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Climate change in South-East region of Rajasthan

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Abstract

At present, Climate change is becoming a major environmental problem. Now It is the great challenge for human being to maintain actual composition of the atmosphere. Mainly global warming is the backbone of climate changing process. Rising of green-house gases as CO₂, CO, CFC etc in the atmosphere are also sensitive for climate. Many industries, vehicles and fossil fuel burning are releasing these gases. Because of population explosion, the pressure on natural resources is continuously increasing. South east region of Rajasthan is rich with flora and fauna. Deforestation is the result of converting forest area in to human residence and cutting forests for timber, fuel wood and others. The area is feeling alarming situation of climate system as uncertainty in temperature, rainfall, winds, air pressure etc. Annual rainfall of the region is decreasing per year and temperature is in increasing status. Some species of flora and fauna are losing their natural habitats and some other are in endanger stage.

Keywords: climate change, global warming, deforestation, temperature, rainfall

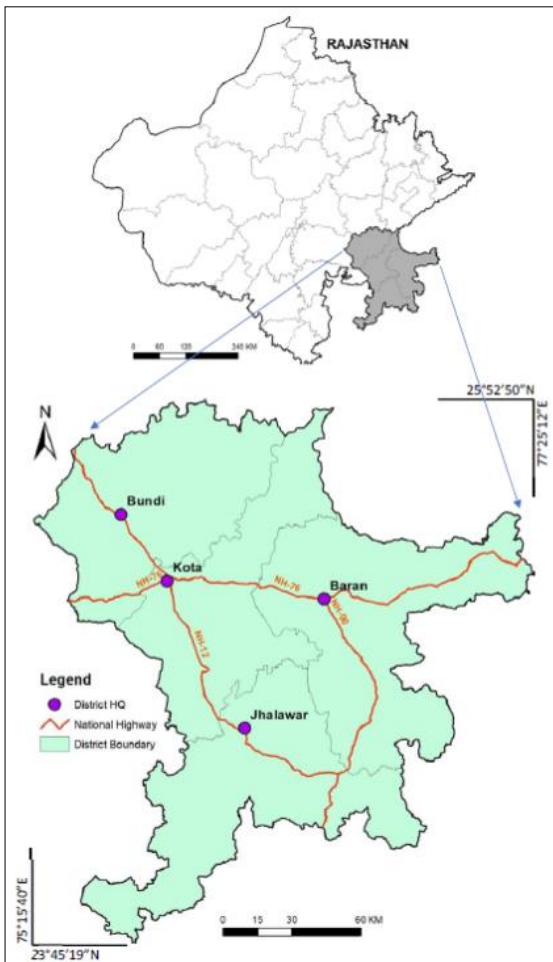
Introduction

At this time, the velocity of climate change is very speedy. According to the scientist the main reason of climate change is imbalance between incoming and outgoing radiation in the atmosphere. In other hand human being is developing new techniques by exploiting our natural resources, results green house gases emission has increased. Change in climate is recognized as a serious threat to ecosystem. It generates food and water insecurity in the food chain for various ecosystems. The study area is also facing these problems. In the Hadoti region the population is increasing very fast so the natural vision of the area is reducing. Scarcity in many dimensions has been appeared so many species of flora and fauna are at risky point and it is alarming stage for human being.

Study Area

The study area, South east Rajasthan that is well known as 'Hadoti region, lies between 75°15'40" East to 77°25'12" East Longitudes and 23°45'19" North to 25°52'50" North Latitudes. There are mostly four districts as Kota, Baran, Bundi and Jhalawar. The boundary of this region touches with Gujarat and Madhya Pradesh states. The area of this region is 9.6% of the state. The mostly part of this region is formed by plateau. The soil is black and very productive. Chambal and its tributaries as kalisindh, parwati and parwan are main rivers of the area. Major crops are rice, maize, soybean, wheat and linseed. The forest area of Hadoti region is rich with fauna like tiger, panther, hyena and others. Hadoti region of Rajasthan gets its name from the Hada Rajputs, a clan of Chauhan dynasty. They ruled the region/kingdom after conquering it from Meena rulers.

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Location Map

Objectives

1. To study climatic conditions of the study area.
2. To find out the reasons of climate change.

Table 1: Station wise Rainfall in South East Rajasthan (1960 to 2020) (Rainfall in mm.)

Station	Antah	Atru	Keshorai patan	Talera	Bakani	Jhalawar	Digod	Ladpura (Kota)
2020	592.0	547	548	458	747	842	546	513.5
2015	691	1109	768	828	1340	1316	639	799.4
2010	583	668	678	732	721.3	524.6	638.5	571
2005	1029.2	610	677	506	751.8	743	324.7	458
2000	831	641.2	651	527.1	794.4	655.2	948	791.3
1995	858	879.6	678.5	864.8	900	828.2	814.5	829.2
1990	405	813	541.4	1241	405	792.9	0.0	734.2
1985	575	691.3	576.5	539.5	998.6	1331.2	507	596
1980	519.6	603	361.7	444	595.8	454.9	398	413.4
1975	1086	1439	954.8	674	1106.5	1204.4	906.6	1005.2
1970	844.6	1005	755.9	474	971.6	1099.4	704.7	689.5
1965	0.0	429.2	354.7	441	531.3	625.8	335.9	321.7
1960	938.3	707.6	965.3	596.4	1005.6	970.6	856.4	556.5

Source: Annual Rainfall Data, 1960-2020
water.rajasthan.gov.in

According to this table tendency of rainfall on these stations is dynamic because sometimes it is very high and sometimes very low. In the years as 2015, 1985 and 1975 almost stations got high rainfall. But analysis shows that overall there is reduction in rainfall. Every station received lower rainfall in 2020 than 1960.

Hypothesis

Decreasing annual rainfall and increasing temperature are the main causes of climate change.

Methodology

Methodology in this research paper is defined as the systematic method to resolve a research problem through data gathering, using various techniques, providing an interpretation of data gathered and drawing conclusions about the research data. Primary data collected from survey. Secondary data collected from various departments, reports, books and research works.

Climate Change

To find out the climatic conditions of an area the path is to analyze rainfall, temperature, winds, humidity and other weather elements. It knows as the sum of these elements duration of 30 years. According to many research and studies, climate is changing regularly. The reason gets its maximum rainfall during Bay of Bengal branch of south east monsoon. During last time there are extremely variations in the quantity of precipitation. Position of seasons is also changing. Maximum and minimum temperatures of the day are also inconstant.

Climate Change Major Indicators

There are several indicators of climate change but in this study two are taken as rainfall and temperature. Those are as follows

1. Rainfall

Rainfall is the liquid form of water that reaches on the earth generally in droplets. It is the part of water cycle when atmospheric water vapor gets condensed results rainfall. To analyze the rainfall status of last 60 years data are taken as station wise of 5 years intervals

2. Temperature

Atmospheric temperature is assessed at station of the surface of the Earth. It depends on incoming and outgoing radiations, humidity and location. In this study station wise data of two periods as 1961-1990 and 1981-2010 from Climatological Normals issued by meteorology department of India have been discussed.

Table 2: Air Temperature Station Kota (A) (1961-1990)

Month	Mean				Extremes			
	Daily Max (°C)	Daily Min (°C)	Highest in The month (°C)	Lowest in the month (°C)	Highest (°C)	Year	Lowest (°C)	Year
Jan.	23.7	10.6	28.6	7	33.4	1966	1.8	1967
Feb.	27	13.5	33.3	8.6	37	1973	4.5	1971
Mar	33	18.9	38.8	13.1	41.7	1972	8.6	1979
Apr	38.8	25	43.1	19.5	48.5	1984	14	1976
May	42	29.1	45.2	23.4	47	1988	20	1971
June	39.9	29	44.4	23.8	47.3	1979	18.8	1979
July	34.1	26.4	39.2	23.3	43.6	1966	20.4	1986
Aug	32	25.2	36	23.1	41	1987	21.6	1972
Sep	33.9	24.9	37.3	22.1	40.4	1987	16.4	1966
Oct	34.5	21.6	37.6	17.6	40	1965	14.3	1964
Nov	30	16.1	33.9	11.7	36.6	1977	7.1	1970
Dec	25.2	11.8	29.5	8.1	33.2	1963	3.8	1964
Annual Total or Mean	32.8	21	44.8	6.6	48.5		1.8	
No. of Years	30	30	30	30	30		30	

Source: Climatological Normals (1961-1990)

Office of the Additional Director General of Meteorology (Research) India Meteorological Department, Pune

Table 3: Air Temperature Station Kota (A) (1981-2010)

Month	Mean				Extremes			
	Daily Max (°C)	Daily Min (°C)	Highest in The month (°C)	Lowest in the month (°C)	Highest (°C)	Year	Lowest (°C)	Year
Jan.	23.5	11.5	28.8	7.9	33.4	1966	1.8	1967
Feb.	26.8	14.3	32.8	10.2	37	1973	4.5	1971
Mar	33.2	19.9	39.2	14.6	42.7	2003	8.6	1979
Apr	39.1	25.7	43.8	19.8	48.5	1984	14	1976
May	42.3	29.9	45.6	24	48.4	2010	20	1971
June	40.3	29.6	44.7	24.1	47.3	1979	18.8	1979
July	34.4	27	39.3	23.5	44.9	1995	17.1	2004
Aug	32.4	25.8	35.8	23.5	41	1987	18.4	2006
Sep	34.2	25.7	37.6	23	41	2009	16.4	1966
Oct	34.4	22.5	37.5	18.6	46.8	2003	14.3	1964
Nov	29.9	17.1	33.8	13.1	38	2001	7.1	1970
Dec	25.4	12.6	29.7	9.2	33.2	1963	3.8	1964
Annual Total or Mean	33	21.8	46.1	7.7	48.5		1.8	
No. of Years	30	30	30	30	50		50	

Source: Climatological Normals (1981-2010)

Office of the Additional Director General of Meteorology (Research) India Meteorological Department, Pune

According to Table No 2 and 3 the temperature at station Kota (A) has been increased. In 1961-1990 annual mean daily maximum temperature was 32.8°C and in 1981-2010 it became 33°C as well as minimum temperature also increased from 21°C to 21.8°C. In the period 1961 to 1990, highest temperature in the month was 44.8° C and lowest temperature was 6.6°C. They also increased as 46.1°C and 7.7°C in 1981-2010.

Conclusion

As two main indicators shows climate is changing in the South East Rajasthan. In this study 8 stations were taken to analyze rainfall position. At all stations rainfall is decreasing. For temperature analyze Kota (A) station was decided. It shows increasing of temperature. Both indicators are very sensitive for the climate and majorly affect the climatic conditions. So it is important to protect the natural environment as well as flora and fauna. It is necessary to control emission of green house gases. Sustainable development is the primary requirement for human being.

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