RESEARCH PAPER:

Rainy season and its variability for crop planning in Basavakalyan region (Karnataka)

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SUMMARY

The analysis of daily rainfall data of thirty four years (1976-2009) indicated that the average annual rainfall for the Basavakalyan region was 759 mm spread over with a mean rainy days of 49.9 days. The lowest and highest recorded annual rainfall and rainy days was 392.3 and 1122.5 mm and 33 and 62 days, respectively. The standard deviation and coefficient of variation for mean annual rainfall and rainy days was 179.3 mm and 23.6 per cent and 7.8 days and 15.6 per cent, respectively. The highest mean rainfall of 162.6 mm with coefficient of variation of 60 per cent was highest in September month followed by August (158.1 mm) with coefficient of variation of 56 per cent. However, the lowest coefficient of variation of 45 per cent was noticed during June month with mean rainfall of 101.9 mm indicating lesser variability.

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Key words : Rainfall, Rainy days, Seasonal rainfall

The agricultural strategy to increase production on a sustained basis should make use of scientific information generated by the agrometerological fraternity. Food production from dryland agriculture is always uncertain, due to large temporal and spatial variation in rainfall. In minimizing risk, climatological data of a location are very helpful (Vairavan *et al.,* 2002). According to Pandey *et al.* (2002), seventy per cent rainfalls occurs during monsoon period, out of which the crops use only small amount and a large portion is lost as surface runoff. Rainfall is the main limiting factor affecting crop productivity. Therefore, its amount, time of occurrence and spatial variability controls the agricultural practices adopted in the region.

Mean monsoon rainfall over India as a whole during June-September is 840 mm with a coefficient of variation of 10 per cent. And this amounts to about 85 per cent of the annual precipitation (1081 mm) (Parthasarathy *et al.,* 1992; Gadgil *et al.,* 1999 and Gopinathan, 2000). Even in monsoon months the crops are subjected to moisture stress due to occasional dry spells. Although the rainfall is high, the distribution is erratic making the crop vulnerable even during monsoon.

Several workers like Sahu (2008) reported annual and seasonal variability of climate in south Saurastra agroclimatic zone. Parmer *et al.* (2005) and Krishnakumar and Prasad Rao (2008) reported rainfall variability in Gujarat and Kerala state respectively. Halikatti *et al.* (2010) reported annual and seasonal rainfall variability at Dharwad, Karnataka. In this context, a similar attempt was made at Agriculture Research Station, Bidar, to analyze the rainfall variability in month, season and annual wise for Basavakalyan region.

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MATERIALS AND METHODS

Daily rainfall data for the past 34 years (1976-2009) were collected from District Statistical Office, Bidar, for analysis (Table 1). The rainfall data were critically examined for annual, seasonal and monthly values following the procedure of Panse and Sukhatme (1985). The standard deviation (S.D.) and Coefficient of Variance (C.V.) of rainfall were worked out.

RESULTS AND DISCUSSION

The daily rainfall data for the period from 1976 to 2009 were analyzed and the results were presented under different heads for mean, standard deviation (mm) and coefficient of variance (%) of annual and seasonal rainfall and the per cent of different seasonal rainfall *vis-à-vis* annual rainfall (Table 1). The highest

Table 1: Monthly mean, highest and lowest rainfall (mm) and rainy days along with SD and CV at Basava Kalyan (1976-2009)

Months	Rainfall						Rainy days				
	Lowest (mm)	Highest (mm)	Mean (mm)	S.D. (mm)	C.V. (%)	Per cent of annual RF	Lowest (mm)	Highest (mm)	Mean (mm)	S.D. (day/s)	C.V. (%)
January	0	32.4	6.2	12.2	196	0.8	0	2	0.5	0.7	140
February	0	19.8	5.2	10.8	207	0.6	0	4	0.4	0.8	200
March	0	92.6	15.5	25.2	162	2.0	0	4	1.1	1.4	127
April	0	63.8	22.1	20.2	91	2.9	0	5	2.1	1.7	80
May	0	200.8	32.7	43.4	132	4.4	0	11	2.5	2.4	96
June	26.0	198.8	101.9	46.5	45	13.5	3	11	7.5	2.3	30
July	32.0	439.6	144.5	98.7	68	19.0	3	16	9.1	3.3	36
August	22.1	353.9	158.1	89.5	56	20.9	3	19	10.4	3.9	37
September	22.0	432.5	162.6	97.9	60	21.5	3	19	9.7	4.1	42
October	0	236.4	83.3	70.4	84	10.9	0	12	4.9	3.3	67
November	0	172.2	22.5	34.4	152	2.9	0	7	1.8	1.8	100
December	0	29.6	5.0	9.0	180	0.6	0	2	0.5	0.7	140

and lowest rainfall (mm) recorded in annual and in different seasons was also presented as shown in Table 2. The coefficient of variability (C.V.) indicates the dependability or reliability on rainfall for any period. Lower values of C.V. indicate better reliability (Ramana Rao, 1988).

Monthly rainfall :

Rainfall quantum and distribution during different months have been shown in Fig. 1. It is evident that monthly rainfall had unimodal peak. September month received maximum mean rainfall of 162.6 mm distributed in 9 mean rainy days followed by August (158.1 mm) in 10 rainy days. Monthly rainfall during November to May remained lowest in the range of 5.0 to 32.7 mm. The highest rainfall of 439.6 mm was reported in the July (Table 1; Fig. 1 and 2).

Seasonal rainfall :

The average seasonal rainfall along with rainy days and its variability during the seasons winter (January – February), summer (March- May), Monsoon (June - September) and Post monsoon (October – December) are presented in Table 2 and Fig. 3 and 4. The highest rainfall was received during monsoon season (999.7 mm) followed by post monsoon (270.9 mm) and summer (202.6 mm), where as the lowest by winter (56.2 mm) season. South west (SW) monsoon season contributed 74.6 per cent of mean annual rainfall. Rainfall during this period varied between 358.8 mm to 999.7 mm with the mean value of 566.9 mm. Mean number of rainy days during SW monsoon season was 36 days. Total amount of rainfall received during north east (NE) monsoon was 14.6 per cent of the mean annual rainfall. The mean rainfall during

Table 2: Characteristics of seasonal rainfall (mm) and rainy days at Basava Kalyan (1976-2009)

Year	Particulars	Lowest (mm)	Highest (mm)	Mean (mm)	S.D.	C.V. (%)	Per cent of annual rainfall
Annual	Rainfall	392.3	1122.5	759.1	179.3 mm	23.6	-
	Rainy days	33	62	49.9	7.8 days	15.6	-
Winter	Rainfall	0.0	56.2	11.3	16.4 mm	145	1.5
	Rainy days	0	4	0.9	1.1 days	122	-
Summer	Rainfall	0.0	202.6	70.2	48.7 mm	69.3	9.3
	Rainy days	0	13	5.5	3.1 days	56.3	-
Monsoon	Rainfall	325.8	999.7	566.9	175.9 mm	31.0	74.6
	Rainy days	24	59	36.5	7.9 days	21.6	-
Post monsoon	Rainfall	5.3	270.9	110.7	77.0 mm	69.5	14.6
	Rainy days	1	15	6.9	3.7 days	53.6	-

Annual : January – December **Winter :** January – February **Summer :** March- May
Monsoon : June - September **Post monsoon/north east monsoon:** October - December
S.D. : Standard Deviation **C.V. :** Coefficient of variation

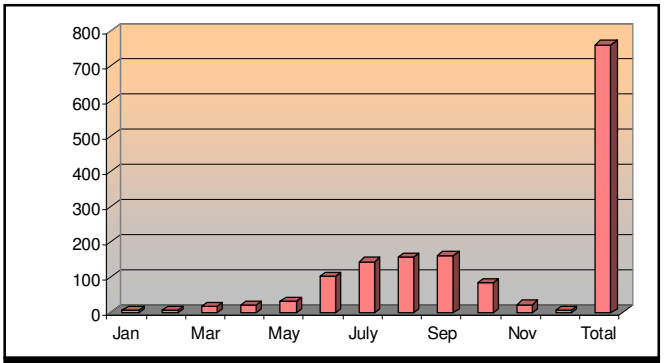

Fig. 1: Monthly average rainfall (mm) recorded at Basara Kalyan

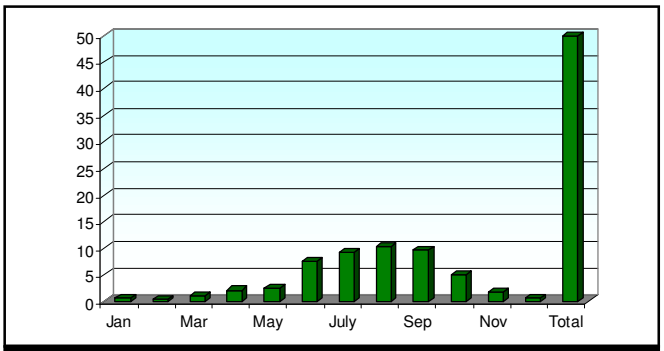

Fig. 2: Monthly average rainy days recorded at Basara Kalyan

this period was 110.7 mm. Pre monsoon season contributed 9.3 per cent (70.2 mm) of the mean annual rainfall. The winter rainfall contributed 1.5 per cent (11.3 mm) to the mean annual rainfall. The lowest CV was during monsoon (31.0%) (Table 2; Fig. 3 and 4).

Annual rainfall :

The overall mean total annual rainfall of Basavakalyan region for the past thirty four years (1976-2009) was found to be 759.1 mm with a coefficient of variation of 23.6 per cent spread over 50 rainy days. This revealed that the rainfall was more or less stable over the years. The annual rainfall ranged from 392.3 to 1122.5 mm. The standard deviation and coefficient of variation for annual rainy days was 7.8 days and 15.6 per cent, respectively with mean of 49.9 mm. The highest and lowest annual rainy days recorded was 33 and 62, respectively (Table 2).

Crop planning :

Based on the present study, the following recommendations could be made to increase the land productivity in the region. During summer season as the rainfall receipt was too low for crop cultivation, it was recommended to go for land preparation, especially

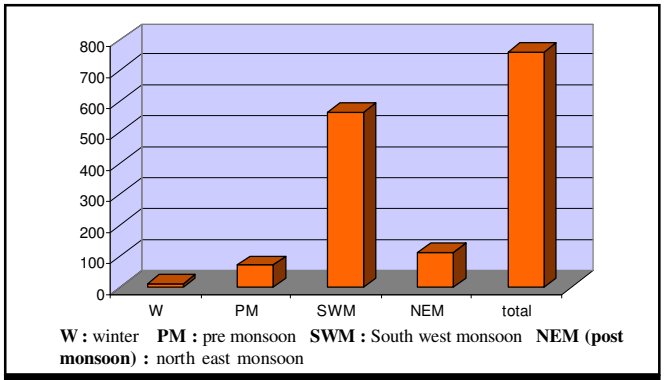

Fig. 3: Average season wise rainfall as observed at Basara Kalyan

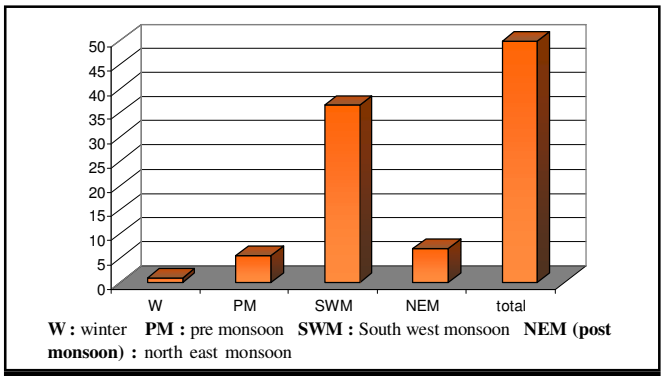

Fig. 4: Average season wise rainy days as observed at Basara Kalyan

summer ploughing and make the soil fit for cultivation during the succeeding year. Or else, less water requiring short duration crops such as millets, forage crops etc. can be grown with supplement irrigation practices. During *Kharif* season, arable short duration crops like pulses, sunflower, millets, maize can be grown. In uplands and in the embankments of water harvesting structures, cultivation of vegetables like cucumber and fruit crops like water melon can be done after the cessation of northeast monsoon rains for effective utilization of land and other resources.

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