



Research Article

RAINFALL ANALYSIS FOR CROP PLANNING

RAJU K.*, CHITKALA DEVI T., KUMARI M.B.G.S., RAMANA MURTHY K.V. AND BHARATHALAKSHMI M.

Department of Agronomy, Regional Agricultural Research Station, Acharya N.G. Ranga Agricultural University, Anakapalle, 531001, Visakhapatnam District, India

*Corresponding Author: Email - kannediraju@gmail.com

Received: June 02, 2021; Revised: June 26, 2021; Accepted: June 27, 2021; Published: June 30, 2021

Abstract: Study is carried out for the weekly probability analysis of rainfall with statistical method for predicting the minimum assured rainfall which helps in crop planning and management. Weekly rainfall data from 1990-2019 (30 years) of Regional Agricultural Research Station, Anakapalle was analyzed using incomplete gamma probability model. The results revealed that, the dependable amount of rainfall at 50 percent probability would be received more than 15.0 mm from 23rd to 44th SMW (4th June to 4th November). It indicates the length of growing period considering at 50 percent probability of rainfall. Study of coefficient of variation of weekly rainfall indicated that dependable rainfall during the period irrespective of quantity of rainfall to be received. The amount of rainfall and duration would be for kharif crops and rabi crops with support of irrigation.

Keywords: Weekly rainfall, Probability, Growing period, Crop planning

Citation: Raju K., et al., (2021) Rainfall Analysis for Crop Planning. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 13, Issue 6, pp.- 10801-10802.

Copyright: Copyright©2021 Raju K., et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Introduction

Rainfall during south west monsoon is a major factor influencing the agricultural production stability in India. The amount, distribution and intensity of rainfall having considerable influence on crop production and also to determine the choice of crops, varieties and agronomic practices. The information on rainfall distribution is essential to avoid water stress and subsequently raising of good crop. The study of variability of annual, seasonal and weekly rainfall record is essential from the point of view of crop planning and to take appropriate mitigating measures based on rainfall characteristics in monsoon season.

Biswas and Khambete (1989) [1] computed the lowest amount of rainfall at different probability levels by fitting gamma distribution probability model on weekly basis of 82 stations in dry farming tract of Maharashtra. Similarly, Upadhaya and Singh (1998) [2] stated that it is possible to predict rainfall fairly accurately using various probability distributions for certain returns periods. To optimize agricultural productivity, there is need to quantify rainfall variability at local and regional level to combating extreme effect of persistent dry spells/droughts [3]. Length of growing period (LGP); is the duration of growth period where in crops gets sufficient moisture for its growth continuously without any interruption. It is also an important criterion in agriculture to select the suitable cropping pattern for particular area. Therefore, the study was carried out for estimation of growing period for crop planning based on rainfall probability at Anakapalle.

Materials and Methods

The rainfall data for last 30 years (1990-2019) recorded in Agrometeorological observatory situated at Regional Agricultural Research Station, Anakapalle was used for its variability and probability analysis in view of crop planning. The research station situated in Visakhapatnam district of Andhra Pradesh with latitude of 17.38°N and longitude of 83.01°E of North coastal Zone of Andhra Pradesh. Weekly rainfall was subjected to workout mean, standard deviation and coefficient of variation. The probability of receiving certain amount of rainfall at 90 percent, 75 percent, 50 percent and 25 percent levels was calculated by incomplete gamma probability model using Weathercock software developed by Central Research Institute for Dryland Agriculture, Hyderabad.

Results and Discussion

Distribution of rainfall on weekly basis is very important and analysis on weekly rainfall at RARS, Anakapalle indicated that mean weekly rainfall during 23rd SMW to 44th SMW varies from 32.5 mm to 46.6 mm and highest mean weekly rainfall of 62.5 mm was received on 40th SMW (1st to 7th October). The lowest mean weekly rainfall was received on 29th SMW and rainfall more than 25 mm per week with coefficient of less than 100% was received from 26th SMW to 39th SMW except 31st SMW with higher rainfall variability of 169.8 %.

The analysis also revealed that standard meteorological weeks from 23rd to 44th week received more than 17.0 mm dependable rainfall at 50% probability and this period is in between 4th June to 4th November from the results of the study at may be concluded that the rainfall received was more than 15 mm at 50% probability from 23rd to 44th SMW indicates the length of growing period [4].

Application of research

The study was carried out for estimation of growing period for crop planning based on rainfall probability at Anakapalle.

Research Category: Agrometeorology

Acknowledgement / Funding: Authors are thankful to Department of Agronomy, Regional Agricultural Research Station, Acharya N.G. Ranga Agricultural University, Anakapalle, 531001, Visakhapatnam District, Andhra Pradesh, India

**Principal Investigator or Chairperson of research: Kannedi Raju

University: Acharya N.G. Ranga Agricultural University, Anakapalle, 531001, Visakhapatnam District, Andhra Pradesh, India

Research project name or number: Research station study

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Table-1 Probability analysis of weekly rainfall at RARS,Anakapalle (1990-2019)

SMW	Date	Mean	SD ±	CV %	Probability levels			
					90%	75%	50%	25%
22	28-3 June	8.9	12.3	137.5	0.6	2.0	6.0	13.7
23	04-Oct	32.5	47.3	145.7	1.0	4.8	17.6	45.4
24	Nov-17	37.5	50.8	135.5	2.3	8.1	23.5	53.1
25	18-24	32.4	46.3	142.9	1.5	6.0	19.2	45.8
26	25- 1 July	29.8	26.4	88.4	3.0	8.5	21.1	42.7
27	02-Aug	30.0	27.1	90.4	3.7	9.5	22.0	42.9
28	Sep-15	31.4	31.9	101.6	2.4	7.6	20.8	44.9
29	16-22	27.7	22.1	79.7	6.3	12.4	23.2	39.1
30	23-29	38.2	29.9	78.4	8.3	16.6	31.4	53.4
31	30-5 Aug.	30.1	51.1	169.8	1.5	5.8	18.1	42.7
32	06-Dec	39.0	30.2	77.5	5.4	13.2	29.2	55.3
33	13-19	41.1	36.3	88.4	6.0	14.3	31.1	58.2
34	20-26	36.5	34.6	94.8	5.0	12.2	27.3	52.0
35	27-2 Sep.	45.5	38.8	85.3	7.0	16.3	34.8	64.2
36	03-Sep	40.7	33.2	81.6	7.0	15.5	31.9	57.3
37	Oct-16	53.7	51.9	96.8	6.6	16.9	39.0	75.7
38	17-23	58.3	53.9	92.4	5.6	16.1	40.2	82.3
39	24-30	52.5	43.5	83	7.1	17.4	38.9	74.0
40	1-7 Oct.	65.2	69.0	105.9	4.7	15.2	42.0	91.6
41	Aug-14	50.9	61.7	121.1	3.4	11.5	32.5	71.8
42	15-21	31.1	34.7	111.9	1.2	5.3	17.8	43.8
43	22-28	42.9	102.9	240.2	0.3	3.0	16.9	56.1
44	29-4 Nov	46.6	85.1	182.5	0.4	3.6	19.2	61.5
45	05-Nov	11.6	20.6	177.4	0.3	16.0	6.2	16.9
46	Dec-18	23.1	45.1	195.5	0.2	1.6	9.3	30.8

Study area / Sample Collection: Regional Agricultural Research Station, Anakapalle

Cultivar / Variety / Breed name: Nil

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

References

- [1] Biswas B.C. and Khambeta N K. (1989) *Journal of Maharashtra Agricultural University*, 12, 157-168.
- [2] Upadhaya A. and Singh S.R. (1998) *Indian Journal of Soil Conservation*, 26(2), 193-200.
- [3] Sathyamoorthy N.K., Ramaraj A.P., Dheebakaran G., Arthirani B., Senthilraja K. and Jagannathan R. (2017) *Indian Journal of Ecology*, 44(2), 232- 238.
- [4] Das S. and Patel S.A. (2020) *Res. Jr. of Agril. Sci.*, 11(1), 32-34.