भारत सरकार
GOVERNMENT OF INDIA
पृथ्वी विज्ञान मंत्रालय
MINISTRY OF EARTH SCIENCES
भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

बिहार की जलवायु

CLIMATE OF BIHAR

CLIMATOLOGICAL SUMMARIES OF STATES SERIES - No. 18

ISSUED BY

OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL
OF METEOROLOGY (RESEARCH)
INDIA METEOROLOGICAL DEPARTMENT
PUNE - 411 005

भारत सरकार
GOVERNMENT OF INDIA
भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

CLIMATE OF BIHAR

ISSUED BY

OFFICE OF THE
ADDITIONAL DIRECTOR GENERAL
OF METEOROLOGY (RESEARCH)
INDIA METEOROLOGICAL DEPARTMENT
PUNE - 411 005

Additional Director General of Meteorology (Research)
India Meteorological Department
Shivajinagar, Pune 411 005
India
Tel : 020-25535211
email : rcps@imdpune.gov.in

PRICE
Publication with CD
* Inland - Rs. 1400 /-
* Foreign - U.K. £ 43 or US $ 66

PRICE
Publication without CD
* Inland - Rs. 900/-
* Foreign - U.K. £ 27 or US $ 42

PRICE
Publication on CD
* Inland - Rs. 500/-
* Foreign - U.K. £ 15 or US $ 24

Designed & CD authored
at the Climatological Publication Section
and Printed at
Meteorological Office Press
Office of the Addl. Director General of
Meteorology (Research), Pune

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, power and energy, tourism, shipping, transport, industry etc., require climatological information pertaining to different regions of the country, for planning and executing the different 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 a series of "Climatological Summaries" for each state in the country, incorporating the district climatological summaries. The eighteenth issue in the series of 'State Climatological Summaries' is "Climate of Bihar".

The present publication contains an extensive information on rainfall in Bihar state and in all districts of the state based on the available rainfall data for the period 1951-2000. The climatological data in respect of temperature, wind, clouds and other weather parameters for the period from 1961-1990 and information on droughts, excessive rainfall, depressions and cyclonic storms are also included in the publication.

The contribution for preparation of climatological summary and related maps have been made by Shri G.S. Dhekne, Shri S.M. Deshpande, Smt. U.S. Satpute, Smt. P.R. Iyer, Shri. R.S. Wayal, Smt. P.P. Bhagwat and Shri A.B. Dhule from "Climatological Publications Section" of the Office of the Additional Director General of Meteorology (Research), India Meteorological Department, Pune. The contributions of Shri K.K. Raina and Shri Philipose Abraham have been very vital.

The publication has been prepared by Dr. T.P. Singh, Director and reviewed by Dr. A.L. Koppar, DDGM(C). Dr.A.B. Mazumdar, LACD-ADGM(R) provided the overall guidance for this publication. I appreciate their sincere efforts.

NEW DELHI
November, 2011

AJIT TYAGI
DIRECTOR GENERAL OF METEOROLOGY

INDIA METEOROLOGICAL DEPARTMENT
DOCUMENT AND DATA CONTROL SHEET

1	Document title	Climate of Bihar
2	Document type	Scientific Publication
3	Issue No.	Climatological Summaries of States Series - No. 18
4	Issue date	November 2011
5	Security Classification	Unclassified
6	Control Status	Uncontrolled
7	No. of Pages	300 (approx.)
8	No. of Figures	27
9	No. of references	Nil
10	Distribution	Unrestricted
11	Language	English
12	Authors	Climatological Publication Section, Office of Additional Director General of Meteorology (Research), Pune.
13	Originating Division/Group	Climatological Publication Section
14	Reviewing and Approving Authority	Director General of Meteorology, India Meteorological Department, New Delhi.
15	End users	State Gazetteers Unit, Central and State Ministries of Agriculture, Science & Technology, Education, Irrigation and Power, Disaster Management Agencies, Research Institutes and Agricultural Universities.
17	Abstract	The publication contains extensive information on the climate of Bihar and its districts based on rainfall, temperature, winds, clouds and other weather parameters. The information on droughts, excessive rainfall, depressions and cyclonic storms are also included in the publication.
18	Key words	State Summary, District Summary, Physical Features, Climatic Classification, Heaviest Rainfall, Highest Maximum Temperature, Lowest Minimum Temperature, Rainfall Variability, Seasonal Rainfall, Annual Rainfall, Mean Maximum Temperature, Mean Minimum Temperature.

INTRODUCTION

The climatology of the state of Bihar in terms of various meteorological parameters is described in the first chapter. It is followed by a detailed description of the climate of each district in the succeeding chapters. In this publication, the districts of Bihar state which were in existence as on 1st January 2010, have been considered and the climatology of these districts, arranged in alphabetical order is presented.

The normals of meteorological parameters used for describing the climate are generally based on data for the period 1961 to 1990, except in the case of rainfall. The normals of rainfall are based on the data for the period 1951 to 2000. The extreme values of temperature and rainfall presented in the publication are based on the updated data upto the year 2010 and 2006 respectively. These data are obtained from National Data Centre, Pune.

TABLE OF CONTENTS

Page No.

District Climatological Summaries:

LIST OF ILLUSTRATIONS

FIG: 1 :PHYSICAL FEATURES OF BIHAR STATE

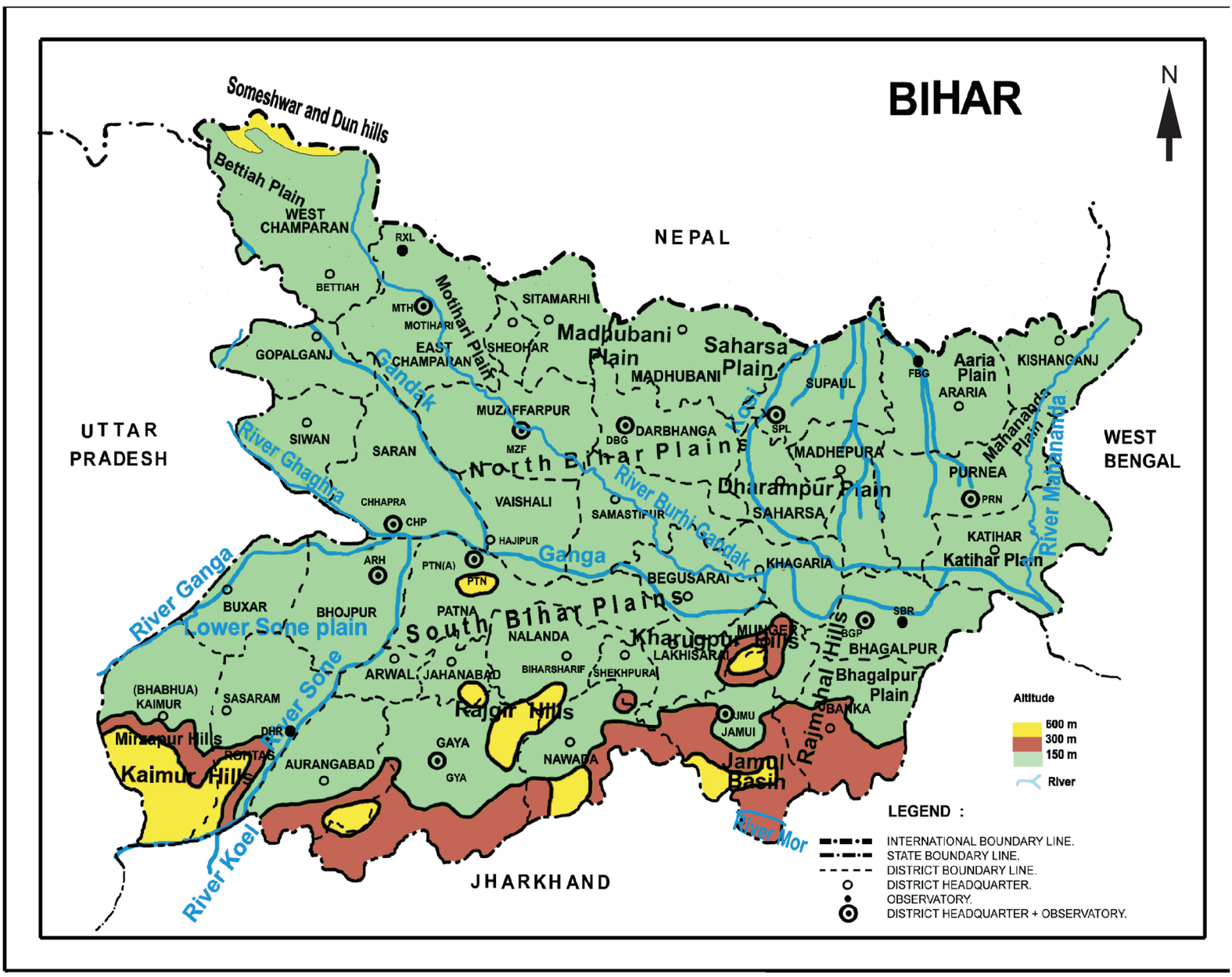


FIG:1(a) : INSET

FIG: 2 : CLIMATIC CLASSIFICATION

FIG: 2(a) : MEAN MAXIMUM TEMPERATURE (°C) - MAY

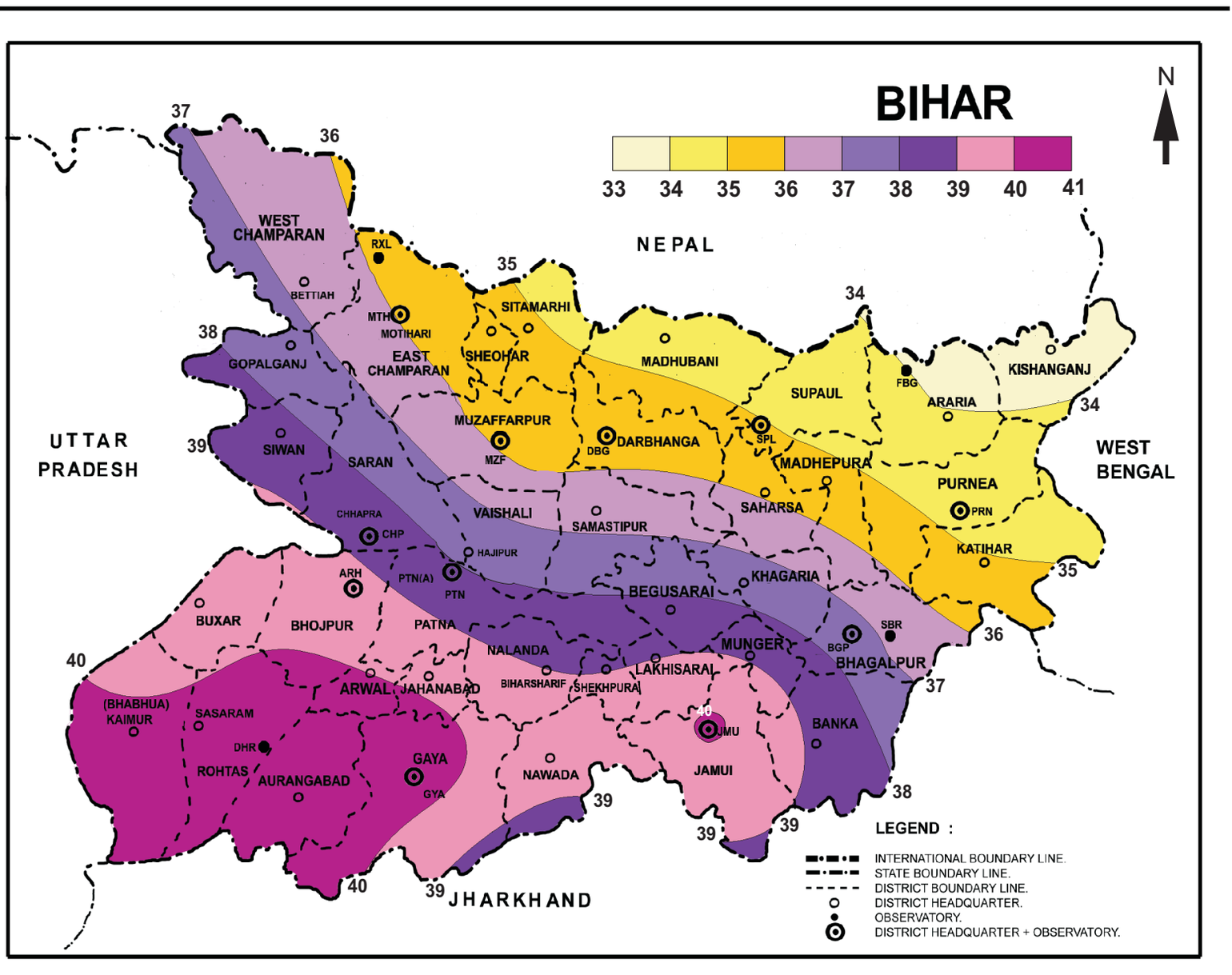


FIG:2(b) :MEAN MAXIMUM TEMPERATURE (°C) -JULY

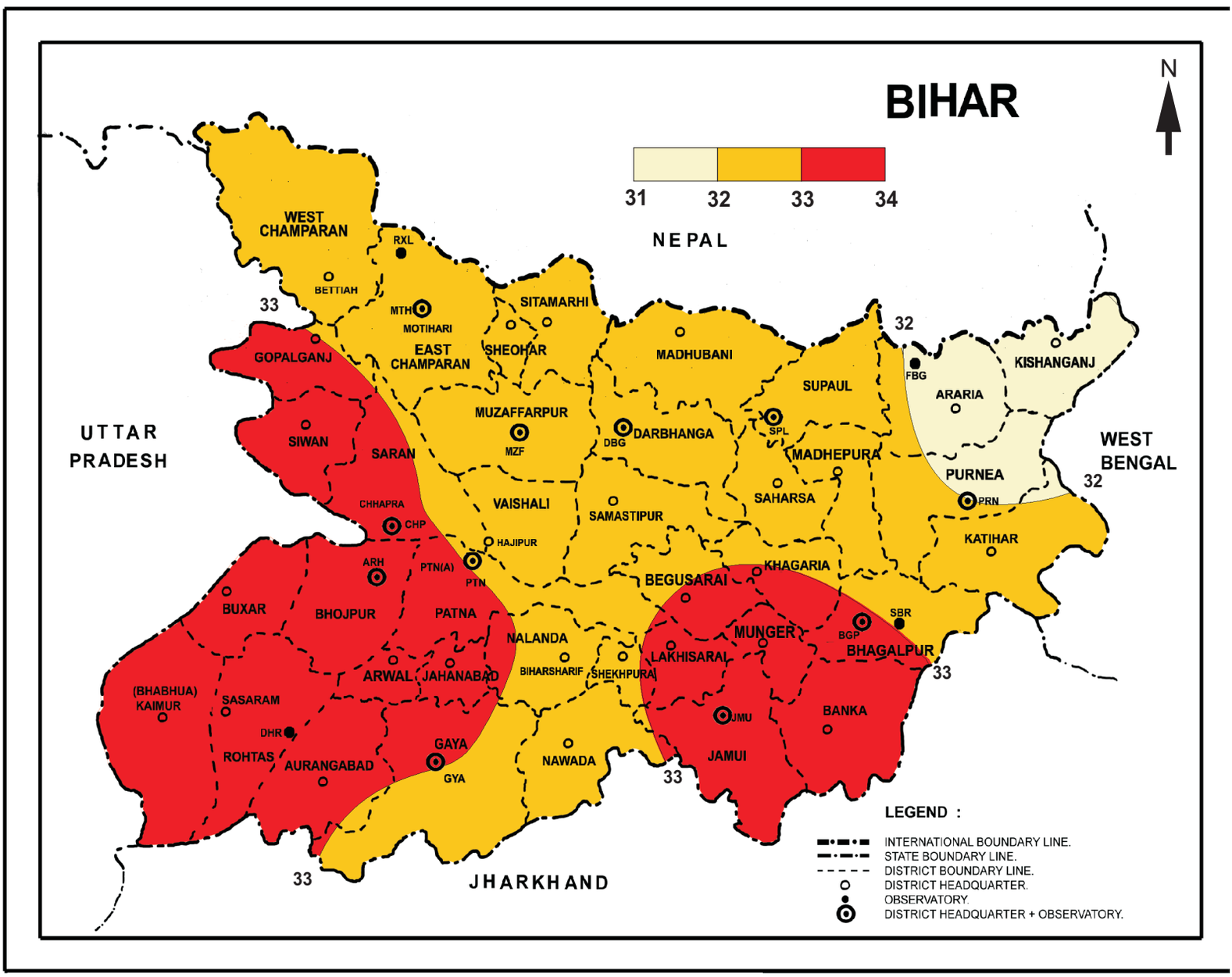


FIG: 2(C) :MEAN MAXIMUM TEMPERATURE (°C) -OCTOBER

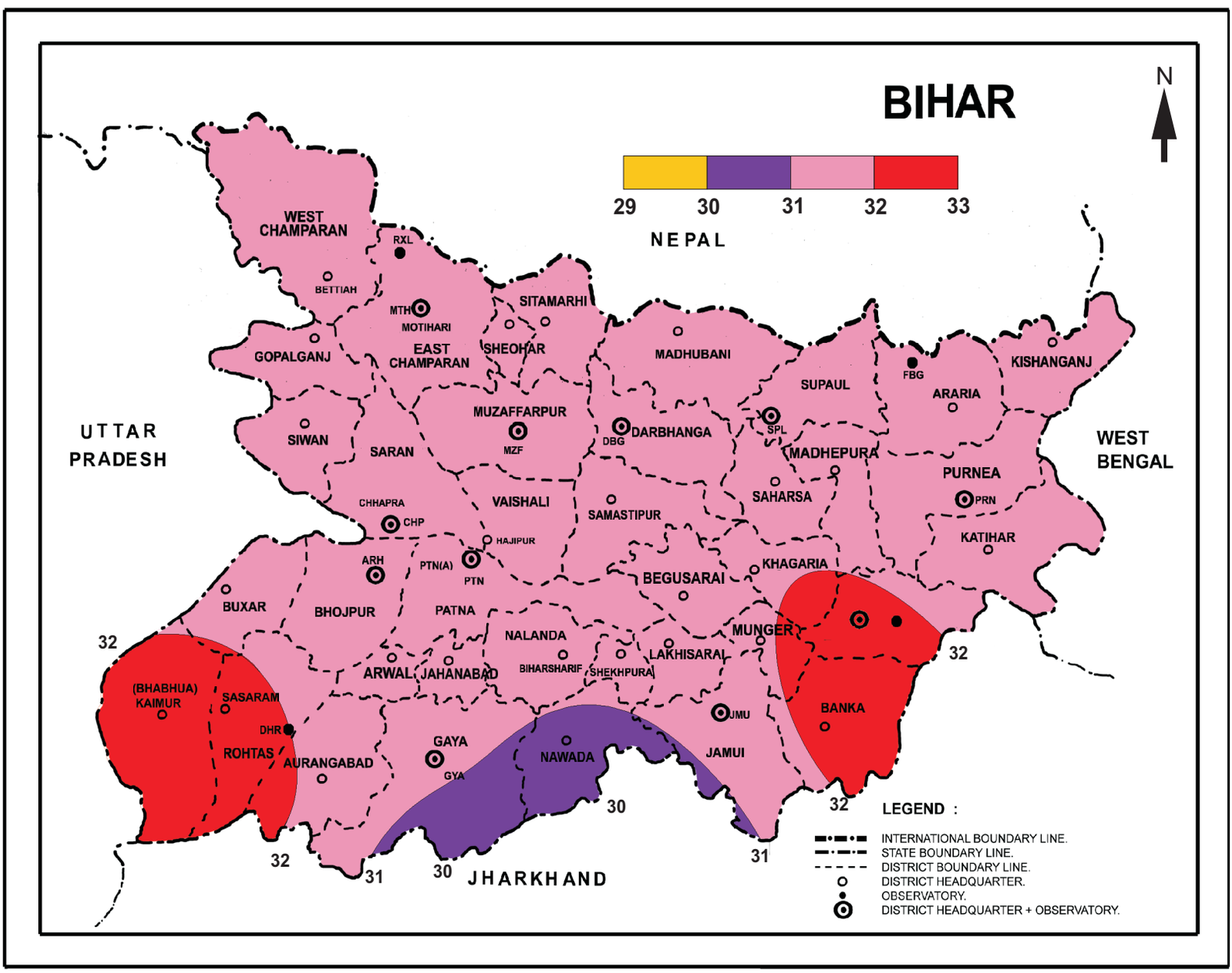


FIG. 2(d) : MEAN MAXIMUM TEMPERATURE (°C) - JANUARY

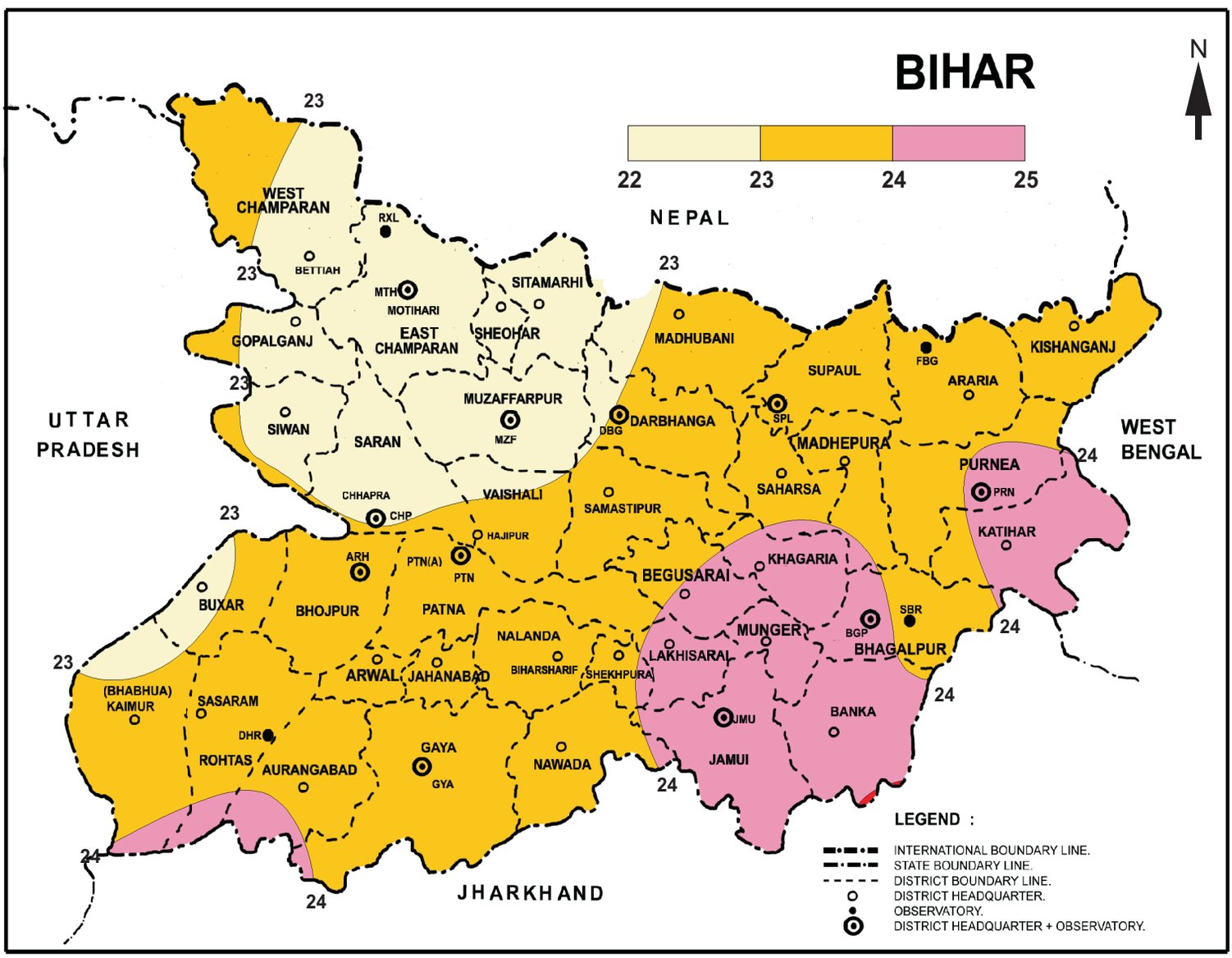


FIG. 3(a) : MEAN MINIMUM TEMPERATURE (°C) - JANUARY

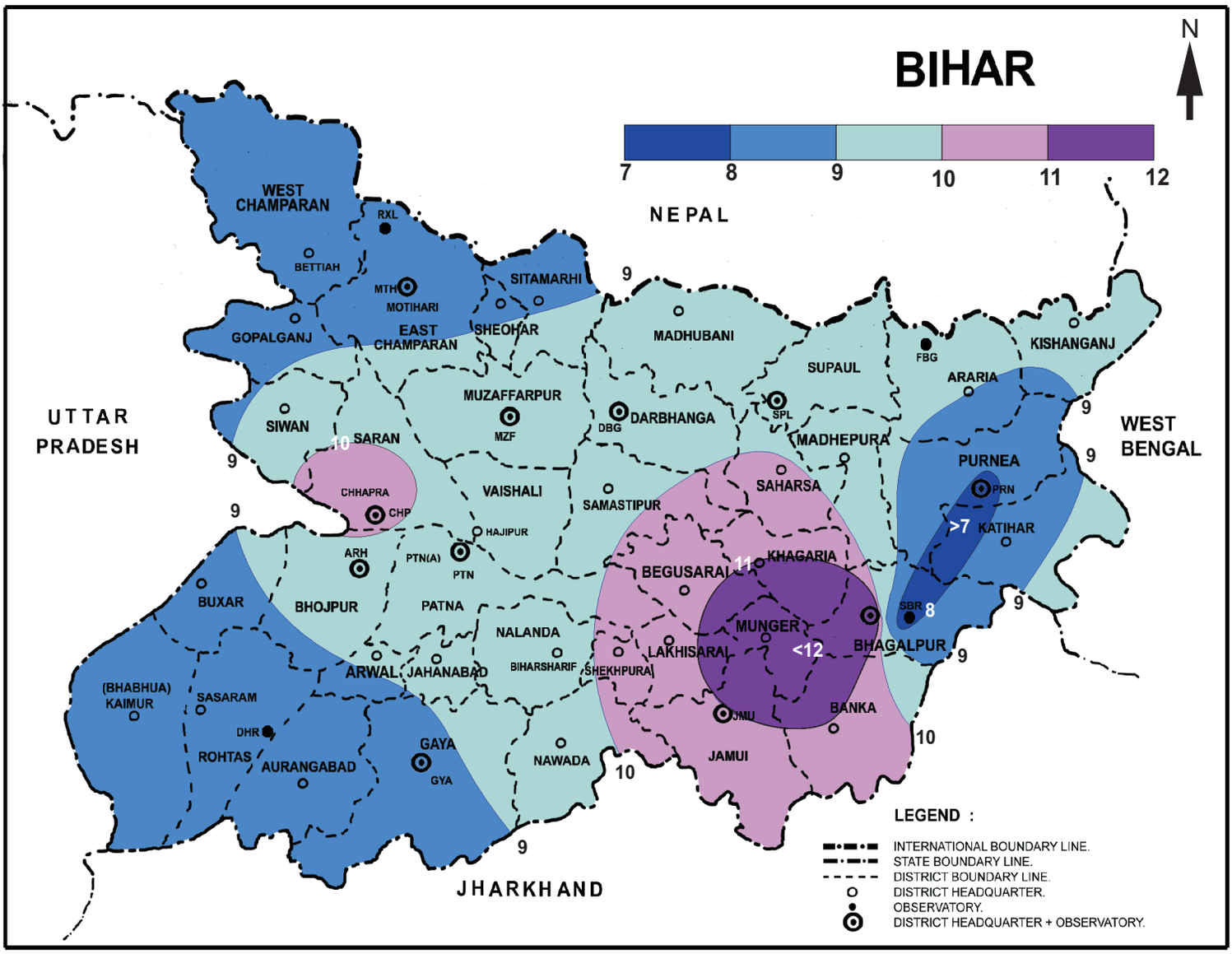


FIG: 3(b) :MEAN MINIMUM TEMPERATURE (°C) - APRIL

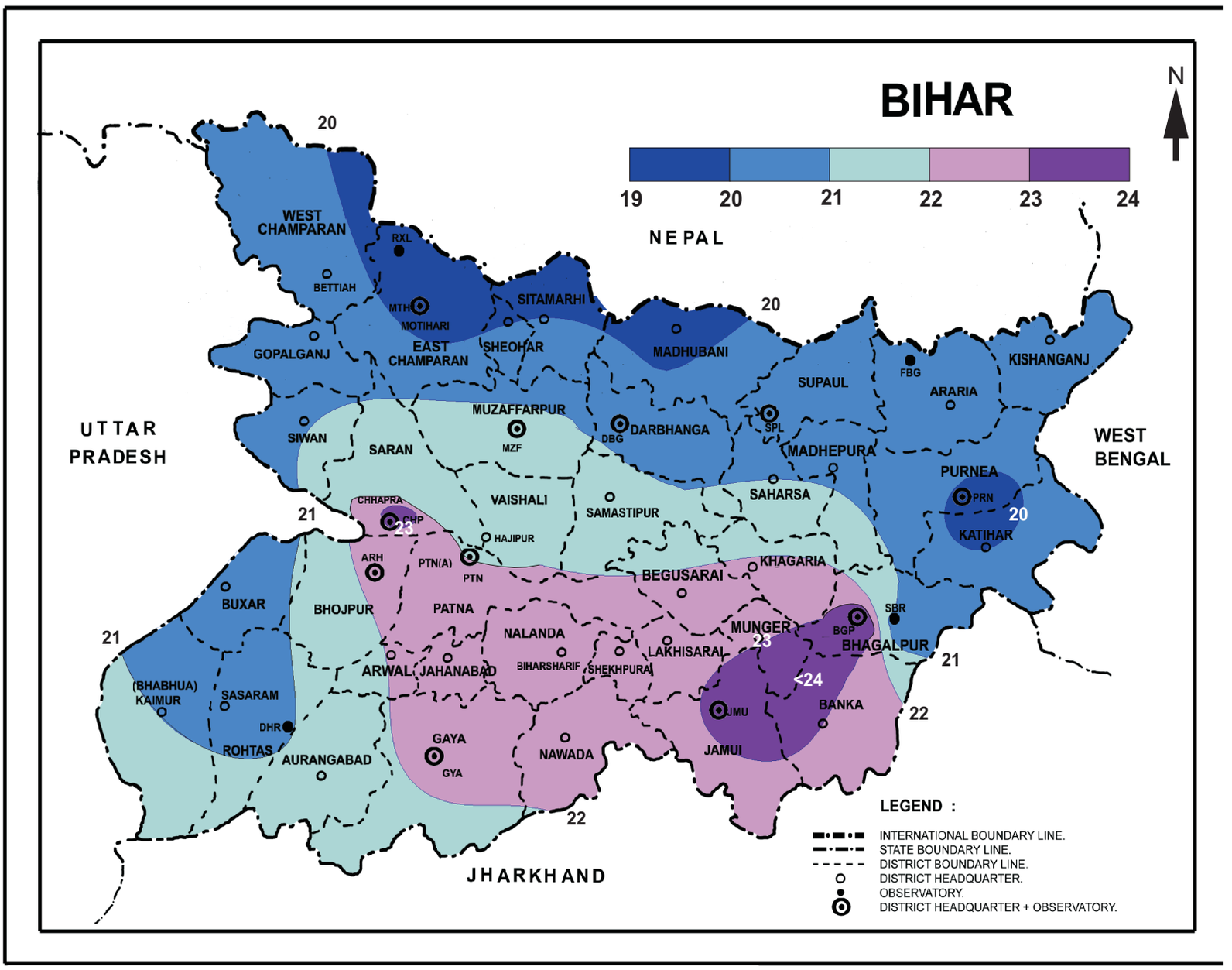


FIG: 3(c) : MEAN MINIMUM TEMPERATURE (°C) - JULY

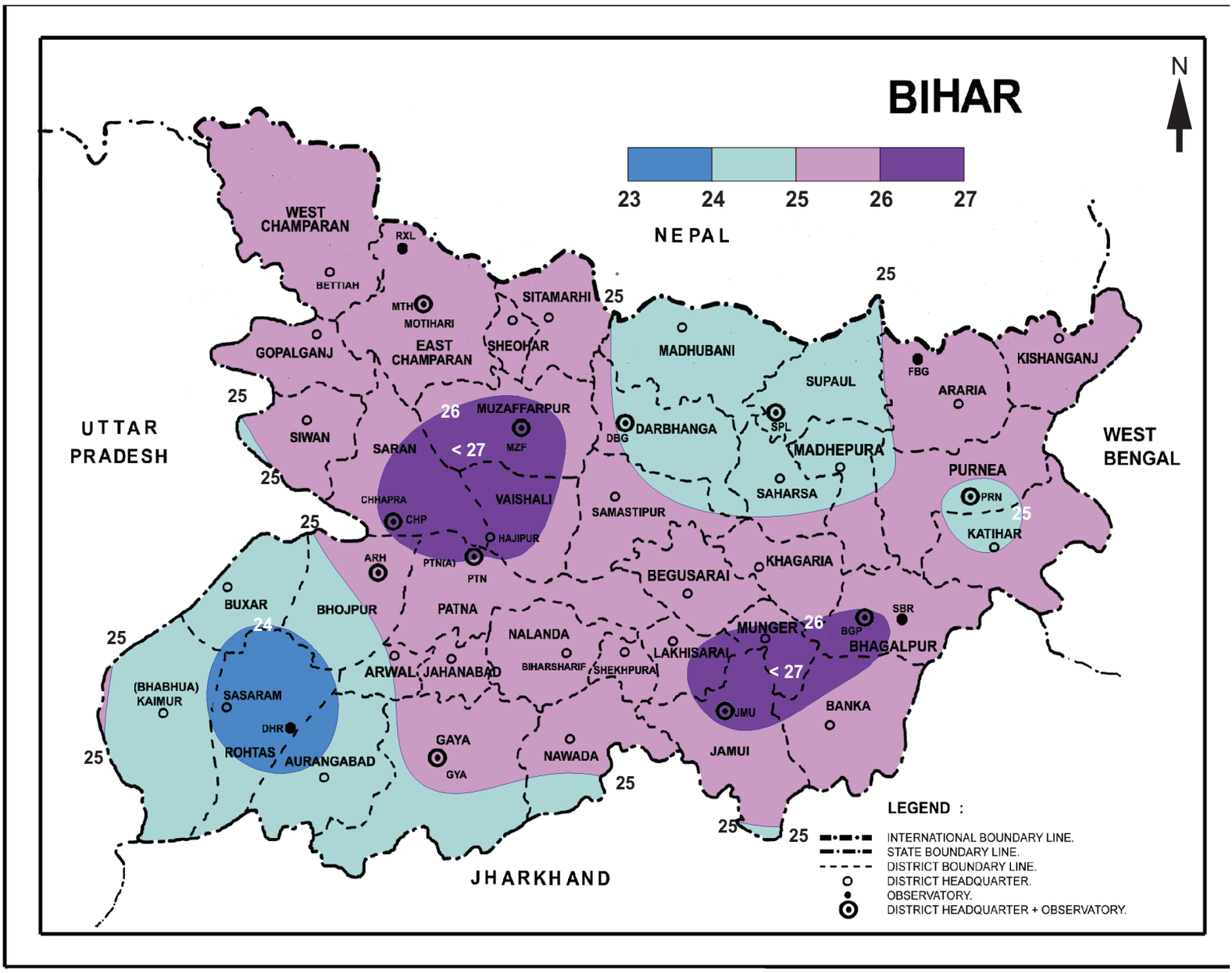


FIG: 3(d) : MEAN MINIMUM TEMPERATURE (°C) - OCTOBER

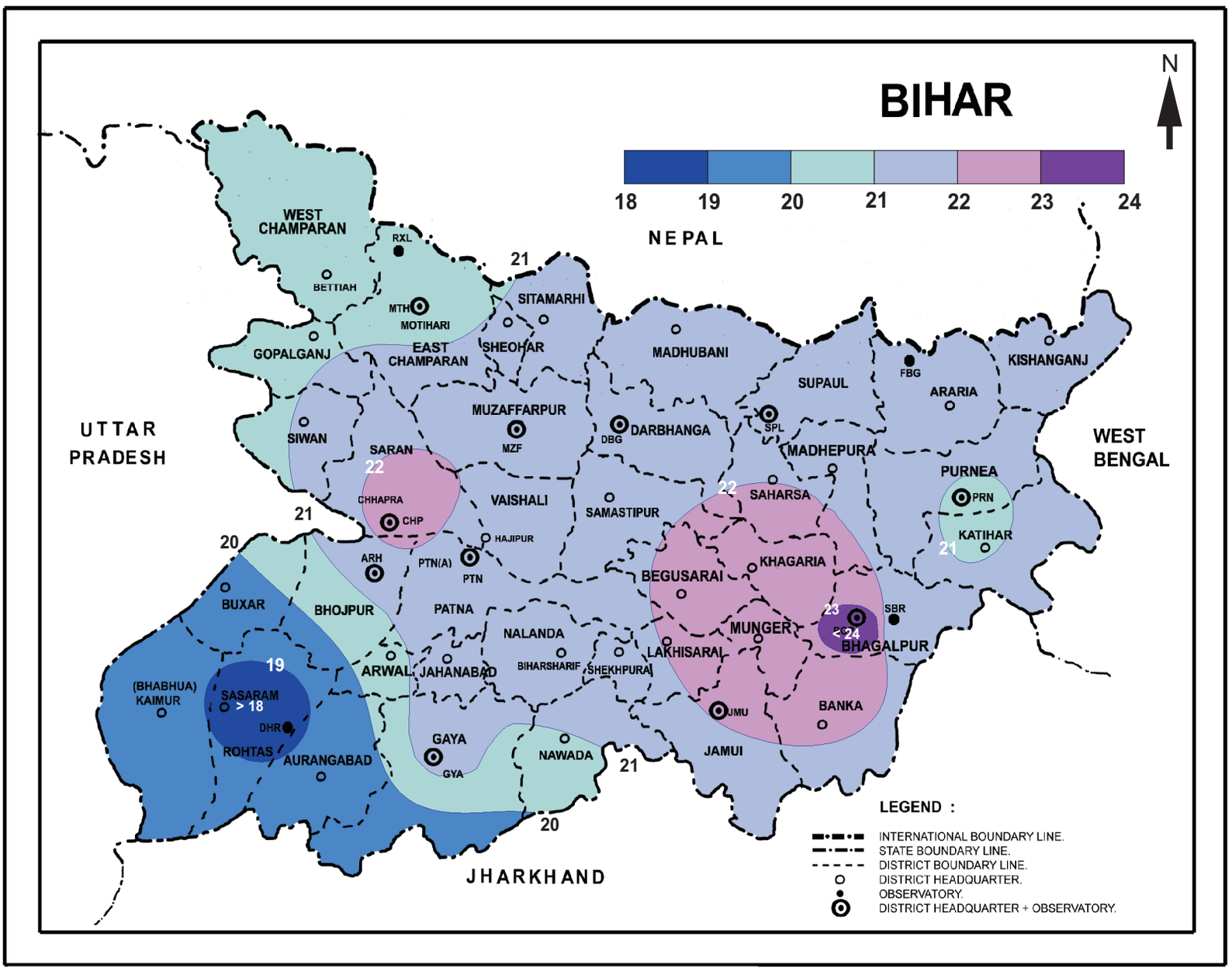


FIG: 4 : HIGHEST MAXIMUM TEMPERATURE (°C) EVER RECORDED

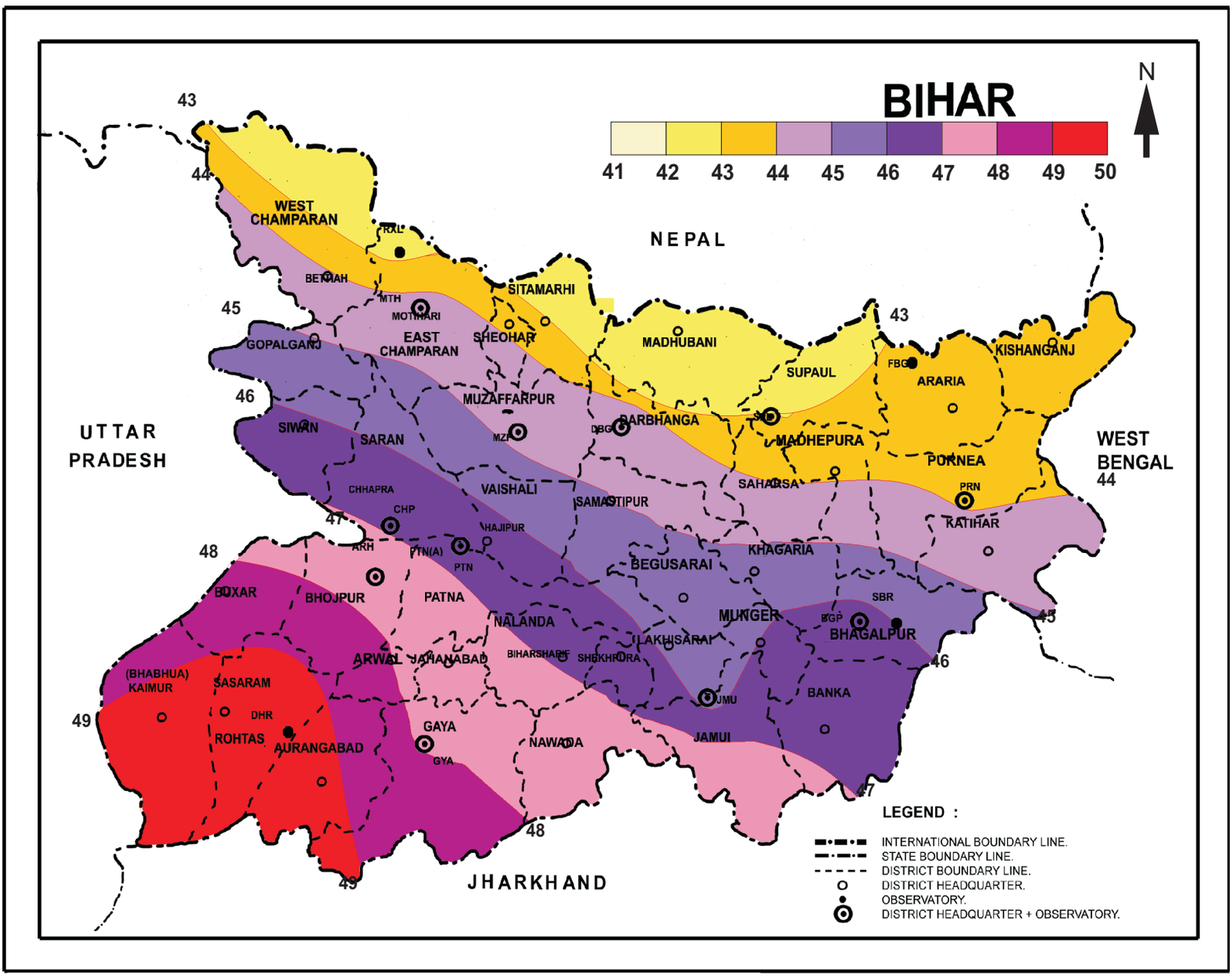


FIG: 5 :LOWEST MINIMUM TEMPERATURE (°C) EVER RECORDED

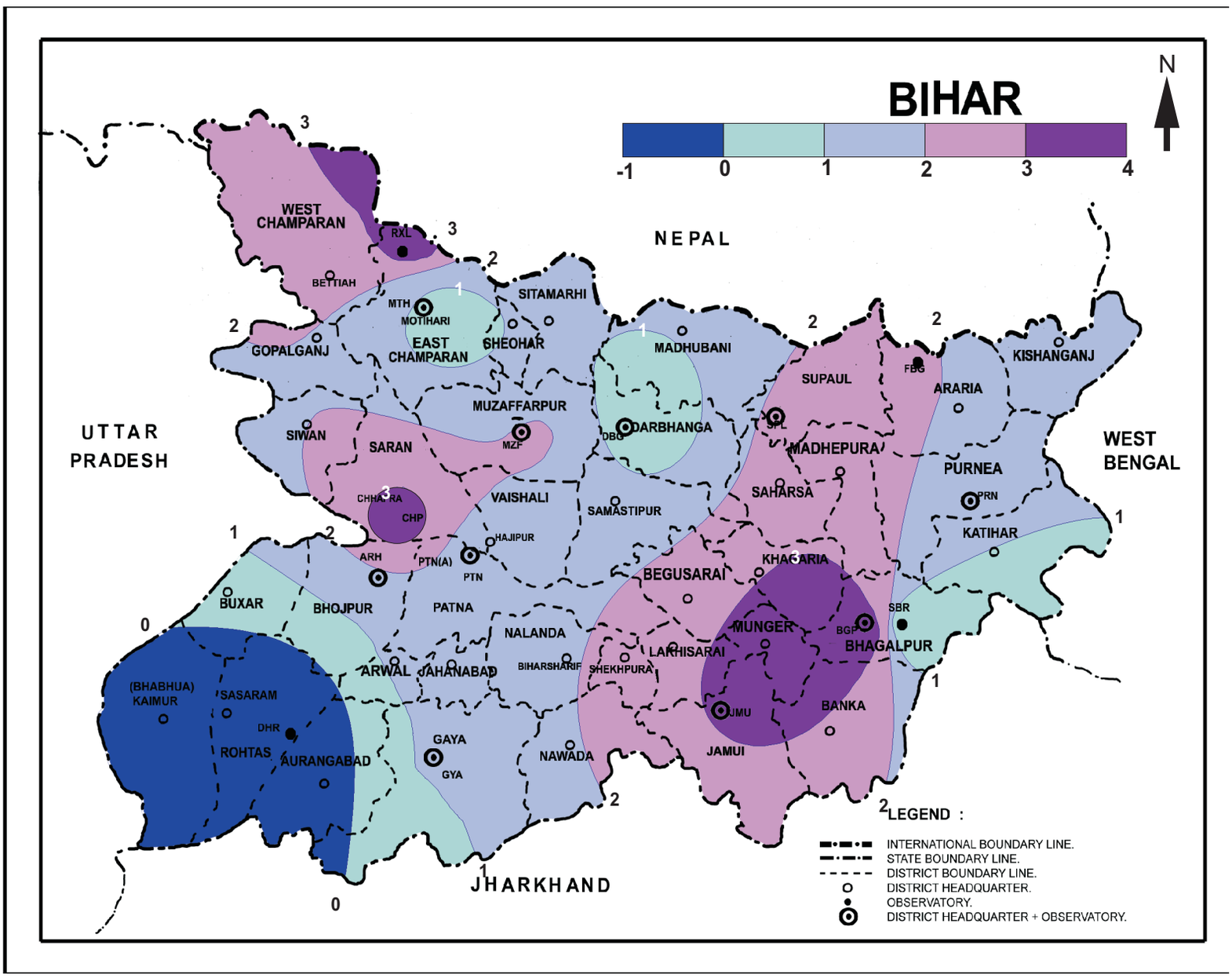


FIG: 6 : ANNUAL NORMAL RAINFALL (cm)

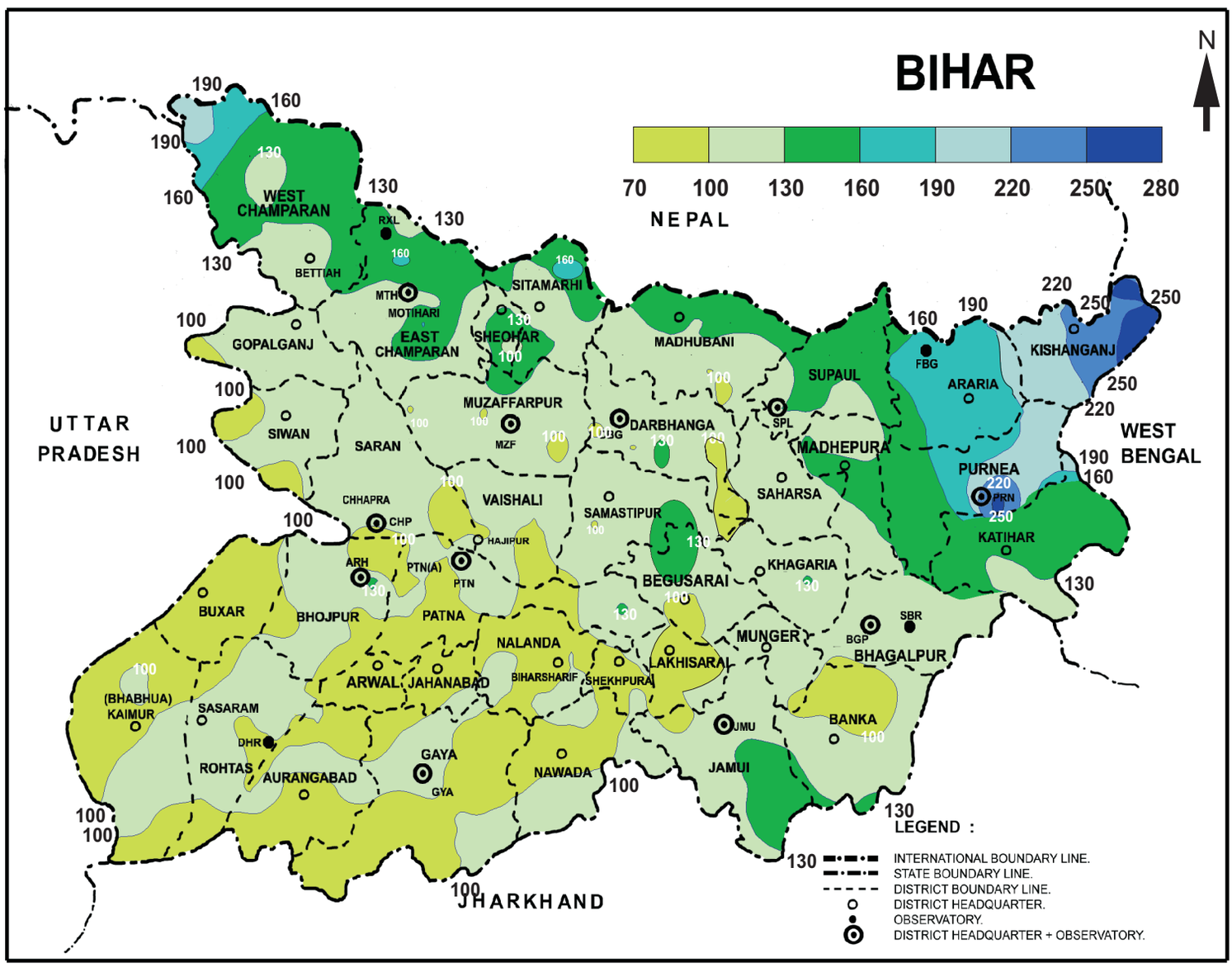


FIG: 6(a) : SEASONAL RAINFALL (cm) - COLD WEATHER SEASON - DEC-JAN-FEB

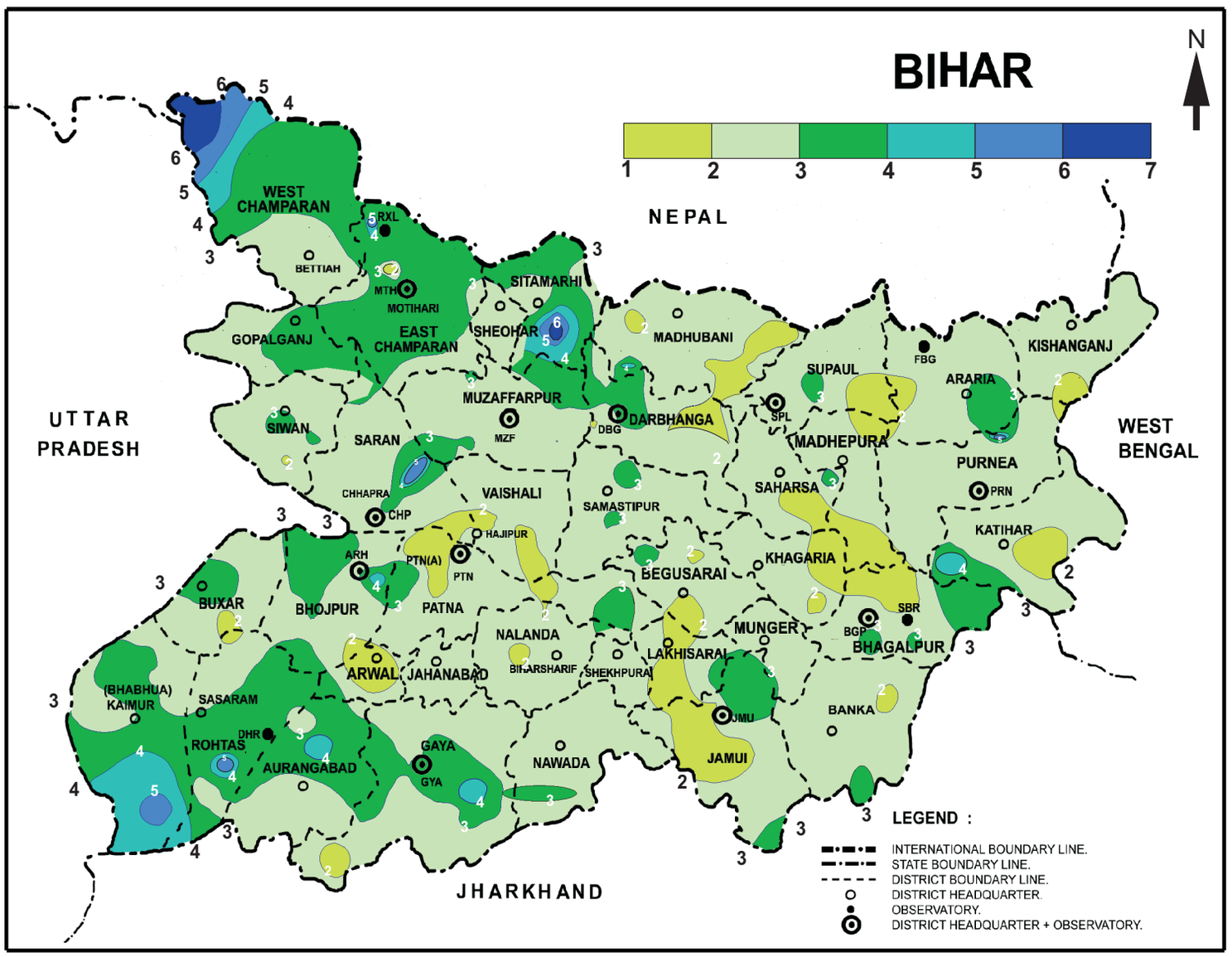


FIG: 6(b) : SEASONAL RAINFALL (cm)- PRE-MONSOON (HOT WEATHER) SEASON-MARCH-MAY

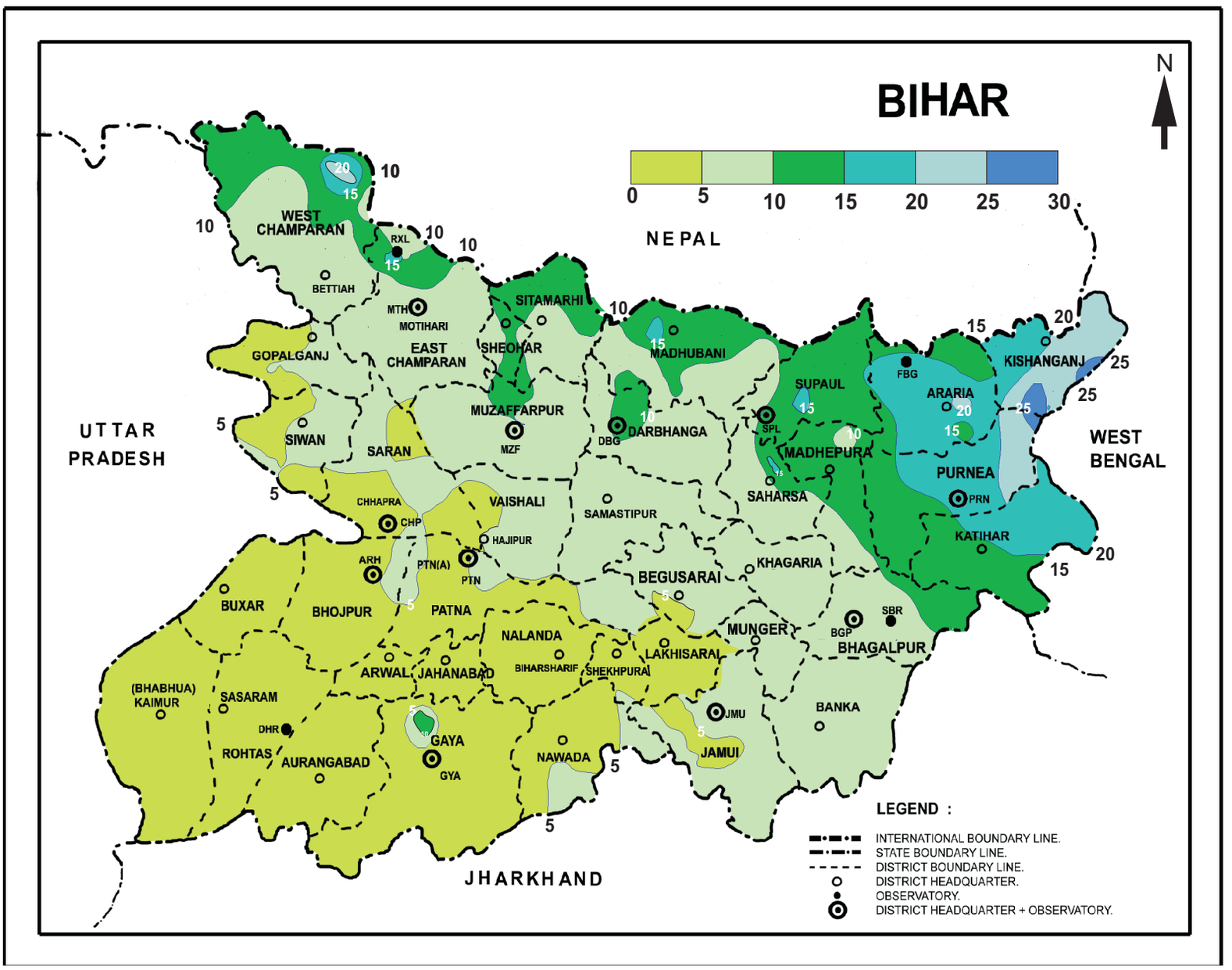


FIG: 6(c) : SEASONAL RAINFALL (cm) - MONSOON SEASON - JUNE - SEPTEMBER

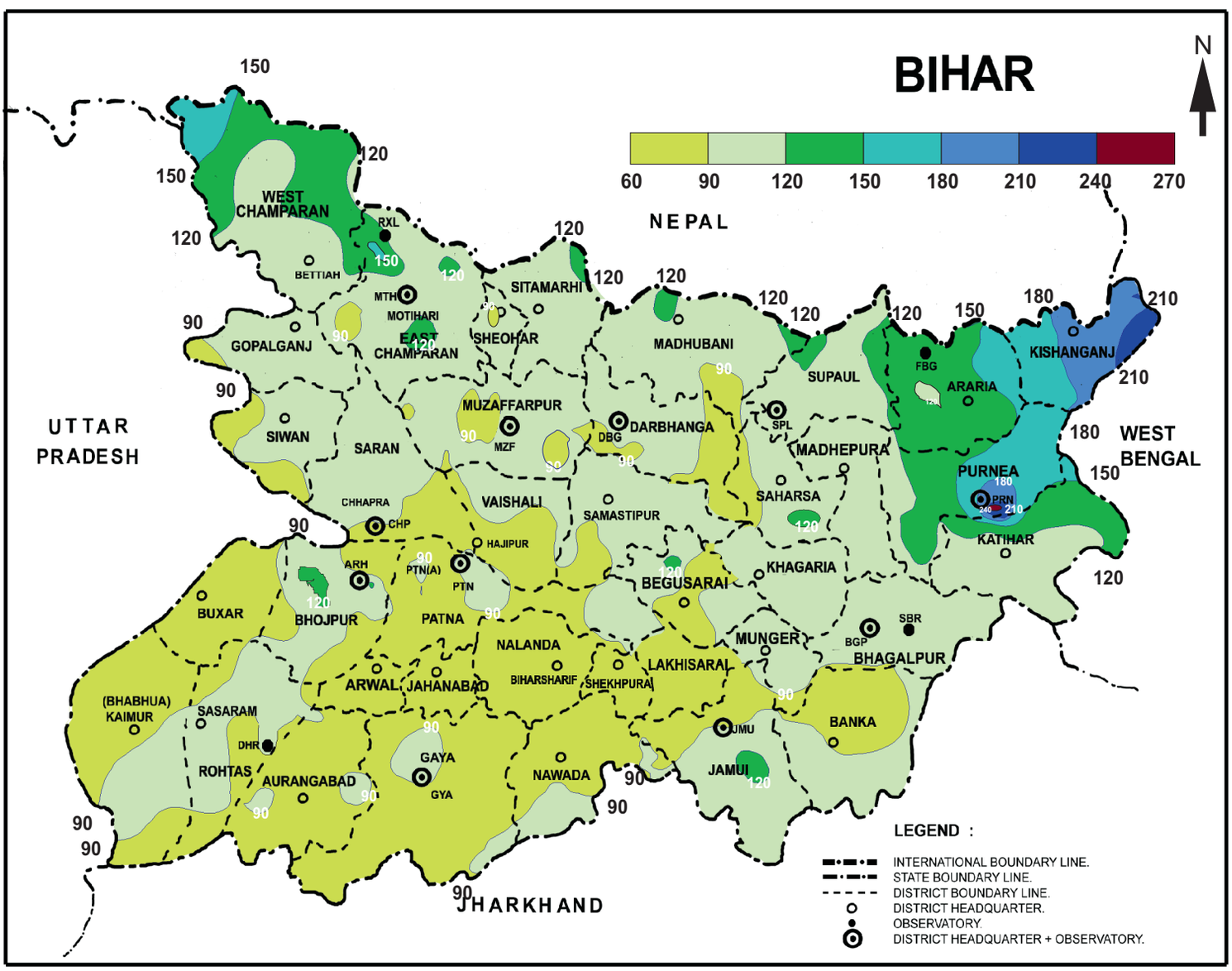


FIG: 6(d) : SEASONAL RAINFALL (cm) - POSTMONSOON SEASON - OCTOBER-NOVEMBER

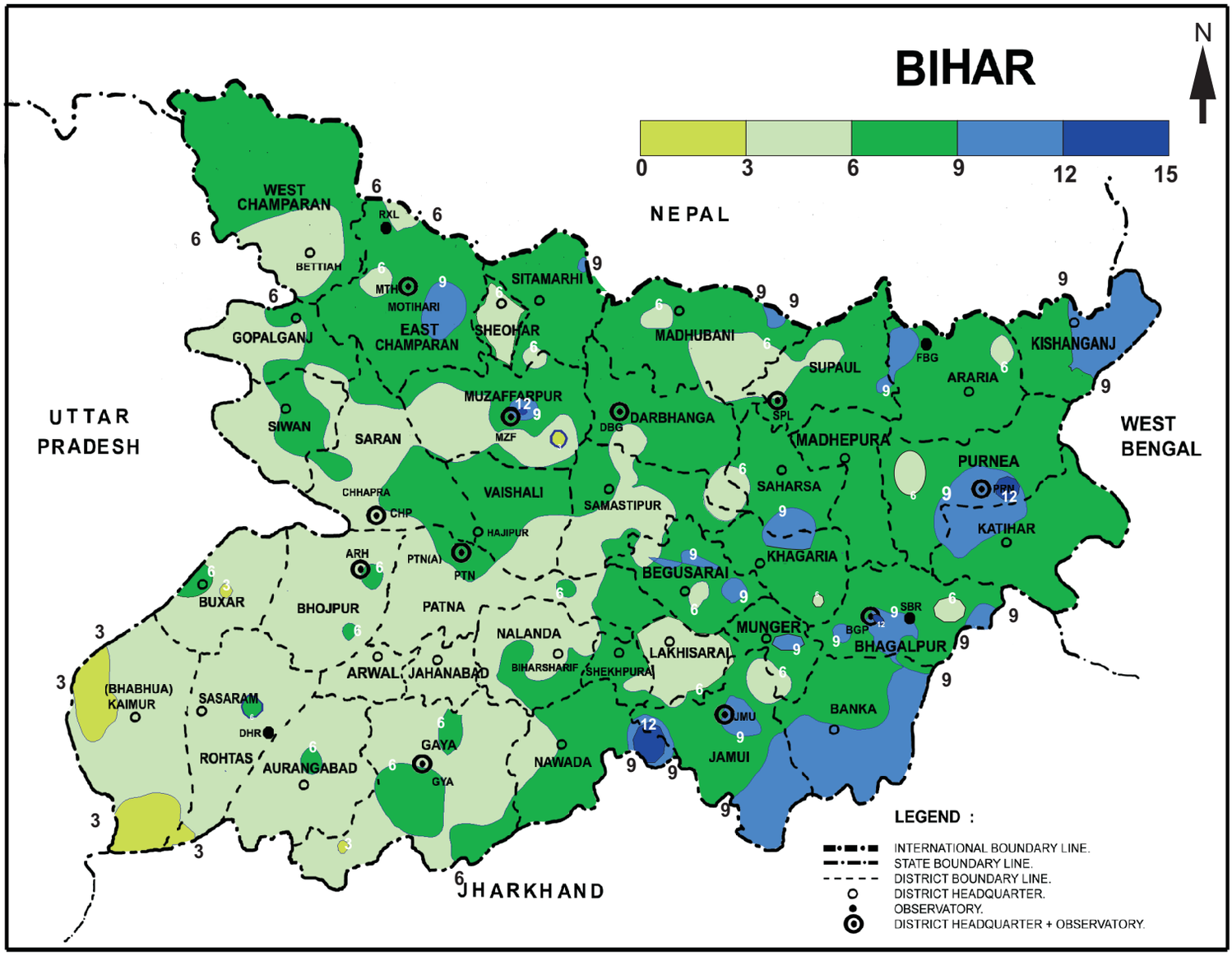


FIG: 7 : DISTRICT NORMALS OF SEASONAL AND ANNUAL RAINFALL (mm) (1951-2000)
BIHAR

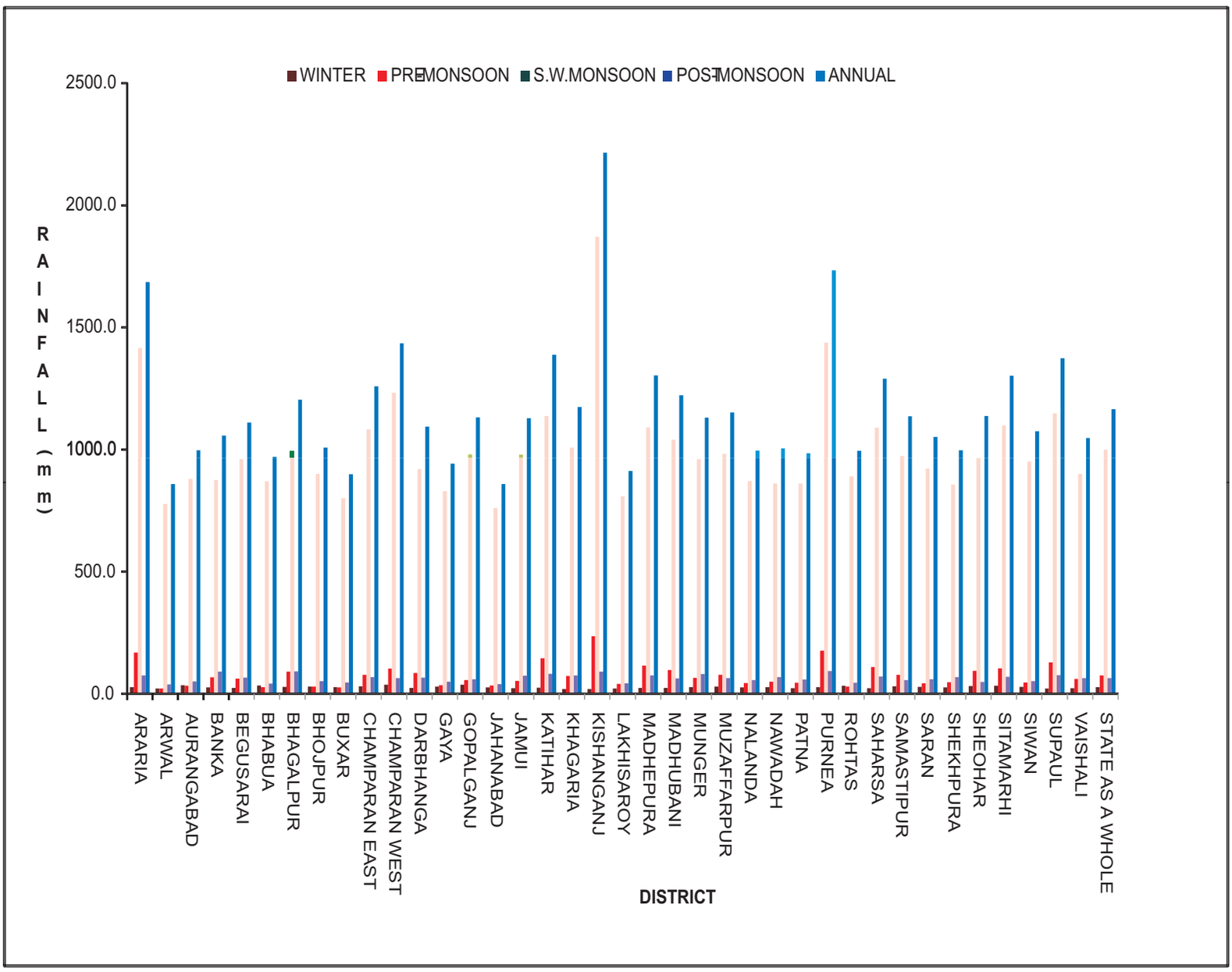


FIG: 8 : CATCHMENT AREAS WITH ANNUAL RAINFALL (mm)
(321,322,324,325,414,415,418)

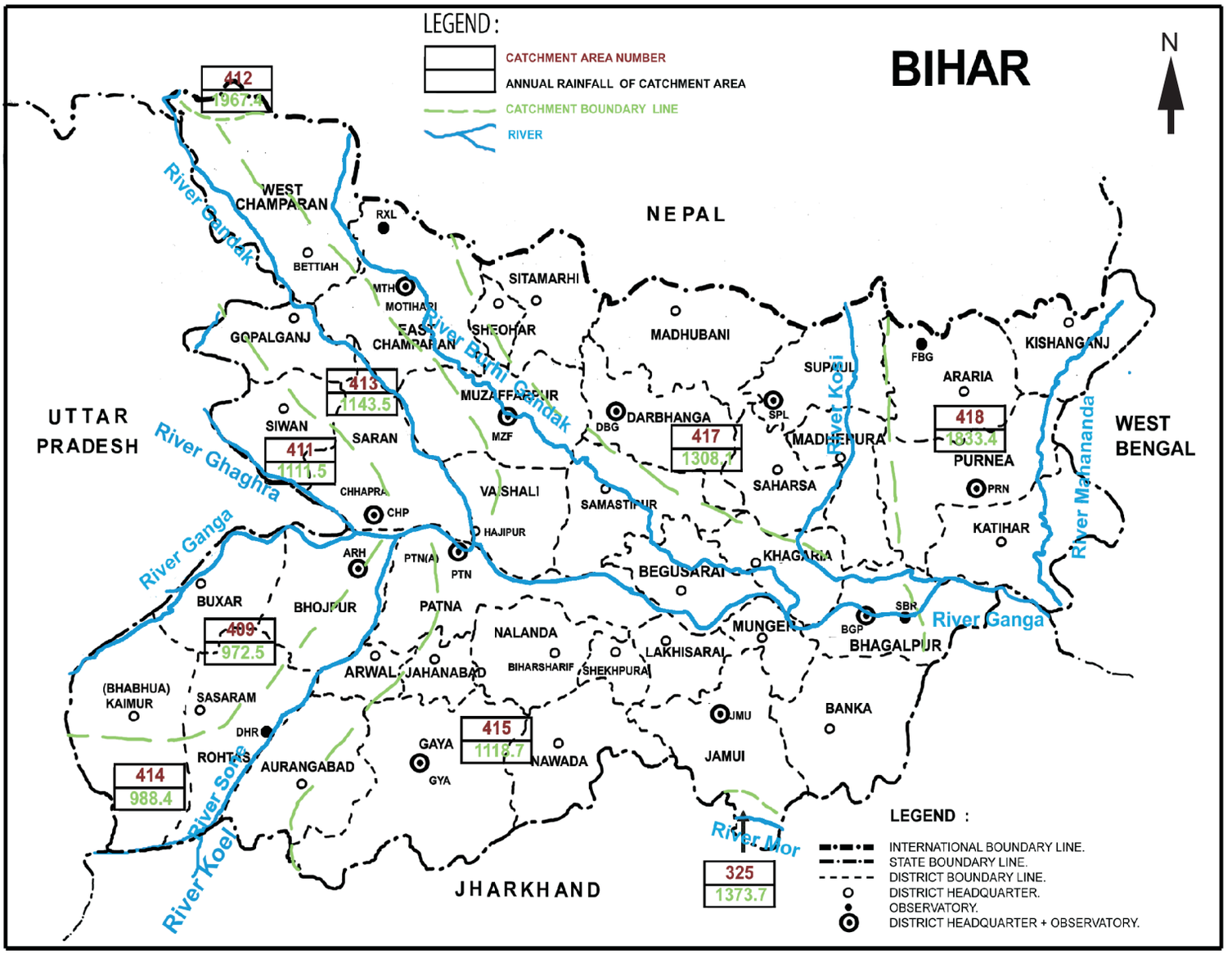


FIG: 9 :COEFFICIENT OF RAINFALL VARIATION - ANNUAL

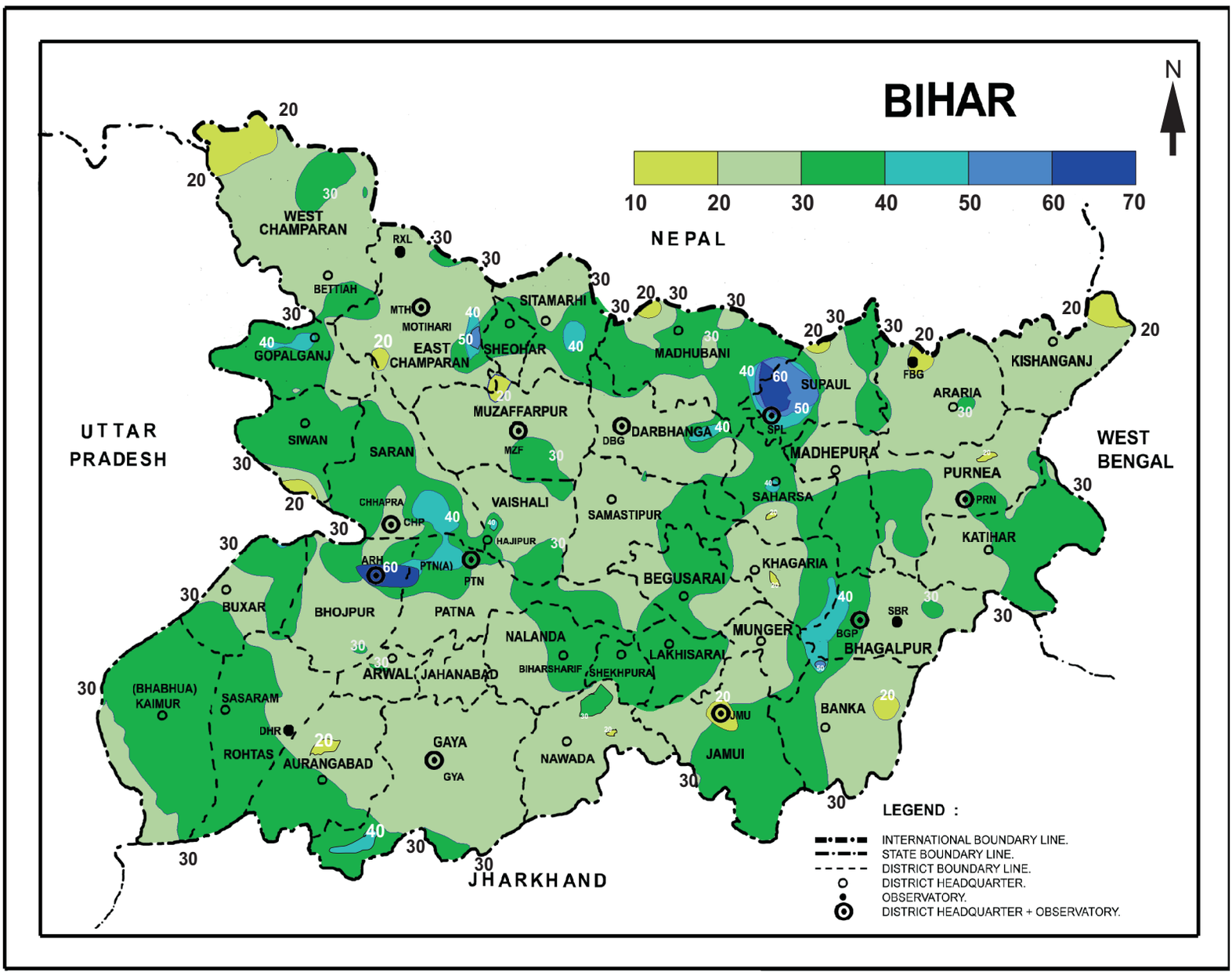


FIG.9(a) : COEFFICIENT VARIATION OF RAINFALL PRE-MONSOON SEASON (MARCH-MAY)

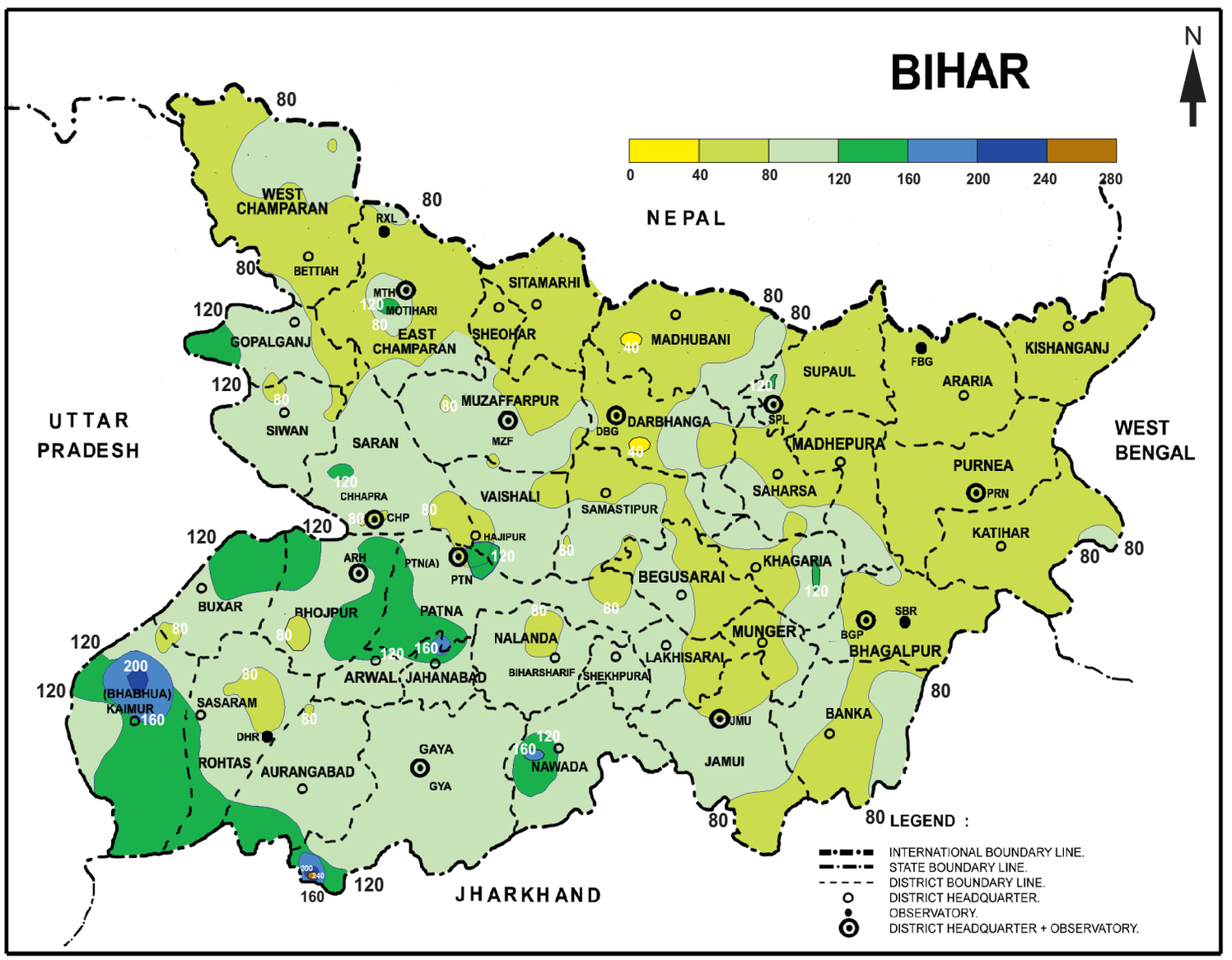


FIG :9(b) :COEFFICIENT OF RAINFLL VARIATION - SOUTH WEST MONSOON SEASON (JUNE-SEPTEMBER)

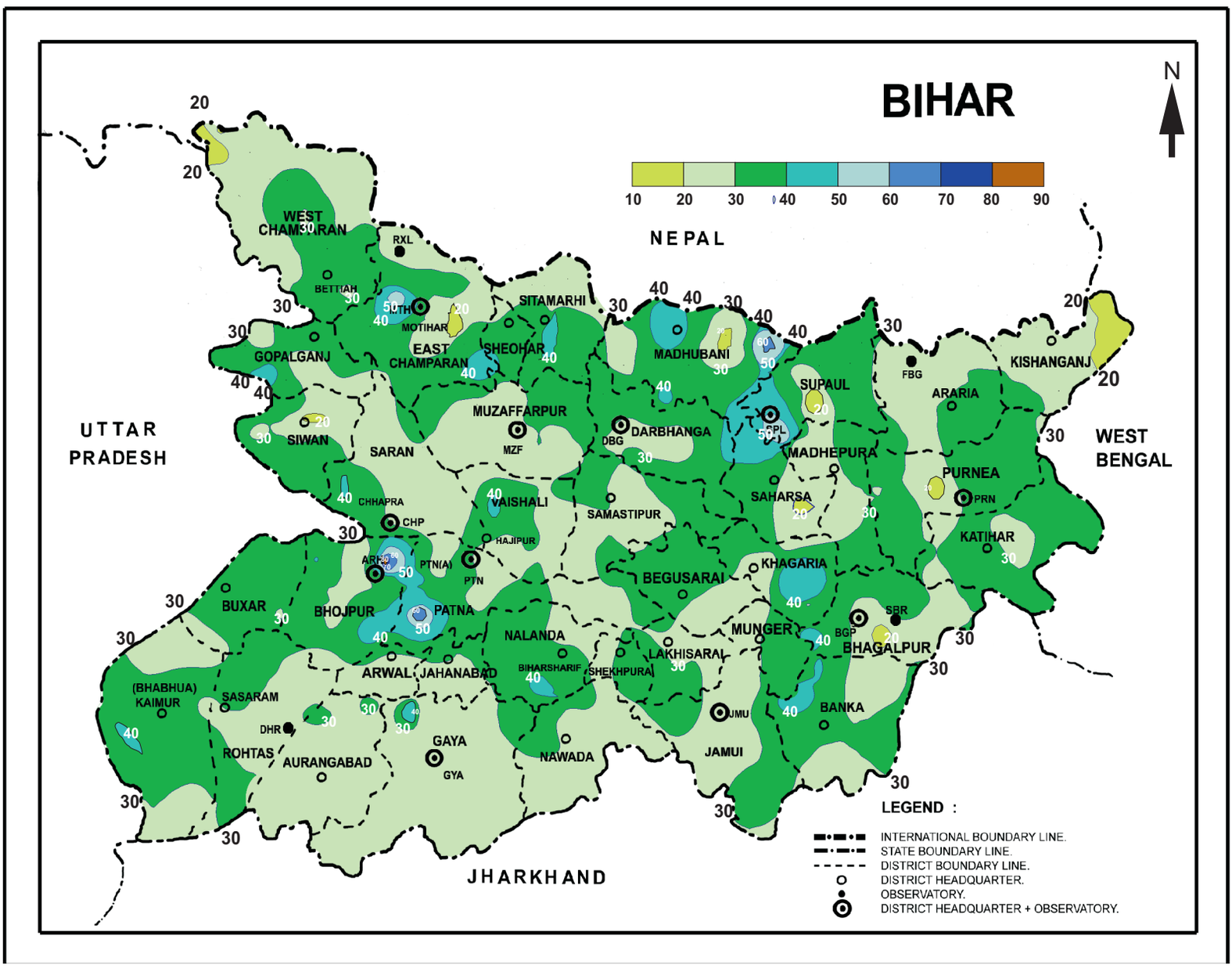


FIG : 9(c) :COEFFICIENT OF RAINFALL VARIATION - POST-MONSOON SEASON (OCTOBER-NOVEMBER)

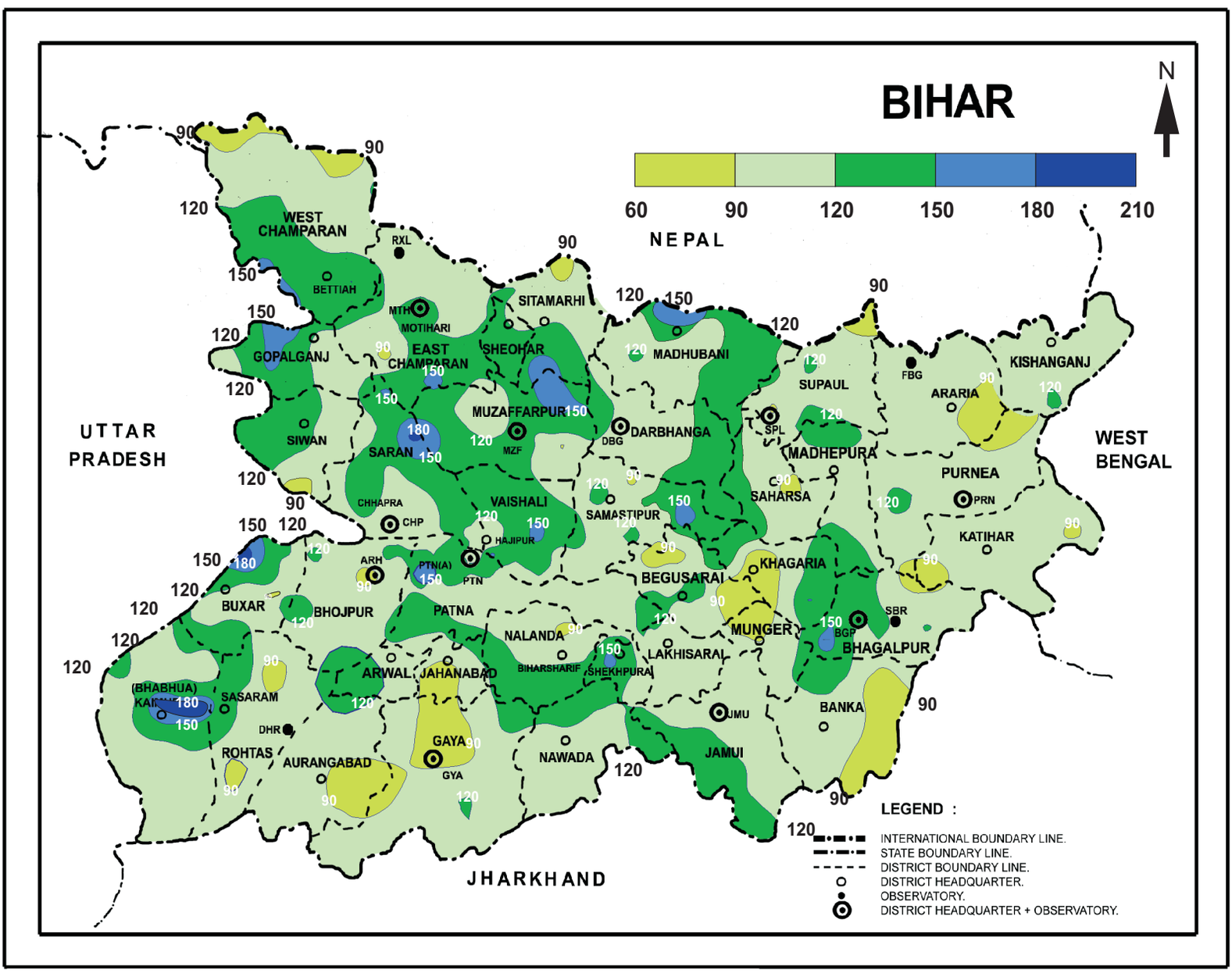


FIG: 9(d) :COEFFICIENT OF RAINFALL VARIATION - WINTER SEASON (DECEMBER-JANUARY-FEBRUARY)

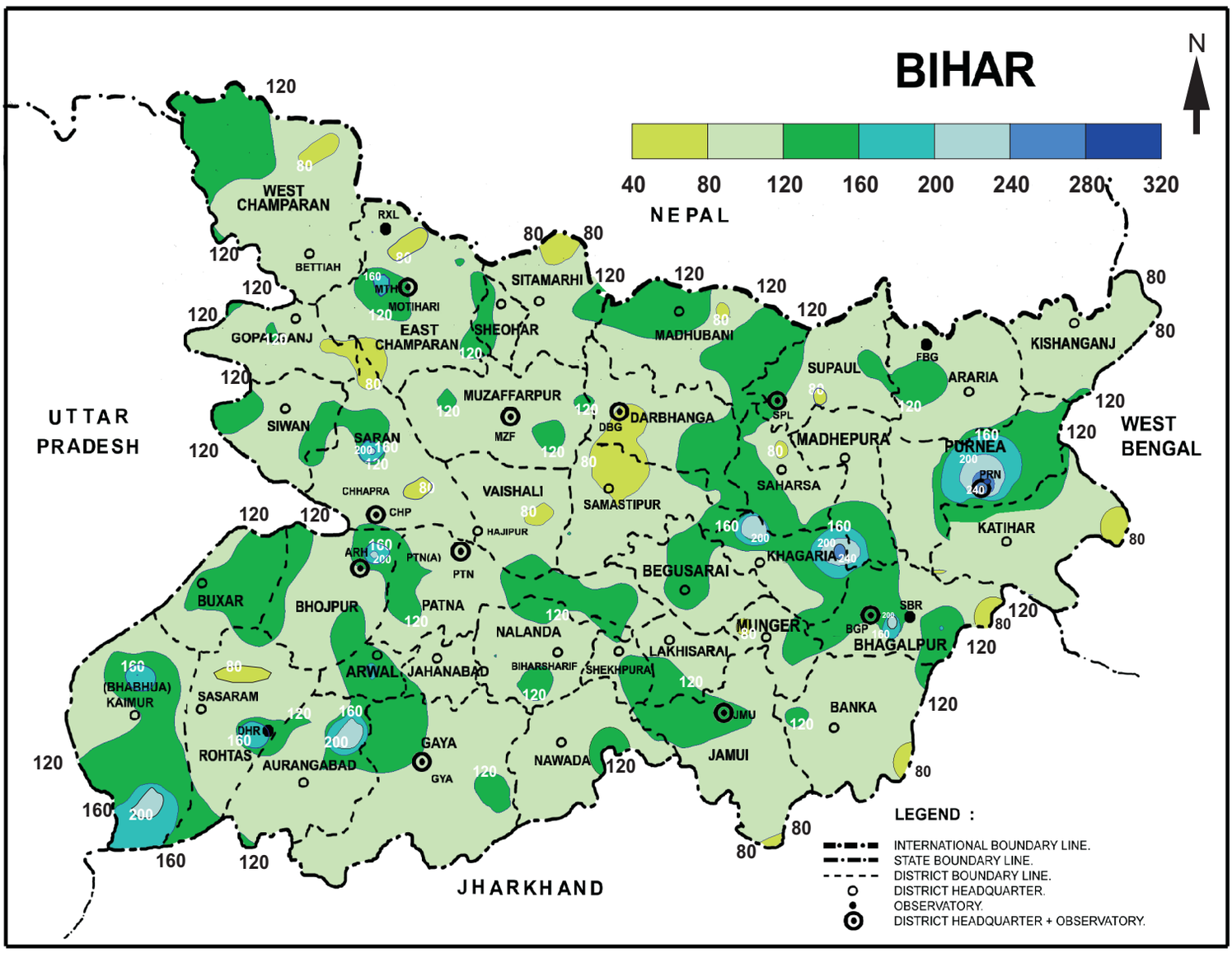


FIG:10 :AREA AFFECTED BY DROUGHT (1951-2000)
BIHAR

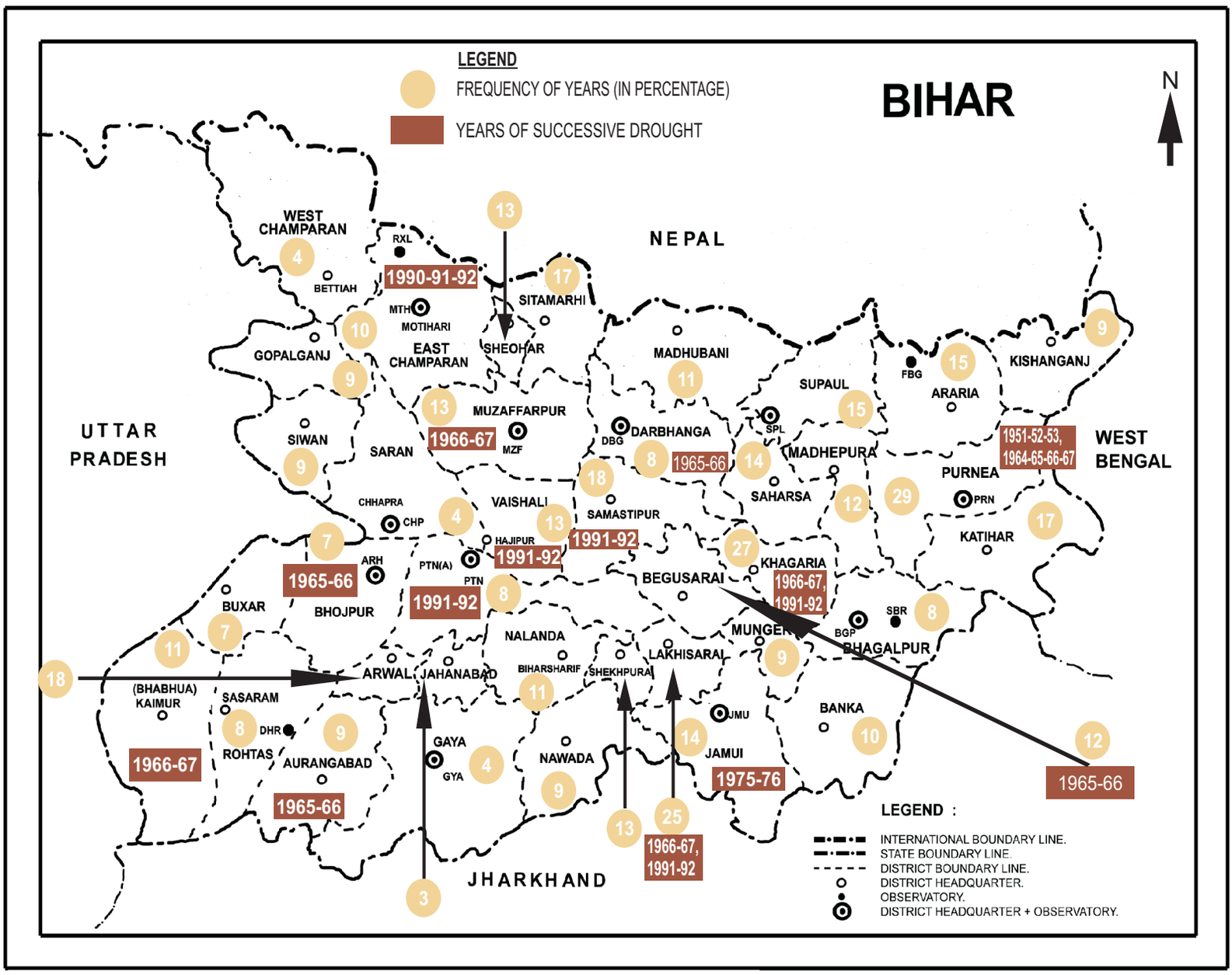
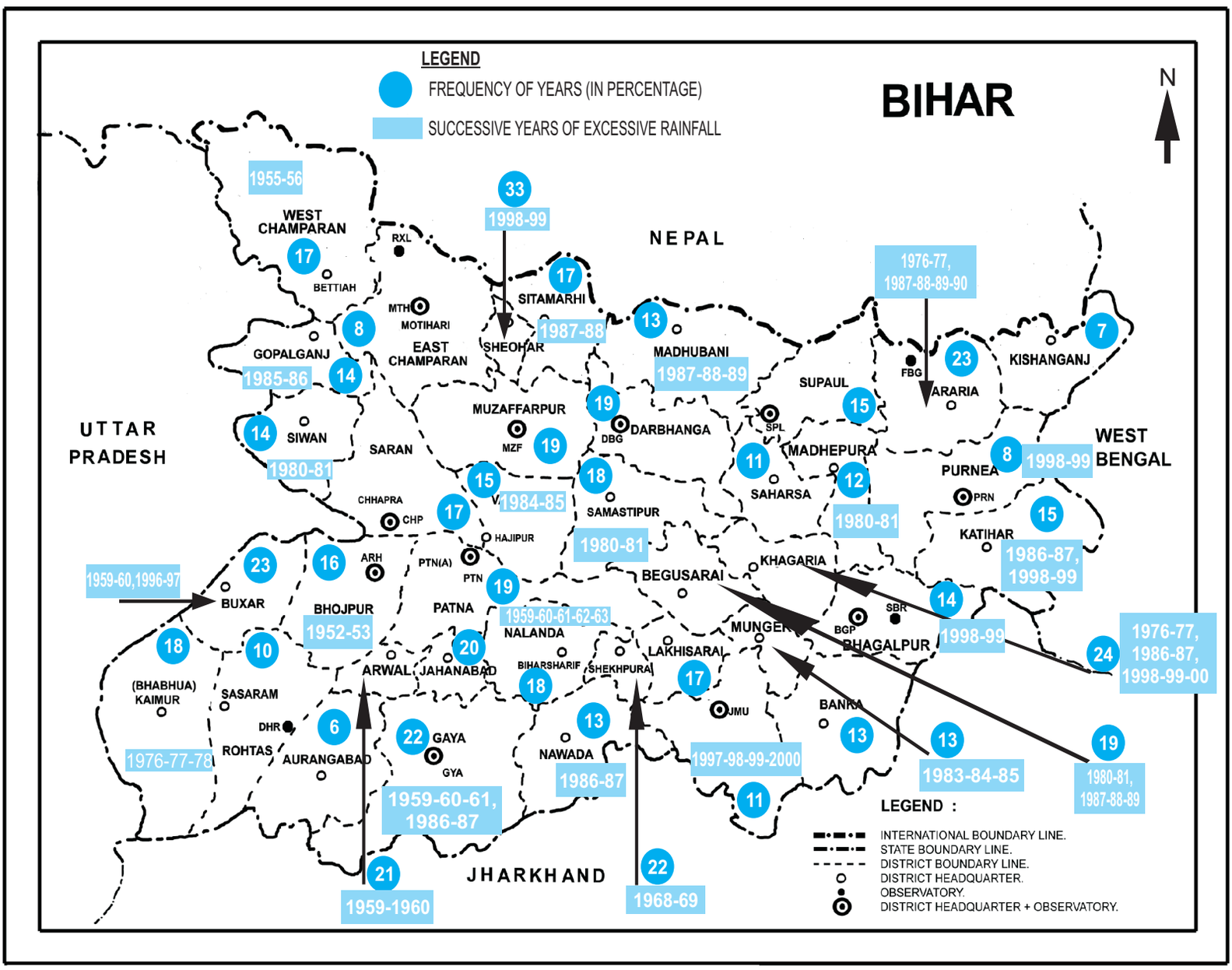


FIG: 11 :AREA AFFECTED BY EXCESSIVE RAINFALL (1951 - 2000)
BIHAR



STATE CLIMATOLOGICAL SUMMARY

THE CLIMATE OF BIHAR

General Description

The state of Bihar is located in the eastern part of the Republic of India. It covers an area of 94,163 square kms bounded by 24º20'N to 27º31'N latitude and 83º20'E to 88º18'E longitude. It is an entirely land-locked state, having an average elevation of about 150 meters above mean sea level. The state shares its boundary with Nepal to the north, the states of West Bengal to the east, Jharkhand to the south and Uttar Pradesh to the west.

Topographically, Bihar state can be divided into three regions.

1. The Sub-Himalayan foot hills
2. The Indo Gangetic Plain
3. The Southern Plateau region

The Sub-Himalayan foot hills region lies in the northern part of the state. There are some small hills like Someshwar and the Dun hills, in the extreme north of West Champaran district. These hills are off-shoots of the Himalayan system. South of it lies the Tarai region, a belt of marshy and sparsely populated region.

The Bihar state has a number of rivers, the most important of which is the Ganga. The Gangetic plain of Bihar is divided into north and south by the Ganga river which flows through it from west to east. The Ganga is the most dominant river

of Bihar state and is joined by the rivers: Ghaghra, Gandak, Burhi Gandak, Bagmati, Kamla-Balan, Kosi and Mahananda flowing southward from Himalayas in northern part of the Gangetic Plain. In the southern part of the plain, there are some rivers: Sone, Uttari Koel, Pinpun, Panchane and Karmnaska which flow towards north from the plateau region. In the central part of the state, there exist small hills like Rajgir Hills and Kharugpur Hills which are two parallel ridges extending around 65 kms. These hills are around 300 meters high. To the further south of Bihar plains lie the plateau region which consists of Kaimur plateau in the west and Chhota Nagpur plateau in the east.

Rivers

The Kosi river flows from Nepal into Bihar. It is one of the largest tributaries of the Ganga. The Kosi river basin is surrounded by ridges separating it from the Gandak in the west, the Mahananda in the east and the Ganga in the south. Over the last 250 years, the Kosi river has changed its course over 120 kms from east to west and the unstable nature of the river is attributed to the heavy silt which it carries during the monsoon season, draining the plains of north Bihar. This is one of the most flood prone areas of India. It causes great loss of the life and property and therefore, it is also known as the “Sorrow of Bihar”.

The Gandak river is a mighty river originating from the Himalayas in Nepal. It passes through Gopalganj, East Champaran, Muzaffarpur districts and flows into Ganga near Hajipur in Vaishali district. It lies between the Kosi system to the east and Karnali system to the west.

The Mahananda river originates in the district of Darjeeling in the Himalayan Region of West Bengal. It flows through the northern part of West Bengal, Bihar and Bangladesh. It again enters India in Malda district of West Bengal before joining the Ganga near Chapai Nawabganj.

The Sone river originates in Madhya Pradesh, just east of the headwaters of the Narmada river and flows north-northwest through Madhya Pradesh before turning sharply eastwards when it encounters the southwest-northeast running

Kaimur Range. This river runs parallel to the Kaimur Range, flowing towards east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganga just above Patna. Dehri is one of the major towns situated on Sone river. This river is 784 kms long and is one of the largest rivers in India. Its chief tributaries are Rihand and the Koel.

The state is free from maritime influence. The orographic features play a dominant role in the climate of the state. It affects the northern parts of the state which is the neighbourhood of Sub Himalayan foot hills. Bihar is affected by severe cold, severe heat and plenty of floods.

The state has meteorologically only one sub-division. There are thirty eight districts in the state of Bihar, as stated below:

1.	Araria	20.	Madhepura
2.	Arwal	21.	Madhubani
3.	Aurangabad	22.	Munger
4.	Banka	23.	Muzaffarpur
5.	Begusarai	24.	Nalanda
6.	Bhagalpur	25.	Nawada
7.	Bhojpur	26.	Patna
8.	Buxar	27.	Purnea
9.	Darbhanga	28.	Rohtas
10.	East Champaran	29.	Saharsa
11.	Gaya	30.	Samastipur
12.	Gopalganj	31.	Saran
13.	Jamui	32.	Shekhpura
14.	Jahanabad	33.	Sheohar
15.	Kaimur(Bhabhua)	34.	Sitamarhi
16.	Katihar	35.	Siwan
17.	Khagaria	36.	Supaul
18.	Kishanganj	37.	Vaishali
19.	Lakhisarai	38.	West Champaran

Climate

The year may be divided into four seasons. The winter season from December to February is followed by the pre-monsoon or hot weather season from March to May. The period from June to September constitutes the southwest monsoon season. The period of October and November is the post monsoon season.

Areas in the state under each climate pattern based on Koppen's classification are shown in Fig. 2. This broad classification is based on temperature and rainfall.

The state mainly comes under the climate type: subtropical monsoon, mild and dry winter, hot summer (Cwa) except the districts viz. Jamui, Banka, Munger, Lakhisarai, Khagaria, Shekhpura and some parts of Bhagalpur, Saharsa and Begusarai located in the extreme southeastern part of the state which come under the type:Tropical Savanna, Hot, seasonally dry (usually winter) (Aw).

Sea Level Pressure and Winds

The seasonal variation of atmospheric pressure over the state occurs in a systematic way with a maximum in the winter and a minimum in the southwest monsoon season. The pressure gradient over the state is generally weak except during late summer. The pressure during winter is slightly higher over the south. The pressure increases from southwest to northeast direction during May.

The winds, which are calm or light and mainly blow from south, southwest, west and sometimes northwest direction in winter, turn gradually clockwise and are replaced at most places by moderate winds from east direction in April. The pressure gradient increases with the advance of the summer and correspondingly the winds from east direction also strengthen, reaching the maximum value in May and June. In July the pressure increases from southwest to northeast direction over the state and correspondingly the winds become mainly easterly.

Easterly component of the wind becomes increasingly predominant with the progress of the monsoon. October onwards, the changeover of the pressure and wind pattern to winter pattern commences. Table 1 gives the monthly mean wind speed in kilometer per hour and predominant wind direction in the morning and evening for observatory stations in the state.

Temperature

Table II gives the mean maximum and minimum temperature at the observatory stations in the state.

The spatial distribution of the mean maximum temperature for the representative months of the four seasons of a year is depicted in Fig. 2(a,b,c,d). Pre-monsoon is the hottest season while winter is the coldest season of the year. May is the hottest month with mean maximum temperature of about 37ºC in the plains, while the plateau region and elevated places record about 3ºC lower. The mean maximum temperature ranges from 34ºC to 40.5ºC over the state during May and the values progressively increase southwestwards. The highest values observed over extreme southwestern region are depicted in Fig. 2(a).

There is an appreciable drop in the mean maximum temperature during July with values ranging between 31.9ºC and 33.5ºC (Fig. 2(b)). The maximum temperature pattern of October (Fig. 2(c)) is quite similar to that of July. The mean maximum temperature in October ranges between 31.2ºC and 32.4ºC. It is observed from (Fig. 2(d) that the mean maximum temperature of January ranges between 22.4ºC and 24.8ºC.

The spatial distribution of mean minimum temperature for the representative months of the four seasons is depicted in Fig.3(a,b,c,d). In the month of January, the minima of the mean minimum temperature is observed over the eastern region of the state. The values range between 7.8ºC and 11.9ºC. The temperature higher than 10ºC is observed over the southeastern region of the state (Fig 3(a)). The gradient of the mean minimum temperature increases in the month of April. The values range between 19.6ºC and 23.4ºC. The temperature is lower than 20ºC over the

extreme northwestern and eastern regions of the state (Fig. 3(b)). The gradient of mean minimum temperature is observed to decrease during the month of July. The values of minimum temperature range between 23.0ºC and 26.3ºC (Fig. 3(c)). The values of mean minimum temperature, range between 18.5ºC and 23.1ºC during the month of October, (Fig. 3(d)). The temperature value is less than 20ºC over extreme southwestern parts of the state.

The highest maximum temperature and the lowest minimum temperature ever recorded are depicted in Fig. 4 and 5 respectively. The extreme maximum temperature increases from 42.5ºC to 49.5ºC from north to southwestern parts of the state. The values of extreme minimum temperature range from -1.0ºC to 3.9ºC. The lowest temperature is experienced over southwestern part of the state. The highest maximum temperature and the lowest minimum temperature ever recorded in the state of Bihar are 49.5ºC and -1.0ºC respectively on 11th May 1988 and 18th January 1977 both at Dehri observatory in Rohtas district.

The day temperatures in the state are more or less uniform over the plains throughout the year except during pre-monsoon season when temperatures increase southwestwards. Night temperatures remain low in northwestern and eastern region of the state during winter and summer seasons. During the southwest monsoon and post monsoon seasons, night temperatures remain more or less uniform throughout the state except in extreme southwest region where they are lowest. In general, the temperatures at night are low in high altitude stations except during the southwest monsoon season.

The maximum and minimum temperatures rise rapidly from February onwards till May. The increase in maximum temperature during the period January to May ranges from 10ºC to 15ºC at individual stations of the state. The maximum temperature falls by about 1ºC to 5ºC from June to July, whereas the minimum temperature slightly falls by 0.1ºC to 2.5ºC from June to September. The night temperature starts falling rapidly after September, while day temperature follow this trend from October and both attain the lowest values by January. August has the lowest diurnal range of temperature of about 7ºC. The diurnal range increases rapidly after the withdrawal of the southwest monsoon. The diurnal range is of the

order of 12ºC to 18ºC during the period November to March, with March being highest.

Humidity

Table III gives the mean relative humidity at 0830 and 1730 hours IST for observatory stations in the state. The relative humidity is generally high during the period from July to September. It is about 70% in June rising to about 80% during July, August and September. The relative humidity is least during summer afternoons when it is about 45%. The diurnal variation of relative humidity is the least in the months of July to October and highest during the winter and summer months.

Cloudiness

Table IV and IV(a) give the mean monthly total cloud amount and mean number of days with clear and overcast skies at 0830 and 1730 hours IST respectively.

The period from November to April generally has clear or lightly clouded skies. However, the northern districts of the state experience more cloudiness in the morning than in the afternoons. The skies are heavily clouded during the southwest monsoon season (June – September), particularly during July and August. On an average in each of these two months, the sky remains overcast for about 15 days and it is clear on an average only for one or two days. Cloudiness decreases considerably over the entire state by October.

Rainfall

Table V gives districtwise and statewise mean monthly, mean annual rainfall and number of rainy days (i.e. days with rainfall of 2.5 mm or more). Fig. 6 and 6(a) to 6(d) depict the spatial distribution of the annual and seasonal rainfall for the respective representative months over the state.

The total annual rainfall is maximum over the northeastern part of the state. The total annual normal rainfall for the state is about 116.4 cms and the state receives on an average rainfall exceeding 2.5 mm for about 50 days. Kishanganj district in northeast sector receives a maximum amount of rainfall of about 221cm in a year, whereas Arwal and Jahanabad districts in southwest sector receive a minimum amount of rainfall of about 86 cm in a year.

It is seen from Fig. 6 that annual rainfall in the state increases from the southwestern sector to the northeastern and northwestern sectors. Rainfall is also depicted in the pattern of spatial distribution of the rainfall over the state during the southwest monsoon season Fig. 6(a), pre-monsoon season Fig. 6(b), post monsoon season Fig. 6(c), and winter season Fig. 6(d). The southwest monsoon season is the main rainy season over the state and the total amount of rainfall of about 86% is received in the southwest monsoon season (June to September), about 2% in the winter season (December, January and February) and about 6% in the pre-monsoon (March-May) and about 6% in post monsoon season (October and November).

The percentage of the seasonal number of rainy days to that of the annual number of rainy days shows that 81% rainy days were during the southwest monsoon season, 9% during the pre-monsoon season, 6% during the post monsoon season and the remaining 4% during the winter season. The state receives rainfall mainly due to low pressure areas and monsoon depressions originating in the Bay of Bengal during the southwest monsoon.

The southwest monsoon sets in over the eastern parts of the state by about the middle of second week of June and covers the entire state by the end of the second week of June. July and August are the rainiest months, each accounting individually to about 28% and 24% respectively of the annual rainfall. The number of rainy days in a month ranges from 7 to 13 during the southwest monsoon season, with a maximum of 13 for the month of July.

The withdrawal of the southwest monsoon begins from the northern parts of the state in the first week of October and the monsoon completely withdraws from the state by about mid October.

The most common rain giving systems over the state during the post monsoon season are the depressions and cyclonic storms originating in the Bay of Bengal. The storms and depressions cause heavy to very heavy rainfall and contribute substantially to the season's total rainfall.

The state receives about 3 cm of rainfall during winter. This rainfall, though small in amount, is of utmost significance for agriculture. This rainfall generally occurs in association with induced low pressure areas over the surface due to western disturbances moving from west to east, across the northern parts of the country.

The state in all receives about 7.5 cm of rainfall during the pre-monsoon season. This rainfall generally occurs in association with thunderstorms.

The features of rainfall described above are also evident from Fig. 7, which shows the annual and seasonal rainfall for the individual districts as well as for the state as a whole. It provides a measure for comparison for both districtwise and statewise seasonal rainfall with the annual rainfall.

Table VI gives the monthly and annual rainfall for various river catchments (No. 325, 409, 411, 412, 413, 414, 415. 417, 418) in the state. The annual rainfall of these river catchments is shown in Fig. 8. It is seen from Table VI and Fig. 8 that River Gandak-trans-Himalayan region (No. 412) in the state receives the maximum amount of annual rainfall (196.7 cm) as well as maximum rainfall (166.1 cm) during the southwest monsoon season.

Rainfall Variability

The spatial distribution of variation of annual rainfall over Bihar is depicted in Fig. 9. Coefficient of Variation (CV) which is expressed as percentage, is defined as:

$$C.V. = \frac{\text{Standard deviation } (\sigma)}{\text{Normal } (N)} \times 100$$

It is observed from Fig. 9 that the values of CV of annual rainfall range between 15% and 70% over the entire state.

The spatial distribution of CV of seasonal rainfall over Bihar is shown in Fig. 9(a), 9(b), 9(c) and 9(d) for the pre-monsoon season (March to May), southwest monsoon season (June to September), post monsoon season (October and November) and the winter season (December to February) respectively.

It is observed that the values of CV range between 35% to 265% (Fig. 9(a)) in the pre-monsoon season. Some regions of extreme southwest exhibit the highest variability with values of CV exceeding 200% while the northeast regions of the state exhibit the least CV at about 50%.

In the southwest monsoon season the rainfall variability is low with CV ranging between10% to 85% (Fig. 9(b)). Extreme northeast and extreme northwest regions of the state exhibit the lowest values of CV at about 15% while some areas in the western region show the highest CV at about 75%.

In the post monsoon season the values of CV range between 60% to 210% (Fig. 9(c)). The regions of extreme northeast, northwest and southwest exhibit the lowest values of CV at about 75% while western some parts of Bihar shows the highest variability at about 200%.

In the winter season the values of CV show a steep gradient with a range between 45% to 320% (Fig. 9(d)). Some parts of southwestern Bihar and eastern portion exhibit the highest variability at about 225% while small area of northern, northwestern and central part of the state show the least CV at about 50%.

The variability of annual rainfall over Bihar state ranges between 15% to 70% (Fig.9). As the variability of annual rainfall and rainfall during the southwest monsoon over Bihar is relatively low (about 10% to 85%), while the variability of seasonal rainfall for the other three seasons are very high with CV exceeding 200%, over some parts of the state, the contribution of southwest monsoon rainfall to the annual rainfall is the highest over the state.

Droughts

Meteorological drought over an area or a place may be defined as a situation when the annual rainfall over the area or place is less than 75% of the normal. It is classified as “Moderate drought” if the rainfall deficit is between 25% and 50% and “Severe drought” when it is more than 50%. Areas where frequency of drought as defined above is more than 20% of the years examined, such areas are classified as “drought areas” and areas having drought condition for more than 40% of the years under consideration represent “chronically drought affected areas”.

Purnea, Khagaria, Katihar and Samastipur districts in the state experienced 14, 11, 8 and 8 years of drought respectively out of the 49, 41, 47 and 45 years under consideration during 1951-2000, satisfying the criteria for “drought areas”.

There is not a single district in the state during 1951-2000, which satisfies the criteria for “chronically drought affected areas”.

All the districts of the state were affected by drought during some year or the other during the period 1951-2000. The details of yearwise occurrence of drought over each district during the 50 year period of 1951-2000 are given below. The figures within the brackets against each district indicate the number of occasions during the 50 year period when these districts were affected by drought.

Araria (7), Arwal (5), Aurangabad (4), Banka (4), Begusarai (5),Bhabhua (5), Bhagalpur (4), Bhojpur (3), Buxar (3), Darbhanga (4), East Champaran (5), Gaya (2), Gopalganj (4), Jahanabad (1), Jamui (6), Katihar (8), Khagaria (11), Kishanganj (4). Lakhisarai (6), Madhepura (5),Madhubani (5), Munger (4), Muzaffarpur (6), Nalanda (5), Nawada (4), Patna (4), Purnea (14), Rohtas (4), Saharsa (5), Samastipur (8), Saran (2), Sitamarhi (7), Shekhpura (5), Sheohar (2), Siwan (4), Supaul (6), Vaishali (6) West Champaran (2),.

Occurrence of drought conditions in successive years is not frequent in the state. However, individual district have had successive years of drought. Severity of drought not only depends upon the order of the rainfall deficiency in a single year,

but also on the continued occurrence of deficient rain in successive years, even though the deficiency in each successive year may not be as high as in a single year.

The following table (i) depicts districtwise years of successive drought during the 50 year period 1951-2000.

Table (i)

Sr. No.	Name of Affected districts	Years of Successive Drought
1.	Aurangabad	1965-1966
2.	Begusarai	1965-1966
3.	Bhabhua	1966-1967
4.	Bhojpur	1965-1966
5.	Darbhanga	1965-1966
6.	East Champaran	1990-1991-1992
7.	Jamui	1975-1976
8.	Khagaria	1966-1967, 1991-1992
9.	Lakhisarai	1966-1967, 1991-1992
10.	Muzaffarpur	1966-1967
11.	Patna	1991-1992
12.	Purnea	1951-1952-1953, 1964-1965-1966-1967
13.	Samastipur	1991-1992
14.	Vaishali	1991-1992

Fig. 10 shows the percentage frequency of drought and years of successive drought in the districts during the period 1951-2000. The following table (ii) shows the years of severe drought for various districts, with the actual rainfall expressed as percentage of normal rainfall given in brackets, against each district.

Table (ii)

Sr. No.	Affected Districts	Years of Severe Drought (Rainfall less than 50%)
1.	Araria	1951 (43%)
2.	Banka	1951 (41%)
3.	Begusarai	1966, (42%)
4.	Jahanabad	1966 (39%)
5.	Lakhisarai	1967 (40%)
6.	Munger	1966 (48%)
7.	Muzaffarpur	1966 (42%)
8.	Purnea	1972 (36%)
9.	Rohtas	1966 (43%)
10.	Sheohar	1982 (39%)
11.	Siwan	1966 (44%)
12.	Supaul	1957 (32%)

It is observed that the lowest annual rainfall was in Supaul district (32% of the normal rainfall) in the year 1957.

Incidence of widespread and fairly widespread drought over the state in any particular year was not very common. However, in the year 1951, 1966 and 1992 fairly widespread drought affected the state. The year 1966 and 1992 were the years when the state was worst affected by drought, with 30 and 28 districts of the state reporting drought.

There were no drought conditions in the state in the following 18 years: 1955, 1956, 1958, 1959, 1960, 1963, 1969, 1971, 1973, 1974, 1977, 1984, 1985, 1986, 1987, 1993, 1997, 2000. In the following 10 years, only one district of the state was affected by drought condtions: 1952, 1953, 1961, 1962, 1980, 1981, 1989, 1995, 1998 and 1999. The district Purnea and Khagaria experienced the maximum number of drought conditions namely 14 and 11 years respectively during the 50 year period under consideration.

Excessive Rainfall

Rainfall sufficiently in excess of the normal, is a predominant factor for occurrence of floods, particularly in high rainfall regions. An annual rainfall of 125% or more of the normal is considered as excessive rainfall.

Fig. 11 shows the percentage frequency of excessive rainfall years and of successive years of excessive rainfall during the period 1951-2000. It is seen from the figure that the frequency of excessive rainfall is generally higher in the central region of the state.

The following table (iii) gives the districtwise excessive rainfall years and the highest annual rainfall (expressed as percentage of normal) with the years of occurrence.

Table (iii)

Sr.No	District	Years of excessive rainfall	Highest amount of Rainfall expressed as % of normal with year
1.	Araria	1955 1974 1976 1977 1980 1984 1987 1988 1989 1990 1998	242.7 cms in1974 (144%)
2.	Arwal	1953 1956 1959 1960 1970 1997	131.3 cms in1959 (153%)
3.	Aurangabad	1961 1978 1987	160.3 cms in1961 (161%)
4.	Banka	1956 1959 1968 1980 1987	155.3 cms in1968 (147%)
5.	Begusarai	1959 1978 1980 1981 1987 1988 1989 1997	165.4 cms in 1987 149 %
6.	Bhabhua	1953 1961 1976 1977 1978 1981 1987 1997	156.2 cms in 1978 (161 %)
7.	Bhagalpur	1956 1971 1973 1984 1987 1998 1999	211.8 cms in 1987 (176 %)
8.	Bhojpur	1952 1953 1956 1961 1987 1993 1997	173.3 cms in 1997 (172 %)
9.	Buxar	1953 1959 1960 1964 1978 1991 1993 1996 1997	136.5 cms in 1993 (152 %)
10.	Darbhanga	1956 1963 1971 1974 1985 1987 1989 1997 1999	185.9 cms in1985 (170%)

Table (iii) (contd)

Sr.No	District	Years of excessive rainfall	Highest amount of Rainfall expressed as % of normal with year
11.	East Cham-paran	1956 1969 1974 1985	191.3 cms in 1985 (152 %)
12.	Gaya	1953 1959 1960 1961 1971 1978 1984 1986 1987 1990 1997	153.4 cms in 1971 (163%)
13.	Gopalganj	1953 1956 1985 1986 1988 1990	176.5 cms in1953 (156%)
14.	Jahanabad	1956 1961 1967 1976 1986 1997	163.9 cms in1997 (191 %)
15.	Jamui	1987 1997 1998 1999 2000	178.1cms in1999 (158 %)
16.	Katihar	1984 1986 1987 1989 1995 1998 1999	245.6 cms in 1999 (177%)
17.	Khagaria	1956 1976 1977 1984 1986 1987 1989 1998 1999 2000	212.3 cms in 1987 (181%)
18.	Kishanganj	1952 1987 1998	283.5 cms in 1998 (128%)
19.	Lakhisarai	1969 1976 1990 1999	153.2 cms in1969 (168%)
20.	Madhepura	1980 1981 1984 1987 1999	204.6 cms in 1999 (157%)
21.	Madhubani	1956 1960 1987 1988 1989 1999	189.3 cms in 1987 (155%)
22.	Munger	1956 1983 1984 1985 1987 1995	189.9 cms in 1984 168%
23.	Muzaffarpur	1953 1963 1969 1971 1974 1978 1981 1985 1987	171.5 cms in 1985 (149%)
24.	Nalanda	1959 1960 1961 1962 1963 1987 1997 1999	192.1 cms in 1962 (193%)
25.	Nawada	1961 1978 1984 1986 1987 1990	166.7 cms in 1961 (166%)
26.	Patna	1953 1962 1973 1976 1981 1985 1987 1997 2000	155.6 cms in 1987 (158%)
27.	Purnea	1984 1987 1998 1999	249.5 cms in 1998 (144%)
28.	Rohtas	1956 1959 1961 1978 1987	167.1cms in 1961 (168%)
39.	Saharsa	1956 1984 1987 1999	233.5 cms in 1987 (181%)
30.	Samastipur	1963 1980 1981 1987 1989 1993 1997 1999	154.4 cms in 1987 (136%)
31.	Saran	1953 1969 1971 1973 1978 1981 1985 1997	177.7 cms in 1953 (169%)

Table (iii) (contd)

Sr.No	District	Years of excessive rainfall	Highest amount of Rainfall expressed as % of normal with year
32.	Sitamarhi	1953 1958 1978 1981 1985 1987 1988	210.9 cms in 1958 (162%)
33.	Shekhpura	1956 1968 1969 1978 1981 1985 1987 1997	158.5 cms in 1997 (159%)
34.	Sheohar	1981 1985 1987 1998 1999	204.7 cms in 1985 (180%)
35.	Siwan	1953 1969 1980 1981 1985 1988	180.6 cms in1953 (168%)
36.	Supaul	1956 1963 1981 1984 1987 1998	230.7 cms in 1987 (168 %)
37.	Vaishali	1953 1967 1978 1984 1985 1987 1990	155.9 cms in 1985 (149%)
38.	West Cham-paran	1952 1955 1956 1962 1974 1986 1988 2000	220.9 cms in 1986 (154%)

From the above table, it is seen that during the 50 year period 1951-2000, there were 39 years in which some districts or the other in the state recorded excessive rainfall. In the year 1962, Nalanda district received highest excessive rainfall, i.e. 193% of the annual normal rainfall. In the year 1987, maximum number of districts (i.e. 29 out of 38) of the state experienced excessive rainfall. Araria and Gaya districts experienced maximum number of excessive rainfall years (11) while Aurangabad and Kishanganj districts experienced only 3 years excessive rainfall. The successive years of excessive rainfall against each district are listed below:

Successive years of Excessive Rainfall (Districtwise)

Sr. No.	Districts	Successive years of Excessive Rainfall
1.	Araria	1976-1977, 1987-1988-1989-1990
2.	Arwal	1959-1960
3.	Begusarai	1980-1981, 1987-1988-1989
4.	Bhabhua	1976-1977-1978
5.	Bhagalpur	1998-1999
6.	Bhojpur	1952-1953
7.	Buxar	1959-1960, 1996-1997

Sr. No.	Districts	Successive years of Excessive Rainfall
8.	Gaya	1959-1960-1961, 1986-1987
9.	Gopalganj	1985 -1986
10.	Jamui	1997-1998-1999-2000
11.	Katihar	1986-1987, 1998-1999
12.	Khagaria	1976-1977, 1986-1987, 1998-1999-2000
13.	Madhepura	1980-1981
14.	Madhubani	1987-1988-1989
15.	Munger	1983-1984-1985
16.	Nalanda	1959-1960-1961-1962-1963
17.	Nawada	1986-1987
18.	Purnea	1998-1999
19.	Samastipur	1980-1981
20.	Shekhpura	1968-1969
21.	Sheohar	1998-1999
22.	Sitamarhi	1987-1988
23.	Siwan	1980 -1981
24.	Vaishali	1984 -1985
25.	Champaran West	1955-1956

The heaviest one day rainfall on record at any station in the sub-division was 580.0 mm on 11 August 1987 at Majarganj in Sitamarhi district.

Cyclonic storms and depressions

Table VII depicts the total number of storms/depressions which affected the state during the period 1891-2010. The cyclonic storms and depressions which affect India, mostly originate and/or intensify over the Bay of Bengal during the months of May to November. They usually travel northwestwards or westwards and cross the east coast of India. In general storms and depressions become weak after entering the land. Bihar being an inland state, far away from the coast about 400 km, does not experience the full fury of severe storms/depressions like the coastal regions.

However, in association with these systems, heavy to very heavy rainfall occurs over the affected districts. During the course of their movement, they sometimes turn or recurve towards north or northeast. In May these disturbances recurve while still out in Bay of Bengal. Hence, exceptionally few of them cross the coast and travel inland, affecting the weather of the state.

During the months of December to April, the state was not affected by Bay storms/depressions even on a single occasion since 1891, but during the month of November, it was affected once. The number of storms/depressions that affected the state in October was 17 the maximum number being 43 in the month of September. The monsoon depressions during June to September generally form over the north or head of Bay of Bengal and traveling westwards or northwestward, across Orissa, Jharkhand, Bihar, Chhattisgarh and Madhya Pradesh. During the period 1891-2010, total 113 storms /depressions influenced the weather of Bihar state. The storms/depressions over Bay of Bengal progressively form in the lower latitudes, with the advance of the year. The tracks of the Bay cyclones are observed in lower latitudes in October and November, influencing the weather of Bihar.

Other Weather Phenomena:

(a) Thunderstorms and Dust storms

Convective activity is essential for the occurrence of thunderstorms and dust storms. With the advance of the summer, thunderstorm activity becomes pronounced due to heating of the land and reaches to its maximum in May. The activity in May is almost double than that of April. When the moisture in the atmosphere is insufficient, dry thunderstorms or dust storms do occur in the pre-monsoon months. Thunderstorms in the pre-monsoon season are known as “Norwesters”. Some of them may reach the violence of tornadoes. They are often accompanied by severe squalls. Dust storms are mainly confined to the pre-monsoon season and before the onset of the monsoon. Hail storms occur in the state rather rarely, during the pre-monsoon months March to May. Squalls occasionally occur in the state during pre-monsoon and early part of southwest monsoon season. Thunderstorm activity continues in the southwest monsoon

season and attains its maximum in the month of July and August. The frequency of days of thunderstorms is maximum at Raxaul. Even during winter season, the state may experience thunderstorm activity resulting from low pressure areas, induced due to eastward moving upper air disturbances known as “Western Disturbances”. Thunderstorm activity is minimum in December.

(b) Fog

Favourable condition for formation of radiation fog such as light to calm wind, clear skies, low temperature, etc., do exist in association with western disturbances in its rear sector and sometimes ahead of it during post monsoon and winter months. Formation of fog in northwestern part of Bihar is frequent for about 10 to 15 days in December and January. Favourable conditions for formation of advection fog (which forms when the moist air is transported over cooler surface) over the region near rivers do exist occasionally under the influence of Western Disturbances over the state.

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

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
BIHAR														
Bhagalpur	a	4.0	5.1	6.1	7.2	7.4	6.5	5.3	5.3	4.9	3.4	3.0	3.6	5.2
	m	C/SW	C/SW	SW/C	E	E	E	SE/E	E/SE	E/SE	C/E	C/SW	C/SW	
	e	C/W	W	W	W/E/NW	E	E	E/C	E	E/C	C/E/NW	C/W	C/W	
Chapra	a	2.8	3.5	4.8	6.4	7.3	7.0	5.9	5.8	6.2	3.1	2.1	2.3	4.8
	m	SW	SW	SW	SW	NE	NE	NE	NE	NE	C/NE	C/SW	SW	
	e	C/SW	SW/C	SW	SW	NE	NE	NE/C	NE	NE/C	C/NE	C/SW	C/SW	
Darbhanga	a	1.5	2.2	3.3	4.6	5.8	5.7	5.1	4.8	4.9	2.2	1.1	1.2	3.5
	m	C/W	C/W	C/W/E	C/E	E	E	E/C	E/C	C/E	C/E	C	C	
	e	C	C	C	C/E/W	C/E	C/E	C/E	C/E	C/E	C	C	C	
Dehri	a	3.0	3.8	4.5	5.1	5.1	5.3	4.6	4.0	3.8	2.5	2.1	2.4	3.9
	m	SW/C/S	SW/W	SW/W	W/SW	E/SW	E/SE/W	E/SE	E/SE	E/SE	C/SW/SE	SW/C/S	C/SW/S	
	e	W	W	W	W	W	E/W	E/W	E/C/W	E/W	W/C	W/C/N	W	
Forbesganj	a	3.8	4.8	7.2	9.0	9.1	9.2	7.8	7.6	6.4	3.9	2.6	2.8	6.2
	m	W/E	W/E	E	E	E	E	E	E	E	E	E	C/W/E	
	e	C/W	W	W	W/E	E	E	E	E	E/C	C/W	C	C/W	
Gaya	a	4.4	5.5	6.5	8.3	9.8	10.0	9.1	8.4	7.6	4.8	4.0	4.4	6.9
	m	C/S/SW	SW/C/S	SW	SW/W	E/SW	E/W	E/SE	E	E/SW	C/SW	C/S/SW	C/S/SW	
	e	NW/C	NW	NW	NW	NW/NE	NE/E	E/W	E/C	E/C/NW	C/NW	C/NW	C/NW	
Jamui	a	3.6	4.5	5.9	6.9	7.2	6.5	5.6	5.0	4.6	3.4	2.6	3.0	4.9
	m	E/W/NW/C	E/NW/W/C	E/W/NW	W/E	E	E	E	E	E	E	C/NW/E/W	C/NW/W	
	e	W/NW/C/W	NW/W	NW/W	W/NW	NE/E	E	E	E	E/C	C/E	C/W	C/NW/W	
Motihari	a	3.8	4.3	4.0	5.7	6.0	5.2	6.1	5.1	4.9	2.4	1.0	1.2	4.1
	m	C/W	C/W	C/W/E	E	E	E	E/C	E/C	E/C	C/E	C/E	C	
	e	C	C/W	C/W	C/W	C/E	C/E	C/E	C/E	C/E	C	C	C	
Muzaffarpur	a	2.3	3.0	4.2	4.7	5.8	5.0	5.1	4.9	4.0	2.2	1.7	1.6	3.7
	m	C/W	W	W/E	E	E	E	E	E	E	C/E	C/W/E	C/W	
	e	C/W	C/W	C/W	C/E/W	E	E	E	E	C/E	C	C	C	
Patna (A)	a	2.6	3.3	4.2	6.2	7.9	7.3	6.2	6.6	5.1	2.7	1.9	1.9	4.6
	m	C/W/SW	C/W/SW	W	E	E	E	E	E	E	C/SE	C/W/SW	C/W/SW	
	e	C/W	C/W	W	NW/W	E/NE	E	E	E	E/C	C/E	C	C	

TABLE – I (Contd…)
MEAN WIND SPEED (kmph) AND PREDOMINANT WIND DIRECTION

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
BIHAR														
Purnea	a	2.4	3.6	4.7	6.1	6.6	5.7	4.8	4.7	3.9	2.4	1.6	1.8	4.0
	m	C/W	W	W/E	E	E	E	E	E	E	C/E	C/E/W	C/W	
	e	C/W	C/W	W/C	E/W	E	E	E	E	E/C	C	C	C	
Raxaul	a	3.5	4.5	6.1	9.6	12.0	11.4	9.8	9.1	7.1	3.9	2.7	2.5	6.8
	m	C/E	C/E/W	E/W	E	E	E	E	E	E	E/C	E/C	C/E	
	e	C/SW	W/SW/C	W	W	E	E	E	E	E/C	C/W	C/SW/W	C/SW	
Sabour	a	3.7	4.9	6.2	8.3	9.3	9.0	7.9	8.1	6.8	3.7	2.6	3.0	6.1
	m	C/W/SW	W/C/SW	W	E/NE	E	E	E	E	E	C/SW/E	C/W/SW	C/W/SW	
	e	C/NW/W	NW/W	NW	NW	E	E	E	E	E/C	C/NW	C/NW	C/NW	
Supaul	a	2.0	4.5	9.3	8.1	8.3	7.4	8.6	9.8	6.4	4.8	2.1	1.5	6.1
	m	C/E	C/W	E/W	E	E	E	E	E	E	E/C	C/E	C/E/W	
	e	C	C/W	C/W	C/E/W	E	E	E/C	E	C/E	C	C	C	
State Mean	**a**	**3.1**	**4.1**	**5.5**	**6.9**	**7.7**	**7.2**	**6.6**	**6.3**	**5.5**	**3.2**	**2.2**	**2.4**	**5.1**

a: Mean Wind Speed in km per hour.
m: Predominant wind direction in the morning.
e: Predominant wind direction in the evening.
Var Variable.
C: Calm.

ABLE-II

MEAN MAXIMUM AND MEAN MINIMUM TEMPERATURE(°C)

BIHAR

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
Bhagalpur	Max	24.6	27.4	33.6	37.5	37.5	36.0	33.1	32.9	33.1	32.4	30.0	25.8	32.0
	Min	11.9	14.1	19.3	23.4	24.8	26.4	26.2	26.3	25.9	23.1	17.8	12.9	21.0
Chapra	Max	22.9	26.4	32.5	37.5	38.4	36.9	33.1	32.5	32.3	31.8	28.9	24.4	31.5
	Min	10.5	12.5	17.5	23.0	25.5	26.9	26.3	26.2	25.7	22.7	16.7	11.7	20.4
Darbhanga	Max	23.2	25.9	31.2	35.4	35.6	34.9	32.6	32.7	32.6	31.7	28.9	24.7	30.8
	Min	9.3	11.3	15.6	20.1	22.2	23.8	24.3	24.6	24.3	21.6	15.6	10.7	18.6
Dehri	Max	23.8	26.6	32.9	38.6	40.5	38.5	33.5	32.6	32.5	32.0	29.4	25.2	32.2
	Min	8.6	11.2	15.7	20.9	23.5	24.6	23.0	22.6	22.3	18.5	12.6	8.5	17.7
Forbesganj	Max	23.5	26.1	31.3	34.2	34.0	33.1	31.9	32.3	32.0	31.4	28.9	25.4	30.3
	Min	9.4	11.3	15.6	20.6	23.3	25.1	25.5	25.3	24.8	21.7	15.7	10.6	19.1
Gaya	Max	23.5	26.8	33.2	38.9	40.5	38.0	33.3	32.7	32.6	31.6	28.9	24.7	32.1
	Min	8.9	11.6	16.4	22.5	25.9	27.3	25.8	25.6	24.9	21.0	14.3	9.5	19.5
Jamui	Max	24.8	28.0	33.4	38.8	40.2	37.3	33.3	32.6	32.4	31.6	29.4	25.9	32.3
	Min	11.1	13.4	18.1	23.2	26.1	27.2	26.3	26.1	25.6	22.3	16.7	12.4	20.7
Motihari	Max	22.4	25.2	31.0	35.3	35.7	34.8	32.4	32.4	32.2	31.5	28.7	24.4	30.5
	Min	8.4	10.5	14.8	19.6	23.0	25.1	25.4	25.5	24.5	20.7	14.4	9.8	18.5
Muzaffarpur	Max	22.6	25.3	30.9	35.2	35.6	34.5	32.4	32.6	32.1	31.3	28.7	24.5	30.5
	Min	9.6	11.8	16.4	21.5	24.5	26.3	26.3	26.4	25.4	21.8	15.6	10.8	19.7
Patna (A)	Max	23.3	26.0	32.3	37.2	38.0	36.5	32.9	32.5	32.3	31.6	28.9	24.5	31.3
	Min	9.1	11.3	16.2	22.0	24.9	26.6	26.0	26.0	25.2	21.4	14.9	9.8	19.4
Purnea	Max	24.0	26.7	32.0	35.4	34.7	33.7	32.0	32.2	32.1	31.4	29.1	25.4	30.7
	Min	7.8	10.0	14.5	19.7	22.4	24.4	24.8	24.9	24.1	20.6	14.1	9.0	18.0
Raxaul	Max	22.8	25.1	30.9	35.2	35.5	34.4	32.2	32.4	32.1	31.2	28.7	24.5	30.4
	Min	8.1	9.6	13.4	19.8	23.3	25.4	25.6	25.6	24.5	20.7	14.3	8.7	18.3
Sabour	Max	23.2	26.1	32.4	36.8	36.8	35.2	32.7	32.3	32.3	31.5	28.6	24.4	31.0
	Min	7.8	9.8	14.4	20.7	23.7	25.6	25.5	25.6	24.8	21.3	14.2	8.7	18.5

TABLE-II (contd…)
MEAN MAXIMUM AND MEAN MINIMUM TEMPERATURE(°C)
BIHAR

STATION		*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*
Supaul	Max	23.7	26.5	31.4	35.8	35.1	34.5	32.5	32.7	32.2	31.6	29.0	25.1	30.8
	Min	9.8	11.6	15.3	20.6	23.1	24.7	24.2	25.0	24.7	21.8	15.6	10.8	18.9
State Mean	**Max**	**23.5**	**26.3**	**32.1**	**36.6**	**37.0**	**35.6**	**32.7**	**32.5**	**32.3**	**31.6**	**29.0**	**24.9**	**31.2**
	Min	**9.3**	**11.4**	**15.9**	**21.3**	**24.0**	**25.7**	**25.4**	**25.4**	**24.8**	**21.4**	**15.2**	**10.3**	**19.2**

TABLE III
MEAN RELATIVE HUMIDITY(%)
BIHAR

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Bhagalpur	M	78	69	67	58	68	77	84	84	82	77	72	77	74
	E	65	56	43	41	51	68	79	79	78	71	65	67	64
Chapra	M	79	70	53	58	59	71	83	83	81	76	72	76	71
	E	61	49	36	31	41	58	75	77	75	67	59	60	57
Darbhanga	M	68	63	62	52	58	65	72	80	79	79	71	65	67
	E	66	60	51	51	58	68	77	79	78	73	65	67	66
Dehri	M	74	64	46	38	44	60	80	83	80	72	69	72	65
	E	52	46	33	27	32	50	72	78	75	66	56	52	53
Forbesganj	M	83	73	59	60	69	80	85	83	82	78	77	83	76
	E	63	53	40	41	56	70	77	77	76	73	67	66	63
Gaya	M	76	67	47	39	46	63	82	84	82	77	73	75	68
	E	53	44	28	25	29	53	76	78	75	64	52	52	52
Jamui	M	81	77	66	53	58	71	81	86	85	83	79	80	75
	E	71	63	57	47	51	68	79	85	83	78	75	73	69
Motihari	M	81	73	60	56	67	76	84	83	82	77	73	7	74
	E	69	58	49	46	52	68	80	80	79	73	71	70	66
Muzaffarpur	M	84	72	59	57	67	77	86	84	84	77	74	80	75
	E	72	58	47	44	53	68	81	81	81	76	72	72	67
Patna (A)	M	78	69	53	48	59	70	83	83	82	76	73	77	71
	E	59	48	33	27	37	55	75	76	76	69	64	62	57
Purnea	M	80	70	58	62	73	82	88	86	86	80	76	79	77
	E	64	51	39	43	59	73	82	81	82	76	72	70	66

TABLE III
MEAN RELATIVE HUMIDITY(%)
BIHAR

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Raxaul	M	86	79	59	53	61	75	83	82	82	79	79	85	75
	E	64	54	36	33	43	61	76	76	74	67	60	64	59
Sabour	M	82	73	59	60	69	79	86	86	84	80	76	79	76
	E	63	54	44	42	52	69	80	81	80	74	66	66	64
Supaul	M	87	79	70	70	77	85	89	86	86	84	79	85	81
	E	77	68	59	60	68	76	83	81	82	79	73	76	74
State Mean	**M**	**80**	**71**	**57**	**54**	**63**	**74**	**84**	**84**	**83**	**78**	**74**	**78**	**73**
	E	**64**	**54**	**43**	**40**	**49**	**65**	**78**	**78**	**78**	**72**	**66**	**66**	**63**

M: MORNING
E: EVENING

TABLE – IV
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*
BIHAR														
Bhagalpur	a	20	17	18	15	11	2	0	0	1	12	18	21	135
	b	2	1	1	1	3	6	11	8	5	2	1	1	42
	c	1.6	1.8	1.7	2.2	3.2	5.5	6.8	6.5	5.6	2.8	1.6	1.5	3.4
Chapra	a	25	21	27	26	24	12	3	4	8	22	25	28	225
	b	2	2	1	1	2	9	14	12	10	3	1	1	58
	c	1.1	1.2	1.0	0.9	1.2	3.9	6.1	5.7	4.5	1.8	0.8	0.8	2.4
Darbhanga	a	26	24	28	27	23	12	3	3	7	20	27	28	228
	b	1	1	0	0	1	2	6	6	3	1	0	0	21
	c	0.8	0.7	0.6	0.6	1.2	3.2	5.0	4.6	3.8	1.6	0.6	0.5	1.9
Dehri	a	25	21	24	24	26	13	2	3	9	23	25	24	221
	b	3	3	3	2	2	8	18	14	10	3	2	2	70
	c	1.4	1.5	1.2	1.1	1.0	3.4	6.4	6.1	4.4	1.6	1.1	1.3	2.5
Forbesganj	a	23	21	23	17	10	2	0	0	2	13	22	25	158
	b	2	1	1	2	4	10	14	10	6	3	1	1	55
	c	1.2	1.2	1.3	2.2	3.2	5.5	6.3	5.8	5.0	2.6	1.2	1.0	3.0
Gaya	a	18	15	18	18	18	5	0	0	3	15	18	19	147
	b	1	1	1	0	0	3	8	6	4	2	1	1	28
	c	1.8	1.9	1.6	1.5	1.6	4.6	6.5	6.3	5.1	2.3	1.5	1.5	3.0
Jamui	a	26	19	27	25	24	16	2	2	5	18	24	27	215
	b	1	2	0	0	1	3	12	5	2	1	0	1	28
	c	0.6	1.1	0.4	0.7	0.7	2.4	5.0	4.6	3.5	2.2	0.8	0.4	1.9
Motihari	a	26	23	27	25	23	12	3	3	5	23	25	27	222
	b	2	2	1	1	3	8	16	13	12	2	1	1	62
	c	1.0	1.0	0.9	1.1	1.7	4.2	6.0	5.4	4.8	1.6	0.8	0.7	2.4
Muzaffarpur	a	23	20	24	22	18	7	1	1	4	19	24	25	188
	b	3	2	1	1	3	9	18	12	10	3	1	1	64
	c	1.4	1.4	1.2	1.3	2.0	4.6	6.6	6.1	5.1	2.0	1.0	1.0	2.8
Patna (A)	a	18	15	17	17	15	4	0	0	2	14	18	19	139
	b	2	1	1	0	1	3	8	5	3	1	1	1	27
	c	1.8	1.7	1.6	1.7	1.8	4.7	6.6	6.2	5.2	2.2	1.4	1.5	3.0
Purnea	a	23	19	21	13	9	3	0	0	1	12	21	22	144
	b	2	1	1	2	4	8	11	8	5	2	1	1	46
	c	1.3	1.3	1.3	2.2	3.5	5.3	6.5	6.0	5.1	2.4	1.1	0.9	3.1
Raxaul	a	19	16	16	17	12	3	0	0	2	11	19	21	136
	b	1	2	1	1	1	5	9	5	4	2	1	1	33
	c	2.0	1.9	1.8	1.6	2.5	5.1	6.6	6.1	5.4	2.5	1.2	1.0	3.1
Sabour	a	20	17	19	17	12	3	0	0	2	13	20	21	144
	b	2	1	1	1	2	5	8	5	3	2	1	1	32
	c	1.5	1.6	1.6	2.0	3.0	5.3	6.6	6.2	5.9	2.7	1.4	1.3	3.2
Supaul	a	24	22	25	24	18	8	4	3	7	20	25	27	207
	b	2	1	1	1	4	8	13	9	7	2	1	1	50
	c	1.0	1.1	0.7	1.3	2.4	4.3	5.6	5.5	4.5	2.0	0.7	0.6	2.5
State Mean	**a**	**23**	**19**	**22**	**20**	**17**	**7**	**1**	**1**	**4**	**17**	**22**	**24**	**15**
	b	**2**	**1**	**1**	**1**	**2**	**6**	**12**	**8**	**6**	**2**	**1**	**1**	**4**
	c	**1.3**	**1.4**	**1.2**	**1.5**	**2.1**	**4.4**	**6.2**	**5.8**	**4.8**	**2.2**	**1.1**	**1.0**	**2.7**

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.

TABLE – IV (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
BIHAR														
Bhagalpur	a	18	16	18	15	8	2	0	0	0	7	14	19	117
	b	1	1	1	1	2	6	8	6	6	3	1	1	37
	c	1.6	1.7	1.8	2.2	2.7	5.6	6.6	6.5	5.9	3.1	1.8	1.6	3.4
Chapra	a	24	21	26	25	26	13	2	3	11	22	26	28	227
	b	2	2	1	1	1	7	13	8	6	2	1	1	45
	c	1.1	1.2	1.1	0.9	0.9	3.7	5.7	5.3	3.9	1.4	0.5	0.7	2.2
Darbhanga	a	26	24	28	27	28	17	7	8	12	25	28	29	259
	b	1	0	0	0	0	2	3	3	2	1	0	0	12
	c	0.7	0.6	0.5	0.4	0.4	2.0	3.6	3.5	2.8	0.9	0.3	0.4	1.3
Dehri	a	25	22	27	26	26	16	4	5	12	23	27	27	240
	b	3	3	2	2	2	9	18	16	10	4	1	2	72
	c	1.2	1.2	0.8	0.9	0.8	3.5	6.0	5.8	4.3	1.5	0.8	1.0	2.3
Forbesganj	a	22	18	22	17	13	3	0	0	2	15	22	25	159
	b	1	1	0	1	1	3	4	3	2	1	0	0	17
	c	1.3	1.3	1.2	1.8	2.0	4.2	5.1	5.0	4.3	1.9	1.0	1.0	2.5
Gaya	a	16	14	16	14	13	2	0	0	1	11	15	17	119
	b	1	1	1	1	0	5	9	7	5	2	1	1	34
	c	1.9	1.9	1.9	2.1	2.0	5.4	6.7	6.6	5.6	2.6	1.7	1.7	3.3
Jamui	a	24	21	29	25	22	13	2	2	5	17	24	27	211
	b	1	1	0	1	1	4	10	6	3	2	0	0	29
	c	0.7	1.0	0.4	0.9	0.9	2.6	5.1	5.0	4.0	2.2	0.7	0.4	2.0
Motihari	a	26	21	25	23	24	14	2	2	5	23	26	27	218
	b	1	2	1	1	2	5	13	13	10	2	1	1	52
	c	1.1	1.2	1.0	1.2	1.3	3.6	5.6	5.3	4.3	1.4	0.5	0.7	2.3
Muzaffarpur	a	23	21	24	24	24	9	2	3	6	22	24	25	207
	b	2	1	1	1	1	4	9	6	5	2	1	1	34
	c	1.3	1.3	1.0	0.9	1.0	3.5	5.2	4.9	4.1	1.4	0.7	0.8	2.2
Patna(A)	a	16	13	17	16	15	4	0	0	1	8	16	16	122
	b	1	1	0	0	0	3	4	3	2	1	0	1	16
	c	1.8	1.8	1.8	1.8	1.4	4.6	6.3	6.1	5.2	2.5	1.5	1.6	3.0
Purnea	a	20	17	19	15	13	3	0	0	1	15	20	20	143
	b	1	1	1	1	1	4	6	3	3	1	0	1	23
	c	1.1	1.3	1.3	1.6	2.0	4.5	5.8	5.5	4.8	2.1	1.0	1.0	2.7
Raxaul	a	15	12	13	11	6	1	0	0	0	5	17	19	99
	b	1	1	0	0	0	2	3	3	2	1	0	0	13
	c	2.1	2.1	2.1	2.5	2.5	4.3	6.1	6.1	5.1	2.5	1.2	1.3	3.2
Sabour	a	19	16	19	16	12	2	0	0	1	11	17	20	133
	b	1	1	1	1	1	5	6	4	4	2	1	1	28
	c	1.5	1.6	1.6	1.9	2.4	5.3	6.4	6.2	5.5	2.8	1.6	1.4	3.2
Supaul	a	25	22	26	23	25	14	5	6	12	21	27	26	232
	b	1	1	0	1	1	3	6	3	4	2	1	1	24
	c	0.8	0.9	0.6	0.8	0.8	3.0	4.3	4.2	3.2	1.5	0.3	0.5	1.7
State Mean	**a**	**21**	**18**	**22**	**20**	**18**	**8**	**2**	**2**	**5**	**16**	**22**	**23**	**15**
	b	**1**	**1**	**1**	**1**	**1**	**4**	**7**	**6**	**5**	**2**	**1**	**1**	**3**
	c	**1.3**	**1.4**	**1.2**	**1.4**	**1.5**	**4.0**	**5.6**	**5.4**	**4.5**	**2.0**	**1.0**	**1.0**	**2.5**

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.

TABLE – V

MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS

BIHAR

DISTRICT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Araria	a	10.6	8.8	11.1	37.3	120.2	266.8	485.9	350.7	312.4	68.7	5.5	7.3	1685.3
	b	0.7	0.6	0.8	2.2	5.5	10.0	16.2	13.3	10.7	3.0	0.3	0.6	63.9
Arwal	a	11.2	5.7	4.8	1.8	15.1	100.2	259.7	246.0	170.8	33.0	5.2	4.4	857.9
	b	0.9	0.7	0.4	0.1	1.0	4.8	11.4	11.6	8.6	1.9	0.4	0.5	42.3
Aurangabad	a	14.2	13.6	7.9	6.2	18.5	116.1	308.1	259.2	195.7	41.9	8.2	6.3	995.9
	b	1.1	1.1	0.7	0.6	1.3	5.3	13.1	12.1	8.6	2.2	0.5	0.6	47.2
Banka	a	8.9	9.6	10.0	12.1	44.3	126.9	288.2	252.8	206.7	78.6	11.8	6.9	1056.8
	b	0.9	0.9	0.8	0.9	3.0	7.2	13.3	12.2	9.9	3.5	0.5	0.6	53.7
Begusarai	a	10.7	8.1	9.1	14.1	38.0	149.7	309.6	276.9	222.9	60.2	6.0	5.0	1110.3
	b	0.9	0.8	0.7	0.8	2.4	6.5	13.1	11.7	8.6	2.1	0.4	0.4	48.4
Bhabhua	a	14.4	12.6	8.5	4.3	13.5	112.4	263.4	261.6	232.3	34.3	6.9	5.9	970.1
	b	1.1	1.0	0.7	0.5	1.1	5.1	12.0	11.7	8.9	1.9	0.3	0.5	44.8
Bhagalpur	a	13.4	7.5	9.6	16.7	63.7	173.3	308.4	264.1	248.9	84.3	7.0	6.5	1203.4
	b	0.9	0.9	0.8	1.3	3.5	8.2	13.8	12.4	9.8	3.2	0.3	0.5	55.6
Bhojpur	a	15.0	8.8	7.1	5.1	16.6	105.8	306.6	275.5	211.1	44.7	6.9	4.7	1007.9
	b	1.1	0.8	0.6	0.4	1.0	4.6	11.7	11.6	8.5	2.1	0.4	0.4	43.2
Buxar	a	10.7	9.5	4.5	5.0	16.3	96.6	279.4	246.9	176.9	38.4	7.2	6.9	898.3
	b	0.9	0.8	0.4	0.4	1.1	4.6	11.8	11.0	8.4	2.1	0.4	0.6	42.5
Darbhanga	a	10.9	7.6	7.5	19.4	57.4	160.7	314.7	260.6	184.0	60.1	5.4	5.4	1093.7
	b	0.8	0.7	0.7	1.4	3.2	6.6	12.5	10.6	8.1	2.2	0.3	0.5	47.6
E. Champaran	a	13.0	10.3	8.5	16.5	52.1	193.3	361.9	309.1	218.3	62.6	5.9	7.0	1258.5
	b	1.1	0.8	0.7	1.1	3.0	7.1	12.8	11.4	8.3	2.4	0.4	0.5	49.6
Gaya	a	11.7	10.1	12.2	4.7	17.2	133.2	267.7	248.9	179.4	40.8	8.3	7.1	941.3
	b	0.9	0.9	0.7	0.4	1.2	5.9	12.4	12.2	8.8	2.1	0.5	0.7	46.7
Gopalganj	a	14.8	11.7	7.1	12.6	36.4	154.2	317.2	292.1	216.2	52.6	6.4	10.0	1131.3
	b	0.9	0.9	0.6	0.9	2.1	5.7	12.3	11.4	8.6	2.1	0.4	0.7	46.6
Jahanabad	a	10.2	8.3	5.3	8.2	20.3	97.2	238.4	242.6	182.0	32.1	7.0	6.6	858.2
	b	0.8	1.0	0.6	0.5	1.3	4.9	11.3	12.1	8.5	1.7	0.5	0.7	43.9
Jamui	a	10.7	6.5	7.2	10.0	34.9	153.5	311.0	267.1	247.4	67.5	6.3	5.4	1127.5
	b	0.9	0.7	0.6	0.8	2.2	7.3	13.8	12.6	10.2	2.9	0.4	0.4	52.8
Katihar	a	9.8	8.0	9.4	29.2	105.9	209.6	366.5	282.8	278.5	74.2	7.1	6.8	1387.8
	b	0.7	0.7	0.6	1.7	4.9	8.5	14.7	11.7	9.9	3.1	0.4	0.5	57.4
Khagaria	a	9.0	4.6	7.4	15.3	49.6	187.5	317.6	266.1	236.3	69.7	5.1	4.9	1173.1
	b	0.5	0.5	0.5	0.9	2.5	6.8	12.5	10.9	8.8	2.6	0.4	0.3	47.2
Kishanganj	a	8.4	5.9	15.9	52.5	166.5	374.7	642.0	471.4	382.7	83.2	6.9	4.9	2215.0
	b	0.5	0.5	0.9	2.7	7.2	12.2	17.5	14.6	12.2	3.1	0.4	0.4	72.2
Lakhisarai	a	6.0	8.4	3.9	5.7	30.1	119.8	270.6	231.6	186.4	38.0	4.4	7.0	911.9
	b	0.5	0.7	0.3	0.5	1.8	6.0	11.8	11.7	8.6	1.9	0.3	0.4	44.5
Madhepura	a	9.6	7.2	10.6	24.6	79.9	196.0	351.2	294.2	248.5	65.7	9.1	6.6	1303.2
	b	0.8	0.6	0.9	1.5	4.2	8.0	14.2	12.2	9.9	2.8	0.5	0.6	56.2
Madhubani	a	10.4	7.4	8.1	23.7	64.7	181.7	371.7	296.6	189.4	58.0	4.1	5.5	1221.3
	b	0.7	0.6	0.6	1.7	3.4	7.0	12.9	10.7	7.9	2.2	0.3	0.4	48.4
Munger	a	14.5	6.2	9.6	13.2	41.4	172.7	286.4	264.4	236.0	73.0	7.0	6.1	1130.5
	b	0.9	0.7	0.7	1.1	2.3	7.2	12.9	12.3	9.9	2.8	0.4	0.5	51.7
Muzaffarpur	a	12.2	11.1	5.9	16.6	54.1	163.9	323.8	296.1	198.3	54.2	9.6	5.2	1151.0
	b	0.9	0.9	0.6	1.1	3.1	6.4	12.8	11.5	8.7	2.2	0.5	0.4	49.1
Nalanda	a	11.5	8.4	8.6	7.7	26.7	131.4	292.5	252.7	194.4	49.9	5.7	5.9	995.4
	b	0.8	0.8	0.7	0.6	1.6	5.7	12.5	11.5	8.5	2.2	0.4	0.5	45.8
Nawada	a	11.2	8.7	7.7	5.3	35.6	135.3	277.4	260.3	187.5	61.6	6.6	7.1	1004.3
	b	0.9	0.9	0.7	0.5	2.0	6.0	12.4	12.3	9.0	2.5	0.4	0.6	48.2

TABLE – V
MEAN RAINFALL (mm) AND NUMBER OF RAINY DAYS
BIHAR

DISTRICT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Patna	a	10.7	8.3	7.4	9.3	27.6	116.4	304.9	238.0	201.3	52.7	5.0	3.1	984.7
	b	1.0	0.8	0.7	0.7	1.6	5.3	12.6	10.9	8.6	2.2	0.3	0.4	45.1
Purnea	a	9.3	8.7	12.2	36.9	127.4	277.3	479.0	358.4	322.2	84.9	8.0	8.5	1732.8
	b	0.7	0.7	0.9	2.1	5.7	10.0	16.7	13.8	11.2	3.3	0.5	0.6	66.2
Rohtas	a	12.2	14.2	7.6	5.9	15.1	105.1	310.7	263.4	209.8	36.7	7.5	6.2	994.4
	b	1.0	1.1	0.7	0.5	1.1	4.9	12.6	11.9	8.7	1.8	0.4	0.6	45.3
Saharsa	a	9.9	9.0	12.0	24.8	71.9	189.2	338.1	316.0	245.5	62.5	7.2	3.7	1289.8
	b	0.8	0.8	0.8	1.5	3.7	8.0	13.6	12.9	9.8	2.8	0.5	0.3	55.5
Samastipur	a	12.6	10.6	8.8	17.4	50.8	162.6	299.8	278.9	231.2	47.1	8.8	6.6	1135.2
	b	1.0	0.9	0.8	1.2	2.9	6.8	12.4	12.1	9.4	2.2	0.5	0.6	50.8
Saran	a	13.8	10.1	6.1	7.4	28.8	132.9	299.8	282.8	206.7	53.3	6.0	3.9	1051.6
	b	1.1	0.7	0.5	0.6	1.7	5.4	12.0	11.7	8.4	2.0	0.4	0.4	44.9
Shekhpura	a	12.9	7.8	6.7	9.0	31.0	144.9	281.3	236.7	193.1	62.5	5.7	5.0	996.6
	b	0.9	0.8	0.6	0.6	1.7	6.0	12.1	11.1	8.5	2.2	0.4	0.5	45.4
Sheohar	a	12.9	9.8	11.2	18.7	64.1	168.5	343.8	273.0	179.0	45.6	2.8	8.0	1137.4
	b	0.7	0.7	0.6	1.2	3.5	5.9	12.4	9.6	7.5	1.8	0.2	0.5	44.6
Sitamarhi	a	14.8	10.0	11.5	25.1	66.7	189.0	383.0	318.4	207.1	64.3	4.6	7.2	1301.7
	b	0.9	0.7	0.8	1.5	3.5	6.5	12.8	10.5	8.0	2.4	0.4	0.5	48.5
Siwan	a	11.5	10.1	6.8	9.1	29.3	133.3	309.4	279.8	227.9	45.2	6.5	5.9	1074.8
	b	0.8	0.8	0.7	0.7	1.9	5.1	12.5	11.1	8.6	2.0	0.4	0.5	45.1
Supaul	a	8.2	8.7	12.0	27.9	88.4	223.8	381.0	308.5	234.9	70.4	5.2	4.0	1373.0
	b	0.8	0.8	0.8	1.8	4.4	8.3	14.3	12.3	9.8	2.5	0.4	0.4	56.6
Vaishali	a	8.6	8.3	6.2	12.5	41.7	133.4	321.7	253.3	191.1	58.4	5.5	5.5	1046.2
	b	0.8	0.8	0.6	0.8	2.3	5.6	13.0	11.0	8.2	2.3	0.4	0.5	46.3
W.Champaran	a	13.9	11.4	10.9	22.1	69.5	208.5	432.5	356.8	234.0	57.6	5.7	11.2	1434.1
	b	1.1	1.0	0.9	1.5	3.8	7.7	13.6	12.2	8.2	2.3	0.4	0.6	53.3
State Mean	**a**	**11.5**	**9.9**	**12.0**	**23.8**	**56.4**	**164.6**	**324.8**	**276.0**	**216.9**	**83.1**	**6.4**	**6.0**	**1191.2**
	b	**0.9**	**0.8**	**0.8**	**1.4**	**3.0**	**6.7**	**12.8**	**11.5**	**8.8**	**3.5**	**0.4**	**0.5**	**50.0**

a : Normal Rainfall (mm)

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

TABLE – VI
MEAN RAINFALL (mm) OVER DIFFERENT RIVER CATCHMENTS OF BIHAR

Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*

1. **River Hoogli and River Mor (Catchment No. 325)**

Districts/parts of districts within this Catchment:

Jamui

12.1	11.1	10.6	10.8	47.7	209.9	380.0	284.6	296.2	96.9	9.4	4.4	1373.7

2. River Ganga between its confluence with River Yamuna and River Ghaghra (including Gomti (Catchment No. 409)

Districts/parts of districts within this Catchment:

Bhabhua, Bhojpur, Buxar, Gaya, Patna, Rohtas

13.8	10.0	7.6	5.1	15.7	107.0	288.0	264.2	208.3	40.2	7.4	5.2	972.5

3. River Ghaghra excluding its course in trans-Himalayan region (including River Sarada) upto its confluence with River Ganga (Catchment No. 411)

Districts/parts of districts within this Catchment:

Gopalganj, Saran, Siwan, Sheohar, West Champaran

12.6	9.7	6.8	10.0	33.3	141.0	329.6	293.7	211.2	51.5	5.9	6.3	1111.5

4. River Gandak-trans-Himalayan region (Catchment No. 412)

Districts/parts of districts within this Catchment:

West Champaran

13.6	16.8	18.9	27.0	104.4	292.6	596.7	481.6	290.4	79.6	9.0	36.7	1967.4

5. Rest of River Gandak upto its confluene with River Ganga (Catchment No. 413)

Districts/parts of districts within this Catchment:

East Champaran , Gopalganj, Saran, Siwan, Vaishali, West Champaran

14.1	9.2	8.0	11.7	35.5	154.5	330.1	292.2	216.4	58.2	5.5	6.2	1143.5

6. River Sone (Catchment No. 414)

Districts/parts of districts within this Catchment:

Aurangabad, Arwal, Bhojpur, Gaya, Nawada, Patna, Rohtas, Saran

13.6	15.4	12.5	6.1	21.0	116.5	299.4	255.6	197.8	38.3	6.2	5.8	988.4

7. River Ganga between its confluence with River Sone and River Kosi, excluding River Kosi (Catchment No. 415)

Districts/parts of districts within this Catchment:

Arwal, Aurangabad, Bhagalpur, Banka, Begusrai, Buxar, East Champaran, Gaya, Jahanabad, Jamui, Katihar, Khagaria, Lakhisarai, Munger, Muzaffarpur, Nalanda, Nawada, Patna, Purnea, Samastipur, Shekhpura, Sitamarhi, Siwan, Supaul, Vaishali, West Champaran

12.3	9.1	8.5	13.0	43.1	155.4	317.5	274.3	213.2	59.6	6.9	5.9	1118.7

TABLE – VI (contd…)
MEAN RAINFALL (mm) OVER DIFFERENT RIVER CATCHMENTS OF BIHAR

Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*

8. River Kosi from Barahakshetra dam site to its confluence with River Ganga (Catchment No. 417)

Districts/parts of districts within this Catchment:

Araria, Begusarai, Darbhanga, Katihar, Khagaria, Madhepura, Madhubani, Munger, Purnea, Saharsa, Sitamarhi, Supaul

10.3	7.7	10.4	26.0	76.8	199.0	371.9	300.7	226.0	68.0	5.8	5.5	1308.1

9. River Ganga from its confluence with River Kosi to Bangladesh Border (Catchment No. 418)

Districts/parts of districts within this Catchment:

Araria, Jamui, Katihar, Kishanganj, Purnea

9.6	7.1	13.1	44.7	141.0	290.8	523.9	379.1	334.3	76.5	6.4	6.9	1833.4

TABLE – VII

STORMS AND DEPRESSIONS AFFECTING BIHAR STATE

DURING 1891 – 2010

MONTH	***NO. OF STORMS/ DEPRESSIONS***
January	NIL
February	NIL
March	NIL
April	NIL
May	05
June	17
July	12
August	18
September	43
October	17
November	01
December	NIL
Total	**113**

DISTRICT CLIMATOLOGICAL SUMMARIES

ARARIA DISTRICT

The climate of this district is characterized by mild winter, hot summer and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till about the middle of March. This is followed by the summer season which continues till mid June, when the southwest monsoon commences. The period from June to September is the southwest monsoon season followed by post monsoon season during October and November. November is a transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 10 raingauge stations for the period ranging from 11 to 43 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 1685.3 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 485.9 mm. The variation in the annual rainfall from year to year is large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1974 when it amounted to 144% of the normal, while 1951 was the year with the lowest rainfall and it was 43% of the normal. In this fifty year period there were 8 years when the rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall was between 1301 mm and 2100 mm in 29 years out of 48.

On an average there are 64 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 54 at Bargawan to 71 at Forbesganj observatory.

The heaviest rainfall recorded in 24 hours at any station in the district was 385.0 mm at Araria on 10 September 1991.

TEMPERATURE

There is one meteorological observatory in the district at Forbesganj. The description of climate of this district is based on the meteorological data of this observatory. The cold season commences from late November when both day and night temperatures begin to decrease rapidly with the advance of the cold season. January is the coldest month with the mean maximum temperature at 23.5°C and the mean minimum temperature at 9.4°C. In winter, when cold waves affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 34°C and mean minimum temperature at 23.3°C. In the latter part of the summer season and beginning June the maximum temperatures may sometimes be above 42°C. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief from hot weather as the weather is uncomfortable on account of the increased moisture in air and continuing high night temperatures. In October day temperature remains as high as in the monsoon months, while the nights are cooler.

The highest maximum temperature ever recorded at Forbesganj was 43.4°C on 02 May 1966 and the lowest minimum temperature ever recorded was 2.0°C on 05 January 1990. .

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 40% to 55%. The humidity is high during the monsoon period when it is between 70% to 85%. The relative humidity during the rest of the year generally varies between 55% to 85%.

CLOUDINESS

The skies are heavily clouded to overcast during southwest monsoon months. The skies are generally clear or lightly clouded in the winter, but cloudiness increases from the late summer.

WINDS

Light easterly or westerly winds prevail in the winter and early summer season. In April moderate easterly winds begin and predominate throughout the southwest monsoon and early winter months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months, which move in westerly/northwesterly direction towards the district or its neighbourhood, cause widespread heavy rain and strong winds. Thunderstorms occur during the summer and southwest monsoon season. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

Table 3, 4, 5 and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Forbesganj observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
ARARIA

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Araria	43	a	11.4	5.2	15.0	35.4	122.5	222.8	432.1	354.3	304.8	75.5	5.9	4.8	1589.7	165	24	385.0	10 Sep1991
		b	0.9	0.6	1.1	2.3	6.0	10.2	16.7	14.0	11.5	3.4	0.5	0.5	67.7	(1974)	(1964)		
Bargawan	20	a	7.2	8.7	7.6	16.8	87.5	208.8	358.6	268.0	265.0	72.6	7.2	8.2	1316.2	142	61	173.0	04 Oct 2001
		b	0.5	0.5	0.6	1.2	4.3	8.4	13.8	12.1	8.9	2.9	0.3	0.8	54.3	(1989)	(1992)		
Forbesganj	34	a	8.6	10.7	13.7	48.8	127.5	239.9	538.5	400.2	282.2	75.6	6.7	8.1	1760.5	195	23	342.9	26 Jul 1934
		b	0.7	0.7	0.9	2.5	5.4	9.8	16.2	13.8	10.7	3.0	0.4	0.6	64.7	(1977)	(1951)		
Forbesganj (Obsy)	40	a	15.1	10.6	15.9	38.3	103.0	307.2	457.9	354.2	253.6	89.6	7.6	3.3	1656.3	142	65	300.0	14 Aug1996
		b	1.1	1.0	1.4	2.7	5.9	12.0	17.8	14.6	10.7	3.5	0.5	0.3	71.5	(1955)	(1972)		
Jakihat	11	a	12.0	9.8	3.3	19.1	106.1	283.1	435.6	311.8	369.3	50.0	0.0	8.8	1608.9	145	63	202.5	29 Sep1989
		b	0.5	0.5	0.5	1.4	4.7	10.2	13.8	12.0	10.0	2.4	0.0	0.7	56.7	(1998)	(1992)		
Kursakanta	27	a	12.1	8.8	14.7	54.8	150.9	290.7	574.7	394.7	319.0	63.2	6.2	9.8	1899.6	184	45	295.0	08 Jul 1988
		b	0.7	0.8	1.0	2.9	6.2	10.1	17.0	13.0	11.7	3.2	0.5	0.7	67.8	(1974)	(1992)		
Narpatganj	35	a	7.0	7.9	14.9	39.9	114.8	258.6	476.2	356.2	302.6	63.6	7.8	4.1	1653.6	137	59	300.0	27 Sep1968
		b	0.5	0.4	1.0	2.2	4.9	9.6	15.9	12.1	9.8	2.4	0.4	0.4	59.6	(1998)	(1992)		
Palasi	11	a	13.5	10.8	2.8	25.4	87.9	294.1	442.9	296.6	355.5	59.8	0.0	11.1	1600.4	137	56	187.0	29 Sep1989
		b	0.9	0.6	0.4	1.9	4.9	10.3	16.3	15.1	11.4	2.8	0.0	0.8	65.4	(1989)	(1992)		
Raniganj (East)	36	a	9.4	10.3	11.7	42.8	129.6	242.1	512.0	386.5	295.9	72.7	5.5	4.8	1723.3	172	50	240.0	18 Sep1967
		b	0.6	0.7	0.7	1.8	5.6	9.3	17.0	13.7	11.0	3.0	0.4	0.6	64.4	(1980)	(1992)		
Sikaty	21	a	9.6	5.5	11.3	51.4	172.0	320.6	630.3	384.1	375.8	64.2	7.7	10.3	2042.8	142	59	294.0	2 Jul 2000
		b	0.8	0.5	0.7	3.1	6.8	10.5	17.7	13.0	11.6	2.9	0.3	0.6	68.5	(1998)	(1994)		
Araria (District)		a	10.6	8.8	11.1	37.3	120.2	266.8	485.9	350.7	312.4	68.7	5.5	7.3	1685.3	144	43		
		b	0.7	0.6	0.8	2.2	5.5	10.0	16.2	13.3	10.7	3.0	0.3	0.6	63.9	(1974)	(1951)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
ARARIA
(Data 1951-2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	1	1601 - 1700	2
801 - 900	0	1701 - 1800	8
901 - 1000	1	1801 - 1900	4
1001 - 1100	1	1901 - 2000	3
1101 - 1200	3	2001 - 2100	0
1201 - 1300	2	2101 - 2200	6
1301 - 1400	4	2201 - 2300	2
1401 - 1500	4	2301 - 2400	2
1501 - 1600	4	2401 - 2500	1

(Data available for 48 years)

TABLE – 3
Normals of Temperature and Relative Humidity
(FORBESGANJ)

MONTH	Mean Maximum Temperature	Mean 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	23.5	19.4	33.6	03 Jan 1982	2.0	05 Jan 1990	83	63
February	26.1	11.3	33.3	28 Feb 1955	4.9	05 Feb 1964	73	53
March	31.3	15.6	39.2	31 Mar 1986	6.9	04 Mar 1965	59	40
April	34.2	20.6	42.8	29 Apr 1954	10.3	01 Apr 1968	60	41
May	34.0	23.3	43.4	02 May 1966	15.4	13 May 1996	69	56
June	33.1	25.1	42.6	06 Jun 1979	19.0	14 Jun 1996	80	70
July	31.9	25.5	40.6	04 Jul 1993	20.4	29 Jul 1982	85	77
August	32.3	25.3	39.0	21 Aug 1957	11.4	21 Aug 1989	83	77
September	32.0	24.8	38.2	08 Sep 1982 04 Sep 1989	18.0	02 Sep 1996	82	76
October	31.4	21.7	39.4	31 Oct 1953	12.5	04 Oct 1966	78	73
November	28.9	15.7	35.6	06 Nov 1996	7.6	30 Nov 1996	77	67
December	25.4	10.6	34.2	03 Dec 1993	4.4	27 Dec 1989	83	66
Annual	30.3	19.1	43.4	02 May 1966	2.0	05 Jan 1990	76	63

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies (FORBESGANJ)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	23	21	23	17	10	2	0	0	2	13	22	25	158
b	2	1	1	2	4	10	14	10	6	3	1	1	55
c	1.2	1.2	1.3	2.2	3.2	5.5	6.3	5.8	5.0	2.6	1.2	1.0	3.0
1730 HOURS IST													
a	22	18	22	17	13	3	0	0	2	15	22	25	159
b	1	1	0	1	1	3	4	3	2	1	0	0	17
c	1.3	1.3	1.2	1.8	2.0	4.2	5.1	5.0	4.3	1.9	1.0	1.0	2.5

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction (FORBESGANJ)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.8	4.8	7.2	9.0	9.1	9.2	7.8	7.6	6.4	3.9	2.6	2.8	6.2
Direction in morning	W/E	W/E	E	E	E	E	E	E	E	E	E	C/W/E	
Direction in evening	C/W	W	W	W/E	E	E	E	E	E/C	C/W	C	C/W	

TABLE - 6
Special Weather Phenomena (FORBESGANJ)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.2	0.5	1.3	3.6	7.8	9.2	9.3	8.6	8.0	2.1	0.4	0.0	51.0
Hail	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Dust storm	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Squall	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Fog	4.0	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.9	2.8	9.1

ARWAL DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon period October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 3 raingauge stations, for period ranging from 15 to 35 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 857.9 mm. The rainfall in the southwest monsoon season constitutes about 91% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 259.7 mm. The variation of the annual rainfall from year to year is large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 153% of the normal occurred in 1959. The lowest annual rainfall which was 55% of the normal occurred in 1954. In this fifty year period, there were 7 years when the annual rainfall in the district was less than 80% of the normal, out of which two years were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 601 mm and 1100 mm in 18 years out of 28.

On an average there are 42 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 41 at Karpy to 45 at Arwal.

The heaviest rainfall in 24 hours recorded at any station in the district was 266.7 on 22 July 1919 at Arwal.

TEMPERATURE

There is no meteorological observatory in the district. The climatological description of the district which follows is based on the meteorological records of Patna and Gaya observatories in the neighbouring districts. The cold season commences from late November when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9.0°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 39°C and the mean minimum temperature at about 25°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperatures with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief as the weather is uncomfortable on account of the increase moisture in air and continuous high night temperatures. In October while day temperature remains as high as in the monsoon months, while the night temperatures begin to decrease progressively and nights are cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In post monsoon, winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district during winter season in association with passage of western disturbance across the state.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
ARWAL

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
Arwal	35	a	17.0	5.9	5.0	1.7	7.2	110.1	267.0	238.3	192.5	28.0	5.6	3.6	881.9	198	56	266.7	22 Jul 1919
		b	1.2	0.9	0.5	0.2	0.8	5.0	11.9	12.1	9.4	1.9	.3	0.4	44.6	(1953)	(1998)		
Karpy	15	a	5.0	3.7	5.1	0.0	22.7	71.0	286.7	245.2	161.8	34.4	5.0	5.8	846.4	132	66	152.0	2 Jul 1986
		b	0.5	0.5	0.5	0.0	1.2	3.6	11.5	11.6	8.3	1.9	0.4	0.6	40.6	(1997)	(1998)		
Kurtha	34	a	11.6	7.5	4.3	3.8	15.3	119.6	225.4	254.6	158.2	36.5	4.9	3.7	845.4	156	17	187.6	22 Aug 1989
		b	1.1	0.8	0.3	0.2	1.0	5.8	10.7	11.0	8.1	2.0	0.4	0.4	41.8	(1959)	(1954)		
Arwal (District)		a	11.2	5.7	4.8	1.8	15.1	100.2	259.7	246.0	170.8	33.0	5.2	4.4	857.9	153	55		
		b	0.9	0.7	0.4	0.1	1.0	4.8	11.4	11.6	8.6	1.9	0.4	0.5	42.3	(1959)	(1954)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
ARWAL
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	901 - 1000	4
501 - 600	4	1001 - 1100	2
601 - 700	2	1101 - 1200	2
701 - 800	5	1201 - 1300	2
801 - 900	5	1301 - 1400	1

(Data available for 28 years)

AURANGABAD DISTRICT

The climate of this district is generally hot in summer, mild humid and cold in winter, humid in monsoon season. The cold season starts late in November and lasts till March. April to mid June is the hot season. The period from mid June to about the first week of October constitutes the southwest monsoon season. The succeeding period till late November is the post monsoon or transition period.

RAINFALL

Records of rainfall in the district are available for 13 stations for the period ranging from 19 to 45 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 995.9 mm. The rainfall is largely confined to the southwest monsoon season when 88% of the annual rainfall is received. July is the generally the month with the highest rainfall with an average value of 308.1 mm. The variation from year to year of the annual rainfall is not very large. In the fifty years period 1951 to 2000, the highest annual rainfall occurred in 1961 when it amounted to 161% of the normal. The lowest annual rainfall which was 50% of the normal occurred in 1966. In this fifty year period there were 6 years when the rainfall was less than 80% of the normal. Considering the district as a whole, there were two occasions when such a low rainfall occurred in two consecutive years. It is seen from Table 2 that the annual rainfall was between 801 mm and 1200 mm in 36 years out of 47.

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 41 at Goh to 54 at Palmerganj Hydro.

The heaviest rainfall recorded in 24 hours at any station in the district was 448.0 mm at Aurangabad Hydro on 07 July 2004.

TEMPERATURE

There is no meteorological observatory in the district. So, the description, which follows is based on the data of Dehri observatory in the neighbouring district. The summer season starts from March with appreciable rise in day and night temperature. May is the hottest month of the season with the mean maximum temperature at about 41°C and mean minimum temperature at about 24°C. During May and early June the maximum temperature may go upto 47°C on individual days. There is a fall in day temperature after the onset of the monsoon in second week of June. The night temperature however, continues to be high. The temperature falls appreciably from mid October after the withdrawal of the monsoon. Generally January is the coldest month of the season with the mean maximum temperature at about 24°C and the mean minimum temperature at about 9°C. In association with western disturbances which move across the state during winter season, cold wave conditions prevail in the district and the minimum temperature may fall to about 2°C.

HUMIDITY

Humidity remains high about 75% to 80% during monsoon season. Thereafter, humidity decreases and remains between 55% and 70% in the post monsoon and winter season. Summer is the driest part of the year when humidity is about 25% to 35% in the afternoons.

CLOUDINESS

During monsoon season sky is generally heavily clouded to overcast. Thereafter cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer season.

WINDS

Winds are generally light to moderate throughout the year. In the morning winds are generally calm or blow from west-southwest and south direction in post monsoon, winter and early summer period. However, during afternoon westerlies are predominant. Thereafter, easterly/southeasterly/westerly winds blow predominantly in the morning during southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Depressions originating in Bay of Bengal during monsoon period which move in westerly/northwesterly direction towards the district and its neighbourhood, cause heavy rainfall and thunderstorms. Thunderstorms also occur during pre-monsoon period occasionally. Fog occurs occasionally during post monsoon and winter seasons.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
AURANGABAD

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST R/F IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Aurangabad	39	a	17.7	12.3	13.1	6.5	12.9	106.7	304.3	290.9	186.9	48.0	7.8	5.8	1012.9	144	51	343.4	29 Aug 1940
		b	1.6	1.3	1.1	0.7	1.1	5.7	13.8	13.5	8.8	2.4	0.5	0.6	51.1	(1978)	(1966)		
Aurangabad (Hydro)	19	a	11.7	18.7	11.8	7.9	24.2	121.3	341.1	240.4	183.6	51.4	10.7	6.2	1029.0	144	81	448.0	07 Jul 2004
		b	1.2	1.4	1.1	0.8	1.9	5.5	14.2	12.3	9.8	2.6	0.6	0.8	52.2	(1978)	(1995)		
Barun	32	a	16.4	12.7	6.1	5.7	23.8	95.3	303.3	264.9	207.4	35.6	8.3	6.0	985.5	162	45	300.0	09 Jul 1976
		b	0.9	1.2	0.5	0.5	1.2	4.5	13.6	12.4	8.3	1.7	0.6	0.6	46.0	(1987)	(1979)		
Daudnagar (Haspu)	43	a	16.9	11.0	4.7	5.4	20.8	118.9	317.5	248.1	182.9	42.7	8.3	6.3	983.5	145	58	252.0	11 Sep 1987
		b	1.2	1.0	0.6	0.6	1.2	4.9	12.8	12.3	8.3	2.1	0.5	0.6	46.1	(1997)	(1979)		
Deo	45	a	15.5	9.5	9.5	5.3	12.1	125.6	278.3	257.8	199.4	51.8	10.1	7.2	982.1	183	35	330.7	07 Sep 1919
		b	1.4	0.9	0.8	0.6	1.0	5.8	12.9	12.7	8.4	2.6	0.5	0.8	48.4	(1956)	(1966)		
Goh	33	a	9.9	14.1	5.9	4.7	17.8	108.1	310.4	223.6	185.0	30.8	8.4	4.8	923.5	152	52	195.0	16 Sep 1976
		b	0.6	1.0	0.6	0.3	1.1	4.8	12.2	10.2	7.9	1.7	0.5	0.4	41.3	(1977)	(1965)		
Haspur	27	a	14.9	15.7	8.3	8.2	18.1	98.7	329.6	227.3	190.9	34.6	6.6	4.9	957.8	140	65	194.5	16 Sep 1976
		b	1.0	1.3	0.7	0.7	1.3	4.9	12.7	10.7	8.0	1.7	0.3	0.5	43.8	(1997)	(1975)		
Kutumba	20	a	11.8	10.5	8.4	4.6	22.1	125.9	284.4	302.5	248.7	49.8	7.2	5.9	1081.8	127	73	161.4	26 Jun 1993
		b	0.9	1.1	0.7	0.5	1.7	5.6	13.6	13.6	10.0	2.7	0.6	0.6	51.6	(1989)	(1992)		

TABLE – 1(contd….)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Madhanpur	25	a	12.9	19.2	5.5	8.4	28.8	124.4	311.7	271.3	210.8	57.1	10.7	10.0	1070.8	154 (1978)	62 (1988)	209.0	16 Sep 1976
		b	1.1	1.2	0.5	0.6	1.7	5.3	13.1	10.9	7.8	2.6	0.5	0.7	46.0				
Nabinagar	45	a	15.8	15.1	9.7	4.7	11.9	126.8	273.3	258.5	199.4	49.0	5.7	5.8	975.7	170 (1953)	59 (1966)	284.5	16 Sep 2005
		b	1.3	1.2	0.8	0.4	0.8	5.7	12.5	12.7	8.9	2.3	0.5	0.5	47.6				
Obra	22	a	5.8	9.5	3.0	5.0	16.6	111.5	313.7	267.5	175.5	27.7	11.1	5.3	952.2	171 (1969)	35 (1966)	155.0	05 Aug 1997
		b	0.6	0.5	0.5	0.5	1.2	4.4	12.6	12.0	6.9	1.8	0.5	0.6	42.1				
Palmerganj (Hydro)	22	a	13.3	19.5	10.3	6.9	20.2	129.4	346.2	266.7	181.5	32.6	6.2	9.9	1042.7	158 (1978)	67 (1979)	171.5	03 Jul 2002
		b	1.2	1.8	1.0	1.0	1.7	6.6	14.5	12.4	9.8	2.3	0.5	0.8	53.6				
Rafiganj	42	a	21.5	8.7	6.9	7.1	11.7	116.2	291.4	250.3	192.3	34.2	5.8	4.4	950.5	151 (1984)	51 (1975)	340.0	03 Jan1984
		b	1.0	0.7	0.5	0.4	0.9	4.8	12.1	11.6	8.3	2.2	0.3	0.5	43.3				
Aurangabad (District)		a	14.2	13.6	7.9	6.2	18.5	116.1	308.1	259.2	195.7	41.9	8.2	6.3	995.9	161 (1961)	50 (1966)		
		b	1.1	1.1	0.7	0.6	1.3	5.3	13.1	12.1	8.6	2.2	0.5	0.6	47.2				

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
AURANGABAD
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1001 - 1100	9
501 - 600	0	1101 - 1200	8
601 - 700	2	1201 - 1300	3
701 - 800	3	1301 - 1400	1
801 - 900	9	1401 - 1500	0
901 - 1000	10	1501 - 1600	1

(Data available for 47 years)

BANKA DISTRICT

The climate of this district is characterized by mild winter, hot summer and hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from December and lasts till the beginning of March. The summer season follows and continues till first week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 9 raingauge stations for the period ranging from 11 to 41 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 1056.8 mm. The rainfall in the southwest monsoon season constitutes about 83% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 288.2 mm. The variation of the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1968 when it amounted to 147% of the normal. 1951 was the year with the lowest rainfall and it was 41% of the normal. In this fifty year period the rainfall was less than 80 % of the normal in 8 years and there was one occasion each of two and four consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall was between 801 mm and 1300 mm in 29 years out of 39 years.

On an average there are 54 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 47 at Belhar to 59 at Chandan.

The heaviest rainfall in 24 hours at any station in the district was 400.0 mm at Barhat on 08 August 1990 .

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Jamui observatory in the neighbouring district may be taken as representative of the district in general. The cold season commences early in December when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 25°C and the mean minimum temperature is at about 11°C. In winter sometimes cold waves affect the district in the wake of western disturbances passing across north India, minimum temperatures may sometimes go down to about 4°C. The temperatures begin to increase rapidly from March till May. May is the hottest month with the mean maximum temperature at about 40°C and mean minimum temperature at about 26°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, but there is a little relief as the weather is unpleasant on account of the increased moisture in air and continuing high night temperatures. In October while day temperature remains as high as in the monsoon months, the nights however, are cooler.

HUMIDITY

Air remains humid throughout the year. Humidity remains high between 75% to 80% during southwest monsoon season, post monsoon and early part of winter season. During summer season humidity is less between 45% to 65%.

CLOUDINESS

Skies are heavily clouded to overcast in the monsoon months. During winter the sky remains cloudy for few days in association with western disturbances which affect the state. In summer season the skies are generally clear or lightly clouded, but towards the late summer the cloudiness increases in the afternoons.

WINDS

Winds are generally light with some increase in wind force in latter part of summer and early part of southwest monsoon season. Light easterly, northwesterly or westerly winds prevail in the winter and summer season. In southwest monsoon season moderate easterly winds prevail mostly but in winter they are less frequent.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/westerly direction towards the district or its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms also occur during the summer season and early post monsoon season. Dust storms occur occasionally in the summer months. Fog affects the district occasionally during winter season.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
BANKA

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Amarpur	29	a	18.3	4.8	6.3	9.4	35.7	113.2	261.7	209.3	210.4	68.0	6.4	3.5	947.0	148	52	308.5	24 Sep 1965
		b	1.2	0.7	0.6	0.8	2.5	7.2	12.2	11.2	10.0	3.0	0.2	0.5	50.1	(1951)	(1966)		
Banka	41	a	7.5	8.2	6.9	12.8	36.5	120.7	270.7	227.5	198.0	78.8	5.0	4.6	977.2	159	22	241.3	09 Aug 1942
		b	0.9	0.9	0.6	0.9	2.8	7.6	13.1	12.1	9.7	3.5	0.3	0.4	52.8	(1968)	(1951)		
Barhat	18	a	10.1	15.2	11.2	13.1	48.5	129.1	256.2	288.4	191.0	74.5	8.6	9.3	1055.2	161	67	400.0	08 Aug 1990
		b	0.9	1.6	0.8	1.1	3.7	7.9	12.8	12.9	10.3	3.9	0.4	0.8	57.1	(1990)	(1992)		
Baunsi	36	a	9.8	9.8	12.2	16.5	57.2	145.4	313.7	263.9	205.2	85.5	16.5	4.2	1139.9	266	52	236.7	08 Aug 1942
		b	0.7	.8	0.7	1.1	3.0	7.1	13.6	13.0	9.3	3.2	0.5	0.3	53.3	(1963)	(1966)		
Belhar	15	a	3.5	7.8	8.0	8.7	40.6	124.5	240.1	217.3	161.3	74.5	5.8	6.5	898.6	151	31	202.0	07 Oct 1986
		b	0.5	0.7	0.6	0.6	2.8	7.0	11.9	10.2	8.9	2.9	0.3	0.5	46.9	(1989)	(1978)		
Chandan	11	a	5.3	11.6	16.3	14.5	48.8	177.0	370.2	273.2	274.2	71.1	45.6	12.4	1320.2	182	72	240.4	25 Sep 1999
		b	0.7	1.0	1.0	1.0	3.3	8.4	14.0	12.9	10.5	3.6	1.2	0.9	58.5	(1999)	(1994)		
Katoria	40	a	11.8	9.3	15.5	18.5	54.3	155.8	274.2	255.1	235.3	93.3	5.8	6.1	1135.0	154	40	240.0	08 Aug 2004
		b	1.0	0.9	0.9	1.2	3.1	7.5	13.3	13.1	10.4	3.5	0.3	0.4	55.6	(1987)	(1964)		
Rajeon	15	a	4.9	5.6	7.6	9.6	37.2	97.4	286.3	223.2	174.5	85.8	7.2	6.7	946.0	132	52	213.5	25 Sep 1965
		b	0.6	0.7	0.7	0.8	2.9	6.8	15.5	11.2	8.8	3.9	.4	.8	53.1	(1977)	(1992)		
Shambuganj	11	a	8.5	13.9	6.0	5.8	39.9	79.1	320.4	317.6	210.2	76.1	4.9	8.6	1091.0	164	47	261.0	12 Aug 1998
		b	1.2	1.2	1.0	1.0	3.2	5.3	13.5	13.4	11.0	3.9	0.6	0.9	56.2	(1998)	(1992)		
Banka (District)		a	8.9	9.6	10.0	12.1	44.3	126.9	288.2	252.8	206.7	78.6	11.8	6.9	1056.8	147	41		
		b	0.9	0.9	0.8	0.9	3.0	7.2	13.3	12.2	9.9	3.5	0.5	0.6	53.7	(1968)	(1951)		

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 2006.
** Years of occurrence given in brackets.

TABLE – 2
Frequency of Annual Rainfall in the District
BANKA
(Data 1951 - 2000)

Range in mm	No. of Years	Range in mm	No. of Years
401 - 500	1	1001 - 1100	7
501 - 600	1	1101 - 1200	7
601 - 700	1	1201 - 1300	4
701 - 800	1	1301 - 1400	4
801 - 900	7	1401 - 1500	1
901 - 1000	4	1501 - 1600	1

(Data available for 39 years)

BEGUSARAI DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The period of post monsoon is October and November months, however November is transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 9 raingauge stations for the period ranging from 14 to 33 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 1110.3 mm. The rainfall in the southwest monsoon season constitutes about 86% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 309.6 mm. The variation from year to year of the annual rainfall is large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 149% of the normal. 1966 was the year with the lowest rainfall and it was 42% of the normal. In this fifty year period there were 10 years when the rainfall was less than 80% of the normal and there were two occasions of two consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall was between 901 mm and 1400 mm in 22 years out of 41.

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. This number varies from 43 at Cheriabariapur to 52 at Khudhavanthpur.

The heaviest rainfall in 24 hours at any station in the district was 412.0 mm at Begusarai on 20 September 1976.

TEMPERATURE

There is no meteorological observatory in the district. The climatological description of the district which follows is based on the basis of meteorological data of observatories at Patna and Bhagalpur in neighbouring districts where similar climatological conditions prevail. The cold season commences from late November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C to 3°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 38.0°C and the mean minimum temperature at about 25°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, night temperatures are as high as in summer months and there is little relief as the weather is uncomfortable on account of the increase moisture and heat. In October while day temperature remains as high as in the monsoon months, the night temperature drops progressively and the nights are cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon season. In the winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season and occasionally in the rest of the year.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
BEGUSARAI

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
Bachwara	17	a	12.9	10.0	9.1	11.5	30.7	143.5	305.7	284.2	237.8	29.4	12.1	8.7	1095.6	153	43	198.3	30 Jul 2003
		b	1.1	0.9	0.8	0.8	2.5	6.5	13.3	12.8	9.1	2.3	0.6	0.5	51.2	(1987)	(1992)		
Bakhri	21	a	6.4	7.4	3.4	11.4	37.6	119.5	267.7	217.3	168.0	61.8	1.8	5.4	907.7	168	37	200.0	03 Oct 1961
		b	0.8	0.8	0.4	0.6	2.4	5.5	13.1	10.8	7.4	2.4	0.1	0.5	44.8	(1963)	(1966)		
Begusarai	23	a	18.2	3.8	9.1	6.8	35.1	126.9	307.7	289.1	195.2	39.5	3.0	2.2	1036.6	152	27	412.0	20 Sep 1976
		b	1.1	0.5	0.5	0.5	2.3	6.1	12.7	11.9	7.8	2.1	.3	.1	45.9	(1959)	(1965)		
Bhagwanpur	33	a	8.7	11.6	8.6	11.5	31.2	151.3	329.7	290.5	219.7	88.8	4.5	3.4	1159.5	177	32	318.4	03 Oct 1961
		b	.7	1.0	.7	.7	2.0	7.0	14.1	12.7	8.1	2.5	0.3	0.3	50.1	(1980)	(1966)		
C.B.pur II(K.PU)	24	a	11.3	10.2	17.0	20.6	53.7	179.9	277.5	269.8	235.8	79.9	3.1	4.4	1163.2	164	44	283.0	02 Oct 1961
		b	0.8	0.9	1.1	1.0	2.6	6.9	12.1	11.3	9.2	1.9	0.4	0.5	48.7	(1987)	(1966)		
Cheriabariapur	14	a	11.5	5.4	3.6	9.0	26.2	103.8	235.7	262.6	239.6	87.0	10.9	1.6	996.9	175	45	370.1	03 Oct 1961
		b	0.8	0.6	0.2	0.6	1.8	5.4	10.7	12.1	8.0	1.8	0.9	0.1	43.0	(1993)	(1966)		
Khudhavathpur	27	a	14.5	9.5	7.3	23.0	49.2	235.5	438.6	388.0	302.3	60.4	4.4	5.5	1538.2	174	36	254.0	29 Jul 1989
		b	0.9	0.8	0.7	1.0	2.5	7.7	14.6	11.5	9.4	2.2	0.4	0.4	52.1	(1987)	(1979)		
Matihavi	16	a	7.4	7.7	13.9	19.0	36.5	157.3	307.8	249.8	204.9	46.7	10.1	8.2	1069.3	136	46	191.4	27 Sep 1993
		b	0.8	0.6	0.9	1.1	2.5	7.0	12.9	10.6	8.8	1.7	0.6	0.7	48.2	(1987)	(1994)		
Sahebpur Kanal	23	A	5.0	6.9	10.1	13.7	42.1	129.5	316.2	240.7	202.4	48.6	3.7	5.9	1024.8	141	37	197.0	12 Jul 2006
		b	0.7	0.7	0.9	0.8	2.7	6.3	14.6	11.2	9.6	2.2	0.4	0.6	50.7	(1984)	(1975)		
Begusarai (District)		a	10.7	8.1	9.1	14.1	38.0	149.7	309.6	276.9	222.9	60.2	6.0	5.0	1110.3	149	42		
		b	0.9	0.8	0.7	00.8	2.4	6.5	13.1	11.7	8.6	2.1	0.4	0.4	48.4	(1987)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
BEGUSARAI
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1101 - 1200	3
501 - 600	0	1201 - 1300	7
601 - 700	2	1301 - 1400	4
701 - 800	2	1401 - 1500	4
801 - 900	6	1501 - 1600	3
901 - 1000	2	1601 - 1700	1
1001 - 1100	6		

(Data available for 41 years only)

BHABHUA DISTRICT

The climate of this district is generally hot and dry in summer, mild humid and cold in winter, humid in monsoon season. The cold season starts late in November and lasts till March. April to mid June is the hot season. The period from mid June to about the first week of October constitutes the southwest monsoon season. The succeeding period till late November is the post monsoon or transition period.

RAINFALL

Records of rainfall in the district are available for 9 stations for the period ranging from 12 to 43 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 970.1 mm. The rainfall is largely confined to the southwest monsoon season when 90% of the annual rainfall is received. July and August are generally the months with the maximum rainfall with an average value of 262.5 mm. The variation from year to year of the annual rainfall is not large. In the fifty year period 1951 to 2000, the highest annual rainfall occurred in 1978 when it amounted to 161% of the normal. 1972 was the year with the lowest annual rainfall and it was 59% of the normal. In this fifty year period there were 5 years when the rainfall was less than 80% of the normal out of which two years were consecutive. It is seen from Table 2 that the annual rainfall was between 701 mm and 1200 mm in 32 years out of 44.

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 37 at Ramghar to 52 at Bhabhua Hydro.

The heaviest rainfall in 24 hours at any station in the district was 381.0 mm at Chand on 29 Aug 1940.

TEMPERATURE

There is no meteorological observatory in the district. So, the description of climate of this district is based on the meteorological data of Dehri observatory in the neighbouring district of Rohtas. The summer season starts from March with appreciable rise in day and night temperature. May is the hottest month of the season with the mean maximum temperature at about 40°C and mean minimum temperature at about 23°C. During May and early June the maximum temperature may go upto 47°C on individual days. There is a fall in day temperature after the onset of the monsoon in second week of June. The night temperature however, continues to be high. The temperature falls appreciably after the withdrawal of the monsoon by mid October. Generally January is the coldest month of the season with the mean maximum temperature at about 24°C and the mean minimum temperature at about 9°C. In association with western disturbances which move across the state during winter season, cold wave conditions prevail in the district and the minimum temperature may fall below freezing point.

HUMIDITY

Humidity remains high about 75% to 80% during monsoon season. Thereafter, humidity decreases and remains between 55% and 70% in the post monsoon and winter season. Summer is the driest part of the year when humidity is about 25% to 35% in the afternoons.

CLOUDINESS

During monsoon season sky is generally heavily clouded to overcast. Thereafter cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer season.

WINDS

Winds are generally light to moderate throughout the year. In the morning winds are generally calm or blow from west-southwest and south direction in post monsoon, winter and early summer period, however westerlies are predominant in the afternoon. Thereafter, easterly/southeasterly/westerly winds blow predominantly in the morning during southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Depressions originating in Bay of Bengal during monsoon period which move in westerly/northwesterly direction towards the district and its neighbourhood cause heavy rainfall and thunderstorms. Thunderstorms also occur during pre-monsoon period occasionally. Fog occurs occasionally during post monsoon and winter seasons.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
BHABHUA

STATION	No. of Years Of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Adhoura	39	a	16.3	21.6	2.8	5.4	14.7	118.8	330.1	286.4	271.2	37.3	3.5	5.2	1113.3	188	43	340.0	17 Feb 1983
		b	1.4	1.1	0.3	0.5	1.0	5.2	14.0	13.9	9.9	2.3	0.2	0.5	50.3	(1978)	(1988)		
Babua	16	a	9.0	16.8	15.8	7.4	10.2	144.5	223.4	235.9	217.5	41.6	17.7	0.1	939.9	120	61	144.5	24 Jun 1978
		b	0.9	1.4	1.5	1.0	1.6	6.8	11.4	13.2	10.5	3.0	0.4	0.0	51.7	(1976)	(1972)		
Bagvanpur	26	a	11.0	10.4	13.7	6.5	9.5	96.0	242.1	246.4	226.0	51.3	7.4	7.6	927.9	200	52	368.6	11 Sep 1987
		b	1.1	1.0	0.8	0.4	1.0	4.7	12.6	12.1	8.6	2.5	0.4	0.6	45.8	(1987)	(1992)		
Bhabhua (Hydro)	40	a	36.5	11.6	16.0	4.9	22.9	145.2	301.3	320.2	237.4	47.7	7.6	7.3	1158.6	259	58	274.8	21 Aug 1933
		b	1.6	1.1	0.8	0.5	1.1	5.8	13.8	12.4	9.1	2.5	0.4	0.8	49.9	(1981)	(2000)		
Chand	16	a	10.6	9.6	2.1	1.4	9.8	106.3	229.2	258.5	290.7	14.7	2.9	7.2	943.0	177	79	381.0	29 Aug 1940
		b	1.1	0.7	0.3	0.3	0.5	4.6	9.9	10.6	8.3	0.8	0.1	0.5	37.7	(1956)	(1989)		
Durgavathy	26	a	12.3	11.6	7.4	3.8	14.0	94.7	275.9	248.2	196.1	30.0	5.2	7.7	906.9	148	64	200.0	12 Jul 1977
		b	1.0	1.0	0.7	0.3	1.0	4.7	12.3	10.8	8.4	1.7	0.4	0.3	42.6	(1978)	(1992)		
Kudra	36	a	10.4	12.9	9.4	3.5	15.0	114.5	277.5	240.6	223.0	38.8	4.5	6.0	956.1	214	52	233.2	11 Sep 1987
		b	1.0	1.0	0.7	0.4	1.3	5.0	12.3	10.4	8.2	1.8	0.4	0.5	43.0	(1978)	(1967)		
Mohania/ Mahania	43	a	16.8	9.7	7.9	5.1	10.6	107.5	296.0	269.2	216.3	32.1	7.5	4.1	982.8	172	63	257.0	28 Aug 1940
		b	1.4	0.9	0.7	0.5	0.9	4.9	12.2	12.2	9.0	1.9	0.4	0.4	45.4	(1978)	(1951)		
Ramghar	12	a	6.3	9.2	1.3	1.1	14.9	84.3	195.4	249.2	212.2	15.3	6.2	7.9	803.3	142	58	165.0	26 Sep1993
		b	0.7	0.9	0.3	0.2	1.1	3.9	9.6	10.1	8.3	1.0	0.3	0.5	36.9	(1994)	(1992)		
Bhabhua (District)		a	14.4	12.6	8.5	4.3	13.5	112.4	263.4	261.6	232.3	34.3	6.9	5.9	970.1	161	59		
		b	1.1	1.0	0.7	0.5	1.1	5.1	12.0	11.7	8.9	1.9	0.3	0 .5	44.8	(1978)	(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 2006.

** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
BHABHUA
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	1	1101 - 1200	7
601 - 700	3	1201 - 1300	4
701 - 800	3	1301 - 1400	1
801 - 900	6	1401 - 1500	1
901 - 1000	7	1501 - 1600	2
1001 - 1100	9		

(Data available for 44 years)

BHAGALPUR DISTRICT

The climate of this district is characterized by a mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts in December and lasts till February. This is followed by summer season which continues till second week of June when the southwest monsoon commences. The period from June to September is the southwest monsoon season followed by the post monsoon season (October and November). November is transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 14 raingauge stations for the period ranging from 10 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 1203.4 mm. The rainfall in the southwest monsoon season constitutes about 83% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 308.4 mm. The variation in annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 176% of the normal, while 1966 was the year with the lowest rainfall and it was 53% of the normal. In this fifty year period there were 8 years, when the rainfall was less than 80% of the normal. There was one occasion when such a low rainfall occurred in two consecutive years. It is seen from Table 2 that the annual rainfall was between 901 mm and 1500 mm in 38 years out of 49.

On an average there are 56 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 Shahkundi to 64 at Peerpanthy.

The heaviest rainfall recorded in 24 hours at any station in the district was 417.6 mm at Peerpanthy on 25 September 1999.

TEMPERATURE

There are two meteorological observatories in the district at Bhagalpur and Sabour. The temperature and other meteorological conditions as indicated by the data at these stations may be taken as representative of weather conditions prevailing in the district in general. The cold season commences early in December when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature is at about 10°C. In winter sometimes cold waves affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 2°C to 3°C. The temperatures begin to increase rapidly from March till May. May is the hottest month with the mean maximum temperature at about 37.0°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 45°C on individual days. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, but there is a little relief as the weather is unpleasant on account of the increased moisture in air and continuing high night temperatures. In October while day temperature remains as high as in the monsoon months, the nights however, are cooler.

The highest maximum temperature ever recorded in the district was 46.4°C at Bhagalpur on 28 May 1982 and while the lowest minimum temperature ever recorded was 0.6°C on 19th January 1934 at Sabour. .

HUMIDITY

The driest part of the year is the summer months when the relative humidity especially in the afternoon is between 40% and 50%. The humidity is high during the

monsoon period when it is generally above 80%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast during the post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Light westerly/southwesterly or calm winds prevail in the winter and early summer season. In April light to moderate easterly winds begin and predominate in the monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during summer months, their frequency being higher in the monsoon months. Thunderstorms occurring during the summer months are sometimes accompanied with squall. Dust storms occur occasionally in the summer months. Fog occurs mostly in winter months and at times during early summer season.

Table 3, 4, 5, 6 and 3(a), 4(a) 5(a) and 6(a) give the temperature and humidity, cloudiness, mean wind speed and predominant wind direction and special weather phenomena respectively for Bhagalpur and Sabour observatories.
.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
BHAGALPUR

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bhagalpur	14	a	14.5	1.1	5.0	12.7	45.4	192.1	234.3	227.9	244.7	133.1	1.9	1.7	1114.4	162	75		
		b	0.8	0.2	0.5	1.1	3.0	7.9	12.9	12.5	10.2	3.6	0.2	0.2	53.1	(1959)	(1962)		
Bhagalpur Obsy	50	a	17.8	10.1	9.0	21.3	59.4	203.0	287.6	258.4	230.9	85.8	7.7	6.4	1197.4	184	50	352.8	25 Sep 1965
		b	1.2	1.2	0.9	1.6	4.0	9.0	14.1	12.8	10.1	3.5	0.5	0.6	59.5	(1987)	(1966)		
Bihpur	10	a	10.7	8.1	3.9	6.9	45.2	162.5	329.1	266.5	265.4	54.5	8.8	5.6	1167.2	132	61	195.0	28 Sep 1995
		b	0.9	0.9	0.6	0.6	2.3	8.1	12.9	13.0	10.0	2.7	0.3	0.3	52.6	(1995)	(1996)		
Colgong	19	a	21.9	3.7	7.5	21.7	67.3	182.9	319.4	289.6	227.9	68.8	2.9	1.3	1214.9	150	67	210.1	06 Jun 1927
		b	1.0	0.5	0.7	1.5	3.2	7.5	12.1	13.0	8.5	2.6	0.2	0.2	51.0	(1964)	(1951)		
Colgong (Hydro)	21	a	9.8	11.4	9.2	26.7	76.4	201.5	301.1	257.0	258.1	97.0	9.1	10.4	1267.7	147	72	342.0	28 Sep 1995
		b	0.6	1.4	0.8	2.0	4.7	10.1	14.8	12.6	11.2	3.9	0.5	0.8	63.4	(1987)	(1982)		
Jagdishpur	11	a	14.2	8.8	8.5	17.0	71.7	162.1	309.3	292.6	254.6	88.0	25.0	10.0	1261.8	175	54	180.4	11 Nov 1995
		b	1.1	1.1	0.7	1.6	4.1	8.8	14.8	14.0	10.5	3.8	0.8	0.8	62.1	(1999)	(1994)		
Nathnagar	12	a	11.0	7.8	17.9	16.6	85.3	191.7	404.8	275.3	235.9	85.6	8.6	13.4	1353.9	161	66	368.0	31 Jul 1999
		b	0.8	0.9	1.0	1.1	3.8	9.3	16.5	13.1	11.0	3.1	0.3	0.9	61.8	(1999)	(1990)		
Naugachia	23	a	8.2	3.3	10.6	11.1	53.2	132.4	337.8	253.4	269.8	53.8	5.1	5.8	1144.5	176	50	225.0	28 Sep 1995
		b	0.8	0.4	1.0	0.9	2.9	7.5	14.1	12.3	10.1	2.6	0.3	0.5	53.4	(1995)	(1965)		
Peerpanthy	14	a	15.3	9.7	9.9	16.6	77.7	214.3	307.9	295.9	345.2	103.4	5.8	6.0	1407.7	166	54	417.6	25 Sep 1999
		b	0.9	1.2	0.8	1.8	4.9	9.6	15.6	12.8	11.2	4.4	0.3	0.6	64.1	(1999)	(1992)		
Sabour	19	a	11.1	7.6	9.0	14.4	71.4	152.1	279.0	230.8	232.3	71.4	1.6	5.6	1086.3	127	56	332.8	24 Sep 1965
		b	0.9	1.0	0.7	1.2	4.1	8.1	15.3	11.6	9.6	4.0	0.1	0.7	57.3	(1986)	(1966)		

.

TABLE – 1 (contd…)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Sabour (Obsy)	49	a	17.4	10.3	10.3	24.6	70.8	192.0	298.8	265.6	220.1	91.1	8.4	6.9	1216.3	164 (1987)	64 (1975)	346.2	25 Sep 1965
		b	1.1	1.1	1.0	1.6	4.0	9.3	14.1	13.4	9.9	4.1	0.5	0.7	60.8				
Shahkundi	14	a	7.7	9.8	11.5	9.7	56.1	96.6	221.6	218.4	213.4	67.4	3.2	6.9	922.3	175 (1986)	38 (1966)	239.9	07 Oct1986
		b	0.8	0.6	0.8	0.7	2.5	5.7	10.3	10.5	7.9	1.6	0.1	0.6	42.1				
Sonaula	36	a	12.7	7.9	9.6	19.0	57.1	183.1	333.9	273.9	232.0	82.7	5.9	6.8	1224.6	187 (1987)	47 (1966)	272.3	11Jun1950
		b	0.6	0.8	0.8	1.2	2.5	7.1	13.1	11.2	8.7	2.6	0.3	0.3	49.2				
Sultanganj	28	a	15.3	5.9	12.3	15.1	55.3	159.5	353.2	292.8	254.7	97.2	4.7	3.7	1269.7	175 (1987)	50 (1951)	317.5	10 Aug 1935
		b	0.8	0.7	1.0	0.9	2.8	6.7	13.1	10.4	8.5	2.6	0.1	0.5	48.1				
Bhagalpur (District)		a	13.4	7.5	9.6	16.7	63.7	173.3	308.4	264.1	248.9	84.3	7.0	6.5	1203.4	176	53		
		b	0.9	0.9	0.8	1.3	3.5	8.2	13.8	12.4	9.8	3.2	0.3	0.5	55.6	1987	1966		

a Normal Rainfall in mm

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

* Based on all available data upto 2006

** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
BHAGALPUR
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	1	1401 - 1500	4
701 - 800	0	1501 - 1600	3
801 - 900	3	1601 - 1700	0
901 - 1000	9	1701 - 1800	1
1001 - 1100	5	1801 - 1900	2
1101 - 1200	10	1901 - 2000	0
1201 - 1300	5	2001 - 2100	0
1301 - 1400	5	2101 - 2200	1

(Data available for 49 years)

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

MONTH	Mean Maximum Temperature	Mean 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	24.6	11.9	31.9	25 Jan 1982	4.2	20 Jan 2003	78	65
February	27.4	14.1	35.8	26 Feb 1981	5.0	03 Feb 1990	69	56
March	33.6	19.3	42.6	27 Mar 1988	10.8	10 Mar 1979	57	43
April	37.5	23.4	45.3	30 Apr 1980	13.1	02 Apr 1990	58	41
May	37.5	24.8	46.4	28 May 1982	14.5	13 May 1978	68	51
June	36.0	26.4	46.0	07 Jun 1983	19.5	16 Jun 1968	77	68
July	33.1	26.2	42.3	06 Jul 1982	22.4	12 Jul 1980	84	79
August	32.9	26.3	39.7	11 Aug 1986	20.1	21 Aug1989	84	79
September	33.1	25.9	38.6	24 Sep 1982	21.5	26 Sep 1999	82	78
October	32.4	23.1	40.0	19 Oct 1981	16.1	31 Oct 1954	77	71
November	30.0	17.8	37.4	15 Nov 1981	11.1	29 Nov 1952	72	65
December	25.8	12.9	32.2	04 Dec 1981	3.9	31 Dec 1990	77	67
Annual	32.0	21.0	46.4	28 May 1982	3.9	31 Dec 1990	74	64

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(BHAGALPUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	20	17	18	15	11	2	0	0	1	12	18	21	135
b	2	1	1	1	3	6	11	8	5	2	1	1	42
c	1.6	1.8	1.7	2.2	3.2	5.5	6.8	6.5	5.6	2.8	1.6	1.5	3.4
1730 HOURS IST													
a	18	16	18	15	8	2	0	0	0	7	14	19	117
b	1	1	1	1	2	6	8	6	6	3	1	1	37
c	1.6	1.7	1.8	2.2	2.7	5.6	6.6	6.5	5.9	3.1	1.8	1.6	3.4

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(BHAGALPUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	4.0	5.1	6.1	7.2	7.4	6.5	5.3	5.3	4.9	3.4	3.0	3.6	5.2
Direction in morning	C/SW	C/SW	SW/C	E	E	E	SE/E	E/SE	E/SE	C/E	C/SW	C/SW	
Direction in evening	C/W	W	W	W/E/NW	E	E	E/C	E	E/C	C/E/NW	C/W	C/W	

TABLE – 6
Special Weather Phenomena
(BHAGALPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.4	0.9	1.6	2.7	6.4	8.1	10.9	10.4	9.6	3.4	0.1	0.1	54.6
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Dust storm	0.1	0.1	0.1	1.2	1.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0	2.9
Squall	0.0	0.0	0.1	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Fog	2.0	0.5	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.2	0.9	1.3	5.4

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

MONTH	Mean Maximum Temperature	Mean 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	23.2	7.8	29.0	27 Jan 1958	0.6	19 Jan 1934	82	63
February	26.1	9.8	34.0	28 Feb 1969	2.0	10 Feb 1972	73	54
March	32.4	14.4	41.1	29 Mar 1941	3.9	08 Mar 1945	59	44
April	36.8	20.7	44.0	16 Apr 1973 29 Apr 1980	9.7	01 Apr 1968	60	42
May	36.8	23.7	45.1	27 May 1958	16.1	30 May 1934	69	52
June	35.2	25.6	46.1	12 Jun 1931	19.4	02 Jun 1934	79	69
July	32.7	25.5	39.2	26 Jul 1972	20.7	17 Jul 1971	86	80
August	32.3	25.6	37.4	21 Aug 1957	20.7	31 Aug 1971	86	81
September	32.3	24.8	38.0	26 Sep 1972	19.7	27 Sep 1969	84	80
October	31.5	21.3	35.6	17 Oct 1957	12.6	22 Oct 1977	80	74
November	28.6	14.2	33.4	04 Nov 1957	5.0	29 Nov 1970	76	66
December	24.4	8.7	29.4	05 Dec 1955	2.2	15 Dec 1964	79	66
Annual	31.0	18.5	46.1	12 Jun 1931	0.6	19 Jan 1934	76	64

TABLE – 4(a)
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(SABOUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	20	17	19	17	12	3	0	0	2	13	20	21	144
b	2	1	1	1	2	5	8	5	3	2	1	1	32
c	1.5	1.6	1.6	2.0	3.0	5.3	6.6	6.2	5.9	2.7	1.4	1.3	3.2
1730 HOURS IST													
a	19	16	19	16	12	2	0	0	1	11	17	20	133
b	1	1	1	1	1	5	6	4	4	2	1	1	28
c	1.5	1.6	1.6	1.9	2.4	5.3	6.4	6.2	5.5	2.8	1.6	1.4	3.2

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE – 5(a)
Mean Wind Speed and Predominant Wind Direction
(SABOUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.7	4.9	6.2	8.3	9.3	9.0	7.9	8.1	6.8	3.7	2.6	3.0	6.1
Direction in morning	C/W/SW	W/C/SW	W	E/NE	E	E	E	E	E	C/SW/E	C/W/SW	C/W/SW	
Direction in evening	C/NW/W	NW/W	NW	NW	E	E	E	E	E/C	C/NW	C/NW	C/NW	

TABLE – 6(a)
Special Weather Phenomena
(SABOUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.5	1.0	1.5	2.8	5.5	7.1	9.0	9.9	8.6	3.4	0.1	0.2	49.6
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	0.1	0.2	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Squall	0.0	0.0	0.2	1.3	1.5	0.4	0.0	0.0	0.1	0.0	0.0	0.0	3.5
Fog	6.2	1.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.4	1.4	4.4	14.2

BHOJPUR DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 20 raingauge stations for period ranging from 11 to 36 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 1007.9 mm. About 89% of the annual normal rainfall in the district is received during the monsoon period from June to September, generally July being the rainiest month with an average rainfall of 306.6 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 172% of the annual normal occurred in 1997. The lowest annual rainfall which was 53% of the normal occurred in 1966. In this fifty year period, the annual rainfall in the district was less than 80% of the normal in 4 years, out of which two were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1300 mm in 36 years out of 45.

The heaviest rainfall in 24 hours recorded at any station in the district was 550.0 mm at Tharary on 13 September 1987.

TEMPERATURE

There is no meteorological observatory in the district. The meteorological data and climatological conditions prevailing at Patna observatory in the neighbouring district can be taken as representative of the weather conditions in the district as a whole. The cold season commences from late November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 23◦C and the mean minimum temperature at about 9◦C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2◦C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 38.0◦C and the mean minimum temperature at about 25◦C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44(C on individual days. There is drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief as the weather is uncomfortable on account of increase in moisture and heat. In October while day temperature remains as high as in the monsoon months the nights are however cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In the post monsoon, winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in the southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season and occasionally in the rest of the year.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
BHOJPUR

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Ageon	22	a	19.2	2.6	5.6	4.8	6.8	98.7	245.6	284.4	250.3	42.8	3.2	0.3	964.3	182	34	222.3	10 Sep 1921
		b	1.5	0.3	0.7	0.4	0.5	5.0	10.8	12.3	9.2	2.0	0.2	0.1	43.0	(1952)	(1964)		
Arrah	18	a	15.7	12.2	4.1	12.2	39.3	162.7	448.4	404.6	290.7	70.9	17.2	9.6	1487.6	147	66	275.0	15 Aug 1996
		b	0.9	0.9	0.4	0.8	1.9	5.0	14.3	13.3	10.0	2.9	0.8	0.8	52.0	(1996)	(1986)		
Arrah Obsy	27	a	17.5	3.1	10.3	6.9	17.6	100.7	215.0	208.6	165.6	39.0	6.1	0.8	791.2	271	16	215.9	08 Aug 1906
		b	0.9	0.4	0.7	0.3	0.8	4.6	10.7	9.9	7.0	2.1	0.4	0.1	37.9	(1952)	(1969)		
Barahara	22	a	12.7	7.1	5.2	6.0	18.9	105.5	369.4	272.8	220.3	53.1	4.3	4.0	1079.3	184	52	292.0	27 Sep 1975
		b	1.3	0.9	0.4	0.5	1.5	5.0	12.0	10.6	8.3	2.3	0.3	0.5	43.6	(1987)	(2000)		
Baruhi	13	a	15.5	3.3	6.7	2.4	15.7	82.2	310.3	290.5	205.4	64.8	3.5	0.0	1000.3	197	32	166.4	29 Sep 1942
		b	.80	0.6	0.3	0.3	0.5	3.4	9.6	10.9	6.9	2.2	0.2	0.0	35.7	(1953)	(1951)		
Bassawan	16	a	19.9	7.2	8.7	1.7	7.6	94.8	303.4	272.8	189.9	43.0	3.6	2.4	955.0	168	68	251.5	0 5 Sep 1942
		b	1.6	0.5	0.8	0.3	0.8	5.2	12.7	12.2	9.5	2.2	0.2	0.4	46.4	(1961)	(1964)		
Behea	36	a	11.6	15.7	4.3	13.6	24.8	93.9	288.1	261.7	188.8	41.8	9.9	5.9	960.1	145	61	170.0	20 Sep 1995
		b	1.1	0.9	0.3	0.8	1.4	4.9	12.0	12.2	8.1	2.2	0.5	0.5	44.9	(1994)	(1999)		
Charpokhari	19	a	14.2	13.2	5.5	5.0	21.1	110.4	346.9	293.7	208.6	40.5	3.9	4.1	1067.1	139	59	476.0	04 Oct 2001
		b	1.1	1.2	0.4	0.4	1.2	4.4	12.6	12.6	9.6	2.2	0.4	0.4	46.5	(1999)	(1996)		
Jagdishpur	11	a	18.6	18.1	4.2	2.0	20.6	115.4	253.6	264.2	194.7	21.9	13.1	8.6	935.0	188	80	217.2	13 Jul 1997
		b	1.2	1.7	.5	.3	1.4	4.9	10.5	12.0	9.3	1.6	1.0	0.9	45.3	(1997)	(2000)		
Koath	15	a	16.0	3.0	10.5	1.3	5.2	109.7	238.5	245.9	184.0	47.7	4.5	0.7	867.0	154	29	238.8	27 Aug 1916
		b	0.8	0.5	1.0	0.2	0.2	4.5	8.5	10.0	7.9	2.4	0.2	0.1	36.3	(1961)	(1951)		

TABLE – 1 (contd….)

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Kochas	14	a	19.2	3.3	10.7	5.5	10.1	112.9	312.3	266.8	190.7	32.1	5.0	3.7	972.3	172	73	233.7	26 Jun 1950
		b	1.5	0.6	1.3	0.4	0.8	5.4	12.3	12.2	8.2	1.7	0.2	0.4	45.0	(1956)	(1957)		
Koilwar	34	a	8.6	7.3	6.6	8.7	28.2	119.4	383.1	292.2	215.4	49.6	10.2	5.8	1135.1	211	59	266.0	27 Sep 1975
		b	0.8	0.8	0.6	0.6	1.9	5.3	13.2	11.3	8.8	2.3	0.6	0.5	46.7	(1997)	(1982)		
Manoharpur	20	a	19.2	5.6	13.3	2.0	6.3	113.2	294.8	300.8	157.7	52.7	0.0	2.0	967.6	182	36	295.1	07 Aug 1948
		b	1.2	0.7	1.1	0.3	0.6	4.9	10.9	12.2	7.5	2.5	0.0	0.2	42.1	(1968)	(1966)		
Peeor	20	a	10.5	13.6	7.1	3.5	24.5	98.1	307.5	255.6	211.9	28.6	7.1	8.9	976.9	131	68	162.4	06 Jul 1998
		b	0.9	1.2	0.7	0.3	1.3	4.7	11.9	11.4	9.1	1.7	0.4	0.7	44.3	(1997)	(1979)		
Ramnagar	20	a	22.9	5.5	4.9	2.2	10.0	121.8	281.3	267.0	197.8	56.2	5.5	1.2	976.3	166	55	241.3	09 Jul 1908
		b	1.5	0.6	0.6	0.2	0.6	4.9	12.1	11.4	8.9	2.7	0.2	0.1	43.8	(1953)	(1951)		
Sahar	17	a	7.0	11.1	7.7	3.3	14.1	97.6	325.8	264.8	206.6	45.0	4.8	8.8	996.6	183	78	186.4	13 Jul 1997
		b	0.6	0.8	0.6	0.4	0.9	3.7	12.6	11.9	8.6	2.0	0.3	0.7	43.1	(1997)	(1992)		
Shahpur	22	a	15.3	11.6	5.2	4.1	18.5	105.3	374.7	306.1	270.8	46.9	12.2	9.3	1180.0	202	47	360.6	13 Sep 2001
		b	1.1	0.9	0.5	0.3	1.0	4.5	12.8	11.8	9.6	1.8	0.6	0.5	45.4	(1997)	(1979)		
Sikraul(Snehpur)	12	a	10.0	0.5	12.7	1.1	2.8	33.4	231.5	282.7	147.4	48.0	0.0	2.5	772.6	131	48	220.0	25 Aug1965
		b	1.0	0.1	0.6	0.1	0.3	2.9	10.7	11.3	7.1	2.0	0.0	0.1	36.2	(1953)	(1951)		
Tharary	17	a	13.2	24.6	4.5	8.8	16.3	102.9	260.5	218.3	279.7	35.8	9.4	8.5	982.5	240	49	550.0	13 Sep 1987
		b	0.8	1.6	0.4	0.4	1.4	4.2	11.4	11.6	8.3	2.0	0.5	0.7	43.3	(1987)	(1996)		
Udhvanthnagar	21	a	13.7	7.0	4.6	6.4	22.6	136.6	340.6	256.0	245.3	34.2	15.0	6.9	1088.9	190	63	372.6	05 Oct 2001
		b	1.0	0.6	0.6	0.6	1.3	4.5	12.1	10.5	8.6	2.0	0.5	0.4	42.7	(1997)	(2000)		
Bhojpur (District)		a	15.0	8.8	7.1	5.1	16.6	105.8	306.6	275.6	211.1	44.7	6.9	4.7	1007.9	172	53		
		b	1.1	0.8	0.6	0.4	1.0	4.6	11.7	11.6	8.5	2.1	0.4	0.4	43.2	(1997)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
BHOJPUR
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
101 - 200	1	1001 - 1100	6
201 - 300	0	1101 - 1200	5
301 - 400	0	1201 - 1300	4
401 - 500	0	1301 - 1400	2
501 - 600	1	1401 - 1500	2
601 - 700	1	1501 - 1600	0
701 - 800	2	1601 - 1700	0
801 - 900	9	1701 - 1800	1
901 - 1000	12		

(Data available for 46 years)

BUXAR DISTRICT

The climate of this district is characterized by mild winter, hot and dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The period of post monsoon season is October and November, however, November is transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for eight raingauge stations, for period ranging from 11 to 45 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 898.3 mm. About 89% of the annual normal rainfall in the district is received during the monsoon period from June to September. July is the rainiest month with an average rainfall of 279.4 mm. The variation in the annual rainfall from year to year is large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 152% of the annual normal occurred in 1993. The lowest annual rainfall which was 54% of the normal occurred in 1975. In this fifty year period, there were 6 years when the annual rainfall in the district was less than 80% of the normal, out of which two years were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 701 mm and 1100 mm in 25 years out of 40.

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 36 at Itahary to 50 at Buxar.

The heaviest rainfall in 24 hours recorded at any station in the district was 275.0 mm at Nawanagar on 23 June 1978.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data of Patna observatory in the neighbouring district may be taken as representative of the climatic conditions of this district in general. The cold season commences from late November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 38°C and the mean minimum temperature at about 25°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief as the weather is uncomfortable on account of increase in moisture and high night temperatures as in summer. In October while day temperature remains as high as in the monsoon months the nights are however cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In post monsoon, winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
BUXAR

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
Brahamapur	17	a	12.9	14.3	1.4	5.2	12.0	105.9	287.1	231.1	170.6	41.6	2.0	10.8	894.9	176	51	195.2	14 Aug 1996
		b	0.7	0.9	0.2	0.5	1.0	4.9	10.9	9.9	7.9	2.6	0.1	0.6	40.2	(1996)	(1975)		
Buxar	45	a	14.1	6.7	6.7	3.7	17.7	110.8	287.3	263.2	200.2	53.7	6.8	4.8	975.7	192	52	217.2	12 Sep 1953
		b	1.2	.7	.5	.4	1.0	5.0	11.8	11.3	8.2	2.0	.3	.5	42.9	(1993)	(1975)		
Buxar	22	a	12.4	9.7	8.6	5.9	27.9	126.1	388.6	302.6	213.5	55.9	16.0	9.2	1176.4	137	67	204.0	04 Aug 1991
		b	1.1	0.8	0.9	0.6	1.5	5.3	14.2	11.8	9.5	3.0	0.8	0.9	50.4	(1993)	(1979)		
Durmawan	35	a	7.8	4.9	3.7	8.6	10.2	101.8	240.6	256.4	175.7	38.3	4.4	4.3	856.7	150	63	180.0	11 Jul 1999
		b	0.8	0.4	0.4	0.6	1.0	5.1	10.8	12.7	9.5	1.9	0.2	0.3	43.7	(1997)	(1982)		
Itahary	16	a	9.4	5.9	0.9	3.9	12.3	63.2	229.6	250.2	159.5	19.9	6.3	4.2	765.3	163	57	240.0	12 Jul 1997
		b	0.9	0.7	0.2	0.3	0.9	3.2	9.9	10.3	7.9	1.3	0.4	0.4	36.4	(1997)	(1992)		
Nawanagar	11	a	7.8	12.4	4.6	5.5	19.5	108.2	244.3	184.8	181.6	34.1	2.8	4.7	810.3	159	58	275.0	23 Jun 1978
		b	0.8	1.1	0.4	0.5	1.5	4.4	13.0	9.6	8.9	2.1	0.2	0.4	42.9	(1978)	(1992)		
Rajpur	15	a	10.6	13.5	5.8	2.8	16.7	79.0	284.9	272.9	153.8	26.9	13.8	12.1	892.8	169	45	143.0	19 Aug 1996
		b	0.8	1.1	0.4	0.2	1.1	3.6	11.8	11.1	6.4	1.4	0.4	0.8	39.1	(1978)	(1986)		
Simary	17	a	10.7	8.4	4.2	4.5	14.5	77.4	272.5	214.0	160.6	36.6	5.2	4.9	813.5	148	75	165.4	05 Oct 2001
		b	1.0	0.8	0.4	0.3	1.2	5.0	12.1	11.5	8.5	2.3	0.4	0.6	44.1	(1989)	(1999)		
Buxar (District)		a	10.7	9.5	4.5	5.0	16.3	96.6	279.4	246.9	176.9	38.4	7.2	6.9	898.3	152	54		
		b	0.9	0.8	0.4	0.4	1.1	4.6	11.8	11.0	8.4	2.1	0.4	0.6	42.5	(1993)	(1975)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
BUXAR
(Data 1951- 2000)

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

(Data available for 40 years only)

DARBHANGA DISTRICT

The climate of this district is characterized by mild cold winter, hot summer and the monsoon season with moist heat. The year may be divided into four seasons. The cold season starts from mid November and lasts till about the middle of March. The hot season follows and continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon month October and November constitute transitional period from the monsoon to the winter conditions.

RAINFALL

Records of rainfall in the district are available for 16 raingauge stations for the period ranging from 11 to 46 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 1093.7 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 314.7 mm. The variation in the annual rainfall from year to year is not large. In the fifty years period 1951 to 2000, the highest annual rainfall was in 1985 when it amounted to 170% of the normal. 1992 was the year with the lowest rainfall and it was 63% of the normal. In this fifty year period the rainfall was less than 80% of the normal in 9 years, out of which two years were consecutive. It is seen from Table 2 that the annual rainfall was between 801 mm and 1400 mm in 37 years out of 48 years.

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. This number varies from 38 at Singhwara to 59 at Kamtaul Hydro.

The heaviest rainfall in 24 hours at any station in the district was 441.5 mm at Umgaon on 30 September 1942.

TEMPERATURE

There is one meteorological observatory in the district at Darbhanga The temperature and other meteorological condition as indicated by the data at this station may be taken as representative of those in the district in general. The cold season commences from mid November when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at 23.2°C and the mean minimum temperature at about 9.3°C. In winter cold waves which affect the district in the wake of western disturbances passing across north India, minimum temperatures may sometimes go down to about 1°C. The days become warmer in March while nights continue to be cool. Both day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at 35.6°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes rise to about 42°C on individual days. There is drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, but night temperature continues to be high. In October while day temperature continues as in the monsoon months, however the nights are cooler.

The highest maximum temperature ever recorded at Darbhanga was 44.1°C on 31 May 1995 and the lowest minimum temperature ever recorded was 0.0°C on 31 January 1971 and 03 February 1971. .

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 50% and 60%. The humidity is high during the monsoon period when it is between 70% and 80%. In the rest of the year the relative humidity generally varies between 60% and 70%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In the winter and summer season the skies are generally clear or lightly clouded.

WINDS

Light westerly or calm winds prevail in post monsoon, winter and early summer season. From April calm or easterly winds appear and these predominate in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and strong winds. Thunderstorms occur occasionally during the summer and southwest monsoon season. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

Tables 3, 4, 5 and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Darbhanga observatory. .

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
DARBHANGA

STATION	No.of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm	DATE
Bahadurganj	12	a	4.3	7.9	4.7	24.6	77.4	190.6	447.8	301.1	212.8	72.0	2.1	11.6	1356.9	150	68	207.0	01Aug1987
		b	0.4	0.9	0.6	1.7	4.2	7.6	15.0	10.6	8.4	2.3	0.3	0.9	52.9	(1985)	(1991)		
Bahari	30	a	8.3	7.8	8.9	16.0	46.0	125.3	294.3	249.7	183.5	74.5	3.1	4.7	1022.1	191	51	262.2	01 Aug1987
		b	0.6	0.7	0.7	1.1	2.3	5.7	11.0	9.9	7.2	2.1	0.2	0.4	41.9	(1985)	(1991)		
Bahera	12	a	11.8	3.5	9.1	13.8	41.7	162.0	279.8	227.5	156.3	57.5	8.8	0.0	971.8	160	54	220.2	20 Aug 1921
		b	0.5	0.4	0.7	0.6	2.7	6.0	11.3	9.8	7.0	1.9	0.7	0.0	41.6	(1953)	(1966)		
Biraul	21	a	6.0	8.5	8.1	10.6	41.0	156.5	276.7	238.0	175.0	47.6	5.3	5.3	978.6	161	32	300.0	10 Jul 1997
		b	0.7	0.5	0.5	0.8	2.3	6.3	11.4	11.2	7.3	1.8	0.4	0.4	43.6	(1998)	(2000)		
Darbhanga	11	a	13.7	6.9	7.9	22.1	44.5	142.7	299.1	246.6	139.9	33.2	4.0	6.6	967.2	150	61	223.0	01 Jul 1996
		b	0.9	0.6	0.9	1.7	2.9	6.9	12.7	11.9	7.9	1.7	0.2	0.5	48.8	(1989)	(1992)		
Darbhanga Obsy	46	a	17.0	10.1	9.2	21.9	63.9	157.4	314.6	248.8	189.4	69.6	8.4	4.7	1115.0	159	58	266.7	04 Sep 1925
		b	1.4	1.1	1.1	1.8	3.6	7.6	13.3	11.5	9.0	2.8	0.4	0.6	54.2	(1981)	(1966)		
Dhanushyampur	16	a	11.7	9.3	9.1	26.6	72.8	149.2	271.8	268.6	230.7	56.6	6.9	11.1	1124.4	156	62	201.4	29 Sep 1989
		b	0.8	0.7	0.7	1.5	3.7	5.7	12.8	10.6	8.6	2.5	0.3	0.8	48.7	(1987)	(1992)		
Hayaghat	22	a	5.8	6.2	2.3	16.3	41.3	141.7	335.4	298.2	180.3	59.4	5.4	3.1	1095.4	197	49	240.3	01 Oct 1979
		b	.5	.4	.3	.9	2.5	5.4	12.3	10.8	7.6	2.0	.2	.3	43.2	(1999)	(1992)		

TABLE – 1(contd….)

STATION	No.of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Hayaghat (Hydro)	21	a	11.1	12.3	8.2	32.5	90.1	190.5	398.6	300.5	225.8	68.0	6.5	7.8	1351.9	147	54	290.0	01 Aug 1987
		b	1.1	1.1	.7	2.4	4.8	8.1	15.1	11.1	10.4	2.3	0.5	0.8	58.4	(1985)	(1982)		
Jaley	39	a	14.3	8.2	14.7	19.9	53.6	151.0	285.6	311.8	181.8	65.1	8.2	4.0	1118.2	182	39	406.4	24 Sep 1917
		b	0.9	0.7	0.9	1.2	2.9	5.8	11.7	11.4	7.6	2.6	0.5	0.4	46.6	(1999)	(1951)		
Kamtaul (Hydro)	20	a	10.4	12.7	9.6	30.3	81.4	197.0	419.7	293.0	202.6	62.1	4.5	9.1	1332.4	141	67	222.0	01 Aug 1987
		b	0.9	1.1	0.9	2.5	4.4	8.1	15.6	12.2	9.7	2.7	0.4	0.9	59.4	(1987)	(1991)		
Kevatiranvey	13	a	8.7	2.9	2.3	16.2	62.5	153.6	292.5	272.4	195.5	58.5	0.0	4.2	1069.3	139	70	180.0	11 Aug 1987
		b	0.8	0.5	0.3	1.8	3.8	6.8	13.6	9.9	9.3	1.9	0.0	.5	49.2	(1985)	(1994)		
Kusheshwar Sthan	34	a	15.8	4.6	6.9	14.0	36.7	152.9	225.8	212.0	160.8	41.1	2.6	4.5	877.7	161	26	195.6	30 Jul 1964
		b	0.9	0.6	0.6	1.1	2.3	6.0	10.3	9.7	7.4	2.0	0.1	0.3	41.3	(1997)	(1965)		
Moniguchchi	19	a	9.0	9.9	5.5	13.0	63.0	163.5	322.4	271.4	215.5	64.2	5.0	4.1	1146.5	162	71	239.0	25 Sep 2006
		b	0.7	0.8	0.4	0.9	3.7	6.2	13.7	10.7	8.1	2.7	0.2	0.3	48.4	(1989)	(1992)		
Singhwara	24	a	8.6	5.2	5.8	14.2	42.2	125.1	273.7	190.9	122.9	75.0	5.5	3.9	873.0	157	40	304.6	04 Oct 1961
		b	0.6	0.7	0.4	0.8	2.4	5.9	10.3	9.1	5.8	1.7	0.3	0.4	38.4	(1961)	(1966)		
Umgaon	13	a	17.4	5.2	7.1	18.9	60.4	211.6	296.8	239.6	170.8	56.6	9.4	1.2	1095.0	183	36	441.5	30 sep 1942
		b	1.2	0.4	0.8	1.1	3.1	7.7	10.5	9.2	7.8	2.6	0.4	0.2	45.0	(1956)	(1960)		
Darbhanga (District)		a	10.9	7.6	7.5	19.4	57.4	160.7	314.7	260.6	184.0	60.1	5.4	5.4	1093.7	170	63		
		b	0.8	0.7	0.7	1.4	3.2	6.6	12.5	10.6	8.1	2.2	0.3	0.5	47.6	(1985)	(1992)		

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 2006.

** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
DARBHANGA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	1	1301 - 1400	5
701 - 800	3	1401 - 1500	2
801 - 900	7	1501 - 1600	1
901 - 1000	12	1601 - 1700	1
1001 - 1100	6	1701 - 1800	2
1101 - 1200	3	1801 - 1900	1
1201 - 1300	4		

(Data available for 48 years)

TABLE - 3
NORMALS OF TEMPERATURE AND RELATIVE HUMIDITY
(DARBHANGA)

Month	Mean Maximum Temp	Mean Minimum Temp	Highest Maximum Ever recorded		Lowest Minimum Ever recorded		Relative Humidity (%)	
	°C	°C	°C	Date	°C	Date	0830	1730
January	23.2	9.3	30.6	02 Jan 1982	0.0	31Jan 971	68	66
February	25.9	11.3	34.1	05 Feb 1988	0.0	03 Feb 1971	63	60
March	31.2	15.6	40.6	29 Mar 1941	4.1	02 Mar 1971	52	51
April	35.4	20.1	43.9	28 Apr 1922	9.4	24 Apr 1971	58	51
May	35.6	22.2	44.1	31 May 1995	10.6	08 May 1971	65	58
June	34.9	23.8	43.6	13 Jun 1972	11.0	11Jun 1982	72	68
July	32.6	24.3	39.3	07 Jul 1974	13.5	22 Jul 1982	80	77
August	32.7	24.6	38.6	06 Aug 1973	14.0	15 Aug1982	79	79
September	32.6	24.3	38.6	28 Sep 1988	13.5	30 Sep 1982	79	78
October	31.7	21.6	39.4	23 Oct 1988	10.0	23 Oct 1982	71	73
November	28.9	15.6	34.1	14 Nov 1990	7.2	18 Nov 1926	65	65
December	24.7	10.7	36.6	25 Dec 1960	2.6	29 Dec 1989	67	67
Annual	30.8	18.6	44.1	31-05-1995	0.0	31 Jan1971 03 Feb 1971	68	66

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(DARBHANGA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	26	24	28	27	23	12	3	3	7	20	27	28	228
b	1	1	0	0	1	2	6	6	3	1	0	0	21
c	0.8	0.7	0.6	0.6	1.2	3.2	5.0	4.6	3.8	1.6	0.6	0.5	1.9
1730 HOURS IST													
a	26	24	28	27	28	17	7	8	12	25	28	29	259
b	1	0	0	0	0	2	3	3	2	1	0	0	12
c	0.7	0.6	0.5	0.4	0.4	2.0	3.6	3.5	2.8	0.9	0.3	0.4	1.3

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(DARBHANGA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	1.5	2.2	3.3	4.6	5.8	5.7	5.1	4.8	4.9	2.2	1.1	1.2	3.5
Direction in morning	C/W	C/W	C/W/E	C/E	E	E	E/C	E/C	C/E	C/E	C	C	
Direction in evening	C	C	C	C/E/W	C/E	C/E	C/E	C/E	C/E	C	C	C	

TABLE - 6
Special Weather Phenomena
(DARBHANGA)

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	0.3	1.1	0.4	0.5	0.9	1.1	0.2	0.1	0	5.3
Hail	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1
Dust storm	0	0	0	0.3	0.8	0.1	0	0	0	0	0	0	1.2
Squall	0	0	0	0	0	0	0	0	0	0	0	0	0
Fog	0.4	0	0	0	0	0	0	0	0	0	0	0.1	0.5

EAST CHAMPARAN DISTRICT

The district has a hot dry summer, hot and humid monsoon season and mild winter. The year may be divided into four seasons. The cold season starts from mid November and lasts till mid March. This is followed by summer season from April to second week of June. The period from second week of June to September constitutes the monsoon season. The succeeding period lasting till November is the post monsoon season.

RAINFALL

Records of rainfall in the district are available for 23 raingauge stations for the period ranging from 11 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 1258.5 mm. About 86% of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month with an average rainfall of 361.9 mm. The variation in the annual rainfall from year to year is generally not large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 152% of the normal occurred in 1985. The lowest annual rainfall, amounting to 58% of the normal occurred in 1990. In this fifty year period there were 8 years when the annual rainfall in the district was less than 80% of the normal and there was one occasion when such a low rainfall occurred in four consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 1001 mm and 1600 mm in 36 years out of 48.

On an average there are 50 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 41 at Madhuban to 71 at Bhaisalotan.

The heaviest rainfall recorded in 24 hours at any station in the district was 520.0.0 mm at Motihari (Obsy) on 25 August 2005.

TEMPERATURE

There are two meteorological observatories in the district, one at Motihari and the other at Raxaul. The records of these observatories may be taken as representative of the general climatic conditions prevailing in the district. The cold season starts from mid November when temperatures begin to fall rapidly and lasts till mid March. Generally January is the coldest month with the mean maximum temperature at about 22.6°C and the mean minimum temperature at about 8.3°C. In association with cold waves after the passage of western disturbance across north India, the minimum temperature may go down to about 1°C to 2°C. Temperatures start to rise from middle of March and summer season sets in till second week of June. May is generally the hottest month with the mean maximum temperature at about 35.6°C and the mean minimum temperature at about 23.1°C. On individual days the maximum temperature may go upto about 42°C. The day temperature drops with the onset of the monsoon by about the second week of June, but the nights continue to be quite warm with the night temperatures slightly higher than those in summer season which make nights uncomfortable due to high humidity. The temperatures begin to decrease after the withdrawal of southwest monsoon in October.

The highest maximum and the lowest minimum temperature ever recorded in the district was 44.4°C on 24th May 1903 and 0.0°C on 3rd February 1905 respectively at Motihari.

HUMIDITY

The air remains humid throughout the year except in summer season when the relative humidity remains between 35% to 50% in the afternoon. During monsoon season relative humidity remains high with value varying between 75% and 80%.

There is slight fall in relative humidity during post monsoon and winter season with values remaining between 60% to 80%.

CLOUDINESS

The sky is generally clouded to overcast during the monsoon season. During the rest of the year generally clear or lightly clouded sky prevails. But in winter season, when the district is affected by passing western disturbances cloudy skies prevail for spells of a day or two.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening during summer and southwest monsoon season. Winds are generally calm or blow from west/east direction during the early part of summer. Easterly winds or calm appears from April and remains predominant throughout the southwest monsoon season. Winds are generally calm or easterly or westerly/southwesterly during post monsoon and winter season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in monsoon and post monsoon season move in northwesterly to northerly direction after crossing the coast, affect the district and its neighbourhood causing heavy thunderstorms with heavy rain. The frequency of thunderstorm is quite high during the late summer and southwest monsoon season. During late summer season occasionally dust storms affect the district. Fog occurs during post monsoon and winter season. The frequency is very high during December and January.

Tables 3, 4, 5 and 6 and Tables 3(a), 4(a), 5(a) and 6(a) give the temperature and humidity, cloudiness, mean wind speed and special weather phenomena respectively for Motihari and Raxaul observatories. .

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
EAST CHAMPARAN

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
Areraj	21	a	8.5	17.1	4.0	14.6	45.2	157.7	323.3	317.8	191.1	55.0	5.8	11.8	1151.9	159	57	211.8	15 Sep 1994
		b	1.0	1.2	0.6	0.8	2.7	6.1	12.2	11.8	8.5	2.0	0.5	0.8	48.2	(1985)	(1997)		
Barharwa	24	a	20.1	9.0	7.3	9.0	38.0	185.1	330.8	280.7	218.2	55.6	5.0	3.4	1162.2	139	71	234.7	07 Jul 1930
		b	1.8	0.8	0.8	0.7	2.0	6.9	12.5	10.8	8.1	2.2	0.3	0.4	47.3	(1969)	(1966)		
Bhaisalotan	18	a	28.0	13.8	21.8	20.4	42.0	314.9	501.2	467.5	285.2	83.4	4.0	11.7	1793.9	122	72	320.0	26 Sep 1934
		b	2.2	0.9	1.6	1.6	3.1	12.7	16.1	17.2	11.7	2.8	0.4	0.8	71.1	(1956)	(1968)		
Chatia (Hydro)	21	a	12.1	16.1	9.0	31.4	54.3	199.9	343.7	307.1	212.5	60.7	7.5	7.7	1262.0	163	75	240.0	08 Jun 1984
		b	1.0	1.4	0.9	1.8	3.9	7.1	13.8	12.5	8.9	2.9	0.6	0.6	55.4	(1985)	(1982)		
Chauradano	30	a	18.4	11.3	8.4	16.8	48.5	223.8	402.9	390.6	230.3	57.2	10.9	4.7	1423.8	167	47	276.6	04 Oct 1923
		b	1.4	0.7	0.5	0.9	2.7	7.6	12.6	11.7	7.4	2.3	0.5	0.3	48.6	(1996)	(1989)		
Dhaka	27	a	16.4	6.2	13.9	24.2	51.0	201.8	369.0	278.0	194.4	62.1	4.0	2.3	1223.3	153	43	375.0	27 Sep 1975
		b	1.0	0.5	1.0	1.2	3.1	7.5	13.3	11.5	7.2	2.7	0.3	0.3	49.6	(1969)	(1968)		
Godasahan	11	a	7.0	10.5	2.8	22.8	43.6	224.5	305.9	306.3	201.2	30.3	11.0	8.0	1173.9	154	57	240.0	09 Jul 1993
		b	0.8	0.6	0.4	1.3	2.5	7.7	9.9	8.4	7.9	1.2	0.6	0.5	41.8	(1993)	(1989)		
Harisidhi	23	a	9.6	14.1	7.6	15.6	54.5	146.6	351.4	305.7	218.9	62.6	7.9	8.2	1202.7	194	53	345.0	15 Sep 1994
		b	0.7	0.7	0.7	1.1	3.2	5.9	12.5	11.4	8.7	2.7	0.5	0.6	48.7	(1980)	(1982)		
Hassanpur	14	a	12.0	8.9	8.8	14.8	50.4	163.1	240.8	230.8	259.2	32.2	4.5	7.3	1032.8	131	53	175.4	12 Aug 2002
		b	0.8	0.8	0.6	1.2	3.4	7.4	10.7	10.5	9.5	2.0	0.3	0.5	47.7	(2000)	(1992)		
Kessariah	26	a	16.8	3.9	8.2	13.1	41.0	149.0	327.6	313.1	204.6	74.5	5.6	1.3	1158.7	194	18	330.2	08 Sep 1918
		b	1.3	0.5	0.6	0.7	2.0	6.0	12.2	11.8	7.5	2.0	0.3	0.1	45.0	(1980)	(1964)		
Lalbegiaghat (Hydro)	22	a	12.7	12.4	8.3	21.5	85.7	212.7	382.2	314.4	168.2	111.6	6.3	10.7	1346.7	174	77	290.0	30 Jun 1999
		b	1.1	0.9	1.0	1.6	4.9	7.9	14.6	11.6	8.6	3.6	0.7	0.9	57.4	(1985)	(1992)		
Madhuban	39	a	12.2	7.2	7.0	6.3	42.4	133.3	328.1	256.9	168.0	55.9	3.7	4.2	1025.2	199	17	270.0	23 Jul 1977
		b	1.0	0.7	0.7	0.5	2.3	5.2	10.6	10.0	7.0	2.1	0.2	0.3	40.6	(1977)	(1964)		
Mahedi	35	a	12.8	10.6	6.3	14.2	51.6	161.5	369.2	331.8	213.6	94.8	7.1	8.1	1281.6	158	48	339.2	04 Oct 1961
		b	1.0	0.7	0.5	0.9	2.7	6.1	12.5	11.0	7.8	2.8	0.4	0.6	47.0	(1987)	(1980)		
Motihari	20	a	10.2	13.8	5.8	15.1	51.2	193.0	331.3	283.8	237.6	85.3	9.2	6.5	1242.8	156	66	297.0	04 Oct 1998
		b	0.8	1.0	0.8	1.2	3.5	7.1	11.8	12.2	8.8	2.9	0.5	0.4	51.0	(1998)	(1992)		

TABLE – 1(contd….)

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
Motihari Obsy	50	a	14.2	12.1	12.4	13.1	51.9	215.0	366.4	289.6	247.6	50.8	2.8	2.0	1277.9	163	67	520.0	25 Aug 2005
		b	1.4	1.1	1.0	0.8	3.0	8.5	13.8	11.6	8.8	2.2	0.3	0.1	52.6	(1985)	(1951)		
Pahadpur	15	a	9.6	18.6	2.6	9.6	42.5	195.1	346.6	348.7	262.7	63.8	7.7	17.3	1324.8	138	70	195.0	09 Jun 1984
		b	0.8	1.2	0.2	0.7	2.8	6.2	11.5	10.8	8.9	2.6	0.5	0.9	47.1	(1987)	(1991)		
Patahi	12	a	4.5	2.2	4.4	13.5	60.3	232.3	366.8	295.5	199.3	42.2	3.5	1.0	1225.5	134	61	261.0	02 Sep 2001
		b	0.7	0.2	0.5	0.5	2.9	7.0	13.3	11.2	7.6	1.5	0.2	0.2	45.8	(2000)	(1968)		
Pathridhayal	26	a	4.7	4.4	1.1	2.9	31.6	153.1	350.5	338.3	217.1	69.9	4.0	4.4	1182.0	195	65	315.0	27 Sep 1975
		b	0.4	0.3	0.1	0.4	1.9	5.2	12.3	10.6	8.0	2.7	0.3	0.4	42.6	(1985)	(1984)		
Ramgarhwa	15	a	8.1	8.1	13.8	7.9	80.2	230.4	478.6	307.1	263.6	59.0	3.7	11.7	1472.2	173	51	288.0	06 Jun 1980
		b	0.6	0.7	1.0	.6	3.1	5.9	14.5	9.9	7.9	2.0	0.3	0.7	47.2	(1981)	(1977)		
Raxaul	18	a	20.1	5.3	10.4	9.3	38.3	185.1	358.4	291.4	185.6	34.6	1.7	1.4	1141.6	136	63	264.0	30 Jul 1965
		b	1.3	0.4	0.9	0.8	2.8	7.5	12.2	11.5	7.8	1.9	0.1	0.2	47.4	(1969)	(1991)		
Raxaul obsy	12	a	20.3	11.0	13.7	52.2	97.2	215.9	402.5	226.4	211.9	84.0	8.5	7.9	1351.5	148	63	224.3	10 Sep 1981
		b	1.7	1.4	1.1	3.3	5.8	9.9	15.9	11.1	8.9	3.3	1.2	0.9	64.5	(1981)	(1972)		
Sugauli	23	a	8.1	9.8	9.2	12.5	44.6	142.9	410.9	297.2	225.8	54.0	1.7	12.9	1229.6	230	66	280.0	28 Jul 1985
		b	0.7	0.8	0.8	1.0	2.6	6.0	13.3	10.9	7.5	2.9	0.2	0.6	47.3	(1985)	(1977)		
Turkaulia	25	a	12.8	10.3	8.7	17.6	52.7	208.3	334.6	331.4	203.7	61.4	8.5	7.2	1257.2	151	46	232.4	27 Sep 1975
		b	0.9	0.6	0.7	0.8	2.3	6.9	12.5	12.5	8.4	2.1	0.4	0.4	48.5	(1969)	(1991)		
E.Champaran District		a	13.0	10.3	8.5	16.5	52.1	193.3	361.9	309.1	218.3	62.6	5.9	7.0	1258.5	152	58		
		b	1.1	0.8	0.7	1.1	3.0	7.1	12.8	11.4	8.3	2.4	0.4	0.5	49.6	(1985)	(1990)		

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 2006.

** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
EAST CHAMPARAN
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	2	1401 - 1500	5
801 - 900	3	1501 - 1600	5
901 - 1000	3	1601 - 1700	2
1001 - 1100	8	1701 - 1800	1
1101 - 1200	8	1801 - 1900	0
1201 - 1300	4	1901 - 2000	1
1301 - 1400	6		

(Data available for 48 years only)

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

MONTH	Mean Maximum Temperature	Mean 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	22.4	8.4	31.3	01 Jan 1993	2.2	25 Jan 1905	81	69
February	25.2	10.5	35.6	28 Feb 1896	0.0	03 Feb 1905	73	58
March	31.0	14.8	42.9	30 Mar 1976	5.6	07 Mar 1945	60	49
April	35.3	19.6	42.2	---- Apr 1903 1908 1954	8.3	13 Apr 1969	56	46
May	35.7	23.0	44.4	24 May 1903	13.7	12 May 1968	67	52
June	34.8	25.1	43.3	07 Jun 1935	15.4	06 Jun 1982	76	68
July	32.4	25.4	42.8	02 Jul 1955	18.9	06 Jul 1995	84	80
August	32.4	25.5	37.2	17 Aug 1953	19.9	16 Aug 1995	83	80
September	32.2	24.5	37.2	06 Sep 1953	18.4	29 Sep 1995	82	79
October	31.5	20.7	38.4	08 Oct 1965	11.4	25 Oct 1995	77	73
November	28.7	14.4	35.6	01 Nov 1955	6.4	27 Nov 1969 30 Nov 1982 29 Nov 1896	73	71
December	24.4	9.8	29.1	01 Dec 1970	1.7	21 Dec 1896	79	70
Annual	30.5	18.5	44.4	24 May 1903	0.0	03 Feb 1905	74	66

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(MOTIHARI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	26	23	27	25	23	12	3	3	5	23	25	27	222
b	2	2	1	1	3	8	16	13	12	2	1	1	62
c	1.0	1.0	0.9	1.1	1.7	4.2	6.0	5.4	4.8	1.6	0.8	0.7	2.4
1730 HOURS IST													
a	26	21	25	23	24	14	2	2	5	23	26	27	218
b	1	2	1	1	2	5	13	13	10	2	1	1	52
c	1.1	1.2	1.0	1.2	1.3	3.6	5.6	5.3	4.3	1.4	0.5	0.7	2.3

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(MOTIHARI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.8	4.3	4.0	5.7	6.0	5.2	6.1	5.1	4.9	2.4	1.0	1.2	4.1
Direction in morning	C/W	C/W	C/W/E	E	E	E	E/C	E/C	E/C	C/E	C/E	C	
Direction in evening	C	C/W	C/W	C/W	C/E	C/E	C/E	C/E	C/E	C	C	C	

TABLE - 6
Special Weather Phenomena
(MOTIHARI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.0	0.5	0.5	1.0	0.9	0.4	0.3	0.4	0.1	0.0	0.0	4.2
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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2
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
(RAXAUL)

MONTH	Mean Maximum Temperature	Mean 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	22.8	8.1	27.4	04 Jan 1974	4.0	30 Jan 1971	86	64
February	25.1	9.6	31.8	23 Feb 1974	3.4	09 Feb 1974	79	54
March	30.9	13.4	38.1	31 Mar 1973	5.8	10 Mar 1979	59	36
April	35.2	19.8	41.4	24 Apr 1980	10.7	02 Apr 1978	53	33
May	35.5	23.3	41.7	30 May 1972	15.6	12 May 1973	61	43
June	34.4	25.4	42.5	07 Jun 1979	19.1	08 Jun 1974	75	61
July	32.2	25.6	40.0	29 Jul 1972	22.3	11 Jul 1976	83	76
August	32.4	25.6	36.8	07 Aug 1979	17.4	20 Aug 1980	82	76
September	32.1	24.5	37.1	10 Sep 1982	17.4	01 Sep 1980	82	74
October	31.2	20.7	35.0	04 Oct 1978	14.8	29 Oct 1971	79	67
November	28.7	14.3	33.0	02 Nov 1978	7.3	30 Nov 1982	79	60
December	24.5	8.7	29.6	04 Dec 1972	5.0	23 Dec 1974 19 Dec 1981	85	64
Annual	30.4	18.3	42.5	07 Jun 1979	3.4	09 Feb 1974	75	59

TABLE – 4(a)
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(RAXAUL)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	19	16	16	17	12	3	0	0	2	11	19	21	136
b	1	2	1	1	1	5	9	5	4	2	1	1	33
c	2.0	1.9	1.8	1.6	2.5	5.1	6.6	6.1	5.4	2.5	1.2	1.0	3.1
1730 HOURS IST													
a	15	12	13	11	6	1	0	0	0	5	17	19	99
b	1	1	0	0	0	2	3	3	2	1	0	0	13
c	2.1	2.1	2.1	2.5	2.5	4.3	6.1	6.1	5.1	2.5	1.2	1.3	3.2

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE – 5(a)
Mean Wind Speed and Predominant Wind Direction
(RAXAUL)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.5	4.5	6.1	9.6	12.0	11.4	9.8	9.1	7.1	3.9	2.7	2.5	6.8
Direction in morning	C/E	C/E/W	E/W	E	E	E	E	E	E	E/C	E/C	C/E	
Direction in evening	C/SW	W/SW/C	W	W	E	E	E	E	E/C	C/W	C/SW/W	C/SW	

TABLE – 6(a)
Special Weather Phenomena
(RAXAUL)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.9	0.9	1.8	4.2	10.8	13.3	14.9	13.8	10.1	3.4	0.6	0.2	74.9
Hail	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Dust storm	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4
Squall	0.0	0.0	0.0	0.2	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Fog	15.8	6.9	0.7	0.0	0.0	0.3	0.1	0.0	0.3	3.3	7.0	17.8	52.2

GAYA DISTRICT

The climate of this district is characterized by mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till end of February. March to the first week of June is the summer or hot weather season. The period from second week of June to about the first week of October constitutes the southwest monsoon season. The succeeding period lasting till late November is the post monsoon or transitional period from monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for a good network of 20 raingauge stations for the period ranging from 11 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 941.3 mm. The district gets about 88% of the normal annual rainfall during the monsoon months June to September, July being the rainiest month with an average rainfall of 267.7 mm. In the fifty years period 1951 to 2000, the highest annual rainfall amounted to 163% of the normal in the year 1971. The lowest annual rainfall which was 70% of the normal occurred in 1966. In the fifty year period there were 3 years when the annual rainfall in the district was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall was between 701 mm and 1200 mm in 39 years out of 50.

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 40 at Immamganj to 55 at Gaya (A) observatory.

The heaviest rainfall in 24 hours at any station in the district was 408.7 mm at Barachatti on 10 September 1936.

TEMPERATURE

There is one meteorological observatory in the district at Gaya. The temperature and other meteorological condition as indicated by the data at this station may be taken as representative of weather conditions prevailing in the district in general. The summer season starts from March with steady rise in day temperature and lasts till first week of June. May is generally the hottest month with the mean maximum temperature at about 40.5°C. and the mean minimum temperature at 25.9°C. The day temperature may go above 45°C on individual days before the onset of the monsoon. The scorching northwesterly winds which blow during the hot summer season are quite uncomfortable. There is fall in day temperature from second week of June with the onset of monsoon, but night temperatures continue to remain high making the weather uncomfortable. The day and night temperatures fall rapidly from about the middle of November. January is the generally the coldest month with the mean maximum temperature at 23.5°C and the mean minimum temperature at about 8.9°C. In association with passage of western disturbances, cold wave conditions hit the district and minimum temperature drops down to about 2°C during this period.

The highest maximum temperature ever recorded at Gaya was 47.9°C on 09 June 1966 and the lowest minimum temperature ever recorded at was 1.2°C on 15 February 1991. .

HUMIDITY

The relative humidity remains generally high about 75% during the southwest monsoon season and in the morning of post monsoon and winter season. The driest part of the year is the summer season when humidity remains between 25% to 30% especially in the afternoon. The relative humidity remains between 45% to 65% in the afternoon during rest of the year.

CLOUDINESS

The sky is generally heavily clouded or overcast during the monsoon period. Thereafter the cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer months. During the passage of western disturbances across the state during winter season, the sky remains covered with clouds.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening in force during the summer and monsoon season. Winds are generally calm or blow from south/southwest direction in the morning during post monsoon and winter season and in the afternoon winds are generally northwesterly In the summer season winds are mostly southwesterly in the morning and northwesterly in the afternoon. Easterly winds appear from late summer season and remain predominant during the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in pre-monsoon and monsoon season move in northwesterly to northerly direction after crossing the coast and affect the district and its neighbourhood causing heavy thunderstorms and rainfall accompanied with squalls at times. Thunderstorms occur throughout the year, however their frequency are more during monsoon period. Dust storms accompanied with squall affect the district during summer and early part of monsoon season occasionally. Fog affects the district occasionally during winter season in association with passage of western disturbance across the state.

Tables 3, 4, 5, and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Gaya observatory. .

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
GAYA

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
Amaz	17	a	8.6	12.3	11.0	3.0	27.1	169.6	306.5	244.4	223.8	41.1	9.9	12.0	1069.3	145	69	210.0	17 Sep 1976
		b	0.7	1.2	1.2	0.4	1.7	6.4	12.8	12.9	8.7	2.1	0.4	1.3	49.8	(2000)	(1986)		
Athari	24	a	9.4	10.4	7.5	7.6	14.0	143.5	299.9	260.7	165.0	48.8	8.0	6.3	981.1	144	58	144.0	22 Aug 1987
		b	0.9	0.9	0.6	0.6	1.1	6.2	12.4	10.8	8.3	2.3	0.4	0.6	45.1	(1978)	(1975)		
Balaganj Block	18	a	5.4	4.5	11.2	1.9	10.3	119.8	258.4	230.4	152.9	17.4	4.4	7.4	824.0	185	42	198.3	19 Sep 1967
		b	0.6	0.5	1.0	0.2	0.9	5.6	10.4	11.5	8.3	1.2	0.5	0.5	41.2	(1997)	(1974)		
Barachatti	36	a	12.5	9.6	8.6	7.1	10.4	129.2	299.1	301.0	165.7	48.3	5.7	7.3	1004.5	156	55	408.7	10 Sep 1936
		b	1.1	1.1	0.9	0.8	0.9	5.8	13.9	13.1	8.5	2.6	0.4	0.7	49.8	(1959)	(1996)		
Bodh Gaya	27	a	12.8	15.1	4.6	5.5	16.4	153.0	277.3	260.1	169.7	50.2	7.8	8.2	980.7	153	60	180.0	16 Sep 1976
		b	1.1	1.4	0.7	0.6	1.3	5.9	12.6	12.8	8.6	2.6	0.5	0.8	48.9	(1978)	(1966)		
Dumaria	13	a	5.6	2.7	5.8	1.9	8.7	93.7	227.8	204.6	138.0	42.3	2.1	5.6	738.8	132	69	175.0	03 Sep 1996
		b	0.7	0.4	0.4	0.2	1.1	6.4	12.1	12.1	9.1	2.2	0.3	0.5	45.5	(1999)	(1992)		
Fatehpur	25	a	13.6	12.2	9.1	3.6	18.9	145.0	285.7	259.2	169.3	47.0	6.0	7.7	977.3	167	57	225.5	26 Jun1978
		b	0.9	1.0	0.6	0.4	1.0	6.7	13.3	12.2	8.7	2.6	0.3	0.6	48.3	(1978)	(1996)		
Gaya Obsy	49	a	17.9	14.4	11.3	10.2	22.3	139.6	306.5	289.3	203.9	55.1	8.6	5.3	1084.4	156	58	290.8	16 Sep 1976
		b	1.5	1.5	1.0	0.8	1.8	6.6	14.1	14.3	9.5	2.8	0.5	0.6	55.0	(1984)	(1966)		
Gaya Town Block	23	a	11.3	10.4	20.1	6.4	32.4	187.0	327.6	264.1	204.6	35.1	6.0	6.4	1111.4	182	49	235.0	16 Sep 1976
		b	1.1	0.9	1.3	0.4	1.6	6.6	13.6	13.7	9.6	2.0	0.5	0.6	51.9	(1986)	(1966)		
Guruva	16	a	8.9	4.5	6.2	3.1	6.3	118.5	235.0	192.5	188.8	30.8	12.4	10.5	817.5	140	88	180.0	03 Aug 1996
		b	0.8	0.6	0.5	0.2	0.5	5.0	12.4	10.4	8.0	1.3	0.5	0.8	41.0	(1978)	(1995)		

TABLE – 1(contd….)

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
Immamganj	11	a	7.7	15.0	6.3	3.1	5.9	115.5	171.6	238.3	182.6	14.8	10.9	7.1	778.8	119	70	160.0	03 Aug 1996
		b	0.9	0.9	0.8	0.3	0.4	5.7	8.7	12.9	7.5	1.2	0.4	0.7	40.4	(1997)	(1975)		
Khizirsarai	35	a	13.5	11.4	6.1	6.5	21.9	144.7	332.1	251.9	202.0	59.1	9.6	6.6	1065.4	163	53	180.0	20 Sep 1967
		b	1.1	1.0	0.6	0.6	1.3	5.8	12.2	11.3	8.8	2.4	0.4	0.6	46.1	(1997)	(1975)		
Konch	17	a	16.9	20.4	7.2	3.1	16.2	100.0	212.3	298.5	185.8	21.4	2.9	4.4	889.1	228	57	180.0	09 Jun 2006
		b	1.0	1.5	.4	.4	1.0	5.5	11.1	11.4	8.6	1.7	.3	.6	43.5	(1980)	(1996)		
Manpur	25	a	7.2	10.7	8.9	4.8	16.2	153.0	267.1	233.2	208.9	63.6	7.1	7.8	988.5	154	61	245.2	19 Sep 1967
		b	0.8	1.2	0.8	0.4	1.3	6.0	12.4	13.3	9.7	2.8	0.4	0.9	50.0	(1978)	(1992)		
Mohanpur	12	a	7.8	1.7	0.7	2.5	16.0	151.1	234.3	233.2	158.6	16.2	8.4	15.1	845.6	124	72	198.4	6 Jun 2006
		b	0.7	0.3	0.1	0.4	0.9	6.3	12.9	11.4	8.8	1.4	0.6	0.7	44.5	(1994)	(1995)		
Pareya	17	a	18.4	10.9	82.6	6.4	25.6	120.7	227.0	213.5	139.4	31.8	4.7	5.6	886.6	195	43	150.0	30 Jun 1986
		b	0.9	1.1	0.9	0.6	2.1	6.3	11.5	12.6	9.4	1.9	0.4	0.7	48.4	(1975)	(1991)		
Sherghati	43	a	16.1	12.0	9.1	4.3	19.3	123.7	300.1	246.9	178.0	54.7	6.8	6.4	977.4	154	37	407.4	29 Aug 1940
		b	1.0	1.3	.8	.6	1.3	5.4	13.6	11.5	9.0	2.6	.3	0.7	48.1	(1990)	(1965)		
Sherghati (Hydro)	12	a	17.5	8.4	9.0	5.8	16.8	103.6	276.8	246.3	191.3	59.7	29.7	2.8	967.7	145	98	160.0	13 Aug 1991
		b	0.6	0.7	0.4	0.3	0.8	4.8	13.9	10.7	9.0	2.2	1.3	0.4	45.1	(1990)	(1985)		
Tekari	26	a	10.2	9.1	11.1	2.9	22.6	153.5	253.7	249.1	205.6	31.9	8.0	6.4	964.1	129	52	202.0	18 Sep 1976
		b	0.8	0.7	0.9	0.3	1.6	6.2	12.2	12.6	9.4	2.3	0.5	0.7	48.2	(1967)	(1979)		
Waziganj	32	a	13.0	6.0	8.4	4.1	16.3	99.8	255.0	260.6	154.9	47.5	7.6	2.5	875.7	157	50	225.2	01 Jul 1986
		b	1.0	0.6	0.6	0.4	1.4	4.9	11.7	12.1	8.0	2.1	0.4	0.3	43.5	(1987)	(1979)		
Gaya (District)		a	11.7	10.1	12.2	4.7	17.2	133.2	267.7	248.9	179.4	40.8	8.3	7.1	941.3	163	70		
		b	0.9	0.9	0.7	0.4	1.2	5.9	12.4	12.2	8.8	2.1	0.5	0.7	46.7	(1971)	(1966)		

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 2006 ** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
GAYA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	2	1101 - 1200	4
701 - 800	6	1201 - 1300	3
801 - 900	9	1301 - 1400	4
901 - 1000	7	1401 - 1500	0
1001 - 1100	13	1501 - 1600	2

(Data available for 50 years only)

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

MONTH	Mean Maximum Temperature	Mean 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	23.5	8.9	32.5	04 Jan 1997	1.9	16 Jan 2003	76	53
February	26.8	11.6	35.6	28 Feb 1896	1.2	15 Feb 1991	67	44
March	33.2	16.4	41.7	28 Mar 1941	7.8	04 Mar 1981	47	28
April	38.9	22.5	45.0	24 Apr 1980	12.9	01 Apr 1968	39	25
May	40.5	25.9	47.1	14 May 1970	17.1	19 May 1999	46	29
June	38.0	27.3	47.9	09 Jun 1966	18.3	06 Jun 1913	63	53
July	33.3	25.8	43.7	06 Jul 1982	16.7	02 Jul 1886	82	76
August	32.7	25.6	42.3	31 Aug 1979	18.5	03 Aug 1962	84	78
September	32.6	24.9	42.3	01 Sep 1979	17.4	28 Sep 1994	82	75
October	31.6	21.0	37.2	17 Oct 1918	11.0	19 Oct 1997	77	64
November	28.9	14.3	35.0	01 Nov 1896	6.1	28 Nov 1995	73	52
December	24.7	9.5	32.6	01 Dec 1991	1.4	25 Dec 1961	75	52
Annual	32.1	19.5	47.9	09 Jun 1966	1.2	15 Feb 1991	68	52

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(GAYA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	18	15	18	18	18	5	0	0	3	15	18	19	147
b	1	1	1	0	0	3	8	6	4	2	1	1	28
c	1.8	1.9	1.6	1.5	1.6	4.6	6.5	6.3	5.1	2.3	1.5	1.5	3.0
1730 HOURS IST													
a	16	14	16	14	13	2	0	0	1	11	15	17	119
b	1	1	1	1	0	5	9	7	5	2	1	1	34
c	1.9	1.9	1.9	2.1	2.0	5.4	6.7	6.6	5.6	2.6	1.7	1.7	3.3

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(GAYA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	4.4	5.5	6.5	8.3	9.8	10.0	9.1	8.4	7.6	4.8	4.0	4.4	6.9
Direction in morning	C/S/SW	SW/C/S	SW	SW/W	E/SW	E/W	E/SE	E	E/SW	C/SW	C/S/SW	C/S/SW	
Direction in evening	NW/C	NW	NW	NW	NW/NE	NE/E	E/W	E/C	E/C/NW	C/NW	C/NW	C/NW	

TABLE - 6
Special Weather Phenomena
(GAYA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	1	1.5	1.9	2.2	3.5	8.4	11.9	11	9.2	1.7	0.1	0.2	52.6
Hail	0	0	0	0	0	0.1	0.2	0.1	0.1	0	0	0	0.5
Dust storm	0	0	0	0.3	0.5	0.2	0.2	0	0	0	0	0	1.2
Squall	0	0.3	0.5	0.8	1.9	1.5	0.9	0.4	0.4	0.3	0	0	7
Fog	1.2	0.5	0.1	0.1	0	0	0.2	0	0	0.2	0.3	0.5	3.1

GOPALGANJ DISTRICT

The district has a hot dry summer, hot and humid monsoon season and mild winter. The year may be divided into four seasons. The cold season starts from mid November and lasts till mid March. This is followed by summer season from April to second week of June. The period from second week of June to September constitutes the monsoon season. The succeeding period lasting till November is the post monsoon season.

RAINFALL

Records of rainfall in the district are available for 9 raingauge stations for the period ranging from 11 to 44 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 1131.3 mm. The rainfall in the southwest monsoon season constitutes about 87% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 317.2 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1953 when it amounted to 156% of the normal. 1951 was the year with the lowest rainfall and it was 57% of the normal. In this fifty year period there were 9 years when the rainfall was less than 80% of the normal. Considering the district as a whole, there was one occasion each when such a low rainfall occurred in two consecutive years and three consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 901 mm and 1400 mm in 28 years out of 43 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. This number varies from 38 at Bijaipur to 54 at Vaikunthpur. .

The heaviest rainfall in 24 hours at any station in the district was 380.0 mm at Uchakagaon on 09 June 1984. .

TEMPERATURE

There is no meteorological observatory in the district. So the description which follows is based on the records of Motihari observatory in the neighbouring district, which may be taken as representative of the general climatic conditions prevailing in the district. The cold season starts from mid November when temperatures begin to fall rapidly and lasts till mid March. Generally January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 8°C. In association with cold waves after the passage of western disturbance across north India, the minimum temperature may go down to about 1°C to 2°C. Temperatures start to rise from middle of March and summer season sets in till second week of June. May is generally the hottest month with the mean maximum temperature at about 36°C and the mean minimum temperature at about 23°C. On individual days the maximum temperature may go upto about 42°C. The day temperature drops with the onset of the monsoon by about the second week of June, but the nights continue to be quite warm with the night temperatures slightly higher than those in summer season which make nights uncomfortable due to high humidity. The temperatures begin to decrease after the withdrawal of southwest monsoon in October.

HUMIDITY

The air remains humid throughout the year except in summer season when the relative humidity remains between 45% to 50% in the afternoon. During monsoon season relative humidity remains high with value varying between 75% and 80%.

There is slight fall in relative humidity during post monsoon and winter season with values remaining between 60% to 80%.

CLOUDINESS

The sky is generally clouded to overcast during the monsoon season. During the rest of the year generally clear or lightly clouded sky prevails. But in winter season, when the district is affected by passing western disturbances cloudy skies prevail for spells of a day or two.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening during summer and southwest monsoon season. Winds are generally calm or blow from west/east direction during the early part of summer. Easterly wind appears from April and remains predominant throughout the southwest monsoon season. Winds are generally calm or easterly or westerly and appears during post monsoon and winter seasons.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in monsoon and post monsoon season move in northwesterly to northerly direction after crossing the coast, affect the district and its neighbourhood causing heavy thunderstorms with heavy rain. The frequency of thunderstorm is quite high during the late summer and southwest monsoon season. During late summer season occasionally dust storms affect the district.

.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
GOPALGANJ

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Barauli	22	a	14.9	11.6	10.3	18.8	43.6	188.5	386.4	304.7	231.7	58.5	3.0	13.2	1285.2	173	62	200.3	15 Sep 1994
		b	1.0	0.8	0.6	1.3	2.8	6.9	13.4	11.8	8.4	2.3	0.1	0.8	50.2	(1985)	(1992)		
Bhore(Borch)	41	a	12.4	10.2	6.0	11.9	34.5	154.3	332.9	318.5	245.4	55.2	3.3	7.3	1191.9	253	55	275.2	09 Sep 2000
		b	0.9	0.9	0.5	0.7	1.9	5.4	12.5	12.0	9.1	2.4	0.3	0.5	47.1	(2000)	(1951)		
Bijaipur	24	a	8.2	8.6	3.4	4.8	20.4	79.7	291.0	208.9	169.0	40.2	3.6	9.1	846.9	153	35	290.0	22 Aug 1977
		b	0.5	0.6	0.5	0.4	1.0	4.0	11.0	9.5	7.5	2.0	0.2	0.6	37.8	(1986)	(1985)		
Gopalganj	44	a	18.7	10.4	8.6	13.2	32.6	164.7	292.1	263.4	203.2	67.2	6.4	6.5	1087.0	187	56	332.8	09 Jun 1984
		b	1.4	0.9	0.8	0.8	2.2	6.3	12.1	11.0	8.1	2.5	0.3	0.6	47.0	(1953)	(2000)		
Hathwa	34	a	15.7	13.9	7.4	11.1	34.8	148.8	294.7	310.5	205.7	57.7	6.4	8.9	1115.6	146	34	231.4	11 Jul 1912
		b	1.2	1.1	0.9	0.9	2.1	6.3	12.3	12.4	9.1	2.2	0.3	0.8	49.6	(1963)	(1951)		
Katiya	43	a	11.7	6.2	4.4	14.7	25.2	160.7	338.6	330.8	237.7	47.3	7.0	6.6	1190.9	161	56	320.0	15 Sep 1994
		b	0.6	0.5	0.3	0.6	1.3	4.8	11.3	10.7	8.3	1.8	0.2	0.4	40.8	(1956)	(1982)		
Kuchaikot	30	a	13.9	11.0	5.3	10.7	44.2	133.9	302.1	283.2	206.7	50.3	5.9	10.7	1077.9	157	50	280.0	14 Sep 1986
		b	0.8	0.9	0.5	0.8	2.7	5.5	12.1	10.6	7.9	2.4	0.4	0.8	45.4	(1987)	(1965)		
Uchakagaon	26	a	9.1	13.7	2.5	11.2	44.3	170.2	359.1	330.6	229.9	38.7	8.3	10.8	1228.4	147	63	380.0	09 Jun 1984
		b	0.7	0.9	0.3	0.9	2.6	6.1	12.6	11.9	8.2	1.6	0.4	0.7	46.9	(1988)	(1982)		
Vaikunthpur	11	a	28.5	19.3	16.0	17.4	47.8	187.4	258.2	278.0	216.6	58.2	13.9	16.9	1158.2	128	72	185.0	15 Sep 1994
		b	1.4	1.5	1.2	1.5	2.7	6.3	13.1	12.4	10.4	1.8	1.0	1.1	54.4	(1998)	(1992)		
Gopalganj (District)		a	14.8	11.7	7.1	12.6	36.4	154.2	317.2	292.1	216.2	52.6	6.4	10.0	1131.3	156	57		
		b	0.9	0.9	0.6	0.9	2.1	5.7	12.3	11.4	8.6	2.1	0.4	0.7	46.6	(1953)	(1951)		

a Normal rainfall in mm

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

* Based on all available data upto 2006

** Years of occurrence given in brackets

TABLE-2
Frequency of Annual Rainfall in the District
GOPALGANJ
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	1	1201 - 1300	6
701 - 800	1	1301 - 1400	3
801 - 900	7	1401 - 1500	3
901 - 1000	7	1501 - 1600	2
1001 - 1100	6	1601 - 1700	0
1101 - 1200	6	1701 - 1800	1

(Data available for 43 years)

JAHANABAD DISTRICT

The climate of this district is characterized by mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till end of February. March to first the week of June is the summer or hot weather season. The period from second week of June to about the first week of October constitutes the southwest monsoon season. The succeeding period lasting till late November is the post monsoon or transitional period from monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 4 raingauge stations, for period ranging from 13 to 32 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district as a whole is 858.2 mm. The rainfall in the southwest monsoon season constitutes about 89% of the annual normal rainfall. July and August are the months with the heaviest rainfall with an average value of 240.5 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 191% of the annual normal occurred in 1997. The lowest annual rainfall which was 39% of the normal occurred in 1966. In this fifty year period, there were 2 years when the annual rainfall in the district was less than 80% of the normal. It is seen from Table 2 that the annual rainfall in the district was between 701 mm and 1100 mm in 23 years out of 30.

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 40 at Kaka to 47 at Makhdumpur and Jahanabad.

The heaviest rainfall in 24 hours recorded at any station in the district was 340.6 mm at Jahanabad on 11 August 1942.

TEMPERATURE

There is no meteorological observatory in the district. The climatological description which follows is based on data of Gaya observatory in the neighbouring district. The summer season starts from March with steady rise in day temperature and lasts till first week of June. May is generally the hottest month with the mean maximum temperature at about 40°C. and the mean minimum temperature at 25°C. The day temperature may go above 45°C on individual days before the onset of the monsoon. The scorching northwesterly winds which blow during the hot summer season, are quite uncomfortable. There is a drop in day temperature from second week of June with the onset of monsoon, however night temperatures continue to remain high making the weather uncomfortable due to increased moisture in the air. The day and night temperatures fall rapidly from about the middle of November. January is the generally the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In association with passage of western disturbances, cold wave conditions hit the district and minimum temperature drops down to about 2°C during this period.

HUMIDITY

The relative humidity remains generally high about 75% during the southwest monsoon season and in the morning of post monsoon and winter season. The driest part of the year is the summer season when humidity remains between 25% to 30% especially in the afternoon. The relative humidity remains between 45% to 65% in the afternoon during rest of the year.

CLOUDINESS

The sky is generally heavily clouded or overcast during the monsoon period. Thereafter the cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer months. During the passage of western

disturbances across the state during winter season, the sky remains covered with clouds.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening in force during the summer and monsoon season. Winds are generally calm or blow from south/southwest direction in the morning during post monsoon and winter season and in the afternoon winds are generally northwesterly In the summer season winds are mostly southwesterly in the morning and northwesterly in the afternoon. Easterly winds appear from late summer season and remain predominant during the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in pre-monsoon and monsoon season move in northwesterly to northerly direction after crossing the coast and affect the district and its neighbourhood causing heavy thunderstorms and rainfall accompanied with squalls at times. Thunderstorms occur throughout the year, however their frequency are more during monsoon period. Dust storms accompanied with squall affect the district during summer and early part of monsoon season occasionally. Fog affects the district occasionally during winter season in association with passage of western disturbance across the state.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
JAHANABAD

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
Ghosi	20	a	10.2	10.0	5.1	3.4	14.8	79.9	232.5	264.3	172.6	32.9	7.3	8.2	841.2	150	17	143.2	12 Jul 1997
		b	0.8	1.2	0.5	0.2	1.2	3.9	11.1	12.4	8.2	1.5	0.5	0.9	42.4	(1997)	(1966)		
Jahanabad	32	a	16.5	6.7	7.8	18.3	21.1	103.5	242.4	231.6	196.7	43.6	5.5	4.1	897.8	203	37	340.6	11 Aug 942
		b	1.1	0.8	0.8	1.0	1.4	5.6	11.9	12.5	9.0	1.9	0.4	0.5	46.9	(1997)	(1966)		
Kaka	13	a	6.2	8.7	2.9	3.0	20.7	86.8	212.2	202.1	167.7	18.7	6.1	7.2	742.3	154	66	150.0	12 Jul 1997
		b	0.6	0.9	0.4	0.3	1.4	4.3	10.2	10.7	8.3	1.3	0.4	0.8	39.6	(1997)	(1992)		
Makhdumpur	27	a	8.0	7.7	5.4	8.2	24.7	118.7	266.5	272.2	190.9	33.2	9.0	6.7	951.2	173	54	262.0	20 Sep 967
		b	0.7	1.0	0.8	0.6	1.3	5.8	11.8	13.0	8.5	2.2	0.7	0.7	47.1	(1997)	(1966)		
Jahanabad (District)		a	10.2	8.3	5.3	8.2	20.3	97.2	238.4	242.6	182.0	32.1	7.0	6.6	858.2	191	39		
		b	0.8	1.0	0.6	0.5	1.3	4.9	11.3	12.1	8.5	1.7	0.5	0.7	43.9	(1997)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
JAHANABAD
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
301 - 400	1	1001 - 1100	1
401 - 500	0	1101 - 1200	3
501 - 600	0	1201 - 1300	1
601 - 700	1	1301 - 1400	0
701 - 800	9	1401 - 1500	0
801 - 900	8	1501 - 1600	0
901 - 1000	5	1601 - 1700	1

(Data available for 30 years only)

JAMUI DISTRICT

The climate of this district is characterized by mild winter, hot summer and hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from December and lasts till the beginning of March. The summer season follows and continues till first week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 10 stations for the period ranging from 11 to 47 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 1127.5 mm. The rainfall in the southwest monsoon season constitutes about 87% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 311.0 mm. The variation from year to year of the annual rainfall is large. In the fifty years period 1951 to 2000, the highest annual rainfall was in 1999 when it amounted to 158% of the normal. 1970 was the year with the lowest rainfall and it was 63% of the normal. In this fifty years period there were 10 years when the rainfall was less than 80% of the normal. Considering the district as a whole, rainfall was less than 80% of the normal once each for two and three consecutive years. It is seen from Table 2 that the annual rainfall was between 901mm and 1400 mm in 27 years out of 44 years.

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 45 at Khaira to 59 at Garhi and Jhajha .

The heaviest rainfall in 24 hours at any station in the district was 475.0 mm at Chakaibanda on 01 July 1985.

TEMPERATURE

There is a meteorological observatory in the district at Jamui. The temperature and other meteorological condition as indicated by the data at this station may be taken as representative of weather conditions in the district in general. The cold season commences from December when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at 24.8°C and the mean minimum temperature at 11.1°C (based on 1951-1979 data). In winter cold waves which affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool. Both day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 40.2°C and the mean minimum temperature at about 26.1°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. With the advance of the southwest monsoon into the district towards the second week of June there is drop in day temperature, however there is a little relief as the weather is oppressive on account of the increased moisture and high night temperatures. In October while day temperature remains as high as in the monsoon months the nights are cooler.

The highest maximum temperature ever recorded at Jamui was 45.8 °C on 27 May 1958 and the lowest minimum temperature ever recorded at Jamui was 3.3°C on 17 January 1967.

HUMIDITY

Air remains humid throughout the year. Humidity remains high between 75% to 80% during southwest monsoon season, post monsoon and early part of winter season. During summer season humidity is less between 50% to 65%.

CLOUDINESS

Skies are heavily clouded to overcast in the monsoon months. During winter the sky remains cloudy for few days in association with western disturbances which affect the state. In post monsoon and summer seasons the skies are generally clear or lightly clouded, but towards the late summer the cloudiness increases in the afternoons.

WINDS

Winds are generally light with some increase in wind force in latter part of summer and early part of southwest monsoon season. Light easterly, northwesterly/ westerly winds prevail in the winter and summer season. In southwest monsoon season moderate easterly winds prevail mostly but in winter they are less frequent.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/westerly direction towards the district or its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms also occur during the summer season and early post monsoon season. Dust storms occur occasionally in the summer months. Fog affects the district occasionally during winter season.

Table 3, 4, 5 and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind direction, special weather phenomena respectively for Jamui observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
JAMUI

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Chakaibanda	47	a	12.1	11.1	10.6	10.8	47.7	209.9	380.0	284.6	296.2	96.9	9.4	4.4	1373.7	217	54	475.0	01 Jul 1985
		b	0.9	0.9	0.7	0.8	2.8	8.2	14.6	12.6	10.1	3.2	0.4	0.4	55.6	(1999)	(1976)		
Garhi (Hydro)	14	a	16.3	1.2	12.9	20.8	37.4	92.1	319.7	299.9	203.5	35.7	5.0	10.0	1054.5	143	96	194.0	04 Jul 2002
		b	2.0	0.0	0.8	1.8	2.8	7.3	15.0	14.3	10.6	3.1	1.0	0.3	59.0	(1980)	(1981)		
Jamui	36	a	8.4	7.1	6.5	7.5	36.2	166.9	288.6	235.5	190.8	66.4	6.8	3.2	1023.9	161	36	342.6	01 Jul 1985
		b	0.6	0.7	0.5	0.8	2.2	7.6	13.4	12.7	9.4	3.2	0.4	0.4	51.9	(1964)	(1977)		
Jamui obsy	21	a	24.8	7.8	7.7	9.9	37.5	113.0	260.3	203.3	226.1	111.8	1.0	1.8	1005.0	147	72	205.8	03 Oct 1961
		b	1.8	0.9	0.8	0.6	2.3	7.0	13.3	13.0	10.6	4.6	0.1	0.2	55.2	(1964)	(1951)		
Jhajha	11	a	3.8	3.2	1.7	6.7	32.5	210.7	430.9	319.5	359.6	66.9	8.8	8.0	1452.3	142	55	240.2	22 Sep 2000
		b	0.5	0.5	0.2	0.7	1.5	9.9	16.3	13.9	12.5	2.1	0.6	0.6	59.3	(1999)	(1989)		
Jhajha (Hydro)	18	a	12.2	12.9	10.6	14.1	58.2	210.3	351.6	330.1	296.1	71.6	0.0	10.6	1378.3	142	80	268.4	01 Jul 1985
		b	0.5	0.9	0.5	1.0	3.7	7.9	14.3	14.2	11.4	3.1	0.0	0.4	57.9	(1999)	(1981)		
Khaira	12	a	4.8	4.5	1.0	0.4	20.1	140.6	229.2	237.7	276.6	56.3	17.8	5.0	994.0	162	66	423.0	23 Jun 1987
		b	0.5	0.5	0.2	0.1	1.3	6.1	11.5	10.9	10.4	2.2	0.6	0.7	45.0	(1987)	(1991)		
Lakshimipur	21	a	5.3	7.0	4.3	12.7	27.0	120.9	273.8	266.6	204.1	59.5	2.3	4.4	987.9	191	67	201.5	20 Aug 1967
		b	0.5	0.9	0.4	0.7	2.1	5.4	13.7	11.0	9.9	2.8	0.2	0.4	48.0	(1987)	(1966)		
Sikandra	34	a	10.9	5.5	8.6	10.3	21.4	114.4	266.6	239.2	183.1	48.4	10.2	3.6	922.2	162	13	225.0	20 Sep 1976
		b	0.6	0.7	0.8	0.7	1.4	6.1	12.4	11.1	8.3	2.5	0.5	0.3	45.4	(1975)	(1977)		
Sono	27	a	8.8	5.1	8.1	6.9	31.4	156.2	309.4	254.2	238.0	61.7	1.7	3.2	1084.7	160	52	348.2	22 Sep 2000
		b	0.8	0.7	0.7	0.8	1.7	7.2	13.9	12.0	9.0	2.0	0.2	0.3	49.3	(2000)	(1970)		
Jamui (Disrict)		a	10.7	6.5	7.2	10.0	34.9	153.5	311.0	267.1	247.4	67.5	6.3	5.4	1127.5	158	63		
		b	0.9	0.7	0.6	0.8	2.2	7.3	13.8	12.6	10.2	2.9	0.4	0.4	52.8	(1999)	(1970)		

a :Normal rainfall in mm

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

* Based on all available data upto 2006

** Years of occurrence given in brackets

TABLE – 2
Frequency of Annual Rainfall in the District
JAMUI
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	5	1301 - 1400	7
801 - 900	7	1401 - 1500	2
901 - 1000	2	1501 - 1600	1
1001 - 1100	6	1601 - 1700	1
1101 - 1200	5	1701 - 1800	1
1201 - 1300	7		

(Data available for 44 years)

TABLE - 3
NORMALS OF TEMPRATURE AND RELATIVE HUMIDITY
JAMUI
(1951-1980)

(1951-1979)

Month	Mean Maximum Temp	Mean Minimum Temp	Highest maximum ever recorded		Lowest minimum ever recorded		Relative Humidity (%)	
	°C	°C	°C	Date	°C	Date	0830	1730
January	24.8	11.1	30.7	28 Jan 1958	3.3	17 Jan 1967	81	71
February	28.0	13.4	35.4	28 Feb 966	6.1	05 Feb 1964	77	63
March	33.4	18.1	41.1	27 Mar 1955	10.0	08 Mar 1962	66	57
April	38.8	23.2	44.9	30 Apr 1966	13.7	01 Apr 1959	53	47
May	40.2	26.1	45.8	27 May 1958	19.1	25 May 1959	58	51
June	37.3	27.2	45.6	03 Jun 1958 04 Jun 1964	20.1	19 Jun 1963	71	68
July	33.3	26.3	40.7	04 Jul 1976	20.1	17 Jul 1973	81	79
August	32.6	26.1	38.4	02 Aug 1972	22.8	Aug 1965	86	85
September	32.4	25.6	37.2	29 Sep 1966	20.1	20 Sep 1964	85	83
October	31.6	22.3	36.4	18 Oct 1966	15.6	26 Oct 1952	83	78
November	29.4	16.7	34.5	02 Nov 1978	8.3	29 Nov 1952	79	75
December	25.9	12.4	31.7	10 Dec 1963	4.8	30 Dec 1965	80	73
Annual	32.3	20.7	45.8	27 May1958	3.3	17 Jan 1967	75	69

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(JAMUI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	26	19	27	25	24	16	2	2	5	18	24	27	215
b	1	2	0	0	1	3	12	5	2	1	0	1	28
c	0.6	1.1	0.4	0.7	0.7	2.4	5.0	4.6	3.5	2.2	0.8	0.4	1.9
1730 HOURS IST													
a	24	21	29	25	22	13	2	2	5	17	24	27	211
b	1	1	0	1	1	4	10	6	3	2	0	0	29
c	0.7	1.0	0.4	0.9	0.9	2.6	5.1	5.0	4.0	2.2	0.7	0.4	2.0

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(JAMUI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.6	4.5	5.9	6.9	7.2	6.5	5.6	5.0	4.6	3.4	2.6	3.0	4.9
Direction in morning	E/W/NW/C	E/NW/W/C	E/W/NW	W/E	E	E	E	E	E	E	C/NW/E/W	C/NW/W	
Direction in evening	W/NW/C/E	NW/W	NW/W	W/NW	NE/E	E	E	E	E/C	C/E	C/W	C/NW/W	

TABLE - 6
Special Weather Phenomena
(JAMUI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	0.2	0.4	0.3	1.0	0.5	1.2	0.8	0.7	0.0	0.0.1	5.5
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	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Squall	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	1.3	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.7

KATIHAR DISTRICT

The climate of this district is characterized by a mild winter, hot moderate summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by the hot season which continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 12 raingauge stations for the period ranging from 16 to 44 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 1387.8 mm. The rainfall in the southwest monsoon season constitutes about 82% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 366.5 mm. The variation from year to year of the annual rainfall is large. In the fifty year period 1951to 2000, the highest annual rainfall was in 1999 when it amounted to 177% of the normal. 1966 was the year with the lowest rainfall and it was 55% of the normal. In the same fifty year period there were 11 years when the rainfall was less than 80% of the normal with one occasion of two consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall was between 1101mm and 1700 mm in 29 years out of 47 years.

On an average there are 57 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 53 at Gondwara/Kohra to 63 at Kursela Hydro.

The heaviest rainfall recorded in 24 hours at any station in the district was 510.5 mm at Barsoe on 23 June 1911.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Purnea observatory in the neighbouring district may be taken as representative of the district in general. The summer season starts from mid March when temperatures start to rise sharply. Generally April to May is the hottest period of the year with the mean maximum temperature at about 35^{o}C and the mean minimum temperature at 21^{o}C. The day temperature falls slightly with the onset of the monsoon in second week of June, but the night temperatures throughout the southwest monsoon period remain even higher than summer season. Night temperatures decrease more rapidly than day temperatures after September. January is the coldest month when the mean maximum temperature is at about 24.0^{o}C and the mean minimum temperature is at about 8^{o}C. During winter the district is affected by cold wave condition in association with western disturbances which pass across the state and minimum temperatures may sometimes go down to about 2^{o}C during this period.

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 40% to 60%. The humidity is high during the monsoon period when it is about 85%. In the rest of the year the relative humidity generally varies between 60% to 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In post monsoon, winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate throughout the year. Winds are generally calm or blow from west during the post monsoon, winter and early summer seasons. Easterly winds blow predominantly during pre-monsoon and monsoon period.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal during the monsoon period which move in north westerly to northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during the summer months and southwest monsoon season. Dust storms occur occasionally in the summer and southwest monsoon season. Fog occurs occasionally during winter season.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
KATIHAR

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Amdabad	24	a	9.3	8.2	11.6	22.9	88.6	218.0	412.8	290.2	310.1	70.9	7.8	8.3	1458.7	140	60	389.2	28 Sep 1995
		b	0.7	0.6	0.8	1.5	4.5	8.9	15.8	12.0	10.0	3.4	0.3	0.5	59.0	(1998)	(1966)		
Azamnagar	34	a	7.0	7.3	10.0	26.3	92.1	189.0	324.7	268.5	293.6	58.3	5.2	7.6	1289.6	160	39	445.8	26 Sep 1999
		b	0.6	0.6	0.5	1.8	4.3	8.5	14.1	11.3	9.7	3.1	0.4	0.6	55.5	(1986)	(1966)		
Balrampur	22	a	8.3	6.0	5.7	42.7	131.6	179.4	378.5	283.1	266.8	70.3	8.0	7.1	1387.5	151	55	430.0	25 Sep 1999
		b	0.7	0.6	0.6	2.0	6.0	8.8	15.3	11.9	10.9	3.4	0.4	0.5	61.1	(1988)	(1992)		
Barory	16	a	9.6	8.7	7.7	30.9	99.9	208.3	364.9	324.7	332.6	82.8	8.7	9.5	1488.3	177	52	334.0	25 Sep 1999
		b	0.7	0.8	0.4	1.7	5.2	7.8	14.3	10.9	11.3	3.6	0.5	0.4	57.6	(1999)	(1994)		
Barsoe	34	a	11.4	8.1	7.1	36.2	137.9	208.6	411.8	314.3	337.5	87.7	8.3	8.0	1576.9	175	20	510.5	23 Jun 1911
		b	0.6	0.4	0.6	1.8	5.4	8.7	14.4	12.3	10.3	3.1	0.5	0.6	58.7	(1999)	(1966)		
Gondwara/Kohra	37	a	12.6	5.3	10.9	17.1	108.3	210.8	360.2	258.5	224.6	78.9	7.5	4.3	1299.0	168	28	315.0	16 Jun 1984
		b	0.8	0.5	0.6	1.3	4.0	7.2	14.1	11.7	8.9	2.9	0.3	0.3	52.6	(1989)	(1966)		
Katihar/North	31	a	8.6	4.9	5.1	28.5	102.9	194.5	362.7	244.5	270.2	57.2	2.4	5.3	1286.8	164	60	348.6	28 Sep 1995
		b	0.7	0.6	0.3	1.8	5.3	8.4	14.4	11.8	9.5	2.9	0.2	0.4	56.3	(1991)	(1964)		
Kodwa	36	a	4.2	3.9	9.8	33.2	104.4	217.4	359.1	283.9	261.3	68.0	5.3	4.7	1355.2	154	53	219.0	07 Sep 1962
		b	0.5	0.3	0.6	1.6	4.7	9.1	13.9	11.4	9.8	2.6	0.3	0.3	55.1	(1976)	(1994)		
Kursela (Hydro)	22	a	11.1	15.9	13.2	31.7	96.9	220.4	345.7	281.3	279.4	77.3	9.4	14.1	1396.4	158	52	250.4	25 Sep 1999
		b	0.8	1.5	1.3	2.4	5.1	9.3	15.3	12.2	10.3	3.3	0.8	0.7	63.0	(1999)	(1979)		
Manihari	44	a	15.4	8.5	12.3	21.0	89.6	224.5	345.6	270.6	259.2	79.1	6.9	2.4	1335.1	196	55	374.0	25 Sep 1999
		b	1.0	0.9	0.7	1.5	4.4	9.4	14.6	12.0	9.9	3.2	0.5	0.2	58.3	(1999)	(1966)		
Phalka	26	a	8.8	10.2	8.3	30.8	105.7	208.8	371.9	275.0	267.1	75.0	9.8	5.5	1376.9	174	52	190.0	21 Jun 1988
		b	0.5	0.7	0.7	1.7	4.8	7.9	15.5	12.0	10.2	3.1	0.6	0.6	58.3	(1987)	(1996)		
Puranbur	29	a	11.1	8.7	11.5	29.2	112.7	235.4	360.4	298.5	239.1	84.7	5.9	5.0	1402.2	186	64	370.0	08 Aug 1966
		b	0.6	0.6	0.7	1.7	4.7	8.3	14.1	11.0	8.5	3.0	0.3	0.4	53.9	(1986)	(1996)		
Katihar (District)		a	9.8	8.0	9.4	29.2	105.9	209.6	366.5	282.8	278.5	74.2	7.1	6.8	1387.8	177	55		
		b	0.7	0.7	0.6	1.7	4.9	8.5	14.7	11.7	9.9	3.1	0.4	0.5	57.4	(1999)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
KATIHAR
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	2	1601 - 1700	3
801 - 900	3	1701 - 1800	3
901 - 1000	3	1801 - 1900	0
1001 - 1100	3	1901 - 2000	2
1101 - 1200	6	2001 - 2100	1
1201 - 1300	3	2101 - 2200	0
1301 - 1400	7	2201 - 2300	0
1401 - 1500	5	2301 - 2400	0
1501 - 1600	5	2401 - 2500	1

(Data available for 47 years)

KHAGARIA DISTRICT

The climate of this district is characterized by a mild cold winter, hot and dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts in December and lasts till February. This is followed by summer season which continues till second week of June when the southwest monsoon commences. The period from June to September is the southwest monsoon season followed by the post monsoon season (October and November). November is transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 6 raingauge stations for the period ranging from 21 to 42 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 1173.1 mm. The rainfall in the southwest monsoon season constitutes about 86% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 317.6 mm. The variation in the annual rainfall from year to year is large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 181% of the normal. 1966 was the year with the lowest rainfall amounting to 51% of the normal. In this fifty year period there were 13 years when the rainfall was less than 80 % of the normal. Considering the district as a whole there were three occasions of two consecutive years when the annual rainfall was less than 80% of the normal. It is seen from Table 2 that the annual rainfall was between 901mm and 1400 mm in 20 years out of 40 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. This number varies from 43 at Alonli and Chouthan to 60 at Khagaria Hydro.

The heaviest rainfall in 24 hours at any station in the district was 370.0 mm at Beldaur on 22 September 2000.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Bhagalpur observatory in the neighbouring district may be taken as representative of the climatic conditions in the district in general. The cold season commences early in December when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature is at about 10°C. In winter sometimes cold waves affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 2°C to 3°C. The temperatures begin to increase rapidly from March till May. May is the hottest month with the mean maximum temperature at about 37.0°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 45°C on individual days. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, but there is a little relief as the weather is unpleasant on account of the increased moisture in air and continuing high night temperatures. In October while day temperature remains as high as in the monsoon months, the nights however, are cooler.

HUMIDITY

The driest part of the year is the summer months when the relative humidity especially in the afternoon is between 40% and 50%. The humidity is high during the

monsoon period when it is generally above 80%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. During the post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Light westerly/southwesterly or calm winds prevail in the winter and early summer season. In April easterly winds begin and easterly/southeasterly winds predominate in the monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during summer months, their frequency being higher in the monsoon months. Thunderstorms occurring during the summer are sometimes accompanied with squall. Dust storms occur occasionally in the summer months. Fog occurs in winter months and occasionally in post monsoon and early summer seasons.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
KHAGARIA

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
Alonli	26	a	12.2	5.9	1.4	7.7	63.7	200.0	330.1	238.7	210.8	87.8	5.2	4.8	1168.3	185	40	135.0	09 Jul 2004
		b	0.3	0.3	0.1	0.4	2.1	6.6	11.6	10.1	7.9	2.8	0.3	0.2	42.7	(1984)	(1991)		
Beldaur	23	a	2.8	3.8	6.0	13.6	38.7	239.9	315.7	249.8	252.1	55.0	0.7	5.0	1183.1	169	50	370.0	22 Sep 2000
		b	0.2	0.3	0.4	0.8	2.3	7.3	12.1	10.0	8.7	2.2	0.1	0.2	44.6	(1981)	(1988)		
Chouthan	28	a	7.1	3.1	8.4	15.7	41.4	145.1	301.5	253.7	181.1	50.2	2.7	3.9	1013.9	179	49	300.0	16 Jul 1977
		b	0.6	0.4	0.5	0.9	2.2	5.6	11.9	10.5	8.2	2.2	0.2	0.3	43.5	(1986)	(1967)		
Gogri	42	a	13.5	3.6	10.1	13.9	49.4	201.7	330.1	354.4	270.8	89.0	7.4	3.5	1347.4	285	47	198.1	08 Sep 1911
		b	0.6	0.5	0.4	0.8	2.6	7.4	12.8	12.3	8.6	2.8	0.4	0.3	49.5	(1987)	(1970)		
Khagaria (Hydro)	21	a	13.1	6.9	13.8	24.8	58.8	171.9	338.8	260.0	250.5	74.8	8.5	8.5	1230.4	126	59	247.0	22 Sep 2000
		b	0.9	1.0	1.4	1.9	3.7	8.3	14.9	12.1	11.0	3.1	0.8	0.6	59.7	(1987)	(1992)		
Parbatta	32	a	5.2	4.1	4.5	16.4	45.6	166.6	289.3	240.1	252.5	61.6	6.2	3.8	1095.9	219	33	275.4	22 Sep 2000
		b	0.3	0.6	0.4	0.8	2.2	5.8	11.8	10.5	8.4	2.5	0.4	0.3	44.0	(2000)	(1994)		
Khagaria (District)		a	9.0	4.6	7.4	15.3	49.6	187.5	317.6	266.1	236.3	69.7	5.1	4.9	1173.1	181	51		
		b	0.5	0.5	0.5	0.9	2.5	6.8	12.5	10.9	8.8	2.6	0.4	0.3	47.2	(1987)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(KHAGARIA)
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	1	1401 - 1500	0
601 - 700	1	1501 - 1600	2
701 - 800	5	1601 - 1700	1
801 - 900	4	1701 - 1800	2
901 - 1000	5	1801 - 1900	2
1001 - 1100	3	1901 - 2000	2
1101 - 1200	4	2001 - 2100	0
1201 - 1300	4	1401 - 1500	0
1301 - 1400	4		

(Data available for 40 years only)

KISHANGANJ DISTRICT

The climate of this district is characterized by mild winter, hot summer and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till about the middle of March. This is followed by the summer season which continues till mid June, when the southwest monsoon commences. The period from June to September is the southwest monsoon season, followed by post monsoon season during October and November. November is a transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 7 raingauge stations for the period ranging from 12 to 40 years. The details of rainfall at these stations and for the district as a whole are given in Table 1 and 2. The average annual rainfall in the district is 2215.0 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 642.0 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1998 when it amounted to 128 % of the normal. 1992 was the year with the lowest rainfall and it was 57% of the normal. In the same fifty year period there were 7 years when the rainfall was less than 80% of the normal, none of them being consecutive. It is seen from Table 2 that the annual rainfall was between 1701mm and 2700 mm in 32 years out of 42.

On an average there are 72 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 65 at Kochdhawan to 82 at Thakurganj.

The heaviest rainfall recorded in 24 hours at any station in the district was 465.0 mm at Bahadurganj on 28 August 1977.

TEMPERATURE

There is no meteorological observatory in the district. The climatological description of the district which follows is based on the meteorological data of Forebesganj observatory in the neighbouring district where similar climtological conditions prevail. The cold season commences from late November when both day and night temperatures begin to decrease rapidly with the advance of the cold season. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In winter, when cold waves affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 34°C and mean minimum temperature at about 23°C. In the latter part of the summer season and beginning June the maximum temperatures may sometimes be above 41°C. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief from hot weather as the weather is uncomfortable on account of the increased moisture in air and continuing high night temperatures. In October when the southwest monsoon withdraws, the day temperature remains as high as in the monsoon months, while the night temperatures begin to decrease progressively and nights are cooler.

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 40% to 55%. The humidity is high during the monsoon period when it is between 70% to 85%. The relative humidity during the rest of the year generally varies between 55% to 85%.

CLOUDINESS

The skies are heavily clouded to overcast during southwest monsoon months. The skies are generally clear or lightly clouded in the post monsoon, winter and summer seasons.

WINDS

Winds are generally light to moderate with some strengthening during latter part of summer and southwest monsoon season. Light easterly or westerly winds prevail in the winter and early summer season. In May moderate easterly begin and predominate throughout the southwest monsoon and early winter months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months, which move in westerly/northwesterly direction towards the district or its neighbourhood, cause widespread heavy rain and strong winds. Thunderstorms occur mostly during the summer and southwest monsoon season. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
KISHANGANJ

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bahadurganj	40	a	11.3	8.4	18.0	48.1	128.6	350.3	586.2	470.9	321.0	72.7	5.4	4.0	2024.9	149	53	465.0	28 Aug 1977
		b	0.6	0.6	1.0	2.4	5.8	11.9	16.5	14.3	10.5	2.8	0.5	0.3	67.2	(1998)	(1992)		
Deegalbank	21	a	7.2	8.3	15.7	56.5	129.4	354.7	688.5	445.9	405.0	76.8	1.5	2.5	2192.0	134	59	245.2	30 Jun 1991
		b	0.4	0.6	0.6	3.2	6.7	12.2	17.6	13.9	11.8	3.2	0.2	0.3	70.7	(1987)	(1992)		
Kishanganj	37	a	8.1	5.9	16.0	55.6	182.5	385.6	571.2	455.6	368.3	85.1	7.4	3.5	2144.8	165	51	369.8	26 Jun 1933
		b	0.6	0.6	1.0	3.0	7.6	12.2	17.7	14.7	11.8	2.9	0.6	0.3	73.0	(1998)	(1994)		
Kochadhawan	34	a	8.2	3.8	12.1	49.0	153.7	327.5	537.3	416.7	348.1	83.6	11.2	4.7	1955.9	166#	55	332.0	25 Sep 1999
		b	0.5	0.3	0.8	2.3	6.1	10.5	15.8	12.9	12.4	2.6	0.4	0.3	64.9	(1987)	(1994)		
Pothia/Taibpur	32	a	7.2	3.4	18.3	70.7	189.9	446.6	761.0	523.0	407.7	107.8	4.6	7.0	2547.2	133	58	283.0	27 Jul 1998
		b	0.5	0.3	1.0	3.0	8.4	13.8	19.5	15.5	12.8	3.1	0.3	0.6	78.8	(1991)	(1992)		
Taydagachy	12	a	7.6	4.5	13.0	32.4	155.1	334.2	549.4	419.7	426.5	55.3	6.9	4.8	2009.4	123	57	255.0	03 Jul 2000
		b	0.6	0.3	0.9	2.0	6.2	10.8	15.6	15.2	12.6	3.0	0.5	0.3	68.0	(1998)	(1992)		
Thakurganj	22	a	9.1	7.1	17.9	55.0	226.3	423.9	800.3	567.7	402.0	100.9	11.0	8.0	2629.2	142	58	290.0	03 Jul 1981
		b	0.5	0.6	0.8	3.3	9.3	13.9	19.7	15.5	13.8	3.8	0.5	0.6	82.3	(1977)	(1992)		
Kishanganj (District)		a	8.4	5.9	15.9	52.5	166.5	374.7	642.0	471.4	382.7	83.2	6.9	4.9	2215.0	128	57		
		b	0.5	0.5	0.9	2.7	7.2	12.2	17.5	14.6	12.2	3.1	0.4	0.4	72.2	(1998)	(1992)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
KISHANGANJ
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
1201 - 1300	1	2101 - 2200	3
1301 - 1400	0	2201 - 2300	4
1401 - 1500	1	2301 - 2400	2
1501 - 1600	1	2401 - 2500	6
1601 - 1700	2	2501 - 2600	4
1701 - 1800	3	2601 - 2700	1
1801 - 1900	2	2701 - 2800	3
1901 - 2000	4	2801 - 2900	2
2001 - 2100	3		

(Data available for 42 year)

LAKHISARAI DISTRICT

The climate of this district is characterized by mild winter, hot summer and hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from December and lasts till the beginning of March. The summer season follows and continues till first week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 3 raingauge stations for the period ranging from 14 to 24 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 911.9 mm. The rainfall in the southwest monsoon season constitutes about 89% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 270.6 mm. The variation in the annual rainfall from year to year is large. In the fifty years period 1951 to 2000, the highest annual rainfall was in 1969 when it amounted to 168% of the normal. 1967 was the year with the lowest rainfall and it was 40% of the normal. In this fifty year period there were eight years when the rainfall was less than 80% of the normal with one occasion of three consecutive years and two occasions of two consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall was between 701 mm and 1100 mm in 11 years out of 24 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.

The heaviest rainfall recorded in 24 hours at any station in the district was 300.6 mm at Suryagada on 19 September 1976.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data of Jamui observatory in the neighbouring district may be taken as representative of the climatic conditions in the district in general. The cold season commences from December when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool. Both day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 40°C and the mean minimum temperature at about 26°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 43°C on individual days. There is a drop in day temperatures, with the advance of the southwest monsoon into the district towards the second week of June, however there is a little relief as the weather is oppressive on account of the increased moisture and high night temperatures. In October while day temperature remains as high as in the monsoon months the nights are cooler.

HUMIDITY

Air remains humid throughout the year. Humidity remains high between 75% to 80% during southwest monsoon season, post monsoon and early part of winter season. During summer season humidity is less between 45% to 65%.

CLOUDINESS

Skies are heavily clouded to overcast in the monsoon months. During winter the sky remains cloudy for few days in association with western disturbances which

affect the state. In post monsoon and summer seasons the skies are generally clear or lightly clouded, but towards the late summer the cloudiness increases in the afternoons.

WINDS

Winds are generally light with some increase in wind force in latter part of summer and early part of southwest monsoon season. Light easterly/northwesterly/ westerly winds prevail in the winter and summer season. In southwest monsoon season easterly winds prevail mostly but in winter they are less frequent. Northwesterly winds also prevail in winter months.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/westerly direction towards the district or its neighborhood cause widespread heavy rain and strong winds. Thunderstorms also occur during the summer season and early post monsoon season. Dust storms occur occasionally in the summer months. Fog affects the district occasionally during winter season.

.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
LAKHISARAI

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Halsi	24	a	3.6	2.9	2.1	6.2	33.7	124.2	246.6	276.0	192.1	42.7	5.6	5.6	941.3	163	39	262.0	15 Jul 1998
		b	0.3	0.4	0.2	0.6	1.9	6.0	11.6	12.5	10.0	2.1	0.4	0.4	46.4	(1969)	(1967)		
Lakhisarai	14	a	7.3	6.1	3.1	7.4	20.3	148.4	306.1	228.6	156.2	38.0	1.9	6.3	929.7	133	63	176.2	01 Oct 1998
		b	0.8	0.8	0.3	0.6	1.6	6.7	12.8	11.8	8.5	1.4	0.2	0.5	46.0	(1999)	(1979)		
Suryagada	14	a	7.1	16.3	6.4	3.4	36.4	86.9	259.2	190.3	210.8	33.4	5.7	9.1	865.0	195	56	300.6	19 Sep 1976
		b	0.5	1.0	0.5	0.2	2.0	5.3	11.1	10.7	7.4	2.1	0.3	0.4	41.5	(1990)	(2000)		
Lakhisarai (District)		a	6.0	8.4	3.9	5.7	30.1	119.8	270.6	231.6	186.4	38.0	4.4	7.0	911.9	168	40		
		b	0.5	0.7	0.3	0.5	1.8	6.0	11.8	11.7	8.6	1.9	0.3	0.4	44.5	(1969)	(1967)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE – 2
Frequency of Annual Rainfall in the District
LAKHISARAI
(Data 1964 - 2000)

Range in mm	No. of years	Range in mm	No. of years
301 - 400	1	1001 - 1100	4
401 - 500	0	1101 - 1200	1
501 - 600	4	1201 - 1300	2
601 - 700	3	1301 - 1400	1
701 - 800	3	1401 - 1500	0
801 - 900	3	1501 - 1600	1
901 - 1000	1		

(Data available for 24 years)

MADHEPURA DISTRICT

The climate of this district is characterized by a mild winter, hot moderate summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by the hot season which continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 7 raingauge stations for the period ranging from 28 to 41 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 1303.2 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 351.2 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1999 when it amounted to 157% of the normal. 1966 was the year with the lowest rainfall and it was 55% of the normal. Considering the district as a whole there were six years when rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall was between 1001mm and 1600 mm in 31 years out of 41.

On an average there are 56 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 47 at Chausa to 62 at Murliganj.

The heaviest rainfall in 24 hours at any station in the district was 406.0 mm at Chausa on 08 July 1967.

TEMPERATURE

There is no meteorological observatory in the district at Madhepura. The temperature and other meteorological condition as indicated by the data at Purnea and Supaul observatories in the neighbouring districts may be taken as representative of the district in general. The summer season starts from mid March when temperatures start to rise sharply. Generally April to May are the hottest period of the year with the mean maximum temperature at about 35°C and the mean minimum temperature at about 21°C. The day temperature falls slightly with the onset of the monsoon in second week of June, but the night temperatures throughout the southwest monsoon period remain even higher than summer season. Night temperatures decrease more rapidly than day temperatures after September. January is the coldest month when the mean maximum temperature is at about 24°C and the mean minimum temperature is at about 8°C. During winter the district is affected by cold waves conditions in association with western disturbances which pass across the state and minimum temperatures may sometimes go down to about 2°C during this period.

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 40% to 60%. The humidity is high during the monsoon period when it is about 85%. In the rest of the year the relative humidity generally varies between 60% to 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In post monsoon, winter and summer season the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate throughout the year. Winds are generally calm or blow from westerly/easterly direction during the post monsoon and winter seasons. Easterly winds blow predominantly during pre-monsoon and monsoon period.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal during the monsoon period which move in north westerly to northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during the summer months and southwest monsoon season. Dust storms occur occasionally in the summer and southwest monsoon season. Fog occurs occasionally during winter season.

.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
MADHEPURA

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Alamnagar	36	a	4.8	4.1	7.7	15.5	66.1	152.3	291.0	248.0	240.5	70.2	6.6	5.9	1112.7	167	29	369.0	22 Sep 2000
		b	0.4	0.5	0.6	1.1	3.6	6.8	12.8	11.2	9.5	2.5	0.6	0.4	50.0	(1987)	(1983)		
Chausa	36	a	6.2	6.3	6.9	20.8	56.0	147.1	295.6	273.9	218.6	67.7	4.9	5.2	1109.2	177	42	406.0	08 Jul 1967
		b	0.5	0.5	0.5	1.4	3.0	6.3	12.0	10.8	8.2	2.5	0.4	0.4	46.5	(1977)	(1997)		
Kishanganj	28	a	9.2	4.8	11.3	24.8	79.0	185.2	350.1	319.3	300.5	64.8	9.9	8.3	1367.2	174	56	286.4	31 Aug 1996
		b	0.9	0.6	1.1	1.4	3.9	8.6	14.0	12.3	10.4	3.0	0.7	0.8	57.7	(1999)	(1966)		
Kumarkhand	31	a	11.0	8.1	17.3	29.2	95.2	225.8	388.6	329.8	234.1	56.3	8.4	5.6	1409.4	152	49	286.4	13 Sep 2001
		b	0.8	0.6	0.2	1.6	4.9	8.5	15.3	13.2	10.3	2.9	0.5	0.5	60.3	(1999)	(1994)		
Madhipura	41	a	15.2	10.6	12.1	28.4	81.0	224.2	405.5	313.1	246.7	71.6	13.1	7.5	1429.0	168	37	289.6	29 Jul 1906
		b	1.2	0.9	0.9	1.5	4.2	8.2	15.2	12.5	10.0	3.0	0.6	0.8	59.0	(1981)	(1966)		
Murliganj	36	a	8.3	7.3	12.4	30.3	90.1	198.1	353.3	302.6	269.5	70.2	12.5	7.1	1361.7	168	58	298.2	31 Aug 1996
		b	0.7	0.7	1.0	1.9	5.1	8.8	15.3	13.3	11.1	3.0	0.5	0.7	62.1	(1984)	(1982)		
Sinheshwar Block	29	a	12.2	9.0	6.6	23.1	91.6	239.2	374.1	272.6	229.6	59.2	8.2	6.5	1331.9	176	49	278.8	08 Sep 1987
		b	0.8	0.6	0.8	1.6	4.8	8.7	14.8	12.0	10.0	2.6	0.4	0.5	57.6	(1984)	(1978)		
Madhepura (District)		a	9.6	7.2	10.6	24.6	79.9	196.0	351.2	294.2	248.5	65.7	9.1	6.6	1303.2	157	55		
		b	0.8	0.6	0.9	1.5	4.2	8.0	14.2	12.2	9.9	2.8	0.5	0.6	56.2	(1999)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
MADHEPURA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	1	1401 - 1500	4
801 - 900	1	1501 - 1600	2
901 - 1000	3	1601 - 1700	1
1001 - 1100	1	1701 - 1800	1
1101 - 1200	12	1801 - 1900	1
1201 - 1300	6	1901 - 2000	0
1301 - 1400	6	2001 - 2100	2

(Data available for 41 years)

MADHUBANI DISTRICT

The climate of this district is characterized by mild winter, moderate summer and humid monsoon season. The year may be divided into four seasons. The cold season starts from mid November and lasts till about the middle of March. This is followed by the hot season which continues till June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon month October constitutes transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 25 raingauge stations for the period ranging from 10 to 45 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 1221.3 mm. The rainfall in the southwest monsoon season constitutes about 85% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 371.7 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period from 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 155% of the normal.1982 was the year with the lowest annual rainfall amounting to 58% of the normal. In this fifty year period there were 6 years when the annual rainfall in the district was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall was between 901 mm and 1500 mm in 34 years out of 46.

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. This number varies from 39 at Bisfi to 60 at Balan Hydro and Jhanjharpur Hydro.

The heaviest rainfall in 24 hours at any station in the district was 412.6 mm at Lukaha on 15 September 1984.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Supaul observatory in the neighbouring district may be taken as representative the climate in the district in general. The cold season commences from mid November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In winter when cold waves affect the district in the wake of western disturbances passing across north India, minimum temperature may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool, however day and night temperatures begin to rise rapidly till the middle of June. April and May are the hottest months with the mean maximum temperature at about 35°C and the mean minimum temperature at about 22°C. In the latter part of the summer season i.e. May and June the maximum temperature may sometimes go above 41°C on individual days. There is a drop in day temperatures with the advance of the southwest monsoon into the district towards the third week of June however, there is little relief as the weather is unpleasant due to the increased moisture in air and continuing high night temperatures. In October while day temperature continues as in the monsoon months, the nights are cooler.

HUMIDITY

The humidity is generally high throughout the year. The humidity is high during the monsoon period when it is between 80% and 90%. The driest part of the year is summer months when the relative humidity especially in the afternoon is at about 60%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally calm or light and blow from easterly or westerly direction in post monsoon, winter and early summer seasons. April onwards easterly winds begin and remain predominant upto end of southwest monsoon period.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly direction towards the district and its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occasionally occur during summer and monsoon season. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
MADHUBANI

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**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Andharaiadi	19	a	12.1	12.9	3.0	19.0	81.2	192.9	396.3	254.3	194.3	38.2	1.3	6.3	1211.8	145	55	225.6	01 Aug 1987
		b	0.6	0.8	0.4	1.5	3.9	6.7	14.1	10.1	8.7	1.9	0.1	0.7	49.5	(1987)	(1995)		
Bahuharhi	23	a	5.4	4.4	1.3	18.2	49.8	141.0	305.0	230.2	131.7	46.6	1.0	10.5	945.1	215	52	254.0	10 Jun 1995
		b	0.5	0.6	0.3	1.6	2.2	5.5	12.8	9.0	6.5	2.3	0.1	0.3	41.7	(1987)	(1999)		
Balan (Hydro)	22	a	8.6	18.6	9.0	31.7	110.6	185.2	418.7	319.0	196.0	72.6	7.4	2.8	1380.2	141	55	290.6	12 Jul 1997
		b	0.7	1.1	0.9	2.5	6.4	8.1	15.2	12.0	9.1	2.6	0.8	0.2	59.6	(1987)	(1992)		
Bassopatti	33	a	10.8	6.3	13.3	31.8	66.5	174.5	406.8	308.1	151.1	59.5	2.7	6.8	1238.2	202	41	303.5	21 Sep 1967
		b	0.9	0.6	0.9	2.1	3.8	6.6	12.3	10.7	7.4	2.2	0.3	0.4	48.2	(1975)	(1982)		
Benipatti	45	a	11.3	6.1	10.4	19.7	52.5	170.2	327.4	261.0	152.2	67.3	2.9	5.1	1086.1	176	46	215.4	30 Sep 1942
		b	0.9	0.4	0.8	1.5	2.8	6.4	12.9	11.0	7.5	2.4	0.3	0.3	47.2	(1955)	(1982)		
Bisfi	22	a	4.2	9.0	8.4	15.2	43.1	123.9	425.8	402.4	168.1	51.7	0.6	7.1	1259.5	213	18	320.0	13 Aug 1995
		b	0.4	0.7	0.1	1.1	2.5	4.5	12.1	8.7	6.8	1.4	0.1	0.6	39.0	(1997)	(1982)		
Ghoghadiha	10	a	8.1	2.1	1.7	8.9	15.2	163.6	339.5	268.8	209.5	26.0	4.6	0.0	1048.0	172	61	210.0	04 Jul 1990
		b	0.8	0.4	0.4	1.6	2.1	8.0	11.6	11.1	6.3	1.3	0.3	0.0	43.9	(1993)	(1998)		
Harlakhi	25	a	9.0	4.9	10.0	20.4	78.3	183.4	463.0	368.7	221.6	57.3	1.1	10.4	1428.1	165	48	257.0	11 Aug 1987
		b	0.5	0.3	0.5	1.3	3.1	5.5	11.8	9.1	6.8	1.9	0.1	0.4	41.3	(1987)	(1995)		
Jainagar	45	a	9.8	7.6	6.8	21.5	71.8	191.2	375.6	317.2	156.3	62.7	4.5	6.5	1231.5	193	19	315.0	19 Aug 1976
		b	0.9	0.7	0.6	1.7	3.8	7.4	12.6	10.6	8.0	2.3	0.3	0.4	49.3	(1987)	(1951)		
Jhanjhanpur	11	a	13.3	9.8	0.8	15.6	33.8	205.0	344.4	266.5	178.4	42.4	5.7	3.4	1119.1	116	76	187.0	25 Sep 2006
		b	0.8	0.7	0.2	1.5	2.3	7.2	12.0	10.8	6.7	1.1	0.2	0.4	43.9	(1993)	(2000)		

TABLE – 1 (contd…)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEARS**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Jhanjharpur (Hydro)	25	a	11.6	10.3	12.2	40.4	84.5	177.4	375.7	308.9	210.3	78.3	9.0	11.1	1329.7	154	67	268.0	06 Oct 1978
		b	1.0	0.9	1.1	2.2	4.8	8.7	15.4	12.0	9.6	3.1	0.6	1.0	60.4	(1987)	(1982)		
Khajauli	43	a	11.8	5.0	8.8	18.2	46.7	132.4	326.1	234.4	144.0	46.5	2.8	2.4	979.1	178	30	398.5	30 Sep 1942
		b	0.7	0.5	0.7	1.3	2.7	5.7	11.6	9.4	6.6	2.0	0.2	0.3	41.7	(1987)	(1965)		
Khutauna	43	a	9.9	1.8	5.0	20.8	56.1	173.9	413.6	288.0	190.5	48.6	2.4	5.5	1216.1	184	21	260.9	30 Sep 1905
		b	0.7	0.3	0.4	1.3	3.1	6.9	12.5	10.1	8.1	2.1	0.1	0.2	45.8	(1987)	(1978)		
Ladania	41	a	7.0	4.7	3.9	21.1	63.0	170.7	354.4	274.4	146.9	58.5	4.9	3.8	1113.3	214	11	350.0	27 Sep 1975
		b	0.6	0. 5	0.4	1.6	3.2	6.5	12.1	9.6	6.5	2.1	0.3	0.3	43.7	(1975)	(1982)		
Laukaha	36	a	7.3	4.7	2.0	20.8	59.1	188.6	444.2	290.6	238.2	86.1	7.5	5.1	1354.2	317	31	412.6	15 Sep 1984
		b	0.5	0.4	0.2	1.3	2.6	7.0	12.2	9.0	7.8	2.2	0.2	0.3	43.7	(1960)	(1983)		
Loukahi	27	a	14.0	5.5	10.7	14.9	81.7	265.7	350.4	389.5	234.4	71.4	5.6	1.2	1445.0	132	73	347.0	19 Aug 1976
		b	0.9	0.5	1.0	1.0	3.6	8.7	11.4	11.9	8.8	2.5	0.2	0.1	50.6	(1998)	(1994)		
Madhawapur	21	a	9.9	4.0	12.8	40.3	92.9	216.5	406.5	308.3	192.0	54.4	2.9	5.7	1346.2	131	81	277.5	21 Sep 1967
		b	0.5	0.6	0.8	2.7	4.7	7.1	13.7	11.1	8.7	2.4	0.3	0.4	53.0	(1987)	(1980)		
Madhepur	41	a	15.1	6.6	11.3	21.4	53.7	159.5	317.3	274.5	190.2	73.0	5.3	2.4	1130.3	183	15	353.1	06 Jul1922
		b	0.9	0.6	0.8	1.2	2.7	6.7	13.5	11.3	7.8	2.4	0.3	0.3	48.5	(1987)	(1980)		

TABLE – 1 (contd…)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEARS**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Madhubani (R. Nag)	41	a	13.9	10.4	18.7	31.3	60.5	188.9	368.9	284.7	192.9	61.6	6.4	4.7	1242.9	199 (1974)	49 (1992)	397.5	30 Sep 1942
		b	1.1	0.7	0.9	1.7	3.4	7.6	13.0	11.1	8.6	2.7	0.4	0.5	51.7				
Madhwapur	45	a	13.1	3.7	11.0	23.4	73.2	209.1	383.7	309.8	183.2	56.0	3.3	2.0	1271.5	170 (1956)	54 (1982)	290.8	18 Sep 1935
		b	0.7	0.4	0.7	1.5	3.1	6.7	11.9	10.4	7.4	1.9	0.2	0.3	45.2				
Pandol	27	a	6.9	12.7	12.6	25.3	75.1	191.2	365.7	264.7	217.2	62.5	5.4	7.2	1246.5	134 (1974)	52 (1982)	258.0	20 Jun 1974
		b	0.8	1.1	0.6	1.8	4.2	7.2	15.2	11.2	10.0	2.5	0.4	0.7	55.7				
Phulparas (Hydro)	22	a	20.7	3.9	2.6	20.2	38.2	181.1	253.7	293.8	182.0	25.9	6.0	0.5	1028.6	164 (1956)	23 (1951)	266.7	04 Jul 1948
		b	0.9	0.4	0.4	1.8	2.3	7.5	9.6	10.4	6.3	1.3	0.3	0.1	41.3				
Phulparas	18	a	6.5	13.1	9.1	36.2	86.5	200.8	395.7	326.8	253.9	39.5	0.6	4.2	1372.9	155 (1987)	60 (1992)	220.0	26 Sep 1993
		b	0.6	0.8	0.7	2.6	4.7	7.4	14.0	12.1	10.0	2.1	0.1	0.3	55.4				
Rahika (Madhubani	22	a	9.5	6.6	6.9	25.8	57.7	170.3	366.8	270.3	192.9	77.9	5.4	3.9	1194.0	165	37	185.6	30 Jun 1996
		b	0.8	0.7	0.5	1.8	3.4	6.9	13.9	11.1	8.9	2.6	0.3	0.5	51.4	(1988)	(1977)		
Saulighat (Hydro)	23	a	9.6	11.5	10.0	30.2	85.8	186.7	368.0	299.8	207.3	86.1	4.3	19.0	1318.3	161 (1999)	53 (1982)	349.0	24 Jun 2003
		b	1.0	1.2	1.1	2.3	4.8	7.7	14.7	12.5	9.7	3.0	0.5	1.0	59.5				
Madhubani (District)		a	10.4	7.4	8.1	23.7	64.7	181.7	371.7	296.6	189.4	58.0	4.1	5.5	1221.3	155 (1987)	58 (1982)		
		b	.7	.6	.6	1.7	3.4	7.0	12.9	10.7	7.9	2.2	.3	.4	48.4				

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
MADHUBANI
(Data 1951 - 2000)

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

(Data available for 46 years)

MUNGER DISTRICT

The climate of this district is characterized by a mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts in December and lasts till February. The summer season follows and continues till second week of June when the southwest monsoon commences. The period from June to September is the southwest monsoon season followed by the post monsoon season (October and November). November is transition month from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 9 stations for the period ranging from 11 to 41 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 1130.5 mm. The rainfall in the southwest monsoon season constitutes about 85% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 286.4 mm. The variation in the annual rainfall from year to is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1984 when it amounted to 168 % of the normal. 1966 was the year with the lowest annual rainfall amounting to 48% of the normal. In this fifty year period there were 6 years when the rainfall was less than 80% of the normal with one occasion of two consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall was between 901mm and 1400 mm in 33 years out of 46.

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 46 at Gidhour to 57 at Munger Hydro. .

The heaviest rainfall in 24 hours at any station in the district was 461.0 mm at Bakhtiarpur on 04 September 1925.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological conditions as indicated by the data at Bhagalpur observatory in the neighbouring district may be taken as representative of the climatic conditions of this district in general. The cold season commences early in December when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern parts of India, minimum temperatures may sometimes go down to about 2°C to 3°C. The day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 37°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes go above 45°C on individual days. There is a drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, however, there is a little relief as the weather is oppressive on account of the increased moisture and continuing high night temperatures during the monsoon season. In October while day temperature remains as high as in the monsoon months, the nights however, are cooler.

HUMIDITY

The driest part of the year is the summer months when the relative humidity especially in the afternoon is between 40% and 50%. The humidity is high during the monsoon period when it is generally above 80%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. During post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Light westerly/southwesterly or calm winds prevail in the winter and early summer season. In April easterly winds begin and easterly/southeasterly winds predominate in the monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during summer months, their frequency being higher in the monsoon months. Thunderstorms occurring during the summer months are sometimes accompanied with squall. Dust storms occur occasionally in the summer months. Fog occurs mostly in winter months and occasionally in early summer and post monsoon seasons.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
MUNGER

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS *	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bakhtiarpur	13	a	19.6	4.2	8.9	9.8	35.3	191.3	246.5	279.1	240.9	109.4	2.7	1.3	1149.0	147	70	461.0	04 Sep
		b	1.0	0.5	1.1	1.0	1.8	6.8	11.5	12.7	9.4	3.3	0.3	0.2	49.6	(1956)	(1951)		1925
Dharhara	11	a	7.9	7.6	3.2	10.4	15.7	144.5	208.9	258.9	229.2	34.5	15.7	13.7	950.2	123	59	168.6	24 Sep
		b	0.6	0.9	0.3	1.1	1.8	7.2	12.2	14.1	10.7	2.6	0.7	0.7	52.9	(1997)	(1994)		1999
Gidhour	18	a	22.5	5.5	18.4	7.6	55.5	183.9	301.5	239.2	244.2	113.4	2.6	2.8	1197.1	163	34	368.3	13 Jun
		b	0.9	0.6	0.6	0.7	1.4	5.8	11.4	11.5	9.0	3.3	0.3	0.2	45.7	(1953)	(1966)		1949
Jamalpur	31	a	17.9	4.1	3.3	9.3	33.8	179.0	267.8	257.0	222.6	52.7	5.2	2.5	1055.2	166	45	370.6	29 Aug
		b	1.1	0.6	0.4	0.9	2.2	7.3	13.5	12.7	10.3	2.1	0.4	0.3	51.8	(1956)	(1994)		1914
Kharagpur	39	a	9.4	4.8	15.4	14.0	42.9	147.0	295.0	279.8	256.6	76.3	5.5	5.9	1152.6	153	33	440.3	22 Sep
		b	0.6	0.6	0.9	1.2	2.6	7.0	13.5	12.3	9.9	2.9	0.4	0.4	52.3	(1960)	(1994)		2000
Munger	40	a	14.3	7.1	11.5	19.1	45.7	165.3	292.8	230.6	219.9	65.0	9.3	4.5	1085.1	149	50	385.0	22 Sep
		b	1.2	0.9	0.9	1.3	2.8	7.7	13.4	11.1	9.3	2.6	0.5	0.5	52.2	(1987)	(1977)		2000
Munger (Hydro)	23	a	12.3	8.1	14.0	25.3	53.7	191.7	330.0	261.4	253.2	63.0	10.9	11.3	1234.9	139	72	340.0	22 Sep
		b	0.8	0.9	1.0	1.7	2.9	8.4	14.4	11.9	10.7	2.5	0.6	0.8	56.6	(2000)	(1996)		2000
Sagrampur	41	a	16.2	7.1	4.0	12.5	49.3	174.1	338.3	302.9	229.0	87.6	4.6	5.7	1231.3	184	47	322.3	26 Jun
		b	1.1	0.7	0.4	0.8	2.4	7.3	13.1	12.8	9.6	2.9	0.2	0.4	51.7	(1983)	(1990)		1984
Tarapur	32	a	10.4	7.0	8.0	10.5	40.9	177.4	296.9	270.5	228.5	55.5	6.2	7.3	1119.1	203	44	214.8	24 Sep
		b	0.8	0.6	0.7	0.9	2.6	7.3	12.9	11.9	10.3	2.8	0.4	0.6	51.8	(1984)	(1966)		1965
Munger (District)		a	14.5	6.2	9.6	13.2	41.4	172.7	286.4	264.4	236.0	73.0	7.0	6.1	1130.5	168	48		
		b	0.9	0.7	0.7	1.1	2.3	7.2	12.9	12.3	9.9	2.8	0.4	0.5	51.7	(1984)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
MUNGER
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	2	1201 - 1300	8
601 - 700	0	1301 - 1400	5
701 - 800	0	1401 - 1500	4
801 - 900	5	1501 - 1600	0
901 - 1000	5	1601 - 1700	0
1001 - 1100	4	1701 - 1800	1
1101 - 1200	11	1801 - 1900	1

(Data available for 46 years)

MUZAFFARPUR DISTRICT

The climate of this district is characterized by mild cold season, hot dry summer, hot and moist monsoon season. The cold season starts from about end of November to the end of February. This is followed by the summer season from March to about second week of June. Southwest monsoon sets in from second week of June and lasts till September. October to November is a transition period from monsoon to winter season.

RAINFALL

Records of rainfall in the district are available for 18 raingauge stations for period ranging from 10 to 47 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 1151.0 mm. About 85% of the annual normal rainfall in the district is received during the monsoon months, June to September, July being the rainiest month with an average rainfall of 323.8 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951-2000, the highest annual rainfall amounting to 149% of the normal occurred in 1985. The lowest annual rainfall which was 42% of the normal occurred in 1966. In this fifty year period there were 11 years when the annual rainfall in the district was less than 80% of the normal. There was one occasion each when such a low rainfall occurred for two and three consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1400 mm in 35 years out of 47.

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. This number varies from 38 at Kudani to 58 at Moradpur (Hydro).

The heaviest rainfall recorded in 24 hours at any station in the district was 458.2 mm at Buchaha on 04 October 1961.

TEMPERATURE

There is one meteorological observatory in the district at Muzaffarpur. The data of this observatory may be taken as representative of the climatic conditions in the district as a whole. The summer season commences from March when temperature begins to rise rapidly and lasts till second week of June. Generally May is the hottest month with the mean maximum temperature at about 35.6ºC and the mean minimum temperature at 24.5ºC. On individual days the maximum temperature may rise upto 42ºC during May and early part of June. There is fall in day temperature with the onset of the southwest monsoon by second week of June. However, the weather remains uncomfortable throughout the monsoon season as night temperatures continue to remain high, being even higher than those during the summer season. Temperatures begin to drop from mid November and winter season sets in and lasts till February. January is the coldest month with the mean maximum temperature at 22.6ºC and mean minimum temperature at 9.6ºC. During winter season the district is affected by cold waves in association with western disturbances which move across northern part of the country and under its influence minimum temperature may drop to 3ºC.

The highest maximum temperature ever recorded at Muzaffarpur was 44.5ºC on 08 May 1972 and the lowest minimum temperature ever recorded was 2.2ºC on 01 February 1905.

HUMIDITY

Humidity remains high throughout the year except during the summer season when it is comparatively low between 45% to 55% in the afternoon. During monsoon season humidity remains high above 80%. In post monsoon and winter season humidity remains between 65% to 80%.

CLOUDINESS

Sky is heavily clouded to overcast during monsoon season. Thereafter the cloudiness decreases and the sky is generally clear or lightly clouded for rest of the year. During the passage of western disturbances across northern part of the country during post monsoon and winter season the sky remains overcast or heavily clouded.

WINDS

Winds are generally calm or easterly/westerly in post monsoon, winter and pre-monsoon seasons. Winds generally blow predominantly from the east direction in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during monsoon and post monsoon months which move in westerly/northwesterly direction after crossing the coast affect the district and its neighbourhood and cause widespread heavy rain and strong winds. Thunderstorms generally occur throughout the year however, their frequency is more during summer and southwest monsoon season, thunderstorms are occasionally accompanied with hail during summer season. Dust storms affect the district occasionally during summer season. Fog occurs occasionally during post monsoon and winter season.

Tables 3, 4, 5 and 6 give the temperature, relative humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Muzaffarpur observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
MUZAFFARPUR

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
Benibad (Hydro)	19	a	9.5	6.9	4.3	28.7	70.9	179.0	328.1	302.9	205.3	61.7	2.8	7.8	1207.9	145	74	225.0	13 Sep 1982
		b	0.7	0.8	0.6	2.1	4.1	7.5	13.4	10.3	9.2	2.5	0.3	0.7	52.2	(1998)	(1991)		
Buchaha	31	a	14.2	13.0	5.9	18.0	61.4	149.0	319.0	279.7	190.4	57.8	4.1	2.7	1115.2	178	62	458.2	04 Oct 1961
		b	1.0	0.9	0.6	1.2	3.5	7.5	14.4	12.3	9.6	2.1	0.4	0.3	53.8	(1981)	(1970)		
Gaighat	11	a	15.8	15.2	1.8	12.4	38.2	137.4	302.0	293.9	148.0	22.1	2.0	3.8	992.6	127	64	161.2	29 Sep 1989
		b	1.1	0.8	0.3	1.1	3.2	5.2	10.6	10.0	5.9	1.3	0.4	0.5	40.4	(1993)	(1992)		
Katia	11	a	13.0	15.6	6.0	14.9	45.5	208.0	249.1	330.8	170.1	70.6	15.5	5.9	1145.0	148	52	268.0	25 Aug 1993
		b	1.1	1.3	0.5	1.4	3.3	7.6	12.2	12.5	9.5	3.6	0.8	0.3	54.1	(1993)	(1998)		
Katra	37	a	19.8	7.7	6.5	16.5	64.6	147.5	355.0	294.4	204.6	59.6	5.3	5.8	1187.3	228	42	375.9	11 Jul1933
		b	0.9	0.7	0.4	1.2	3.7	6.0	12.9	10.8	8.5	2.2	0.4	0.5	48.2	(1985)	(1992)		
Kudani	22	a	7.9	6.9	3.7	12.8	39.7	132.2	304.9	247.5	179.1	30.5	7.1	3.7	976.0	190	34	236.2	30 Jun 1996
		b	0.6	0.5	0.5	0.6	2.2	4.4	11.6	8.5	7.0	1.2	0.4	0.3	37.8	(1981)	(1992)		
Minapur	41	a	11.0	8.4	6.9	12.7	50.7	150.8	288.1	252.8	171.8	73.6	7.7	2.0	1036.5	155	35	304.2	27 Sep 1975
		b	1.1	0.7	0.7	1.0	3.1	6.1	12.3	10.1	7.5	2.4	0.4	0.2	45.6	(1985)	(1966)		
Moradpur (S'madi) (Hydro)	12	a	8.6	21.2	15.9	8.0	84.3	206.9	390.6	354.3	201.8	92.5	48.3	0.0	1432.4	111	49	204.0	03 July 1981
		b	0.5	1.7	1.0	0.3	4.0	8.8	13.0	13.1	9.3	4.0	2.0	0.0	57.7	(1999)	(1972)		
Motipur	10	a	11.2	12.5	0.8	15.4	54.3	174.5	196.4	315.6	152.4	39.0	12.3	6.5	990.9	126	53	195.0	29 Jun 1997
		b	1.1	0.9	0.2	1.3	3.3	6.8	11.4	12.8	8.5	1.7	0.5	0.4	48.9	(1998)	(1992)		
Murol	11	a	13.4	15.0	6.0	20.8	62.7	196.2	285.8	331.8	194.7	29.1	14.9	8.0	1178.4	128	56	220.0	30 Jun1996
		b	1.3	1.0	0.8	1.7	3.3	6.5	11.9	12.7	9.5	1.7	0.7	0.5	51.6	(1996)	(1992)		

TABLE – 1(contd)

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
Mushari	30	a	13.4	10.1	6.5	15.6	61.6	160.6	306.8	297.3	192.2	61.9	12.4	4.8	1143.2	180	44	275.5	30 Jun 1996
		b	0.9	0.9	0.7	1.1	3.3	6.7	13.0	12.4	8.7	2.5	0.4	0.4	51.0	(1987)	(1966)		
Muzaffarpur (Obsy)	47	a	14.4	8.7	7.3	12.7	50.9	165.5	337.4	292.4	201.9	66.2	6.3	7.9	1171.6	157	64	313.7	15 Sep 1921
		b	1.2	0.8	0.6	0.9	2.9	7.0	12.9	11.7	9.4	2.6	0.4	0.4	50.8	(1957)	(1982)		
Orai	21	a	8.6	11.6	6.9	22.7	42.1	138.5	324.7	241.9	166.4	47.5	3.5	3.9	1018.3	161	61	265.0	04 Jul 1983
		b	0.6	0.9	0.4	1.2	2.5	5.4	12.8	10.2	8.1	2.0	0.4	0.5	45.0	(1987)	(1991)		
Paru	26	a	12.2	7.0	3.9	19.1	55.8	154.3	383.1	323.3	236.9	54.6	7.8	7.2	1265.2	179	62	351.1	17 Jul 1981
		b	0.7	0.6	0.3	0.8	2.6	5.2	13.6	10.8	8.6	2.1	0.5	0.6	46.4	(1981)	(1992)		
Rewaghat (Hydro)	20	a	13.5	8.2	8.1	24.7	37.8	138.5	351.2	254.0	194.8	37.8	4.3	7.2	1080.1	142	54	205.4	03 Aug1991
		b	0.7	0.9	0.9	1.1	2.9	5.8	14.3	11.9	9.9	2.1	0.3	0.7	51.5	(1985)	(1992)		
Sahebganj	44	a	13.2	8.3	7.2	11.1	45.7	169.1	369.7	317.4	241.0	50.3	4.3	4.2	1241.5	188	47	348.0	27 Sep 1975
		b	1.0	0.6	0.6	0.8	2.3	6.2	13.7	11.9	8.7	1.7	0.3	0.4	48.2	(1974)	(1966)		
Sakra	30	a	10.5	10.7	5.0	24.6	58.0	180.0	370.7	300.0	276.6	61.1	7.5	5.5	1310.2	179	57	394.6	27 Sep 1975
		b	1.1	0.8	0.6	1.2	3.1	7.3	14.0	12.2	9.5	2.2	0.3	0.4	52.7	(1997)	(1992)		
Saraiya	22	a	10.1	13.3	4.1	8.6	49.3	161.6	365.4	299.4	241.4	59.0	6.0	7.5	1225.7	137	46	209.0	30 Jun 1996
		b	0.6	0.9	0.4	0.7	2.4	5.2	12.7	12.0	9.8	2.1	0.3	0.6	47.7	(1985)	(1992)		
Muzaffarpur (District)		a	12.2	11.1	5.9	16.6	54.1	163.9	323.8	296.1	198.3	54.2	9.6	5.2	1151.0	149	42		
		b	0.9	0.9	0.6	1.1	3.1	6.4	12.8	11.5	8.7	2.2	0.5	0.4	49.1	(1985)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
MUZAFFARPUR
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1101 - 1200	5
501 - 600	0	1201 - 1300	7
601 - 700	2	1301 - 1400	4
701 - 800	0	1401 - 1500	3
801 - 900	4	1501 - 1600	2
901 - 1000	8	1601 - 1700	3
1001 - 1100	7	1701 - 1800	1

(Data available for 47 years only)

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

MONTH	Mean Maximum Temperature	Mean 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	22.6	9.6	30.2	18 Jan 1993	2.7	20 Jan 1908	84	72
February	25.3	11.8	34.4	28 Feb 1969	2.2	01 Feb 1905	72	58
March	30.9	16.4	39.4	Mar 1909	7.2	01 Mar 1906	59	47
April	35.2	21.5	42.2	Apr 1908	12.6	01 Apr 1968	57	44
May	35.6	24.5	44.5	08 May 1972	18.3	03 May 1905	67	53
June	34.5	26.3	43.4	03 Jun 1967	19.4	01 Jun 1903	77	68
July	32.4	26.3	43.5	16 Jul 1972	20.9	23 Jul 1989	86	81
August	32.6	26.4	40.6	15 Aug 1987	20.6	15 Aug 1971	84	81
September	32.1	25.4	38.2	28 Sep 1970	19.6	29 Sep 1972	84	81
October	31.3	21.8	39.0	02 Oct 1994	14.4	31 Oct 1908	77	76
November	28.7	15.6	33.2	01 Nov 1992	7.7	30 Nov 1982	74	72
December	24.5	10.8	28.6	04 Dec 1981	4.0	31 Dec 1972	80	73
Annual	30.5	19.7	44.5	08 May 1972	2.2	0 1 Feb 1905	75	67

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(MUZAFFARPUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	23	20	24	22	18	7	1	1	4	19	24	25	188
b	3	2	1	1	3	9	18	12	10	3	1	1	64
c	1.4	1.4	1.2	1.3	2.0	4.6	6.6	6.1	5.1	2.0	1.0	1.0	2.8
1730 HOURS IST													
a	23	21	24	24	24	9	2	3	6	22	24	25	207
b	2	1	1	1	1	4	9	6	5	2	1	1	34
c	1.3	1.3	1.0	0.9	1.0	3.5	5.2	4.9	4.1	1.4	0.7	0.8	2.2

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(MUZAFFARPUR)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	2.3	3.0	4.2	4.7	5.8	5.0	5.1	4.9	4.0	2.2	1.7	1.6	3.7
Direction in morning	C/W	W	W/E	E	E	E	E	E	E	C/E	C/W/E	C/W	
Direction in evening	C/W	C/W	C/W	C/E/W	E	E	E	E	C/E	C	C	C	

TABLE - 6
Special Weather Phenomena
(MUZAFFARPUR)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	0.4	0.7	1	1.7	1.8	2.5	2.3	2.7	0.4	0	0	13.8
Hail	0	0	0	0.2	0.1	0	0	0	0	0	0	0	0.3
Dust storm	0	0	0	0.4	0.5	0.2	0	0	0	0	0	0	1.1
Fog	3.9	1.8	0.1	0	0	0	0	0	0	0.2	1.6	3.3	10.9

NALANDA DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 12 raingauge stations, for period ranging from 24 to 45 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 995.4 mm. The rainfall in the southwest monsoon season constitutes about 87% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 292.5 mm. The variation in the annual rainfall from year to year is large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 193% of the annual normal occurred in 1962. The lowest annual rainfall which was 52% of the normal occurred in 1966. In this fifty year period, there were 8 years when the annual rainfall in the district was less than 80% of the normal out of which two years were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1200 mm in 26 years out of 45.

On an average there are 46 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 43 at Asthawan to 50 at Rahui.

The heaviest rainfall in 24 hours recorded at any station in the district was 395.2 mm at Ekangersarai on 20 September1967.

TEMPERATURE

There is no meteorological observatory in the district. So the climatological description which follows, is based on data of Patna observatory in the neighbouring district. The cold season commences from late November when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 39°C and the mean minimum temperature at about 25°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperatures with the advance of the southwest monsoon into the district towards the third week of June, however, there is little relief as the weather is uncomfortable on account of increase in moisture and high night temperatures. In October while day temperature remains as high as in the monsoon months the nights are however cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season and occasionally in the rest of the year.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
NALANDA

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
Asthawan	33	a	15.0	6.4	7.6	5.2	27.6	127.8	246.4	253.9	185.2	42.6	4.8	4.6	927.1	157	64	203.2	27 Aug 1941
		b	0.9	0.6	0.7	0.4	1.6	5.5	11.2	11.5	8.0	2.0	0.3	0.3	43.0	(1997)	(1958)		
Bihar	44	a	10.4	9.4	8.6	8.2	31.3	137.4	287.6	256.7	195.2	54.9	6.1	6.4	1012.2	189	52	313.4	10 Jul 2006
		b	0.9	1.0	0.9	0.5	1.7	5.7	12.6	11.5	8.9	2.2	0.4	0.5	46.8	(1987)	(1975)		
Chandi	45	a	13.5	10.0	7.6	6.8	27.6	137.4	272.4	238.5	195.9	44.1	6.0	3.9	963.7	173	34	338.3	8 Sep 1918`
		b	0.9	1.0	0.8	0.6	1.4	5.7	12.0	10.7	8.6	2.1	0.4	0.3	44.5	(1997)	(1966)		
Ekangersarai	44	a	8.7	10.5	12.4	7.3	28.0	123.2	278.3	238.4	195.4	47.3	5.6	4.9	960.0	204	25	395.2	20 Sep 1967
		b	0.8	1.0	0.8	0.8	1.6	5.4	11.6	11.4	8.1	2.0	0.4	0.5	44.4	(1987)	(1958)		
Griyak	33	a	12.9	8.6	11.4	8.9	32.6	157.0	307.4	241.3	200.8	60.6	6.5	14.4	1062.4	192	29	254.0	23 Sep 1965
		b	0.9	0.8	0.6	0.8	1.7	6.6	13.7	11.1	8.7	2.4	0.5	0.8	48.6	(1999)	(1966)		
Hilsa	28	a	9.2	9.2	5.7	8.3	19.5	129.2	303.2	242.5	216.5	36.6	6.8	5.1	991.8	176	40	266.7	04 Jul 1952
		b	0.8	0.8	0.6	0.6	1.2	6.0	12.5	11.2	9.5	2.0	0.3	0.6	46.1	(1987)	(1992)		
Islampur	44	a	12.0	8.4	7.3	3.6	24.4	120.5	327.9	300.4	232.1	52.9	3.5	4.9	1097.9	196	52	274.0	13 Sep 1987
		b	0.9	0.8	0.5	0.4	1.4	5.1	12.5	11.9	8.3	2.1	0.3	0.3	44.5	(1960)	(1970)		
Naronoth	24	a	7.2	4.8	3.5	9.9	24.1	135.4	300.9	237.1	190.2	47.2	5.8	4.4	970.5	173	44	153.0	12 Aug 2002
		b	0.6	0.5	0.4	0.8	1.8	5.9	12.5	11.3	8.4	2.3	0.4	0.4	45.3	(1997)	(1992)		
Noorsarai	32	a	8.8	7.5	7.8	10.0	27.1	123.4	262.8	234.4	169.0	40.7	3.0	2.8	897.3	152	37	205.0	16 Sep 1976
		b	0.8	0.7	0.7	0.7	1.7	5.5	12.5	11.7	8.0	2.1	0.3	0.2	44.9	(1987)	(1992)		
Rahui	24	a	9.3	10.6	10.6	7.7	31.1	141.3	311.0	255.6	176.4	45.5	8.7	11.0	1018.8	151	48	220.0	10 Jul 2006
		b	0.9	1.0	0.9	0.7	2.0	6.8	13.8	11.5	8.9	2.3	0.6	1.0	50.4	(1987)	(1992)		

TABLE – 1 (contd…)

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
Rajgir	30	a	12.0	7.6	9.7	10.0	19.7	111.0	315.2	278.9	180.3	58.3	6.7	3.6	1013.0	196	46	285.0	19 Sep 1967
		b	0.6	0.7	0.6	0.7	1.2	4.9	13.4	12.4	8.3	2.1	0.3	0.6	45.8	(1987)	(1992)		
Sarmera	44	a	19.1	7.6	10.7	6.6	26.8	133.6	296.8	254.8	195.7	68.3	4.8	4.7	1029.5	150	52	300.0	03 Oct 1961
		b	1.0	0.7	0.7	0.6	1.6	5.5	12.1	11.3	8.5	2.7	0.3	0.4	45.4	(1953)	(1966)		
Nalanda (District)		a	11.5	8.4	8.6	7.7	26.7	131.4	292.5	252.7	194.4	49.9	5.7	5.9	995.4	193	**52**		
		b	0.8	0.8	0.7	0.6	1.6	5.7	12.5	11.5	8.5	2.2	0.4	0.5	45.8	(1962)	**(1966)**		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
NALANDA
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	1	1301 - 1400	1
601 - 700	4	1401 - 1500	3
701 - 800	4	1501 - 1600	0
801 - 900	5	1601 - 1700	2
901 - 1000	4	1701 - 1800	0
1001 - 1100	7	1801 - 1900	0
1101 - 1200	10	1901 - 2000	1
1201 - 1300	3		

(Data available for 45 years only)

NAWADA DISTRICT

The climate of this district is characterized by mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till end of February. March to first the week of June is the summer or hot weather season. The period from second week of June to about the first week of October constitutes the southwest monsoon season. The succeeding period lasting till late November is the post monsoon or transitional period from monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 10 raingauge stations for the period ranging from 18 to 47 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 1004.3 mm. The rainfall is largely confined to the southwest monsoon season when 86% of the annual normal rainfall is received. July is the rainiest month with an average rainfall of 277.4 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1961 when it amounted to 166% of the normal. 1966 was the year with the lowest rainfall amounting to 60 % of the normal. In this fifty year period there were 6 years when the rainfall was less than 80 % of the normal, out of which two were consecutive. It is seen from Table 2 that the annual rainfall was between 801 mm and 1300 mm in 35 years out of 46.

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. This number varies from 44 at Pakribarwan to 51 at Hisuaa and Kowakol. .

The heaviest rainfall recorded in 24 hours at any station in the district was 450.0 mm at Rajauli on 04 July 1981.

TEMPERATURE

There is no meteorological observatory in the district at Nawada The temperature and other meteorological condition as indicated by the data at Gaya and Jamui observatories in the neighbouring districts may be taken as representative of the climatic conditions in the district in general. The summer season starts from March with steady rise in day temperature and lasts till first week of June. May is generally the hottest month with the mean maximum temperature at about 40°C and the mean minimum temperature at about 26°C. The day temperature may go above 45°C on individual days before the onset of the monsoon. The scorching northwesterly winds which blow during the hot summer season are quite uncomfortable. There is fall in day temperature from second week of June with the onset of monsoon, but night temperatures continue to remain high making the weather uncomfortable. The day and night temperatures fall rapidly from about the middle of November. January is generally the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In association with passage of western disturbances, cold wave conditions hit the district and minimum temperature drops down to about 2°C during this period.

HUMIDITY

The relative humidity remains generally high about 75% during the southwest monsoon season and in the morning of post monsoon and winter season. The driest part of the year is the summer season when humidity remains between 25% to 30% especially in the afternoon. The relative humidity remains between 45% to 65% in the afternoon during rest of the year.

CLOUDINESS

The sky is generally heavily clouded or overcast during the monsoon period. Thereafter the cloudiness decreases and sky remains generally clear or lightly

clouded during winter and summer months. During the passage of western disturbances across the state during winter season, the sky remains covered with clouds.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening in force during the summer and monsoon season. During the post monsoon and winter season winds are generally calm or blow from south/southwest direction in the morning and in the afternoon winds are generally northwesterly. In the summer season winds are mostly southwesterly in the morning and northwesterly in the afternoon. Easterly winds appear from late summer season and remain predominant during the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in pre-monsoon and monsoon season move in northwesterly to northerly direction after crossing the coast and affect the district and its neighbourhood causing heavy thunderstorms and rainfall accompanied with squalls at times. Thunderstorms occur throughout the year, however their frequency are more during monsoon period. Dust storms accompanied with squall affect the district during summer and early part of monsoon season occasionally. Fog affects the district occasionally during winter season in association with passage of western disturbance across the state.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
NAWADA

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Akbarpur	19	a	7.2	10.2	8.6	4.2	31.5	137.0	269.9	225.0	174.5	60.1	9.0	10.6	947.8	183	47	224.0	02 Jul
		b	0.8	0.9	0.6	0.4	1.9	5.1	11.2	10.9	9.4	2.4	0.6	0.6	44.8	(1986)	(1977)		1986
Gobindpur	27	a	10.8	5.9	7.5	3.9	25.6	138.9	273.3	242.2	181.6	50.8	7.3	5.3	953.1	144	71	275.0	24 Sep
		b	0.9	0.7	0.7	0.4	1.6	6.0	13.2	12.4	8.8	2.4	0.5	0.5	48.1	(1997)	(1966)		1965
Hisuaa	26	a	13.4	9.3	11.9	3.0	36.1	132.8	305.9	308.1	175.3	36.9	7.3	7.3	1047.3	168	57	225.0	24 Aug
		b	1.0	0.9	1.0	0.4	2.3	6.0	14.1	13.8	8.4	1.9	0.5	0.7	51.0	(1980)	(1966)		1968
Kowakol	27	a	8.4	8.6	6.5	6.0	55.7	139.0	283.5	256.8	236.0	113.0	8.3	6.7	1128.5	181	47	330.2	02 Oct
		b	0.7	0.9	0.5	0.5	2.5	6.4	13.0	12.1	10.4	3.3	0.2	0.4	50.9	(1961)	(1965)		1961
Narhat	18	a	12.4	7.5	7.5	3.6	31.5	114.9	284.3	267.3	184.5	37.5	4.1	7.1	962.2	193	55	203.0	02 Jul
		b	1.0	.8	.7	.5	2.2	6.4	11.5	12.5	9.8	2.5	0.5	0.8	49.2	(1986)	(1992)		1986
Nawada	47	a	14.5	11.3	8.3	6.6	29.0	126.2	280.1	237.9	188.9	76.2	6.0	4.0	989.0	168	63	418.0	02 Oct
		b	1.1	1.0	.8	.6	1.8	5.9	12.4	11.7	8.8	2.8	0.3	0.4	47.6	(1961)	(1982)		1961
Pakribarwan	39	a	14.2	7.7	4.7	5.3	28.4	131.7	227.1	255.9	194.5	57.2	4.5	5.2	936.4	160	40	233.7	01 Sep
		b	1.1	0.8	0.4	0.4	1.5	5.7	10.7	11.8	8.6	2.4	0.3	0.3	44.0	(1990)	(1964)		1907
Rajauli	42	a	11.0	7.7	9.6	7.6	37.1	147.5	322.8	268.8	186.9	75.0	5.9	3.9	1083.8	160	48	450.0	04 Jul
		b	0.9	0.8	0.6	0.6	1.7	6.1	13.3	12.8	9.3	2.8	0.3	0.3	49.5	(1978)	(1966)		1981
Sirdala	24	a	9.6	9.2	4.9	5.1	40.0	155.8	268.6	273.7	171.4	41.3	6.0	14.0	999.6	180	60	298.8	08 Jul
		b	0.9	0.8	0.6	0.7	1.8	6.3	12.0	12.5	8.0	2.0	0.4	1.0	47.0	(1986)	(1966)		1968
Warsaliganj	28	a	10.1	9.7	7.9	7.3	41.5	128.7	258.9	266.9	181.2	67.8	7.6	6.6	994.2	166	55	421.2	24 Sep
		b	0.8	1.0	0.8	0.8	2.4	6.0	12.7	12.3	8.9	2.4	0.6	0.6	49.3	(1978)	(1967)		1965
Nawada D (District)		a	11.2	8.7	7.7	5.3	35.6	135.3	277.4	260.3	187.5	61.6	6.6	7.1	1004.3	166	60		
		b	0.9	0.9	0.7	0.5	2.0	6.0	12.4	12.3	9.0	2.5	0.4	0.6	48.2	(1961)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
NAWADA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	2	1201 - 1300	7
701 - 800	4	1301 - 1400	2
801 - 900	9	1401 - 1500	2
901 - 1000	8	1501 - 1600	0
1001 - 1100	6	1601 - 1700	1
1101 - 1200	5		

(Data available for 46 years)

PATNA DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 20 raingauge stations 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 984.7 mm. The rainfall in the southwest monsoon season constitutes about 87% of the annual normal rainfall. July is the month with the highest rainfall with an average rainfall of 304.9 mm. The variation in the annual rainfall from year to year is not much large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 158% of the normal. 1992 was the year with the lowest rainfall and it was 52% of the normal. In this fifty year period there were 10 years when the rainfall was less than 80% of the normal. There were two occasions when such a low rainfall occurred in two consecutive years in the district. It is seen from Table 2 that the annual rainfall was between 701 mm and 1200 mm in 33 years out of 48.

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 38 at Khagaul to 54 at Patna (Aerodrome) observatory.

The heaviest rainfall recorded in 24 hours at any station in the district was 366.0 mm at Patna Obsy on 08 September 1918.

TEMPERATURE

There is one meteorological observatory in the district at Patna. The temperature and other meteorological condition as indicated by the data of this observatory may be taken as representative of the climatic conditions of the district in general. The cold season commences from late November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at 23.3°C and the mean minimum temperature at about 9.1°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at 38.0°C and the mean minimum temperature at 24.9°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperatures with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief as the weather is uncomfortable on account of increase in moisture and heat. In October while day temperature remains as high as in the monsoon months the nights are however cooler.

The highest maximum temperature ever recorded at Patna was 46.6°C on 09 June 1966 and the lowest minimum temperature ever recorded was 1.4°C on 21 January 1984.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50% and 75%.

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in the southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season and occasionally in the rest of the year.

.

Tables 3, 4, 5 and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Patna observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
PATNA

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
Bakhtiarpur	34	a	9.5	8.2	7.0	8.0	20.3	120.7	276.3	260.5	179.0	66.0	2.2	2.4	960.1	155	58	240.0	27 Aug 1958
		b	1.0	0.7	0.6	0.6	1.0	5.1	10.9	10.5	7.3	2.1	0.2	0.2	40.2	(1983)	(1966)		
Barh	45	a	12.2	8.2	9.3	13.5	48.8	144.3	327.1	234.4	202.2	65.7	4.8	3.3	1073.8	166	43	240.5	18 Jun 1934
		b	1.0	0.8	0.8	0.7	2.3	6.3	12.8	10.8	9.1	2.5	0.3	0.3	47.7	(1981)	(1965)		
Bihta	31	a	9.4	8.3	8.4	8.0	22.6	125.5	345.8	246.2	217.3	46.4	5.3	4.5	1047.7	181	62	241.0	03 Jul 1981
		b	0.8	0.7	0.9	0.6	1.8	5.4	12.6	11.5	8.9	1.9	0.5	0.6	46.2	(1987)	(1966)		
Bikram	46	a	12.7	8.0	10.4	7.6	21.5	110.6	320.6	273.1	214.6	47.3	7.4	2.6	1036.4	170	46	258.2	15 Sep 1976
		b	1.1	0.8	0.9	0.7	1.4	5.5	13.1	12.6	9.1	2.4	0.5	0.3	48.4	(1987)	(1966)		
Dhansua	28	a	6.9	8.0	7.3	6.8	19.5	83.0	250.4	202.6	170.2	36.1	3.4	2.1	796.3	171	43	346.0	20 Sep 1967
		b	0.7	0.8	0.7	0.8	1.7	5.0	12.7	10.7	7.8	2.0	0.4	0.3	43.6	(1976)	(1992)		
Dinapur	46	a	10.1	6.6	5.1	7.2	25.8	110.2	321.7	257.7	196.5	66.2	5.8	1.6	1014.5	179#	58	300.0	02 Aug1965
		b	1.0	0.7	0.6	0.6	1.5	4.8	12.2	10.2	8.0	2.4	0.4	0.2	42.6	(1988)	(1966)		
Fatuha	24	a	11.0	12.6	6.4	11.9	29.9	155.3	339.2	224.2	213.1	48.1	6.5	2.7	1060.9	140	59	223.0	03 Jul 1981
		b	0.9	1.0	0.6	1.0	2.1	6.1	13.0	10.2	8.8	2.1	0.4	0.4	46.6	(1986)	(1975)		
Khagaul	12	a	6.5	4.7	6.7	1.2	17.7	133.0	216.2	196.7	218.8	60.5	0.0	0.0	862.0	150#	27	217.2	29 Sep 1942
		b	0.9	0.5	0.4	0.1	0.9	5.9	11.3	8.7	6.7	2.2	0.0	0.0	37.6	(1953)	(1954)		

TABLE – 1 (contd….)

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
Maneer	10	a	5.4	9.3	11.0	16.4	35.8	78.5	383.5	219.6	220.4	38.5	5.1	3.0	1026.5	124	89	217.0	03 Jul 1981
		b	0.8	0.8	1.0	0.8	2.6	3.7	13.2	8.3	7.9	2.0	0.4	0.4	41.9	(1985)	(1976)		
Masaurhi	35	a	9.7	7.5	8.1	8.3	22.2	103.7	284.5	224.7	166.5	39.5	5.3	3.3	883.3	173	30	233.0	20 Sep 1967
		b	1.1	0.9	0.8	0.8	1.8	5.8	12.9	11.7	8.8	2.0	0.4	0.5	47.5	(1987)	(1991)		
Mokameh	29	a	8.7	9.2	9.3	11.5	34.1	145.1	317.5	229.9	194.0	63.8	4.5	6.1	1033.7	183	49	320.5	20 Sep 1976
		b	0.8	0.8	0.7	0.8	2.0	5.9	13.5	10.8	8.7	2.4	0.4	0.5	47.3	(1981)	(1979)		
Naubatpur	34	a	5.9	4.8	5.4	5.7	13.4	83.1	294.4	253.9	201.8	51.4	3.7	1.8	925.3	159	43	259.1	28 Sep 1942
		b	0.7	0.5	0.7	.5	1.1	4.3	12.2	12.2	8.5	2.0	0.4	0.3	43.4	(1962)	(1951)		
Paliganj	39	a	10.3	11.3	6.5	10.7	23.3	117.5	305.8	256.0	208.0	30.8	7.6	5.6	993.4	355	31	330.0	12 Jul 1961
		b	0.9	0.6	0.6	0.8	1.1	4.8	12.5	10.9	8.4	1.7	0.5	0.5	43.3	(1961)	(1966)		
Pandarak	30	a	11.2	7.1	6.6	16.5	37.1	127.0	299.0	228.0	225.7	49.2	8.3	4.0	1019.7	178	51	295.8	19 Sep 1976
		b	0.8	0.4	0.3	0.8	1.9	5.5	13.1	10.1	9.1	2.3	0.3	0.3	44.9	(1987)	(1992)		
Patna	17	a	20.5	6.9	9.1	11.6	24.7	139.6	253.1	248.0	216.3	63.4	6.8	3.4	1003.4	129	60	366.0	08 Sep 1918
(Obsy)		b	1.2	0.9	1.1	0.6	1.5	6.1	12.4	12.0	9.3	2.7	0.3	0.4	48.5	(1964)	(1966)		
Patna (A)	49	a	15.8	11.6	10.7	9.4	34.6	141.9	334.1	277.9	221.5	74.2	9.4	6.0	1147.1	164	51	273.5	20 Sep 1967
Obsy		b	1.3	1.1	0.9	0.9	2.3	6.5	13.8	12.8	9.8	3.1	0.5	0.6	53.6	(1987)	(1966)		

TABLE – 1 (contd….)

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
Patna Sadar	20	a	7.0	8.3	4.2	9.1	60.1	115.6	336.6	259.9	200.7	61.6	2.7	3.4	1069.2	161 (1978)	74 (1991)	196.4	27 Sep 1975
		b	0.7	0.8	0.4	0.7	1.9	4.8	13.6	10.8	9.4	2.3	0.3	0.6	46.3				
Phulwari	42	a	10.1	7.2	6.2	8.9	24.3	102.5	289.7	219.6	178.3	46.2	6.8	2.6	902.4	200 (1977)	31 (1951)	310.1	08 Sep 1918
		b	0.8	0.8	0.6	0.8	1.7	5.4	12.3	11.2	9.1	2.1	0.4	0.4	45.6				
Punpun	17	a	9.0	13.6	5.5	11.3	29.2	111.9	372.2	230.0	206.8	54.6	3.5	3.7	1051.3	134 (1977)	66 (1979)	155.6	12 Aug 1987
		b	0.9	1.2	0.6	0.7	2.1	5.4	14.0	10.6	9.7	2.6	0.3	0.5	48.6				
Silab	10	a	21.5	4.3	4.5	3.2	6.5	78.2	229.4	216.6	173.4	44.1	0.0	0.1	781.8	126 (1959)	76 (1958)	304.8	07 Sep1918
		b	1.8	0.6	0.4	0.1	0.3	4.2	10.8	12.0	8.1	2.0	0.0	0.0	40.3				
Patna (District)		a	10.7	8.3	7.4	9.3	27.6	116.4	304.9	238.0	201.3	52.7	5.0	3.1	984.7	158 (1987)	52 (1992)		
		b	1.0	0.8	0.7	0.7	1.6	5.3	12.6	10.9	8.6	2.2	0.3	0.4	45.1				

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 2006.

** Years of occurrence given in bracket.

TABLE - 2
Frequency of Annual Rainfall in the District
PATNA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	2	1101 - 1200	7
601 - 700	2	1201 - 1300	5
701 - 800	6	1301 - 1400	4
801 - 900	3	1401 - 1500	1
901 - 1000	12	1501 - 1600	1
1001 - 1100	5		

(Data available for 48 years only)

TABLE - 3
Normals of Temperature and Relative Humidity
(PATNA (A))

MONTH	Mean Maximum Temperature	Mean 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	23.3	9.1	33.1	02 Jan 1993	1.4	21 Jan 1984	78	59
February	26.0	11.3	35.1	27 Feb 2006	3.4	10 Feb1974	69	48
March	32.3	16.2	41.1	27 Mar 1955	8.2	10 Mar 1979	53	33
April	37.2	22.0	44.6	29 Apr 1980	13.3	02 Apr 1965	48	27
May	38.0	24.9	45.6	30 May 2005	17.7	03 May 1954	59	37
June	36.5	26.6	46.6	09 Jun 1966	19.3	05 Jun 1996	70	55
July	32.9	26.0	41.2	06 Jul 1982	21.1	11 Jul 1960	83	75
August	32.5	26.0	39.7	08 Aug 1985	20.5	17 Aug 1994	83	76
September	32.3	25.2	37.5	20 Sep 1968	19.0	29 Sep 1972	82	76
October	31.6	21.4	38.2	11 Oct 1991	12.0	23 Oct 1991	76	69
November	28.9	14.9	34.1	01 Nov 1966	7.7	29 Nov 1952	73	64
December	24.5	9.8	32.6	23 Dec 2001	2.2	25 Dec 1961	77	62
Annual	31.3	19.4	46.6	09 Jun 1966	1.4	21-01-1984	71	57

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(PATNA (A))

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	18	15	17	17	15	4	0	0	2	14	18	19	139
b	2	1	1	0	1	3	8	5	3	1	1	1	27
c	1.8	1.7	1.6	1.7	1.8	4.7	6.6	6.2	5.2	2.2	1.4	1.5	3.0
1730 HOURS IST													
a	16	13	17	16	15	4	0	0	1	8	16	16	122
b	1	1	0	0	0	3	4	3	2	1	0	1	16
c	1.8	1.8	1.8	1.8	1.4	4.6	6.3	6.1	5.2	2.5	1.5	1.6	3.0

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(PATNA(A))

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	2.6	3.3	4.2	6.2	7.9	7.3	6.2	6.6	5.1	2.7	1.9	1.9	4.6
Direction in morning	C/W/SW	C/W/SW	W	E	E	E	E	E	E	C/SE	C/W/SW	C/W/SW	
Direction in evening	C/W	C/W	W	NW/W	E/NE	E	E	E	E/C	C/E	C	C	

TABLE - 6
Special Weather Phenomena
(PATNA(A))

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.7	1.4	1.6	1.9	4.5	7.3	10.3	10.3	8.9	2.7	0.2	0.2	50
Hail	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0	0	0	0	1.2
Dust storm	0.1	0.1	0.2	1.4	1.4	0.9	0.2	0.1	0	0	0	0	4.4
Squall	0.1	0	0.1	0.5	1.4	0.6	0.2	0.1	0.1	0.2	0	0	3.3
Fog	7.2	2.4	0.5	0.1	0.1	0.1	0.2	0.2	0.2	1.1	3.8	6.3	22.2

PURNEA DISTRICT

The climate of this district is characterized by a mild winter, hot moderate summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by the hot season which continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 17 raingauge stations, for period ranging from 14 to 48 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 1732.8 mm. The rainfall in the southwest monsoon season constitutes about 83% of the annual normal rainfall. July is the month with the highest rainfall with an average rainfall of 479.0 mm. The variation in the annual rainfall from year to year is large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 144% of the annual normal occurred in 1998. The lowest annual rainfall which was 36% of the normal occurred in 1972. In this fifty year period, there were 19 years when the annual rainfall in the district was less than 80% of the normal. During the same period, there was one occasion each when such a low rainfall occurred for six consecutive years and three consecutive years in the district. There were also three occasions of two consecutive years of such a low rainfall. It is seen from Table 2 that the annual rainfall in the district was between 1301 mm and 2100 mm in 30 years out of 49.

On an average there are 66 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 Bawanipur to 90 at Taibpur Hydro.

The heaviest rainfall recorded in 24 hours at any station in the district was 445.2 mm at Dengraghat on 26 September 1999.

TEMPERATURE

There is one meteorological observatory located in the district at Purnea. The data of this observatory may be taken as representative of the climatic conditions of the whole district. The summer season starts from mid March when temperatures start to rise sharply. Generally April to May is the hottest period of the year with the mean maximum temperature at about 35^{o}C and the mean minimum temperature at 21^{o}C. The day temperature falls slightly with the onset of the monsoon in second week of June, but the night temperatures throughout the southwest monsoon period remain even higher than summer season. Night temperatures decrease more rapidly than day temperatures after September. January is the coldest month when the mean maximum temperature is at 24.0^{o}C and the mean minimum temperature is at about 7.8^{o}C. During winter the district is affected by cold wave condition in association with western disturbances which pass across the state and minimum temperatures may sometimes go down to about 2^{o}C during this period.

The highest maximum temperature ever recorded at Purnea was 43.9^{o}C on 27 May 1916 and the lowest minimum temperature ever recorded was 1.3^{o}C on 31 January 1971.

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 40% to 60%. The humidity is high during the monsoon period when it is about 85%. In the rest of the year the relative humidity generally varies between 60% to 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate throughout the year. Winds are generally calm or blow from westerly direction during the post monsoon, winter and early summer seasons. Easterly winds blow predominantly during pre-monsoon and monsoon period.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal during the monsoon period which move in north westerly to northerly direction towards the district and its neighbourhood cause widespread heavy rain and strong winds. Thunderstorms occur during the summer months and southwest monsoon season. Dust storms occur occasionally in the summer and southwest monsoon season. Fog occurs occasionally during winter season.

Tables 3, 4, 5 and 6 give the temperature and relative humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Purnea observatory.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
PURNEA

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
Amaur	19	a	10.0	6.3	3.9	39.3	125.5	274.9	413.0	365.3	358.5	131.3	7.5	6.8	1742.3	152	57	318.4	29 Sep 1989
		b	0.6	0.7	0.5	1.9	4.9	9.3	15.4	13.0	10.4	3.4	0.4	0.6	61.1	(1987)	(1992)		
Baisee	23	a	7.0	9.6	15.9	50.7	141.6	290.2	468.3	293.7	325.8	81.1	2.9	4.1	1690.9	158	29	267.2	24 Jun1987
		b	0.5	0.8	0.9	2.5	6.0	11.1	17.1	13.1	10.8	2.9	0.2	0.5	66.4	(1987)	(1965)		
Banmahkhi	31	a	8.4	11.2	11.5	30.4	96.9	221.7	385.3	335.2	249.2	67.5	7.5	4.2	1429.0	179	58	247.8	08 Jun 1982
		b	0.7	0.8	1.0	1.9	5.3	7.8	15.8	13.4	10.0	3.1	0.5	0.6	60.9	(1980)	(1966)		
Barharkothi	27	a	6.4	8.4	5.1	25.9	96.5	215.2	376.5	292.0	215.3	80.3	5.3	8.5	1335.4	153	67	400.0	15 Jun 1989
		b	0.5	0.6	0.6	1.6	4.8	8.5	15.6	12.1	9.6	2.7	0.2	0.8	57.6	(1987)	(1994)		
Bawanipur	27	a	7.8	7.9	11.9	20.3	78.8	233.6	380.6	277.8	254.1	48.6	3.9	42.5	1367.8	163	53	260.0	25 Aug 1988
		b	0.6	0.7	0.9	1.3	4.3	7.9	13.9	12.1	10.4	2.3	0.2	0.6	55.2	(1977)	(1994)		
Chargharia (Hydro)	21	a	8.4	4.8	17.7	72.7	185.9	340.5	609.0	391.5	391.0	99.7	5.4	6.2	2132.8	178	58	344.0	13 Aug 1987
		b	0.7	0.6	1.2	3.4	6.9	11.9	18.8	13.7	12.6	3.5	0.4	0.5	74.2	(1987)	(1992)		
Dengraghat (Hydro)	22	a	10.3	6.7	12.0	51.4	180.4	239.4	467.1	314.5	347.8	80.2	7.7	7.5	1725.0	173	59	445.2	26 Sep 1999
		b	0.8	0.8	0.9	3.0	8.2	9.9	17.4	13.3	11.9	3.1	0.5	0.9	70.7	(1989)	(1992)		
Dhamdaha(West)	18	a	22.7	5.0	13.0	29.8	60.4	203.7	354.5	311.9	241.2	106.7	6.0	0.6	1355.5	153	58	265.0	03 Oct 1961
		b	1.1	0.6	1.1	1.4	3.3	8.5	14.7	14.3	9.1	4.0	0.4	0.1	58.6	(1956)	(1967)		
Dhamdha(East)	29	a	10.0	11.3	13.6	24.0	93.1	257.1	440.5	388.8	318.8	67.9	6.5	8.1	1639.7	181	55	373.2	15 Jun 1989
		b	0.7	0.8	1.1	1.8	4.4	8.6	15.4	14.2	10.5	2.9	0.5	0.6	61.5	(1998)	(1992)		
Galgalia (Hydro)	21	a	7.0	15.5	19.5	47.5	175.8	472.8	913.8	576.1	447.4	116.7	5.1	7.9	2805.1	135	63	347.2	15 Jul 1983
		b	0.6	0.8	1.4	2.8	7.3	15.3	22.7	17.7	14.6	4.8	0.4	0.7	89.1	(1998)	(1992)		

TABLE – 1 (Contd….)

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
Kasba	31	a	9.0	10.3	15.2	43.8	135.3	243.8	508.8	375.1	302.2	75.7	7.7	5.9	1732.8	170	57	350.0	26 Sep 1999
		b	0.7	0.8	1.0	2.6	5.8	9.5	17.2	13.9	10.4	3.1	0.5	0.6	66.1	(1998)	(1966)		
Khoskibagh	35	a	7.1	9.7	11.2	39.1	113.9	235.4	421.5	330.2	275.2	79.5	9.9	9.4	1542.1	156	40	278.0	27 Aug 1968
		b	0.5	0.9	0.8	2.2	5.7	9.8	16.8	13.8	11.4	2.9	0.5	0.7	66.0	(1998)	(1964)		
Krityanand nagar	33	a	6.4	6.9	11.4	22.7	116.2	224.7	425.7	337.3	319.1	80.9	6.1	7.5	1564.9	166	54	276.0	16 Jun 1984
		b	0.7	0.5	0.8	1.6	6.0	9.1	16.1	13.5	11.5	3.1	0.5	0.5	63.9	(1984)	(1966)		
Purnea Obsy	48	a	12.6	7.4	14.2	29.7	118.2	270.9	382.8	315.5	293.1	94.6	9.9	5.2	1554.1	166	40	318.0	15 Jun 1989
		b	1.0	0.7	1.2	1.9	5.5	10.0	16.2	13.6	11.1	3.8	0.6	0.5	66.1	(1989)	(1972)		
Roopauly	14	a	4.8	9.3	5.4	22.5	81.1	193.7	391.6	306.0	320.1	48.7	11.4	1.9	1396.5	143	53	275.0	25 Sep 1999
		b	0.6	0.9	0.5	1.2	3.5	7.3	13.7	12.9	11.4	2.9	0.4	0.4	55.7	(1998)	(1994)		
Taibpur (Hydro)	23	a	10.6	9.9	15.2	54.0	219.0	514.7	811.3	502.8	460.8	101.3	16.5	11.4	2727.5	160	61	342.6	28 May 1989
		b	0.8	0.8	1.5	3.9	9.4	15.2	21.7	16.5	14.5	4.2	0.8	1.0	90.3	(1998)	(1992)		
Vasi	14	a	9.2	6.9	10.5	24.3	147.3	281.6	391.9	379.1	357.9	83.1	17.1	6.4	1715.3	155	55	238.0	29 Sep 1989
		b	0.8	0.6	0.7	1.5	5.2	10.0	15.6	13.8	10.5	3.3	0.7	0.6	63.3	(1999)	(1992)		
Purnea (District)		a	9.3	8.7	12.2	36.9	127.4	277.3	479.0	358.4	322.2	84.9	8.0	8.5	1732.8	144	36		
		b	0.7	0.7	0.9	2.1	5.7	10.0	16.7	13.8	11.2	3.3	0.5	0.6	66.2	(1998)	(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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
PURNEA
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	1	1601 - 1700	8
701 - 800	0	1701 - 1800	3
801 - 900	0	1801 - 1900	6
901 - 1000	2	1901 - 2000	1
1001 - 1100	3	2001 - 2100	2
1101 - 1200	4	2101 - 2200	1
1201 - 1300	4	2201 - 2300	1
1301 - 1400	6	2301 - 2400	2
1401 - 1500	1	2401 - 2500	0
1501 - 1600	3	2501 - 2600	1

(Data available for 49 years only)

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

MONTH	Mean Maximum Temperature	Mean 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	24.0	7.8	29.3	29 Jan 1990	1.3	31 Jan 1971	80	64
February	26.7	10.0	34.4	28 Feb 1896	1.7	08 Feb 1891	70	51
March	32.0	14.5	40.6	29 Mar 1941	5.4	05 Mar 1973	58	39
April	35.4	19.7	43.3	15 Apr 1891	10.4	04 Apr 1965	62	43
May	34.7	22.4	43.9	27 May 1916	15.3	11 May 1971	73	59
June	33.7	24.4	43.0	06 Jun 1979	17.8	06 Jun 1906	82	73
July	32.0	24.8	38.9	14 Jul 1972	20.7	28 Jul 1971	88	82
August	32.2	24.9	37.7	12 Aug 1986	19.6	30 Aug 1970	86	81
September	32.1	24.1	39.6	11 Sep 1991	18.0	29 Sep 1972	86	82
October	31.4	20.6	36.0	09 Oct 1993	10.0	31 Oct 1891	80	76
November	29.1	14.1	34.8	05 Nov 1996	4.6	29 Nov 1970	76	72
December	25.4	9.0	30.6	03 Dec 1953	2.1	25 Dec 1965	79	70
Annual	30.7	18.0	43.9	27 May 1916	1.3	31 Jan 1971	77	66

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies (PURNEA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	23	19	21	13	9	3	0	0	1	12	21	22	144
b	2	1	1	2	4	8	11	8	5	2	1	1	46
c	1.3	1.3	1.3	2.2	3.5	5.3	6.5	6.0	5.1	2.4	1.1	0.9	3.1
1730 HOURS													
a	20	17	19	15	13	3	0	0	1	15	20	20	143
b	1	1	1	1	1	4	6	3	3	1	0	1	23
c	1.1	1.3	1.3	1.6	2.0	4.5	5.8	5.5	4.8	2.1	1.0	1.0	2.7

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction (PURNEA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	2.4	3.6	4.7	6.1	6.6	5.7	4.8	4.7	3.9	2.4	1.6	1.8	4.0
Direction in morning	C/W	W	W/E	E	E	E	E	E	E	C/E	C/E/W	C/W	
Direction in evening	C/W	C/W	W/C	E/W	E	E	E	E	E/C	C	C	C	

TABLE - 6
Special Weather Phenomena (PURNEA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.1	0.5	0.9	2.1	2.1	1.3	1.5	1.5	0.4	0.0	0.1	10.6
Hail	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.1	0.0	0.1	0.9
Dust storm	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.8
Fog	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.4	1.3

ROHTAS DISTRICT

The climate of this district is generally hot and dry in summer, mild humid and cold in winter, humid in monsoon season.. The cold season starts late in November and lasts till March. April to mid June is the hot season. The period from mid June to about the first week of October constitutes the southwest monsoon season. The succeeding period till late November is the post monsoon or transition period.

RAINFALL

Records of rainfall in the district are available for 15 raingauge stations for period ranging from 11 to 44 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 994.4 mm. About 89% of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month with an average rainfall of 310.7 mm. The variation in the annual rainfall from year to year is not much large. In the fifty years period, 1951-2000 the highest annual rainfall amounting to 168% of the normal occurred in 1961. The lowest annual rainfall, which was 43% of the normal occurred in 1966. In this fifty year period, there were 4 years when the annual rainfall in the district was less than 80% of the normal, none of them were in consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1200 mm in 36 years out of 49.

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 39 at Karakat and Jinara to 55 at Dehri observatory.

The heaviest rainfall recorded in 24 hours at any station in the district was 394.5 mm at Chenari on 11 September 1936.

TEMPERATURE

There is one meteorological observatory in the district at Dehri. The meteorological data and climatological conditions prevailing at this station may be taken as representative of weather conditions of the whole district. The summer season starts from March with appreciable rise in day and night temperature. May is the hottest month of the season with the mean maximum temperature at 40.5°C and mean minimum temperature at 23.5°C. During May and early June the maximum temperature may go upto 47°C on individual days. There is a fall in day temperature after the onset of the monsoon in second week of June. The night temperature however, continues to be high. The temperature falls appreciably after the withdrawal of the monsoon by mid October. Generally January is the coldest month of the season with the mean maximum temperature at 23.8°C and the mean minimum temperature at 8.6°C. In association with western disturbances which move across the state during winter season, cold wave conditions prevail in the district and the minimum temperature may fall below freezing point.

The highest maximum temperature ever recorded at Dehri was 49.5°C on 11 May 1988 and the lowest minimum temperature ever recorded was –1.0°C on 18 January 1977.

HUMIDITY

Humidity remains high about 75% to 80% during monsoon season. Thereafter, humidity decreases and remains between 55% and 70% in the post monsoon and winter season. Summer is the driest part of the year when humidity is about 25% to 35% in the afternoons.

CLOUDINESS

During monsoon season sky is generally heavily clouded to overcast. Thereafter cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer season.

WINDS

Winds are generally light to moderate throughout the year. In the morning winds are generally calm or blow from west-southwest and south direction in post monsoon, winter and early summer period. However, during afternoon westerlies are predominant. Thereafter, easterly/southeasterly/westerly winds blow predominantly in the morning during southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Depressions originating in Bay of Bengal during monsoon period which move in westerly/northwesterly direction towards the district and its neighbourhood, cause heavy rainfall and thunderstorms. Thunderstorms also occur during pre-monsoon period occasionally. Fog occurs occasionally during post monsoon and winter seasons.

Tables 3, 4, 5, and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind directions, special weather phenomena respectively for Dehri observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
ROHTAS

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Akbarpur	16	a	27.4	15.8	8.8	6.0	10.7	126.9	299.9	304.1	195.4	58.8	3.4	2.0	1059.2	147	34	217.2	14 Aug 1935
		b	1.6	0.8	0.9	0.5	1.0	5.4	11.6	12.8	9.3	2.7	0.2	0.2	47.0	(1961)	(1966)		
Bikramganj	25	a	10.2	14.1	12.4	7.0	27.2	108.9	359.4	260.7	230.3	32.6	7.3	9.8	1079.9	161	58	285.0	18 Jul 1977
		b	1.0	1.1	0.8	0.6	1.6	5.0	14.0	12.2	8.2	1.5	0.4	0.6	47.0	(1987)	(1996)		
Chenari	42	a	13.3	12.3	7.9	6.3	13.1	97.4	299.2	306.9	221.3	49.2	7.4	2.8	1037.1	188	41	394.5	11 Sep1936
		b	1.0	1.0	0.8	0.5	0.8	4.4	11.2	13.6	8.8	1.8	0.4	0.3	44.6	(1969)	(1966)		
Dehri Obsy	43	a	17.7	14.8	10.9	9.0	21.5	113.6	332.3	279.0	206.1	43.6	6.8	5.7	1061.0	169	50	254.5	14 Aug 1910
		b	1.6	1.4	1.1	0.9	1.7	6.1	14.9	14.0	9.5	2.8	0.4	0.6	55.0	(1961)	(1966)		
Dhavat	18	a	6.5	12.6	5.7	8.8	9.6	124.7	400.2	215.2	275.2	33.7	3.5	2.9	1098.6	160	67	200.0	13 Sep 1987
		b	0.4	0.9	0.5	0.4	0.9	4.3	12.9	9.8	8.4	1.5	0.2	0.4	40.6	(1987)	(1983)		
Dihari	11	a	8.9	10.9	6.4	5.9	17.6	117.4	316.3	275.6	209.7	15.2	6.8	9.9	1000.6	132	77	162.6	03 Jul 2002
		b	1.0	1.1	0.8	0.5	1.2	5.4	13.0	12.1	8.8	0.9	0.2	0.8	45.8	(1993)	(1989)		
Inderpuri (Hydro)	22	a	11.4	19.8	13.3	6.1	17.3	122.0	314.5	233.5	190.6	59.6	10.0	5.8	1003.9	149	55	165.2	15 Jul 1977
		b	1.1	1.8	0.9	0.4	1.7	5.6	14.8	12.6	8.8	3.0	0.6	0.6	51.9	(1978)	(1979)		
Jinara	11	a	6.4	6.5	4.0	1.1	12.4	78.7	250.2	273.5	162.8	8.9	9.4	12.2	826.1	132	60	294.4	03 Jul 2002
		b	0.8	0.8	0.4	0.2	0.9	5.1	9.1	11.5	8.5	0.6	0.6	1.0	39.5	(1989)	(1998)		

TABLE – 1 (contd….)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL R/F AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Karakat	24	a	9.6	13.5	7.5	5.9	8.5	82.8	309.4	250.3	215.4	34.4	8.4	6.2	951.9	224	17	235.3	21 Aug 1985
		b	0.8	1.0	0.5	0.5	0.6	3.3	11.1	10.4	8.0	1.6	0.4	0.6	38.8	(1987)	(1981)		
Kargahar	34	a	10.8	13.6	10.0	4.8	13.9	82.3	257.0	247.7	163.0	32.6	16.4	5.7	857.8	206	44	204.6	03 Jul 2002
		b	0.9	1.2	0.9	0.5	1.0	4.1	12.2	11.3	8.0	1.7	0.5	0.7	43.0	(1978)	(1964)		
Nauhatta	26	a	12.4	33.3	4.0	5.3	15.9	113.0	304.2	256.7	198.8	22.0	3.1	8.6	977.3	174	60	300.0	09 Aug 1988
		b	0.8	1.1	0.3	0.4	0.7	5.1	13.0	10.2	9.1	1.6	0.2	0.7	43.2	(1978)	(1992)		
Nauka	25	a	10.6	8.8	4.6	3.0	15.4	112.3	343.2	253.3	216.5	24.6	9.4	5.7	1007.4	151	52	381.0	02 Jul 1983
		b	0.8	0.7	0.5	0.3	1.3	4.6	12.0	11.4	8.7	1.6	0.4	0.4	42.7	(1983)	(1988)		
Rohtas	26	a	5.9	7.5	3.9	3.3	12.7	104.7	288.7	281.5	238.9	42.0	4.1	5.1	998.3	176	44	210.5	25 Sep 1978
		b	0.5	0.8	0.2	0.3	0.8	4.8	13.0	11.9	8.8	2.0	0.4	0.4	43.9	(1978)	(1992)		
Sasaram	44	a	16.8	14.9	7.9	8.3	18.8	112.7	301.0	295.3	207.2	44.9	8.9	6.0	1042.7	165	31	278.9	14 Aug 1910
		b	1.4	1.3	1.1	0.7	1.4	5.3	13.3	13.7	9.2	2.1	0.5	0.6	50.6	(1984)	(1966)		
Shivsagar	23	a	15.3	14.2	7.3	8.0	11.3	78.5	284.5	217.3	215.1	47.8	7.5	4.5	911.3	148	50	210.0	11 Sep 1987
		b	1.1	1.2	0.7	0.7	1.0	4.3	12.8	10.6	8.8	2.0	0.4	0.6	44.2	(1987)	(1966)		
Rohtas (District)		a	12.2	14.2	7.6	5.9	15.1	105.1	310.7	263.4	209.8	36.7	7.5	6.2	994.4	168	43		
		b	1.0	1.1	0.7	0.5	1.1	4.9	12.6	11.9	8.7	1.8	0.4	0.6	45.3	(1961)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
ROHTAS
(Data 1951 - 2000)

Range in Mm	No. of years	Range in mm	No. of years
401 - 500	1	1101 - 1200	6
501 - 600	0	1201 - 1300	4
601 - 700	1	1301 - 1400	0
701 - 800	3	1401 - 1500	3
801 - 900	12	1501 - 1600	0
901 - 1000	10	1601 - 1700	1
1001 - 1100	8		

(Data available for 49 years)

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

MONTH	Mean Maximum Temperature	Mean 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	23.8	8.6	30.6	28 Jan 1958	-1.0	18 Jan 1977	74	52
February	26.6	11.2	35.3	23 Feb 1964	0.0	21 Feb 1990	64	46
March	32.9	15.7	41.5	31 Mar 1973	1.5	11 Mar 1990	46	33
April	38.6	20.9	44.4	23 Apr 1973	3.0	05 Apr 1990	38	27
May	40.5	23.5	49.5	11 May 1988	5.0	01 May 1990	44	32
June	38.5	24.6	47.2	-- Jun 1901 09 Jun 1966	12.4	26 Jun 1993	60	50
July	33.5	23.0	44.5	01 Jul 1987	11.2	25 Jul 1993	80	73
August	32.6	22.6	39.4	03 Aug 1972	10.0	30 Aug 1993	83	78
September	32.5	22.3	37.1	12 Sep 1979	8.0	26 Sep 1993	80	75
October	32.0	18.5	39.7	04 Oct 1986	4.0	29 Oct 1989	72	66
November	29.4	12.6	35.1	07 Nov 1977	0.0	21 Nov 1989	69	56
December	25.2	8.5	31.7	01 Dec 1952	0.0	31 Dec 1988	73	52
Annual	32.2	17.7	49.5	11 May 1988	-1.0	18 Jan 1977	65	53

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(DEHRI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS													
a	25	21	24	24	26	13	2	3	9	23	25	24	221
b	3	3	3	2	2	8	18	14	10	3	2	2	70
c	1.4	1.5	1.2	1.1	1.0	3.4	6.4	6.1	4.4	1.6	1.1	1.3	2.5
1730 HOURS													
a	25	22	27	26	26	16	4	5	12	23	27	27	240
b	3	3	2	2	2	9	18	16	10	4	1	2	72
c	1.2	1.2	0.8	0.9	0.8	3.5	6.0	5.8	4.3	1.5	0.8	1.0	2.3

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(DEHRI)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	3.0	3.8	4.5	5.1	5.1	5.3	4.6	4.0	3.8	2.5	2.1	2.4	3.9
Direction in morning	SW/C/S	SW/W	SW/W	W/SW	E/SW	E/SE/W	E/SE	E/SE	E/SE	C/SW/SE	SW/C/S	C/SW/S	
Direction in evening	W	W	W	W	W	E/W	E/W	E/C/W	E/W	W/C	W/C/N	W	

TABLE - 6
Special Weather Phenomena
(DEHRI)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.1	0.2	0.2	0.3	0.6	0.9	2.4	3.9	2.9	0.5	0	0	12
Hail	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	0.1
Fog	0	0.2	0	0	0	0	0	0	0	0.1	0.1	0.2	0.6

SAHARSA DISTRICT

The climate of this district is characterized by mild winter, moderate summer and humid monsoon season. The year may be divided into four seasons. The cold season starts from mid November and lasts till about the middle of March. This is followed by the summer season which continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon month October constitutes a transition month from the monsoon to the winter conditions.

.

RAINFALL

Records of rainfall in the district are available for 14 stations for the period ranging from 10 to 23 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 1289.8 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 338.1 mm. The variation from year to year of the annual rainfall is not large. In the fifty years period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 181% of the normal. 1978 was the year with the lowest annual amounting to 58% of the normal. In this fifty year period the there were 6 years when the rainfall was less than 80 % of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall was between 1001 mm and 1600 mm in 26 years out of 36.

On an average there are 55 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 49 at Sirmari Balkhtir to 68 at Birpur Hydro.

The heaviest rainfall in 24 hours at any station in the district was 456.0 mm at Kotra (Kohra) on 26 September 1999.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Supaul observatory in the neighbouring district may be taken as representative of the climate in the district in general. The cold season commences from mid November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature of 24°C and the mean minimum temperature of 10°C. In winter when cold waves affect the district in the wake of western disturbances passing across north India, minimum temperature may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool, however day and night temperatures begin to rise rapidly till the middle of June. April and May are the hottest months with the mean maximum temperature at about 36°C and the mean minimum temperature at about 22°C. In the latter part of the summer season i.e. May and June the maximum temperature may sometimes go above 41°C on individual days. There is a drop in day temperatures with the advance of the southwest monsoon into the district towards the third week of June, however, there is little relief as the weather is unpleasant due to the increased moisture in air and continuing high night temperatures. In October while day temperature continues as in the monsoon months, the nights are cooler.

HUMIDITY

The humidity is generally high throughout the year. The humidity is high during the monsoon period when it is between 80% and 90%. The driest part of the year is summer months when the relative humidity especially in the afternoon is at about 60%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In the post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally calm or light and blow from easterly or westerly direction in the post monsoon, winter and early summer season. April onwards easterly winds begin and remain predominant upto end of southwest monsoon period.

SPECIAL WEATHER PHENOMENA

In association with storms and depression originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly direction towards the district and its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occasionally occur in summer and monsoon seasons. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SAHARSA

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Baswa	19	a	10.6	14.3	14.4	36.9	83.5	216.3	396.4	302.4	258.7	52.6	5.1	8.5	1399.7	123	62	203.5	26 Aug 1981
(Hydro)		b	1.0	1.2	1.2	2.1	5.2	9.1	15.5	12.6	11.5	2.4	0.3	0.8	62.9	(1981)	(1982)		
Bhaptiahi	12	a	11.1	11.5	11.5	29.2	62.4	161.4	305.2	298.8	257.7	72.8	4.8	0.6	1227.0	132	79	194.3	19 Aug 1976
		b	0.9	0.7	0.7	1.7	4.0	6.1	11.8	12.0	9.4	2.0	0.3	0.1	49.7	(1962)	(1966)		
Bhimnagar	10	a	21.2	2.4	3.3	28.9	85.8	304.2	283.8	365.6	273.3	72.2	5.3	0.8	1446.8	132	76	239.0	10 Jul1942
		b	1.5	0.3	0.4	1.3	4.4	9.7	11.1	9.9	10.2	4.2	0.1	0.1	53.2	(1956)	(1957)		
Bhimnagar	23	a	9.4	11.8	15.2	34.9	94.9	232.7	424.9	285.6	245.9	55.0	6.4	4.0	1420.7	175	50	330.2	11 Jul 2004
(Hydro)		b	0.4	0.9	0.9	2.1	4.3	9.0	14.9	10.3	9.5	2.5	0.6	0.5	55.9	(1984)	(1992)		
Birpur	21	a	6.2	11.8	12.5	39.5	107.1	249.1	507.9	365.8	290.6	94.4	3.4	10.2	1698.5	148	64	314.6	14 Jul 2004
(Hydro)		b	0.5	1.0	1.0	2.6	5.2	10.5	16.3	14.2	11.9	3.2	0.4	0.8	67.6	(1987)	(1992)		
Kotra(kohra)	20	a	8.1	4.7	16.3	19.9	55.9	187.5	315.7	301.4	232.4	53.1	8.6	0.3	1203.9	188	57	456.0	26 Sep 1999
		b	0.8	0.3	0.9	1.2	3.1	7.5	14.0	13.8	9.0	2.6	0.5	0.0	53.7	(1999)	(1966)		
Maheshi	12	a	12.0	17.1	13.5	22.7	67.8	173.0	340.5	355.6	209.9	43.3	10.2	5.3	1270.9	125	68	214.6	25 Aug1981
		b	0.6	0.9	0.8	1.4	3.1	7.6	13.7	13.2	9.1	2.2	0.7	0.5	53.8	(1995)	(1994)		
Partapganj	13	a	5.7	2.3	21.1	21.1	86.7	168.5	380.0	358.8	243.5	95.0	5.5	0.3	1388.5	148	75	266.7	25 Jul1934
		b	0.6	0.5	1.7	1.7	4.2	7.7	14.4	14.1	10.6	2.8	0.8	0.0	59.1	(1963)	(1965)		
Saharsa	20	a	6.5	9.2	9.8	28.5	61.8	165.2	323.9	338.0	247.9	66.6	8.0	3.8	1269.2	169	58	193.0	07 Aug 1967
		b	0.6	0.9	0.8	1.7	3.5	7.2	13.8	15.2	10.4	3.5	0.5	0.4	58.5	(1987)	(1966)		
Salkhua	11	a	10.6	10.1	7.7	12.4	61.6	173.8	227.6	272.9	245.5	51.9	7.1	4.0	1085.2	170	50	218.0	14 Aug 1995
		b	0.8	0.7	0.3	0.8	2.8	8.6	12.5	13.4	9.5	2.7	0.5	0.2	52.8	(1999)	(1996)		
Samahar salam	10	a	14.2	14.1	6.5	20.2	77.6	228.8	357.2	337.2	303.0	50.5	7.2	5.0	1421.5	126	72	185.2	22 Sep 2000
		b	1.0	1.1	.5	1.3	4.0	8.8	13.6	13.1	10.3	3.0	.5	.2	57.4	(1999)	(1992)		
Sirmari Balkhtir	17	a	8.9	4.5	9.4	13.8	59.1	102.8	297.9	301.4	232.8	41.1	6.8	4.9	1083.4	195	40	203.1	16 Sep 1976
		b	0.8	0.6	0.8	0.8	3.4	5.8	12.8	12.8	8.5	2.1	0.3	0.3	49.0	(1999)	(1996)		
Sonbarsa	23	a	5.4	5.1	13.2	19.4	58.6	140.3	269.4	268.2	195.4	69.7	10.3	1.4	1056.4	156	50	172.7	03 Oct 1961
		b	0.6	0.9	0.6	1.0	2.8	7.5	12.7	12.4	7.9	3.0	0.5	0.2	50.1	(1964)	(1994)		
Sourbazar	21	a	9.2	6.5	14.0	20.2	44.2	144.6	303.6	272.3	200.3	56.8	12.6	2.7	1087.0	129	60	210.8	03 Oct 1961
		b	0.9	0.6	0.9	1.2	2.4	6.9	13.4	13.2	9.8	3.1	0.6	0.2	53.2	(1963)	(1994)		
Saharsa		a	9.9	9.0	12.0	24.8	71.9	189.2	338.1	316.0	245.5	62.5	7.2	3.7	1289.8	181	58		
(District)		b	0.8	0.8	0.8	1.5	3.7	8.0	13.6	12.9	9.8	2.8	0.5	0.3	55.5	(1987)	(1978)		

a Normal rainfall in mm

b Average number of rainy days (days with rain of 2.5 mm or more) * Based on all available data upto 2006 ** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
SAHARSA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	2	1601 - 1700	0
801 - 900	2	1701 - 1800	0
901 - 1000	2	1801 - 1900	1
1001 - 1100	2	1901 - 2000	1
1101 - 1200	3	2001 - 2100	1
1201 - 1300	6	2101 - 2200	0
1301 - 1400	8	2201 - 2300	0
1401 - 1500	2	2301 - 2400	1
1501 - 1600	5		

(Data available for 36 years)

SAMASTIPUR DISTRICT

The climate of this district is characterized by mild cold winter, hot summer and the monsoon season with moist heat. The year may be divided into four seasons. The cold season starts from mid November and lasts till about the middle of March. The hot season follows and continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute transitional period from the monsoon to the winter conditions.

RAINFALL

Records of rainfall in the district are available for 14 raingauge stations for the period ranging from 11 to 36 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 1135.2 mm. The rainfall in the southwest monsoon season constitutes about 86% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 299.8 mm. The variation in the annual rainfall from year to year is not much large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1987 when it amounted to 136% of the normal. 1966 was the year with the lowest annual rainfall amounting to 54% of the normal. In this fifty year period the there were 9 years when the rainfall was less than 80% of the normal out of which two years were consecutive. It is seen from Table 2 that the annual rainfall was between 901 mm and 1400 mm in 27 years out of 45.

On an average there are 51 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 46 at Mohiuddin Nagar to 58 at Samastipur Hydro.

The heaviest rainfall recorded in 24 hours at any station in the district was 417.3 mm at Dalsinghsarai on 05 September 1925.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at of Darbhanga observatory in the neighboring district may be taken as representative of the climatic conditions of the district in general. The cold season commences from mid November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In winter cold waves which affect the district in the wake of western disturbances passing across north India, minimum temperatures may sometimes go down to about 1°C. The days become warmer in March while nights continue to be cool. Both day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 36°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes rise to about 42°C on individual days. There is drop in day temperature with the advance of the southwest monsoon into the district towards the second week of June, but night temperature continues to be high. In October while day temperature continues as in the monsoon months, however the nights are cooler.

HUMIDITY

The driest part of the year is summer months when the relative humidity especially in the afternoon is between 50% and 60%. The humidity is high during the monsoon period when it is between 70% and 80%. In the rest of the year the relative humidity generally varies between 60% and 70%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In the winter and summer season the skies are generally clear or lightly clouded.

WINDS

Light westerly or calm winds prevail in post monsoon, winter and early summer season. From April calm or easterly winds appear and these predominate in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and strong winds. Thunderstorms occur occasionally during the summer and southwest monsoon season. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SAMASTIPUR

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bharishnagar	11	a	12.3	18.3	5.8	16.8	45.2	119.2	264.1	287.4	281.1	17.9	8.6	10.1	1086.8	154	51	256.2	30 Sep
		b	1.1	1.4	0.8	1.0	3.0	6.2	10.7	12.6	9.6	1.2	0.5	0.9	49.0	(1989)	(1992)		1989
Dalsinghsarai	34	a	6.9	11.5	8.7	13.7	46.7	168.4	306.4	284.4	237.1	60.7	7.0	7.5	1159.0	146	58	417.3	05
		b	0.7	1.1	0.7	0.9	2.9	6.6	13.3	12.2	9.5	2.4	0.5	0.5	51.3	(1985)	(1992)		Sep1925
Kalyanpur	34	a	11.1	9.0	6.3	21.7	59.6	148.2	325.2	289.4	236.3	69.2	8.5	8.0	1192.5	160	46	257.2	27 Sep
		b	0.8	0.7	0.6	1.2	2.9	6.2	12.4	11.2	9.5	2.7	0.5	0.7	49.4	(1981)	(1966)		1975
Mohiuddin nagar	34	a	17.4	7.7	12.7	14.0	35.9	161.8	280.6	215.2	195.9	52.4	12.8	4.4	1010.8	176	45	254.0	18 Jun
		b	1.4	0.8	1.0	1.0	2.2	6.8	12.1	9.8	8.0	2.2	0.4	0.4	46.1	(1993)	(1992)		1952
Morwa(Tajpur)	36	a	10.7	9.3	7.3	13.7	37.2	156.0	323.7	259.4	194.9	66.5	7.9	5.4	1092.0	159	49	217.5	25 Jul
		b	1.0	0.8	0.7	1.1	2.5	6.2	12.9	11.5	8.3	2.2	0.5	0.6	48.3	(1974)	(1992)		1984
Patori	14	a	13.2	7.3	4.9	8.4	42.8	156.9	243.1	285.5	219.0	20.1	15.2	6.6	1023.0	135	67	256.0	04 Jul
		b	1.0	0.9	0.4	1.0	2.9	6.7	12.0	11.6	9.5	1.6	0.5	0.6	48.7	(1997)	(1975)		2002
Pusa	11	a	13.1	15.8	5.8	14.1	65.1	183.7	312.1	318.7	199.8	42.8	10.2	8.4	1189.6	130	45	202.0	03 Jul
		b	1.1	1.2	0.8	1.5	3.4	7.4	11.8	12.9	9.6	2.8	0.6	0.8	53.9	(1989)	(1992)		1989
Rossera	28	a	17.7	7.3	12.5	18.5	44.5	196.5	318.6	316.3	299.4	63.9	4.6	3.4	1303.2	146	39	399.5	19 Sep
		b	1.2	0.7	0.8	1.1	2.4	7.2	12.9	12.6	8.8	2.2	0.3	0.3	50.5	(1955)	(1970)		1976

TABLE – 1 (contd…)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Samastipur	34	a	15.9	8.8	11.9	13.1	46.9	179.6	303.4	285.5	234.6	63.5	8.0	3.6	1174.8	169	42	320.0	29 Jul
		b	1.2	1.1	0.9	1.2	2.6	7.0	12.7	12.9	10.1	2.6	0.5	0.3	53.1	(1989)	(1992)		1989
Samastipur (Hydro)	22	a	8.6	8.9	8.1	21.9	65.9	161.0	382.1	272.6	222.3	69.9	7.9	8.3	1237.5	136	40	202.2	22 Sep
		b	1.0	1.0	1.0	1.6	4.0	8.0	14.3	12.5	10.5	3.0	0.5	0.6	58.0	(1999)	(1992)		2000
Saryaranjan	14	a	21.9	7.2	10.1	18.3	60.3	178.5	271.5	329.3	231.7	29.4	13.6	7.4	1179.2	158	59	213.0	30 Jun
		b	1.1	0.8	1.1	1.2	2.9	6.5	12.4	12.8	9.1	1.7	0.6	0.6	50.8	(1997)	(1992)		1996
Sidhiya	25	a	6.2	14.1	5.5	24.5	53.3	161.3	257.0	199.7	174.9	44.8	1.6	2.4	945.3	158	53	300.0	23 Sep
		b	0.6	0.8	0.5	1.7	2.8	7.0	11.8	10.8	8.6	2.6	0.3	0.3	47.8	(1987)	(1992)		1978
Ujiyarpur	13	a	13.2	13.9	15.8	18.5	53.4	154.1	310.7	275.3	290.6	22.7	12.8	5.8	1186.8	163	57	293.0	20 Sep
		b	1.5	1.0	1.2	1.4	3.4	6.2	11.3	14.1	10.2	1.7	0.8	0.8	53.6	(1989)	(1992)		1976
Vibhutipur	19	a	8.9	8.7	7.7	26.3	54.6	151.3	298.8	285.9	218.6	35.7	4.4	11.5	1112.4	147	42	215.4	04 Aug
		b	0.8	0.9	0.6	1.4	3.1	6.9	13.6	11.7	9.7	2.1	0.5	0.7	52.0	(1997)	(1992)		1985
Samastipur (District)		a	12.6	10.6	8.8	17.4	50.8	162.6	299.8	278.9	231.2	47.1	8.8	6.6	1135.2	136	54		
		b	1.0	0.9	0.8	1.2	2.9	6.8	12.4	12.1	9.4	2.2	0.5	0.6	50.8	(1987)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
SAMASTIPUR
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	3	1101 - 1200	5
701 - 800	1	1201 - 1300	10
801 - 900	5	1301 - 1400	3
901 - 1000	4	1401 - 1500	6
1001 - 1100	5	1501 - 1600	3

(Data available for 45 years)

SARAN DISTRICT

The climate of this district is characterized by a mild winter, hot dry summer, humid and hot monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by summer season from March to about mid June. The southwest monsoon season is from June to September. The succeeding period upto end of November is the post monsoon or transition period.

RAINFALL

Records of rainfall in the district are available for 18 raingauge stations for period ranging from 11 to 48 years. The details of the rainfall at these stations and for the district as a whole are given in Table 1 and 2. The average annual rainfall in the district is 1051.6 mm. About 88% of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month with an average rainfall of 299.8 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall amounting to 169% of the normal occurred in 1953. The lowest annual rainfall which was 59% of the normal occurred in 1966. In this fifty year period there were 6 years when the annual rainfall in the district was less than 80%, out of which two years were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1300 mm in 34 years out of 47.

On an average there are 45 rainy days I(i.e. days with rainfall of 2.5 mm or more) n a year in the district. This number varies from 39 at Dighwara to 51 at Pertabpur.

The heaviest rainfall recorded in 24 hours at any station in the district was 400.0 mm at Ekma/Akma on 08 June 2005.

TEMPERATURE

There is one meteorological observatory located in the district at Chapra. The meteorological data and climatological conditions prevailing at this station can be taken as representative of weather conditions of whole district. The summer season starts from March when temperatures start to rise appreciably till second week of June, May is the hottest month of the year with mean maximum temperature at 38.4°C and the mean minimum temperature at 25.5°C. During May and early June maximum temperature may rise to about 45°C on individual days. There is a fall in day temperature after the onset of the southwest monsoon around second week of June, but there is not much relief as the weather is uncomfortable due to humid and warm nights. The temperatures fall appreciably after withdrawal of southwest monsoon in October. Winter season sets in from December and lasts till early March. Generally January is the coldest month of the year with the mean maximum temperature at 22.9°C and mean minimum temperature at 10.5°C. In association with passage of western disturbances across the state during winter season, the minimum temperature may fall to 4°C on individual days.

The highest maximum temperature ever recorded at Chapra was 46.6°C on 09 June 1966 and the lowest minimum temperature ever recorded was 3.3°C on 03 February 1905.

HUMIDITY

Humidity is high between 75% and 85% during southwest monsoon season. After withdrawal of monsoon there is fall in humidity and it remains between 60% and 75% during post monsoon and winter season. Summer is the driest part of the year when the humidity remains between 30% and 40% especially in the afternoons.

CLOUDINESS

During monsoon season the skies remain heavily clouded or overcast. Thereafter cloudiness decreases and sky remains clear or lightly clouded in the rest of the year. Sky may remain heavy clouded or overcast for few days during winter when western disturbances move across the state.

WINDS

Winds are generally light to moderate throughout the year. Winds are generally calm or blow from southwest direction during the post monsoon, winter and early summer season. Northeasterly winds appear in the district, during late summer season and are predominant in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Depressions originating in the Bay of Bengal during pre monsoon and monsoon season which move in northwesterly/northerly direction after crossing the coast affect the district and its neighbourhood causing heavy rain and thunderstorms. Dust storms affect the district occasionally during summer and early monsoon season. Fog occurs occasionally during winter season due to the passage of western disturbances across the state.

Tables 3, 4, 5 and 6 give the temperature and relative humidity, cloudiness, mean wind speed and predominant wind direction, special weather phenomena respectively for Chhapra observatory.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
SARAN

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
Amanur	23	a	10.3	6.9	5.8	11.1	20.8	114.5	298.3	265.4	176.2	55.4	6.8	4.3	975.8	151	51	240.4	30 Jun1997
		b	1.0	0.5	0.5	0.8	1.7	5.1	12.6	12.0	8.6	2.3	0.5	0.3	45.9	(1981)	(1992)		
Baniapur	32	a	16.3	6.1	5.5	8.9	35.6	128.3	310.3	284.3	217.7	40.7	4.0	1.5	1059.2	148	62	300.5	03 Jul 1981
		b	1.0	0.7	0.6	0.6	2.1	4.6	12.4	11.4	8.5	1.7	0.3	0.2	44.1	(1981)	(1965)		
Buchea	20	a	11.9	5.2	4.8	7.6	18.0	129.9	268.0	299.8	196.6	56.0	4.3	1.4	1003.5	165	62	250.0	21 Aug 1962
		b	1.2	0.6	0.5	0.8	1.3	5.2	10.7	11.2	7.7	2.2	0.3	0.2	41.9	(1953)	(1968)		
Chapra obsy	48	a	17.0	10.5	6.9	7.8	30.6	122.2	311.7	281.6	214.7	53.8	8.4	4.1	1069.3	160	66	368.0	16 Aug 1995
		b	1.2	0.9	0.7	0.7	1.9	6.0	12.8	12.2	9.0	2.6	0.3	0.6	48.9	(1987)	(1966)		
Dhariapur	14	a	8.3	41.1	3.3	6.4	25.8	142.8	243.0	257.0	211.4	29.3	5.5	4.0	977.9	199	37	200.2	30 Jun 1997
		b	0.9	0.7	0.4	0.4	1.5	5.1	9.3	11.5	7.8	1.5	0.5	0.4	40.0	(1997)	(1992)		
Dighwara	14	a	12.2	13.1	0.8	1.7	22.0	103.6	239.9	169.8	162.9	34.3	7.9	1.1	769.3	133	53	262.0	27 Sep 1975
		b	1.2	1.0	0.2	0.3	1.5	5.2	11.8	9.7	6.6	1.3	0.6	0.1	39.5	(1975)	(1999)		
Ekma/akma	34	a	12.6	10.4	5.9	6.3	35.6	132.5	360.5	304.0	208.4	57.7	6.7	6.1	1146.7	196	23	400.0	08 Jun2005
		b	0.8	0.6	0.5	0.5	1.5	4.6	12.6	11.0	8.0	1.9	0.4	0.6	43.0	(1978)	(1968)		
Garkha	22	a	10.1	10.8	3.3	4.8	22.8	126.7	250.2	289.7	225.8	42.6	5.9	3.2	995.9	155	59	227.0	30 Jun 1997
		b	1.1	0.9	0.4	0.3	1.1	5.7	10.9	12.1	8.3	1.7	0.3	0.4	43.2	(1997)	(1965)		
Jalalpur	34	a	11.6	9.7	6.9	6.5	38.8	116.0	326.8	249.6	203.0	54.8	7.4	8.2	1039.3	143	55	210.0	30 Jun 1997
		b	0.9	1.0	0.6	0.6	2.1	5.2	12.4	11.2	8.8	2.0	0.4	0.5	45.7	(1964)	(1992)		
Manjhi	33	a	10.4	8.6	2.7	7.2	29.9	129.6	357.7	258.8	202.5	49.2	7.8	3.4	1067.8	195	52	226.0	12 Jul 1970
		b	1.0	0.8	0.3	0.5	1.9	4.7	13.0	11.2	8.6	1.8	0.4	0.3	44.5	(1970)	(1966)		

TABLE – 1 (Contd….)

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
Marhaura(amnar)	45	a	19.9	10.7	12.7	9.9	39.6	149.3	319.0	285.4	199.6	62.7	5.9	8.8	1123.5	167	56	302.5	11 Sep 1920
		b	1.4	1.0	0.9	0.8	2.0	6.3	13.3	12.3	8.8	2.6	0.4	0.6	50.4	(1981)	(1992)		
Marsrakh	42	a	18.2	5.8	5.9	8.0	28.0	134.9	308.8	305.6	216.0	53.4	5.3	2.8	1092.7	181	50	390.0	01 Oct 1979
		b	1.2	0.6	0.5	0.5	1.9	5.1	12.5	11.7	8.6	1.9	0.4	0.3	45.2	(1953)	(1966)		
Parsa	40	a	15.6	10.3	9.5	15.6	38.7	142.7	386.3	317.9	228.4	67.8	6.9	3.5	1243.2	176	61	287.2	07 Jul1985
		b	1.1	0.8	0.7	0.9	1.9	5.5	13.3	11.5	8.4	2.4	0.4	0.4	47.3	(1985)	(1992)		
Pertabpur	11	a	16.7	2.8	10.4	2.7	16.1	155.5	241.9	307.0	243.4	73.1	3.2	1.5	1074.3	161	75	336.6	19 Sep1922
		b	1.7	0.4	1.2	0.3	0.7	7.1	12.0	14.3	10.0	2.6	0.1	0.2	50.6	(1953)	(1957)		
Saran sadar	11	a	13.3	7.6	1.4	4.8	26.4	119.6	261.6	292.0	202.0	24.3	11.7	6.5	971.2	151	63	205.0	30 Jun 1997
		b	1.5	0.8	0.3	0.6	1.8	4.9	10.5	11.9	8.7	1.8	0.8	0.4	44.0	(1997)	(1992)		
Sepaya	13	a	23.0	6.8	19.3	8.9	29.8	183.3	306.4	354.0	207.6	74.8	6.9	1.7	1222.5	145	72	257.2	03 Oct 1959
		b	1.8	0.6	1.0	0.7	1.8	6.8	12.6	12.9	9.1	1.9	0.3	0.3	49.8	(1953)	(1957)		
Sonepur	26	a	6.0	5.0	3.5	9.1	33.7	116.1	275.5	248.8	200.5	65.2	3.0	3.2	969.6	167	47	176.4	15 Sep 1989
		b	0.6	0.6	0.3	0.5	1.9	5.5	12.3	11.2	7.6	2.7	0.2	0.4	43.8	(1988)	(1991)		
Thareya	26	a	14.7	10.8	1.3	5.4	26.3	144.4	329.9	318.9	203.3	64.8	1.1	4.6	1125.5	203	45	290.0	01 Oct 1979
		b	0.7	0.8	0.2	0.3	1.5	4.0	11.0	10.8	8.2	1.4	0.2	0.5	39.6	(1975)	(1992)		
Saran (District)		a	13.8	10.1	6.1	7.4	28.8	132.9	299.8	282.8	206.7	53.3	6.0	3.9	1051.6	169	59		
		b	1.1	0.7	0.5	0.6	1.7	5.4	12.0	11.7	8.4	2.0	0.4	0.4	44.9	(1953)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
SARAN
(Data 1951- 2000)

Range in mm	No. of years	Range in mm	No. of years
601 - 700	2	1201 - 1300	5
701 - 800	2	1301 - 1400	4
801 - 900	7	1401 - 1500	3
901 - 1000	9	1501 - 1600	1
1001 - 1100	8	1601 - 1700	0
1101 - 1200	5	1701 - 1800	1

(Data available for 47 years only)

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

MONTH	Mean Maximum Temperature	Mean 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	22.9	10.5	30.2	15 Jan 1974	4.4	21 Jan 1993	79	61
						24 Jan 1987		
						Jan 1905		
February	26.4	12.5	39.6	21 Feb 1963	3.3	03 Feb 1905	70	49
March	32.5	17.5	40.8	06 Mar 1960	7.7	01 Mar 1906	53	36
April	37.5	23.0	44.1	30 Apr 1966	13.3	03 Apr 1905	48	31
May	38.4	25.5	45.5	27 May 1995	17.3	01 May 1993	59	41
June	36.9	26.9	46.6	09 Jun 1966	18.1	06 Jun 1996	71	58
July	33.1	26.3	41.7	06 Jul 1982	20.2	05 Jul 1960 16 Jul 1981	83	75
August	32.5	26.2	39.4	02 Aug 1982	19.8	24 Aug 1993	83	77
September	32.3	25.7	37.8	29 Sep 1966	19.6	28 Sep 1986 04 Sep 1993	81	75
October	31.8	22.7	36.9	06 Oct 1976	13.8	23 Oct 1993	76	67
November	28.9	16.7	35.8	13 Nov 1969	8.2	26 Nov 1993	72	59
December	24.4	11.7	32.0	04 Dec 1978	4.7	24 Dec1993	76	60
Annual	31.5	20.4	46.6	09 Jun 1966	3.3	03 Feb 1905	71	57

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(CHAPRA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	25	21	27	26	24	12	3	4	8	22	25	28	225
b	2	2	1	1	2	9	14	12	10	3	1	1	58
c	1.1	1.2	1.0	0.9	1.2	3.9	6.1	**5.7**	4.5	1.8	0.8	0.8	2.4
1730 HOURS													
a	24	21	26	25	26	13	2	3	11	22	26	28	227
b	2	2	1	1	1	7	13	8	6	2	1	1	45
c	1.1	1.2	1.1	0.9	0.9	3.7	5.7	5.3	3.9	1.4	0.5	0.7	2.2

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(CHAPRA)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	2.8	3.5	4.8	6.4	7.3	7.0	5.9	5.8	6.2	3.1	2.1	2.3	4.8
Direction in morning	SW	SW	SW	SW	NE	NE	NE	NE	NE	C/NE	C/SW	SW	
Direction in evening	C/SW	SW/C	SW	SW	NE	NE	NE/C	NE	NE/C	C/NE	C/SW	C/SW	

TABLE - 6
Special Weather Phenomena
(CHAPRA)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0.3	0.1	0.6	0.6	0.8	1.1	1.0	1.0	0.9	0.4	0.1	0.0	6.9
Hail	0.1	0.0	0.0	0.0	0.0	0	0	0	0.1	0	0	0	0.2
Dust storm	0	0	0	0.1	0.3	0.4	0	0	0	0	0	0	0.8
Fog	2.4	0.6	0	0	0	0.1	0	0	0	0	0	1	4.1

SHEKHPURA DISTRICT

The climate of this district is characterized by mild winter, hot summer and hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from December and lasts till the beginning of March. The summer season follows and continues till first week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 3 raingauge stations for the period ranging from 30 to 45 years. The details of rainfall at these stations and for the district as a whole are given in Table 1 and 2. The average annual rainfall in the district is 996.6 mm. The rainfall in the southwest monsoon season constitutes to about 86% of the annual normal rainfall. July is the rainiest month with an average rainfall of 281.3 mm. The variation of the annual rainfall from year to year is large. In the fifty years period 1951 to 2000, the highest annual rainfall occurred in 1997 when it amounted to 159% of the normal. The lowest annual rainfall which was 50% of the normal occurred in 1992. In this fifty year period there were 5 years when the rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 801mm and 1200 mm in 21years out of 37.

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.

The heaviest rainfall recorded in 24 hours at any station in the district was 374.0 mm at Shekhpura Block on 03 October 1961.

TEMPERATURE

There is no meteorological observatory in the district. The temperature and other meteorological condition as indicated by the data at Jamui observatory in the neighbouring district may be taken as representative of the climatic conditions in the district in general. The cold season commences from December when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month when the mean maximum temperature at about 25°C and the mean minimum temperature at about 11°C. In winter cold waves which affect the district in the wake of western disturbances passing across north India, minimum temperatures may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool. Both day and night temperatures begin to rise rapidly till May. May is the hottest month with the mean maximum temperature at about 40°C and the mean minimum temperature at about 26°C. In the latter part of the summer season i.e. May and June the maximum temperatures may sometimes be above 44°C on individual days. With the advance of the southwest monsoon into the district towards the second week of June there is drop in day temperatures, however there is a little relief as the weather is oppressive on account of the increased moisture and high night temperatures. In October while day temperature remains as high as in the monsoon months the nights are cooler.

HUMIDITY

Air remains humid throughout the year. Humidity remains high between 75% to 80% during southwest monsoon season, post monsoon and early part of winter season. During summer season humidity is less between 50% to 65%.

CLOUDINESS

Skies are heavily clouded to overcast in the monsoon months. During winter the sky remains cloudy for few days in association with western disturbances which affect the state. In post monsoon and summer seasons the skies are generally clear or lightly clouded, but towards the late summer the cloudiness increases in the afternoons.

WINDS

Winds are generally light with some increase in wind force in latter part of summer and early part of southwest monsoon season. Light easterly/northwesterly/ westerly winds prevail in the winter and summer season. In southwest monsoon season moderate easterly winds prevail mostly but in winter they are less frequent.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly/westerly direction towards the district or its neighborhood cause widespread heavy rain and strong winds. Thunderstorms also occur during the summer season and early post monsoon season. Dust storms occur occasionally in the summer months. Fog affects the district occasionally during winter season.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SHEKHPURA

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Ariari	30	a	11.2	7.9	8.1	10.5	36.1	143.2	310.2	242.5	191.0	49.1	7.1	6.1	1023.0	197	41	212.1	04 Jul 1981
		b	0.6	0.8	0.5	0.7	2.0	6.1	11.8	10.6	8.3	2.1	0.4	0.6	44.5	(1981)	(1970)		
Barbigha	27	a	12.3	7.2	4.1	8.6	26.1	145.0	262.9	231.0	198.1	70.5	4.9	5.6	976.3	179	53	340.0	20 Sep 1976
		b	1.0	0.6	0.5	0.5	1.6	6.0	12.2	11.5	8.9	1.9	0.3	0.5	45.5	(1969)	(1991)		
Shekhpura Block	45	a	15.3	8.3	7.9	7.8	30.7	146.5	270.8	236.6	190.1	67.9	5.0	3.4	990.3	169	47	374.0	03 Oct 1961
		b	1.0	1.0	0.7	0.6	1.5	5.9	12.2	11.1	8.4	2.7	0.4	0.3	45.8	(1997)	(1982)		
Shekhpura (District)		a	12.9	7.8	6.7	9.0	31.0	144.9	281.3	236.7	193.1	62.5	5.7	5.0	996.6	159	50		
		b	0.9	0.8	0.6	0.6	1.7	6.0	12.1	11.1	8.5	2.2	0.4	0.5	45.4	(1997)	(1992)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
SHEKHPURA
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1001 - 1100	8
501 - 600	2	1101 - 1200	3
601 - 700	1	1201 - 1300	4
701 - 800	2	1301 - 1400	2
801 - 900	5	1401 - 1500	1
901 - 1000	5	1501 - 1600	3

(Data available for 37 years)

SHEOHAR DISTRICT

The climate of this district is characterized by mild cold season, hot dry summer, hot and moist monsoon season. The cold season starts from about end of November to the end of February. This is followed by the summer season from March to about second week of June. Southwest monsoon sets in from second week of June and lasts till September. October to November is a transition period from monsoon to winter season.

RAINFALL

Records of rainfall in the district are available for 2 raingauge stations for the period ranging from 15 to 20 years. The average annual rainfall in the district is 1137.4 mm. The rainfall in the southwest monsoon season constitutes about 85% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 343.8 mm. In the fifty year period from 1951 to 2000, the highest rainfall was in 1985 when it amounted to 180% of the normal. 1982 was the year with the lowest rainfall and it amounted to 39% of the normal. In this fifty year period, there were 3 years when the rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 901 mm and 1400 mm in 7 years out of 15 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.

The heaviest rainfall recorded in 24 hours at any station in the district was 290.0 mm on 09 July 2004 at Sheohar.

TEMPERATURE

There is no meteorological observatory in the district. The meteorological data and climatological conditions prevailing at Muzaffarpur observatory of the neighbouring district may be taken as representative of the climatic conditions in the district as a whole. The summer season commences from March when temperature begins to rise rapidly and lasts till second week of June. Generally May is the hottest month with the mean maximum temperature at about 35ºC and the mean minimum temperature at about 24ºC. On individual days the maximum temperature may rise upto about 42ºC during May and early part of June. There is fall in day temperature with the onset of the southwest monsoon by second week of June. However, the weather remains uncomfortable throughout the monsoon season as night temperatures continue to remain high, being even higher than those during the summer season. Temperatures begin to drop from mid November and winter season sets in. January is the coldest month with the mean maximum temperature at about 22ºC and mean minimum temperature at about 9ºC. During winter season the district is affected by cold waves in association with western disturbances which move across northern parts of the country and under its influence minimum temperature may drop to 3ºC.

HUMIDITY

Humidity remains high throughout the year except during the summer season when it is comparatively low between 45% to 55% in the afternoon. During monsoon season humidity remains high above 80%. In post monsoon and winter season humidity remains between 65% to 80%.

CLOUDINESS

Sky is heavily clouded to overcast during monsoon season. Thereafter the cloudiness decreases and the sky is generally clear or lightly clouded for rest of the year. During the passage of western disturbances across northern parts of the country during post monsoon and winter season the sky remains overcast or heavily clouded.

WINDS

Winds are generally calm or easterly/westerly in post monsoon, winter and pre-monsoon seasons. Winds generally blow predominantly from the east direction in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during monsoon and post monsoon months which move in westerly/northwesterly direction after crossing the coast affect the district and its neighbourhood and cause widespread heavy rain and strong winds. Thunderstorms generally occur throughout the year however, their frequency is more during summer and southwest monsoon season, occasionally thunderstorms are accompanied with hail during summer season. Dust storms affect the district occasionally during summer season. Fog occurs occasionally during post monsoon and winter season.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SHEOHAR

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Peeparahi	15	a	12.9	7.2	15.6	21.6	71.1	152.3	346.9	246.1	148.5	46.4	0.0	9.3	1077.9	194	28	220.0	25 Sep
		b	0.8	0.5	0.7	1.2	3.5	5.3	12.5	8.8	6.4	2.1	0.0	0.5	42.3	(1985)	(1982)		2006
Sheohar	20	a	12.9	12.4	6.8	15.8	57.1	184.7	340.7	299.9	209.4	44.7	5.6	6.7	1196.7	167	49	290.0	09 Jul
		b	0.6	0.9	0.6	1.3	3.5	6.4	12.3	10.4	8.6	1.6	0.3	0.4	46.9	(1985)	(1982)		2004
Sheohar		a	12.9	9.8	11.2	18.7	64.1	168.5	343.8	273.0	179.0	45.6	2.8	8.0	1137.4	180	39		
(District)		b	0.7	0.7	0.6	1.2	3.5	5.9	12.4	9.6	7.5	1.8	0.2	0.5	44.6	(1985)	(1982)		
		b																	

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
SHEOHAR
(Data 1976 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1301 - 1400	0
501 - 600	0	1401 - 1500	1
601 - 700	0	1501 - 1600	2
701 - 800	0	1601 - 1700	0
801 - 900	2	1701 - 1800	1
901 - 1000	0	1801 - 1900	0
1001 - 1100	3	1901 - 2000	0
1101 - 1200	1	2001 - 2100	1
1201 - 1300	3		

(Data available for 15 years)

SITAMARHI DISTRICT

The district has a hot dry summer, hot and humid monsoon season and mild cold winter. The year may be divided into four seasons. The cold season starts from mid November and lasts till mid March. This is followed by summer season from April to second week of June. The period from second week of June to September constitutes the monsoon season. The succeeding period lasting till November is the post monsoon season.

RAINFALL

Records of rainfall in the district are available for 14 raingauge stations for the period ranging from 11 to 40 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 1301.7 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 383.0 mm. The variation in the annual rainfall from year to year is not very large. In the fifty year period from 1951 to 2000, the highest rainfall was in 1958 when it amounted to 162% of the normal. 1982 was the year with the lowest rainfall and it amounted to 55% of the normal. In this fifty year period, there were 7 years when the rainfall was less than 80% of the normal and none of them were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 1001 mm and 1600 mm in 28 years out of 42 years.

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. This number varies from 39 at Runisedhpur to 57 at Sonbarsa (Hydro).

The heaviest rainfall recorded in 24 hours at any station in the district was 580.0 mm on 11 August 1987 at Majarganj.

TEMPERATURE

There is no meteorological observatory in the district. So the description which follows is based on the records of Motihari and Muzaffarpur observatories in the neighbouring districts, which may be taken as representative of the general climatic conditions prevailing in the district. The cold season starts from mid November when temperatures begin to fall rapidly and lasts till mid March. Generally January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In association with cold waves after the passage of western disturbance across north India, the minimum temperature may go down to about 2°C to 3°C. Temperatures start to rise from middle of March and summer season sets in till second week of June. May is generally the hottest month with the mean maximum temperature at about 35°C and the mean minimum temperature at about 23°C. On individual days the maximum temperature may go upto about 42°C. The day temperature drops with the onset of the monsoon by about the second week of June, but the nights continue to be quite warm with the night temperatures slightly higher than those in summer season which make nights uncomfortable due to high humidity. The temperatures begin to decrease after the withdrawal of southwest monsoon in October.

HUMIDITY

The air remains humid throughout the year except in summer season when the relative humidity remains between 35% to 50% in the afternoon. During monsoon season relative humidity remains high with value varying between 75% and 80%. There

is slight fall in relative humidity during post monsoon and winter season with values remaining between 60% to 80%.

CLOUDINESS

The sky is generally clouded to overcast during the monsoon season. During the rest of the year generally clear or lightly clouded sky prevails. But in winter season, when the district is affected by passing western disturbances cloudy skies prevail for spells of a day or two.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening during summer and southwest monsoon season. Winds are generally calm or blow from west/east direction during the early part of summer. Easterly winds or calm appears from April and remains predominant throughout the southwest monsoon season. Winds are generally calm or easterly or westerly during post monsoon and winter season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in monsoon and post monsoon season move in northwesterly to northerly direction after crossing the coast, affect the district and its neighbourhood causing heavy thunderstorms with heavy rain. The frequency of thunderstorm is quite high during the late summer and southwest monsoon season. During late summer season occasionally dust storms affect the district. Fog occurs during post monsoon and winter season. The frequency is very high during December and January.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SITAMARHI

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bairgania	36	a	9.3	13.0	12.1	30.7	85.6	199.1	410.4	293.4	178.9	71.9	2.7	10.3	1317.4	159	42	285.0	06 Oct
		b	0.6	0.9	0.8	1.7	3.8	7.0	13.1	9.7	7.5	2.1	0.4	0.6	48.2	(1985)	(1982)		1978
Belsand	28	a	20.6	13.6	6.6	22.7	51.4	241.4	323.0	349.7	200.6	46.3	6.1	3.7	1285.7	238	47	388.6	18 Sep
		b	0.8	0.9	0.3	1.0	2.9	7.0	11.6	10.6	7.3	1.7	0.3	0.4	44.8	(1958)	(1987)		1924
Bhajapatti	11	a	4.4	6.0	3.6	25.5	80.4	121.3	363.9	340.9	278.1	49.1	4.1	10.6	1287.9	214	41	275.0	23 Sep
		b	0.4	0.5	0.4	1.7	3.4	4.6	12.2	9.5	9.2	2.3	0.4	0.5	45.1	(1981)	(1979)		2006
Dhong Bridge(Hydro)	22	a	6.1	9.0	12.2	32.6	78.2	179.0	332.2	288.1	181.0	79.4	8.0	7.7	1213.5	169	65	230.0	27 Jul
		b	0.7	0.6	1.2	2.6	4.5	6.9	13.5	9.5	7.5	2.9	0.6	0.8	51.3	(1998)	(1990)		1998
Majarganj	21	a	8.2	13.0	15.8	30.8	79.8	213.3	476.7	441.1	215.5	65.8	2.9	16.6	1579.5	249	39	580.0	11 Aug
		b	0.7	0.5	0.6	1.8	4.2	6.4	13.0	10.6	7.8	2.3	0.4	0.8	49.1	(1987)	(1982)		1987
Manatu (Hydro)	15	a	7.9	14.6	7.0	2.2	25.8	142.5	295.9	234.7	192.5	41.9	11.4	8.2	984.6	144	32	440.0	19 Aug
		b	1.1	1.4	0.9	0.4	2.1	6.1	15.1	13.2	9.0	2.3	0.7	0.8	53.1	(1990)	(1998)		2003
Parihar	17	a	7.5	10.5	11.0	36.1	76.8	174.0	453.3	280.2	256.2	64.4	0.1	11.3	1381.4	157	44	295.0	22 Sep
		b	0.6	0.5	0.7	2.2	3.7	6.9	14.1	9.5	7.8	2.6	0.0	0.5	49.1	(1987)	(1990)		1983

TABLE – 1 (contd…)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Pupri	30	a	15.2	5.2	8.2	19.1	59.8	169.3	386.7	255.7	205.3	58.6	5.4	3.1	1191.6	140	53	315.2	21 Sep 1967
		b	1.1	0.6	0.6	1.2	3.3	6.3	12.9	10.6	8.0	2.6	0.3	0.3	47.8	(1958)	(1986)		
Runisedhpur	21	a	5.8	16.5	13.6	22.7	76.2	133.3	273.0	227.9	158.3	45.0	1.1	3.3	976.7	188	24	216.0	04 Jul 2002
		b	0.5	1.1	0.8	1.4	3.7	5.0	10.8	7.9	6.3	1.3	0.1	0.1	39.0	(1985)	(1980)		
Sheohar	13	a	39.8	7.1	22.4	24.8	63.0	260.5	484.0	406.4	282.0	65.1	2.9	0.5	1658.5	149	60	395.5	28 Jun 1938
		b	1.6	0.7	1.3	1.2	2.2	6.2	12.4	11.1	8.0	2.5	0.1	0.1	47.4	(1958)	(1951)		
Sitamarhi	14	a	52.2	7.7	19.3	11.6	50.7	220.8	357.6	311.0	177.5	82.8	6.3	0.8	1298.3	181	48	320.8	18 Sep 1935
		b	2.1	0.5	1.1	0.5	2.4	7.5	12.6	13.1	8.4	2.9	0.3	0.2	51.6	(1958)	(1966)		
Sonbarsa	40	a	11.6	7.2	8.2	27.0	71.0	209.7	422.8	350.2	198.1	71.8	5.6	8.3	1391.5	168	57	354.0	11 Aug 1987
		b	0.7	0.5	0.9	1.9	4.2	7.2	12.6	10.7	8.4	2.7	0.5	0.6	50.9	(1987)	(1951)		
Sonbarsa (Hydro)	22	a	8.5	9.7	10.9	45.5	76.6	195.7	432.3	396.5	207.6	92.3	4.5	9.2	1489.3	158	59	354.0	11 Jul 1987
		b	0.6	0.9	1.2	2.5	5.2	7.5	13.3	11.6	9.6	3.2	0.7	0.8	57.1	(1987)	(1982)		
Sursand	40	a	9.4	6.4	10.8	19.8	58.9	186.8	350.3	282.2	168.2	66.5	4.0	6.6	1169.9	153	35	288.0	20 Jul 1981
		b	0.7	0.6	0.8	1.2	3.1	6.8	11.9	9.8	7.4	2.3	0.3	0.4	45.3	(1981)	(1951)		
Sitamarhi (District)		a	14.8	10.0	11.5	25.1	66.7	189.0	383.0	318.4	207.1	64.3	4.6	7.2	1301.7	162	55		
		b	0.9	0.7	0.8	1.5	3.5	6.5	12.8	10.5	8.0	2.4	0.4	0.5	48.5	(1958)	(1982)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE – 2
Frequency of Annual Rainfall in the District
SITAMARHI
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
701 - 800	1	1501 - 1600	4
801 - 900	5	1601 - 1700	3
901 - 1000	1	1701 - 1800	1
1001 - 1100	6	1801 - 1900	2
1101 - 1200	6	1901 - 2000	0
1201 - 1300	7	2001 - 2100	0
1301 - 1400	2	2101 - 2200	1
1401 - 1500	3		

(Data available for 42 years)

SIWAN DISTRICT

The climate of this district is characterized by a mild winter, hot dry summer, humid and hot monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till early March. This is followed by summer season from March to about mid June. The southwest monsoon season is from June to September. The succeeding period upto end of November is the post monsoon or transition period.

RAINFALL

Records of rainfall in the district are available for 16 raingauge stations for the period ranging from 14 to 41 years. The details of rainfall for all the stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1074.8 mm. The rainfall in the southwest monsoon season constitutes about 88% of the annual normal rainfall. July is the month with the highest rainfall with an average value of 309.4 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period from 1951 to 2000, the highest annual rainfall was in 1953 when it amounted to 168% of the normal. 1966 was the year with the lowest annual rainfall and it amounted to 44% of the normal. In this fifty year period, there were 7 years when the rainfall was less than 80% of the normal. Considering the district as a whole, the annual rainfall of less than 80% of the normal occurred once for two consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1300 mm in 33 years out of 44 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 39 at Barharia to 51 at Darauli.

The heaviest rainfall recorded in 24 hours at any station in the district was 488.4 mm on 19 September 1935 at Siwan.

TEMPERATURE

There is no meteorological observatory in the district. The meteorological data and climatological conditions prevailing at Chapra observatory in the neighbouring district Saran may be taken as representative of weather conditions of whole district. The summer season starts from March when temperatures start to rise appreciably till second week of June. May is the hottest month of the year with mean maximum temperature at 38°C and the mean minimum temperature at 25°C. During May and early June maximum temperature may rise to about 45°C on individual days. There is a fall in day temperature after the onset of the southwest monsoon around second week of June, but there is not much relief as the weather is uncomfortable due to humid and warm nights. The temperatures fall appreciably after withdrawal of southwest monsoon in October. Winter season sets in from December and lasts till early March. Generally January is the coldest month of the season with the mean maximum temperature at 23.0°C and mean minimum temperature at 11°C. In association with passage of western disturbances across the state during winter season, the minimum temperature may fall to 4°C on individual days.

HUMIDITY

Humidity is high between 75% and 85% during southwest monsoon season. After withdrawal of monsoon there is fall in humidity and it remains between 60% and 75% during post monsoon and winter season. Summer is the driest part of the year when the humidity remains between 30% and 40% especially in the afternoons.

CLOUDINESS

During monsoon season the skies remain heavily clouded or overcast. Thereafter cloudiness decreases and sky remains clear or lightly clouded in the rest of the year. Sky may remain heavy clouded or overcast for few days during winter when western disturbances move across the state.

WINDS

Winds are generally light to moderate throughout the year. Winds are generally calm or blow from southwest direction during the post monsoon, winter and early summer season. Northeasterly winds appear in the district during late summer season and is predominant in the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Depressions originating in the Bay of Bengal during pre monsoon and monsoon season which move in northwesterly/northerly direction after crossing the coast affect the district and its neighbourhood causing heavy rain and thunderstorms. Dust storms affect the district occasionally during summer and early monsoon season. Fog occurs occasionally during winter season due to the passage of western disturbances across the state.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
SIWAN

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Andar	29	a	9.2	11.9	5.7	8.9	31.1	144.4	340.4	281.1	215.6	51.3	9.1	3.1	1111.8	148	58	280.3	14 Sep 1986
		b	0.8	0.8	0.5	0.7	2.0	4.9	12.1	11.0	8.4	2.1	0.4	0.4	44.1	(1964)	(1966)		
Bagwanpur	14	a	14.4	10.0	5.4	9.3	37.5	144.9	295.1	300.8	176.8	42.8	4.5	5.0	1046.5	149#	66	210.0	13 Aug 1999
		b	1.2	0.6	0.6	0.9	2.6	6.2	12.3	12.1	8.3	1.8	0.3	0.6	47.5	(1988)	(1991)		
Barharia	22	a	11.3	8.1	2.7	8.1	16.6	107.1	301.7	238.4	206.3	53.8	8.2	9.0	971.3	168	70	320.4	09 Jul 1980
		b	0.7	0.8	0.3	0.6	1.2	3.9	11.3	9.0	8.0	1.9	0.5	0.6	38.8	(1985)	(1995)		
Basantpur	41	a	16.1	8.3	5.4	9.6	36.4	141.9	339.5	319.9	230.5	44.0	5.4	4.4	1161.4	148	58	259.4	14 Aug 1999
		b	1.0	0.7	0.6	0.6	2.0	5.5	13.4	11.9	7.9	1.9	0.3	0.4	46.2	(1994)	(1992)		
Darauli	38	a	16.2	10.6	8.2	8.5	22.2	145.4	301.5	284.4	213.6	33.7	7.2	3.5	1055.0	230	19	267.7	12 Jul 1934
		b	1.3	0.9	1.0	0.7	1.4	5.6	12.3	11.9	8.5	1.7	0.4	0.3	46.0	(1985)	(1966)		
Darauli	22	a	13.4	12.3	9.5	11.5	37.8	160.7	337.4	297.8	237.7	66.2	12.9	8.6	1205.8	201	63	278.0	12 Aug 1989
		b	1.2	1.0	1.0	1.0	2.3	6.0	13.5	12.2	8.4	2.6	0.5	0.8	50.5	(1985)	(1992)		
Dharaunda	20	a	13.9	14.7	9.3	8.6	26.1	97.7	251.1	235.1	242.8	38.7	7.1	8.5	953.6	140	56	258.0	15 Sep 1976
		b	0.9	1.1	0.7	0.7	1.9	4.1	11.7	9.9	8.2	2.0	0.6	0.6	42.4	(1983)	(1992)		
Gorenkothi	28	a	8.4	9.4	5.6	11.8	36.1	170.4	314.2	298.5	250.5	41.0	4.5	7.7	1158.1	140	52	214.0	11 Sep 1974
		b	0.4	0.8	0.7	0.7	2.0	6.1	12.8	11.3	9.2	2.0	0.2	0.5	46.7	(1974)	(1999)		
Guthani	28	a	5.0	7.6	1.4	3.0	17.7	101.6	304.9	276.0	199.0	26.9	4.4	7.0	954.5	162	26	290.0	05 Jul 1984
		b	0.4	0.5	0.2	0.5	1.3	3.7	13.0	11.1	8.4	1.7	0.3	0.5	41.6	(1984)	(1966)		

TABLE – 1 (contd…)

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**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Hussainganj	25	a	11.1	11.1	7.0	6.3	18.5	154.8	340.3	348.2	271.2	50.5	1.5	8.2	1228.7	179	76	448.0	14 Sep 1986
		b	0.7	0.7	0.4	0.4	1.3	5.4	11.2	10.5	8.6	1.8	0.2	0.5	41.7	(1988)	(1992)		
Maharajganj	24	a	9.5	8.3	9.8	12.1	43.0	135.8	319.1	253.2	274.9	50.0	5.3	6.5	1127.5	143	45	375.0	11 Sep 1974
		b	0.8	0.7	0.9	0.7	2.0	5.2	13.6	10.6	10.0	2.2	0.4	0.6	47.7	(1980)	(1992)		
Mairwa	34	a	11.3	12.0	5.4	6.0	20.0	112.3	251.4	251.3	199.0	31.7	6.3	3.8	910.5	174	44	163.0	08 Aug 1995
		b	0.8	0.8	0.6	0.7	1.6	4.7	11.4	11.3	8.2	1.4	0.3	0.5	42.3	(1964)	(1992)		
Panchrukhi	26	a	12.7	14.1	10.0	10.5	31.7	129.6	376.1	291.1	266.4	52.4	8.8	6.2	1209.6	164	27	469.0	14 Sep 1986
		b	0.5	0.5	0.5	0.7	2.2	3.4	12.2	10.2	7.5	2.5	0.4	0.3	40.9	(1964)	(1966)		
Siswan	17	a	9.5	9.7	7.4	10.5	28.0	127.8	270.3	291.8	260.7	30.4	6.5	4.3	1056.9	129	58	185.0	09 Jul 1998
		b	0.7	0.9	0.8	0.8	2.1	4.8	12.1	11.4	9.9	1.7	0.4	0.3	45.9	(1985)	(1976)		
Siwan	36	a	15.1	8.0	9.2	12.2	34.5	161.3	301.7	278.9	229.7	60.6	6.8	4.1	1122.1	167	56	488.4	19 Sep 1935
		b	1.1	0.8	1.0	0.9	2.3	6.1	12.9	11.3	9.1	2.4	0.3	0.4	48.6	(1981)	(1951)		
Siwan (District)		a	11.5	10.1	6.8	9.1	29.3	133.3	309.4	279.8	227.9	45.2	6.5	5.9	1074.8	168	44		
		b	0.8	0.8	0.7	0.7	1.9	5.1	12.5	11.1	8.6	2.0	0.4	0.5	45.1	(1953)	(1966)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
SIWAN
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1201 - 1300	3
501 - 600	0	1301 - 1400	4
601 - 700	0	1401 - 1500	2
701 - 800	3	1501 - 1600	0
801 - 900	4	1601 - 1700	0
901 - 1000	8	1701 - 1800	0
1001 - 1100	11	1801 - 1900	1
1101 - 1200	7		

(Data available for 44 years)

SUPAUL DISTRICT

The climate of this district is characterized by mild winter, moderate summer and humid monsoon season. The year may be divided into four seasons. The cold season starts from mid November and lasts till about the middle of March. This is followed by the summer season which continues till mid June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon month October constitutes transition month from the monsoon to the winter conditions.

RAINFALL

Records of rainfall in the district are available for 9 raingauge stations for the period ranging from 10 to 39 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 1373.0 mm. The rainfall in the southwest monsoon season constitutes about 84% of the annual normal rainfall. July is the month with the highest rainfall with an average rainfall of 381.0 mm. The variation in the annual rainfall from year to year is large. In the fifty year period 1951 to 2000, the highest annual rainfall was 168% of the normal in 1987. 1957 was the year with the lowest annual rainfall of 32% of the normal. In the same fifty year period there were 7 years when the rainfall was less than 80 % of the normal, none of them being consecutive. It is seen from Table 2 that the annual rainfall was between 1101 mm and 1700 mm in 28 years out of 41.

On an average there are 57 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 47 at Raghopur to 65 at Bihpur(Basartpur) and Nirmali Hydro.

The heaviest rainfall recorded in 24 hours at any station in the district was 405.0 mm at Chattapur on 15 September 1986.

TEMPERATURE

There is one meteorological observatory in the district at Supaul. The temperature and other meteorological conditions as indicated by the data at this station may be taken as representative of the whole district in general. The cold season commences from mid November when both day and night temperatures decrease rapidly with the advance of the season. January is the coldest month with the mean maximum temperature of 23.7°C and the mean minimum temperature of 9.8°C. In winter when cold waves affect the district in the wake of western disturbances passing across north India, minimum temperature may sometimes go down to about 4°C. The days become warmer in March while nights continue to be cool, however day and night temperatures begin to rise rapidly till the middle of June. April and May are the hottest months with the mean maximum temperature at about 35.5°C and the mean minimum temperature at about 21.8°C. In the latter part of the summer season i.e. May and June the maximum temperature may sometimes go above 41°C on individual days. There is a drop in day temperatures with the advance of the southwest monsoon into the district towards the third week of June, however, there is little relief as the weather is unpleasant due to the increased moisture in air and continuing high night temperatures. In October while day temperature continues as in the monsoon months, the nights are cooler.

The highest maximum temperature ever recorded at Supaul was 43.0°C on 06 Jun 1979 and the lowest minimum temperature ever recorded at Supaul was 2.6°C on 01 January 1977. .

HUMIDITY

The humidity is generally high throughout the year. The humidity is high during the monsoon period when it is between 80% and 90%. The driest part of the

year is summer months when the relative humidity especially in the afternoon is at about 60%. In the rest of the year the relative humidity generally varies between 65% and 80%.

CLOUDINESS

In the monsoon months skies are heavily clouded to overcast. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally calm or light and blow from easterly or westerly direction in post monsoon, winter and early summer seasons. April onwards easterly winds begin and remain predominant upto end of southwest monsoon period.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in northwesterly direction towards the district and its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occasionally occur in summer and monsoon seasons. Dust storms occur occasionally in the summer months. Fog occurs occasionally during winter months.

Tables 3, 4, 5 and 6 give the temperature and humidity, cloudiness, mean wind speed and predominant wind direction and special weather phenomena respectively for Supaul observatory.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
SUPAUL

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bihpur(Basantpur)	29	a	8.9	9.1	14.3	27.4	106.3	221.9	460.1	353.5	265.0	91.9	4.8	4.0	1567.2	165	53	257.0	16 Sep 1970
		b	0.8	0.9	1.1	1.9	5.2	10.3	15.4	14.0	10.9	3.3	0.5	0.4	64.7	(1987)	(1969)		
Chattapur	28	a	8.1	8.0	8.9	25.8	90.5	229.7	428.9	365.3	241.4	55.9	4.9	3.0	1470.4	191#	57	405.0	15 Sep 1986
		b	0.7	0.6	0.6	1.8	4.0	8.4	14.8	11.9	8.9	1.9	0.4	0.3	54.3	(1984)	(1992)		
Kishanpur	10	a	10.0	9.1	7.0	54.3	118.1	263.1	292.0	375.0	266.2	65.2	5.6	4.6	1470.2	141	61	155.8	25 Aug 1992
		b	1.3	1.2	0.7	2.8	5.8	9.2	13.3	14.7	11.7	2.1	0.7	0.3	63.8	(1998)	(1994)		
Nirmali	23	a	10.2	20.3	16.5	42.1	107.6	208.3	481.8	335.5	251.2	80.3	7.9	8.6	1570.3	168	49	337.0	26 Aug 1981
(Hydro)		b	1.1	1.1	1.2	2.6	5.7	9.3	16.5	12.7	10.5	3.1	0.6	0.8	65.2	(1987)	(1982)		
Pipra	11	a	6.6	3.0	8.2	15.0	88.2	317.7	296.5	256.6	261.7	55.0	5.5	1.7	1315.7	243	46	355.6	28 Jun 1999
		b	0.6	0.5	0.7	0.9	3.5	6.6	13.2	11.3	10.3	2.2	0.3	0.3	50.4	(1999)	(1992)		
Raghopur	13	a	6.2	3.5	11.2	15.0	51.5	175.1	416.6	331.9	234.6	71.4	2.3	0.2	1319.5	142	73	291.0	08 Jun 2003
		b	0.6	0.4	0.3	1.0	2.4	6.6	13.3	11.8	8.6	1.9	0.2	0.0	47.1	(1998)	(1999)		
Supaul	39	a	10.6	6.9	15.2	26.5	75.9	196.4	364.5	294.7	213.5	64.1	5.5	5.7	1279.5	143	34	281.9	30 Sep 2005
		b	0.9	0.7	0.9	1.6	4.3	8.1	14.5	12.2	9.6	2.6	0.4	0.4	56.2	(1956)	(1957)		
Supaul obsy	24	a	6.8	10.2	16.8	25.6	91.8	232.2	351.7	189.3	160.0	82.9	5.7	4.9	1177.9	152	34	395.0	08 Jun 1996
		b	0.8	1.0	1.1	1.7	4.9	8.0	13.8	9.9	8.5	2.8	0.5	0.4	53.4	(1981)	(1967)		
Tribeniganj	30	a	6.8	7.8	9.8	19.2	65.6	169.4	336.5	274.7	220.6	66.8	4.4	3.0	1184.6	191	38	156.5	27 Sep 1975
		b	0.6	0.6	0.8	1.6	3.5	7.9	13.6	12.1	9.5	2.3	0.3	0.3	53.1	(1987)	(1992)		
Supaul		a	8.2	8.7	12.0	27.9	88.4	223.8	381.0	308.5	234.9	70.4	5.2	4.0	1373.0	168	32		
(District)		b	0.8	0.8	0.8	1.8	4.4	8.3	14.3	12.3	9.8	2.5	0.4	0.4	56.6	(1987)	(1957)		

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 2006.
** Years of occurrence given in bracket.

TABLE - 2
Frequency of Annual Rainfall in the District
SUPAUL
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
401 - 500	1	1401 - 1500	8
501 - 600	0	1501 - 1600	1
601 - 700	0	1601 - 1700	4
701 - 800	0	1701 - 1800	3
801 - 900	2	1801 - 1900	1
901 - 1000	3	1901 - 2000	1
1001 - 1100	1	2001 - 2100	0
1101 - 1200	6	2101 - 2200	0
1201 - 1300	3	2201 - 2300	0
1301 - 1400	6	2301 - 2400	1

(Data available for 41 years)

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

MONTH	Mean Maximum Temperature	Mean 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	23.7	9.8	29.0	31 Jan 1967	2.6	01 Jan 1977	87	77
February	26.5	11.6	32.5	23 Feb 1977	3.8	10 Feb 1974	79	68
March	31.4	15.3	38.5	31 Mar 1973	8.8	10 Mar 1979	70	59
April	35.8	20.6	42.0	26 Apr 1968	12.1	06 Apr 1970	70	60
May	35.1	23.1	42.0	30 May 1979	17.4	11 May 1984	77	68
				27 May 1982				
June	34.5	24.7	43.0	06 Jun 1979	15.6	21 Jun 1974	85	76
July	32.5	24.2	38.0	15 Jul 1983 04 Jul 1985	15.4	22 Jul 1982	89	83
August	32.7	25.0	37.0	15 Aug 1978 18 Aug 1985	15.8	23 Aug 1983	86	81
September	32.2	24.7	36.0	09 Sep 1982	17.8	02 Sep 1982	86	82
October	31.6	21.8	34.9	01 Oct 1982	14.6	27 Oct 1971	84	79
November	29.0	15.6	32.0	04 Nov 1970 01 Nov 1981	9.0	18 Nov 1982	79	73
December	25.1	10.8	30.0	04 Dec 1972	5.0	15 Dec 1975	85	76
Annual	30.8	18.9	43.0	06 Jun 1979	2.6	01 Jan 1977	81	74

TABLE – 4
Mean Cloud Amount **(Okta of the Sky) and Mean Number of days of Clear and Overcast Skies
(SUPAUL)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0830 HOURS IST													
a	24	22	25	24	18	8	4	3	7	20	25	27	207
b	2	1	1	1	4	8	13	9	7	2	1	1	50
c	1.0	1.1	0.7	1.3	2.4	4.3	5.6	5.5	4.5	2.0	0.7	0.6	2.5
1730 HOURS IST													
a	25	22	26	23	25	14	5	6	12	21	27	26	232
b	1	1	0	1	1	3	6	3	4	2	1	1	24
c	0.8	0.9	0.6	0.8	0.8	3.0	4.3	4.2	3.2	1.5	0.3	0.5	1.7

a: Days with clear sky.
b: Days with sky overcast.
c: Mean cloud amount in Okta.
** 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.

TABLE - 5
Mean Wind Speed and Predominant Wind Direction
(SUPAUL)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Wind speed in km/hr	2.0	4.5	9.3	8.1	8.3	7.4	8.6	9.8	6.4	4.8	2.1	1.5	6.1
Direction in morning	C/E	C/W	E/W	E	E	E	E	E	E	E/C	C/E	C/E/W	
Direction in evening	C	C/W	C/W	C/E/W	E	E	E/C	E	C/E	C	C	C	

TABLE - 6
Special Weather Phenomena
(SUPAUL)

Mean No. of Days With	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Thunder	0	0	0.1	0.3	0.8	0.4	0.1	0.1	0.5	0.1	0	0	2.4
Hail	0	0	0	0	0	0	0	0	0	0	0	0	0
Dust storm	0	0	0	0.1	0.1	0.1	0	0	0	0	0	0	0.3
Fog	0.6	0.2	0	0	0	0	0	0	0.1	0.1	0	0.2	1.2

VAISHALI DISTRICT

The climate of this district is characterized by mild winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till the end of February. The hot season follows and continues till second week of June when the southwest monsoon commences. June to September is the southwest monsoon season. The post monsoon months October and November constitute a transition period from the monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 11 raingauge stations, for period ranging from 15 to 41 years. Tables 1 and 2 give the details of rainfall at these stations and for the district as a whole. The average annual rainfall in the district is 1046.2 mm. The rainfall in the southwest monsoon season constitutes about 86% of the annual normal rainfall. July is the month with the heaviest rainfall with an average value of 321.7 mm. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 149% of the annual normal occurred in 1985. The lowest annual rainfall which was 50% of the normal occurred in 1966. In this fifty year period, there were 10 years when the annual rainfall in the district was less than 80% of the normal. Considering the district as a whole, rainfall less than 80% of the normal occurred thrice in two consecutive years. It is seen from Table 2 that the annual rainfall in the district was between 801 mm and 1300 mm in 32 years out of 47.

On an average there are 46 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 41 at Raghopur to 49 at Goraul (Doli).

The heaviest rainfall in 24 hours recorded at any station in the district was 540.0 mm at Goraul (Doli) on 04 September 1984.

TEMPERATURE

There is no meteorological observatory in the district. So the climatological description which follows is based on data of Patna observatory in the neighbouring district. The cold season commences from late November when both day and night temperatures decrease fairly rapidly with the advance of the season. January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 9°C. In winter cold waves which affect the district in the wake of western disturbances passing across northern part of India, minimum temperatures may sometimes go down to 2°C. The days become warmer in March while nights continue to be cool. Day and night temperatures begin to rise rapidly from March to early June. May is the hottest month of the year with the mean maximum temperature at about 37°C and the mean minimum temperature at about 24°C. In the latter part of summer season i.e. May and June the maximum temperatures may sometimes go above 44°C on individual days. There is drop in day temperatures with the advance of the southwest monsoon into the district towards the second week of June, however, there is little relief as the weather is uncomfortable on account of the increase moisture in the air and continuous high night temperatures. In October while day temperature remains as high as in the monsoon months, are however cooler.

HUMIDITY

Humidity is high during the monsoon period when it is between 75% and 85%. In the rest of the year the relative humidity generally varies between 50%

and 75%. The driest part of the year is summer months when the relative humidity especially in the afternoon is between 30% and 40%.

CLOUDINESS

Skies are heavily clouded to overcast during the monsoon months. In post monsoon, winter and summer seasons the skies are generally clear or lightly clouded.

WINDS

Winds are generally light to moderate with some strengthening during the latter part of summer and southwest monsoon season. Winds are generally calm or westerly or southwesterly winds prevail in the post monsoon, winter and early summer season. In April easterly winds appear and these remain predominant in southwest monsoon months.

SPECIAL WEATHER PHENOMENA

In association with storms and depressions originating in the Bay of Bengal during the monsoon and post monsoon months which move in north westerly direction towards the district or its neighborhood cause widespread heavy rain and thunderstorms. Thunderstorms occur throughout the year and their frequency increases during late summer months and southwest monsoon season and are sometimes accompanied with hail. Dust storms occur occasionally in the summer and early monsoon season when they are accompanied with squalls. Fog affects the district on many occasions during winter season and occasionally in the rest of the year.

TABLE – 1
NORMALS AND EXTREMES OF RAINFALL
VAISHALI

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
Bidupur	31	a	7.9	5.9	5.6	10.6	50.2	112.7	315.1	228.0	169.1	53.2	2.7	4.0	965.0	187	50	218.0	03 Jul 1981
		b	0.9	0.7	0.5	0.9	2.4	5.3	13.4	10.4	8.4	2.1	0.2	0.4	45.6	(1978)	(1994)		
Goraul(doli)	34	a	11.2	10.7	4.6	19.3	47.7	144.9	353.1	290.1	287.9	66.4	5.5	5.3	1246.7	292	39	540.0	04 Sep 1984
		b	1.0	0.9	0.6	0.9	3.0	6.4	13.5	11.7	8.3	2.1	0.3	0.5	49.2	(1984)	(1966)		
Hajipur	39	a	11.1	6.7	7.4	13.8	35.2	120.3	342.5	245.5	188.1	71.6	4.5	6.8	1053.5	172	56	304.8	08 Sep 1918
		b	0.9	0.8	0.7	0.9	1.9	5.7	13.9	11.9	8.5	2.6	0.3	0.5	48.6	(1981)	(1966)		
Jandhaha	27	a	4.7	7.3	5.7	11.8	41.6	132.6	303.5	253.1	174.2	39.6	6.2	6.8	987.1	162	69	230.2	04 Oct 1978
		b	0.6	0.7	0.5	0.8	2.4	5.9	12.9	11.1	8.9	1.8	0.4	0.7	46.7	(1981)	(1995)		
Lalganj	41	a	14.1	9.0	7.6	13.9	26.4	135.1	370.2	287.4	219.5	68.9	5.5	3.8	1161.4	184	41	281.0	30 Jul 1990
		b	0.9	0.9	0.8	0.8	1.8	5.0	13.1	12.1	8.2	2.4	0.4	0.4	46.8	(1990)	(1966)		
Mahnar	26	a	7.7	10.2	10.3	9.9	56.3	145.9	326.8	261.6	166.1	59.1	6.1	5.3	1065.3	169	52	220.0	28 Jul 1990
		b	0.8	0.8	0.8	0.8	3.0	6.1	14.0	11.1	8.2	2.3	0.5	0.4	48.8	(1990)	(1995)		
Mahua	37	a	13.3	8.7	8.1	10.3	38.2	145.0	265.0	268.7	173.2	60.2	6.1	3.9	1000.7	149	59	251.5	09 Jul 1943
		b	0.9	0.9	0.6	0.6	2.1	5.5	12.3	11.2	8.3	2.4	0.4	0.4	45.6	(1985)	(1980)		
Patepur	28	a	6.7	8.4	5.4	16.4	46.6	142.1	352.0	278.9	223.5	73.0	7.2	6.3	1166.5	146	35	242.4	08 Sep 1987
		b	0.7	0.8	0.7	1.0	2.8	5.3	13.2	11.2	8.0	2.8	0.4	0.6	47.5	(1987)	(1966)		
Raghopur	34	a	6.9	5.3	5.5	7.1	46.0	146.8	282.3	192.8	184.2	45.2	5.1	3.6	930.8	150	63	210.8	28 Aug 1914
		b	0.7	0.6	0.4	0.5	1.9	5.7	11.3	9.1	8.1	2.1	0.3	0.5	41.2	(1985)	(1965)		
Sahdhei(bajurga)	15	A	3.7	9.7	3.5	13.8	40.0	131.6	350.8	249.8	145.1	49.3	6.0	9.0	1012.3	132	55	165.0	03 Jul 1989
		b	0.5	1.1	0.4	0.9	2.2	5.0	11.5	9.9	7.2	1.1	0.4	1.0	42.6	(1977)	(1991)		
Vaishali	29	a	7.5	9.5	4.9	10.4	30.9	110.5	277.6	230.5	170.9	56.4	5.4	6.1	920.6	172	50	229.8	03 Aug 1991
		b	0.8	0.9	0.6	0.8	2.3	6.1	13.9	11.6	8.3	2.5	0.4	0.6	48.8	(1985)	(1992)		
Vaishali (District)		a	8.6	8.3	6.2	12.5	41.7	133.4	321.7	253.3	191.1	58.4	5.5	5.5	1046.2	149	50		
		b	.8	.8	.6	.8	2.3	5.6	13.0	11.0	8.2	2.3	.4	.5	46.3	(1985)	(1966)		

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 2006.
** Years of occurrence given in brackets.

TABLE - 2
Frequency of Annual Rainfall in the District
(VAISHALI)
(Data 1945- 2000)

Range in mm	No. of years	Range in mm	No. of years
501 - 600	1	1101 - 1200	10
601 - 700	3	1201 - 1300	3
701 - 800	3	1301 - 1400	5
801 - 900	9	1401 - 1500	1
901 - 1000	6	1501 - 1600	2
1001 - 1100	4		

(Data available for 47 years only)

WEST CHAMPARAN DISTRICT

The district has a hot dry summer, hot and humid monsoon season and mild cold winter. The year may be divided into four seasons. The cold season starts from mid November and lasts till mid March. This is followed by summer season from April to first week of June. The period from second week of June to September constitutes the monsoon season. The succeeding period lasting till November is the post monsoon season.

RAINFALL

Records of rainfall in the district are available for 18 raingauge stations for the period ranging from 15 to 42 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 1434.1 mm. About 86% of the annual normal rainfall in the district is received during the monsoon months June to September, July being the rainiest month with an average rainfall of 432.5 mm. The variation in the annual rainfall from year to year is generally not large. In the fifty year period from 1951 to 2000, the highest annual rainfall amounting to 154% of the normal occurred in 1986. The lowest annual rainfall amounting to 71% of the normal occurred in1976. In this fifty year period there were 6 years when the annual rainfall in the district was less than 80% of the normal out of which two years were consecutive. It is seen from Table 2 that the annual rainfall in the district was between 1101 mm and 1800 mm in 34 years out of 46.

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 43 at Louriya to 74 at Balmiki (Hydro).

The heaviest rainfall recorded in 24 hours at any station in the district was 497.5 mm at Champatia and Champatia (Hydro) on 15 September 1986.

TEMPERATURE

There is no meteorological observatory in the district. So the description which follows is based on the records of Motihari and Raxaul observatories in the neighbouring district, which may be taken as representative of the general climatic conditions prevailing in the district. The cold season starts from mid November when temperatures begin to fall rapidly and lasts till mid March. Generally January is the coldest month with the mean maximum temperature at about 23°C and the mean minimum temperature at about 8°C. In association with cold waves after the passage of western disturbance across north India, the minimum temperature may go down to about 1°C to 2°C. Temperatures start to rise from middle of March and summer season sets in till second week of June. May is generally the hottest month with the mean maximum temperature at about 36°C and the mean minimum temperature at about 23°C. On individual days the maximum temperature may go upto about 42°C. The day temperature drops with the onset of the monsoon by about the second week of June, but the nights continue to be quite warm with the night temperatures slightly higher than those in summer season which make nights uncomfortable due to high humidity. The temperatures begin to decrease after the withdrawal of southwest monsoon in October.

HUMIDITY

The air remains humid throughout the year except in summer season when the relative humidity remains between 35% to 50% in the afternoon. During monsoon season relative humidity remains high with value varying between 75% and 80%. There is slight fall in relative humidity during post monsoon and winter season with values remaining between 60% to 80%.

CLOUDINESS

The sky is generally clouded to overcast during the monsoon season. During the rest of the year generally clear or lightly clouded sky prevails. But in winter season, when the district is affected by passing western disturbances cloudy skies prevail for spells of a day or two.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening during summer and southwest monsoon season. Winds are generally calm or blow from west/east direction during the early part of summer. Easterly wind appears from April and remains predominant throughout the southwest monsoon season. Winds are generally calm or easterly or westerly/southwesterly during post monsoon and winter season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in monsoon and post monsoon season move in northwesterly to northerly direction after crossing the coast, affect the district and its neighbourhood causing heavy thunderstorms with heavy rain. The frequency of thunderstorm is quite high during the late summer and southwest monsoon season. During late summer season occasionally dust storms affect the district. Fog occurs during post monsoon and winter season. The frequency is very high during December and January.

TABLE - 1
NORMALS AND EXTREMES OF RAINFALL
WEST CHAMPARAN

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Bagaha	42	a	18.9	9.8	11.4	18.9	46.4	208.8	414.8	315.7	244.8	60.4	4.4	9.3	1363.6	154	38	439.4	14 Jul 1917
		b	1.3	0.8	1.0	1.0	2.9	7.2	13.8	11.9	8.8	2.1	0.3	0.5	51.6	(1956)	(1992)		
Balmiki(tribeni)	22	a	13.6	16.8	18.9	27.0	104.4	292.6	596.7	481.6	290.5	79.6	9.0	36.7	1967.4	145	70	400.0	28 Dec 1988
		b	1.1	1.4	1.5	2.2	5.8	10.2	18.2	17.2	11.8	3.0	0.5	1.1	74.0	(1981)	(1992)		
Bettiah	35	a	13.9	7.2	11.3	18.4	55.5	186.8	412.5	349.5	256.2	56.6	4.7	5.1	1377.7	156	53	348.6	11 Sep 1974
		b	1.5	0.7	1.0	1.1	2.8	7.1	13.7	12.6	8.3	2.3	0.3	0.3	51.7	(1985)	(1982)		
Bhiriya	15	a	6.6	12.7	5.8	21.1	30.0	126.4	312.9	347.0	222.5	48.3	5.0	6.9	1145.2	173	66	252.2	09 Sep 1988
		b	0.7	1.4	1.0	1.8	2.3	7.1	11.5	11.9	7.3	2.0	0.3	0.5	47.8	(1988)	(1992)		
Champatia	20	a	14.5	11.3	10.7	19.6	54.1	194.4	421.9	343.9	225.0	33.6	6.1	11.2	1346.3	177	61	497.5	15 Sep 1986
		b	1.2	1.1	1.0	1.9	4.1	7.8	13.5	12.8	8.3	2.0	0.5	0.8	55.0	(1986)	(1992)		
Champatia (Hydro)	21	a	13.3	19.9	12.4	23.5	75.0	204.1	434.1	349.1	196.2	53.9	7.9	11.5	1400.9	161	61	497.5	15 Sep 1986
		b	1.1	1.3	1.1	2.2	4.6	8.0	14.3	12.6	8.4	2.6	0.5	0.8	57.5	(1986)	(1992)		
Dhanaha	21	a	13.2	8.8	11.6	8.0	42.6	237.2	372.2	336.6	193.9	57.0	0.0	4.0	1285.1	157	54	263.7	14 Sep 1956
		b	1.3	0.7	0.7	0.5	2.6	7.3	12.3	11.9	7.0	2.0	0.0	0.4	46.7	(1956)	(1967)		
Gaunaha	37	a	16.4	10.8	16.7	35.6	108.8	233.8	458.7	359.5	282.9	58.3	8.5	12.9	1602.9	151	59	378.6	15 Sep 1986
		b	1.0	0.9	1.1	1.9	4.8	8.6	13.8	12.5	9.0	2.7	0.5	0.7	57.5	(1998)	(1996)		
Gaunaha	21	a	15.0	9.7	18.0	48.9	143.6	234.0	453.1	370.9	263.5	66.2	13.8	25.3	1662.0	144	62	378.6	15 Sep 1986
		b	1.0	1.2	1.2	2.5	5.6	8.6	14.4	12.3	9.0	3.2	0.7	1.1	60.8	(1998)	(1991)		
Jogapatti	23	a	12.5	9.4	8.3	16.1	66.0	200.5	403.1	299.9	222.1	47.4	2.4	8.0	1295.7	184	68	340.0	15 Sep 1986
		b	0.9	0.8	0.9	1.2	3.8	8.1	13.4	11.5	8.7	2.1	0.1	.6	52.1	(1986)	(1997)		

TABLE – 1 (contd….)

STATION	No. of Years of Data		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	ANNUAL RAINFALL AS % OF NORMAL & YEAR**		HEAVIEST RAINFALL IN 24 HOURS*	
																HIGHEST	LOWEST	AMOUNT (mm)	DATE
Louriya	28	a	14.3	6.3	7.4	8.8	40.3	185.4	369.7	249.4	204.7	39.4	2.2	2.1	1130.0	155	59	254.0	14 Jul 1934
		b	0.9	0.5	0.7	0.5	2.3	7.3	12.1	10.3	6.6	1.7	0.1	0.2	43.2	(1974)	(1992)		
Mainatand	34	a	11.6	11.0	10.5	22.6	86.2	183.5	459.0	347.3	241.0	59.8	3.7	13.1	1449.3	180	43	385.2	01 Aug 1987
		b	0.9	0.9	0.7	1.6	4.5	7.3	14.0	11.6	8.0	2.3	0.3	0.5	52.6	(1987)	(1982)		
Majulia	24	a	7.5	12.8	4.6	22.5	33.2	198.7	371.8	330.7	151.5	54.0	3.5	5.8	1196.6	145	50	254.1	07 Jun 1980
		b	0.8	1.1	0.5	1.3	2.3	6.7	12.5	11.5	6.7	1.7	0.3	0.5	45.9	(1987)	(1982)		
Narkatiyaganj	40	a	19.0	12.4	12.0	19.0	60.3	231.3	447.6	426.7	251.7	58.0	4.5	8.4	1550.9	179	62	332.2	23 Jun 1922
		b	1.3	1.0	1.0	1.4	3.5	8.6	13.4	12.2	8.2	2.4	0.3	0.4	53.7	(1986)	(1996)		
Ramnagar	38	a	17.1	11.8	13.6	12.3	66.1	250.4	467.8	383.1	257.1	71.8	6.0	7.3	1564.4	154	60	377.4	08 Oct 1915
		b	1.6	0.9	1.2	1.1	3.8	8.9	14.1	13.0	9.0	2.3	0.4	0.5	56.8	(1986)	(1997)		
Ramnagar	22	a	12.8	12.1	11.7	35.9	108.5	260.7	496.4	368.2	231.0	64.6	7.8	10.7	1620.4	161	60	336.0	14 Sep 1986
		b	0.9	1.2	0.8	1.9	5.1	8.4	15.3	12.5	8.2	2.6	0.5	0.7	58.1	(2000)	(1995)		
Sidhau	18	a	12.7	9.9	5.8	20.3	42.3	129.3	447.7	397.5	191.6	53.3	8.0	10.5	1328.9	142	68	337.5	26 Aug 1987
		b	0.7	0.9	0.5	1.4	3.2	5.3	12.8	10.7	6.3	2.3	0.5	0.7	45.3	(1986)	(1997)		
Sikta	24	a	16.4	13.0	5.8	19.9	87.3	195.2	445.0	366.3	286.6	74.7	5.3	12.9	1528.4	159	61	300.0	27 Jul 1975
		b	1.0	1.0	0.7	1.2	3.7	6.8	12.4	10.5	7.5	2.4	0.3	0.7	48.2	(1988)	(1982)		
West Champaran (District)		a	13.9	11.4	10.9	22.1	69.5	208.5	432.5	356.8	234.0	57.6	5.7	11.2	1434.1	154	71		
		b	1.1	1.0	0.9	1.5	3.8	7.7	13.6	12.2	8.2	2.3	0.4	0.6	53.3	(1986)	(1976)		

a Normal rainfall in mm
b Average number of rainy days (days with rain of 2.5 mm or more)
* Based on all available data upto 2006
** Years of occurrence given in brackets

TABLE - 2
Frequency of Annual Rainfall in the District
WEST CHAMPARAN
(Data 1951 - 2000)

Range in mm	No. of years	Range in mm	No. of years
1001 - 1100	4	1701 - 1800	5
1101 - 1200	4	1801 - 1900	5
1201 - 1300	7	1901 - 2000	1
1301 - 1400	6	2001 - 2100	0
1401 - 1500	6	2101 - 2200	1
1501 - 1600	2	2201 - 2300	1
1601 - 1700	4		

(Data available for 46 years)