1 Supplementary Material

	Country code	Country name
1	AT	Austria
2	BE	Belgium
3	BG	Bulgaria
4	CY	Cyprus
5	CZ	Czechia
6	DE	Germany
7	DK	Denmark
8	EE	Estonia
9	EL	Greece
10	ES	Spain
11	FI	Finland
12	FR	France
13	HR	Croatia
14	HU	Hungary
15	IE	Ireland
16	IT	Italy
17	LT	Lithuania
18	LU	Luxembourg
19	LV	Latvia
20	MT	Malta
21	NL	Netherlands
22	PL	Poland
23	PT	Portugal
24	RO	Romania
25	SE	Sweden
26	SI	Slovenia
27	SK	Slovakia

Table S1: EU-27 abbreviations according to NUTS0 country codes and the country they correspond to.

model config	N parameters	AIC
LMM2+Year_c	6	17923.20
LMM2+AR(1)+Year_c	7	17925.00
LMM1+AR(1)	5	18037.96
LMM1+AR(1)+Year_c	5	18037.96
LMM2+AR(1)	7	18040.13
LMM1+Year_c	4	18099.50
LMM1_basic	4	18099.50
LMM1_basic	6	18100.14

Table S2: The resulting AIC score from each model testing of LMM1, LMM2, controlling for the use of AR(1) and year centering. A lower AIC indicates a better trade-off between model fit and complexity.

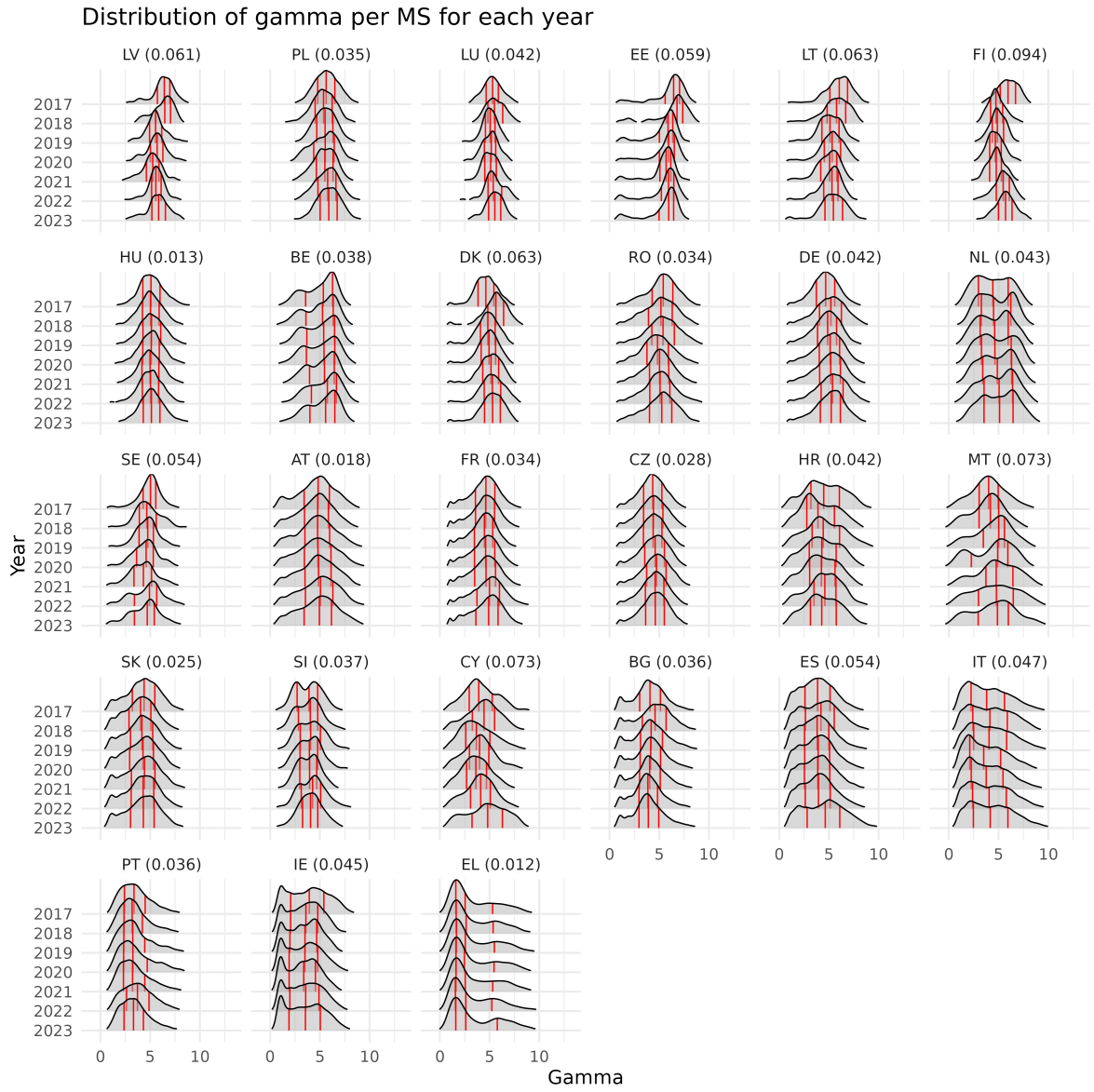


Figure S1: Density ridges of gamma diversity for all seven years of data per Member State (in order of descending geometric mean gamma diversity). Digits in brackets list the mean inter-annual coefficient of variation.

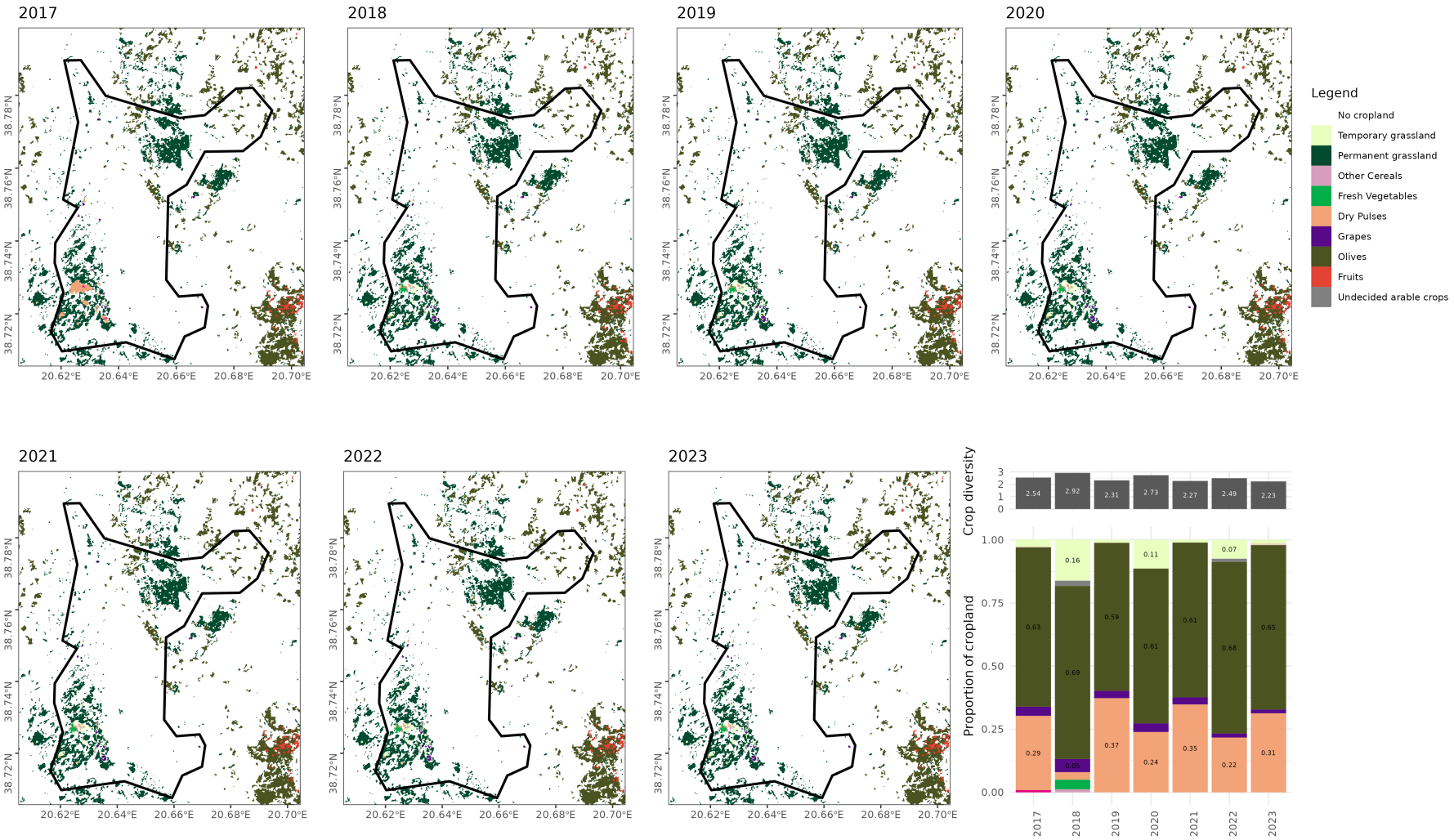
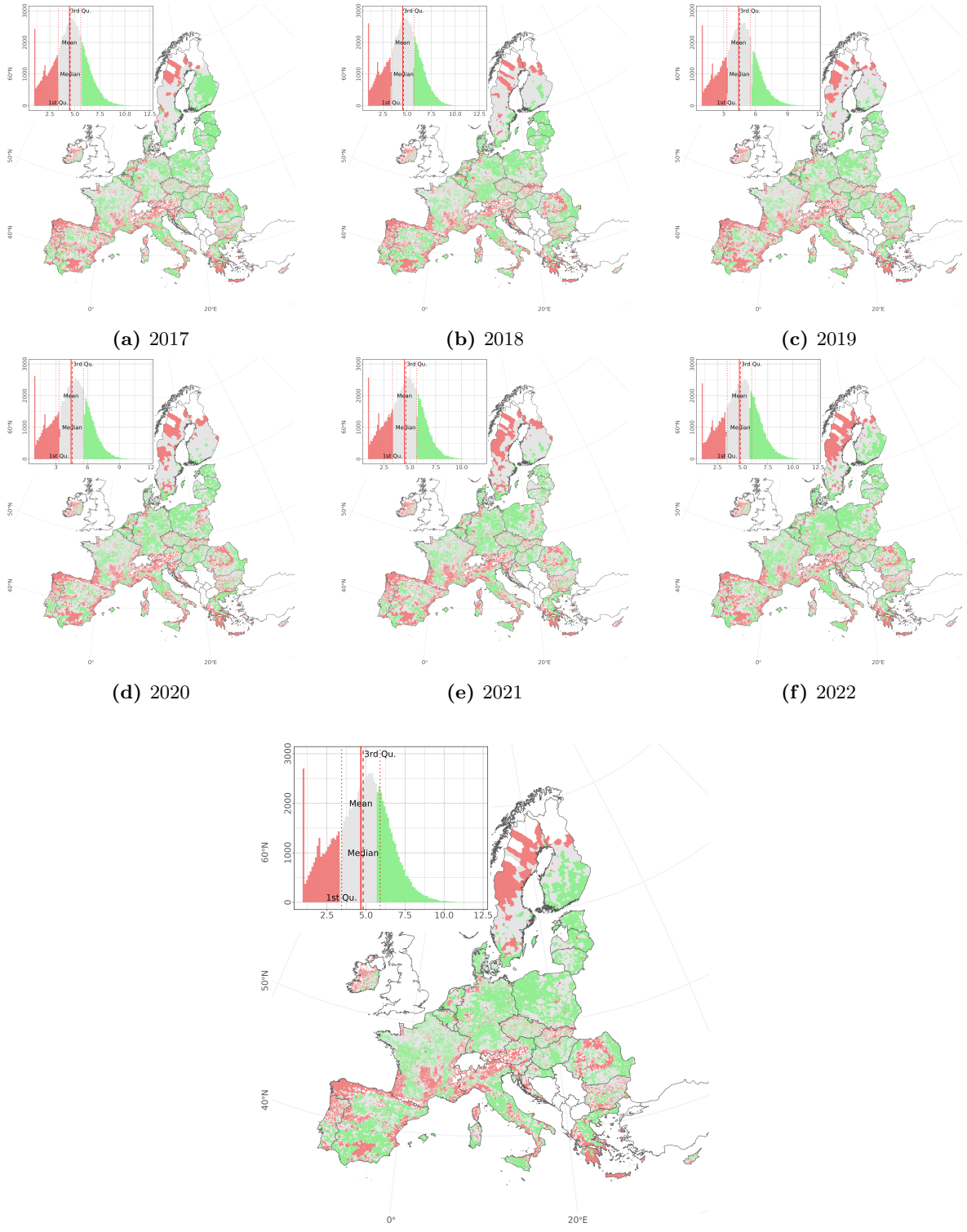


Figure S2: The least gamma diverse LAU (L_2404 - Karyes) per year of data, along with the relative share of each crop type.



(a) 2017 **(b)** 2018 **(c)** 2019

(d) 2020 **(e)** 2021 **(f)** 2022

(g) 2023

Figure S3: Low and High diversity LAU/NUTS4 regions across the EU-27 per year, alongside their respective distributions, defined as the first and third respective quartile of the pooled multi-year distribution of γ-diversity.

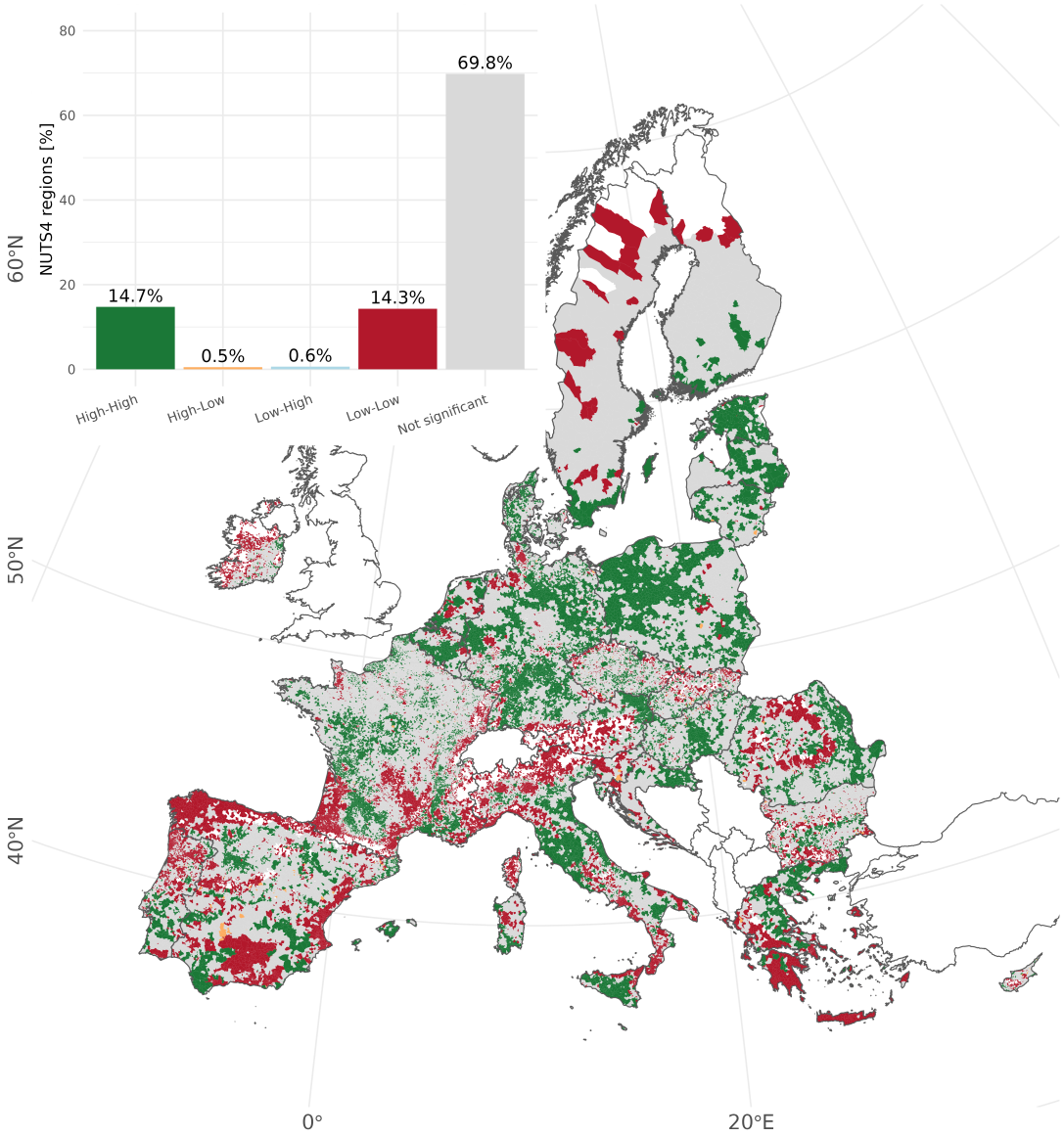


Figure S4: Local Moran's I index at LAU/NUTS4 level based on the mean γ-diversity for the study period (2017-2023) identifying four categories of clusters - High-High, High-Low, Low-High, Low-Low, with inset barplot listing the relevant percent of regions they represent. Statistical significance is tested via p-value with threshold set at 0.05. Regions adjacency is tested via Queen method (shared border OR vertex); weights are row-standardized.

model config	N parameters	AIC
LMMd	24	10892.12
LMMd+AR1	25	10806.17
LMMd+randomSlopes	26	10736.94
LMMd+AR1+randomSlopes	27	10730.22

Table S3: The resulting AIC score from each model testing of LMM_d, controlling for the use of AR(1) and random slopes. A lower AIC indicates a better trade-off between model fit and complexity.

	removed	AIC	delta_AIC
1	Dominance	17251.97	6602.16
2	Richness	11117.93	468.12
3	Environment	10764.04	114.23
4	Time	10667.09	17.28

Table S4: Change in LMMd model support after removing a predictor group.

	code	legend
1	URBN_TYPE1	Predominantly urban
2	URBN_TYPE2	Intermediate
3	URBN_TYPE3	Predominantly rural
4	URBN_TYPE0	Not classified
5	COAST_TYPE1	Coastal region
6	COAST_TYPE2	Coastal ($\geq$50% population within 50 km of coast)
7	COAST_TYPE3	Non-coastal
8	COAST_TYPE0	Not classified
9	MOUNT_TYPE1	>50% surface mountainous
10	MOUNT_TYPE2	>50% population in mountain areas
11	MOUNT_TYPE3	Both surface and population mountainous
12	MOUNT_TYPE4	Non-mountain
13	MOUNT_TYPE0	Not classified

Table S5: Table explaining the environmental variables in GISCO NUTS datasets.