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Research Article

Annual and seasonal rainfall variability of Aurad Taluk, Bidar district (Karnataka)

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Summary

Rainfall data for the period 1976 - 2010 was used to analyze seasonal and annual variability of rainfall. The mean annual rainfall is 849.0 mm with 28 per cent variability; with standard deviation of 241.1 mm. The rainfall during 1981-1985 periods ranged from 487.0 mm to 1337.7 mm with a mean rainfall (772.1 mm). Pre-monsoon season rains were deficit in 16 years, excess in 13 years and normal in 6 years as against the normal rainfall of 69.0 mm, the SWM rainfall was normal in 4 years, excess in 13 years and deficit in 18 years while during post-monsoon season there was only two normal rainfall year, deficit in 18 years and excess in 15 years.

Key words : Annual and seasonal rainfall

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Introduction

The success or failure of the crops in any year is always viewed with great anxiety as they are closely linked with the behavior of the south west monsoon rains received during June to September. Thus for a rainfed crop, rainfall is the only source of water and thereby any fluctuation in rainfall pattern adversely affect the crop production and it tilts the food security of the country. Water is one of the crucial inputs in crop production and its excess or deficit availability/application adversely influences the yield. Rainfall analysis for crop planning was carried out in different regions of the country as reported by Chaudhury and Tomar (1999); Sastri *et al.* (1999) and Sahoo *et al.* (1991). In this context, an attempt was made at Agriculture Research Station, Bidar, to analyze the rainfall variability in monthly, seasonally and annually for Aurad region.

Resources and Research Methods

Daily rainfall data for the past 35 years (1976-2010) were collected from district Statistical Office, Bidar, for analysis. The rainfall data were critically examined for annual, seasonal and monthly values following the procedure of Panse and Sukhatme (1985). The standard deviation (SD) and coefficient of variance (CV) of rainfall were worked out for the above said periods. Drought intensity was classified as per IMD (Normal (N) rainfall mean $\pm$10 %; slight drought (-11 to -25% of N); moderate drought (-26 to -49 % of N) and severe drought (-50 % and above of N).

Research Findings and Discussion

The rainfall of 35 years (Table 1, Fig. 1 and 2) ranged from 453.5.0 mm to 1337.7 mm with a mean of 849.0 mm. The

Table 1: Annual rainfall (mm) variability of Aurad between 1976 - 2010

	Period	Range (mm)	Mean (mm)	S.D. (mm)	CV (%)
I	1976-2010	453.5 - 1337.7	849.0	241.1	28
II	1976-1980	453.5 - 846.6	673.6	167.2	24
III	1981-1985	487.0 - 1337.7	772.1	327.0	42
IV	1986-1990	481.1 - 1212.9	954.4	319.5	33
V	1991-1995	571.5 - 1132.8	759.6	230.1	30
VI	1996-2000	924.2 - 1174.7	1036.4	110.2	10
VII	2001-2005	700.5 - 1209.2	896.6	224.0	24
VIII	2006-2010	637.4 - 1024.8	850.7	158.7	18

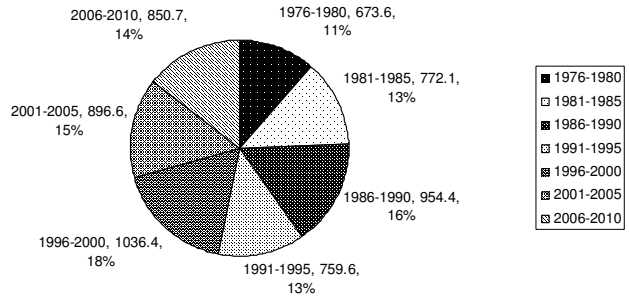

Fig. 1 : Per cent of five years period wise rainfall (mm) as observed at Aurad

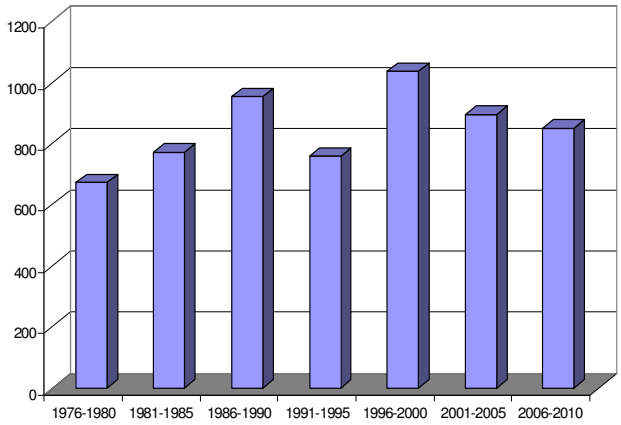

Fig. 2 : Mean of five years period wise rainfall (mm) as observed at Aurad

standard deviation (SD) was 241.1 mm with a coefficient of variation (CV) 28 per cent. The rainfall during 1981-1985 the SD (327.0 mm) was more with a CV of 42 per cent indicating more variability and dependability. The rainfall during this period ranged from 487.0 mm to 1337.7 mm with a mean rainfall (772.1 mm). On the contrary the rainfall during 1996-2000 the SD (110.2 mm) was less with a less CV of 10 per cent indicating least variability and more dependability. The rainfall during this period ranged from 924.2 mm to 1174.7 mm with a mean of 1036.4 mm.

The seasonal rainfall variability (Table 2) during the last 35 years (1976-2010) indicated that pre-monsoon season (January-May) rains were deficit in 16 years, excess in 13 years and normal in 6 years as against the normal rainfall of 69.0 mm. During the months of south west monsoon (SWM) season (June -September) the rainfall ranged from the lowest 317.6 mm in 1986 to the highest 1129.5 in 1983 as against the normal SWM rainfall of 677.0 mm. The SWM rainfall was normal in 4 years, excess in 13 years and deficit in 18 years. The variation of rainfall during SW monsoon was highly fluctuating which may affects the successful cultivation of *Kharif* crops. During post-monsoon season

Table 2: Seasonal rainfall variability of Aurad (1976 - 2010)

Seasons	Yearly total		I. Pre-monsoon (January - May)		II. SW– monsoon (June - September)		III. Post monsoon (October - December)		
Years	Rainfall (mm)	Deviation (%)	Rainfall (mm)	Deviation (%)	Rainfall (mm)	Deviation (%)	Rainfall (mm)	Deviation (%)	Category
Normal	849.0	-	69.0	-	677.0	-	103.0	-	-
1976 *	735.3	- 13.3	5.1	- 92.6	694.1	2.5	36.1	- 64.9	SLD
1977 *	544.9	- 35.8	67.9	- 1.5	395.9	- 41.5	81.1	- 21.2	MD
1978	787.7	- 7.2	70.6	2.3	590.5	- 12.7	126.6	22.9	N
1979	846.6	- 0.2	193.7	180.7	585.9	- 13.4	67.0	- 34.9	N
1980 *	453.5	- 46.5	11.0	- 84.0	408.5	- 39.6	34.0	- 66.9	MD
1981 *	687.0	- 19.0	58.5	- 15.2	584.5	- 13.6	44.0	- 57.2	SLD
1982 *	674.5	- 20.5	10.3	- 85.0	537.8	- 20.5	126.4	22.7	SLD
1983 #	1337.7	57.5	22.7	- 67.1	1129.5	66.8	185.5	80.0	E
1984 *	487.0	- 42.6	3.0	- 95.6	437.0	- 35.4	47.0	- 54.3	MD
1985 *	674.5	- 20.5	71.0	2.8	524.0	- 22.5	79.5	- 22.8	SLD
1986 *	481.1	- 43.3	63.5	- 7.9	317.6	- 53.0	100.0	- 2.9	MD
1987	766.7	- 9.6	28.0	- 59.4	555.7	- 17.9	183.0	77.6	N
1988 #	1131.1	33.2	23.5	- 65.9	1076.6	59.0	31.0	- 69.9	E
1989 #	1180.3	39.0	66.9	- 3.0	1044.7	54.3	68.7	- 33.3	E
1990 #	1212.9	42.8	211.8	206.9	885.4	30.7	115.7	12.3	E
1991 *	574.7	- 32.3	44.9	- 34.9	503.0	- 25.7	26.8	- 73.9	MD
1992	797.2	- 6.1	56.8	- 17.6	642.4	- 5.1	98.0	- 4.8	N
1993 *	721.8	- 14.9	65.4	- 5.2	490.2	- 27.5	166.2	61.3	SLD
1994 *	571.5	- 32.6	40.1	- 41.8	386.4	- 42.9	145.0	40.7	MD
1995 #	1132.8	33.4	149.0	115.9	755.2	11.5	228.6	121.9	E
1996 #	1036.2	22.0	7.4	- 89.2	870.6	28.5	158.2	53.5	E
1997	924.2	8.8	95.8	38.8	549.2	- 18.8	279.2	171.0	N
1998 #	1174.7	38.3	83.6	21.1	908.9	34.2	182.2	76.8	E
1999	932.8	9.8	130.2	88.6	662.4	- 2.1	140.2	36.1	N
2000 #	1114.3	31.2	99.0	43.4	972.9	43.7	42.4	- 59.0	E
2001 *	749.7	- 11.6	24.4	- 64.6	536.5	- 20.7	188.8	83.3	SLD
2002	766.4	- 9.7	125.7	82.1	588.8	- 13.0	51.9	- 49.6	N
2003 #	1057.6	24.5	78.1	13.1	939.4	38.7	40.1	- 61.0	E
2004 *	700.5	- 17.4	119.9	73.7	523.7	- 22.6	56.9	- 44.7	SLD
2005 #	1209.2	42.4	99.5	44.2	981.1	44.9	128.6	24.8	E
2006 #	1024.8	20.7	146.1	111.7	822.4	21.4	56.3	- 45.3	E
2007 *	740.8	- 12.7	20.4	- 70.4	717.2	5.9	3.2	- 96.8	SLD
2008	896.6	5.6	94.3	36.6	753.1	11.2	49.2	- 52.2	N
2009 *	637.4	- 24.9	17.2	- 75.0	534.2	- 21.0	86.0	- 16.5	SLD
2010 #	954.1	12.3	11.5	- 83.3	790.8	16.8	151.8	47.3	E

* Deficit rainfall years, # Excess rainfall years, N: Normal rainfall years, E: Excess rainfall years IMD classification: N: Normal rainfall (mean$\pm$ 10%), SLD: Slight drought (-11 to -25 %) MD: Moderate drought (-26 to-49%) SD: Severe drought (- 50 % and above)

(October-December) there was only two normal rainfall year deficit in 18 years and excess in 15 years.

The annual rainfall was normal in 8 years, deficit in 15 years and excess in 12 years. The analysis of past 35 year's rainfall data revealed that, there was no single severe drought year.

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