

Practical case 1: Application of PCA and LDA to feature selection for classification of urban land uses

1) Correlation analysis

Summary Statistics

	MEAN1	DEVST1	RANGE1	MEAN2	DEVST2	RANGE2	MEAN3
Count	1606	1606	1606	1606	1606	1606	1606
Average	169,538	47,4646	220,342	131,567	50,6286	224,618	121,372
Standard deviation	27,1091	18,776	38,1497	39,3014	17,839	29,2192	31,3239
Coeff. of variation	15,99%	39,558%	17,3139%	29,8719%	35,2349%	13,0084%	25,8082%
Minimum	70,355	4,19706	42,0	29,6655	5,03163	65,0	38,0856
Maximum	246,374	91,9527	255,0	230,768	91,4374	255,0	231,558
Range	176,019	87,7556	213,0	201,102	86,4058	190,0	193,473
Std. skewness	-0,780938	-5,61107	-29,3573	-5,98482	-7,86446	-34,5038	6,3219
Std. kurtosis	0,30634	-3,95919	26,5329	-3,89934	-3,50987	48,2457	1,31392

	DEVST3	RANGE3	MEAN4	DEVST4	RANGE4	MEANNDVI
Count	1606	1606	1606	1606	1606	1606
Average	46,5432	219,4	102,568	47,6922	225,038	0,161118
Standard deviation	16,6698	32,7024	33,3386	16,8752	29,7092	0,151585
Coeff. of variation	35,8158%	14,9054%	32,5037%	35,3835%	13,2019%	94,0834%
Minimum	4,24009	56,0	28,1221	4,99928	72,0	-0,188517
Maximum	88,7674	255,0	225,446	90,11	255,0	0,756522
Range	84,5273	199,0	197,323	85,1107	183,0	0,945038
Std. skewness	-8,98306	-25,9856	9,18433	-8,10616	-23,6075	26,3464
Std. kurtosis	-2,56047	26,0417	4,31038	-2,95121	22,5859	18,1802

	DEVSTNDVI	RANGENDVI
Count	1606	1606
Average	0,120766	1,01469
Standard deviation	0,0707116	0,54421
Coeff. of variation	58,5525%	53,6331%
Minimum	0,0102898	0,095082
Maximum	0,382998	2,0
Range	0,372708	1,90492
Std. skewness	10,8469	9,34031
Std. kurtosis	-1,89669	-5,71698

Here can be seen some basic summary statistics about all 15 variables. Most of them have skewness and kurtosis out of the range of normal distribution, except MEAN1 and two others.

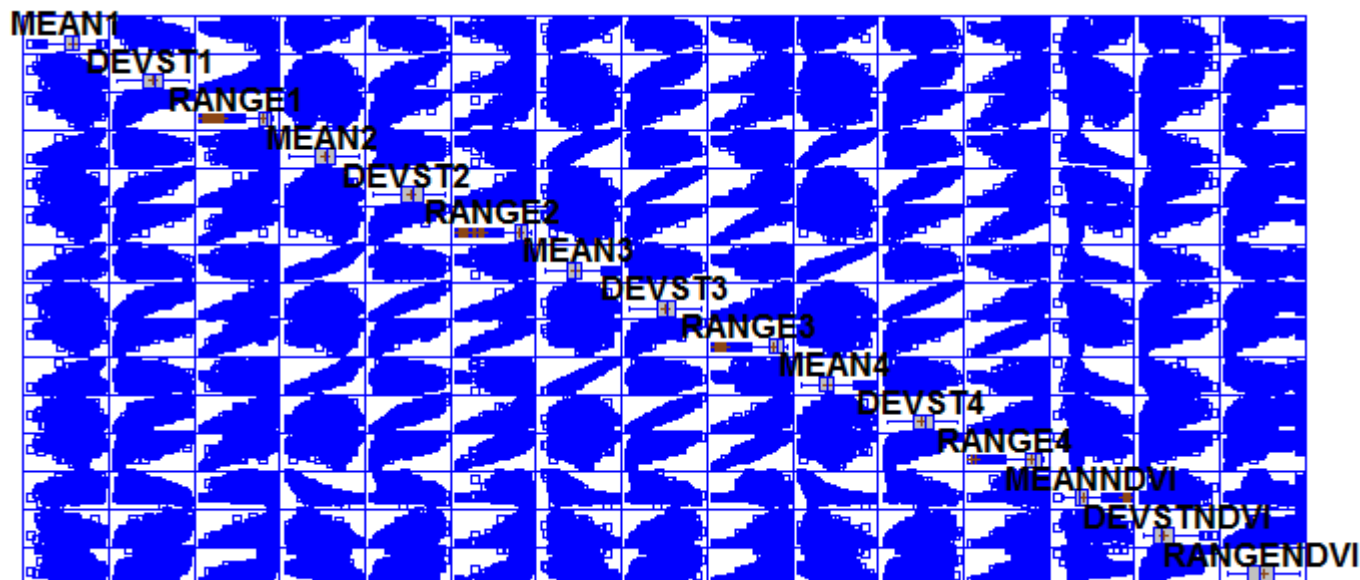
Correlations

	MEAN1	DEVST1	RANGE1	MEAN2	DEVST2	RANGE2	MEAN3	DEVST3
MEAN1		-0,5487	-0,4264	0,4954	-0,4055	-0,2506	0,6212	-0,3637
		(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
DEVST1	-0,5487		0,7502	-0,0456	0,9154	0,6596	-0,2015	0,8952
	(1606)		(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000		0,0000	0,0675	0,0000	0,0000	0,0000	0,0000
RANGE1	-0,4264	0,7502		-0,0789	0,6967	0,8555	-0,1663	0,6933
	(1606)	(1606)		(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000		0,0015	0,0000	0,0000	0,0000	0,0000
MEAN2	0,4954	-0,0456	-0,0789		0,0074	-0,0526	0,9170	0,0916
	(1606)	(1606)	(1606)		(1606)	(1606)	(1606)	(1606)
	0,0000	0,0675	0,0015		0,7677	0,0349	0,0000	0,0002
DEVST2	-0,4055	0,9154	0,6967	0,0074		0,7097	-0,1007	0,9713
	(1606)	(1606)	(1606)	(1606)		(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,7677		0,0000	0,0001	0,0000
RANGE2	-0,2506	0,6596	0,8555	-0,0526	0,7097		-0,1020	0,7085
	(1606)	(1606)	(1606)	(1606)	(1606)		(1606)	(1606)
	0,0000	0,0000	0,0000	0,0349	0,0000		0,0000	0,0000
MEAN3	0,6212	-0,2015	-0,1663	0,9170	-0,1007	-0,1020		-0,0021
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)		(1606)
	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000		0,9336
DEVST3	-0,3637	0,8952	0,6933	0,0916	0,9713	0,7085	-0,0021	

	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	
	0,0000	0,0000	0,0000	0,0002	0,0000	0,0000	0,9336	
RANGE3	-0,1486	0,6349	0,8080	0,1176	0,6838	0,9240	0,0760	0,7294
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0023	0,0000
MEAN4	0,5162	-0,0886	-0,0822	0,8989	0,0047	-0,0228	0,9796	0,1066
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0004	0,0010	0,0000	0,8521	0,3614	0,0000	0,0000
DEVST4	-0,2335	0,8039	0,6392	0,1938	0,9256	0,6877	0,1332	0,9738
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
RANGE4	-0,0460	0,5528	0,6763	0,1771	0,6140	0,8566	0,1629	0,6580
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0650	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
MEANNDVI	0,0201	-0,2764	-0,1370	-0,8371	-0,2263	-0,0652	-0,6595	-0,2863
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,4206	0,0000	0,0000	0,0000	0,0000	0,0088	0,0000	0,0000
DEVSTNDVI	-0,4338	0,4000	0,4134	-0,6162	0,4989	0,4294	-0,5553	0,4304
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
RANGENDVI	-0,4682	0,4831	0,6268	-0,3800	0,4605	0,5774	-0,3610	0,4196
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

	RANGE3	MEAN4	DEVST4	RANGE4	MEANNDVI	DEVSTNDVI	RANGENDVI
MEAN1	-0,1486	0,5162	-0,2335	-0,0460	0,0201	-0,4338	-0,4682
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0650	0,4206	0,0000	0,0000
DEVST1	0,6349	-0,0886	0,8039	0,5528	-0,2764	0,4000	0,4831
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000
RANGE1	0,8080	-0,0822	0,6392	0,6763	-0,1370	0,4134	0,6268
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0010	0,0000	0,0000	0,0000	0,0000	0,0000
MEAN2	0,1176	0,8989	0,1938	0,1771	-0,8371	-0,6162	-0,3800
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
DEVST2	0,6838	0,0047	0,9256	0,6140	-0,2263	0,4989	0,4605
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,8521	0,0000	0,0000	0,0000	0,0000	0,0000
RANGE2	0,9240	-0,0228	0,6877	0,8566	-0,0652	0,4294	0,5774
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,3614	0,0000	0,0000	0,0088	0,0000	0,0000
MEAN3	0,0760	0,9796	0,1332	0,1629	-0,6595	-0,5553	-0,3610
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0023	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
DEVST3	0,7294	0,1066	0,9738	0,6580	-0,2863	0,4304	0,4196
	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
RANGE3		0,1613	0,7357	0,9442	-0,1888	0,3094	0,4442
		(1606)	(1606)	(1606)	(1606)	(1606)	(1606)
		0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
MEAN4	0,1613		0,2325	0,2468	-0,6899	-0,4811	-0,2804
	(1606)		(1606)	(1606)	(1606)	(1606)	(1606)
	0,0000		0,0000	0,0000	0,0000	0,0000	0,0000
DEVST4	0,7357	0,2325		0,6883	-0,3182	0,3731	0,3539
	(1606)	(1606)		(1606)	(1606)	(1606)	(1606)
	0,0000	0,0000		0,0000	0,0000	0,0000	0,0000
RANGE4	0,9442	0,2468	0,6883		-0,2027	0,2466	0,3613
	(1606)	(1606)	(1606)		(1606)	(1606)	(1606)
	0,0000	0,0000	0,0000		0,0000	0,0000	0,0000
MEANNDVI	-0,1888	-0,6899	-0,3182	-0,2027		0,4928	0,1682
	(1606)	(1606)	(1606)	(1606)		(1606)	(1606)
	0,0000	0,0000	0,0000	0,0000		0,0000	0,0000
DEVSTNDVI	0,3094	-0,4811	0,3731	0,2466	0,4928		0,6884
	(1606)	(1606)	(1606)	(1606)	(1606)		(1606)
	0,0000	0,0000	0,0000	0,0000	0,0000		0,0000
RANGENDVI	0,4442	-0,2804	0,3539	0,3613	0,1682	0,6884	

	(1606)	(1606)	(1606)	(1606)	(1606)	(1606)	
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	



Correlation table shows us some correlations between variables. Even the graph isn't very readable, some high correlations are easily recognizable, for instance: high positive correlation coefficient between DEVST2 and MEAN3, MEAN3 and MEAN4, MEAN2 and MEAN4. (Also – the lower P-value, the higher correlation). So for PCA analysis, where is important to have as much uncorrelated variables as possible is good to see it. After, it can be done some average vector for correlated variables (only for purpose of nonsense to having so many variables).

2) Principal Component Analysis

Principal Components Analysis

Component Number	Eigenvalue	Percent of Variance	Cumulative Percentage
1	7,14503	47,634	47,634
2	4,40307	29,354	76,987
3	1,25753	8,384	85,371
4	0,763732	5,092	90,462
5	0,638304	4,255	94,718
6	0,265066	1,767	96,485
7	0,158059	1,054	97,539
8	0,131112	0,874	98,413
9	0,0974359	0,650	99,062
10	0,0626557	0,418	99,480
11	0,0299036	0,199	99,679
12	0,0210831	0,141	99,820
13	0,014052	0,094	99,914
14	0,00680763	0,045	99,959
15	0,00616245	0,041	100,000

Here can be seen applied the PCA method independently to the variables of the following four thematic groups: spectral, texture, shape and context. First one is spectral (on the left) and the rest is following. It is known, that it worths it to keep the first three variables (because the purpose of PCA is to reduce the number of variables without losing information what is exactly the thing we want to do). But for the case, if we want to choose only a few variables for the model is more useful Graph or Table of Component Weights, because the longer is the line, the more influence for final component the variable has, as well as the smaller angle between variables is, the bigger correlation between them is.

Table of Component Weights

	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
MEAN1	0,17651	0,241294	0,50384	0,377078	-0,0455534	-0,534886
DEVST1	-0,332191	0,00863975	-0,319571	0,036645	-0,114074	-0,285946
RANGE1	-0,327355	-0,00484275	0,0815382	-0,365745	0,00346464	-0,451844
MEAN2	0,0362875	0,46183	-0,0780168	-0,0531305	0,0984663	-0,110155
DEVST2	-0,342793	0,0420116	-0,203938	0,310592	-0,0516154	-0,122973
RANGE2	-0,332352	0,0271446	0,300668	-0,207817	-0,120132	-0,0543173
MEAN3	0,0672913	0,449647	0,0989677	0,0791231	0,256273	0,0467657
DEVST3	-0,341955	0,0894099	-0,184999	0,306652	-0,0652442	-0,026589
RANGE3	-0,321533	0,117642	0,315219	-0,170477	-0,191823	0,178059
MEAN4	0,0245072	0,448853	0,0624086	0,073094	0,294937	0,185732

DEVST4	-0,32438	0,143863	-0,110724	0,373492	-0,0412584	0,0540634
RANGE4	-0,290869	0,152007	0,369585	-0,11664	-0,208225	0,426559
MEANNDVI	0,0525415	-0,380503	0,41576	0,329951	-0,106702	-0,110868
DEVSTNDVI	-0,213198	-0,283402	0,126615	0,362401	0,430306	0,303714
RANGENDVI	-0,242001	-0,177489	0,119475	-0,228511	0,723038	-0,198133

	Component	Component	Component	Component	Component	Component
	7	8	9	10	11	12
MEAN1	0,191198	-0,239091	-0,0948797	0,094778	-0,0017943	0,0698297
DEVST1	0,197937	0,047916	-0,626336	-0,207482	0,227808	0,346711
RANGE1	-0,626383	0,0720794	-0,114649	0,228486	-0,270322	-0,0634387
MEAN2	0,0179944	-0,411581	0,0714698	0,181098	0,0310665	-0,0336902
DEVST2	0,0822928	-0,112281	0,0410928	-0,28438	-0,200993	-0,739267
RANGE2	0,00151251	-0,174978	0,429087	-0,656535	0,00304666	0,296497
MEAN3	-0,176579	0,221261	-0,0445385	-0,16438	-0,00942175	-0,00474639
DEVST3	0,0332307	0,139291	0,170929	0,131952	0,15178	0,0518627
RANGE3	-0,0202268	-0,00561155	0,0112478	0,26476	0,708676	-0,2627
MEAN4	-0,193702	0,372206	-0,182702	-0,275665	0,0819676	-0,0293419
DEVST4	-0,0224331	0,215337	0,382558	0,345033	-0,181815	0,365255
RANGE4	0,300263	-0,0058934	-0,353677	0,140253	-0,512871	0,00234966
MEANNDVI	-0,111872	0,432692	-0,0650671	-0,0772287	0,0438019	-0,0888557
DEVSTNDVI	-0,359162	-0,5044	-0,208678	-0,00987072	0,059692	0,13284
RANGENDVI	0,471616	0,166574	0,103533	0,125512	0,00352795	-0,0615345

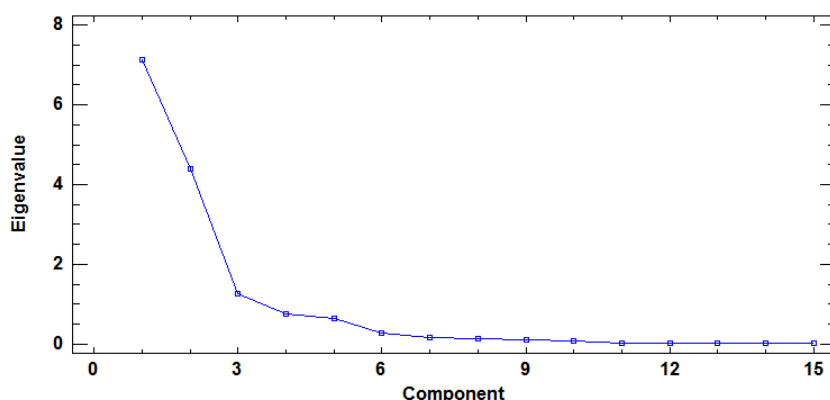
	Component	Component	Component
	13	14	15
MEAN1	-0,261336	0,163037	-0,122215
DEVST1	0,0458196	-0,0535572	0,193483
RANGE1	-0,0268132	0,0374908	-0,0780885
MEAN2	0,714341	-0,107176	0,15218
DEVST2	-0,0732518	0,0531203	0,166861
RANGE2	0,0635202	-0,000480556	-0,0102579
MEAN3	-0,267047	-0,710313	0,155756
DEVST3	0,122745	-0,215412	-0,766498
RANGE3	-0,128598	0,0292004	0,162981
MEAN4	0,127408	0,583078	-0,134117
DEVST4	-0,0914977	0,17632	0,446653
RANGE4	0,0653881	-0,0664583	-0,100473
MEANNDVI	0,524929	-0,165592	0,155995
DEVSTNDVI	-0,0320573	-0,0101089	-0,00763327
RANGENDVI	0,0287293	-0,00532199	0,0103745

Here is the equation of the first component:

$$0,17651 \cdot \text{MEAN1} - 0,332191 \cdot \text{DEVST1} - 0,327355 \cdot \text{RANGE1} + 0,0362875 \cdot \text{MEAN2} - 0,342793 \cdot \text{DEVST2} - 0,332352 \cdot \text{RANGE2} + 0,0672913 \cdot \text{MEAN3} - 0,341955 \cdot \text{DEVST3} - 0,321533 \cdot \text{RANGE3} + 0,0245072 \cdot \text{MEAN4} - 0,32438 \cdot \text{DEVST4} - 0,290869 \cdot \text{RANGE4} + 0,0525415 \cdot \text{MEANNDVI} - 0,213198 \cdot \text{DEVSTNDVI} - 0,242001 \cdot \text{RANGENDVI}$$

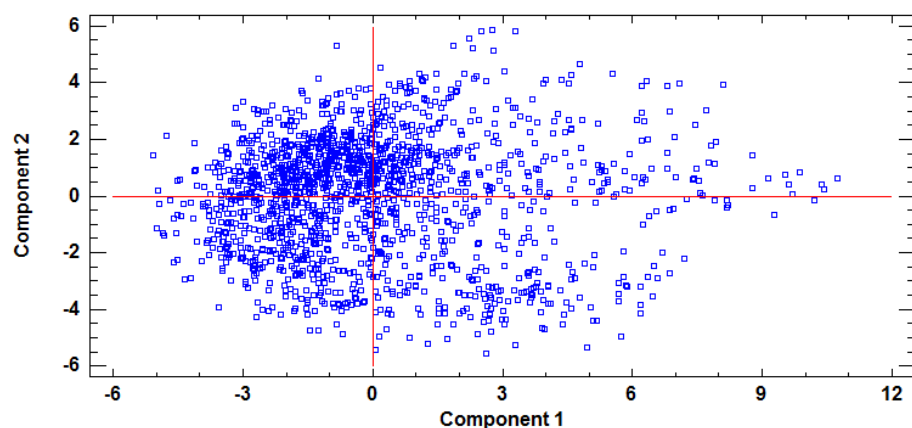
. where the values of the variables in the equation are standardized by subtracting their means and dividing by their standard deviations.

Scree Plot

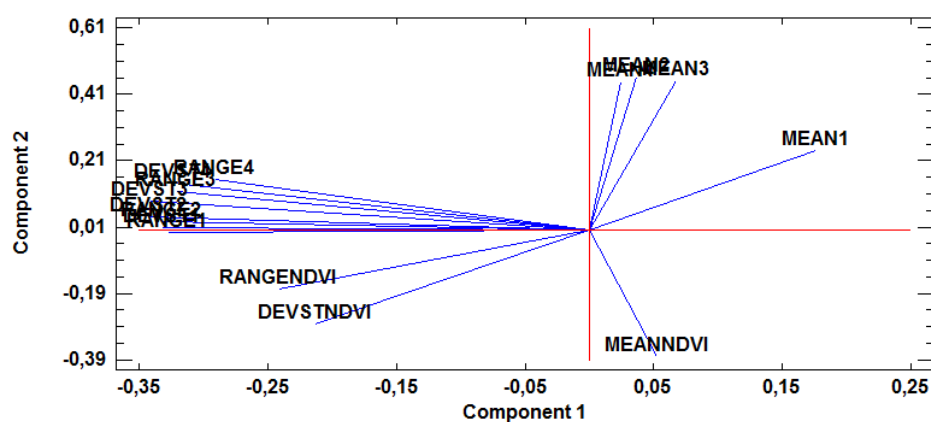


Here is the scree plot. It worths it to keep maximum of 6 Component, the rest has no variability change.

Scatterplot



Plot of Component Weights



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Principal Components Analysis

Component Number	Eigenvalue	Percent of Variance	Cumulative Percentage
1	5,68938	56,894	56,894
2	1,56957	15,696	72,590
3	1,15634	11,563	84,153
4	0,803421	8,034	92,187
5	0,286669	2,867	95,054
6	0,21406	2,141	97,194
7	0,156959	1,570	98,764
8	0,0740074	0,740	99,504
9	0,0395879	0,396	99,900
10	0,00999765	0,100	100,000

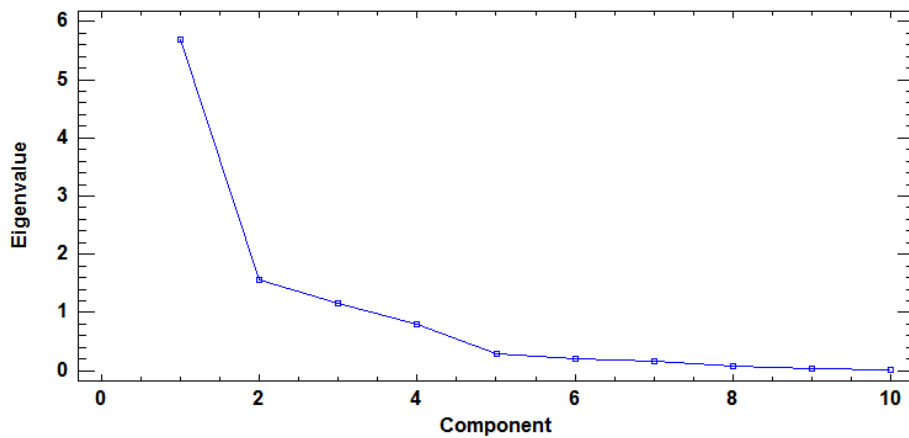
Table of Component Weights

	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
MEAN_EDG	0,391909	-0,223857	0,0158786	0,158327	0,0340445	0,262308
DEVST_EDG	0,353771	-0,0933605	-0,304289	0,268922	-0,197264	-0,525701
UNIFOR	-0,331889	-0,183936	-0,290788	0,364617	-0,251354	0,633436
ENTROP	0,397123	0,0921492	0,101302	-0,128449	0,319755	0,163118
CONTRAS	0,367845	-0,250069	-0,110486	0,289817	-0,122664	0,15761
IDM	-0,377599	0,113918	-0,27679	0,102218	-0,304104	-0,332071
COVAR	0,282296	0,375205	-0,340341	0,371905	0,0364945	-0,0344302
CORRELAC	-0,0299	0,749745	-0,183411	0,0758778	0,212358	0,220008
SKEWNESS	-0,00877082	0,24156	0,757631	0,522749	-0,286595	-0,0542072
KURTOSIS	-0,307966	-0,249176	0,00632823	0,491314	0,747272	-0,198353

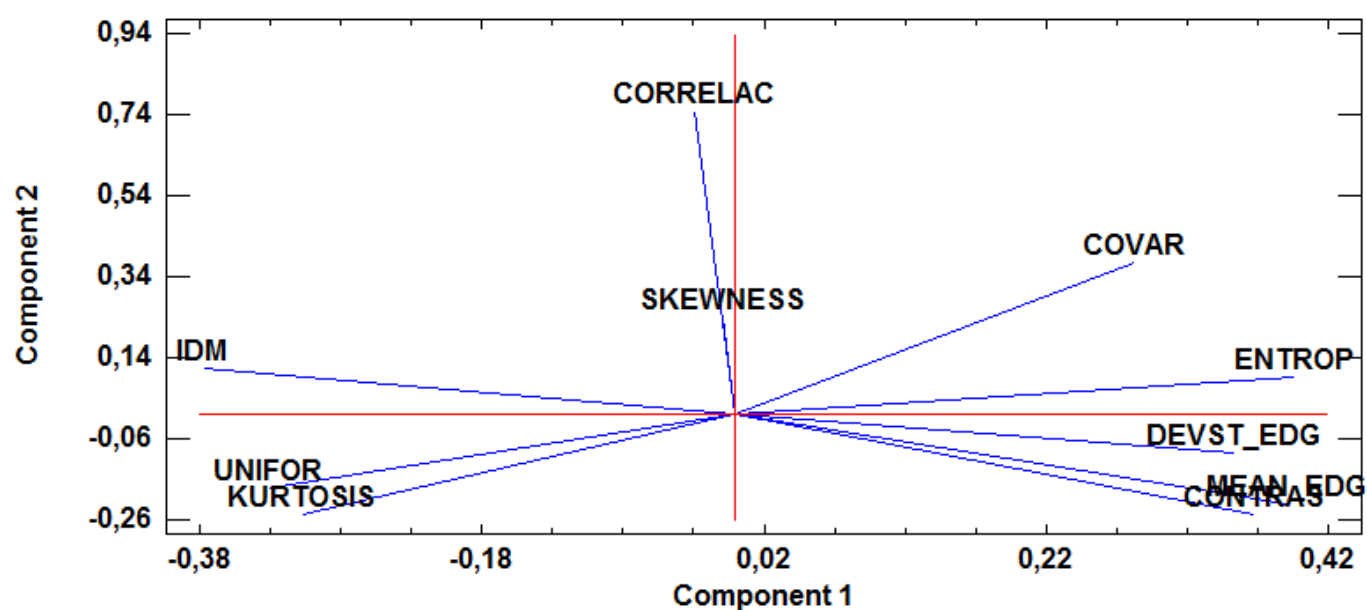
	Component 7	Component 8	Component 9	Component 10

MEAN_EDG	-0,172185	0,0573743	-0,120759	-0,808387
DEVST_EDG	-0,365986	-0,487265	-0,0387427	0,114326
UNIFOR	-0,00838024	-0,383254	0,125693	0,106496
ENTROP	0,0525839	-0,255154	0,778553	0,0646243
CONTRAS	-0,197654	0,661206	0,116721	0,419741
IDM	-0,0389846	0,311455	0,562235	-0,374163
COVAR	0,710432	0,039763	-0,122101	-0,0407827
CORRELAC	-0,534747	0,0792496	-0,108762	0,00525005
SKEWNESS	-0,00661449	-0,0629254	0,0722187	0,00261594
KURTOSIS	-0,0476655	0,035714	0,016944	-0,00668617

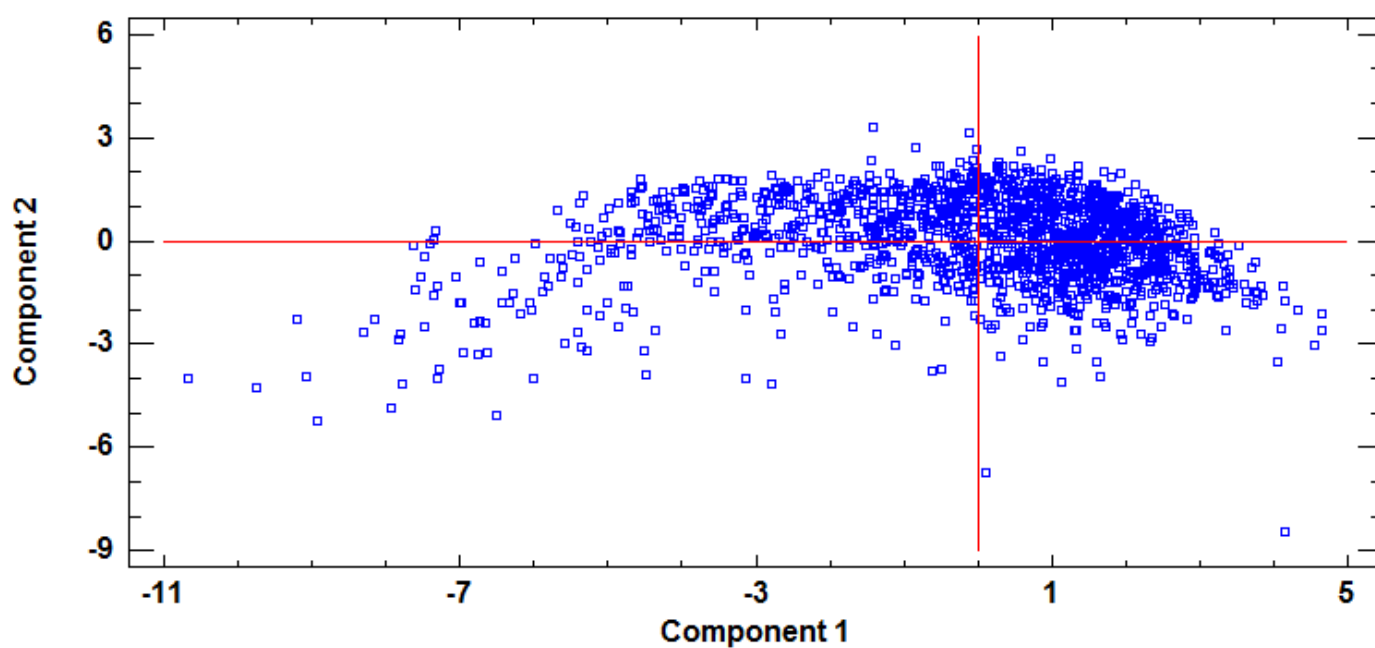
Scree Plot



Plot of Component Weights



Scatterplot



---SHAPE

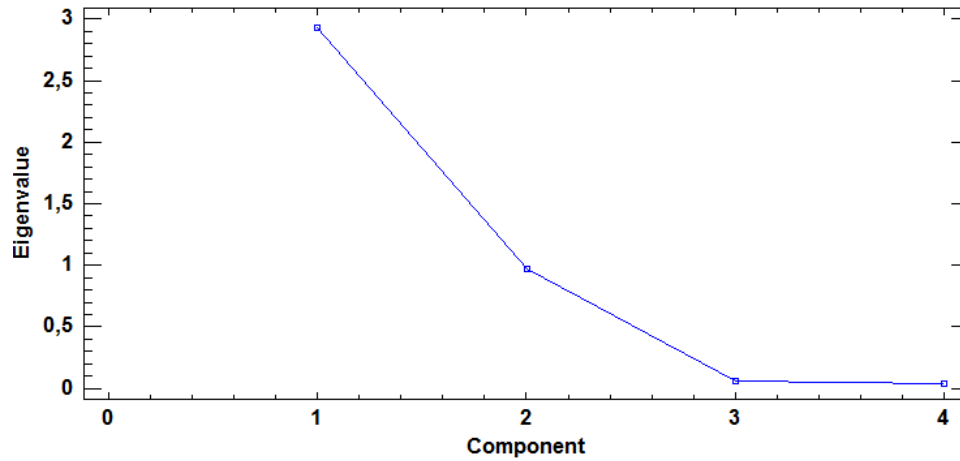
Principal Components Analysis

Component Number	Eigenvalue	Percent of Variance	Cumulative Percentage
1	2,92749	73,187	73,187
2	0,970363	24,259	97,446
3	0,0626494	1,566	99,012
4	0,0395017	0,988	100,000

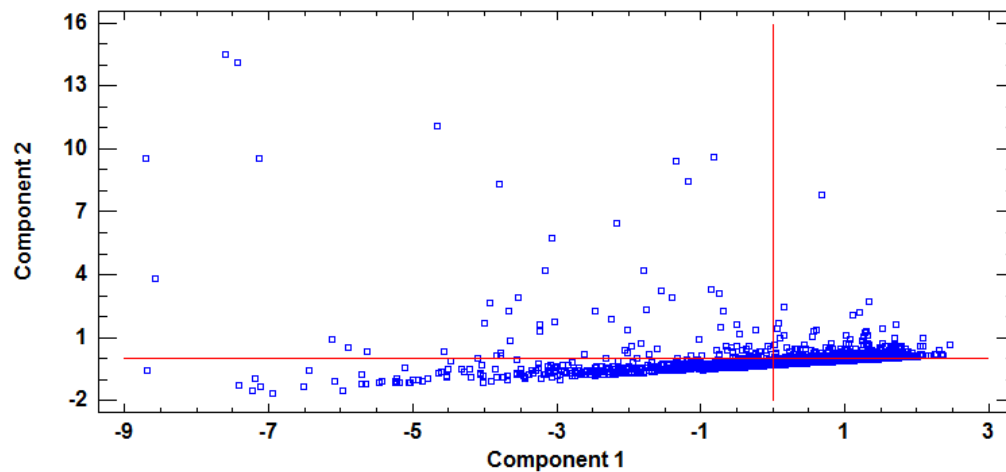
Table of Component Weights

	Component	Component	Component	Component
	1	2	3	4
COMPACT	0,575255	0,0680754	0,146666	0,801833
SH_INDEX	-0,573961	0,000224305	-0,627207	0,526479
FRACTAL	-0,560279	-0,209633	0,749853	0,282598
AREA	-0,16043	0,975408	0,151065	0,00465306

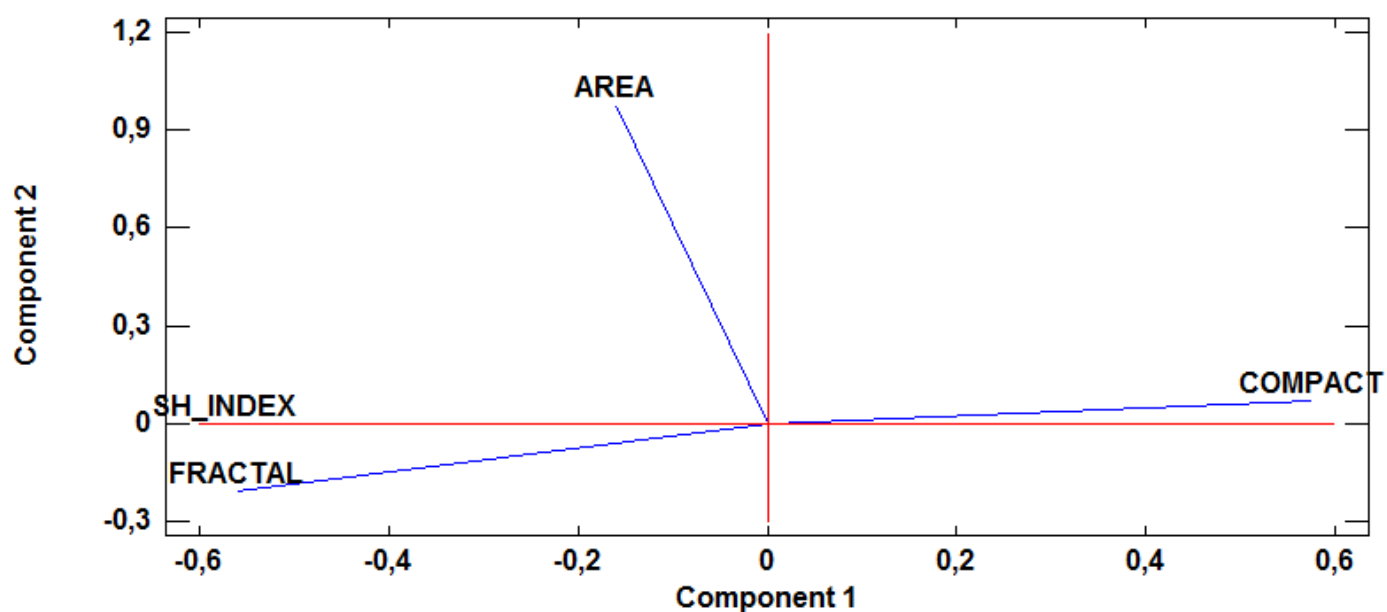
Scree Plot



Scatterplot



Plot of Component Weights



---CONTEXT

Principal Components Analysis

Component Number	Eigenvalue	Percent of Variance	Cumulative Percentage
1	7,16318	32,560	32,560
2	4,19587	19,072	51,632
3	2,25968	10,271	61,903
4	1,70898	7,768	69,671
5	1,31581	5,981	75,652
6	0,978367	4,447	80,100
7	0,848348	3,856	83,956
8	0,772805	3,513	87,468
9	0,719897	3,272	90,741
10	0,469155	2,133	92,873
11	0,329637	1,498	94,372
12	0,262878	1,195	95,566
13	0,233004	1,059	96,626
14	0,207319	0,942	97,568
15	0,149827	0,681	98,249
16	0,122079	0,555	98,804
17	0,0754155	0,343	99,147
18	0,0629488	0,286	99,433
19	0,0438273	0,199	99,632
20	0,0425031	0,193	99,825
21	0,0366045	0,166	99,992
22	0,00185921	0,008	100,000

Table of Component Weights

	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
MEANHED	0,327381	0,0901638	-0,0482852	0,0871172	0,182547	-0,052778
DESVHED	0,275307	0,125008	-0,215773	0,0178392	0,225128	-0,147886
MAXHED	0,297879	0,141157	-0,121909	-0,00528462	0,151993	-0,102302
SUPED	0,0700796	0,192035	-0,225258	-0,602789	-0,159364	0,110906
BCRED	0,313715	0,0289933	0,185332	0,0438293	-0,161738	0,0305993
PERCV	-0,229123	-0,048357	-0,270145	0,0371222	0,235122	-0,139093
NREL	-0,0739853	0,0602486	0,0725716	0,0778261	-0,482332	0,201853

VoIED	0,0927693	0,174038	-0,260724	-0,591078	-0,10062	0,130303
BCRSO	0,319655	-0,0382269	0,180144	0,0426214	-0,165465	0,0401034
SUPEDSO	-0,0368584	0,439772	0,137698	0,0316448	-0,141393	-0,200465
MEANHSD	0,324239	0,0854498	-0,0413985	0,0904909	0,219677	-0,0108385
DESVHSD	0,279276	0,164667	-0,167726	0,0703537	0,200812	-0,0836676
PERCVSD	-0,260514	-0,0395918	-0,301736	0,036772	0,224817	-0,107743
MEANHVS	0,212942	0,024565	-0,168958	0,278248	-0,152529	0,351251
DESVHVS	0,187875	0,0911068	-0,29984	0,259603	-0,211327	0,232838
MEANNDVIVS	-0,149591	0,0834617	-0,457519	0,236343	-0,177727	0,073059
DESVNDVIVS	-0,178871	0,197429	-0,346826	0,197891	-0,183985	-0,0569838
COMPACTSO	0,154129	-0,208487	-0,103963	-0,0128094	-0,33374	-0,431708
IFORMASO	-0,144116	0,395994	0,137487	0,0544051	0,171139	0,115595
DFSO	-0,0804641	0,122617	0,106207	0,00615964	0,271738	0,600325
AREASO	-0,0880538	0,432637	0,149397	0,0707314	-0,0810027	-0,199126
PERIMSO	-0,100457	0,440639	0,145814	0,0683593	-0,048504	-0,167631

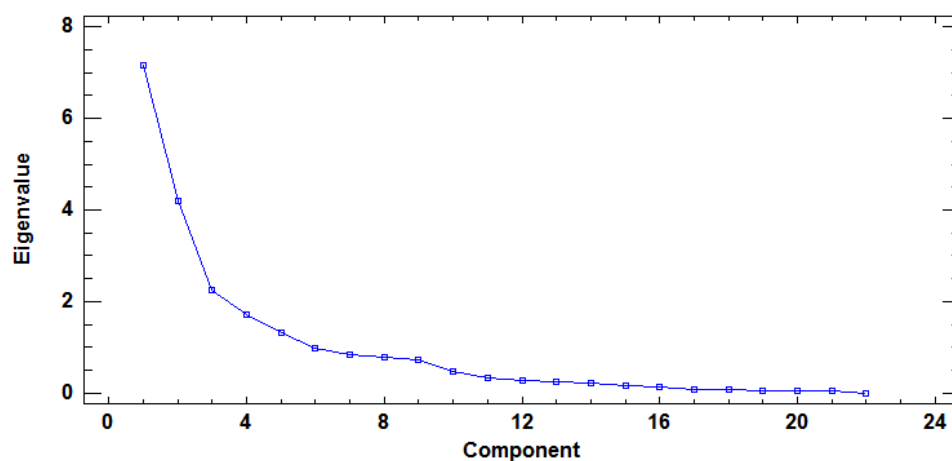
	Component	Component	Component	Component	Component	Component
	7	8	9	10	11	12
MEANHED	-0,051386	0,0598409	-0,0250643	0,200461	-0,143473	-0,245671
DESVHED	-0,170504	0,126735	-0,216566	-0,213061	-0,0932276	0,154922
MAXHED	-0,0904666	0,103873	-0,087813	0,00902078	-0,0719751	-0,649203
SUPED	0,0462935	-0,0292908	0,0678068	0,0640921	0,00924648	-0,0066655
BCRED	0,0801319	-0,00726288	-0,0108118	0,390475	0,330849	-0,0976504
PERCV	-0,119344	0,27837	0,423615	0,39409	0,253608	0,197026
NREL	-0,736728	0,366433	-0,0942323	0,0720835	-0,0989164	-0,0227635
VoIED	0,00360323	-0,021011	0,0767607	0,0393713	-0,0255249	0,0549952
BCRSO	0,0858686	-0,000975719	0,0667139	0,391186	0,274951	0,122697
SUPEDSO	0,130649	0,10984	0,0789228	-0,0176124	0,0133994	0,03412
MEANHSD	-0,0826406	0,000853555	0,0444098	0,206929	-0,106718	0,127353
DESVHSD	-0,204827	0,0392657	-0,152258	-0,156401	0,122134	0,526035
PERCVSD	-0,116933	0,186052	0,267517	0,05917	0,0530539	-0,278088
MEANHVS	0,146026	-0,0776949	0,491212	0,0268228	-0,576539	0,101326
DESVHVS	0,0247612	-0,0588662	0,258897	-0,482073	0,565483	-0,144231
MEANNDVIVS	0,14232	-0,111507	-0,308611	0,282967	-0,056882	0,102555
DESVNDVIVS	0,151512	-0,113285	-0,380912	0,189105	0,0237099	-0,0939248
COMPACTSO	0,319422	0,480343	0,0104024	-0,126913	-0,113644	0,0679322
IFORMASO	-0,116719	-0,246431	0,0498467	0,0501457	0,0266513	0,00197498
DFSO	0,336384	0,603047	-0,22599	-0,0184162	0,0562271	0,0150974
AREASO	0,0930928	0,118355	0,143355	-0,0481063	-0,0475579	0,0102898
PERIMSO	0,0706684	0,065783	0,124727	-0,0369993	-0,0364989	0,0198536

	Component	Component	Component	Component	Component	Component
	13	14	15	16	17	18
MEANHED	0,445207	0,0126238	0,236109	-0,277317	-0,442862	-0,104209
DESVHED	-0,360519	0,109037	0,613003	-0,143737	0,19761	0,0391988
MAXHED	-0,373896	-0,307629	-0,347466	0,124028	0,0773845	0,0372407
SUPED	-0,00812746	0,00334411	-0,102662	0,0657489	-0,0467063	-0,0664592
BCRED	0,188017	0,386795	0,0538804	0,031047	-0,356858	0,0531076
PERCV	-0,136294	-0,442707	0,122288	0,0142822	-0,173737	-0,0101229
NREL	0,0598304	-0,0112068	0,00110517	0,00228055	0,00825981	0,0157735
VoIED	0,0970041	0,0319536	0,118923	-0,064806	0,0345564	0,114883
BCRSO	-0,155034	0,0137769	0,0779445	0,0702673	0,486218	0,0381537
SUPEDSO	-0,0221102	-0,0207119	-0,0137953	-0,112233	0,0559205	-0,695709
MEANHSD	0,543467	-0,0948821	-0,177042	0,0194081	0,442882	0,0785071
DESVHSD	-0,0695555	0,157723	-0,448606	0,263913	-0,266357	-0,083136
PERCVSD	0,0562592	0,699989	-0,0852906	0,0849563	0,213252	-0,0470962
MEANHVS	-0,20548	0,0566975	0,0396332	0,182581	-0,0795142	-0,0499297
DESVHVS	0,170983	-0,100522	0,0568976	-0,102242	0,0222682	0,0357077
MEANNDVIVS	-0,142791	0,0364952	-0,271798	-0,584971	0,059157	0,0731401
DESVNDVIVS	0,182662	-0,0736686	0,272861	0,622865	-0,00701826	-0,0468526
COMPACTSO	0,0987992	0,00653962	-0,0686847	0,0389451	-0,0998954	0,347391
IFORMASO	-0,0402069	0,00990238	0,0271623	0,0333419	-0,129138	0,49552
DFSO	0,0124191	0,00332278	-0,00942872	0,0279824	0,00995499	0,00843154
AREASO	0,0202191	0,0339513	-0,0156844	-0,0597569	0,0927502	0,155939
PERIMSO	0,000570452	0,026324	-0,0122068	-0,0406679	0,00566393	0,2505

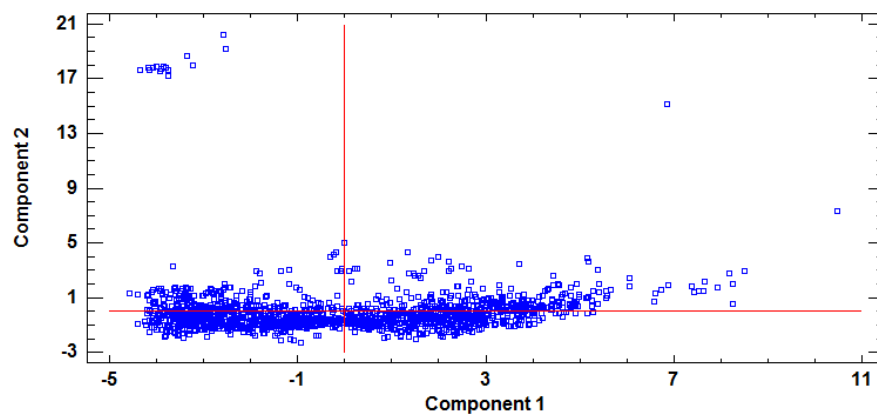
	Component	Component	Component	Component
	19	20	21	22

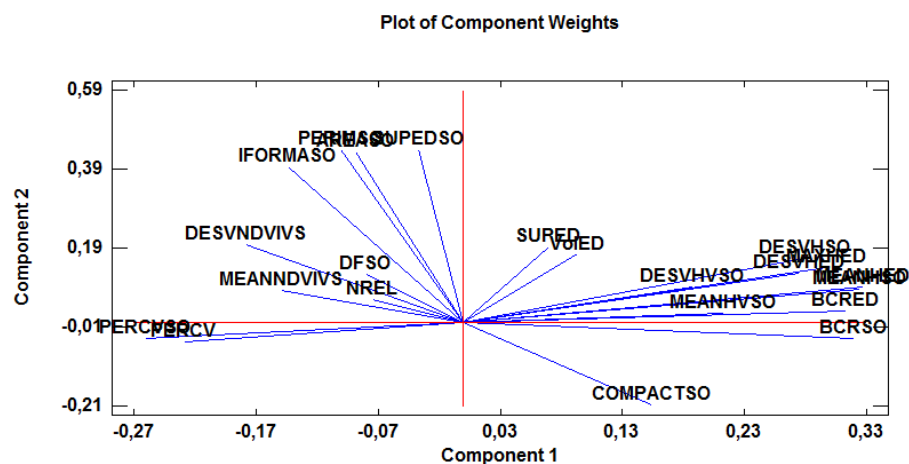
MEANHED	0,291082	-0,0469996	-0,29272	0,0076702
DESVHED	-0,167431	0,109385	-0,0115537	-0,00375826
MAXHED	0,0447324	-0,0527613	0,0822538	-0,000137148
SUPED	-0,292019	0,357559	-0,509823	0,000897083
BCRED	-0,403467	-0,0265956	0,277062	-0,00820592
PERCV	-0,0735418	-0,0104867	0,0315641	-0,00527105
NREL	-0,00055666	0,0265593	0,00538229	-0,000378414
VoIED	0,291857	-0,377505	0,483964	0,00154429
BCRSO	0,465104	-0,00818724	-0,296423	0,0155623
SUPEDSO	0,132437	0,294083	0,280915	-0,0656193
MEANH50	-0,376506	0,135884	0,226818	0,00229554
DESVH50	0,177914	-0,122503	-0,0811316	0,000550393
PERCV50	0,113127	0,0558551	-0,0354789	0,001544
MEANHVS0	-0,00244385	-0,00289651	0,0152977	-0,0005932
DESVHVS0	-0,0222568	0,028163	-0,00822991	0,000603482
MEANN50VVS	-0,00592661	0,00641137	-0,00874527	-0,00311362
DESVN50VVS	0,0045117	-0,054346	-0,00276085	0,00442419
COMPACT50	0,122016	0,278208	0,104296	-0,08765
IFORMAS0	0,261062	0,507563	0,145642	-0,255099
DF50	0,0062111	0,00747124	-0,00407856	0,00148767
AREAS0	-0,201449	-0,485328	-0,262533	-0,547982
PERIMS0	-0,0479636	-0,116632	-0,0894695	0,788795

Scree Plot



Scatterplot





These are variables what I decided to choose for final analysis:

PERCV
 ENTROP
 AREA
 DEVST3
 MEAN3
 MEANNDVI
 SUPED
 COMPACTSO
 MEANHVS0
 IFORMAS0
 FRACTAL
 COMPACT
 KURTOSIS

3) Linear discriminant analysis

4) Discriminant	<i>Eigenvalue</i>	<i>Relative</i>	<i>Canonical</i>
<i>Function</i>		<i>Percentage</i>	<i>Correlation</i>
1	4,45349	42,34	0,90368
2	3,13273	29,78	0,87065
3	1,07023	10,17	0,71900
4	0,518151	4,93	0,58421
5	0,490059	4,66	0,57349
6	0,237941	2,26	0,43841
7	0,211192	2,01	0,41757
8	0,144326	1,37	0,35514
9	0,0994913	0,95	0,30081
10	0,0868275	0,83	0,28265
11	0,0651296	0,62	0,24728
12	0,00743704	0,07	0,08592
13	0,00192578	0,02	0,04384

<i>Functions</i>	<i>Wilks</i>			
<i>Derived</i>	<i>Lambda</i>	<i>Chi-Square</i>	<i>DF</i>	<i>P-Value</i>
1	0,00429813	8667,5495	169	0,0000
2	0,0234398	5969,6547	144	0,0000
3	0,0968705	3712,8318	121	0,0000
4	0,200544	2555,4885	100	0,0000
5	0,304457	1891,4655	81	0,0000
6	0,453658	1257,1492	64	0,0000
7	0,561602	917,6572	49	0,0000
8	0,680208	612,9091	36	0,0000
9	0,77838	398,4845	25	0,0000
10	0,855822	247,6294	16	0,0000

11	0,930131	115,1998	9	0,0000
12	0,99071	14,8449	4	0,0050
13	0,998078	3,0600	1	0,0802

Stepwise regression

Method: forward selection

F-to-enter: 4,0

F-to-remove: 4,0

Step 0:

0 variables in the model.

Step 1:

Adding variable PERCV with F-to-enter = 465,384

1 variables in the model.

Wilk's lambda = 0,208219 Approximate F = 465,384 with P-value = 0,0000

Step 2:

Adding variable ENTROP with F-to-enter = 335,919

2 variables in the model.

Wilk's lambda = 0,0555769 Approximate F = 396,5 with P-value = 0,0000

Step 3:

Adding variable AREA with F-to-enter = 97,1308

3 variables in the model.

Wilk's lambda = 0,0309681 Approximate F = 269,466 with P-value = 0,0000

Step 4:

Adding variable DEVST3 with F-to-enter = 54,6399

4 variables in the model.

Wilk's lambda = 0,0213971 Approximate F = 200,943 with P-value = 0,0000

Step 5:

Adding variable MEAN3 with F-to-enter = 51,3996

5 variables in the model.

Wilk's lambda = 0,0150573 Approximate F = 165,077 with P-value = 0,0000

Step 6:

Adding variable MEANNDVI with F-to-enter = 34,9984

6 variables in the model.

Wilk's lambda = 0,0117007 Approximate F = 139,182 with P-value = 0,0000

Step 7:

Adding variable SUPED with F-to-enter = 27,8084

7 variables in the model.

Wilk's lambda = 0,00952762 Approximate F = 120,583 with P-value = 0,0000

Step 8:

Adding variable COMPACTSO with F-to-enter = 27,7636

8 variables in the model.

Wilk's lambda = 0,00775955 Approximate F = 107,616 with P-value = 0,0000

Step 9:

Adding variable MEANHVS0 with F-to-enter = 19,1082

9 variables in the model.

Wilk's lambda = 0,00670706 Approximate F = 96,5272 with P-value = 0,0000

Step 10:

Adding variable IFORMASO with F-to-enter = 12,184

10 variables in the model.

Wilk's lambda = 0,00609666 Approximate F = 86,925 with P-value = 0,0000

Step 11:

Adding variable FRACTAL with F-to-enter = 11,4343

11 variables in the model.

Wilk's lambda = 0,00557271 Approximate F = 79,2832 with P-value = 0,0000

Step 12:

Adding variable COMPACT with F-to-enter = 28,4219

12 variables in the model.

Wilk's lambda = 0,00451652 Approximate F = 75,3626 with P-value = 0,0000

Step 13:

Adding variable KURTOSIS with F-to-enter = 6,17142

13 variables in the model.

Wilk's lambda = 0,00429813 Approximate F = 69,4344 with P-value = 0,0000

Final model selected.

This procedure is designed to develop a set of discriminating functions which can help predict CLASE based on the values of other quantitative variables. 1605 cases were used to develop a model to discriminate among the 14 levels of CLASE. Using a stepwise selection algorithm, it was determined that 13 variables were significant predictors of CLASE. The 12 discriminating functions with P-values less than 0,05 are statistically significant at the 95,0% confidence level

Classification Function Coefficients for CLASE

	<i>Arable</i>	<i>Casco</i>	<i>Citricos</i>	<i>Cultivado</i>	<i>Dotacional</i>	<i>Ensanche</i>
PERCV	0,983144	0,985944	1,22396	1,25956	1,07296	1,04633
ENTROP	120,492	139,412	149,226	135,139	140,222	141,659
AREA	0,00100101	0,000989598	0,000987504	0,000986045	0,00098714	0,000982746
DEVST3	-0,113456	0,0491152	0,0151605	-0,0386298	0,144636	0,0350241
MEAN3	0,6797	0,704043	0,697591	0,736747	0,751755	0,698858
MEANNDVI	-3,57912	15,8403	12,1207	57,8237	15,4464	2,41859
SUPED	0,000615001	0,000622364	0,000547036	0,000610321	0,00108521	0,000632466
COMPACTSO	75,47	75,8273	67,3585	68,5256	76,2356	77,0696
MEANHVS0	0,0434778	0,0950744	-0,0637198	-0,086221	0,0982273	0,272393
IFORMASO	22,3641	21,5949	21,4992	21,4826	21,1096	21,867
FRACTAL	14252,6	14463,2	14316,7	14291,8	14327,6	14370,1
COMPACT	3660,77	3714,28	3680,21	3668,8	3680,98	3693,62
KURTOSIS	2,8062	2,70647	2,76702	2,71259	2,72056	2,75602
CONSTANT	-8701,9	-9001,29	-8852,73	-8805,93	-8856,14	-8897,44

	<i>FS</i>	<i>Nave</i>	<i>arroz</i>	<i>eaislado</i>	<i>forestal</i>	<i>invernadero</i>
PERCV	1,04017	1,01877	1,68616	1,15164	1,50096	1,09531
ENTROP	143,616	133,708	133,969	137,673	143,666	139,472
AREA	0,00101711	0,000981416	0,00100916	0,000982867	0,00130806	0,00098332
DEVST3	-0,0569372	0,0181502	-0,121017	0,221219	-0,0881251	-0,13433
MEAN3	0,723835	0,757606	0,718506	0,700211	0,651925	0,878473
MEANNDVI	21,5295	14,1587	-29,6945	-7,36925	-32,3832	17,5706
SUPED	0,000523697	0,000726836	0,000565845	0,000656859	0,000124494	0,000600537
COMPACTSO	68,3792	82,2222	72,1027	74,7556	69,3621	70,0757
MEANHVS0	0,0103963	0,0827414	0,0171062	0,168185	0,105681	0,0298715
IFORMASO	21,1245	24,078	22,0079	21,8748	21,6212	21,0782
FRACTAL	14252,6	14306,7	14242,9	14364,7	14164,4	14276,6
COMPACT	3662,26	3673,71	3652,15	3686,69	3627,92	3666,86
KURTOSIS	2,67399	2,63708	2,66832	2,73745	2,75025	2,62143
CONSTANT	-8756,28	-8812,15	-8733,47	-8885,12	-8661,65	-8795,21

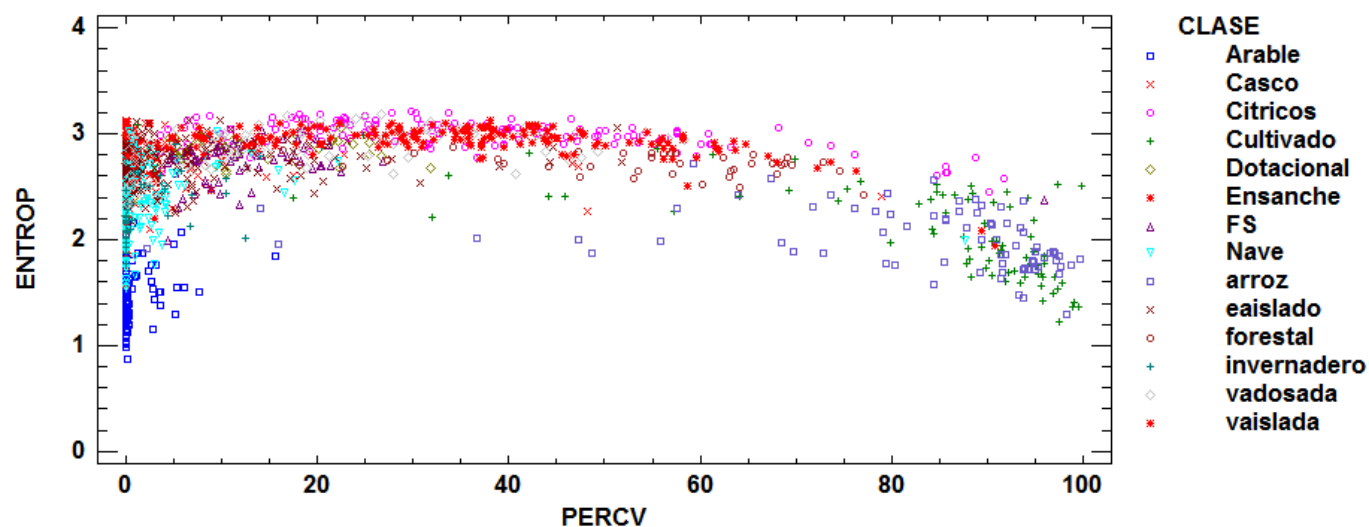
	<i>vadosada</i>	<i>vaislada</i>
PERCV	1,17082	1,30113
ENTROP	143,534	146,666
AREA	0,000982808	0,000979819
DEVST3	0,133046	0,125043
MEAN3	0,719134	0,73324
MEANNDVI	5,63527	2,09939
SUPED	0,000636172	0,000585166
COMPACTSO	74,5849	78,2955
MEANHVS0	0,00861364	0,0760022
IFORMASO	21,5366	22,1441
FRACTAL	14383,7	14385,7
COMPACT	3694,32	3699,46
KURTOSIS	2,76366	2,78021
CONSTANT	-8923,32	-8945,01

For example, the function used for the first level of CLASE is

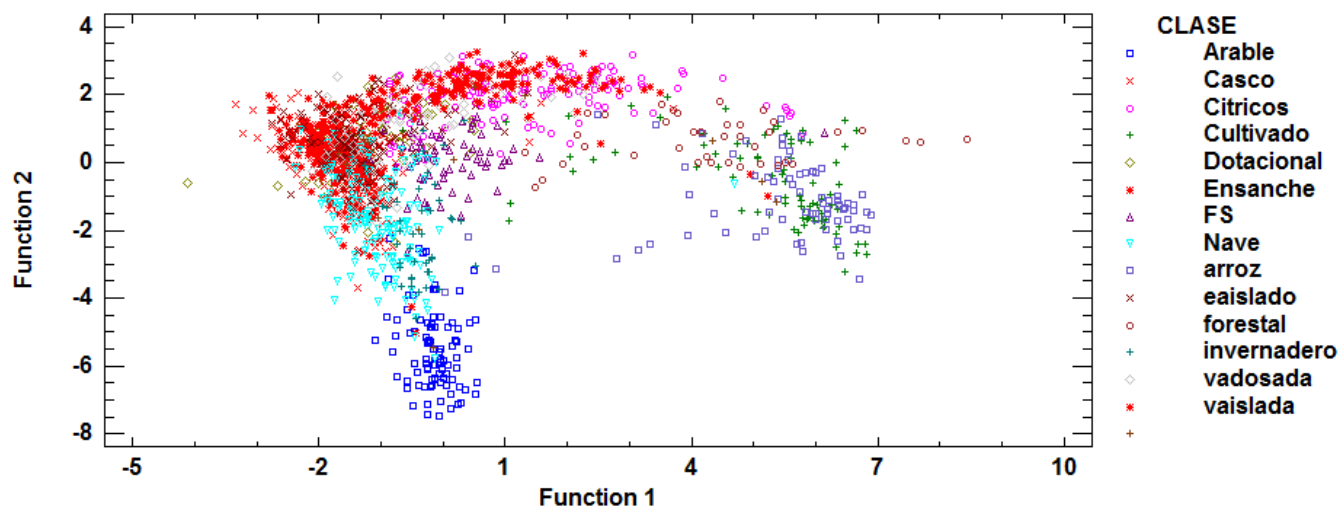
$$\begin{aligned}
 &-8701,9 + 0,983144 * \text{PERCV} + 120,492 * \text{ENTROP} + \\
 &0,00100101 * \text{AREA} - 0,113456 * \text{DEVST3} + \\
 &0,6797 * \text{MEAN3} - 3,57912 * \text{MEANNDVI} + \\
 &0,000615001 * \text{SUPED} + 75,47 * \text{COMPACTSO} + \\
 &0,0434778 * \text{MEANHVS0} + 22,3641 * \text{IFORMASO} + \\
 &14252,6 * \text{FRACTAL} + 3660,77 * \text{COMPACT} + \\
 &2,8062 * \text{KURTOSIS}
 \end{aligned}$$

These functions are used to predict which level of CLASE new observations belong to.

Scatterplot



Plot of Discriminant Functions



Classification Table

Actual	Group	Predicted	CLASE					
CLASE	Size	Arable	Casco	Citricos	Cultivado	Dotacional	Ensanche	FS
Arable	92	84 (91,30%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	1 (1,09%)
Casco	263	1 (0,38%)	156 (59,32%)	0 (0,00%)	1 (0,38%)	0 (0,00%)	48 (18,25%)	8 (3,04%)
Citricos	141	0 (0,00%)	0 (0,00%)	100 (70,92%)	2 (1,42%)	0 (0,00%)	0 (0,00%)	16 (11,35%)
Cultivado	81	0 (0,00%)	0 (0,00%)	6 (7,41%)	57 (70,37%)	0 (0,00%)	0 (0,00%)	3 (3,70%)
Dotacional	62	0 (0,00%)	3 (4,84%)	0 (0,00%)	0 (0,00%)	28 (45,16%)	4 (6,45%)	5 (8,06%)
Ensanche	225	1 (0,44%)	36 (16,00%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	135 (60,00%)	10 (4,44%)
FS	63	0 (0,00%)	2 (3,17%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	0 (0,00%)	53 (84,13%)
Nave	139	7 (5,04%)	9 (6,47%)	0 (0,00%)	0 (0,00%)	6 (4,32%)	11 (7,91%)	8 (5,76%)
arroz	74	2 (2,70%)	0 (0,00%)	1 (1,35%)	5 (6,76%)	0 (0,00%)	0 (0,00%)	1 (1,35%)

eaislado	142	0	18	2	0	2	18	1
		(0,00%)	(12,68%)	(1,41%)	(0,00%)	(1,41%)	(12,68%)	(0,70%)
forestal	39	0	0	4	0	0	0	5
		(0,00%)	(0,00%)	(10,26%)	(0,00%)	(0,00%)	(0,00%)	(12,82%)
invernadero	43	0	0	0	0	0	0	3
		(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(6,98%)
vadosada	89	0	13	12	0	2	1	1
		(0,00%)	(14,61%)	(13,48%)	(0,00%)	(2,25%)	(1,12%)	(1,12%)
vaislada	152	0	0	13	2	0	2	0
		(0,00%)	(0,00%)	(8,55%)	(1,32%)	(0,00%)	(1,32%)	(0,00%)

<i>Actual</i>							
<i>CLASE</i>	<i>Nave</i>	<i>arroz</i>	<i>eaislado</i>	<i>forestal</i>	<i>invernadero</i>	<i>vadosada</i>	<i>vaislada</i>
Arable	7	0	0	0	0	0	0
	(7,61%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)
Casco	14	0	19	0	2	11	3
	(5,32%)	(0,00%)	(7,22%)	(0,00%)	(0,76%)	(4,18%)	(1,14%)
Citricos	0	5	0	0	0	8	10
	(0,00%)	(3,55%)	(0,00%)	(0,00%)	(0,00%)	(5,67%)	(7,09%)
Cultivado	1	12	0	0	0	0	2
	(1,23%)	(14,81%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(2,47%)
Dotacional	5	0	7	0	0	8	2
	(8,06%)	(0,00%)	(11,29%)	(0,00%)	(0,00%)	(12,90%)	(3,23%)
Ensanche	5	2	27	0	1	8	0
	(2,22%)	(0,89%)	(12,00%)	(0,00%)	(0,44%)	(3,56%)	(0,00%)
FS	3	1	1	0	1	2	0
	(4,76%)	(1,59%)	(1,59%)	(0,00%)	(1,59%)	(3,17%)	(0,00%)
Nave	71	1	8	0	15	3	0
	(51,08%)	(0,72%)	(5,76%)	(0,00%)	(10,79%)	(2,16%)	(0,00%)
arroz	1	63	0	0	0	0	1
	(1,35%)	(85,14%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(1,35%)
eaislado	5	0	65	0	2	20	9
	(3,52%)	(0,00%)	(45,77%)	(0,00%)	(1,41%)	(14,08%)	(6,34%)
forestal	0	8	0	21	0	0	1
	(0,00%)	(20,51%)	(0,00%)	(53,85%)	(0,00%)	(0,00%)	(2,56%)
invernadero	0	0	0	0	40	0	0
	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(93,02%)	(0,00%)	(0,00%)
vadosada	1	0	10	0	8	22	19
	(1,12%)	(0,00%)	(11,24%)	(0,00%)	(8,99%)	(24,72%)	(21,35%)
vaislada	0	0	0	0	0	21	114
	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(13,82%)	(75,00%)

Percent of cases correctly classified: **62,87%**

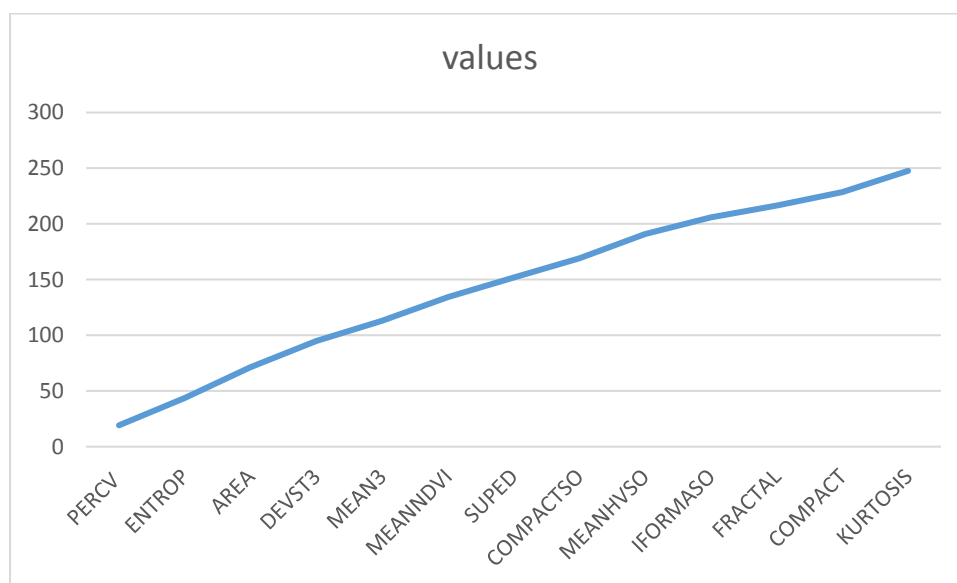
	<i>Prior</i>
<i>Group</i>	<i>Probability</i>
1	0,0714
2	0,0714
3	0,0714
4	0,0714
5	0,0714
6	0,0714
7	0,0714
8	0,0714
9	0,0714
10	0,0714
11	0,0714
12	0,0714
13	0,0714
14	0,0714

	<i>Actual</i>	<i>Highest</i>	<i>Highest</i>	<i>Squared</i>		<i>2nd Highest</i>	<i>2nd Highest</i>	<i>Squared</i>	
<i>Row</i>	<i>Group</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>
1	Arable	Arable	8709,25	2,26475	1,0000	Nave	8693,44	33,8859	0,0000
2	Arable	*Nave	8663,42	11,9122	0,6922	FS	8661,62	15,5143	0,1143
3	Arable	Arable	8864,94	6,35386	0,9998	Nave	8855,74	24,76	0,0001
4	Arable	Arable	8679,59	4,1499	1,0000	Nave	8662,47	38,3861	0,0000
5	Arable	Arable	8567,59	10,1559	1,0000	Nave	8552,26	40,8063	0,0000
6	Arable	Arable	8717,19	79,8323	1,0000	Nave	8690,68	132,862	0,0000
7	Arable	Arable	8662,2	11,9409	0,9998	Nave	8653,42	29,4951	0,0002

8	Arable	Arable	8703,5	13,7361	0,9996	Nave	8695,1	30,5316	0,0002
9	Arable	Arable	8761,18	13,6481	0,6769	Nave	8759,66	16,6875	0,1481
10	Arable	Arable	8774,89	4,98859	1,0000	Nave	8757,98	38,7915	0,0000

This table shows the results of using the derived discriminant functions to classify observations. It lists the two highest scores amongst the classification functions for each of the 1605 observations used to fit the model, as well as for any new observations. For example, row 1 scored highest for CLASE = Arable and second highest for CLASE = Nave. In fact, the true value of CLASE was Arable. Amongst the 1605 observations used to fit the model, 1009 or **62,866% were correctly classified**

name	value	
PERCV	19,18	19,18
ENTROP	24,72	43,9
AREA	27,58	71,48
DEVST3	23,29	94,77
MEAN3	18,24	113,01
MEANNDVI	21,17	134,18
SUPED	17,68	151,86
COMPACTSO	17,06	168,92
MEANHVS0	22,1	191,02
IFORMASO	14,95	205,97
FRACTAL	10,52	216,49
COMPACT	12,14	228,63
KURTOSIS	18,99	247,62



5) Evaluation of the classification

Classification Table

Actual	Group	Predicted	CLASE_1					
CLASE_1	Size	Arable	Casco	Citricos	Cultivado	Dotacional	Ensanche	FS
Arable	92	84	0	0	0	0	0	1
		(91,30%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(1,09%)
Casco	263	1	156	0	1	0	48	8
		(0,38%)	(59,32%)	(0,00%)	(0,38%)	(0,00%)	(18,25%)	(3,04%)
Citricos	141	0	0	100	2	0	0	16
		(0,00%)	(0,00%)	(70,92%)	(1,42%)	(0,00%)	(0,00%)	(11,35%)
Cultivado	81	0	0	6	57	0	0	3
		(0,00%)	(0,00%)	(7,41%)	(70,37%)	(0,00%)	(0,00%)	(3,70%)
Dotacional	62	0	3	0	0	28	4	5
		(0,00%)	(4,84%)	(0,00%)	(0,00%)	(45,16%)	(6,45%)	(8,06%)

Ensanche	225	1	36	0	0	0	135	10
		(0,44%)	(16,00%)	(0,00%)	(0,00%)	(0,00%)	(60,00%)	(4,44%)
FS	63	0	2	0	0	0	0	53
		(0,00%)	(3,17%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(84,13%)
Nave	139	7	9	0	0	6	11	8
		(5,04%)	(6,47%)	(0,00%)	(0,00%)	(4,32%)	(7,91%)	(5,76%)
arroz	74	2	0	1	5	0	0	1
		(2,70%)	(0,00%)	(1,35%)	(6,76%)	(0,00%)	(0,00%)	(1,35%)
eaislado	142	0	18	2	0	2	18	1
		(0,00%)	(12,68%)	(1,41%)	(0,00%)	(1,41%)	(12,68%)	(0,70%)
forestal	39	0	0	4	0	0	0	5
		(0,00%)	(0,00%)	(10,26%)	(0,00%)	(0,00%)	(0,00%)	(12,82%)
invernadero	43	0	0	0	0	0	0	3
		(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(6,98%)
vadosada	89	0	13	12	0	2	1	1
		(0,00%)	(14,61%)	(13,48%)	(0,00%)	(2,25%)	(1,12%)	(1,12%)
vaislada	152	0	0	13	2	0	2	0
		(0,00%)	(0,00%)	(8,55%)	(1,32%)	(0,00%)	(1,32%)	(0,00%)

<i>Actual</i>							
<i>CLASE_1</i>	<i>Nave</i>	<i>arroz</i>	<i>eaislado</i>	<i>forestal</i>	<i>invernadero</i>	<i>vadosada</i>	<i>vaislada</i>
Arable	7	0	0	0	0	0	0
	(7,61%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)
Casco	14	0	19	0	2	11	3
	(5,32%)	(0,00%)	(7,22%)	(0,00%)	(0,76%)	(4,18%)	(1,14%)
Citricos	0	5	0	0	0	8	10
	(0,00%)	(3,55%)	(0,00%)	(0,00%)	(0,00%)	(5,67%)	(7,09%)
Cultivado	1	12	0	0	0	0	2
	(1,23%)	(14,81%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(2,47%)
Dotacional	5	0	7	0	0	8	2
	(8,06%)	(0,00%)	(11,29%)	(0,00%)	(0,00%)	(12,90%)	(3,23%)
Ensanche	5	2	27	0	1	8	0
	(2,22%)	(0,89%)	(12,00%)	(0,00%)	(0,44%)	(3,56%)	(0,00%)
FS	3	1	1	0	1	2	0
	(4,76%)	(1,59%)	(1,59%)	(0,00%)	(1,59%)	(3,17%)	(0,00%)
Nave	71	1	8	0	15	3	0
	(51,08%)	(0,72%)	(5,76%)	(0,00%)	(10,79%)	(2,16%)	(0,00%)
arroz	1	63	0	0	0	0	1
	(1,35%)	(85,14%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(1,35%)
eaislado	5	0	65	0	2	20	9
	(3,52%)	(0,00%)	(45,77%)	(0,00%)	(1,41%)	(14,08%)	(6,34%)
forestal	0	8	0	21	0	0	1
	(0,00%)	(20,51%)	(0,00%)	(53,85%)	(0,00%)	(0,00%)	(2,56%)
invernadero	0	0	0	0	40	0	0
	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(93,02%)	(0,00%)	(0,00%)
vadosada	1	0	10	0	8	22	19
	(1,12%)	(0,00%)	(11,24%)	(0,00%)	(8,99%)	(24,72%)	(21,35%)
vaislada	0	0	0	0	0	21	114
	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(0,00%)	(13,82%)	(75,00%)

Percent of cases correctly classified: 62,87%

	<i>Prior</i>
<i>Group</i>	<i>Probability</i>
1	0,0714
2	0,0714
3	0,0714
4	0,0714
5	0,0714
6	0,0714
7	0,0714
8	0,0714
9	0,0714
10	0,0714
11	0,0714
12	0,0714
13	0,0714
14	0,0714

	<i>Actual</i>	<i>Highest</i>	<i>Highest</i>	<i>Squared</i>		<i>2nd Highest</i>	<i>2nd Highest</i>	<i>Squared</i>	
<i>Row</i>	<i>Group</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>

* = incorrectly classified.

This table shows the results of using the derived discriminant functions to classify observations. It lists the two highest scores amongst the classification functions for each of the 1605 observations used to fit the model, as well as for any new observations. Amongst the 1605 observations used to fit the model, 1009 or 62,866% were correctly classified. You can predict additional observations by adding new rows to the current data file, filling in values for each of the independent variables but leaving the cell for CLASE_1 blank.

	<i>Actual</i>	<i>Highest</i>	<i>Highest</i>	<i>Squared</i>		<i>2nd Highest</i>	<i>2nd Highest</i>	<i>Squared</i>	
<i>Row</i>	<i>Group</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>	<i>Group</i>	<i>Value</i>	<i>Distance</i>	<i>Prob.</i>
1	Citricos	Citricos	8707,7	3,08547	0,9428	FS	8704,14	10,2052	0,0268
2	vaislada	vaislada	8978,9	0,820764	0,7982	vadosada	8977,19	4,22218	0,1457
3	Casco	Casco	9207,41	11,7127	0,5042	Ensanche	9207,1	12,3337	0,3696
4	Ensanche	*eaislado	9071,5	8,25699	0,4942	Casco	9071,29	8,68008	0,4000
5	Ensanche	Ensanche	8868,14	6,45245	0,9392	Casco	8864,84	13,0562	0,0346
6	eaislado	*Ensanche	8872,47	2,78809	0,4573	Casco	8871,98	3,77943	0,2786
7	forestal	*arroz	8561,44	17,9829	0,7942	forestal	8559,34	22,199	0,0965
8	vaislada	vaislada	8927,99	2,19781	0,4923	vadosada	8927,82	2,52675	0,4176
9	Arable	Arable	8791,2	3,64116	0,9999	Nave	8782,22	21,5989	0,0001
10	Dotacional	*vadosada	8803,8	13,462	0,3294	eaislado	8803,41	14,236	0,2237
11	Citricos	*FS	8826,91	2,85322	0,8150	Citricos	8824,59	7,4864	0,0804
12	Cultivado	Cultivado	8848,41	9,54677	1,0000	arroz	8837,51	31,3444	0,0000
13	vadosada	*eaislado	8909,12	5,77299	0,4210	vadosada	8909,02	5,97718	0,3801
14	Ensanche	Ensanche	8926,6	4,91138	0,8971	Casco	8924,02	10,0721	0,0679
15	FS	*Nave	8649,9	8,46203	0,4960	FS	8649,42	9,42404	0,3066
16	vaislada	vaislada	8905,71	1,24134	0,6788	vadosada	8904,68	3,30324	0,2421
17	Casco	Casco	8942,11	2,62091	0,5349	Ensanche	8940,98	4,88503	0,1724
18	Cultivado	Cultivado	8707,3	3,34888	0,9978	arroz	8701,2	15,5424	0,0022
19	arroz	arroz	8608,12	11,6826	0,9839	forestal	8603,41	21,0961	0,0089
20	Ensanche	Ensanche	8887,01	3,83875	0,4368	eaislado	8886,39	5,06405	0,2367
21	Nave	*Casco	9285,45	11,5336	0,7489	eaislado	9283,89	14,6586	0,1570
22	vadosada	*Citricos	8885,19	3,04114	0,9081	vadosada	8881,97	9,4773	0,0364
23	Arable	Arable	8745,58	11,2735	0,9680	Nave	8742,17	18,1034	0,0318
24	Citricos	Citricos	8745,98	10,2775	0,7074	vaislada	8745,01	12,2139	0,2687
25	Dotacional	*eaislado	8821,75	8,25631	0,6531	vadosada	8820,94	9,8825	0,2896
26	Cultivado	Cultivado	8833,93	6,94741	1,0000	arroz	8823,01	28,7762	0,0000
27	Ensanche	Ensanche	8911,0	5,08064	0,6467	Casco	8910,28	6,51876	0,3151
28	Cultivado	*arroz	8787,89	9,44838	0,8278	Cultivado	8786,32	12,5893	0,1722
29	Nave	*Dotacional	8804,85	6,97443	0,2942	Casco	8804,63	7,40017	0,2378
30	eaislado	*vadosada	8738,55	4,65392	0,4244	eaislado	8738,31	5,1378	0,3332
31	Arable	Arable	8783,11	37,4862	1,0000	Nave	8759,41	84,893	0,0000
32	Ensanche	Ensanche	8990,12	8,48883	0,4440	vadosada	8989,49	9,74457	0,2370
33	Arable	Arable	8773,67	3,94828	0,9998	Nave	8765,03	21,2339	0,0002
34	Citricos	Citricos	8848,72	3,72139	0,4553	vadosada	8848,31	4,54503	0,3016
35	Casco	*Ensanche	8890,29	6,2811	0,5503	Casco	8889,59	7,67125	0,2746
36	Nave	*invernadero	8838,58	15,4515	0,5412	Nave	8838,4	15,8045	0,4536
37	vadosada	*Dotacional	8900,27	7,21875	0,3179	vadosada	8899,82	8,1195	0,2026
38	Ensanche	Ensanche	8904,69	5,04839	0,3100	Casco	8904,45	5,54643	0,2416
39	Ensanche	*Casco	9204,58	14,7023	0,7361	eaislado	9202,58	18,7216	0,0987
40	Ensanche	Ensanche	8889,85	0,967731	0,4293	Casco	8889,44	1,7905	0,2845
41	Cultivado	Cultivado	8652,58	9,82143	0,9998	arroz	8644,05	26,8855	0,0002
42	Nave	*invernadero	8857,96	6,13732	0,9041	Nave	8855,67	10,7148	0,0917
43	Nave	Nave	8880,48	11,1121	0,9727	invernadero	8876,72	18,6381	0,0226
44	Citricos	Citricos	8903,88	10,8729	0,8467	vaislada	8901,97	14,6902	0,1256
45	Ensanche	*eaislado	9026,21	8,25663	0,7811	Ensanche	9024,41	11,8676	0,1284
46	Ensanche	Ensanche	8999,67	16,7516	0,9605	eaislado	8995,75	24,5879	0,0191
47	vaislada	vaislada	8754,74	5,1317	0,6641	Citricos	8753,33	7,94271	0,1629
48	Casco	Casco	8945,52	3,74437	0,5346	Ensanche	8944,69	5,41113	0,2323
49	Ensanche	*Casco	8866,29	4,84619	0,6422	Ensanche	8865,12	7,17654	0,2003
50	Dotacional	*Ensanche	8807,34	4,81724	0,2934	FS	8807,32	4,85618	0,2878
51	arroz	arroz	8814,14	7,18878	0,6132	Cultivado	8813,68	8,11073	0,3868
52	eaislado	*Casco	8917,86	8,79924	0,3113	FS	8917,71	9,09416	0,2686
53	Citricos	Citricos	8926,33	2,43831	0,6595	vadosada	8924,86	5,39214	0,1506
54	Cultivado	Cultivado	8749,84	5,50524	0,9639	arroz	8746,56	12,0765	0,0361
55	Cultivado	Cultivado	8993,87	10,2257	0,9983	arroz	8987,46	23,0279	0,0017
56	invernadero	*FS	8855,51	6,31712	0,8534	Citricos	8853,17	11,0078	0,0818
57	Casco	*Ensanche	8892,73	2,24627	0,4698	Casco	8892,55	2,60754	0,3922

58	FS	FS	8753,44	1,2632	0,7250	vadosada	8751,44	5,25489	0,0985
59	arroz	arroz	8629,27	5,65335	0,9931	Cultivado	8624,29	15,6026	0,0069
60	Dotacional	*FS	8990,67	8,90979	0,5830	Citricos	8989,78	10,6791	0,2407
61	Casco	Casco	9023,0	2,78156	0,4794	vadosada	9022,37	4,03787	0,2558
62	FS	FS	8691,0	2,35212	0,8908	vadosada	8687,81	8,73114	0,0367
63	arroz	arroz	9327,36	50,6467	1,0000	Cultivado	9311,93	81,5067	0,0000
64	Casco	*Ensanche	8919,09	2,13774	0,4447	Casco	8918,7	2,92159	0,3005
65	eaislado	eaislado	8776,56	20,5136	0,9759	vadosada	8772,26	29,1246	0,0132
66	Citricos	*FS	8848,77	3,83544	0,5088	Casco	8847,82	5,74758	0,1956
67	Citricos	*vaislada	8856,51	3,51478	0,5014	Citricos	8855,82	4,88233	0,2531
68	Ensanche	Ensanche	8710,33	14,4472	0,6508	eaislado	8709,39	16,317	0,2555
69	eaislado	*vadosada	8796,59	9,61167	0,3883	eaislado	8796,15	10,4889	0,2504
70	Casco	*Ensanche	8916,86	3,75832	0,4470	Casco	8916,74	3,98703	0,3987
71	Ensanche	*Casco	8841,81	3,64021	0,3115	vadosada	8841,4	4,455	0,2073
72	invernadero	invernadero	8639,13	7,57782	0,9935	Nave	8633,55	18,7311	0,0038
73	Citricos	Citricos	8805,64	6,79295	0,9202	FS	8802,46	13,1683	0,0380
74	invernadero	invernadero	8544,48	9,71321	0,5127	FS	8544,32	10,0349	0,4365
75	arroz	*Cultivado	8676,84	21,1104	0,7222	arroz	8675,88	23,0209	0,2778
76	Dotacional	*FS	8789,51	4,84247	0,3276	Dotacional	8788,98	5,90164	0,1929
77	vadosada	*Casco	9043,49	8,99411	0,5620	Ensanche	9042,55	10,88	0,2189
78	Ensanche	Ensanche	8914,39	3,29809	0,3204	Casco	8914,31	3,46369	0,2950
79	Citricos	*FS	8748,78	3,6857	0,8384	Citricos	8747,1	7,06076	0,1551
80	eaislado	eaislado	8840,83	4,26801	0,6049	vadosada	8839,95	6,02942	0,2507
81	vadosada	*invernadero	8855,14	6,32181	0,8096	Nave	8853,4	9,79356	0,1427
82	Casco	Casco	8942,83	7,43813	0,2726	vadosada	8942,66	7,78317	0,2294
83	Nave	Nave	8831,65	3,81074	0,7031	Ensanche	8829,96	7,2107	0,1284
84	Casco	Casco	9374,29	18,5133	0,6882	Ensanche	9373,36	20,3692	0,2721
85	Citricos	Citricos	8921,59	3,43577	0,8993	vadosada	8918,7	9,21483	0,0500
86	Casco	*Ensanche	8857,93	3,9594	0,8131	Casco	8855,99	7,83435	0,1171
87	Ensanche	Ensanche	8908,85	5,9562	0,2663	eaislado	8908,59	6,46661	0,2063
88	forestal	forestal	8884,09	51,7857	1,0000	FS	8828,59	162,792	0,0000
89	Casco	*Ensanche	9065,67	14,337	0,4676	Casco	9065,18	15,3266	0,2851
90	FS	FS	8613,92	7,78519	0,8630	Ensanche	8611,16	13,3123	0,0544
91	forestal	*arroz	8514,67	12,5835	0,9996	Cultivado	8506,76	28,4142	0,0004
92	Casco	*Ensanche	8942,17	5,88448	0,8887	eaislado	8939,43	11,3593	0,0575
93	eaislado	eaislado	9223,79	19,8657	0,8018	Casco	9222,15	23,1394	0,1560
94	Citricos	*vaislada	8987,79	3,42031	0,4627	vadosada	8987,36	4,27744	0,3014
95	Cultivado	*Citricos	8884,64	4,84765	0,9424	FS	8881,01	12,0953	0,0251
96	Nave	*Casco	9137,02	8,63823	0,7815	vadosada	9134,97	12,7453	0,1003
97	Casco	*Ensanche	8875,33	3,98113	0,5416	Casco	8874,48	5,68014	0,2316
98	Ensanche	Ensanche	8899,69	4,41373	0,8386	Casco	8897,47	8,86093	0,0908
99	vadosada	*eaislado	9024,72	28,7748	0,8770	Casco	9022,29	33,6411	0,0770
100	FS	FS	8807,07	4,40148	0,8454	Citricos	8805,2	8,13443	0,1308
101	Ensanche	*Casco	8887,51	4,15724	0,4827	Ensanche	8886,82	5,54587	0,2411
102	Ensanche	Ensanche	8955,67	8,48488	0,8611	eaislado	8952,84	14,1515	0,0506
103	arroz	*Arable	8621,9	15,604	0,9982	FS	8614,91	29,5742	0,0009
104	vaislada	vaislada	8945,16	2,65198	0,6858	vadosada	8944,23	4,51216	0,2705
105	invernadero	invernadero	8689,78	3,32734	0,9977	Nave	8683,63	15,6356	0,0021
106	Ensanche	Ensanche	8837,4	3,62139	0,5478	eaislado	8836,42	5,59612	0,2041
107	Nave	*Dotacional	8813,98	3,81536	0,8374	FS	8811,21	9,36177	0,0523
108	Dotacional	*FS	8779,05	9,25452	0,4427	Ensanche	8778,44	10,4711	0,2410
109	Nave	*Ensanche	8737,32	8,40435	0,6594	Casco	8735,96	11,1196	0,1696
110	Nave	*invernadero	8802,35	16,2736	0,6961	Nave	8801,52	17,9343	0,3034
111	vadosada	*eaislado	8780,0	8,33699	0,6754	vadosada	8779,06	10,223	0,2631
112	vaislada	vaislada	8884,87	3,27198	0,8656	vadosada	8882,77	7,45848	0,1067
113	Arable	Arable	8703,5	13,7361	0,9996	Nave	8695,1	30,5316	0,0002
114	Casco	Casco	8890,72	3,80332	0,3567	FS	8890,07	5,10515	0,1860
115	Ensanche	Ensanche	8873,34	3,78571	0,6007	Casco	8872,11	6,25893	0,1744
116	Cultivado	Cultivado	8927,83	368,821	1,0000	arroz	8909,42	405,65	0,0000
117	Cultivado	*Citricos	8887,16	7,57312	0,6335	FS	8886,59	8,70817	0,3591
118	Casco	Casco	8880,43	4,83917	0,5315	Ensanche	8879,85	5,99993	0,2975
119	Citricos	Citricos	8905,27	7,56609	0,9729	vaislada	8901,26	15,5886	0,0176
120	invernadero	invernadero	8523,98	7,06894	0,9808	FS	8519,7	15,6392	0,0135
121	Ensanche	Ensanche	8889,85	6,42155	0,7670	Casco	8888,45	9,22646	0,1887
122	Arable	*Nave	8616,7	17,6533	0,5014	invernadero	8616,07	18,9162	0,2667
123	vadosada	*Citricos	8826,92	4,30115	0,9643	vaislada	8822,97	12,2029	0,0186
124	Arable	Arable	8679,59	4,1499	1,0000	Nave	8662,47	38,3861	0,0000
125	Casco	*vaislada	8821,37	9,44972	0,5051	vadosada	8820,81	10,5688	0,2886

126	vaislada	vaislada	8943,92	3,09536	0,6104	Citricos	8943,03	4,87656	0,2505
127	vaislada	vaislada	8995,42	3,40381	0,7889	vadosada	8993,61	7,03842	0,1282
128	Arable	Arable	8616,22	20,0542	1,0000	Nave	8595,91	60,6829	0,0000
129	Dotacional	*FS	8688,06	3,49542	0,4581	vadosada	8686,76	6,08709	0,1254
130	Casco	Casco	8944,3	2,57877	0,5179	Ensanche	8943,32	4,53241	0,1950
131	Ensanche	Ensanche	8937,74	4,81027	0,4739	Casco	8937,33	5,6387	0,3132
132	Ensanche	Ensanche	8847,18	8,94151	0,7154	eaislado	8845,93	11,4306	0,2061
133	forestal	*Citricos	8617,66	13,1438	0,5645	vaislada	8616,99	14,4875	0,2883
134	vaislada	vaislada	8883,79	7,37375	0,6672	Citricos	8882,95	9,05046	0,2885
135	invernadero	invernadero	8827,24	2,48485	0,9965	Nave	8821,56	13,8524	0,0034
136	eaislado	*vaislada	9025,04	4,99397	0,8999	vadosada	9022,73	9,60658	0,0897
137	Ensanche	*eaislado	8708,52	6,82537	0,3520	Ensanche	8708,09	7,69513	0,2279
138	vadosada	vadosada	9161,38	8,95591	0,5581	Casco	9160,46	10,7889	0,2232
139	Casco	Casco	8937,34	5,66017	0,3052	eaislado	8937,22	5,90074	0,2706
140	Casco	*Ensanche	9075,44	7,4291	0,4315	Casco	9075,42	7,46381	0,4240
141	Casco	Casco	8972,44	2,2398	0,6375	Ensanche	8971,33	4,45068	0,2111

Frequency Table for CLASE_1 by RESCLAS

	Arable	Casco	Citricos	Cultivado	Dotacional	Ensanche	FS	Nave	arroz	eaislado	forestal
Arable	7	0	0	0	0	0	0	1	0	0	0
Casco	0	11	0	0	0	9	0	0	0	0	0
Citricos	0	0	8	0	0	0	3	0	0	0	0
Cultivado	0	0	2	7	0	0	0	0	1	0	0
Dotacional	0	0	0	0	0	1	4	0	0	1	0
Ensanche	0	4	0	0	0	18	0	0	0	3	0
FS	0	0	0	0	0	0	4	1	0	0	0
Nave	0	2	0	0	2	1	0	2	0	0	0
arroz	1	0	0	1	0	0	0	0	4	0	0
eaislado	0	1	0	0	0	1	0	0	0	3	0
forestal	0	0	1	0	0	0	0	0	2	0	1
invernadero	0	0	0	0	0	0	1	0	0	0	0
vadosada	0	1	2	0	1	0	0	0	0	3	0
vaislada	0	0	0	0	0	0	0	0	0	0	0
Column Total	8	19	13	8	3	30	12	4	7	10	1

	invernadero	vadosada	vaislada	Row Total
Arable	0	0	0	8
Casco	0	0	1	21
Citricos	0	0	2	13
Cultivado	0	0	0	10
Dotacional	0	1	0	7
Ensanche	0	0	0	25
FS	0	0	0	5
Nave	3	0	0	10
arroz	0	0	0	6
eaislado	0	2	1	8
forestal	0	0	0	4
invernadero	5	0	0	6
vadosada	1	1	0	9
vaislada	0	0	9	9
Column Total	9	4	13	141