

```
R version 4.4.3 (2025-02-28 ucrt) -- "Trophy Case"
Copyright (C) 2025 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64
```

```
R is free software and comes with ABSOLUTELY NO WARRANTY.
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```

```
Natural language support but running in an English locale
```

```
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
```

```
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
```

```
> source ("C:\\\\Users\\\\anava\\\\OneDrive\\\\Documentos\\\\MBA\\\\IAA-03\\\\Script\\\\T1.r")
'data.frame': 6435 obs. of 5 variables:
 $ x.17 : num 92 84 84 84 76 76 80 80 76 76 ...
 $ x.18 : num 112 103 99 99 99 99 112 107 91 95 ...
 $ x.19 : num 118 104 104 104 104 108 118 113 104 100 ...
 $ x.20 : num 85 81 78 81 81 85 88 85 74 78 ...
 $ classes: Factor w/ 6 levels "red soil","cotton crop",...: 3 3 3 3 3 3 3 3 3 4 4 ...
Error in createDataPartition(dados$classes, p = 0.8, list = FALSE) :
  could not find function "createDataPartition"
> source ("C:\\\\Users\\\\anava\\\\OneDrive\\\\Documentos\\\\MBA\\\\IAA-03\\\\Script\\\\T1.r")
Installing package into 'C:/Users/anava/AppData/Local/R/win-library/4.4'
(as 'lib' is unspecified)
--- Please select a CRAN mirror for use in this session ---
trying URL 'https://cran-r.c3sl.ufpr.br/bin/windows/contrib/4.4/e1071_1.7-16.zip'
Content type 'application/zip' length 674258 bytes (658 KB)
downloaded 658 KB
```

```
package 'e1071' successfully unpacked and MD5 sums checked
```

```
The downloaded binary packages are in
  C:\\\\Users\\\\anava\\\\AppData\\\\Local\\\\Temp\\\\RtmpWsjaun\\\\downloaded_packages
Installing package into 'C:/Users/anava/AppData/Local/R/win-library/4.4'
(as 'lib' is unspecified)
trying URL 'https://cran-r.c3sl.ufpr.br/bin/windows/contrib/4.4/randomForest_4.7-1.2.zip'
Content type 'application/zip' length 225864 bytes (220 KB)
downloaded 220 KB
```

```
package 'randomForest' successfully unpacked and MD5 sums checked
```

```
The downloaded binary packages are in
  C:\\\\Users\\\\anava\\\\AppData\\\\Local\\\\Temp\\\\RtmpWsjaun\\\\downloaded_packages
Installing package into 'C:/Users/anava/AppData/Local/R/win-library/4.4'
(as 'lib' is unspecified)
trying URL 'https://cran-r.c3sl.ufpr.br/bin/windows/contrib/4.4/kernlab_0.9-33.zip'
Content type 'application/zip' length 2322323 bytes (2.2 MB)
downloaded 2.2 MB
```

```
package 'kernlab' successfully unpacked and MD5 sums checked
```

```
The downloaded binary packages are in
  C:\\\\Users\\\\anava\\\\AppData\\\\Local\\\\Temp\\\\RtmpWsjaun\\\\downloaded_packages
Installing package into 'C:/Users/anava/AppData/Local/R/win-library/4.4'
(as 'lib' is unspecified)
trying URL 'https://cran-r.c3sl.ufpr.br/bin/windows/contrib/4.4/caret_7.0-1.zip'
Content type 'application/zip' length 3602917 bytes (3.4 MB)
downloaded 3.4 MB
```

```
package 'caret' successfully unpacked and MD5 sums checked
```

```
The downloaded binary packages are in
  C:\\\\Users\\\\anava\\\\AppData\\\\Local\\\\Temp\\\\RtmpWsjaun\\\\downloaded_packages
Loading required package: ggplot2
Loading required package: lattice
'data.frame': 6435 obs. of 5 variables:
 $ x.17 : num 92 84 84 84 76 76 80 80 76 76 ...
```

```
$ x.18 : num 112 103 99 99 99 99 112 107 91 95 ...
$ x.19 : num 118 104 104 104 108 118 113 104 100 ...
$ x.20 : num 85 81 78 81 81 85 88 85 74 78 ...
$ classes: Factor w/ 6 levels "red soil","cotton crop",...: 3 3 3 3 3 3 3 3 3 4 4 ...
-----treinar modelo base random forest-----
Confusion Matrix and Statistics
```

Prediction	Reference				
	red soil	cotton crop	grey soil	damp grey soil	grey soil
red soil	296	1	5		2
cotton crop	0	123	0		0
grey soil	3	0	238		29
damp grey soil	1	0	21		62
vegetation stubble	6	10	0		0
very damp grey soil	0	6	7		32
Prediction	Reference				
	vegetation stubble	very damp grey soil			
red soil	8		0		
cotton crop	2		1		
grey soil	1		10		
damp grey soil	2		40		
vegetation stubble	120		8		
very damp grey soil	8		242		

Overall Statistics

```
Accuracy : 0.8419
95% CI : (0.8208, 0.8614)
No Information Rate : 0.2383
P-Value [Acc > NIR] : < 2.2e-16
```

```
Kappa : 0.8047
```

```
Mcnemar's Test P-Value : NA
```

Statistics by Class:

	Class: red soil	Class: cotton crop	Class: grey soil
Sensitivity	0.9673	0.87857	0.8782
Specificity	0.9836	0.99738	0.9576
Pos Pred Value	0.9487	0.97619	0.8470
Neg Pred Value	0.9897	0.98532	0.9671
Prevalence	0.2383	0.10903	0.2111
Detection Rate	0.2305	0.09579	0.1854
Detection Prevalence	0.2430	0.09813	0.2188
Balanced Accuracy	0.9755	0.93797	0.9179
	Class: damp grey soil	Class: vegetation stubble	
Sensitivity	0.49600	0.85106	
Specificity	0.94478	0.97900	
Pos Pred Value	0.49206	0.83333	
Neg Pred Value	0.94560	0.98158	
Prevalence	0.09735	0.10981	
Detection Rate	0.04829	0.09346	
Detection Prevalence	0.09813	0.11215	
Balanced Accuracy	0.72039	0.91503	
	Class: very damp grey soil		
Sensitivity	0.8040		
Specificity	0.9461		
Pos Pred Value	0.8203		
Neg Pred Value	0.9403		
Prevalence	0.2344		
Detection Rate	0.1885		
Detection Prevalence	0.2298		
Balanced Accuracy	0.8750		

```
-----treinar modelo base-svm -----
Confusion Matrix and Statistics
```

Prediction	Reference				
	red soil	cotton crop	grey soil	damp grey soil	grey soil
red soil	298	1	4		2
cotton crop	1	120	0		0
grey soil	4	0	260		29
damp grey soil	0	1	7		69
vegetation stubble	3	14	0		2

very damp grey soil	0	4	0	23
Reference				
Prediction	vegetation stubble	very damp grey soil		
red soil	7	0		
cotton crop	4	0		
grey soil	1	12		
damp grey soil	2	32		
vegetation stubble	117	3		
very damp grey soil	10	254		

Overall Statistics

Accuracy : 0.8707
 95% CI : (0.8511, 0.8886)
 No Information Rate : 0.2383
 P-Value [Acc > NIR] : < 2.2e-16

Kappa : 0.8399

McNemar's Test P-Value : NA

Statistics by Class:

	Class: red soil	Class: cotton crop	Class: grey soil
Sensitivity	0.9739	0.85714	0.9594
Specificity	0.9857	0.99563	0.9546
Pos Pred Value	0.9551	0.96000	0.8497
Neg Pred Value	0.9918	0.98274	0.9888
Prevalence	0.2383	0.10903	0.2111
Detection Rate	0.2321	0.09346	0.2025
Detection Prevalence	0.2430	0.09735	0.2383
Balanced Accuracy	0.9798	0.92639	0.9570
	Class: damp grey soil	Class: vegetation stubble	
Sensitivity	0.55200	0.82979	
Specificity	0.96376	0.98075	
Pos Pred Value	0.62162	0.84173	
Neg Pred Value	0.95226	0.97904	
Prevalence	0.09735	0.10981	
Detection Rate	0.05374	0.09112	
Detection Prevalence	0.08645	0.10826	
Balanced Accuracy	0.75788	0.90527	
	Class: very damp grey soil		
Sensitivity	0.8439		
Specificity	0.9624		
Pos Pred Value	0.8729		
Neg Pred Value	0.9527		
Prevalence	0.2344		
Detection Rate	0.1978		
Detection Prevalence	0.2266		
Balanced Accuracy	0.9031		

-----treinar modelo base-rna -----

```
# weights: 17
initial value 9055.049783
iter 10 value 8837.800082
iter 10 value 8837.800054
iter 10 value 8837.800054
final value 8837.800054
converged
# weights: 39
initial value 12242.033358
iter 10 value 8837.800060
iter 10 value 8837.800053
iter 10 value 8837.800053
final value 8837.800053
converged
# weights: 61
initial value 9497.971827
iter 10 value 8769.935909
iter 20 value 6884.131897
iter 30 value 6277.532586
iter 40 value 5273.231972
iter 50 value 4737.871928
iter 60 value 4236.440233
iter 70 value 4122.565594
```

```
iter 80 value 3978.327220
iter 90 value 3930.236671
iter 100 value 3879.435907
final value 3879.435907
stopped after 100 iterations
# weights: 17
initial value 9793.871269
iter 10 value 8622.023426
iter 20 value 7927.425217
iter 30 value 6085.486378
iter 40 value 5717.691907
iter 50 value 5639.252361
iter 60 value 4578.246780
iter 70 value 4399.619370
iter 80 value 4377.524795
iter 90 value 4375.452810
final value 4375.437559
converged
# weights: 39
initial value 8853.059399
iter 10 value 7849.574432
iter 20 value 6858.964208
iter 30 value 6146.763852
iter 40 value 5583.997698
iter 50 value 4833.473783
iter 60 value 4705.090407
iter 70 value 4701.949500
iter 80 value 4635.457759
iter 90 value 4487.410950
iter 100 value 3171.003678
final value 3171.003678
stopped after 100 iterations
# weights: 61
initial value 9982.897048
iter 10 value 8839.585622
iter 20 value 8140.302952
iter 30 value 7435.446603
iter 40 value 7011.379233
iter 50 value 5779.043839
iter 60 value 5142.078461
iter 70 value 4772.921424
iter 80 value 4633.225110
iter 90 value 4294.678496
iter 100 value 4157.097682
final value 4157.097682
stopped after 100 iterations
# weights: 17
initial value 10327.820929
iter 10 value 8837.800733
final value 8837.800275
converged
# weights: 39
initial value 10743.776996
iter 10 value 8837.800659
iter 10 value 8837.800606
iter 10 value 8837.800606
final value 8837.800606
converged
# weights: 61
initial value 10656.229673
iter 10 value 7926.496782
iter 20 value 6972.071826
iter 30 value 6125.432434
iter 40 value 5625.744674
iter 50 value 4651.380467
iter 60 value 4149.432529
iter 70 value 3943.091788
iter 80 value 3879.467599
iter 90 value 3869.037279
iter 100 value 3862.445565
final value 3862.445565
stopped after 100 iterations
# weights: 17
initial value 10480.093345
```

```
iter 10 value 8851.478486
final value 8851.478087
converged
# weights: 39
initial value 11274.756510
iter 10 value 8851.478089
iter 10 value 8851.478087
iter 10 value 8851.478087
final value 8851.478087
converged
# weights: 61
initial value 9457.313677
iter 10 value 8851.478288
final value 8851.478087
converged
# weights: 17
initial value 9658.731285
iter 10 value 8851.546796
iter 20 value 7655.733212
iter 30 value 7093.159023
iter 40 value 6955.467415
iter 50 value 6915.323526
iter 60 value 6879.403769
iter 70 value 6587.140051
iter 80 value 5423.031417
iter 90 value 4790.600772
iter 100 value 4607.128248
final value 4607.128248
stopped after 100 iterations
# weights: 39
initial value 9104.275860
iter 10 value 8856.966334
iter 20 value 7355.335657
iter 30 value 6973.594260
iter 40 value 6816.427298
iter 50 value 6668.021455
iter 60 value 6364.456717
iter 70 value 5884.143500
iter 80 value 3824.018527
iter 90 value 3271.480472
iter 100 value 3184.731689
final value 3184.731689
stopped after 100 iterations
# weights: 61
initial value 11680.632919
iter 10 value 8865.526390
iter 20 value 7133.252566
iter 30 value 6262.825489
iter 40 value 6075.984211
iter 50 value 5971.217548
iter 60 value 5730.013148
iter 70 value 5046.721433
iter 80 value 4641.017889
iter 90 value 4558.040492
iter 100 value 4279.220652
final value 4279.220652
stopped after 100 iterations
# weights: 17
initial value 10013.968515
iter 10 value 8851.478386
iter 10 value 8851.478339
iter 10 value 8851.478339
final value 8851.478339
converged
# weights: 39
initial value 9937.842587
iter 10 value 8851.479091
final value 8851.478833
converged
# weights: 61
initial value 11429.653709
iter 10 value 8851.481647
final value 8851.478960
converged
```

```
# weights: 17
initial value 9051.631137
iter 10 value 8853.772152
iter 10 value 8853.772146
iter 10 value 8853.772146
final value 8853.772146
converged
# weights: 39
initial value 10212.926015
iter 10 value 8854.259755
iter 20 value 7158.061963
iter 30 value 6579.870881
iter 40 value 6451.116909
iter 50 value 6421.621096
iter 60 value 6406.777404
iter 70 value 6368.663359
iter 80 value 6296.252263
iter 90 value 6176.061674
iter 100 value 5506.336565
final value 5506.336565
stopped after 100 iterations
# weights: 61
initial value 9338.810608
iter 10 value 8852.720575
iter 20 value 8741.943814
iter 30 value 7458.878909
iter 40 value 6158.040310
iter 50 value 5687.690395
iter 60 value 5064.973935
iter 70 value 4436.247869
iter 80 value 4189.630142
iter 90 value 3686.575723
iter 100 value 3312.694372
final value 3312.694372
stopped after 100 iterations
# weights: 17
initial value 9201.596091
iter 10 value 8853.896919
iter 20 value 8811.978248
iter 30 value 8680.191599
iter 40 value 6568.081180
iter 50 value 6000.067314
iter 60 value 5482.945378
iter 70 value 5180.627564
iter 80 value 5148.010938
final value 5147.595604
converged
# weights: 39
initial value 10396.216917
iter 10 value 8758.254482
iter 20 value 7528.804092
iter 30 value 6508.962406
iter 40 value 5900.834791
iter 50 value 4614.173313
iter 60 value 4327.196560
iter 70 value 3749.641070
iter 80 value 3267.978158
iter 90 value 2900.274702
iter 100 value 2683.195255
final value 2683.195255
stopped after 100 iterations
# weights: 61
initial value 10082.662379
iter 10 value 8844.989137
iter 20 value 6259.851288
iter 30 value 6109.096492
iter 40 value 6059.732666
iter 50 value 5852.801441
iter 60 value 5761.681273
iter 70 value 5136.120556
iter 80 value 3664.207508
iter 90 value 2945.981362
iter 100 value 2833.072425
final value 2833.072425
```

```
stopped after 100 iterations
# weights: 17
initial value 9555.828989
iter 10 value 8853.772459
iter 10 value 8853.772384
iter 10 value 8853.772384
final value 8853.772384
converged
# weights: 39
initial value 9972.521422
iter 10 value 8275.892221
iter 20 value 6677.840838
iter 30 value 6037.184309
iter 40 value 6013.308396
iter 50 value 6007.820758
iter 60 value 5968.867936
iter 70 value 5955.449301
iter 80 value 5951.162068
iter 90 value 5945.258272
iter 100 value 5931.165895
final value 5931.165895
stopped after 100 iterations
# weights: 61
initial value 10443.448370
iter 10 value 6559.656312
iter 20 value 6053.428094
iter 30 value 5988.643858
iter 40 value 5977.724909
iter 50 value 5976.684070
iter 60 value 5934.082941
iter 70 value 5721.509170
iter 80 value 4724.384089
iter 90 value 4172.308232
iter 100 value 3931.538795
final value 3931.538795
stopped after 100 iterations
# weights: 17
initial value 10052.204416
iter 10 value 8897.305708
iter 10 value 8897.305642
iter 10 value 8897.305642
final value 8897.305642
converged
# weights: 39
initial value 10289.226279
iter 10 value 8897.305675
iter 10 value 8897.305642
iter 10 value 8897.305642
final value 8897.305642
converged
# weights: 61
initial value 11376.424313
iter 10 value 8897.310241
final value 8897.305641
converged
# weights: 17
initial value 9347.706091
iter 10 value 8897.410081
iter 20 value 8839.825610
iter 30 value 8503.248801
iter 40 value 6480.322621
iter 50 value 6436.219422
iter 60 value 6208.627052
iter 70 value 6083.520708
iter 80 value 5686.386538
iter 90 value 5185.655296
iter 100 value 5134.548757
final value 5134.548757
stopped after 100 iterations
# weights: 39
initial value 10847.312447
iter 10 value 7545.160880
iter 20 value 7453.974623
iter 30 value 7420.681818
```

```
iter 40 value 7410.131307
iter 50 value 7365.748623
iter 60 value 6511.452925
iter 70 value 4975.637267
iter 80 value 4023.831691
iter 90 value 3754.976941
iter 100 value 3375.436108
final value 3375.436108
stopped after 100 iterations
# weights: 61
initial value 11657.058717
iter 10 value 6875.691654
iter 20 value 6448.784265
iter 30 value 5637.315045
iter 40 value 5241.328699
iter 50 value 4677.617772
iter 60 value 3693.283965
iter 70 value 3432.373805
iter 80 value 2789.175536
iter 90 value 2631.565345
iter 100 value 2621.011558
final value 2621.011558
stopped after 100 iterations
# weights: 17
initial value 9894.582951
iter 10 value 8908.306866
iter 20 value 8863.306552
iter 30 value 8632.195820
iter 40 value 6584.458155
iter 50 value 6339.569416
iter 60 value 6334.557137
iter 70 value 6288.266601
iter 80 value 6028.219891
iter 90 value 5773.398139
iter 100 value 5054.764046
final value 5054.764046
stopped after 100 iterations
# weights: 39
initial value 11465.197138
iter 10 value 7816.522370
iter 20 value 7386.425459
iter 30 value 7054.947580
iter 40 value 6278.323145
iter 50 value 5827.347499
iter 60 value 4677.878435
iter 70 value 4476.088447
iter 80 value 4390.299038
iter 90 value 4381.431295
iter 100 value 4379.724468
final value 4379.724468
stopped after 100 iterations
# weights: 61
initial value 11035.783973
iter 10 value 7664.245747
iter 20 value 7055.169377
iter 30 value 5893.010793
iter 40 value 5561.469360
iter 50 value 5040.108952
iter 60 value 4557.720245
iter 70 value 4458.856952
iter 80 value 4426.083716
iter 90 value 4380.475114
iter 100 value 4343.896791
final value 4343.896791
stopped after 100 iterations
# weights: 17
initial value 10189.262378
iter 10 value 8878.683422
final value 8878.682270
converged
# weights: 39
initial value 11102.133132
iter 10 value 8878.682271
iter 10 value 8878.682270
```

```
iter 10 value 8878.682270
final value 8878.682270
converged
# weights: 61
initial value 9406.568080
iter 10 value 8412.764147
iter 20 value 6989.779285
iter 30 value 6477.248168
iter 40 value 6440.283554
iter 50 value 6355.802579
iter 60 value 6220.370761
iter 70 value 5362.527799
iter 80 value 4911.225925
iter 90 value 4621.151374
iter 100 value 4089.858664
final value 4089.858664
stopped after 100 iterations
# weights: 17
initial value 9432.112049
iter 10 value 8881.067841
iter 20 value 8879.820915
iter 30 value 8878.771164
iter 30 value 8878.771135
final value 8878.769891
converged
# weights: 39
initial value 9956.655020
iter 10 value 8878.751336
iter 20 value 7505.363319
iter 30 value 6288.948441
iter 40 value 6120.258373
iter 50 value 5985.861088
iter 60 value 5277.435706
iter 70 value 5081.532734
iter 80 value 4867.955542
iter 90 value 4608.644756
iter 100 value 4394.189286
final value 4394.189286
stopped after 100 iterations
# weights: 61
initial value 9481.001761
iter 10 value 8881.197883
iter 20 value 7710.287834
iter 30 value 6844.428827
iter 40 value 6167.429501
iter 50 value 5493.510396
iter 60 value 4801.101060
iter 70 value 3569.332738
iter 80 value 3124.071260
iter 90 value 2858.283996
iter 100 value 2839.281436
final value 2839.281436
stopped after 100 iterations
# weights: 17
initial value 9401.963281
iter 10 value 8878.682479
iter 10 value 8878.682477
iter 10 value 8878.682477
final value 8878.682477
converged
# weights: 39
initial value 8948.997455
iter 10 value 8878.677019
iter 20 value 7981.370052
iter 30 value 7482.307436
iter 40 value 6759.475365
iter 50 value 6490.778391
iter 60 value 6456.709410
iter 70 value 6363.786875
iter 80 value 6332.017410
iter 90 value 6326.615846
iter 100 value 6324.668757
final value 6324.668757
stopped after 100 iterations
```

```
# weights: 61
initial value 10535.047551
iter 10 value 8824.723008
iter 20 value 7539.907531
iter 30 value 6853.356928
iter 40 value 6827.468759
iter 50 value 6801.530072
iter 60 value 6741.184644
iter 70 value 6479.354657
iter 80 value 5863.509105
iter 90 value 5063.416577
iter 100 value 4456.663095
final value 4456.663095
stopped after 100 iterations
# weights: 17
initial value 10704.986680
iter 10 value 8863.609555
final value 8863.609187
converged
# weights: 39
initial value 10453.688374
iter 10 value 8863.609192
iter 10 value 8863.609187
iter 10 value 8863.609187
final value 8863.609187
converged
# weights: 61
initial value 9485.481079
iter 10 value 8863.609468
final value 8863.609187
converged
# weights: 17
initial value 9531.088156
iter 10 value 8863.537248
iter 20 value 7439.943986
iter 30 value 6310.377448
iter 40 value 6085.112475
iter 50 value 6046.796897
iter 60 value 5951.650410
iter 70 value 5879.105995
iter 80 value 5047.907141
iter 90 value 4597.554590
iter 100 value 4563.070165
final value 4563.070165
stopped after 100 iterations
# weights: 39
initial value 9210.784005
iter 10 value 8866.581962
iter 20 value 7486.920269
iter 30 value 6995.488059
iter 40 value 6824.499135
iter 50 value 6342.266499
iter 60 value 6166.889132
iter 70 value 4515.255137
iter 80 value 3783.561195
iter 90 value 3294.204266
iter 100 value 3130.418843
final value 3130.418843
stopped after 100 iterations
# weights: 61
initial value 9977.892891
iter 10 value 8863.795496
iter 20 value 7494.087578
iter 30 value 7429.894568
iter 40 value 5349.373497
iter 50 value 4633.057795
iter 60 value 4137.226135
iter 70 value 3566.434518
iter 80 value 3340.380615
iter 90 value 3174.714211
iter 100 value 2826.972475
final value 2826.972475
stopped after 100 iterations
# weights: 17
```

```
initial value 9465.818329
iter 10 value 8863.609424
iter 10 value 8863.609407
iter 10 value 8863.609407
final value 8863.609407
converged
# weights: 39
initial value 9159.686353
iter 10 value 8863.609720
iter 10 value 8863.609718
iter 10 value 8863.609718
final value 8863.609718
converged
# weights: 61
initial value 10108.426352
iter 10 value 8863.610341
final value 8863.610182
converged
# weights: 17
initial value 9532.740637
iter 10 value 8845.579710
iter 10 value 8845.579645
iter 10 value 8845.579645
final value 8845.579645
converged
# weights: 39
initial value 10199.596498
iter 10 value 8606.030443
iter 20 value 7519.825683
iter 30 value 7477.315282
iter 40 value 7476.137142
iter 50 value 7475.793524
iter 60 value 7472.693072
iter 70 value 7472.676353
iter 80 value 7468.337666
iter 80 value 7468.337643
iter 80 value 7468.337643
final value 7468.337643
converged
# weights: 61
initial value 9947.089536
iter 10 value 8845.579645
iter 10 value 8845.579645
iter 10 value 8845.579645
final value 8845.579645
converged
# weights: 17
initial value 9718.042315
iter 10 value 7009.562974
iter 20 value 6075.472109
iter 30 value 5017.916912
iter 40 value 4937.491369
iter 50 value 4833.858158
iter 60 value 4820.973092
final value 4820.955639
converged
# weights: 39
initial value 9670.377329
iter 10 value 8840.001273
iter 20 value 8442.279203
iter 30 value 6111.834975
iter 40 value 5739.641979
iter 50 value 5539.924951
iter 60 value 4978.292725
iter 70 value 4279.742190
iter 80 value 4122.069858
iter 90 value 4010.983915
iter 100 value 3809.815586
final value 3809.815586
stopped after 100 iterations
# weights: 61
initial value 9108.551056
iter 10 value 8508.848521
iter 20 value 7532.208332
```

```
iter 30 value 7456.540956
iter 40 value 7192.650277
iter 50 value 6370.800083
iter 60 value 5679.548229
iter 70 value 5216.646704
iter 80 value 4270.796333
iter 90 value 3452.395959
iter 100 value 3077.839122
final value 3077.839122
stopped after 100 iterations
# weights: 17
initial value 10427.999192
iter 10 value 8845.623045
final value 8845.579870
converged
# weights: 39
initial value 11034.495817
iter 10 value 7818.408906
iter 20 value 6599.481514
iter 30 value 5765.020730
iter 40 value 5584.491230
iter 50 value 5096.247224
iter 60 value 4832.038135
iter 70 value 4784.821054
iter 80 value 4775.646881
iter 90 value 4769.065790
iter 100 value 4735.815063
final value 4735.815063
stopped after 100 iterations
# weights: 61
initial value 9273.821647
iter 10 value 8604.629198
iter 20 value 6671.321291
iter 30 value 5334.722560
iter 40 value 4957.927329
iter 50 value 4026.949208
iter 60 value 3516.306103
iter 70 value 3209.558899
iter 80 value 3000.185714
iter 90 value 2863.280729
iter 100 value 2811.945848
final value 2811.945848
stopped after 100 iterations
# weights: 17
initial value 9477.622578
iter 10 value 7443.623570
iter 20 value 6729.116938
iter 30 value 6418.509243
iter 40 value 6384.758938
iter 50 value 6253.923439
iter 60 value 6181.346315
iter 70 value 5414.475822
iter 80 value 4873.621324
iter 90 value 4844.604785
iter 100 value 4824.374430
final value 4824.374430
stopped after 100 iterations
# weights: 39
initial value 10093.002110
iter 10 value 8792.158375
iter 20 value 7640.177583
iter 30 value 6891.264025
iter 40 value 6824.768853
iter 50 value 6819.158857
iter 60 value 6815.564229
iter 70 value 6814.104233
iter 80 value 6615.911211
iter 90 value 6551.703667
iter 100 value 6044.563008
final value 6044.563008
stopped after 100 iterations
# weights: 61
initial value 11919.643904
iter 10 value 7839.580908
```

```
iter 20 value 6521.770454
iter 30 value 5347.121042
iter 40 value 5156.976863
iter 50 value 5090.349101
iter 60 value 5053.046065
iter 70 value 4979.469790
iter 80 value 4664.428392
iter 90 value 4468.123463
iter 100 value 4438.292886
final value 4438.292886
stopped after 100 iterations
# weights: 17
initial value 9436.562480
iter 10 value 7449.985710
iter 20 value 6591.364818
iter 30 value 6427.483002
iter 40 value 6318.639691
iter 50 value 6258.041557
iter 60 value 6177.847590
iter 70 value 5857.289030
iter 80 value 5217.783141
iter 90 value 5008.121415
iter 100 value 4989.712987
final value 4989.712987
stopped after 100 iterations
# weights: 39
initial value 10991.941973
iter 10 value 8855.304640
iter 20 value 8849.220780
iter 30 value 6485.450627
iter 40 value 6010.420894
iter 50 value 5941.097911
iter 60 value 5100.880174
iter 70 value 4853.067126
iter 80 value 4448.052853
iter 90 value 3269.374141
iter 100 value 2982.696994
final value 2982.696994
stopped after 100 iterations
# weights: 61
initial value 12511.954209
iter 10 value 8857.546649
iter 20 value 8852.051855
iter 30 value 7622.868185
iter 40 value 5573.296617
iter 50 value 5157.928277
iter 60 value 4881.705025
iter 70 value 4757.955608
iter 80 value 4604.457704
iter 90 value 3513.102161
iter 100 value 2947.741306
final value 2947.741306
stopped after 100 iterations
# weights: 17
initial value 9743.063280
iter 10 value 8850.458438
final value 8850.458033
converged
# weights: 39
initial value 10218.629381
iter 10 value 8850.460757
final value 8850.458424
converged
# weights: 61
initial value 9547.881376
iter 10 value 7779.594128
iter 20 value 7456.407677
iter 30 value 6581.120630
iter 40 value 5669.650693
iter 50 value 5224.400787
iter 60 value 4923.825551
iter 70 value 4104.727020
iter 80 value 3879.194521
iter 90 value 3425.648150
```

```
iter 100 value 2843.375705
final value 2843.375705
stopped after 100 iterations
# weights: 17
initial value 10724.463482
iter 10 value 8896.057317
final value 8896.055287
converged
# weights: 39
initial value 9645.922685
iter 10 value 8896.055287
iter 10 value 8896.055287
iter 10 value 8896.055287
final value 8896.055287
converged
# weights: 61
initial value 9966.043358
iter 10 value 8906.615910
iter 20 value 8512.266356
iter 30 value 8149.388517
iter 40 value 6418.050170
iter 50 value 4635.846690
iter 60 value 4398.125127
iter 70 value 4029.315225
iter 80 value 3645.097117
iter 90 value 3138.231236
iter 100 value 2841.053579
final value 2841.053579
stopped after 100 iterations
# weights: 17
initial value 9562.225780
iter 10 value 8896.174240
iter 20 value 8856.208109
iter 30 value 7523.106226
iter 40 value 6657.835854
iter 50 value 6633.437477
iter 60 value 6504.363989
iter 70 value 6433.337791
iter 80 value 6303.473299
iter 90 value 6246.104948
iter 100 value 6099.937421
final value 6099.937421
stopped after 100 iterations
# weights: 39
initial value 9642.485958
iter 10 value 8253.008555
iter 20 value 7437.307886
iter 30 value 6768.561057
iter 40 value 4629.217406
iter 50 value 4409.610270
iter 60 value 4358.318969
iter 70 value 4324.587873
iter 80 value 4127.008763
iter 90 value 3568.780727
iter 100 value 3097.607672
final value 3097.607672
stopped after 100 iterations
# weights: 61
initial value 9729.558989
iter 10 value 8902.751443
iter 20 value 8735.136966
iter 30 value 6906.789932
iter 40 value 6717.313309
iter 50 value 6397.027850
iter 60 value 6056.540424
iter 70 value 5696.931191
iter 80 value 5247.138193
iter 90 value 4694.900098
iter 100 value 4328.209103
final value 4328.209103
stopped after 100 iterations
# weights: 17
initial value 9065.068687
iter 10 value 8896.055508
```

```
iter 10 value 8896.055508
iter 10 value 8896.055508
final value 8896.055508
converged
# weights: 39
initial value 10307.647963
iter 10 value 8896.058220
final value 8896.056044
converged
# weights: 61
initial value 9474.599551
iter 10 value 8777.479280
iter 20 value 7054.437655
iter 30 value 6760.796073
iter 40 value 6244.365238
iter 50 value 4967.330044
iter 60 value 4448.877704
iter 70 value 4380.851994
iter 80 value 4355.240782
iter 90 value 4346.724324
iter 100 value 4343.908556
final value 4343.908556
stopped after 100 iterations
# weights: 17
initial value 9411.668488
iter 10 value 8033.331564
iter 20 value 6337.414413
iter 30 value 6244.388352
iter 40 value 6239.663493
iter 50 value 6235.216447
iter 60 value 6047.861402
iter 70 value 5875.970854
iter 80 value 4997.573976
iter 90 value 4196.146712
iter 100 value 4160.467690
final value 4160.467690
stopped after 100 iterations
# weights: 39
initial value 10029.452462
iter 10 value 8866.728907
final value 8866.527209
converged
# weights: 61
initial value 11452.148608
iter 10 value 7952.668281
iter 20 value 7443.618656
iter 30 value 6052.292955
iter 40 value 5442.206348
iter 50 value 4876.361390
iter 60 value 4633.979410
iter 70 value 4580.727920
iter 80 value 4396.904150
iter 90 value 3847.555528
iter 100 value 3206.242890
final value 3206.242890
stopped after 100 iterations
# weights: 17
initial value 10614.023488
iter 10 value 8866.630359
iter 20 value 8739.852817
iter 30 value 7374.233149
iter 40 value 6901.512739
iter 50 value 6475.371270
iter 60 value 6299.875526
iter 70 value 6232.999316
iter 80 value 6047.706071
iter 90 value 5795.260222
iter 100 value 4908.574800
final value 4908.574800
stopped after 100 iterations
# weights: 39
initial value 10291.515187
iter 10 value 8515.854203
iter 20 value 7647.379603
```

```
iter 30 value 7425.495776
iter 40 value 6527.035801
iter 50 value 5925.054679
iter 60 value 5173.855115
iter 70 value 4491.837128
iter 80 value 3957.254302
iter 90 value 3334.679364
iter 100 value 3097.891956
final value 3097.891956
stopped after 100 iterations
# weights: 61
initial value 9973.970786
iter 10 value 8869.506007
iter 20 value 8643.494561
iter 30 value 6755.629582
iter 40 value 6279.295274
iter 50 value 6208.038788
iter 60 value 6052.031014
iter 70 value 5749.550522
iter 80 value 5559.096025
iter 90 value 4110.739591
iter 100 value 3696.419448
final value 3696.419448
stopped after 100 iterations
# weights: 17
initial value 10211.786982
iter 10 value 8866.540579
final value 8866.527514
converged
# weights: 39
initial value 10533.754229
iter 10 value 8638.679364
iter 20 value 6606.173754
iter 30 value 6102.728146
iter 40 value 6033.180696
iter 50 value 5940.135159
iter 60 value 5736.463088
iter 70 value 4893.232744
iter 80 value 4257.580087
iter 90 value 4120.607949
iter 100 value 4047.433953
final value 4047.433953
stopped after 100 iterations
# weights: 61
initial value 9582.639783
iter 10 value 8866.528747
iter 10 value 8866.528743
iter 10 value 8866.528743
final value 8866.528743
converged
# weights: 17
initial value 9921.785846
iter 10 value 8847.745155
final value 8847.744744
converged
# weights: 39
initial value 10468.294490
iter 10 value 8847.316472
iter 20 value 8740.253031
iter 30 value 7369.345122
iter 40 value 7237.311368
iter 50 value 7094.688165
iter 60 value 6915.625120
iter 70 value 6860.461450
iter 80 value 6798.518105
iter 90 value 6734.612755
iter 100 value 6465.322804
final value 6465.322804
stopped after 100 iterations
# weights: 61
initial value 10004.777527
iter 10 value 8806.147049
iter 20 value 8490.002464
iter 30 value 6668.065162
```

```
iter 40 value 6270.587223
iter 50 value 6139.192491
iter 60 value 6133.064885
iter 70 value 6116.418083
iter 80 value 6009.550369
iter 90 value 5891.243364
iter 100 value 5418.308685
final value 5418.308685
stopped after 100 iterations
# weights: 17
initial value 9374.428297
iter 10 value 8847.841811
iter 20 value 6882.569303
iter 30 value 6128.748468
iter 40 value 5908.016196
iter 50 value 5653.334827
iter 60 value 5192.562629
iter 70 value 4719.047620
iter 80 value 4468.349933
iter 90 value 4456.891440
iter 100 value 4456.851937
final value 4456.851937
stopped after 100 iterations
# weights: 39
initial value 9499.129905
iter 10 value 8301.231884
iter 20 value 6642.138326
iter 30 value 6187.955781
iter 40 value 5319.869108
iter 50 value 4210.059379
iter 60 value 3763.626840
iter 70 value 2986.399174
iter 80 value 2662.717634
iter 90 value 2569.514319
iter 100 value 2533.707484
final value 2533.707484
stopped after 100 iterations
# weights: 61
initial value 9393.792779
iter 10 value 7836.405918
iter 20 value 7502.841229
iter 30 value 7383.250510
iter 40 value 7087.718656
iter 50 value 6469.877423
iter 60 value 4927.778236
iter 70 value 3693.569501
iter 80 value 3261.871077
iter 90 value 3008.261690
iter 100 value 2771.754691
final value 2771.754691
stopped after 100 iterations
# weights: 17
initial value 9587.027956
iter 10 value 8847.745182
final value 8847.745039
converged
# weights: 39
initial value 10123.872863
iter 10 value 8847.745813
final value 8847.745360
converged
# weights: 61
initial value 10940.516054
iter 10 value 8848.000720
final value 8847.752735
converged
# weights: 17
initial value 9833.436896
iter 10 value 8854.840679
final value 8854.838530
converged
# weights: 39
initial value 11122.639268
iter 10 value 8855.288269
```

```
final value 8854.838530
converged
# weights: 61
initial value 9836.374190
iter 10 value 7974.062060
iter 20 value 6370.453781
iter 30 value 6271.836058
iter 40 value 6067.719791
iter 50 value 6022.762448
iter 60 value 5970.446083
iter 70 value 5910.523493
iter 80 value 5877.177595
iter 90 value 5868.511183
iter 100 value 5642.423032
final value 5642.423032
stopped after 100 iterations
# weights: 17
initial value 9576.283720
iter 10 value 8854.954297
iter 20 value 8811.383508
iter 30 value 6358.361586
iter 40 value 6000.207392
iter 50 value 5990.010029
iter 60 value 5973.342701
iter 70 value 5930.459405
iter 80 value 5784.231889
iter 90 value 5241.298507
iter 100 value 4564.236368
final value 4564.236368
stopped after 100 iterations
# weights: 39
initial value 10503.592258
iter 10 value 8855.095900
iter 20 value 8240.758110
iter 30 value 7746.599283
iter 40 value 5717.463542
iter 50 value 5540.725624
iter 60 value 5240.010556
iter 70 value 5192.667396
iter 80 value 5145.282073
iter 90 value 5002.815556
iter 100 value 3960.873632
final value 3960.873632
stopped after 100 iterations
# weights: 61
initial value 10558.413268
iter 10 value 7500.062779
iter 20 value 6816.792885
iter 30 value 5776.961485
iter 40 value 4861.519793
iter 50 value 3814.704092
iter 60 value 3457.317126
iter 70 value 2645.806814
iter 80 value 2579.400775
iter 90 value 2492.562251
iter 100 value 2325.224142
final value 2325.224142
stopped after 100 iterations
# weights: 17
initial value 10688.956211
iter 10 value 8854.838831
iter 10 value 8854.838825
iter 10 value 8854.838825
final value 8854.838825
converged
# weights: 39
initial value 9948.028540
iter 10 value 8854.839161
iter 10 value 8854.839145
iter 10 value 8854.839145
final value 8854.839145
converged
# weights: 61
initial value 9084.338099
```

```
iter 10 value 8558.695652
iter 20 value 7824.204262
iter 30 value 6892.281142
iter 40 value 6335.250114
iter 50 value 6198.736956
iter 60 value 5942.578789
iter 70 value 5939.762360
iter 70 value 5939.762334
final value 5939.762334
converged
# weights: 17
initial value 9694.068754
iter 10 value 8859.170981
final value 8859.150058
converged
# weights: 39
initial value 9711.457891
iter 10 value 7828.840241
iter 20 value 6717.127932
iter 30 value 6561.629561
iter 40 value 6446.047523
iter 50 value 6288.866686
iter 60 value 5824.049459
iter 70 value 5093.080892
iter 80 value 4435.386488
iter 90 value 4273.662395
iter 100 value 4259.453175
final value 4259.453175
stopped after 100 iterations
# weights: 61
initial value 11925.520942
iter 10 value 8859.150061
iter 10 value 8859.150057
iter 10 value 8859.150057
final value 8859.150057
converged
# weights: 17
initial value 9895.525209
iter 10 value 8859.277903
iter 20 value 8713.849286
iter 30 value 8282.518135
iter 40 value 6608.547127
iter 50 value 6190.762116
iter 60 value 5887.553667
iter 70 value 4854.334358
iter 80 value 4676.657297
iter 90 value 4671.660381
iter 100 value 4669.172711
final value 4669.172711
stopped after 100 iterations
# weights: 39
initial value 9122.723408
iter 10 value 8829.241403
iter 20 value 7069.998891
iter 30 value 6556.318978
iter 40 value 5105.511160
iter 50 value 4802.743746
iter 60 value 4543.786148
iter 70 value 4212.831259
iter 80 value 3952.741964
iter 90 value 3395.742510
iter 100 value 2790.819005
final value 2790.819005
stopped after 100 iterations
# weights: 61
initial value 10972.594341
iter 10 value 8860.248664
iter 20 value 7760.896615
iter 30 value 7614.672920
iter 40 value 5592.023545
iter 50 value 5275.593974
iter 60 value 5124.854882
iter 70 value 4702.000319
iter 80 value 4304.081779
```

```
iter  90 value 3805.656121
iter 100 value 2887.987733
final value 2887.987733
stopped after 100 iterations
# weights: 17
initial value 9792.488427
iter 10 value 8859.154449
final value 8859.152569
converged
# weights: 39
initial value 10009.500317
final value 8859.151370
converged
# weights: 61
initial value 9917.280874
iter 10 value 7943.686924
iter 20 value 7107.631422
iter 30 value 6958.915931
iter 40 value 6924.714843
iter 50 value 6824.185799
iter 60 value 6524.555255
iter 70 value 5164.011059
iter 80 value 4531.859966
iter 90 value 4383.306447
iter 100 value 4340.284818
final value 4340.284818
stopped after 100 iterations
# weights: 17
initial value 9616.126694
iter 10 value 8876.204106
iter 10 value 8876.204104
iter 10 value 8876.204104
final value 8876.204104
converged
# weights: 39
initial value 10248.729949
iter 10 value 8657.880076
iter 20 value 7317.541526
iter 30 value 6831.951119
iter 40 value 6762.591014
iter 50 value 6308.282894
iter 60 value 5342.609917
iter 70 value 4934.976018
iter 80 value 4736.038292
iter 90 value 4639.930691
iter 100 value 4566.552545
final value 4566.552545
stopped after 100 iterations
# weights: 61
initial value 11729.793886
iter 10 value 7997.784804
iter 20 value 7241.753954
iter 30 value 6964.596285
iter 40 value 6841.981510
iter 50 value 6757.330234
iter 60 value 6126.326252
iter 70 value 5433.818583
iter 80 value 5056.886598
iter 90 value 4153.662193
iter 100 value 3299.635496
final value 3299.635496
stopped after 100 iterations
# weights: 17
initial value 10686.271429
iter 10 value 8877.409684
iter 20 value 8876.445182
iter 30 value 8816.775359
iter 40 value 7096.077074
iter 50 value 6195.414959
iter 60 value 6100.416410
iter 70 value 6062.374140
iter 80 value 5880.516479
iter 90 value 5532.898952
iter 100 value 4656.127315
```

```
final value 4656.127315
stopped after 100 iterations
# weights: 39
initial value 10170.180916
iter 10 value 8140.993589
iter 20 value 7458.123507
iter 30 value 7442.572551
iter 40 value 5579.268306
iter 50 value 5262.532508
iter 60 value 5101.137841
iter 70 value 5073.705250
iter 80 value 4887.478578
iter 90 value 4308.103239
iter 100 value 3536.382647
final value 3536.382647
stopped after 100 iterations
# weights: 61
initial value 9606.096250
iter 10 value 8954.599651
iter 20 value 7774.570322
iter 30 value 7500.153430
iter 40 value 7332.837458
iter 50 value 6350.890708
iter 60 value 5647.667010
iter 70 value 5260.443304
iter 80 value 4455.044328
iter 90 value 3824.200972
iter 100 value 2885.183935
final value 2885.183935
stopped after 100 iterations
# weights: 17
initial value 9820.707129
iter 10 value 8876.208569
final value 8876.204339
converged
# weights: 39
initial value 9827.342634
iter 10 value 6614.628267
iter 20 value 6227.783385
iter 30 value 6134.280552
iter 40 value 6044.775602
iter 50 value 5993.148587
iter 60 value 5790.796758
iter 70 value 5645.235032
iter 80 value 4602.150669
iter 90 value 4136.118401
iter 100 value 4008.661081
final value 4008.661081
stopped after 100 iterations
# weights: 61
initial value 10191.830688
iter 10 value 8876.205244
iter 10 value 8876.205241
iter 10 value 8876.205241
final value 8876.205241
converged
# weights: 17
initial value 10452.540479
iter 10 value 8843.523564
iter 10 value 8843.523517
iter 10 value 8843.523517
final value 8843.523517
converged
# weights: 39
initial value 9097.204895
iter 10 value 8843.525605
final value 8843.523517
converged
# weights: 61
initial value 11150.808677
iter 10 value 8843.540606
iter 20 value 6612.646947
iter 30 value 6230.693163
iter 40 value 6135.037066
```

```
iter 50 value 6116.085113
iter 60 value 6112.780117
iter 70 value 6111.748915
final value 6111.735068
converged
# weights: 17
initial value 11409.516494
iter 10 value 8843.592231
iter 20 value 7551.876899
iter 30 value 6435.280824
iter 40 value 6139.441110
iter 50 value 6024.613570
iter 60 value 6005.782787
iter 70 value 5885.404833
iter 80 value 5744.867358
iter 90 value 5575.175005
iter 100 value 4654.873336
final value 4654.873336
stopped after 100 iterations
# weights: 39
initial value 9333.219255
iter 10 value 8846.979106
iter 20 value 8818.835301
iter 30 value 6655.552732
iter 40 value 5990.682091
iter 50 value 5931.297712
iter 60 value 5848.759951
iter 70 value 5736.932800
iter 80 value 5197.912596
iter 90 value 4492.808425
iter 100 value 4374.245049
final value 4374.245049
stopped after 100 iterations
# weights: 61
initial value 9969.894719
iter 10 value 8793.996269
iter 20 value 8376.135442
iter 30 value 7071.298988
iter 40 value 5517.784241
iter 50 value 4324.020341
iter 60 value 3368.624978
iter 70 value 2705.144395
iter 80 value 2530.536840
iter 90 value 2471.253726
iter 100 value 2399.475447
final value 2399.475447
stopped after 100 iterations
# weights: 17
initial value 10222.026778
iter 10 value 8843.524197
final value 8843.523776
converged
# weights: 39
initial value 10219.534463
iter 10 value 8843.524801
iter 10 value 8843.524800
iter 10 value 8843.524800
final value 8843.524800
converged
# weights: 61
initial value 13556.130746
iter 10 value 8865.081324
final value 8843.524464
converged
# weights: 17
initial value 9647.343929
iter 10 value 8878.047995
final value 8878.047743
converged
# weights: 39
initial value 10134.291977
iter 10 value 8878.052147
final value 8878.047743
converged
```

```
# weights: 61
initial value 10249.319693
iter 10 value 5922.568200
iter 20 value 5317.860760
iter 30 value 5110.367708
iter 40 value 4667.153895
iter 50 value 4351.009974
iter 60 value 4070.380454
iter 70 value 3946.459406
iter 80 value 3826.021569
iter 90 value 3522.346218
iter 100 value 3391.368444
final value 3391.368444
stopped after 100 iterations
# weights: 17
initial value 9614.233261
iter 10 value 8874.240143
iter 20 value 8613.182802
iter 30 value 6389.516677
iter 40 value 5951.723950
iter 50 value 5868.932443
iter 60 value 5743.253989
iter 70 value 4984.002070
iter 80 value 4623.768159
iter 90 value 4571.537200
iter 100 value 4528.384455
final value 4528.384455
stopped after 100 iterations
# weights: 39
initial value 9283.660895
iter 10 value 6721.067319
iter 20 value 6182.822425
iter 30 value 6104.135609
iter 40 value 5853.196645
iter 50 value 5639.304811
iter 60 value 4675.157546
iter 70 value 4143.556010
iter 80 value 3414.553212
iter 90 value 3028.281003
iter 100 value 2796.518255
final value 2796.518255
stopped after 100 iterations
# weights: 61
initial value 9501.143137
iter 10 value 6802.659880
iter 20 value 6152.046147
iter 30 value 6077.827057
iter 40 value 4536.040569
iter 50 value 4089.182682
iter 60 value 3780.238180
iter 70 value 3264.493228
iter 80 value 2761.763729
iter 90 value 2625.283351
iter 100 value 2518.318511
final value 2518.318511
stopped after 100 iterations
# weights: 17
initial value 8856.359253
iter 10 value 7130.151441
iter 20 value 6253.337561
iter 30 value 6078.609007
iter 40 value 6029.849217
iter 50 value 5964.785893
iter 60 value 5545.165633
iter 70 value 4662.122087
iter 80 value 4315.536149
iter 90 value 4097.478181
iter 100 value 4007.435724
final value 4007.435724
stopped after 100 iterations
# weights: 39
initial value 9343.657636
iter 10 value 7221.828701
iter 20 value 6657.258165
```

```
iter 30 value 6476.182998
iter 40 value 5328.965173
iter 50 value 4664.558096
iter 60 value 4564.450573
iter 70 value 4532.073026
iter 80 value 4516.863653
iter 90 value 4514.772209
iter 100 value 4514.074082
final value 4514.074082
stopped after 100 iterations
# weights: 61
initial value 9443.663708
iter 10 value 8878.049197
iter 10 value 8878.049181
iter 10 value 8878.049181
final value 8878.049181
converged
# weights: 17
initial value 11244.946946
iter 10 value 8844.739368
iter 20 value 6610.284233
iter 30 value 6426.012124
iter 40 value 6290.309526
iter 50 value 6244.516044
iter 60 value 6240.572798
iter 70 value 6162.423877
iter 80 value 6095.830155
iter 90 value 5945.245508
iter 100 value 5391.789422
final value 5391.789422
stopped after 100 iterations
# weights: 39
initial value 9931.157349
iter 10 value 8880.601128
final value 8880.599465
converged
# weights: 61
initial value 9835.702949
iter 10 value 8812.572373
iter 20 value 7910.326619
iter 30 value 7713.697414
iter 40 value 6497.993060
iter 50 value 6239.321416
iter 60 value 6233.466425
iter 70 value 6214.092686
iter 80 value 6159.360776
iter 90 value 6065.803445
iter 100 value 5625.019023
final value 5625.019023
stopped after 100 iterations
# weights: 17
initial value 10229.719901
iter 10 value 7600.078799
iter 20 value 7020.145212
iter 30 value 6551.395566
iter 40 value 6190.309205
iter 50 value 6054.553689
iter 60 value 6034.151975
iter 70 value 5930.827132
iter 80 value 5506.686180
iter 90 value 4730.724049
iter 100 value 4642.552120
final value 4642.552120
stopped after 100 iterations
# weights: 39
initial value 9733.460676
iter 10 value 7551.713352
iter 20 value 6235.305547
iter 30 value 5922.150492
iter 40 value 4424.309007
iter 50 value 4137.969707
iter 60 value 3831.509655
iter 70 value 3550.908332
iter 80 value 3248.065521
```

```
iter 90 value 3008.411931
iter 100 value 2815.083119
final value 2815.083119
stopped after 100 iterations
# weights: 61
initial value 9906.603692
iter 10 value 8881.773602
iter 20 value 8878.337483
iter 30 value 7327.857279
iter 40 value 7107.439548
iter 50 value 5125.513027
iter 60 value 4824.206283
iter 70 value 4574.381386
iter 80 value 4321.373324
iter 90 value 4044.904790
iter 100 value 3874.825112
final value 3874.825112
stopped after 100 iterations
# weights: 17
initial value 9111.167937
iter 10 value 8535.972952
iter 20 value 6650.314931
iter 30 value 6326.814517
iter 40 value 6244.563353
iter 50 value 6167.684086
iter 60 value 6023.362714
iter 70 value 5540.345247
iter 80 value 4945.079566
iter 90 value 4614.702849
iter 100 value 4216.501909
final value 4216.501909
stopped after 100 iterations
# weights: 39
initial value 9075.982461
iter 10 value 8717.260848
iter 20 value 7154.003452
iter 30 value 6581.024502
iter 40 value 6431.462952
iter 50 value 6406.275381
iter 60 value 6405.808728
iter 70 value 6405.430938
iter 80 value 6405.348099
iter 90 value 6346.726675
iter 100 value 6317.207945
final value 6317.207945
stopped after 100 iterations
# weights: 61
initial value 9829.507545
iter 10 value 6576.896217
iter 20 value 5895.798836
iter 30 value 4862.698629
iter 40 value 4001.771665
iter 50 value 3280.789204
iter 60 value 2872.451982
iter 70 value 2685.297646
iter 80 value 2568.378533
iter 90 value 2517.214618
iter 100 value 2495.476193
final value 2495.476193
stopped after 100 iterations
# weights: 17
initial value 10047.726797
iter 10 value 8871.723431
final value 8871.716973
converged
# weights: 39
initial value 9364.444247
iter 10 value 8871.783868
final value 8871.716975
converged
# weights: 61
initial value 9701.174965
iter 10 value 7343.727361
iter 20 value 6467.110512
```

```
iter 30 value 5135.706840
iter 40 value 4950.983686
iter 50 value 4553.131473
iter 60 value 3852.323296
iter 70 value 3731.354791
iter 80 value 3702.517125
iter 90 value 3689.022142
iter 100 value 3686.396771
final value 3686.396771
stopped after 100 iterations
# weights: 17
initial value 9883.631174
iter 10 value 8871.835082
iter 20 value 8030.831218
iter 30 value 7819.774608
iter 40 value 7481.207784
iter 50 value 7410.705370
iter 60 value 7269.960071
iter 70 value 7018.042183
iter 80 value 6285.260476
iter 90 value 5645.455165
iter 100 value 5156.758623
final value 5156.758623
stopped after 100 iterations
# weights: 39
initial value 10219.151566
iter 10 value 8869.119108
iter 20 value 7619.825968
iter 30 value 7017.692595
iter 40 value 6823.573003
iter 50 value 6603.793816
iter 60 value 5460.400283
iter 70 value 4858.136950
iter 80 value 3237.519724
iter 90 value 2902.812713
iter 100 value 2658.671626
final value 2658.671626
stopped after 100 iterations
# weights: 61
initial value 9999.044275
iter 10 value 8839.087338
iter 20 value 7442.077833
iter 30 value 6923.048639
iter 40 value 6579.877334
iter 50 value 6159.413967
iter 60 value 5194.554377
iter 70 value 4833.218406
iter 80 value 4439.765276
iter 90 value 3743.692402
iter 100 value 3158.552051
final value 3158.552051
stopped after 100 iterations
# weights: 17
initial value 11052.432742
iter 10 value 8871.718030
final value 8871.717228
converged
# weights: 39
initial value 10173.625578
iter 10 value 8871.717426
iter 10 value 8871.717414
iter 10 value 8871.717414
final value 8871.717414
converged
# weights: 61
initial value 10943.904967
iter 10 value 8601.515488
iter 20 value 7408.048515
iter 30 value 7358.954979
iter 40 value 7277.387607
iter 50 value 6832.988483
iter 60 value 5503.320038
iter 70 value 5030.936913
iter 80 value 4592.674890
```

```
iter 90 value 4477.290080
iter 100 value 4437.603732
final value 4437.603732
stopped after 100 iterations
# weights: 17
initial value 11094.978042
iter 10 value 8897.908488
final value 8897.879943
converged
# weights: 39
initial value 9650.435137
iter 10 value 8897.880023
iter 10 value 8897.879944
iter 10 value 8897.879943
final value 8897.879943
converged
# weights: 61
initial value 11222.602165
iter 10 value 8897.879943
iter 10 value 8897.879943
iter 10 value 8897.879943
final value 8897.879943
converged
# weights: 17
initial value 10352.043723
iter 10 value 8582.576781
iter 20 value 7636.021754
iter 30 value 6328.731672
iter 40 value 6046.884224
iter 50 value 5282.881968
iter 60 value 4894.232252
iter 70 value 4835.202924
iter 80 value 4834.256875
final value 4833.855766
converged
# weights: 39
initial value 9449.183490
iter 10 value 8285.326914
iter 20 value 6718.475341
iter 30 value 5753.614942
iter 40 value 5207.030525
iter 50 value 4573.387736
iter 60 value 4170.277445
iter 70 value 3568.229806
iter 80 value 3183.815797
iter 90 value 2836.005146
iter 100 value 2677.853769
final value 2677.853769
stopped after 100 iterations
# weights: 61
initial value 11767.512677
iter 10 value 8900.370627
iter 20 value 8791.664608
iter 30 value 6954.914864
iter 40 value 6671.372628
iter 50 value 5285.796402
iter 60 value 4745.443193
iter 70 value 3628.416875
iter 80 value 3261.690414
iter 90 value 2913.103449
iter 100 value 2697.465137
final value 2697.465137
stopped after 100 iterations
# weights: 17
initial value 9150.755751
final value 8897.880140
converged
# weights: 39
initial value 9931.430910
iter 10 value 8897.887077
final value 8897.886355
converged
# weights: 61
initial value 9813.962349
```

```
iter 10 value 8342.427746
iter 20 value 6229.369948
iter 30 value 5852.246518
iter 40 value 5265.528712
iter 50 value 4637.394059
iter 60 value 4097.573437
iter 70 value 3990.436688
iter 80 value 3948.147496
iter 90 value 3918.699641
iter 100 value 3476.446301
final value 3476.446301
stopped after 100 iterations
# weights: 17
initial value 9800.706905
iter 10 value 8852.412285
iter 10 value 8852.412241
iter 10 value 8852.412241
final value 8852.412241
converged
# weights: 39
initial value 10559.406330
iter 10 value 8852.467785
final value 8852.412717
converged
# weights: 61
initial value 9357.300554
iter 10 value 7745.990966
iter 20 value 7257.074506
iter 30 value 7036.035346
iter 40 value 6589.827894
iter 50 value 5649.296926
iter 60 value 5208.526003
iter 70 value 4568.210769
iter 80 value 4381.823940
iter 90 value 4352.716284
iter 100 value 4348.407110
final value 4348.407110
stopped after 100 iterations
# weights: 17
initial value 9542.190862
iter 10 value 8852.497711
iter 20 value 8530.163509
iter 30 value 6723.791476
iter 40 value 6391.510991
iter 50 value 6298.758218
iter 60 value 6200.074929
iter 70 value 6086.098722
iter 80 value 5715.069894
iter 90 value 4762.813123
iter 100 value 4437.594253
final value 4437.594253
stopped after 100 iterations
# weights: 39
initial value 10020.263800
iter 10 value 8852.597562
iter 20 value 8474.423359
iter 30 value 7874.745619
iter 40 value 6249.576576
iter 50 value 6034.686913
iter 60 value 5755.673973
iter 70 value 4791.662545
iter 80 value 3925.693013
iter 90 value 2913.622019
iter 100 value 2627.049693
final value 2627.049693
stopped after 100 iterations
# weights: 61
initial value 11394.548076
iter 10 value 7439.316664
iter 20 value 5829.500732
iter 30 value 5245.662319
iter 40 value 4799.936206
iter 50 value 4526.971928
iter 60 value 4179.595129
```

```
iter 70 value 4093.204638
iter 80 value 3985.648795
iter 90 value 3713.514489
iter 100 value 3466.771944
final value 3466.771944
stopped after 100 iterations
# weights: 17
initial value 10381.936436
iter 10 value 8852.416041
final value 8852.412475
converged
# weights: 39
initial value 9876.706876
iter 10 value 8852.412927
iter 10 value 8852.412925
iter 10 value 8852.412925
final value 8852.412925
converged
# weights: 61
initial value 11284.216634
iter 10 value 7467.453456
iter 20 value 7214.620484
iter 30 value 5818.927499
iter 40 value 4596.532123
iter 50 value 3868.626638
iter 60 value 2854.439777
iter 70 value 2578.257876
iter 80 value 2456.482564
iter 90 value 2267.912967
iter 100 value 2185.470149
final value 2185.470149
stopped after 100 iterations
# weights: 17
initial value 9394.228655
iter 10 value 8000.003559
iter 20 value 6794.153026
iter 30 value 6024.551152
iter 40 value 5906.763506
iter 50 value 5085.086688
iter 60 value 4283.638073
iter 70 value 4091.108414
iter 80 value 3986.291286
iter 90 value 3932.951166
iter 100 value 3923.336267
final value 3923.336267
stopped after 100 iterations
# weights: 39
initial value 9254.721428
iter 10 value 8843.422461
iter 20 value 7611.642812
iter 30 value 6826.450427
iter 40 value 6159.150804
iter 50 value 6117.180336
iter 60 value 6098.821098
iter 70 value 6096.957263
iter 80 value 6019.328639
iter 90 value 5950.397562
iter 100 value 5127.951726
final value 5127.951726
stopped after 100 iterations
# weights: 61
initial value 10494.817058
iter 10 value 8853.861189
iter 10 value 8853.861147
iter 10 value 8853.861147
final value 8853.861147
converged
# weights: 17
initial value 9282.488536
iter 10 value 8853.914537
iter 20 value 7637.775791
iter 30 value 6856.619668
iter 40 value 6828.251797
iter 50 value 6789.744043
```

```
iter 60 value 6755.996687
iter 70 value 6594.902436
iter 80 value 5641.311277
iter 90 value 4860.827022
iter 100 value 4761.364750
final value 4761.364750
stopped after 100 iterations
# weights: 39
initial value 9589.531234
iter 10 value 8837.675725
iter 20 value 7270.917268
iter 30 value 6703.006617
iter 40 value 6342.618966
iter 50 value 5008.946140
iter 60 value 4182.730446
iter 70 value 3465.372509
iter 80 value 3196.909109
iter 90 value 3035.076021
iter 100 value 2946.259826
final value 2946.259826
stopped after 100 iterations
# weights: 61
initial value 9967.950275
iter 10 value 8855.381338
iter 20 value 7845.893901
iter 30 value 7072.379216
iter 40 value 6549.344060
iter 50 value 6413.066427
iter 60 value 6366.763984
iter 70 value 6259.162062
iter 80 value 6061.213875
iter 90 value 5702.269836
iter 100 value 5038.069424
final value 5038.069424
stopped after 100 iterations
# weights: 17
initial value 10005.268211
iter 10 value 8853.861515
iter 10 value 8853.861484
iter 10 value 8853.861484
final value 8853.861484
converged
# weights: 39
initial value 9970.293161
iter 10 value 8735.673066
iter 20 value 7678.389914
iter 30 value 6143.035768
iter 40 value 5876.354901
iter 50 value 5327.247173
iter 60 value 4969.852380
iter 70 value 4405.486296
iter 80 value 4109.301894
iter 90 value 4087.759624
iter 100 value 3999.962506
final value 3999.962506
stopped after 100 iterations
# weights: 61
initial value 9904.563881
iter 10 value 8853.876438
final value 8853.864040
converged
# weights: 17
initial value 9520.564037
iter 10 value 8876.345567
iter 10 value 8876.345547
iter 10 value 8876.345547
final value 8876.345547
converged
# weights: 39
initial value 10275.579261
iter 10 value 8567.760184
iter 20 value 6430.731804
iter 30 value 5959.790912
iter 40 value 5776.620550
```

```
iter 50 value 5654.074210
iter 60 value 4865.764350
iter 70 value 3997.528503
iter 80 value 3911.259179
iter 90 value 3881.709872
iter 100 value 3875.276923
final value 3875.276923
stopped after 100 iterations
# weights: 61
initial value 9812.748222
iter 10 value 8876.345740
final value 8876.345547
converged
# weights: 17
initial value 9389.290966
iter 10 value 8877.111547
iter 20 value 8876.434826
iter 30 value 7474.824861
iter 40 value 6170.796394
iter 50 value 5963.956399
iter 60 value 5928.968454
iter 70 value 5790.455651
iter 80 value 5571.992398
iter 90 value 4495.872604
iter 100 value 4411.607801
final value 4411.607801
stopped after 100 iterations
# weights: 39
initial value 9342.172292
iter 10 value 6982.997947
iter 20 value 6257.488452
iter 30 value 5597.094333
iter 40 value 4725.168758
iter 50 value 3531.070176
iter 60 value 3204.408834
iter 70 value 3139.134812
iter 80 value 2988.676659
iter 90 value 2799.212723
iter 100 value 2663.951554
final value 2663.951554
stopped after 100 iterations
# weights: 61
initial value 11412.467090
iter 10 value 8876.210081
iter 20 value 6645.838918
iter 30 value 5980.430347
iter 40 value 5834.079397
iter 50 value 5651.790735
iter 60 value 5119.137156
iter 70 value 4545.606680
iter 80 value 3745.054980
iter 90 value 2864.830211
iter 100 value 2471.722001
final value 2471.722001
stopped after 100 iterations
# weights: 17
initial value 10118.343990
iter 10 value 8876.375551
final value 8876.348846
converged
# weights: 39
initial value 8927.047584
final value 8876.346112
converged
# weights: 61
initial value 12635.165105
iter 10 value 8877.746881
iter 20 value 8876.559471
iter 30 value 7866.220682
iter 40 value 7026.003772
iter 50 value 6371.188700
iter 60 value 6152.041179
iter 70 value 6134.571792
iter 80 value 6046.290019
```

```
iter 90 value 6027.695022
iter 100 value 6025.043052
final value 6025.043052
stopped after 100 iterations
# weights: 17
initial value 9186.035766
iter 10 value 8884.952876
iter 10 value 8884.952869
iter 10 value 8884.952869
final value 8884.952869
converged
# weights: 39
initial value 9183.717392
iter 10 value 8884.952928
iter 10 value 8884.952869
iter 10 value 8884.952869
final value 8884.952869
converged
# weights: 61
initial value 9805.171738
iter 10 value 8884.958895
final value 8884.952869
converged
# weights: 17
initial value 9396.488576
iter 10 value 8885.067661
iter 20 value 8874.682357
iter 30 value 7713.105084
iter 40 value 7078.417865
iter 50 value 6912.648073
iter 60 value 6690.446401
iter 70 value 6625.629413
iter 80 value 6509.161349
iter 90 value 6351.361714
iter 100 value 5622.486962
final value 5622.486962
stopped after 100 iterations
# weights: 39
initial value 10127.060524
iter 10 value 8902.392252
iter 20 value 8891.912468
iter 30 value 8504.814383
iter 40 value 6559.812026
iter 50 value 6251.287032
iter 60 value 6165.411982
iter 70 value 5979.847229
iter 80 value 5661.094132
iter 90 value 5369.715687
iter 100 value 5225.649205
final value 5225.649205
stopped after 100 iterations
# weights: 61
initial value 9823.240757
iter 10 value 6976.630596
iter 20 value 6164.552173
iter 30 value 6026.622764
iter 40 value 5974.185899
iter 50 value 5807.790962
iter 60 value 5049.360541
iter 70 value 4670.873667
iter 80 value 3859.970043
iter 90 value 3051.030713
iter 100 value 2771.078440
final value 2771.078440
stopped after 100 iterations
# weights: 17
initial value 9484.826512
final value 8884.953172
converged
# weights: 39
initial value 10540.215022
iter 10 value 8885.044092
final value 8884.954252
converged
```

```
# weights: 61
initial value 9845.045643
iter 10 value 8884.953966
iter 10 value 8884.953965
iter 10 value 8884.953965
final value 8884.953965
converged
# weights: 17
initial value 9221.816182
iter 10 value 8851.013201
iter 10 value 8851.013200
iter 10 value 8851.013200
final value 8851.013200
converged
# weights: 39
initial value 9891.257986
iter 10 value 6358.642678
iter 20 value 5754.185093
iter 30 value 4559.640152
iter 40 value 3605.184889
iter 50 value 3364.809687
iter 60 value 3010.751633
iter 70 value 2745.212797
iter 80 value 2628.727635
iter 90 value 2616.202149
iter 100 value 2575.206668
final value 2575.206668
stopped after 100 iterations
# weights: 61
initial value 9863.079744
iter 10 value 8851.013222
iter 10 value 8851.013206
iter 10 value 8851.013206
final value 8851.013206
converged
# weights: 17
initial value 10097.387961
iter 10 value 8851.083306
iter 20 value 8794.079075
iter 30 value 7945.482208
iter 40 value 7421.857880
iter 50 value 7218.006205
iter 60 value 6826.936669
iter 70 value 5787.312235
iter 80 value 5209.092618
iter 90 value 4963.231965
iter 100 value 4844.634962
final value 4844.634962
stopped after 100 iterations
# weights: 39
initial value 9761.269061
iter 10 value 8294.460201
iter 20 value 7167.207479
iter 30 value 6700.421189
iter 40 value 6171.258388
iter 50 value 4775.066435
iter 60 value 4578.000213
iter 70 value 4489.542048
iter 80 value 4457.881872
iter 90 value 4452.150707
iter 100 value 4355.133741
final value 4355.133741
stopped after 100 iterations
# weights: 61
initial value 13904.269242
iter 10 value 8851.801069
iter 20 value 7962.003953
iter 30 value 6227.462554
iter 40 value 6089.004743
iter 50 value 6054.738114
iter 60 value 5455.237389
iter 70 value 5252.210667
iter 80 value 4637.558392
iter 90 value 4082.941110
```

```
iter 100 value 3109.575072
final value 3109.575072
stopped after 100 iterations
# weights: 17
initial value 9390.604228
iter 10 value 7457.105791
iter 20 value 7029.055518
iter 30 value 6882.081830
iter 40 value 6290.531748
iter 50 value 5206.968319
iter 60 value 4757.799551
iter 70 value 4556.205105
iter 80 value 4506.836554
iter 90 value 4493.671270
iter 100 value 4492.040741
final value 4492.040741
stopped after 100 iterations
# weights: 39
initial value 9634.451023
iter 10 value 8875.753302
iter 20 value 8851.013629
iter 20 value 8851.013620
iter 20 value 8851.013619
final value 8851.013619
converged
# weights: 61
initial value 12550.110010
iter 10 value 8851.684824
final value 8851.027512
converged
# weights: 17
initial value 9532.056095
iter 10 value 8892.289277
iter 10 value 8892.289266
iter 10 value 8892.289265
final value 8892.289265
converged
# weights: 39
initial value 10332.698157
iter 10 value 8892.289940
final value 8892.289269
converged
# weights: 61
initial value 10005.533585
iter 10 value 8891.759863
iter 20 value 8862.466753
iter 30 value 8709.784659
iter 40 value 8594.629925
iter 50 value 8002.655908
iter 60 value 7625.626896
iter 70 value 7287.794065
iter 80 value 6974.412287
iter 90 value 6678.461997
iter 100 value 6203.280240
final value 6203.280240
stopped after 100 iterations
# weights: 17
initial value 9330.901068
iter 10 value 8892.399287
iter 20 value 7664.878250
iter 30 value 6606.832677
iter 40 value 6297.151320
iter 50 value 6136.884399
iter 60 value 6039.146023
iter 70 value 5639.094173
iter 80 value 4926.048350
iter 90 value 4627.715625
iter 100 value 4572.720465
final value 4572.720465
stopped after 100 iterations
# weights: 39
initial value 10698.597102
iter 10 value 8892.410932
iter 20 value 7717.068174
```

```
iter   30 value 6711.516015
iter   40 value 5726.799700
iter   50 value 4587.928672
iter   60 value 3798.216772
iter   70 value 3678.162833
iter   80 value 3632.984006
iter   90 value 3555.586211
iter  100 value 3106.379884
final  value 3106.379884
stopped after 100 iterations
# weights: 61
initial value 11891.387391
iter   10 value 7256.675915
iter   20 value 6940.593738
iter   30 value 6576.618976
iter   40 value 4451.399767
iter   50 value 3756.205586
iter   60 value 3395.273567
iter   70 value 3091.199959
iter   80 value 2991.285408
iter   90 value 2796.710934
iter  100 value 2740.552447
final  value 2740.552447
stopped after 100 iterations
# weights: 17
initial value 9922.491703
iter   10 value 8892.289508
iter   10 value 8892.289505
iter   10 value 8892.289505
final  value 8892.289505
converged
# weights: 39
initial value 10362.597598
final  value 8892.289831
converged
# weights: 61
initial value 9404.883446
iter   10 value 7402.971863
iter   20 value 6837.516453
iter   30 value 5884.029608
iter   40 value 5147.309538
iter   50 value 3463.169844
iter   60 value 2940.079952
iter   70 value 2757.322050
iter   80 value 2698.568264
iter   90 value 2683.271064
iter  100 value 2666.047372
final  value 2666.047372
stopped after 100 iterations
# weights: 61
initial value 9163.324965
iter   10 value 8866.798233
iter   20 value 8048.430867
iter   30 value 5634.139111
iter   40 value 4309.911240
iter   50 value 4087.524945
iter   60 value 3594.752109
iter   70 value 3413.087856
iter   80 value 3247.335969
iter   90 value 3108.096584
iter  100 value 2766.441704
final  value 2766.441704
stopped after 100 iterations
Confusion Matrix and Statistics
```

Confusion Matrix and Statistics

Prediction	Reference								
	red	soil	cotton	crop	grey	soil	damp	grey	soil
red soil		295		3		3			2
cotton crop		0		120		0			0
grey soil		5		0		243			48
damp grey soil		2		0		25			27
vegetation stubble		3		5		0			0
very damp grey soil		1		12		0			48

Prediction	vegetation stubble	very damp grey soil
red soil	10	0
cotton crop	10	0
grey soil	0	13
damp grey soil	2	27
vegetation stubble	98	17
very damp grey soil	21	244

Overall Statistics

Accuracy : 0.7998
 95% CI : (0.7769, 0.8214)

No Information Rate : 0.2383
 P-Value [Acc > NIR] : < 2.2e-16

Kappa : 0.751

McNemar's Test P-Value : NA

Statistics by Class:

	Class: red soil	Class: cotton crop	Class: grey soil
Sensitivity	0.9641	0.85714	0.8967
Specificity	0.9816	0.99126	0.9348
Pos Pred Value	0.9425	0.92308	0.7864
Neg Pred Value	0.9887	0.98267	0.9713
Prevalence	0.2383	0.10903	0.2111
Detection Rate	0.2298	0.09346	0.1893
Detection Prevalence	0.2438	0.10125	0.2407
Balanced Accuracy	0.9728	0.92420	0.9158
	Class: damp grey soil	Class: vegetation stubble	
Sensitivity	0.21600	0.69504	
Specificity	0.95168	0.97813	
Pos Pred Value	0.32530	0.79675	
Neg Pred Value	0.91840	0.96296	
Prevalence	0.09735	0.10981	
Detection Rate	0.02103	0.07632	
Detection Prevalence	0.06464	0.09579	
Balanced Accuracy	0.58384	0.83658	
	Class: very damp grey soil		
Sensitivity	0.8106		
Specificity	0.9166		
Pos Pred Value	0.7485		
Neg Pred Value	0.9405		
Prevalence	0.2344		
Detection Rate	0.1900		
Detection Prevalence	0.2539		
Balanced Accuracy	0.8636		

>