

Short communication

Characteristics of weekly rainfall pattern at Junagadh in Saurashtra region.

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Rainfall is the main source of water for agriculture. However, the availability of water for crops in a season depends on the distribution and variability of weekly rainfall. The study of weekly rainfall is useful for crop planning, scheduling farm operations and land-use operations. The probability of weekly rainfall also serves as an interim substitute for medium range rainfall forecast. Several workers (Sahu and Patel, 1985, Maliwal and Chhatrola, 1991, Marvia et al 1991, Venkatesh *et al* 1996) have studied the weekly rainfall distribution in relation to local agricultural practices in different agroclimatic zones of Gujarat state. The main aim of this study was to reveal the characteristics of rainfall variability and distribution during monsoon season (23rd to 43rd standard weeks) for Junagadh region, which is known as the groundnut bowl of the country. In this region, farmers take spreading type of groundnut variety: GG 11, GG 12, GG 13 and the semi-spreading var GG 20 under normal onset of monsoon and erect type var. GG 2 and GG 5 under delayed monsoon and GG 13 for pre-monsoon or early monsoon conditions.

The daily rainfall data collected at the agrometeorological observatory at Junagadh Agricultural University (Lat 20° 31' N, Long 70° 30' E and Altitude 61m) for a period of 32 years (1968-99) were analyzed and arranged according to meteorological standard weeks. (Table 1). The length of growing season in the region is of 13 weeks from 25th to 37th standard weeks.

The highest average rainfall (104.5 mm) has occurred during 29th week and the lowest (20.6 mm) during 34th week, in which the evaporation exceeds rainfall. The rainfall pattern has shown the highest peak at 29th week and the subsequent two peaks during 32nd and 35th weeks during the rainy season. The maximum rainfall varied from 619 mm in 26th week to 54.7mm in 39th week during the past 32 years.

The standard deviation is very high in the beginning of the season indicates the high fluctuation of mean rainfall. The standard deviation (SD) is often used in defining drought classification for different length of time. A week is considered as dry when the rainfall is less than mean minus half SD (Mean- ½ SD) and wet when the rainfall during a week is more than mean plus half SD (Mean + ½ SD) (Subrahmanyam and Sastri, 1969). The studies on frequency of occurrence of different types of weeks during last 32 years (672 weeks) indicated that 47.2 percent of weeks were dry, 18% wet and 34.8% normal weeks. Monthly distribution of different categories of weeks indicated that the frequency of occurrence of dry and wet weeks were highest during October and July respectively and normal weeks in the month of August (Table 2).

The coefficient of variability (CV) indicates the dependability or reliability on rainfall for any period. The experience has shown that the weeks with values of CV below 100% are highly dependable and weeks with CV value up to 150 % are dependable and above 150% are unreliable (Singh 1978). Lower values of CV indicate better reliability (Ramana Rao, 1988). The CV of weekly rainfall in the beginning and ending of the season is quite high except during the five weeks of July, one week in August (34th) and two weeks (36th and 39th) in September (Table 1). The higher values of skewness indicate the asymmetrical distribution of weekly rainfall at Junagadh. The rainfall distribution in most of the weeks is mostly leptokurtic and skewed to the right. The probability of getting any amount of rainfall during rainy period from 25th to 37th week is more than 70 percent (Table 3) and it is more than 40 percent for getting at least 20 mm of rainfall during kharif period from 25th to 36th weeks indicating safe period for kharif crops. The stable period of rainfall is only five to six weeks falling in the months of July and August.

Table 1: Weekly rainfall Statistics of Junagadh. (1968-1999)

Standard week No.	Mean (mm)	S.D. (mm)	CV %	Skewness	Kurtosis	Maximum (mm)	Year of maximum	Evapo. (mm)
23	16.7	32.2	193	2.25	4.91	132.5	1980	68.0
24	34.4	55.1	160	2.04	3.88	121.8	1989	58.3
25	59.5	101.4	170	2.27	5.05	398.0	1986	56.7
26	62.5	125.3	201	3.28	12.57	619.0	1980	50.3
27	67.8	95.9	141	1.87	3.12	378.2	1980	47.5
28	85.7	111.4	130	1.81	3.10	454.2	1981	26.6
29	104.5	121.2	116	1.32	0.98	412.0	1995	30.7
30	55.7	74.2	133	2.46	8.18	359.4	1988	34.8
31	56.1	78.9	141	2.46	7.66	373.8	1979	30.7
32	57.5	94.7	165	2.68	7.35	420.5	1979	25.6
33	39.9	75.1	188	4.20	20.33	411.9	1990	26.3
34	20.6	29.1	141	2.80	10.13	144.5	1970	24.3
35	41.8	72.6	174	3.35	13.93	373.0	1971	24.3
36	29.8	41.2	138	1.88	3.75	174.2	1992	35.7
37	23.7	48.6	205	3.14	10.36	223.0	1984	35.4
38	20.2	42.4	210	3.80	16.57	220.0	1983	35.5
39	18.4	20.1	109	0.63	-1.18	54.7	1990	37.5
40	13.7	29.4	215	2.70	6.83	113.4	1990	37.7
41	6.1	16.8	276	3.69	14.98	83.4	1975	37.3
42	5.2	16.8	323	3.72	13.33	76.0	1998	38.4
43	7.4	19.0	256	3.70	15.90	96.4	1993	39.3
Total	827.2							860.9

Table 2: Percent frequency of dry and wet weeks during monsoon at Junagadh

Month	Dry	Wet	Normal
June	8.8	3.6	86.7
July	11.1	4.9	7.7
August	7.6	3.7	7.7
Sept.	7.6	3.7	7.7
Oct.	7.6	3.7	7.7
Total	47.2	18.0	34.8

The rainfall pattern showed that the groundnut crop suffers a period of low and uncertain rainfall during pegging and pod development stages. The pod filling and maturity period are encountered by the period when weekly evaporation exceeds the corresponding mean rainfall. Most of the rainfall is received during 25th to 30th weeks when the crop is in vegetative and flowering stages. If the crop is sown earlier than 25th week then the crop may escape the period of low rainfall during pod development stages and the yield may increase

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Table 3: Percent probabilities of rainfall exceeding selected levels of rainfall at Junagadh

Week No.	Any rain	>10 mm	>20 mm	>35 mm	>50 mm	>75 mm
23	9.4	28.1	25.0	15.6	15.6	6.3
24	59.4	40.6	37.5	34.4	18.8	15.6
25	71.9	53.1	40.6	34.4	31.3	28.1
26	78.1	53.1	40.6	31.3	25.0	18.8
27	90.6	59.4	53.1	46.9	43.8	31.3
28	90.6	75.0	65.6	50.0	43.8	37.5
29	93.8	68.8	62.5	56.3	53.1	43.8
30	90.6	62.5	50.0	43.8	40.6	34.4
31	93.8	62.5	56.3	40.6	37.5	28.1
32	96.9	71.9	43.8	37.5	25.0	18.8
33	87.5	62.5	46.9	28.1	21.9	12.5
34	84.4	53.1	40.6	18.8	12.5	3.1
35	75.0	56.3	40.6	28.1	25.0	21.5
36	81.3	56.3	40.6	31.3	25.0	15.6
37	71.9	40.6	25.0	18.8	12.5	6.3
38	56.3	40.6	28.1	12.5	9.4	6.3
39	65.6	56.3	40.6	28.1	12.5	0
40	34.4	28.1	18.8	9.4	9.4	6.3
41	25.0	15.6	9.4	6.3	3.1	3.1
42	25.0	12.5	6.3	6.3	6.3	3.1
43	25.0	18.8	15.6	3.1	3.1	3.1

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Received: September 2007; Accepted: August 2008.