23.5	41.4	1992 Jul 03	15.0	1987 Jul 17	82	68
August	30.1	22.8	39.9	1993 Aug 24	17.9	1992 Aug 27	85	73
September	31.7	22.5	36.8	1974 Sep 18	16.9	1991 Sep 04	81	66
October	32.8	20.0	38.4	1989 Oct 29	11.8	1986 Oct 28	65	46
November	30.4	16.3	35.5	1989 Nov 04	9.0	1968 Nov 03	56	39
December	28.2	13.5	33.4	1991 Dec 03	7.3	1983 Dec 28	55	36
Annual	33.6	20.6					58	41

TABLE - 4
Mean Wind Speed in km/hr.
(WARDHA)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.5	5.4	5.9	6.6	9.0	10.5	9.2	8.8	6.5	4.7	4.9	4.3	6.7

TABLE - 5
Special Weather Phenomena
(WARDHA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	0.2	0.2	0.6	0.3	0.7	0.4	0.3	0.5	0.3	0.0	0.0	3.8
Hail	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WASHIM DISTRICT

The climate of this district is characterised by a hot summer and general dryness throughout the year except during the southwest monsoon season. The year may be divided into four seasons. The period from about the middle of November to the end of February constitutes the winter season. The period from March to the first week of June is the hot season. This is followed by the southwest monsoon season which extends upto the end of September. October and November constiute the post monsoon season.

Rainfall

Records of rainfall in the district are available for 5 raingauge stations for period ranging from 28 to 48 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall of the district is 915.7 mm. Rainfall during the southwest monsoon months constitute about 80% of the annual rainfall, July being the rainiest month. During the 50 year period from 1941-1990, the highest annual rainfall amounting to 157% of the normal occurred in 1959, while the lowest annual rainfall which was only 45% of the normal occurred in 1965. In the same fifty year period, the annual rainfall in the district was less than 80% of the normal in 12 years, out of which 2 consecutive years occurred thrice.

It will be seen from Table 2 that the annual rainfall in the district was between 701 and 1100 mm in 31 years out of 47.

On an average there are 48 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district and this number varies from 46 at Karanjia and Mangrulpir to 51 at Sirpur.

The heaviest rainfall recorded in 24 hours at any station in the district was 355.6 mm at Washim on 26 June 1914.

Temperature

As there is no meteorological observatory in Washim district, the climatological description which follows is mainly based on records of two meteorological observatories viz. Akola and Akola (A) in the neighbouring district Akola where similar climatological conditions prevail. Temperatures rise rapidly after February till May which is the hottest month of the year. In May, the mean daily maximum temperature is at about 42°C and the mean daily minimum temperature is at about 27.3°C. The heat in the summer season is intense during the day and the nights are comparatively cooler. During the period April to June, on individual days, the day temperatures rise upto about 48°C. The afternoon heat is sometimes relieved by thundershowers. With the arrival of the southwest monsoon in the district by about the mid-June, there is an appreciable drop in the day temperatures and the weather becomes pleasant. After the withdrawal of the monsoon the day temperatures increase gradually and a secondary maximum in day temperature is observed in October. However, night temperatures decrease progressively after September. Both day and night temperatures decrease rapidly from October till December which is the coldest month in the year. The mean daily maximum temperature during this month is at about 29.4°C and the mean daily minimum temperature is about 12.7°C. In the rear of the western disturbances which move across north India in the winter months, cold waves affect the district at times and night temperatures may go down to about 2 to 4°C.

Humidity

Except during the southwest monsoon season when the humidities are between about 60 and 85%, the air is generally dry over the district. The summer months are the driest, when the relative humidities are even less than 20% in the afternoons on many days.

Cloudiness

The skies are heavily clouded to overcast during the southwest monsoon season. In the latter half of the summer season and the post-monsoon season there is moderate cloudiness particularly in the afternoons. In the rest of the year clear or lightly clouded skies generally prevail.

Winds

Winds are generally light with some strengthening in speed in the latter part of the hot season and in the early part of the monsoon season. The winds are mostly calm or blow from northeast or east during the postmonsoon and early cold weather seasons. By February winds become westerly to northwesterly and continue to be so till June. In the southwest monsoon season, winds from directions between west-southwest and northwest are most common.

Special Weather Phenomena

In association with monsoon depressions which originate in the Bay of Bengal and move westnorthwestwards through the central parts of the country, the district experiences strong winds and widespread heavy rain. Thunderstorms occur in all the months of the year, their frequency being the least during the months of November to January and the highest during the months of June, July and September. Less frequently, storms and depressions of post monsoon months (October and November) also affect the weather over the district. Dust storms occur occasionally in summer months. Fog is noticed occasionally during the post monsoon and winter seasons.

TABLE - I
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Karanjia	29	a	8.4	9.0	7.7	2.7	6.3	146.8	267.9	173.4	130.7	59.3	15.0	7.3	834.5	151	63	300.2	09 Jun 1938
		b	0.7	0.6	0.6	0.3	0.7	7.7	13.8	10.1	7.2	2.8	0.8	0.4	45.7	(1989)	(1987)		
Mangrulpir	48	a	11.3	7.9	8.8	5.9	8.9	150.5	249.0	218.2	161.0	51.3	15.3	5.2	893.3	186	46	210.8	14 Jul 1890
		b	0.9	0.5	0.7	0.6	0.7	7.7	12.7	11.1	7.7	2.4	0.8	0.4	46.2	(1959)	(1965)		
Risod	32	a	6.3	6.5	3.7	2.7	11.7	149.6	236.1	202.3	194.7	45.6	17.5	5.8	882.5	247	51	295.9	26 Jun 1914
		b	0.6	0.5	0.4	0.4	1.0	7.9	11.9	11.8	8.9	2.9	0.9	0.3	47.5	(1989)	(1980)		
Sirpur	28	a	6.8	8.7	11.8	4.8	11.5	151.4	285.0	234.9	158.0	49.0	20.2	10.9	953.0	172	54	200.7	14 Sep 1959
		b	0.8	0.6	0.7	0.6	1.1	8.1	14.1	12.2	8.4	2.8	0.9	0.6	50.9	(1949)	(1960)		
Washim	43	a	8.2	7.1	6.6	3.4	9.0	192.9	283.8	269.5	160.4	53.4	13.9	6.6	1014.8	162	50	355.6	26 Jun 1914
		b	0.7	0.7	0.7	0.4	0.7	8.4	13.6	13.4	7.6	2.9	0.9	0.4	50.4	(1949)	(1971)		
Washim		a	8.2	7.8	7.7	3.9	9.5	158.2	264.4	219.7	161.0	51.7	16.4	7.2	915.7	157	45		
(District)		b	0.7	0.6	0.6	0.5	0.8	8.0	13.2	11.7	8.0	2.8	0.9	0.4	48.2	(1959)	(1965)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(WASHIM)

Range in mm	No. of years	Range in mm	No. of years
401 – 500	1	1001 – 1100	6
501 – 600	2	1100 – 1200	3
601 – 700	4	1201 – 1300	4
701 – 800	11	1301 – 1400	0
801 – 900	9	1401 – 1500	2
901 – 1000	5		

(Data available for 47 years only)

YAVATMAL DISTRICT

The climate of this district, which is similar to neighbouring districts of north Deccan, is characterised by a hot summer and general dryness except during the southwest monsoon season. The cold season from December to February is followed by the hot season from March to May. The period from June to September is the southwest monsoon season and October and November form the post monsoon period.

Rainfall

Records of rainfall in the district are available for 11 stations for the period ranging from 10 to 49 years. The details of the rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The normal annual rainfall in the district is 1012.1 mm. The rainfall generally increases from the northwest towards the southeast. Ner, near the northwestern border of the district gets annually 870.3 mm while Panderkowra near the southeast border gets 1145.7 mm. The rainfall during the southwest monsoon season constitutes about 87% of the annual rainfall, July being the rainiest month. The variation in the rainfall from year to year is not large. During the fifty year period, 1941-1990, the highest annual rainfall over the district amounting to 153% of the normal occurred in 1959. 1972 was the year with the lowest annual rainfall which was only 64% of the normal. In the same fifty year period rainfall less than 80% of the normal occurred in 8 years, two of them being consecutive. It will be seen from Table 2 that the annual rainfall in the district was between 801 and 1300 mm in 37 years out of 50.

On an average there are 52 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 47 days at Ner to 58 days at Panderkowra.

The heaviest rainfall in 24 hours recorded at any station in the district was 339.0 mm at Panderkowra on 14th September 1959.

Temperature

There are two meteorological observatories in the district, one each at Yavatmal and Pusad. The description which follows is mainly based on the records of the observatories in the district. Temperatures rise rapidly after February till May which is the hottest month of the year. In May the mean daily maximum temperature is about 42.1°C and the mean daily minimum temperature is about 27.7°C. The heat in the summer season is intense and on some days in May and June the maximum temperatures may rise upto 47°C. The afternoon heat is sometimes relieved by thundershowers. With the arrival of the southwest monsoon by about the middle of June, there is an appreciable drop in day temperatures and the weather becomes pleasant. After the end of September, when the southwest monsoon withdraws, the day temperatures increase slightly, but the night temperatures decrease progressively. After October both day and night temperatures decrease rapidly. December is usually the coldest month with the mean daily maximum temperature at about 29°C and the mean daily minimum temperature at about 13°C. In association with the western disturbances which move across north India cold waves affect the district and the minimum temperature may occasionally go down upto about 3-4°C.

The highest maximum temperature ever recorded at Yavatmal was 46.6°C on 11th May 1988 and 5th June 1995. The lowest minimum temperature ever recorded was 3.0°C on 30th January 1980. The highest maximum temperature ever recorded at Pusad was 49.9°C on 8th April 1990 and the lowest minimum temperature was 4.2°C on 4th January 1991.

Humidity

Except during the southwest monsoon season when the humidity is high (70-80%) the air is generally dry. The summer months are the driest, with the relative humidity in the afternoons being about 20%.

Cloudiness

During the southwest monsoon season, the skies are heavily clouded or overcast. In summer season and October skies are often moderately clouded in afternoons. In the rest of the year clear or lightly clouded skies prevail.

Winds

Winds are generally light to moderate with some strengthening during the period May to August. In the post-monsoon and cold seasons the winds generally blow from east or northeast. By March westerlies start blowing and in the rest of the summer and southwest monsoon season winds are mostly from directions between west and northwest. During the southwest monsoon season winds are predominantly from westerly direction.

Special Weather Phenomena

In association with depressions which originate in the Bay of Bengal and move westwards during the southwest monsoon season, widespread heavy rain and gusty winds are experienced in the district, when they pass through the neighbourhood of the district. Less frequently storms and depressions during the post monsoon months of October and November also affect the weather over the district. Thunderstorms occur in all the months, their frequency being highest in summer and monsoon months. Squalls occur occasionally in the month of May. Occasional hail and dust storms occur in the summer months. Fog is noticed on few occasions during post monsoon and winter season.

Tables 3, 4, 5, and 3(a), 4(a), 5(a) give the temperature and humidity, mean wind speed and special weather phenomena for Pusad and Yavatmal observatories respectively.

TABLE – 1
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Darwha	44	a	8.5	8.4	7.8	6.8	8.5	159.0	268.0	215.7	156.7	44.3	13.7	4.1	901.5	168	49	236.5	21 Jul 1937
		b	0.8	0.5	0.8	0.9	0.7	7.8	13.6	11.7	8.1	2.7	1.0	0.4	49.0	(1959)	(1987)		
Digras	41	a	3.3	4.6	6.3	4.7	4.0	171.6	276.7	227.6	145.3	57.7	12.5	2.7	917.0	158	49	254.0	26 Jun 1914
		b	0.4	0.3	0.5	0.5	0.4	8.2	14.1	12.3	7.5	3.1	0.6	0.3	48.2	(1955)	(1972)		
Ner	39	a	10.8	10.0	8.3	5.7	11.6	145.2	265.0	191.7	137.3	56.1	15.1	13.5	870.3	168	62	185.2	20 Jul 1982
		b	0.7	0.6	0.7	0.7	1.1	7.6	13.6	10.3	7.3	2.9	0.6	0.8	46.9	(1983)	(1984)		
Panderkowra	33	a	9.6	9.0	14.7	8.8	16.3	180.3	344.8	277.4	206.3	61.5	12.9	4.1	1145.7	144	49	339.0	14 Sep 1959
		b	0.7	0.6	1.4	1.1	1.2	9.8	16.4	13.1	9.3	3.5	0.7	0.2	58.0	(1959)	(1987)		
Pengana Bridge(Hydro)	10	a	22.7	10.9	3.8	6.0	19.3	178.4	351.3	309.0	198.5	62.3	19.7	12.1	1194.0	145	69	118.0	25 Sep 1979
		b	1.6	1.1	0.4	0.8	1.6	9.1	14.9	11.8	7.9	2.3	1.1	0.9	53.5	(1983)	(1984)		
Pusad	26	a	6.1	13.2	7.6	10.4	11.9	156.8	258.6	206.1	160.3	46.6	11.3	6.2	895.1	155	53	193.0	26 Jun 1955
		b	0.5	0.8	0.7	1.1	1.3	8.5	14.0	11.6	8.1	2.6	0.5	0.4	50.1	(1955)	(1941)		
Pusad (Obsy)	29	a	12.2	5.7	11.6	7.0	18.7	170.6	226.3	259.3	132.9	54.9	19.1	16.9	935.2	179	74	245.3	17 Aug 1963
		b	0.9	0.5	0.9	0.8	1.6	8.6	12.5	11.9	7.1	3.1	1.0	0.8	49.7	(1990)	(1971)		
Umerkhed	49	a	7.2	9.1	10.4	7.8	15.4	183.2	286.1	262.4	175.1	57.2	14.8	5.9	1034.6	174	52	216.4	07 Sep 1908
		b	0.6	0.6	0.9	1.0	1.4	9.4	14.1	13.4	8.8	3.3	0.9	0.3	54.7	(1959)	(1984)		
Wani	48	a	9.2	10.2	16.8	10.3	9.5	171.1	328.9	274.1	175.7	60.2	12.1	5.1	1083.2	168	51	276.1	18 Jul 1913
		b	0.7	0.8	1.1	0.9	0.7	8.3	15.2	13.0	8.3	3.0	0.8	0.3	53.1	(1959)	(1987)		

TABLE – 1 (Contd….)
Normals and Extremes of Rainfall

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	HIGHEST	LOWEST	HEAVIEST RAINFALL in 24 HOURS *	
																ANNUAL RAINFALL AS % OF NORMAL & YEARS **		Amount (mm)	Date
Yavatmal	30	a	9.6	12.6	18.7	13.0	14.3	172.5	339.8	247.3	175.5	45.7	10.2	5.1	1064.3	157	60	337.6	21 Jul 1937
		b	1.0	1.0	1.7	1.0	1.2	8.7	16.4	12.0	8.5	3.0	0.6	0.5	55.6	(1955)	(1984)		
Yavatmal	41	a	10.7	6.4	17.1	12.9	20.6	191.1	291.0	283.2	177.3	54.0	15.4	12.4	1092.1	160	63	256.6	12 Jun 1970
(Obsy)		b	0.8	0.7	1.5	1.2	1.5	9.0	14.9	13.4	9.1	3.0	0.7	0.9	56.7	(1959)	(1974)		
Yavatmal		a	10.0	9.1	11.2	8.5	13.6	170.9	294.2	250.3	167.4	54.6	14.3	8.0	1012.1	153	64		
(District)		b	0.8	0.7	1.0	0.9	1.2	8.6	14.5	12.2	8.2	3.0	0.8	0.5	52.4	(1959)	(1972)		

a : Normal rainfall in mm.
b : Average number of rainy days (days with rainfall of 2.5 mm or more)
* : Based on all available data upto 1996.
** : Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(Data 1941 - 1990)
(YAVATMAL)

Range in mm	No. of years	Range in mm	No. of years
601 – 700	4	1101 – 1200	4
701 – 800	4	1201 – 1300	6
801 – 900	12	1301 – 1400	2
901 – 1000	8	1401 – 1500	2
1001 – 1100	7	1501 – 1600	1

(Data available for 50 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(PUSAD)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	30.6	12.7	35.2	1988 Jan 31	4.2	1991 Jan 04	63	36
February	33.6	15.3	40.0	1985 Feb 28	6.8	1977 Feb 01	53	29
March	37.8	19.6	43.7	1986 Mar 30	11.0	1984 Mar 02	43	25
April	41.0	24.6	49.9	1990 Apr 08	15.1	1990 Apr 04	38	23
May	42.5	27.8	47.5	1989 May 17	19.1	1966 May 06	40	24
June	37.7	25.8	47.0	1995 Jun 04	20.0	1985 Jun 22	65	47
July	32.8	23.8	40.4	1966 Jul 12	18.1	1973 Jul 14	78	65
August	31.2	23.4	38.0	1987 Aug 03	20.6	1969 Aug 28	81	70
September	32.5	22.8	39.0	1987 Sep 26	16.6	1972 Sep 26	78	61
October	33.5	19.8	39.0	1986 Oct 17	11.2	1991 Oct 31	69	47
November	31.3	14.8	37.0	1980 Nov 09	5.7	1970 Nov 30	68	41
December	29.7	12.0	39.0	1984 Dec 08	5.0	1983 Dec 28	68	39
Annual	34.5	20.2					62	42

TABLE - 4
Mean Wind Speed in km/hr.
(PUSAD)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
3.5	4.7	5.0	6.1	9.1	11.4	10.0	8.5	6.4	4.3	3.8	3.0	6.3

TABLE - 5
Special Weather Phenomena
(PUSAD)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.2	0.3	0.3	0.2	0.9	0.5	0.3	1.0	0.7	0.1	0.2	4.9
Hail	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Dust storm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Squall	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Fog	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1

TABLE – 3(a)
Normals of Temperature and Relative Humidity
(YAVATMAL)

MONTH	Mean Daily Maximum Temperature	Mean Daily Minimum Temperature	Highest Maximum ever recorded		Lowest Minimum ever recorded		Relative Humidity (%)	
	^{0}C	^{0}C	^{0}C	Date	^{0}C	Date	0830 IST	1730 IST
January	28.8	15.5	33.9	1973 Jan 08	3.0	1980 Jan 30	50	32
February	32.0	17.5	38.8	1969 Feb 18	7.2	1950 Feb 11	41	25
March	36.5	21.6	41.8	1969 Mar 27	9.8	1960 Mar 23	32	19
April	40.2	25.3	45.4	1973 Apr 14	13.5	1992 Apr 26	29	17
May	41.8	27.6	46.6	1988 May 11	18.3	1966 May 06	35	19
June	36.7	24.9	46.6	1995 Jun 05	16.1	1965 Jun 13	66	47
July	31.0	23.1	39.5	1966 Jul 10	18.0	1990 Jul 24	82	69
August	29.3	22.4	35.8	1972 Aug 03	17.8	1991 Aug 16	85	74
September	30.9	22.0	37.2	1987 Sep 26	16.3	1972 Sep 23	78	66
October	31.9	20.4	37.4	1965 Oct 05	13.9	1952 Oct 31	61	47
November	29.8	17.3	34.9	1976 Nov 08	9.5	1988 Nov 30	50	39
December	27.9	15.0	34.0	1960 Dec 24	7.5	1970 Dec 13	50	37
Annual	33.1	21.1					55	41

TABLE – 4(a)
Mean Wind Speed in km/hr.
(YAVATMAL)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
7.7	8.6	9.3	11.1	15.1	18.6	17.2	15.7	10.5	6.5	6.8	6.9	11.2

TABLE – 5(a)
Special Weather Phenomena
(YAVATMAL)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.3	0.8	1.4	1.0	2.1	1.3	1.0	0.8	0.7	0.1	0.3	9.9
Hail	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Dust storm	0.0	0.0	0.1	0.5	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Squall	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Fog	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	1.4