



ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2026): 4.97
IJAFA 2026; 8(4): 76-78
www.agriculturaljournals.com
Received: 05-01-2026
Accepted: 08-02-2026

N Ashokkumar
Assistant Professor,
Department of Irrigation and
Drainage Engineering, Dr.
NTR College of Agricultural
Engineering, Bapatla, Andhra
Pradesh, India

MV Ramana
REGISTRAR, Administrative
Office, Acharya N.G. Ranga
Agricultural University, Lam,
Guntur (Dist), Andhra
Pradesh, India

M Raghu Babu
Retired Professor, Department
of Irrigation and Drainage
Engineering, College of
Agricultural Engineering,
Madakasira, Andhra Pradesh,
India

P Prasuna Rani
Associate Dean, Agricultural
College, Bapatla, Andhra
Pradesh, India

B Ravindra Reddy
Professor, Department of
Statistics, Agricultural College,
Bapatla, Andhra Pradesh,
India

Corresponding Author:
N Ashokkumar
Assistant Professor,
Department of Irrigation and
Drainage Engineering, Dr.
NTR College of Agricultural
Engineering, Bapatla, Andhra
Pradesh, India

Cluster analysis for 63 mandals in Anantapuramu district using SPSS

N Ashokkumar, MV Ramana, M Raghu Babu, P Prasuna Rani and B Ravindra Reddy

DOI: <https://www.doi.org/10.33545/2664844X.2026.v8.i4b.1295>

Abstract

Anantapur district is one of the four districts of Rayalaseema region and the largest in area among the 13 districts of Andhra Pradesh. The district is economically backward and chronically drought affected. Cluster analysis is the task of grouping a set of objects in such way that objects in the same group are more similar to each other than to those in other groups. Cluster analysis was carried out for 63 mandals of the Anantapur district based on mean annual rainfall of 30 years using SPSS software. The mean annual rainfall of Cluster 1, Cluster 2, Cluster 3, Cluster 4 and Cluster 5 were 429.7, 489.5, 556.9, 375.6 and 300.3 respectively. The mean annual rainfall for five clusters ranges from 300 to 600. The highest mean annual rainfall was observed in Cluster 3 and Lowest mean annual rainfall was observed in Cluster 5. The number of mandals under Cluster 1, Cluster 2, Cluster 3, Cluster 4 and Cluster 5 were 16, 23, 11, 8 and 5 respectively.

Keywords: Cluster, rainfall

1. Introduction

Anantapur district is one of the four districts of Rayalaseema region and the largest in area among the 13 districts of Andhra Pradesh. The district is economically backward and chronically drought affected. Anantapur district lies between 13°40' N to 15°15' N latitude and 76°50' E to 78°30' E longitude with cultivable command area, irrigation potential created and irrigation potential utilized areas of extending in 167173, 214787 and 12455 ha respectively.

Cluster analysis is a multivariate technique used to determine group membership for cases or variables. In cluster analysis, the number of groups and the members of the groups are unknown. A cluster analysis of cases is like a discriminated analysis. SPSS provides hierarchical cluster analysis and k-means cluster analysis. The hierarchical cluster analysis is for either cases or variables. The k-means cluster analysis is for cases only when we have a large number of cases. By using a distance measure the hierarchical algorithm combines closest pair of cases or variables to form a cluster. This technique continues to join pairs of cases or cluster until the final step where all are joined to form one cluster. When some variables have large values or different scales of measurement, they should be standardized before using them in cluster analysis (Celso *et al.* 2019, Nurtiti *et al.* 2024 and Sulochana and Narayana,1980) ^[3, 2, 1].

2. Material and Methods

Mean annual rainfall for 63 mandals in Anantapur district is used for cluster analysis. Cluster analysis is the task of grouping a set of objects in such way that objects in the same group are more similar to each other than to those in other groups. Cluster analysis was carried out for 63 mandals of the Anantapur district based on mean rainfall using IBM SPSS 26 software (Table 1).

Table 1: Cluster classification of 63 mandals of the Anantapur district

Class	Number of cases	Name of Mandals
Cluster 1	16	Amarapuram, Bathalapalle, Beluguppa, Brahmasamudram, Chilamathur, Gudibanda, Guntakal, Kalyandurg, Kanaganapalle, Madakasira, Peddapappur, Ramagiri, Raptadu, Tadimarri, Uravakonda, Vajrakarur
Cluster 2	23	Agali, Amadagur, Anantapur, Bukkarayasamudram, Dharmavaram, Gandlapenta, Garladinne, Gooty, Gorantla, Lepakshi, Nallacheruvu, Nallamada, Nambulipulikunta, Narpala, Obuladevaracheruvu, Parigi, Putlur, Puttaparthi, Roddam, Rolla, Singanamala, Tanakal, Vidapanakal
Cluster 3	11	Bukkapatnam, Hindupur, Kadiri, Kothacheruvu, Mudigubba, Penukonda, Somandepalle, Tadpatri, Talupula, Yadiki, Yellanur
Cluster 4	8	Gummagatta, Kambadur, Kanekal, Kundurpi, Pamidi, Peddavadugur, Rayadurg, Settur
Cluster 5	5	Atmakur, Bommanahal, Chenna Kothapalle, D.Hirehal, Kudair

3. Results AND Discussion

Cluster analysis is the task of grouping a set of objects in such way that objects in the same group are more similar to each other than to those in other groups. Cluster analysis was carried out for 63 mandals of the Anantapur district based on mean annual rainfall of 30 years using SPSS software. From Table 2, the mean annual rainfall of Cluster 1, Cluster 2, Cluster 3, Cluster 4 and Cluster 5 for the period 1986 to 2015, ranges from 407.9 to 445.0, 462.3 to 516.2,

525.8 to 600.0, 347.5 to 401.3 and 281.0 to 326.4 mm respectively. The mean annual rainfall of Cluster 1, Cluster 2, Cluster 3, Cluster 4 and Cluster 5 were 429.7, 489.5, 556.9, 375.6 and 300.3 respectively. The mean annual rainfall for five clusters ranges from 300 to 600. The highest mean annual rainfall was observed in Cluster 3 and Lowest mean annual rainfall was observed in Cluster 5. The number of mandals under Cluster 1, Cluster 2, Cluster 3, Cluster 4 and Cluster 5 were 16, 23, 11, 8 and 5 respectively (Fig.1).

Table 2: Mean annual rainfall of 30 years (1986 to 2015) for 63 mandals of Anantapur district

S. No.	Cluster class	Mandal name	Mean annual rainfall (mm)	S. No.	Cluster class	Mandal name	Mean annual rainfall (mm)
1	Cluster 1	Uravakonda	427.4	33	Cluster 2	Gooty	490.7
2		Brahmasamudram	424.5	34		Anantapur Mandal	478.6
3		Vajrakarur	425.9	35		Tanakal	494.9
4		Tadimarri	407.9	36		Garladinne	479.4
5		Raptadu	444.7	37		Amadagur	504.8
6		Chilamathur	434.6	38		Agali	472.3
7		Kanaganapalle	414.5	39		Nambulipulikunta	499.6
8		Beluguppa	408.7	40		Yellanur	560.9
9		Peddappapur	414.6	41	Cluster 3	Yadiki	574.2
10		Amarapuram	444.9	42		Somandepalle	533.2
11		Bathalapalle	445.0	43		Kothacheruvu	532.4
12		Ramagiri	443.8	44		Kadiri	544.4
13		Guntakal	439.1	45		Talupula	525.8
14		Kalyandurg	443.7	46		Penu Konda	556.2
15		Madakasira	439.6	47		Mudigubba	572.9
16		Gudibanda	415.8	48		Tadpatri	590.5
17	Cluster 2	Narpala	496.3	49		Bukkapatnam	600.0
18		Nallamada	477.8	50		Hindupur	535.1
19		Gorantla	516.2	51		Kundurpi	401.3
20		Singanamala	462.3	52		Gummagatta	364.0
21		Obuladevaracheruvu	510.9	53		Pamidi	387.9
22		Rolla	499.9	54		Settur	400.2
23		Bukkarayasamudram	471.3	55		Kanekal	353.7
24		Puttaparthi	515.9	56		Peddavadugur	347.5
25		Gandlapenta	468.1	57	Rayadurg	395.4	
26		Putlur	485.8	58	Kambadur	355.3	
27		Dharmavaram	475.5	59	D Hirchal	326.4	
28		Vidapanakal	478.7	60	Chenne Kothapalle	285.4	
29		Roddam	499.4	61	Kudair	287.6	
30		Lepakshi	510.1	62	Bommanahal	321.2	
31		Parigi	489.7	63	Atmakur	281.0	
32		Nallacheruvu	479.5				

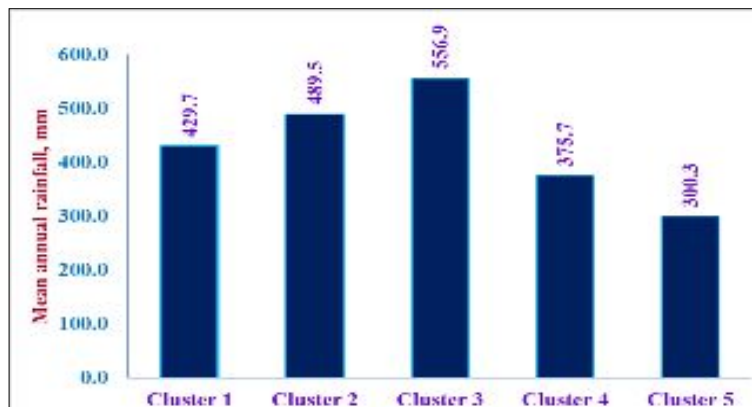


Fig 1: Distribution of mean annual rainfall received in five clusters in the Anantapur district during 1986 to 2015

References

1. Sulochana G, Narayana IR. Cluster analysis of rainfall stations of the Indian peninsula. *Quarterly Journal of the Royal Meteorological Society*. 1980;106:873–886.
2. Nurtiti S, Giarno, Muflihah, Sumanta P. Cluster analysis of rainfall patterns in Mamminasata: validation of climate hazards group infrared precipitation with station dataset using observational comparisons. *Edelweiss Applied Science and Technology*. 2024;8(6):9555–9567.
3. Celso AGS, Reginaldo MBN, Richarde MS, Samir GFC. Cluster analysis applied to spatiotemporal variability of monthly precipitation over Paraíba state using tropical rainfall measuring mission (TRMM) data. *Remote Sensing*. 2019;11:637–655.
4. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate data analysis*. 7th ed. Upper Saddle River (NJ): Pearson Education; 2010.
5. Kaufman L, Rousseeuw PJ. *Finding groups in data: an introduction to cluster analysis*. New York: John Wiley & Sons; 2005.