

Rainfall analysis in relation to paddy crop in coastal saline soils at Panvel

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ABSTRACT

The rainfall data of 26 years (1975-2000) of Agrometeorological Observatory, Khar Land Research Station, Panvel has been analyzed to evolve rainfall based cropping system with minimum risk to utilize the rainfall efficiently for increased production. The mean annual rainfall is worked out as 2854.3 mm. *Kharif*, *rabi* and summer season receive 2683.9, 151.9 and 18.7 mm rainfall respectively. The month of July receives highest (1010.8 mm.) rainfall and March (0.03 mm) lowest. About 94.0 percent of total annual rainfall is received in *kharif*. Sowing of *kharif* crop is advocated from 2nd and 3rd week of June. The month of July is regarded suitable for transplanting of rice in coastal saline soils. *Rabi* crop needs assured irrigation.

Key words : Rainfall pattern, Rainfall probability, Crop planning.

The Indian sub continent receive adequate amount of rainfall annually through the four different types of weather phenomena- southwest monsoon(74%), northeast monsoon(3%), per-monsoon (13%) and post monsoon(10%). The distribution in time and space is erratic thus resulting in a limitation on the length of crop growing periods or the occurrence of floods. Panvel is located on the west coast of major rice producing belt of the Maharashtra State. To follow a profitable cropping system under rain fed condition, the primary need of the farmers is to know when and where to sow and reap for successful cultivation with proper utilization of available rainwater (Sarma *et al.*, 1996).

In most of the studies the workers (Sharma *et al.*, 1979, Ray *et al.*, 1980, Suresh *et al.*, 1992, Tiwari *et al.*, 1992, Rana

and Chakor, 1995; Rana and Thakur, 1998 and Srivastav *et al.*, 1998) have suggested the cropping pattern considering the rainfall amount at different probability levels. Keeping this in view, rainfall data of Agro meteorological observatory, KLRS, Panvel were analyzed for evolving rainfall based profitable cropping system for the region.

MATERIALS AND METHODS

The rainfall data recorded at Agro-meteorological observatory, KLRS, Panvel for the period 1974-2000 were used for the analysis. The weekly (in terms of meteorological standard weeks, MSW), monthly and seasonal totals of rainfall have been computed and analyzed adapting procedure suggested by Panse and Sukhatme (1985) and SD, SE, were calculated. The probabilities were calculated

by using Weibull formula (Chow, 1964),

$$P = m/N+1 * 100$$

where,

P = plotting positions, percent

m = is rank of magnitude

N = Number of observations

RESULTS AND DISCUSSION

Weekly rainfall and its probability

Mean and expected weekly rainfall at different probability levels (Table 1) showed that from 23rd meteorological week onwards the rainfall was recorded within the range of 53.0 mm to 295.0 mm per week and continued up to 39th week. The total rainfall received during this period was 2638.8 mm representing 92.4 per cent of annual rainfall. Table 1 indicate that 29th week has the highest rain, contributing 295.0 mm and 38th week recorded the lowest rainfall of only 53.0 mm.

At 50 per cent chance no rainfall is assured in 22nd week. A rainfall of more than 100 mm per week occurs from 25th to 34th week at 50 per cent probability.

Probilities at 80 per cent level for the corresponding weeks 30,33 and 38 show expected rainfall of 67.4,45 and 3.6 mm. The probabilities for the week 38 even at 50 per cent probability level show cessation of monsoon conditions over the region with possibility of 60 mm of rainfall in week 39 in a few years.

Crop planning

The major crop of the region is paddy which is of about 120-125 days duration.

Lowland of this region is characterized by having better moisture holding capacity and fertility. The crop planning of this area can be done at 50 per cent probability level so that early sowing of paddy crop for nursery can be done in 23rd and 24th week for better germination. These soils are having high (about 45%) clay content and low hydraulic conductivity. Therefore, germination will be difficult after these weeks. Thus, the growth of standing crop may be such that they can resist severe water logging expected in 29th week. At 50 per cent probability total rainfall received at end of 27th week (befor the transplanting) could be 549.1 mm, which is sufficient to flush out salts by rainwater and create favorable soil conditions for transplanting. As regards to rahu planning (broadcasting of sprouted seed), 26th and 27th weeks are suitable for better water logging expected in 29th and 30th week. The expected growth stages of rahu crop during 30,33 and 38 weeks would be tillering, panicle initiation and maturity respectively. The transplanting of paddy should be completed in the month of July. Salt tolerant paddy varieties i.e. Panvel-1, Panvel-2 and Panvel-3 may be used by farmers to withstand salinity variation in coastal saline soils during intermittent dry spells. These varieties mature by the end of September and can be safely harvested at the end of October. There is scope for water harvesting in on - farm reservoir during the 25th to 34th week. As such there is no source of good irrigation water in coastal saline soils. Ground water is brackish and not suitable for irrigation.

To make the use of residual moisture direct sowing of *rabi* immediately after the harvest of *kharif* crop could be tried upon.

Table 1 : Weekly rainfall at different probability levels at Panvel

Met. Week No	Period	Mean	Probability levels (%)				
			90	80	70	60	50
22	28May-3 June	16.4	0	0	0	0	0
23	4-10 June	8.8	0	1.0	10	12.4	18.8
24	11-17 June	96.9	2.2	5.6	49.4	53.8	63.8
25	18-24 June	180.6	0	28.6	63.8	88.0	141.2
26	25-1 July	189.0	6.8	32.0	74.4	102.6	145.7
27	2-8 July	226.0	33.8	55.0	74.6	96.6	179.6
28	9-15 July	187.9	27.8	48.2	82.4	104.8	121.4
29	16-22 July	295.0	47.9	57.6	113.8	183.0	264.6
30	23-29 July	219.2	45.8	67.4	106.8	140.6	222.2
31	30-5 August	189.6	32.2	51.4	66.2	68.8	126.0
32	6-12 August	183.8	29.8	71.0	81.2	89.2	127.4
33	13-19 August	167.5	22.2	45.0	57.8	75.8	100.0
34	20-26 August	163.2	1.8	19.4	53.6	67.4	105.2
35	27-2 Sept	132.7	11.4	39.2	48.8	55.0	78.6
36	3-9 Sept	124.6	7.0	27.2	50.9	71.6	91.8
37	10-16 Sept	57.7	0	14.8	17.4	19.6	37.3
38	17-23 Sept	53.0	0	3.6	11.6	18.1	21.0
39	24-30 Sept	84.0	0.6	22.7	32.2	35.3	60.0
40	1-7 Oct	43.9	0	0	5.6	15.8	26.1
41	8-14 Oct	42.2	0	0	0	0	3.8
42	15-21 Oct	30.4	0	0	0	0	0

However, *rabi* crops are possible where assured irrigation facilities are available in coastal saline soils.

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