

Supplementary material: Trajectories and drivers signalling the end of agricultural abandonment in Trás-os-Montes, Portugal (Imbrechts L, Azevedo JC & Verburg PH)

Table S1. Corresponding land use/land cover classes defined in *Carta de uso e ocupação do solo* (COS) from Direção-Geral do Território (2022) with LULC categories presented in this research.

COS Level 1	COS Level 2	COS Level 3	COS Level 4	Assigned LULC category
1. Artificial surfaces	<i>all</i>	<i>all</i>	<i>all</i>	Urbanised
2. Agriculture	2.1 Temporary crops	<i>all</i>	<i>all</i>	Agriculture (intensive)
	2.2 Permanent crops	<i>all</i>	<i>all</i>	Agriculture (intensive)
		2.3.1 Permanent crops with temporary crops / pasture	<i>all</i>	Agriculture (intensive)
		2.3.2 Cultural mosaics and complex parcels	<i>all</i>	Agriculture (extensive)
		2.3.3 Agriculture with natural and semi-natural spaces.	<i>all</i>	Agriculture (extensive)
3. Pasture		3.1.1 Managed pasture	<i>all</i>	Agriculture (intensive)
		3.1.2 Grassland pasture	<i>all</i>	Agriculture (extensive)
4. Agroforestry area	<i>all</i>	<i>all</i>	<i>all</i>	Agriculture (extensive)
5. Forest		5.1.1 Broadleaf forest	<i>all, except</i>	Forest (natural)
			5.1.1.5 Eucalyptus forest	Forestry plantation
		5.1.2 Coniferous forest	<i>all</i>	Forestry plantation
6. Shrubland	<i>all</i>	<i>all</i>	<i>all</i>	Shrubland
9. Surface water bodies	<i>all</i>	<i>all</i>	<i>all</i>	Water

Table S2. Significance of variables and corresponding coefficients for all iterations of the logistic regression R1 'Revegetation' (1) compared to 'Staying in agriculture' (0) in both 1995-2007 and 2007-2018. Colours indicate levels of significance (legend at the end of the supplementary material).

Independent variables	1995-2007					2007-2018		
Existing agriculture in 4x4km neighbourhood	10.505	12.157	9.864	10.594	11.654	3.164	3.627	3.868
Existing (re-)vegetation in 4x4km neighbourhood						-4.404	-3.274	-4.337
Climate: annual ombrothermic index		3.555	2.24	2.461				2.102
Soil type: cambisol	2.27		1.65	1.85	3.096			
alisol								
luvisol								
anthrosols								
Soil cation exchange capacity					2.01			
Soil organic carbon								
Soil pH					-2.314		-2.168	
Soil silt content								
Slope	-4.925	-3.46	-3.781	-4.329	-4.049	-4.638	-3.467	-3.125
Deviation from South (Aspect)			-2.367		-2.229			
Protection regime: medium		-3.769		-2.87				
high		-5.544	-2.922	-3.534	-3.797	-3.155	-3.125	-5.049
Cost distance to nearest Settlement	-4.597	-5.421	-5.373	-5.977	-5.097			
Cost distance to nearest Municipality Centre	1.851	3.199	2.702	2.326	2.547			
Cost distance to Highway entry ramp 2007								
Cost distance to Highway entry ramp 2018								
Population density per parish	-2.062					-2.476		-2.42
Population rate of change								
Mean farmer age per parish							3.00	3.002
Mean value of farm output in proportion to the overall TTM mean value of farm output, per parish								
Number of livestock (cattle, sheep, goats, pigs) per 100ha per parish								
Number of farms per 100 ha per parish								
Model fit measured by ROC (AUC)	0.67663	0.69636	0.68825	0.71214	0.68368	0.65714	0.674	0.64658

Table S3. Significance of variables and corresponding coefficients for all iterations of the logistic regression R2 'Managed revegetation' (1) compared to 'Spontaneous revegetation' (0) in both 1995-2007 and 2007-2018. Colours indicate levels of significance (legend at the end of the supplementary material).

Independent variables	1995-2007					2007-2018		
Existing agriculture in 4x4km neighbourhood	-2.777	-2.512	-2.282	-2.19	-2.266		-2.751	-1.88
Existing (re-)vegetation in 4x4km neighbourhood								
Climate: annual ombrothermic index	-4.673	-5.369	-5.007	-4.279	-4.271			-2.106
Soil type: cambisol	2.069		3.513	1.794				
alisol								
luvisol								
anthrosols								
Soil cation exchange capacity								
Soil organic carbon								
Soil pH								-2.096
Soil silt content						-1.996		
Slope			2.146	1.789	1.786			
Deviation from South (Aspect)								
Protection regime: medium	-2.47	-2.352	-2.455	-2.384		-2.708	-4.317	-2.566
high	-3.868	-4.239	-2.826	-4.019	-3.467	-2.206		
Cost distance to nearest Settlement	4.437	5.091	3.203	3.168	3.764			
Cost distance to nearest Municipality Centre	-2.957	-4.567	-3.949	-2.32	-2.112			
Cost distance to Highway entry ramp 2007	3.858	4.321	5.774	4.409	4.126		2.524	2.683
Cost distance to Highway entry ramp 2018								
Population density per parish							2.295	1.846
Population rate of change								
Mean farmer age per parish	-2.454	-1.646				2.482		
Mean value of farm output in proportion to the overall TTM mean value of farm output, per parish								
Number of livestock (cattle, sheep, goats, pigs) per 100ha per parish								
Number of farms per 100 ha per parish		-2.11			-2.015			
Model fit measured by ROC (AUC)	0.62074	0.60853	0.62499	0.62531	0.61076	0.63709	0.55377	0.59654

Table S4. Significance of variables and corresponding coefficients for all iterations of the logistic regression R3. 'Return to agriculture' (1) compared to 'Staying vegetated' (0) in both 1995-2007 and 2007-2018. Colours indicate levels of significance (legend at the end of the supplementary material).

Independent variables	1995-2007					2007-2018				
Existing agriculture in 4x4km neighbourhood										
Existing (re-)vegetation in 4x4km neighbourhood	11.081	10.399	11.898	11.321	11.798	8.469	9.094	7.815	9.483	9.702
Climate: annual ombrothermic index						2.249	3.456	3.312	3.648	3.661
Soil type: cambisol										
alisol	-2.46	-3.164			-1.845		-3.527		-2.339	
luvisol	-2.028		-2.301						-1.758	-2.193
anthrosols					-2.378					
Soil cation exchange capacity	-2.644	-3.308	-4.044	-3.806		-2.316				
Soil organic carbon	2.339	2.113	3.043	3.006						
Soil pH	2.306			3.083						
Soil silt content	-2.089			-2.109	2.867					
Slope	2.659		2.11	1.938						
Deviation from South (Aspect)										
Protection regime: medium							-2.668	-1.777		-3.193
high		2.601		1.747	1.782	2.24	1.762			
Cost distance to nearest Settlement	8.129	8.456	6.968	6.37		7.891	7.867	7.884	7.575	9.143
Cost distance to nearest Municipality Centre			-1.699		-2.806					
Cost distance to Highway entry ramp 2007	-3.631	-3.666	-3.484	-2.371						-2.927
Cost distance to Highway entry ramp 2018						-1.944	-2.87	-2.38	-2.247	-2.955
Population density per parish										
Population rate of change									-1.732	-2.487
Mean farmer age per parish	-2.23	-3.156	-1.672	-2.595						
Mean value of farm output in proportion to the overall TTM mean value of farm output, per parish			-2.531							
Number of livestock (cattle, sheep, goats, pigs) per 100ha per parish					-3.175	-2.628	-2.373			
Number of farms per 100 ha per parish					2.376					
Model fit measured by ROC (AUC)	0.70855	0.69744	0.71121	0.70614	0.71164	0.71105	0.68446	0.73314	0.68773	0.6645

Table S5. Significance of variables and corresponding coefficients for all iterations of the logistic regression R4. 'Managed revegetation' compared to 'Return to agriculture' (0) in both 1995-2007 and 2007-2018. Colours indicate levels of significance (legend at the end of the supplementary material).

Independent variables	1995-2007					2007-2018		
Existing agriculture in 4x4km neighbourhood	-3.46	-2.211	-2.837		-2.485			
Existing (re-)vegetation in 4x4km neighbourhood						3.488	1.781	
Climate: annual ombrothermic index	-1.993		-2.756	-2.342				
Soil type: cambisol		2.522		1.74	3.336			
alisol	3.948	4.098	4.121	3.092	3.56	2.103		
luvisol								
anthrosols		-2.006						
Soil cation exchange capacity	3.702	4.305	3.431	3.629	4.116			
Soil organic carbon	-3.258	-3.409	-2.458	-2.713	-3.413			
Soil pH								
Soil silt content						-2.702	-3.344	
Slope	1.844	2.067	2.039			2.048	2.535	5.235
Deviation from South (Aspect)								
Protection regime: medium	-2.419	-2.497	-2.459				-3.251	-2.146
high								
Cost distance to nearest Settlement	1.782	2.573	2.154	1.786	2.071			
Cost distance to nearest Municipality Centre	-3.645	-2.966	-4.973	-3.148	-4.363			
Cost distance to Highway entry ramp 2007	10.54	9.344	9.595	9.787	8.83	2.602	2.673	3.516
Cost distance to Highway entry ramp 2018								
Population density per parish								
Population rate of change								
Mean farmer age per parish	2.313	2.809				4.168	3.329	4.598
Mean value of farm output in proportion to the overall TTM mean value of farm output, per parish								
Number of livestock (cattle, sheep, goats, pigs) per 100ha per parish	3.789	2.024	4.352	2.818	1.878			
Number of farms per 100 ha per parish	-3.697	-2.979	-3.29	-2.998	-3.123			
Model fit measured by ROC (AUC)	0.68109	0.68474	0.64869	0.65288	0.67253	0.67432	0.643424	0.687075

