

Short communication

Probability analysis of weekly rainfall for crop planning in Nilgiris hills of Tamil Nadu

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Rainfall is one of the important factors deciding success of rainfed agriculture of the particular agro-ecological region where the major part of the precipitation is rainfall. Crop growth and yield will be affected by the amount of rainfall received during the period and its distribution. 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 water harvesting structures to meet out the irrigation requirement during drought periods. Nilgiris hill ranges are located on the fragile environment of Western Ghats with an elevation ranging from 300 m to 2634 m above mean sea level. Major part of the Nilgiris is covered under forest (56%) followed by plantation crops (20%) like tea, coffee and remaining areas are covered by vegetables. Out of total annual rainfall of 1204 mm, 54 % of rainfall is distributed over four month period from June to September in 50 rainfall events and remaining amount of rainfall is distributed during January to May and October to December.

Though, the Nilgiris hill ranges receive comparatively higher rainfall, still many places experience severe water scarcity during summer months as the maximum amount of rainfall is received during South-west and North-east monsoon periods (June to December). Moisture stress due to frequent dry spells occurring during monsoon periods, adversely affects the productivity of plantations and vegetable crops in the region. 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 (Sharma *et al.*, 1979; Prakash and Rao, 1986; Sharma and Thakur, 1995; Rana and Thakur 1998; Mohanty *et al.*, 2000; Manivannan *et al.*, 2010) in various regions. However, the rainfall

analysis for crop planning in the Nilgiris of Tamil Nadu State was scanty and limited. Hence, an attempt was made to analyze the weekly rainfall data for crop planning in Udthagamandalam block of the Nilgiris.

The weekly rainfall data of 52 years (1961-2013) recorded at Regional Centre of Indian Institute of Soil and Water Conservation, Udthagamandalam were collected. Rainfall at the various probability levels 30, 50, 60 and 70 per cents were worked out for all 52 standard weeks using Weibul's formula. The weekly probable rainfall values for different probability levels have been depicted in Fig. 1.

The weekly probable rainfall values shows that maximum rainfall of 33.9 mm occurs during 40th week (1st to 7th October) followed by 31.4 mm during 42nd week (15th to 21st October) at 70 per cent probability level. It is evident from Fig. 1 that at 50 per cent probability level, minimum rainfall is received in every meteorological week from 15th to 50th weeks. Field preparation and tillage operations could be initiated during 16th (16th to 22nd April) week as assured rainfall of 14.6 mm at 50 per cent probability level is received during these weeks for the *Kharif* (17th to 28th Week) season (April to July). Simultaneously, nursery activities for *Kharif* crops may be initiated during 16th Week. Dependable rainfall of 16.6 mm received from 23rd to 29th April (17th week) will be sufficient for sowing of vegetable crops namely cabbage, broccoli, brussel sprout and chinese cabbage. Planting of vegetable crops like potato, beetroot, beans and radish and other minor vegetable crops could be taken up during 18th week as subsequent weeks receive assured rainfall at 80 % probability level which is sufficient for survival and establishment of vegetable crops.

Preparation of nursery for *rabi* season (August to November) crops namely cabbage, broccoli and radish could be done during 27th week (2-8th July) as sufficient assured rainfall of 15.4 mm received at 60% probability level in that week. Sowing of *rabi* crops namely potato, carrot,

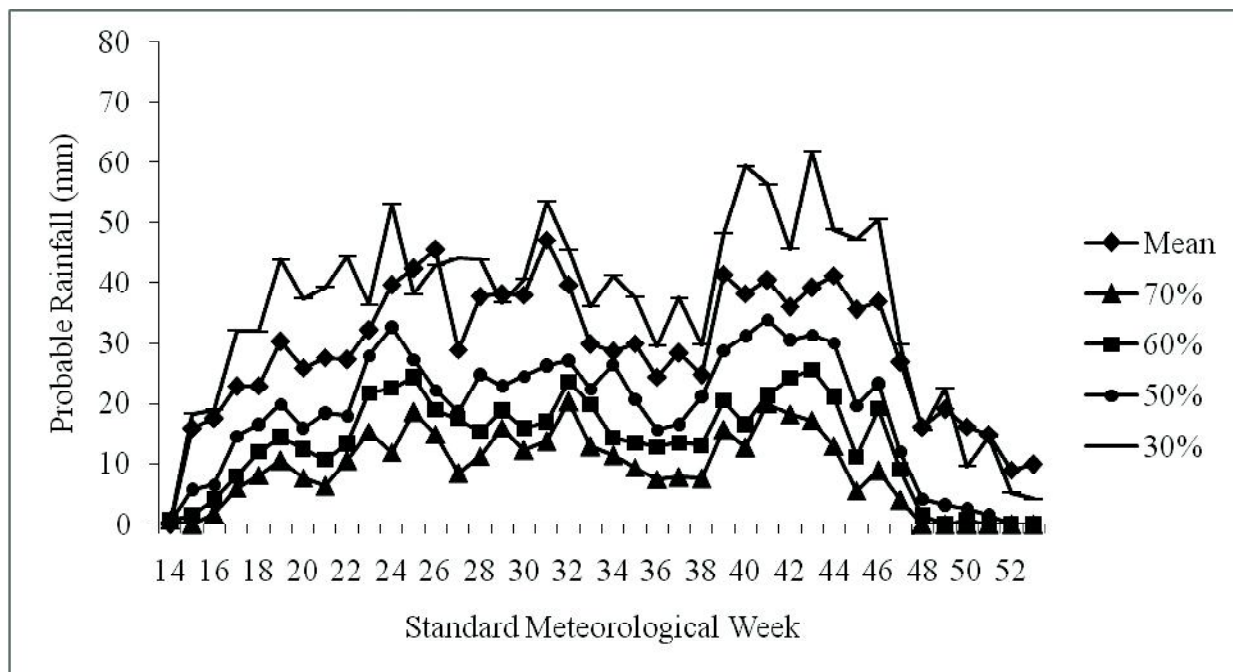


Fig. 1: Probability of weekly rainfall in Udhagamandalam block in Nilgiris

beans, turnip and radish can be taken during 32nd (6th to 12th August) week as assured rainfall of 12.9 mm received at 70% probability level during that week.

Sowing of irrigated crops (November to February) namely beans, carrot, radish and turnip may be taken up during 46th week (12 to 18th November) as minimum rainfall at 50% dependable rainfall will be available up to 51st week followed by irrigation with harvested rain water. As there is no long dry spell occurring from 18th week onwards at 50% probability level, both *kharif* and *rabi* season, farmers can cultivate all kind of rainfed crops especially vegetable crops. As evident from probable rainfall values at 50% level, the monsoon rain could produce excess rainfall from 20th to 45th weeks which could be harvested and stored in smaller and larger farm ponds and subsequently be used for supplemental irrigation for third crop.

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