

## PREDICTION OF SOWING RAINS DURING SOUTHWEST AND NORTHEAST MONSOON SEASONS AT COIMBATORE

1. Rainfall data for 80 years (1907-86) were used to predict the probability of getting sowing rains (20 mm) during southwest and northeast monsoon seasons at Coimbatore (Tamil Nadu) by employing constant probability analysis. The highest probability of getting sowing rains during the southwest monsoon period is only 38.2 per cent in the third week of July (29th standard week). In the pre-northeast monsoon period the probability of having sowing rains during the 4th week of September (39th standard week) is with 61.7 per cent probability. This would enable advance dry seeding in 'vertisols' during 2nd or 3rd week of September (37th and 38th standard weeks). The sowing rain probabilities are as high as 62 per cent during the 1st and 2nd week of October (40th and 41st standard weeks) in the northeast monsoon period. The probability is further increased to 75 per cent in the subsequent weeks of October.

2. Adequate rainfall climatology has to be built up, for developing dry land agriculture on a firm scientific basis. This involves adoption of more realistic criteria to time of receiving sowing rains. It is also necessary to estimate the sufficiency/deficiency of rainfall to sustain the seedling growth subsequent to the sowing rains. Estimates on the probabilities of receipt of sowing rains in a locality would facilitate dry seeding

practices especially in black soils areas. Advance dry seeding would, not only ease the labour pressure but also offers ample scope for effective utilization of the first soaking rain. In determining the rainfall probabilities, the common approach is to fit the mathematical function to the rainfall data. In the probability analysis, two approaches, *viz.*, constant precipitation analysis and constant probability analysis have been suggested (Sivakumar *et al.* 1984). The criteria for estimating the receipt of sowing rains was suggested as 25 mm in a period of 7 days (Raman 1979). In this paper, the probabilities of receiving sowing rains during southwest and northeast monsoon seasons at Coimbatore are discussed.

3. *Materials and methods*— The rainfall data collected at the Agri-met Unit of the Tamil Nadu Agricultural University, Coimbatore for the past 80 years (1907-86) were analysed for the probabilities at different levels. The criteria for determining the sowing rains is taken as 20 mm in a period of 7 days. The probabilities of receiving 15, 20, 25, 30, 35, 40, 45 and 50 mm of rainfall were computed with following relationship :

$$P = \frac{\bar{x} - x}{SD}$$

where,  $P$  = Probability level,  $\bar{x}$  = weekly mean rainfall (mm)

$x$  = Anticipated rainfall (mm)

SD = Standard deviation of the respective week.

TABLE 1

Rainfall probability during southwest and northeast monsoon periods at Coimbatore

| Month                        | Date  | Stand. week | Rainfall (mm) |      |      |      |      |      |      |      | Mean rainfall | Mean No. of rainy days |
|------------------------------|-------|-------------|---------------|------|------|------|------|------|------|------|---------------|------------------------|
|                              |       |             | 15            | 20   | 25   | 30   | 35   | 40   | 45   | 50   |               |                        |
| <b>Southwest monsoon</b>     |       |             |               |      |      |      |      |      |      |      |               |                        |
| Jul                          | 2-8   | 27          | 46.4          | 34.4 | 30.2 | 15.8 | 8.2  | 4.5  | 2.8  | 0.2  | 13.1          | 0.9                    |
|                              | 9-15  | 28          | 38.2          | 27.4 | 15.7 | 8.1  | 4.4  | 1.8  | 0.8  | 0.1  | 11.6          | 0.5                    |
|                              | 16-22 | 29          | 46.2          | 38.2 | 38.0 | 24.2 | 21.1 | 15.2 | 11.5 | 8.1  | 11.3          | 0.7                    |
|                              | 23-29 | 30          | 43.0          | 30.8 | 21.1 | 11.5 | 6.6  | 3.6  | 1.8  | 8.2  | 11.6          | 0.5                    |
| <b>Pre-northeast monsoon</b> |       |             |               |      |      |      |      |      |      |      |               |                        |
| Sep                          | 3-9   | 36          | 24.2          | 11.5 | 5.4  | 1.8  | 0.8  | 0.13 | 0.2  | 0.8  | 5.6           | 0.3                    |
|                              | 10-16 | 37          | 46.2          | 34.4 | 27.4 | 18.4 | 13.5 | 8.1  | 0.5  | 2.8  | 12.4          | 0.9                    |
|                              | 17-23 | 38          | 50.4          | 42.1 | 34.4 | 24.2 | 18.4 | 13.6 | 9.3  | 5.4  | 15.3          | 1.2                    |
|                              | 24-30 | 39          | 69.9          | 61.7 | 42.0 | 33.0 | 27.4 | 24.2 | 15.9 | 11.5 | 20.6          | 1.0                    |
| <b>Northeast monsoon</b>     |       |             |               |      |      |      |      |      |      |      |               |                        |
| Oct                          | 1-7   | 40          | 69.1          | 61.7 | 59.7 | 48.0 | 42.0 | 30.8 | 27.4 | 21.2 | 29.1          | 3.4                    |
|                              | 8-14  | 41          | 62.7          | 62.0 | 61.4 | 53.4 | 52.4 | 50.4 | 40.9 | 34.4 | 40.1          | 1.8                    |
|                              | 15-21 | 42          | 75.8          | 75.2 | 65.4 | 61.8 | 61.0 | 60.5 | 47.6 | 42.1 | 41.4          | 2.7                    |
|                              | 22-28 | 43          | 81.5          | 75.8 | 71.2 | 69.1 | 67.7 | 63.3 | 54.1 | 52.3 | 52.7          | 2.3                    |

The quotient values obtained through above formula were referred to a cumulative function of 'Z' table. If the quotient values had negative signs, the corresponding table values were deducted from one and the remainder expressed in terms of percentage. If the quotient values had positive signs, the corresponding table values were directly expressed in per cent (Anderson and Clove 1978).

The threshold amounts are chosen to decide upon the appropriate rainfall quantity which are considered adequate for different cultural operations like preparatory cultivation, sowing and intercultivation.

4. *Results and discussion* — The probabilities of getting, 15, 20, 25, 30, 35, 40, 45 and 50 mm of rainfall during southwest, pre-northeast and northeast monsoon periods for Coimbatore are presented on (Table 1).

4.1. *Southwest monsoon* — Dryland sowings are usually done during the month of July in red soil areas of Coimbatore. The lands are prepared by making use of the summer showers received during the month of May. The probability of receiving sowing rains (20 mm)

during the 27th standard week is only 34.4 per cent and it decreases to 27.4 per cent during 28th week. The highest probability of 38.2 per cent is observed during 29th standard week followed by 30th week. In general, the probabilities of getting sowing rains during southwest monsoon period appear to be not highly dependable because of the rain shadow effect of the Western Ghats. Considering the rainfall probabilities for sowing the crop and subsequent establishment of the seedlings, drought tolerant crops, like sorghum/pearl millet/pulses can be sown.

4.2. *Pre-northeast monsoon* — The second half of September (38th & 39th standard weeks) forms the transitional period of the southwest and northeast monsoon seasons at Coimbatore. The probability of receiving sowing rains during the first week of September is only 11.5 per cent and it increases to 34.4, 42.1 and 61.7 per cent respectively during 2nd, 3rd and 4th weeks of September. Since the sowing rain probability during the 4th week of September (39th standard week) is fairly dependable, dry seeding can be advocated during 37th and 38th weeks (2nd and 3rd weeks of September).

4.3. *Northeast monsoon* — During the retreating monsoon period (Northeast monsoon) the possibility of getting sowing rains during the 40th and 41st weeks (October 1st and 2nd weeks) remains fairly high with 61.7 and 62.0 per cent probability respectively. The probability increases to 75.2 and 75.8 per cent respectively during 42nd and 43rd standard weeks (October 3rd and 4th weeks). During the last two weeks of October, the probability for even getting higher quantum of 40 mm rainfall remains more than 60 per cent of probability.

5. The probability analysis of rainfall of Coimbatore indicates that the possibility of sowing rains during southwest monsoon season is bleak. The possibility of dry seeding in vertisols is brighter during 37th or 38th standard week as the probability of getting sowing rains is fairly high in 39th and subsequent weeks in October.

#### References

- Anderson, T.W. and Clove, S.L., 1978, *An introduction to the Statistical Analysis*, Houghton Millifin Co., U.S.A., pp. 660 and 661.
- Raman, C.R.V., 1974, "Analysis of commencement of monsoon rains over Maharashtra State for Agricultural Planning", India Met. Dep. Sci. Rep. No. 216.
- Sivakumar, M.V.K., Kenate, M. and Virmani, S.M., 1984, Agrocimatology of West Africa, Mali, *Information Bulletin* No. 19, ICRISAT, India.

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