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A STUDY OF PATTERN OF RAINFALL OF CROP RESEARCH STATION – MASODHA (U.P.)

1.   Various approaches and parameters have been used to characterize rainfall of a locality .Suresh *et al.*, (1993) studies rainfall for investigation of the agricultural drought at Pusa farm (Bihar). Recently, Chaudhary and Tomar (1999) reported that the rice productivity in Chhattisgarh region of Madhya Pradesh was highly dependent on favourable situations like more number of stable rainy days and amount of rainfall. Venkalesh (1998) utilized weekly rainfall, fixed probability and entire monthly relations to identify most favorable period for sowing kharif crops. In Orissa, crop plans were prepared based on the frequencies of dry and wet spells (Pradhan *et al.* 1999). In this paper, we study the pattern of rainfall data of 25-paddy seasons (1975-99) at Crop Research Station, Masodha under N.D.U.A.& Technology, Kumarganj, Faizabad (U.P.) by adopting criteria used by Sharma *et al.* (1979).

2.   *Materials and methods* – Weekly rainfall data for 25 years (1975-99) collected from meteorological observatory , Masodha, were analysed to predict drought pattern and expected monthly and seasonal rainfall at different probability level.

TABLE 1

The amount of rainfall (mm) for abnormal or normal months

Month	Average rainfall (mm)	Drought (less than) (mm)	Abnormal (more than) (mm)	Normal (range between) (mm)
June	131.59	65.80	263.18	65.80-263.18
July	377.40	188.70	754.81	188.70-754.81
Aug	254.28	127.14	508.56	127.14-508.56
Sept	187.64	93.82	375.29	93.82-375.29
Oct	51.13	25.56	102.26	25.56-102.26
Nov	6.49	3.24	12.98	3.24-12.98
Season	1008.54	762.62	1254.47	762.61-1254.47

Total number of months 150 for 25 paddy seasons (1975-99)
% of normal paddy season = 68
% of abnormal paddy season = 20
% of drought paddy season = 12

Computation of drought - The criteria used by Sharma *et al.* (1979) were adopted for computing drought.

Drought month - Any month receiving rainfall less than 50% of the average monthly rainfall.

TABLE 2

The weekly expected rainfall values at different confidence intervals (in percentage) at CRS-Masodha

| Week	50%	90%	95%	98%	99%	99.9%
			June			
I	(3.301, 7.723)	(0.031, 10.993)	(0, 12.114)	(0, 13.492)	(0, 14.486)	(0, 17.531)
II	(30.590, 44.386)	(20.393, 54.583)	(16.894, 58.082)	(12.595. 62.381)	(9.496, 65.480)	(0, 74.977)
III	(33.067, 48.805)	(21.0435, 60.437)	(17.444, 64.428)	(12.540, 69.332)	(9.005, 72.867)	(0, 83.701)
IV	(40.580, 61.338)	(25.268, 76.668)	(20.008, 81.928)	(13.546, 88.390)	(8.887, 93.049)	(0, 107.327)
			July			
I	(39.451, 59.949)	(24.300, 75.100)	(19.101, 80.299)	(12.714, 86.686)	(8.109, 91.291)	(0, 105.403)
II	(79.980, 105.964)	(60.774, 125.170)	(54.184, 131.760)	(46.088, 139.856)	(40.251, 145.693)	(22.363, 163.581)
III	(44.431, 55.433)	(36.300, 63.564)	(33.510, 66.354)	(30.082, 69.782)	(27.610, 72.254)	(20.037, 79.827)
IV	(42.062, 58.882)	(29.629, 71.315)	(25.363, 75.581)	(20.121, 80.823)	(16.343, 84.601)	(4.763, 96.181)
V	(43.393, 58.995)	(31.861, 70.527)	(27.904, 74.484)	(23.042, 79.346)	(19.537, 82.851)	(8.797, 93.592)
			August			
I	(51.106, 65.902)	(40.169, 76.839)	(36.417, 80.591)	(31.806, 85.202)	(28.482, 88.526)	(18.297, 98.712)
II	(92.325, 119.931)	(71.921, 140.335)	(64.920, 147.336)	(56.318, 155.938)	(50.117, 162.139)	(31.113, 181.143)
III	(79.311, 106.801)	(58.991, 127.121)	(52.019, 134.093)	(43.453, 142.659)	(37.277, 148.835)	(18.352, 167.760)
IV	(65.606, 89.274)	(48.112, 106.768)	(42.109, 112.771)	(34.734, 120.146)	(29.417, 125.463)	(13.124, 141.756)
			September			
I	(47.363, 66.917)	(32.909, 81.371)	(27.950, 86.330)	(21.857, 92.423)	(17.464, 96.816)	(4.003, 110.278)
II	(55.716, 79.500)	(38.136, 97.080)	(32.104, 103.112)	(24.693, 110.523)	(19.350, 115.866)	(2.977, 132.239)
III	(26.607, 40.697)	(16.193, 51.111)	(12.619, 54.685)	(8.229, 59.075)	(5.064, 62.240)	(0,71.940)
IV	(17.696, 26.216)	(11.390, 32.514)	(9.238, 34.674)	(6.583, 37.329)	(4.669, 39.243)	(0,45.109)
			October			
I	(24.344, 49.864)	(5.481, 68.727)	(0, 75.200)	(0, 83.152)	(0, 88.884)	(0,6.453)
II	(7.227, 17.053)	(0, 24.315)	(0, 26.807)	(0, 29.869)	(0, 32.076)	(0, 38.840)
III	(10.367, 22.113)	(1.684, 30.796)	(0, 33.775)	(0, 37.435)	(0, 40.074)	(0, 48.160)
IV	(0.263, 0.641)	(0, 0.921)	(0, 1.016)	(0, 1.134)	(0, 1.219)	(0, 1.480)
V	(1.419, 4.707)	(0, 7.138)	(0, 7.972)	(0, 8.997)	(0, 9.735)	(0, 11.999)
			November			
I	(1.717, 4.411)	(0, 6.402)	(0, 7.085)	(0 7.924)	(0, 8.530)	(0, 1.384)
II	(0.362, 1.974)	(0.829, 3.165)	(0 3.579)	(0, 4.076)	(0,4.438)	(0,0.548)
III	(0.060, 0.324)	(0, 0.520)	(0, 0.588)	(0, 0.670)	(0, 0.730)	(0, 0.912)
IV	(1.311, 2.817)	(0.197, 3.931)	(0, 4.314)	(0, 4.783)	(0, 5.122)	(0, 6.159)
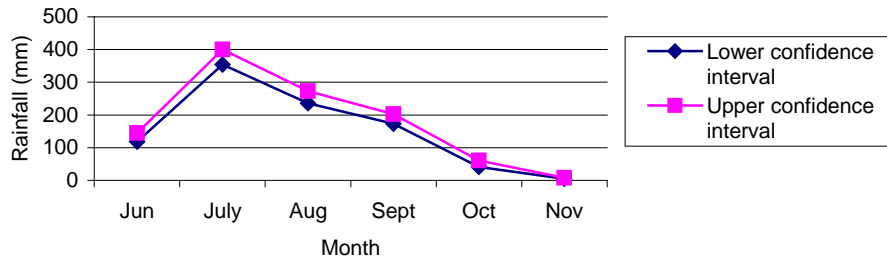
Fig.1. The monthly expected rainfall with 50% confidence interval
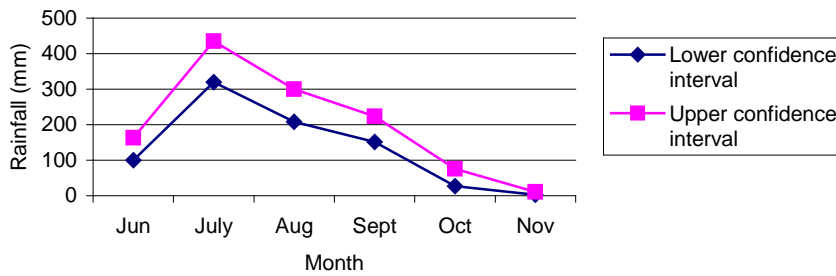

Fig. 2. The monthly expected rainfall with 90% confidence interval
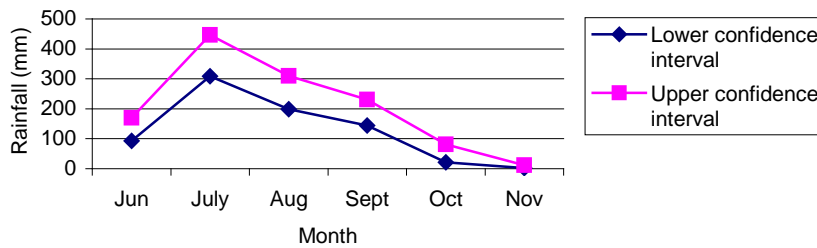

Fig. 3. The monthly expected rainfall with 95% confidence interval
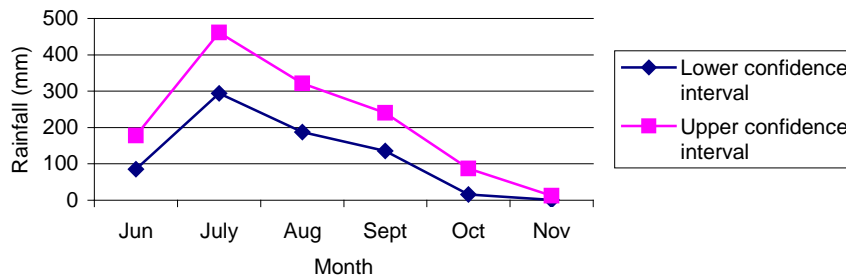

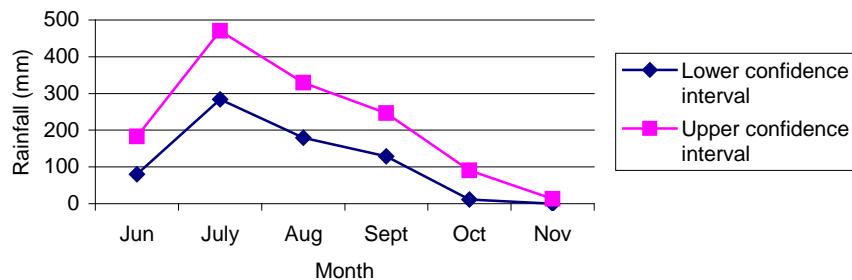**Fig. 4.** The monthly expected rainfall with 98% confidence interval

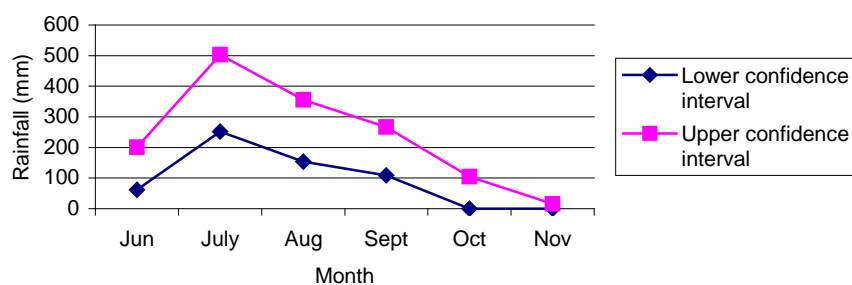**Fig. 5.** The monthly expected rainfall with 99% confidence interval

Fig. 6. The monthly expected rainfall with 99.9% confidence interval

Abnormal month - Any month receiving rainfall more than twice of average monthly rainfall.

Normal month - Any month receiving rainfall between 50% and 200% of the average monthly rainfall.

Drought season - Any year receiving rainfall less than or equal to X-S.D. In which X- is the mean and S.D. is the standard deviation of the annual rainfall.

Abnormal season - Any year receiving rainfall more than or equal to X+S.D.

Normal season - Any year receiving rainfall in the range of X±S.D.

Computation of expected rainfall - Expected weekly, monthly and seasonal rainfall were computed with the help of confidence intervals at different levels of probability for weekly, monthly and seasonal rainfall for paddy crops.

3. *Results and discussion* - The rainfall values for normal (N), abnormal (A) and drought (D) with average were estimated (Table 1).

Expected monthly rainfall - The seasonal, monthly and weekly expected rainfall values were determined with

the help of confidence intervals at different levels of probability *i.e.* 50%, 90%, 95%, 98%, 99% and 99.9% (Table 2) and the monthly-expected rainfall values with different (in percentage) confidence interval at CRS-Masodha are given in Figs. 1 to 6.

4. *Conclusion* - The knowledge of rainfall in any particular region is very helpful in sound crop planning. It is natural to imagine that total agricultural production depends, not only on the total rainfall in a season, but also on its pattern of occurrence such as amount of rainfall for abnormal or normal months, probability distribution of normal, abnormal and drought months and month wise distribution of normal, abnormal and drought months.

If the above informations are available about kharif season, then planning for preparation of beds for rice nursery and date of planting of nursery can be decide well in advance to raise the production of rice.

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