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A Case Study :

Probabilities and variability of rainfall in Peninsular India

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The rainfall analysis was carried out as per availability of data and was collected from India Meteorological Department for study purpose in peninsular India for the period of 1947-2005. The analysis of rainfall consisted of north, central and southern part of the drought prone area of Maharashtra and was carried out for weekly, monthly, seasonal and annual periods. The result indicated at Rahuri the rainfall probability was highest in 24 MW (61 %) with less variability (CV. 86 %) indicated suitability for sowing of *kharif* crops could be undertaken. The sowing of *rabi* crops could be under taken in MW 39 having high probability (>60 %) and less CV (95%). At Kopergaon the rainfall analysis indicated the critical situation for *kharif* as well as for *rabi* season showing more variability during the *kharif* coupled with long dryspells in *kharif* season. Chances of successful of *kharif* season at Chas was very meager due to high variability in 25 MW to 37 (CV. 118 to 222%). The rainfall analysis of southern part representing Jeur, Mohol, Pandharpur, Padegaon and Solapur revealed the highest probability (>50%) of getting > 20 mm rainfall was observed in 38 to 40 MW with less varibility (CV.86 to 110 %) indicated *rabi* dominance. However, *kharif* crops can be possible in 25 MW at Solapur and 26 MW at Pandharpur as during these weeks there was less variability in rainfall (97 to 98 %). At Solapur under delayed onset of monsoon. The northern part, representing Dhule is *kharif* oriented as evidenced by highest initial rainfall probabilities in 25 MW and 26 (> 55 %) and less variability. Delayed sowing of *kharif* crops can be possible in 30 and 31 MW as variability of *kharif* rainfall is less (CV. 102 to 109 %), however, there after their was drastic increase in variability with low probability.

A dryland farmer has to perform many readily identifiable weather related operations from land preparation to harvest of the produce and its post-harvest preservation. According to Mavi (1994), three fourths of the annual losses in crop production are resulted by unfavourable weather.

The weather and its variability is well known to the farming community and it has great impact on crop production. The economy of the farmer is well influenced by weather. It also plays an important role in the economy of the state and even of the country. Moisture is the most limiting factor for crop production in semi-arid region, the greatest risk to crop yields in Indian agriculture is attributed to the variability of seasonal rainfall and the uncertainty in the amount and distribution of rainfall for a given season (Virmani *et al*., 1980)

In the same manner an analysis of denied weather data gives an idea about the water crop needs for a given location. Such studies have been reported by Siva Kumar *et al*. (1991) and Ramana Rao *et al*. (1994) hence rainfall data of 9 places in scarcity zone was analized for annual, monthly seasonal and weekly period.

The rainfall data was collected as per availability from 1947 to 2005 from the India Meteorological Department, Pune. The same data was used for analysis of the study. The rainfall probability and variability analysis was carried out by using Markov chain model. However dryspell and wetspell was calculated by using the formula given by Ramdas (1950).

Weekly rainfall probability:

Weekly initial wet P(W)) and conditional P(W/W))(previous week wet followed by this week wet) probabilities for getting rainfall >20 mm were worked out and presented in Table 1. The rainfall probabilities indicated that, there was no any week at any place having initial probability more than 70