STUDY OF VARIABILITY OF RAINFALL AND SUITABILITY OF FARMING IN SUB- HUMID REGION: A CASE STUDY OF JAIPUR DISTRICT, RAJASTHAN, INDIA.

ESTUDIO DE LA VARIABILIDAD DE LA LLUVIA Y SUSTENTABILIDAD DE LAS GRANJAS EN UNA ZONA SUB-HUMEDA: UN CASO EN ESTUDIO DEL DISTRITO DE JAIPUR, RAJASTAN, INDIA.

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ABSTRACT

Agricultural activities are integrated with climatic conditions and elements such as temperature, humidity, rainfall etc. Rainfall is the prominent feature of climate which directly or indirectly influences agricultural activities. The rainfall pattern and its erratic characteristics have been created problems for farmers as every year its pattern gets change. In India, more than 70% people rely on agriculture and allied activities for their survival. The farming in India totally depends on the mercy of rainfall distribution and intensity as the farmers are not aware about new technologies, tools and methods in farming. This paper is an attempt to demonstrate the rainfall variability in Jaipur district, which is situated in sub-humid region of Rajasthan.
Key words: Variability, Geographical, Rainfall, erratic, irregular, sub-humid etc.

RESUMEN

Las actividades agrícolas se integran con las condiciones climáticas y elementos tales como la temperatura, la humedad, las precipitaciones, etc. La lluvia es la característica prominente del clima que influye directa o indirectamente en las actividades agrícolas. Los patrones de lluvia y sus características erráticas se ha creado problema para el agricultor como cada año su patrón obtiene el cambio. En la India, más del 70% de las personas dependen de la agricultura y actividades afines para su supervivencia. La agricultura depende totalmente de la distribución e intensidad de las lluvias, ya que los agricultores no son conscientes de las nuevas tecnologías y métodos. Este trabajo intenta demostrar la variabilidad de la precipitación en el distrito de Jaipur, que está situado en la región subhúmeda de Rajasthan.
Palabras clave: Variabilidad, Geográfica, Precipitación, errático, irregular, subhúmedo.

INTRODUCTION

Rajasthan is the state of India located in west of country, famous for The Thar Desert world-wide (Upadhyaya, 2014). Another famous geographical feature named as The Aravalli Range passes through the state and divides into two halves (Kumar et al, 2010). The western halve of it is drought prone area while the eastern area receives normal rainfall (Upadhyaya, 2014). Due to Aravalli Range the state is divided into two climatic regions, western part lies in arid region while eastern part belongs to humid Region. Jaipur district is located in this eastern part and it normal rainfall is 54.82 cm (Kumar et al., 2010; Upadhyaya, 2014). Jaipur District lies into two climatic regions: The area receives annual rainfall more than 400 mm belong to Sub-Humid region while the areas with less than 400 mm annual rainfall belong to Semi –Arid region. The district receives the highest rainfall in month of July and lowest in month of December. From the month of October the rainfall decreases drastically till the month of April (Kumar et al., 2010).

Jaipur is the capital of Rajasthan, stretches between the latitudes 26°23'N to 27°51'N and longitudes 74°55'E to 76°50'E. It covers an area of 11,143 km². It comprises 16 tehsils and 13 sub-districts. The study comprises the analysis of rainfall variability of 6 tehsils named as Jaipur, Kotputli, Chomu, Phagi, Sanganer and Jamwa-Ramgarh. Tehsil Kotputli is located in north, Jaipur in Centre, Chomu in west, Jamwa - Ramgarh in East, Phagi in South and Sanganer in centre adjacent to Jaipur Tehsil (Kumar et al., 2010).

The aim of study is to investigate the suitable region for farming by calculating rainfall variability along with the study of rainfall distribution of study area. As hypothesis, it proposes that rainfall variability increases from south to north and east to west in Jaipur district.

MATERIALS AND METHODS

The study is carried out by using secondary data collected from the Rajasthan govt. official website: http://www.water.rajasthan.gov.in/wrd#cd-search . The study is carried out with the rainfall analysis of six tehsils of Jaipur District. The Rain Gauge station is located in Jaipur tehsil at 26°55"N and 76°50"E , in Kotputli Tehsil at 27°43"N and 76°13"E, in Chomu Tehsil at 27°10"N and 75°43"E, in Phagi tehsil at 26°35"N and 75°34"E, in Sanganer tehsil at 26°48"N and 75°47"E and in Jamwa – Ramgarh Tehsil at 27°04"N and 76°02"E. All Mathematical calculations are computed by using MS- Excel.

1. Mean $(\bar{X}) = \frac{\sum X}{N}$

Where, X = Rainfall Variable
N= Number of Years

2. Standard Deviation $(\sigma) = \frac{\sqrt{\sum (x-\bar{x})^2}}{N}$

3. Coefficient of Variability is computed by using following formula:

Coefficient of Variability = $\frac{\text{Standard Deviation}}{} \times 100$

Mean

RESULTS AND DISCUSSION

From the Table, it is clear that Jamwa- Ramgarh tehsil received highest mean annual rainfall (718.7 mm) in last 15 years. Kotputli and Sanganer tehsils received the mean annual rainfall of 611.45mm and 577.8mm respectively during this period. Chomu Tehsil received the lowest mean annual rainfall (512.89mm) in last 15 years.

In Last 15 Years, highest annual rainfall (1160mm) is recorded in Jamwa-Ramgarh in year 2008. The lowest annual rainfall (189mm) is recorded in Phagi tehsil in year 2002.Kotputli and Jamwa-Ramgarh received highest rainfall as they are positioned in north and north-east respectively. Jaipur and Sanganer are ranked third and fourth as they positioned in centre of district. Phagi ranked fifth located in south and Chomu ranked sixth as it located in north –west.

As per the Mathematical Calculation, The highest coefficient of variation (40.11%) is recorded for Jaipur tehsil followed by Jamwa- Ramgarh (38.71), Chomu (38.05%). This implies that rainfall pattern over above tehsils is irregular and erratic which is not favourable condition for farming (Faures et al., 1995; Dykes, 1997; Ewke et al., 2014; Tavdi, 2016). The lowest coefficient of variation (29.67%) for Phagi Tehsil so a regular rainfall pattern persists over the tehsil. Regular pattern of rainfall is good for farming. Comparatively, the Rainfall pattern of Phagi tehsil is more suitable for farming.

Table 1: Coefficient of Variability for Jaipur District

Years/Tehsils	JAIPUR	KOTPUTLI	CHOMU	PHAGI	SANGANER	JAMWA-RAMGARH
2001	426.8	579.8	504	448.8	582	406
2002	222.4	192	205	189	237	341
2003	511	837	581	434	563	1068
2004	807	422	296	624.1	805	1061
2005	408.6	776	306	535.4	392	980
2006	335	520	209	360	407	460
2007	521	691	333	398	553.3	673.5
2008	572	897	424	578	572	1160
2009	306	318	271	355	377	521
2010	659	816	737	810	750	1039
2011	660	659	700	608	646	577
2012	1084	649	535	609	907	599
2013	812.1	721	525	657	757	684
2014	646	594	572	520	606.7	791
2015	456.5	500	523	567	512	420
TOTAL(X)	8427.4	9171.8	6721	7693.3	8667	10780.5
MEAN ($\bar{X}$)	561.83	611.45	448.07	512.89	577.8	718.7
STD	225.33	197.01	170.49	152.16	179.80	278.18
C.V. (%)	40.11	32.22	38.05	29.67	31.12	38.71

Source:http://www.water.rajasthan.gov.in/content/water/en/waterresourcesdepartment/WaterManagement/IWRM.html

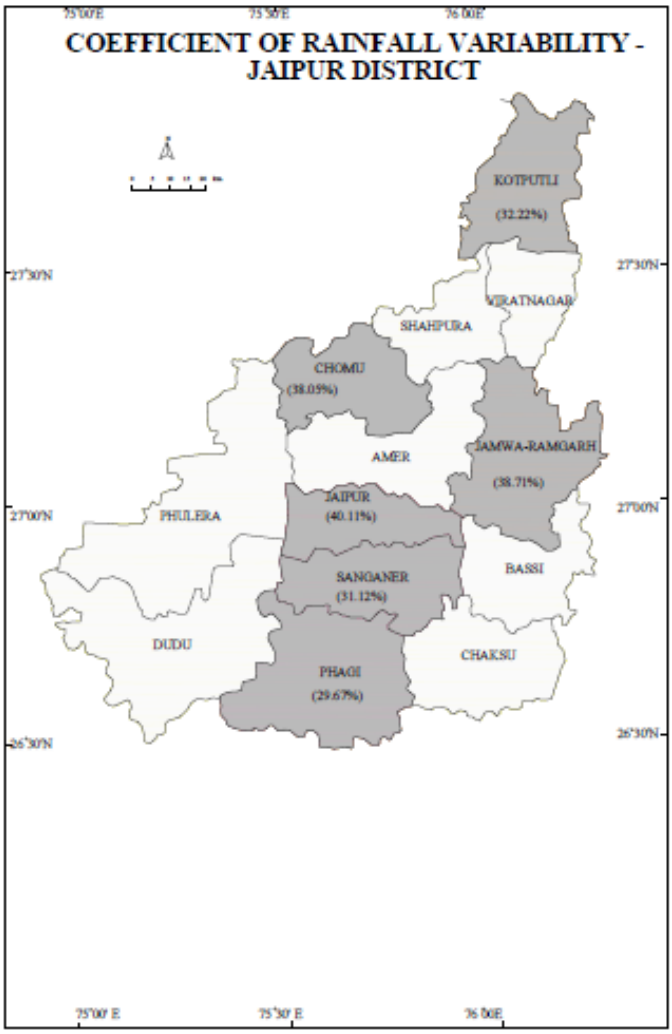

Figure 1: Coefficient of Rainfall Variability- Jaipur District

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