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RANIFALL ANALYSIS AND CROPPING IN NEDUNGAL TRACT OF DHARMAPURI DISTRICT.

M. N BUDHAR [1] and N. GOPALASWAMY [2]

Nedungal tract is a part of north-western agroclimatic zone of Tamil Nadu located in Dharmapuri district. Rainfall data for 34 years (1950-83) of the Nedungal tract has been analysed for annual, seasonal monthly and weekly Variations. Based on the analysis of rainfall data improved cropping sequences viz,. Groundnut – Cowpea / Horsegram, Pulses-Short duration sorghum, little millet-cowpea / horsegram are suggested to increase the net income of dryland farmers of this tract.

The inherant charactestic feature of rainfall is its variability in time and space which causes wide fluctuations in production and productivity under dryland agriculture. The choice of crop varieties and other agronomic practices are by and large decided by rainfall pattern and length of the growing season. A thorough knowledge and proper understanding on the rainfall behaviour in a locality is essential for getting higher yield and income in dryland agriculture. Keeping this in view, the rainfall data of Nedungal tract of Dharmapuri district were analysed.

MATERIALS AND METHODS

The daily rainfall data of 34 years (1950-83) collected from the Assistant Engineer's Office, Public Works Department (Irrigation), Barur, were analysed. The daily rainfall were analysed statistically for annual, seasonal, monthly and weekly periods. Variability in ranifall for a given period was worked out based on coefficient of variation (CV) to assess the dependability of rainfall.

RESULTS AND DISCUSSION

The mean annual and seasonal rainfall, rainy days and given (C.V.) are in Table-1. The mean annual rain fall of Nedungal tract works to 840 mm distributed over 45.7 rainy days. Out of 34 years, in 18 years (53% of total) the annual rainfall was normal (+19 to – 20 percent.) In 8 years (23.5%) it was in excess (20 percent) and it was deficit (–21 to –58 per cent) in remining 8 years (23.5%). An all time record of 1384 mm rainfall in 70 rainy days was received during the year 1953 where as a minimum of 432mm in 34 rainy days was recorded in the year 1957.

Among seasens, southwest monsoon (June-September) contributed the highest quantity of 366 mm rainfall (43.6%) followed by north-east monsoon (October December) to the tune of 309 mm (36.7%). Summer (March-May) and winter (January February) seasons contributed 17.5 and 2.2 per cent respectively. The

1. Assistant Professor Department of Agronomy, Centre for soil and crop Management
2 Associate Professor Studies, Tamil Nadu Agricultural University, Coimbatore - 641 003.

Table 1 Annual and seasonal rainfall, rainy days and C. V

Year	Winter		Summer		SW Monsoon		NE Monsoon		Annual	
	RF	RD	RF	RD	RF	RD	RF	RD	RF	RD
1950	134.9	3	61.7	7	243.0	19	251.6	13	691.2	42
1951	12.7	1	180.9	13	476.9	20	134.2	10	804.7	44
1952	4.0	1	23.4	5	337.6	16	261.0	12	626.0	34
1953	13.5	1	279.8	14	559.9	29	531.4	26	1384.6	70
1954	48.6	5	190.3	13	280.4	13	365.1	18	884.4	49
1955	12.9	2	203.9	13	321.0	22	76 2	6	614.0	43
1956	—		17.8	1	292.9	21	238.8	18	549.5	40
1957	—		141.4	7	132.7	13	157.8	14	431.9	34
1958	11.4	1	335.7	12	293.0	16	287.0	14	927.1	43
1959	53.4	2	152.0	7	97.2	9	496.9	15	799.5	33
1960	—		126.3	4	472.4	13	264.2	18	862.9	35
1961	95.3	6	75.7	5	373.4	19	208.5	18	752.9	48
1962	—		247.2	16	511.5	25	370.8	12	1129.5	53
1963	—		55.9	6	362.2	19	218.1	10	636.2	35
1964	—		63.2	6	518.2	20	471.6	18	1053.0	44
1965	—		87.6	6	326.3	20	198.4	17	612 3	43
1966	—		235.7	7	357.8	24	616.4	21	1209.9	52
1967	52.6	3	157.5	5	408.8	20	422.2	11	1041.1	39
1968	—		135.4	6	363.9	16	332.8	16	832.1	38
1969	—		68.6	5	243.4	15	512.0	25	824.0	45
1970	41.3	2	164.0	10	180.2	16	304.7	16	690.2	44
1971	10.6	1	205.8	12	308.6	15	194.0	11	719 0	39
1972	2.4	0	80.5	6	395.9	20	481.0	26	959.8	52
1973	—		142.4	8	489 4	27	165.6	15	797 4	50
1974	—		80.5	5	655.5	32	207.5	11	943.5	48
1975	—		134.5	11	374.5	26	275.4	19	784.4	56
1976	1 3	0	81.2	7	451.1	27	299.5	21	833.1	55
1977	19.0	2	230.6	13	388.9	22	351.5	25	990.0	62
1978	—		126 1	7	379.1	15	357.4	23	862.6	45
1979	94.0	4	188.2	7	515.3	26	273.8	20	1071.3	57
1980	—		58 8	6	69.6	8	373.9	24	502.3	35
1981	7.0	1	132.0	9	474.0	24	399.6	24	1012.6	58
1982	—		230.8	12	183.8	12	164.6	13	579.2	37
1983	—		297.2	14	616 9	34	234.0	16	1148.1	64
Mean	18.1	1.0	146.8	8.5	366 3	19.2	308.8	17.0	840.0	45.7
C. V. (%)	188		111		75		72			
Percentage to total	2.2		17.5		43.6		36 7		100	

northeast monsoon is found to be more dependable with well distributed rainfall as indicated by the lowest co-efficient of variation (72%) followed by southwest monsoon (75%).

The mean monthly rainfall, rainy days and CV are given in Table 2. The highest rainfall (170mm) was recorded during October followed by September (155 mm), August (104 mm) and May (102 mm) representing 20.2, 18.4, 12.4 and 21.1 per cent respectively. The rainfall during January (7.1 mm), February (11.0 mm) and March (12.4 mm) was less. The number of rainy days also followed the same trend as that of rainfall. Rainfall received during October was more reliable (CV 32%) followed by September (45%) and May (51%).

The mean weekly rainfall, rainy days and CV, are given in Table 3. The rainfall was at its peak (52.55mm) in 38th standard week (Sep. 17-23) followed by 40th, 35th, 41st, 43rd, 37th, 44th, 42nd and 39th week (August 27-Sep. 2 and Sep. 10-December 4). The 20th, 21st weeks (May 14-27) in summer, 30th (July 23-29) and 33rd to 46th week (August 13-November 18) in Southwest and Northeast monsoon period received more than 20 mm of rainfall per week and could be considered as riskfree periods for crop growth. The rainfall in 1st to 15th Standard week (Jan. 1 April 15th), 24th to 26th week (June 4-July 1), 51st and 52nd week (December 17-31) was moisture stress period ($<$10 mm). For favourable and successful crop growth, the standard weeks 17th, 19th, 20th 21st, 27th, 34th to 36th, 38th to 47th were more reliable and dependable as the co-effecient of variation was less than 50 per cent. The rainy days also followed the same trend as that of rainfall.

The common agriculural land use pattern was single long duration crop or two crops during southwest and northeast monsoon periods. In certain pockets two crops were grown making use of summer showers also.

Groundnut (*Arachis hypogaea*) occupied the major area followed by sorghum and little millet. Ground nut was sown during middle of July and harvested in October. For every 6-8 rows of groundnut one row of redgram *(Cajanus Eajan)* was sown as intercrop and castor *(Ricinus communis)* as mixed crop. After groundnut, horsegram (*Macrotyloma uniflorum*) was sown as second crop in the same field making use of northeast monsoon rain.

The long duration lax panicle photosensitive sorghum cultivar co 19 (*Sorghum roxburghili*) was sown during July mixed with lablab (*Dolich*,

lablab), redgram and castor at different proportions.

Table 2 Mean monthly rainfall, rainy days and C.V.

Months	Rainfall (mm)	Contribution to annual (%)	C. V.	Rainy days
January	7.1	0.8	143	0.56
February	11.0	1.4	194	0.47
March	12.4	1.5	174	0.56
Aprial	32.5	3.9	109	2.22
May	102.0	12.1	51	5.79
June	36.6	4.4	84	3.03
July	70 3	8.4	59	4.15
August	104.4	12.4	61	5.50
September	155.0	18.4	45	6.53
Octobe	169.9	20.2	32	9.53
November	95.8	11 4	66	4.59
December	43.0	5.1	101	2.89
Annual	840 0	100		45.71

Little millet (var.Local) cultivar (*Panicum milaire*) was sown in marginal and fertile lands when the receipt of rainfall was delayed beyond July and horsegram was sown during October/November.

Based on the critical analysis of rainfall the risk free weeks for crops were 20th to 24th and 33rd to 47th weeks. From July first week (27th week) onwards, the rainfall was more than 15mm per week.

On receipt of rain during 2nd or 3rd week of July, the improved groundnut varieties Co. 1, JL 24, TMV 7 and TMV 12 can be recommended for sowing. In addition application of micronutrient mixture gypsum application and moisture conservation practices like random tie riding can be followed. After harvest of groundnut, cowpea or horsegram can be sown. Gopalaswamy and Narayanan (1985) found that for redsoil drylands of Dharmapuri district sowing of cowpea during the month of September was more remunerative and for late sowing horsegram was more suitable.

In places where long duration Co. 19 sorghum was sowu, short duration sorghum Co. 25/Co. 26 could be sown with intercrops of redgram, leblab and castor. With a view to increase the cropping intensity and income of the farmer, it is suggested that cowpea, blackgram and greengram can precede the sorghum during June/July. Budhar *et al* (1985b) found that in redsoil drylands greengram (Co. 3) followed by short duration sorghum (Ce. 25)+cowpea (Co. 152) gave angrain yield of 1029 kg pulse, 686 kg sorghum and 49 kg cowpea per hectare with a return of Rs. 2.89 per rupee invested when the rainfall was favourable.

In fields where little millet was grown, an improved variety Paiyur-1 can be recommended. After the harvest of little millet during September, a second crop of cowpea can be sown. For redsoil drylands, Budhar *et al* (1984a) found that if souhtwest monscon failed, the farmer could choose a short duration high yielding

Table 3 Mean weekly rainfall, rainy days and C. V.

Std. Week	Month and date	RF	CV%	RD	Std. week	Month date	RF	CV%	RD
1	Jan. 1- 7	3.57	77	0.24	27	July 2-8	19.52	48	0.68
2	8-14	2.54	108	0.21	28	9-15	12.54	84	0.78
3	15-21	0.68	148	0.09	29	16-22	15.40	52	0.97
4	22-28	—	—	—	30	23-29	20 17	52	1.29
5	Feb. 29- 4	1.88	140	0.09	31	Aug 30-5	18.72	56	1.29
6	5-11	—	—	—	32	6-12	11.62	50	0.76
7	12-18	0.91	205	0.06	33	13-19	20.12	10	1.00
8	19-25	8.20	98	0.35	34	20-26	28.92	39	1.44
9	26-4	0.31	274	0.03	35	27-2	42.30	23	1.65
10	Mar. 5-11	4.15	170	0.12	36	Sep 3-9	25.42	40	1.29
11	12-18	1.46	161	0.09	37	10-16	34.75	56	1.71
12	19-25	3.73	140	0.24	38	17-23	52.55	18	2.29
13	26- 1	3.02	171	0.12	39	24-30	30.85	45	1.74
14	Apr. 2- 8	2.16	198	0.18	40	Oct. 1- 7	44.26	25	2.21
15	9-15	3.59	139	0.29	41	8-14	42.13	22	2.18
16	16-22	15.34	66	0.74	42	15-21	31.00	40	2.06
17	23-29	11.36	45	0.65	43	22-28	34.92	45	2.15
18	May 30- 6	15.74	80	0.85	44	Nov. 29- 4	34.05	50	1.47
19	7-13	17.20	40	1.06	45	5-11	27.22	50	1.59
20	14-20	31.69	41	1.85	46	12-18	21.60	49	1 32
21	21-27	27.83	43	1.44	47	19-25	18 04	47	1,21
22	28- 3	16.74	62	1.21	48	26- 2	13.00	81	0.62
23	Jun 4-10	13.47	79	0.85	49	Dec. 3- 9	17.47	64	1.00
24	11-17	7.35	71	0.71	50	10-16	12.36	77	0.65
25	18-25	7.07	100	0 53	51	17-23	3.69	74	0.24
26	25- 1	6.14	94	0.35	52	24-31	3.52	99	0.26

sorghum variety or blackgram, greengram and cowpea to secure higher production and income during northeast monsoon.

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