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Research Article

MANDAL WISE RAINFALL ANALYSIS OF VIZIANAGARAM DISTRICT FOR EFFECTIVE CROP PLANNING

SRAVANTHI S.*[1], SIVA KRISHNA V.[2], MURALI KRISHNA T.[3] AND ANURADHA T.[4]
[1]SMS (Agromet), Krishi Vigyan Kendra, Rastakuntubai, 535523, Acharya N. G. Ranga Agricultural University, Lam, 522034, Andhra Pradesh, India
[2]Young Professional –II (DBT), Krishi Vigyan Kendra, Rastakuntubai, 535523, Acharya N. G. Ranga Agricultural University, Lam, 522034, Andhra Pradesh, India
[3]Programme Coordinator, Krishi Vigyan Kendra, Rastakuntubai, 535523, Acharya N. G. Ranga Agricultural University, Lam, 522034, Andhra Pradesh, India
[4]Associate Director of Research, RARS, Chintapalle, 531111, Acharya N. G. Ranga Agricultural University, Lam, 522034, Andhra Pradesh, India
*Corresponding Author: Email - sravanthi0128@gmail.com

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Abstract: The aim of the present study is to analyze the mandal wise rainfall data in Vizianagaram district. Mandals were categorised based on the distribution of rainfall. Out of 34 mandals in the district 26 are plain areas and 8 are tribal/agency areas. Among 34 mandals, 6 mandals received normal rainfall and 16 mandals received excess rainfall during South west monsoon period. Similarly, 2tribal/agency mandals received normal rainfall and 6 agency mandal received excess rainfall during South West monsoon period.

Keywords: *Crop planning, Mandal wise rainfall, Vizianagaram district*

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Introduction

Vizianagaram District is predominantly an agricultural district and about 82% of the population of the district are living in Rural areas and they all depend on agriculture for their livelihood and 68.4% are engaged in Agriculture. Rainfed farming is the characteristic feature of Agriculture in the District as about 80% of its area is cultivated purely under Rainfed conditions. Among all the weather parameters, rainfall is main source of irrigation and is the main consideration for raising the crops particularly in rainfed condition [1]. Occurrence of continuous dry spell during monsoon period is common phenomenon. It is well known that the crop development is affected if the dry spells coincide with the sensitive phenological stages of the crop.

Vizianagaram district of North Coastal Andhra Pradesh is comprised of 34mandals, out of which 26 are plain area mandals and 8 are tribal/agency mandals. The annual rainfall of Vizianagaram district is 1240 mm. Though the annual rainfall is fairly high, the distribution of rainfall plays major role in getting good crop yields. In Vizianagaram district, there are majorly 5 farming situations *viz*., Agricultural Crops + Horticulture Crops, Agricultural Crops + Horticulture Crops + Herding, Agricultural Crops + Herding, Agricultural Crops + Horticulture Crops + Herding + Poultry, Agricultural Crops + Horticulture Crops +Poultry.

Material and methods

In the present study mandal wise daily rainfall of Vizianagaram district was collected from CPO, Vizianagram, Andhra Pradesh for the year, 2021. Monthly rainfall, season wise rainfall and annual rainfall was calculated based on the daily rainfall. The mandals were grouped based on the distribution of rainfall in to 5 categories according to IMD specifications *viz*., large excess (60 % or more over normal), Excess (20 % to 59 % more over normal), Normal (-19 % to + 19 % over normal), Deficit (-59% to -20% over normal) and large deficit (-99% to -60 % over normal). The categorization was done for all the months, Winter period (Jan-Feb), Summer period (March-May) South- West monsoon period (June-September), North-East monsoon period (October-December) and for the entire annual rainfall [2,3].

Results and discussion

Mandal wise rainfall analysis revealed that out of 26 plain area mandals, 6mandals received normal rainfall, 16mandals received excess rainfall, 2 mandals received large excess rainfall during South-west monsoon period. Similarly, 2 tribal/agency mandals received normal rainfall, 6 mandals received large excess, for the year 2021 during South-West monsoon period as a whole. During North-East monsoon, 17 mandals received normal rainfall, 1 mandal received excess rainfall, 7 mandals received deficit rainfall and one mandal under large deficit rainfall. Similarly, 7 tribal mandals received excess rainfall and 1 tribal mandal received normal rainfall.

Month wise data revealed that 8 mandals received normal rainfall and 11 mandals received deficit rainfall, 7 mandals are under large deficit rainfall. Similarly, one tribal mandal under normal rainfall, one under excess rainfall and 6 tribal mandals under deficit rainfall in the month of June. Whereas in July, 19 mandals under normal rainfall and 4 under excess rainfall, 2 under deficit and 1 in large deficit category. Regarding tribal mandals, 2 under excess rainfall and 2 under normal and 4 in deficit rainfall. In August and September, maximum mandals were covered under normal to excess and large excess rainfall [Table-1].

During North-East monsoon, 17 mandals received normal rainfall, one mandal under excess rainfall, 7 mandals received deficit rainfall and one mandal in large deficit rainfall in October. Similarly, 7 agency mandals received excess rainfall and one mandal received normal rainfall. Monthly analysis revealed that 3 mandals received normal, 18 mandals received deficit rainfall and 5 mandals received large deficit. One tribal mandal received excess rainfall, 4 mandals received normal rainfall and 3 tribal mandals received deficit rainfall. The rainfall distribution of different mandals of Vizianagaram district in figure 1 depicted that in winter, 91 % mandalsreceived large deficit rainfall. 44 % mandals in summer comes under deficit rainfall category. 64 % mandalscomes under excess rainfall in South – West monsoon and 53 % mandals comes under Normal rainfall in North-East monsoon [Table-2].

In Vizianagaram district, major crops are paddy, maize, cotton and rice fallows pulses (Greengram and blackgram). Sowings will be initiated in the month of June.

Table-1 *Monthly rainfall of Vizianagaram District, 2021*

SN	Months	Mandals	Mandals with Large excess rainfall (60 % or more over normal) 1	Mandals with Excess rainfall I (20 % to 59 % more over normal) 2	Mandals with Normal rainfall (19 % to + 19 % over normal) 3	Mandals with Deficit rainfall (-20 to-59%) 4	Mandals with Large Deficit rainfall (-60 to-99%) 5
1	January	Plain	0	0	0	2	24
		Tribal	1	1	2	1	3
2	February	Plain	0	0	0	1	25
		Tribal	0	0	0	0	8
3	March	Plain	0	0	0	1	25
		Tribal	0	0	0	0	8
4	April	Plain	13	6	4	3	0
		Tribal	6	0	0	1	1
5	May	Plain	1	1	10	12	2
		Tribal	0	3	2	2	1
6	June	Plain	0	0	8	11	7
		Tribal	0	1	1	6	0
7	July	Plain	0	4	19	2	1
		Tribal	0	2	2	4	0
8	August	Plain	2	8	12	4	0
		Tribal	3	4	0	1	0
9	September	Plain	21	4	1	0	0
		Tribal	4	2	2	0	0
10	October	Plain	0	0	3	18	5
		Tribal	0	1	4	3	0
11	November	Plain	11	7	6	2	0
		Tribal	6	2	0	0	0
12	December	Plain	11	2	1	4	8
		Tribal	6	0	2	0	0

Table-2 *Seasonal rainfall in Plain and tribal mandals of Vizianagaram District*

SN	Season	Mandals	Mandals with Large excess rainfall (60 % or more over normal) 1	Mandals with Excess rainfall I (20 % to 59 % more over normal) 2	Mandals with Normal rainfall (19 % to + 19 % over normal) 3	Mandals with Deficit rainfall (-20 to-59%) 4	Mandals with Large Deficit rainfall (-60 to-99%) 5
1	Winter (January-February)	Plain	-	-	-	-	26
		Tribal	-	-	1	2	5
2	Summer (March-May)	Plain	1	2	9	13	1
		Tribal	-	3	3	2	-
3	South West Monsoon (June- September)	Plain	2	16	6	-	-
		Tribal	-	6	2	-	-
4	North East Monsoon (October-December)	Plain	-	1	17	7	1
		Tribal	-	7	1	-	-

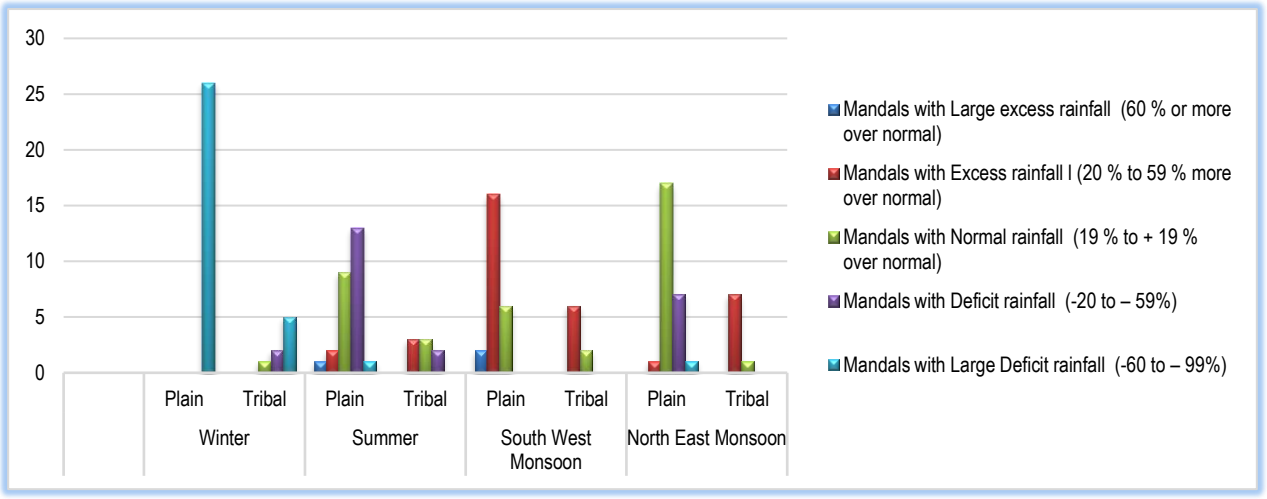

Fig-1 *Seasonal rainfall in Plain and Tribal mandals of Vizianagaram District*

Sowing of rainfed crops *viz*., groundnut, maize, ragi, pulses *etc*., will be taken up during the month of June. Though South West monsoon received normal to excess rainfall, in June deficit to large deficit rainfall recorded. Similarly in January and March large deficit rainfall recorded. As sowings were done in June, January and March for kharif, rabi and summer respectively. Hence there is a dire need to advise the farmer at micro level for mitigating extreme events *viz*., moisture stress and water-logged conditions for reducing the crop loss. Singh, *et al.,* (2008) also reported that rainfed agriculture plays and will continue to play a dominant role in providing food and livelihood for an increasing world population and rainfall analysis is helpful for proper crop planning under the scenario of climate change in any region.

Conclusion

The present study revealed that the rainfall distribution is erratic and it depicts the impact of climate change on Agricultural crops. The rainfall analysis at micro level is very much essential for effective crop planning and crop management in the Vizianagaram district in particular and Andhra Pradesh state in general.

Application of research: Mandal wise rainfall analysis will be useful for micro-level crop planning and there by sustained crop yields could be possible to reduce the losses to the farmers.

Research Category: Rainfall analysis

Abbreviations: IMD- Indian Meteorology Department.

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****Principal Investigator or Chairperson of research: Dr S. Sravanthi**
University: Acharya N. G. Ranga Agricultural University, Lam, 522034, India
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Study area / Sample Collection: Rastakuntubai, Vizianagaram, Andhra Pradesh

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

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