

### Short communication

## Weekly rainfall for crop planning in northern coastal region of Goa

S. MANIVANNAN, J. ASHOK KUMAR and H. R. PRABHUDESAI

Central Soil and Water Conservation Research & Training Institute: Research Centre  
Fernhill (PO), Udhagamandalam – 643 004

Precipitation is one of the most important factors deciding success of rainfed agriculture of the particular agro-ecological region. Total amount of rainfall and its distribution largely affect the crop growth. Seventy per cent rainfall occurs during the monsoon period, out of this crops use only small amount and its large portion ends as surface runoff. Detailed knowledge of the rainfall pattern helps in planning crop calendar and designing of different structures for flood control and for designing storage capacity of reservoirs to meet out the irrigation requirement during drought periods.

Coastal region of North Goa district is receiving annual rainfall of 2892 mm. Out of that 95 % of rainfall is distributed over four months period from June to September in 122 rainfall events. Though, the coastal region of North Goa receive higher rainfall, still many places experience severe water scarcity during summer month as the maximum amount of rainfall is received during monsoon period (June to September). As a result of this, moisture stress and drought, are adversely affected the productivity of horticultural crops like cashew, mango, arecanut, coconut etc. Hence, crop planning based on rainfall analysis is most important for sustainable crop production in these regions. For sustainable crop planning, rainfall was characterized in terms of its variability and probability distribution by many workers (Rana and Thakur 1998; Sharma *et al.*, 1979; Prakash and Rao, 1986; Sharma and Thakur, 1995; Mohanty *et al.*, 2000) in various regions. However, the rainfall analysis for crop planning in northern coastal region of Goa state was limited. Hence, an attempt was made to analyze the weekly rainfall data for crop planning in northern coastal region of Goa state.

The weekly rainfall data of 31 years (1969-1999) recorded at Panaji of northern coastal region of Goa were collected from Indian Meteorological Department, Pune. The values of weekly rainfall for 31 years were arranged in descending order and the data were assigned with rank numbers. The probability (P) of each rank was calculated by the Weibul's formula:

$$P = m / (N + 1) \times 100$$

Where, m = rank number, N = total number of years of record

Rainfall at probability levels 10, 20, 30, 40, 50, 60, 70, 80, 85, 90 and 95 per cents were worked and are presented in Table 1. It shows that maximum rainfall of 199.1 mm occurs during 25<sup>th</sup> week (18<sup>th</sup> to 24<sup>th</sup> June) followed by 153.5 mm during 24<sup>th</sup> week (11<sup>th</sup> to 17<sup>th</sup> June) at 70 per cent probability level. It is evident from Table 1, at 70 per cent probability level rainfall is received every meteorological week with effect from 23<sup>rd</sup> to 40<sup>th</sup> weeks. Field preparation and tillage operations could be initiated during 22<sup>nd</sup> week as assured rainfall at 60 per cent probability level receives at that week. Assured rainfall of 59.6 mm received from 4<sup>th</sup> to 10<sup>th</sup> June will be sufficient for direct sown paddy and other *kharif* crops. Sowing of seasonal vegetables like gourds, amaranthus, bhendi, cluster beans etc. may be taken up during 23<sup>rd</sup> week. Planting of horticultural crops like coconut, cashew, mango and other minor fruits could be taken up during 24<sup>th</sup> week as subsequent weeks receive assured rainfall at 80 per cent probability level which is sufficient for survival and establishment of horticultural crops. Preparation of nursery for paddy rising could be done during 23<sup>rd</sup> week (4<sup>th</sup> to 10<sup>th</sup> June) as sufficient assured rainfall of 98.4 mm receives at 60 percent probability level at that week. Sowing of paddy nursery can be taken up during 24<sup>th</sup> week enable to transplant the paddy during 28<sup>th</sup> week as assured rainfall of 74.6 mm receives at 80 percent probability level during that week. As evident from probable rainfall values at 70 per cent level, the monsoon rain could produce excess rainfall from 24<sup>th</sup> to 30<sup>th</sup> weeks which could be harvested and stored in smaller and larger farm ponds and subsequently be used for supplemental irrigation. Sowing of *rabi* crops could be taken up during 35<sup>th</sup> week as assured rainfall of 45.4 mm receives during that week at 70 per cent probability level. As there is long dry spell occurs from 44<sup>th</sup> week onwards at 60 per cent level, *rabi* crops having resistance for drought must be selected for this region. Rainfall from 44<sup>th</sup> week onwards at 60 per cent probability level is dismal low to be reliable. Hence, it is essential of supplemental irrigation for *rabi* crops from 44<sup>th</sup> week (29<sup>th</sup> October to 4<sup>th</sup> November) onwards. Farm ponds with silpaulin lining may be adopted for harvesting excess water during 24-30<sup>th</sup> weeks and same could be utilized from 44<sup>th</sup> week onwards for supplemental irrigation.

### REFERENCES

Mohanty, S., Marathe, R.A. and Singh, S. (2000). Probability

**Table 1:** Probability of weekly rainfall in coastal region of North Goa

Probability (%)	95	90	85	80	70	60	50	40	30	20	10
Return period (Years)	1.05	1.11	1.18	1.25	1.43	1.67	2.00	2.50	3.33	5.00	10.00
Std week	Rainfall (mm)										
20	0	0	0	0	0	0.1	0.1	0.2	0.8	8.5	33.9
21	0	0	0	0	0.1	0.6	1.5	3.7	4.7	28.7	98.7
22	0	0	0	0	1.1	6.6	14.2	37.2	56.1	133.2	241.9
23	0	0.2	10.3	14.3	59.6	98.4	144.0	167.2	223.4	265.8	318.4
24	8.3	27.8	59.5	85.5	153.5	172.7	235.4	285.6	317.5	389.4	572.6
25	20.5	33.0	43.9	64.2	199.1	156.7	225.1	259.1	282.0	427.8	462.1
26	27.3	36.8	70.0	71.9	138.2	162.7	216.8	252.1	352.5	434.8	564.2
27	31.5	48.0	69.4	75.4	106.8	145.2	162.2	199.2	222.1	298.5	405.0
28	25.1	49.8	74.2	74.6	125.3	153.5	176.7	236.0	252.4	347.8	417.5
29	24.5	26.7	59.9	62.6	102.5	145.5	206.6	235.3	269.0	344.0	516.5
30	27.5	34.8	82.9	98.3	130.5	145.8	174.9	203.5	249.6	335.9	525.0
31	26.4	29.8	46.3	58.3	90.8	132.3	132.9	178.5	242.1	303.7	428.5
32	39.9	62.1	63.7	64.4	81.7	98.5	122.0	178.1	216.1	251.8	402.7
33	7.8	22.8	44.5	49.8	60.7	92.5	102.6	117.5	157.2	246.9	256.3
34	4.9	5.8	25.1	29.8	57.4	69.3	82.9	99.5	107.3	155.7	188.9
35	10.6	15.6	24.0	25.4	45.4	72.6	83.8	107.6	118.3	166.5	264.0
36	0.8	0.9	6.8	9.4	28.7	40.6	55.2	69.9	82.2	114.6	188.1
37	0	1.2	7.6	7.9	18.3	23.1	29.1	42.4	45.9	63.8	129.7
38	0	0	0.9	3.1	7.0	8.8	24.4	33.7	37.6	112.7	153.4
39	0	0.2	3.2	3.3	10.0	16.0	23.7	34.2	39.7	91.8	112
40	0.3	0.3	0.8	1.5	5.8	10.9	14.9	26.5	36.4	93.5	163.6
41	0	0	0	0	1.1	1.6	4.2	12.2	22.2	51.2	95.7
42	0	0	0	0	0	1.0	2.8	3.6	29.9	49.9	136.5
43	0	0	0	0	0	0.7	4.9	9.3	15.1	25.2	57.9
44	0	0	0	0	0	0	0	4.2	9.0	26.8	32.8
45	0	0	0	0	0	0	2.4	4.4	13.4	32.9	43.3
46	0	0	0	0	0	0	0	0.1	1.1	9.2	27.6
47	0	0	0	0	0	0	0	0	0.2	4.0	37.9
48	0	0	0	0	0	0	0	0	0	0.2	4.6

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