



## Research Note

# Application of cluster analysis for spatial classification

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**ABSTRACT :** The present study was undertaken in South Konkan region of Maharashtra state. Cluster analysis is a multivariate statistical procedure that starts with data set containing information about a sample of entities into attempts to reorganize these entities into relatively homogeneous groups or groups of highly similar entities, called as “clusters”. The variables were based on the set of 23 agro-climatic characteristics. The analysis has classified in to all 17 Tahsils of South Konkan region into two distinct clusters. It was concluded from the study that cluster analysis technique is useful in spatial classification, which can be further used for making development policy in general agriculture in particular for deciding the region specific cropping as well fanning systems.

**KEY WORDS :** South Konkan, Cluster analysis, Fanning systems

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Cluster analysis (CA) is a classification method that is used to arrange a set of cases into clusters. This procedure more empirically formed clusters or groups of highly similar entities. Cluster analysis is generic name for wide variety of procedures that can be used to create a classification. Specifically, a clustering method is multivariate statistical procedure that starts with a data set containing information about a sample of entities attempts to reorganize these entities in to relatively homogeneous groups called as “clusters”. The purpose is to establish a set of clusters such that cases within a cluster are more similar to each other than they are in other clusters. Present study was undertaken with an objective to delineate the South Konkan region in to different sub-regions on the basis of agro-climatic parameters.

The South Konkan region of Maharashtra state was

selected purposively for the study. The South Konkan region is comprised of two districts *i.e.* Ratnagiri and Sindhudurg. The data on 23 characteristics such as area under various crops such as mango, cashewnut, coconut, arecanut, paddy, Nagli, other cereals, other pulses, chilli, other vegetables, groundnut, livestock such as cow, buffalo, bullock, poultry birds and also data regarding forest area, rainfall etc. were collected for the year 2014-15. Among the different methods of cluster analysis, Hierarchical agglomerative method was used in the present study. The district level data were obtained from district socio-economic review and District statistical abstract for Ratnagiri and Sindhudurg districts and also from office of Joint Directors of Agriculture, Thane. A Jump statistical software was used to carry out the analysis. The data for the different variables used for each Tahsil were standardized between range of 0 to 1.

**Table 1 : Delineation of study area on the basis of agro-climatic parameters**

Cluster No.	Name of cluster	Tahsils in respective clusters
1.	Cluster - I	Mandangad, Dapoli, Khed, Chiplun, Sangameshwar, Lanja, Rajapur, Ratnagiri, Guhagar.
2.	Cluster - II	Deogad, Vaibhavwadi, Kankavli, Sawantwadi, Vengurle, Dodamarg, Kudal, Malvan.

**Table 2 : Proximity matrix of different clusters**

Tahsils	Dapoli	Khed	Chiplun	Sangameshwar	Lanja	Rajapur	Ratnagiri	Guhagar
Cluster-I								
Mandangad	0.71	0.62	0.81	0.62	0.52	0.34	0.62	0.56
Dapoli	0.0	0.54	0.65	0.75	0.82	0.56	0.64	0.61
Khed	--	0.0	0.52	0.86	0.78	0.82	0.72	0.84
Chiplun	----	--	0.0	0.64	0.50	0.41	0.78	0.55
Sangameshwar	--	--	--	0.0	0.42	0.72	0.81	0.62
Lanja	--	--	--	--	0.0	0.69	0.55	0.42
Rajapur	--	--	--	--	--	0.0	0.94	0.39
Ratnagiri	--	--	--	--	--	--	0.0	0.54
Guhagar	--	--	--	--	--	--	--	0.0
Cluster-II								
Tahsils	Vaibhavwadi	Kankavli	Sawantwadi	Vengurle	Dodamarg	Kudal	Malvan	
Deogad	0.78	0.53	0.85	0.75	0.81	0.46	0.51	
Vaibhavwadi	0.0	0.48	0.64	0.61	0.45	0.58	0.43	
Kankavli		0.0	0.38	0.52	0.69	0.39	0.80	
Sawantwadi			0.0	0.42	0.45	0.86	0.73	
Vengurle				0.0	0.31	0.91	0.37	
Dodamarg					0.0	0.76	0.43	
Kudal						0.0	0.61	
Malvan							0.0	

The Pearson's correlation co-efficient was used to form a proximity matrix. The complete linkage method was used for cluster making.

Delineation of study area on the basis of agro-climatic parameters is presented in Table 1.

The study area consisted of 17 Tahsils of South Konkan region which were classified into two distinct clusters (Table 1). The analysis has classified all 17 Tahsils of South Konkan region into two distinct clusters.

The first cluster included 9 tahsils namely Mandangad, Dapoli, Khed, Chiplun, Sangameshwar, Lanja, Rajapur, Ratnagiri, Guhagar. The correlation co-efficient between vectors of values of Tahsils in this cluster were ranging from 0.54 to 0.927 (Table 2).

The second cluster consisted of 8 tahsils namely Deogad, Vaibhavwadi, Kankavli, Sawantwadi, Vengurle, Dodamarg, Kudal, Malvan. The correlation between vectors of values of tahsils in this cluster were ranging from 0.394 to 0.958 (Table 2).

### Conclusion:

The South Konkan region was classified into two distinct clusters. It can be revealed that the Hierarchical method can be used for the spatial classification type of research. The use of linkages such as complete, single, or average depends upon the need of research, numbers of clusters required or in fact to be enforced.

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