

Short Communication

# Rainfall probability analysis for crop planning in Allahabad district of eastern Uttar Pradesh

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Probability analysis can be used for expecting the occurrence of future events of rainfall from the available data with the help of statistical methods. Probability and frequency analysis of rainfall at 80 per cent probability can be safely engaged as assured rainfall, while 50 per cent probability can be considered as the extreme limit for taking any risk (Gupta *et al.*, 1975). Length of the growing period (LGP) is defined as the period during which the availability of moisture in the root zone of a crop is adequate to meet the water needs. Because the amount and distribution of rainfall varies considerably from year to year so does the operative growing period. The length also depends on the type of soil relating with a given quantity of rainfall.

The daily rainfall data of Allahabad for the past 31 years (1985-2015) were collected from India Meteorological Department, Pune. The weekly rainfall amounts at probability levels of 50 and 75 per cent, were computed through incomplete gamma distribution technique (Chow, 1964).

Analysis revealed that more than 20 mm of rainfall could be expected during 26, 27 and 28<sup>th</sup> SMW at 50 per cent probability (Fig. 1) which shows the potentiality for rain water harvesting. At 75 per cent probability, at least 3 mm per week was expected during 25<sup>th</sup>-38<sup>th</sup> SMW which indicates potentiality for crop growing in dry-land areas. Whereas, with 25 per cent probability, the expected rainfall of more than 20 mm was observed from 26<sup>th</sup>-42<sup>nd</sup> SMW. The pattern and distribution of week by week assured rainfall indicates that the prospects of *kharif* crops in this area are good. Similar types of studies were reported by different scientists from different areas (Mehta *et al.*, 2002 and Goswami *et al.*, 2008).

The crop growing period in Allahabad region was from 24<sup>th</sup> to 42<sup>nd</sup> SMW (11 June-21 Oct) and the length of the growing period at 50 per cent rainfall probability was about 144 days and at 75 per cent rainfall probability the growing period reduces to 91 days. Since rainfall amounting to 20 mm

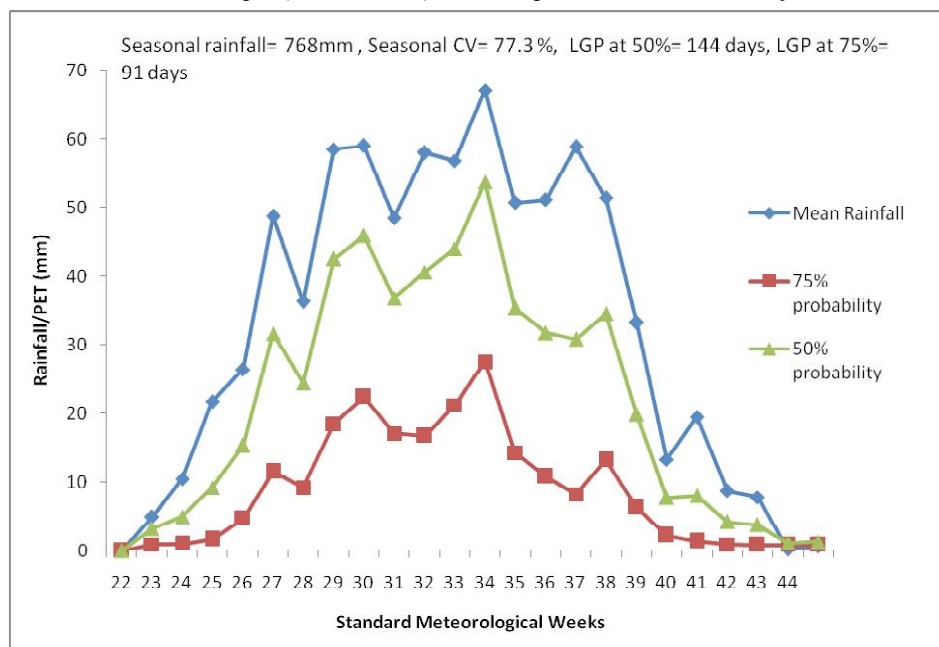


Fig. 1: Weekly rainfall and rainfall at 50 and 75 per cent probability

per week was almost adequate at all the growth stages of rainfed upland crops duration in weeks with assured rainfall eš 20 mm were considered to determine the length of cropping period. Optimum time for sowing of *khari* rainfed crop would be from 23<sup>rd</sup> to 26<sup>th</sup> with average weekly probable rainfall of 5, 9.2, 15.3 and 31.6 cm, respectively, at 50 per cent probability. From 24<sup>th</sup> SMW to 42<sup>nd</sup> SMW the value of MAI is greater than 90 per cent. Therefore, during these months' major parts of the study area have enough moisture to support crops like maize, wheat, rice, sugarcane, barley, lentil etc. Similar type of study was conducted by Singh *et al.* (2004) for Ranichauri, Uttarakhand and Gautam *et al.*, (2012) for *Tarai* region of Uttarakhand.

The inter-cultivation and other operations can be taken up during 34<sup>th</sup> to 37<sup>th</sup> SMW. The crop sown during 23<sup>rd</sup>-26<sup>th</sup> week, reaches the maximum growth or grand growth period during 33<sup>th</sup> to 34<sup>th</sup> week. During this stage crop requires highest amount of water, which is available during the period. Hence, successful dependable rainfed cropping of cereals/pulses and fodder can be taken up during South-west monsoon. Preparation of nursery for *rabi* season can be done from the 41<sup>th</sup> SMW (8-14<sup>th</sup> Oct) and sowing can be started from 45<sup>th</sup> week. It may be suggested that during Mar-Nov crops having medium water requirements can be grown. Vegetable crops like radish, carrot, chilli, brinjal, tomato and other vegetable crops can be grown during this period.

## REFERENCES

- Chow, V.T. (1964). Statistical and probability analysis of hydrological data. Handbook of Applied Hydrology. Mc. Grow Hill, New York. PP.8.1-8.97.
- Goswami, B., Singh, O. P., Satapathi, K. K. and Saikia, U. S. (2008). Rainfall analysis in relation to rice crop for Jaintia Hills district of Meghalaya. *J. Agrometeorol.*, 10(2):188-192.
- Gautam, S., Roy, S., Nain, A. S., Murty, N. S., Bisht, H., Vardhan, H. and Pawar, R. (2012). Determination of Moisture Adequacy Index over Uttarakhand using GIS. *J. Agrometeorol.*, 14 (4):186-191.
- Gupta, S. K., Babu, R. and Tejwani, K. G. (1975). Weekly rainfall of India for planning cropping programme. *Soil Conser. Digest.*, 3(1):31-36.
- Mehta, D.R., Kalola, A.D., Saradava, D.A. and Yusufzai, A.S. (2002). Rainfall variability analysis and its impact on crop productivity- a case study. *Indian J. Agric. Res.*, 36(1): 29-33.
- Singh, R. K., Murty, N. S. and Arya, M. P. S. (2004). Water balance components and effect of soil moisture on yield of wheat in mid Himalayan Region of Uttaranchal. *J. Agrometeorol.*, 6 (2): 234-237.