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Assessment of the impact of agricultural support on crop diversity

Zdeňka Žáková Kroupová[1], Lukáš Čechura[1], Matěj Opatrný[2,3], Zuzana Hloušková[4], Iveta Mlezivová[4]*

[1]*Faculty of Economics and Management, Czech University of Life Sciences Prague, Prague, Czech Republic*
[2]*Institute of Economic Studies, Faculty of Social Sciences, Charles University, Prague, Czech Republic*
[3]*The Environment Centre, Charles University, Prague, Czech Republic*
[4]*Liaison Agency FADN CZ, Institute of Agricultural Economics and Information, Prague, Czech Republic*

**Corresponding author: cechura@pef.czu.cz*

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Electronic supplementary material

Supplementary Tables S1–S9
Supplementary Figures S1–S2

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Table S1. Structure of dataset

Indicator	Total sample											
Number of observations	10 327											
Type of farming	field crops farms						mixed farms					
Number of observations	5 794						4 533					
Type of management	conventional			organic			conventional			organic		
Number of observations	5 626			168			4 136			397		
Altitude	< 300 m	300–600 m	> 600 m	< 300 m	300–600 m	> 600 m	< 300 m	300–600 m	> 600 m	< 300 m	300–600 m	> 600 m
Number of observations	3 456	2 105	65	76	85	7	980	3 003	153	56	291	50

Source: The Farm accountancy data network (FADN)

Table S2. Descriptive statistics of biodiversity indices

Index	Mean	SD	Min.	1Q	Median	3Q	Max.	Average growth rate (%)	Trend
SID (land-use)	0.509	0.137	0.000	0.451	0.529	0.614	0.760	0.943	$SID = 0.449 + 0.003t$ (0.003) (0.001)
SID (field crops)	0.630	0.161	0.000	0.587	0.670	0.730	0.853	0.198	$SID = 0.609 - 0.001t$ (0.005) (0.001)
DIV	2.319	0.685	1.000	1.859	2.244	2.790	5.026	0.728	$DIV = 2.166 + 0.013t$ (0.019) (0.002)

The trend was estimated employing a panel data regression [fixed effect model for *SID* (land-use)]; random effect model for *SID* (field crops) and *DIV*; Hausman for *SID* (land-use), $\chi^2[1] = 12.76$; Hausman for *SID* (field crops), $\chi^2[1] = 1.60$; Hausman for *DIV*, $\chi^2[1] = 0.02$; *SID* – Simpson Index of Diversity; *DIV* – Diversity Index; 1Q, 3Q – first and third quartile, respectively; *t* – time (year)

Source: The Farm accountancy data network (FADN) and authors' own calculations

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Table S3. Diversity indices in different types of farms

Farm size		Altitude < 300 m				Altitude 300–600 m				Altitude > 600 m			
		small	medium	large	very large	small	medium	large	very large	small	medium	large	very large
Type of farming: fieldcrops													
Conventional management practice													
SID (land-use)	mean	0.372	0.441	0.483	0.525	0.421	0.515	0.537	0.565	0.532	0.626	0.569	NA
	SD	0.194	0.138	0.097	0.099	0.171	0.112	0.096	0.072	0.157	0.072	0.052	NA
SID (field crops)	mean	0.467	0.606	0.686	0.662	0.548	0.649	0.679	0.700	0.553	0.651	0.696	NA
	SD	0.208	0.157	0.136	0.147	0.174	0.109	0.091	0.064	0.140	0.133	0.050	NA
DIV	mean	1.713	2.058	2.322	2.500	1.740	2.138	2.396	2.618	1.657	2.506	2.306	NA
	SD	0.516	0.562	0.583	0.648	0.534	0.525	0.603	0.600	0.502	0.519	0.322	NA
Organic management practice													
SID (land-use)	mean	0.276	0.456	0.508	0.538	0.415	0.500	NA	NA	NA	NA	NA	NA
	SD	0.244	0.193	0.112	0.101	0.208	0.132	NA	NA	NA	NA	NA	NA
SID (field crops)	mean	0.218	0.468	0.732	0.706	0.356	0.538	NA	NA	NA	NA	NA	NA
	SD	0.232	0.261	0.060	0.084	0.243	0.187	NA	NA	NA	NA	NA	NA
DIV	mean	1.358	2.035	1.975	2.340	1.567	1.937	NA	NA	NA	NA	NA	NA
	SD	0.358	0.670	0.604	0.544	0.547	0.600	NA	NA	NA	NA	NA	NA
Type of farming: mixed													
Conventional management practice													
SID (land-use)	mean	0.454	0.501	0.565	0.579	0.450	0.523	0.591	0.616	0.501	0.466	0.596	0.610
	SD	0.162	0.175	0.074	0.091	0.151	0.111	0.064	0.038	0.067	0.088	0.057	0.038
SID (field crops)	mean	0.409	0.537	0.684	0.703	0.519	0.623	0.698	0.715	0.530	0.568	0.746	0.757
	SD	0.238	0.188	0.103	0.079	0.200	0.141	0.088	0.063	0.243	0.201	0.050	0.051
DIV	mean	1.913	2.180	2.523	2.799	1.980	2.271	2.714	2.925	2.446	2.551	2.827	3.094
	SD	0.553	0.648	0.601	0.692	0.587	0.604	0.492	0.556	0.503	0.627	0.603	0.769
Organic management practice													
SID (land-use)	mean	NA	0.459	NA	0.568	0.433	0.446	0.499	0.581	0.447	0.400	0.450	NA
	SD	NA	0.173	NA	0.073	0.118	0.144	0.096	0.081	0.155	0.138	0.117	NA
SID (field crops)	mean	NA	0.291	NA	0.703	0.424	0.551	0.659	0.655	0.180	0.544	0.603	NA
	SD	NA	0.240	NA	0.044	0.257	0.184	0.135	0.090	0.201	0.165	0.203	NA

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Table S3. To be continued

Farm size		Altitude < 300 m				Altitude 300–600 m				Altitude > 600 m			
		small	medium	large	very large	small	medium	large	very large	small	medium	large	very large
DIV	mean	NA	2.141	NA	2.302	1.997	2.129	2.353	2.682	1.719	2.512	2.327	NA
	SD	NA	0.762	NA	0.579	0.595	0.596	0.378	0.870	0.396	0.714	0.561	NA

Organic management practice – group of farms that fully or partially practice the organic farming management; small farms – farms with economic size less/equal than/to 50 000 EUR; medium farms – farms with economic size 50 001–500 000 EUR; large farms – farms with economic size 500 001–1 000 000 EUR; very large farms – farms with economic size more than 1 000 000 EUR; NA – not available (less than 10 observations); *SID* – Simpson Index of Diversity; *DIV* – Diversity Index

Source: The Farm accountancy data network (FADN) and authors' own calculations

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Table S4. Descriptive statistics of biodiversity indices for field crops and mixed farms

Index	Mean	SD	Min.	1Q	Median	3Q	Max.	Average growth rate (%)	Trend
Field crops farms									
SID (land-use)	0.473	0.141	0.000	0.420	0.494	0.566	0.753	1.112	$SID = 0.436 + 0.005t$ (0.005) (0.001)
SID (field crops)	0.617	0.162	0.000	0.568	0.657	0.720	0.853	0.309	$SID = 0.599 + 0.001t$ (0.005) (0.001)
DIV	2.128	0.614	1.000	1.749	2.025	2.512	5.026	0.574	$DIV = 1.993 + 0.016t$ (0.018) (0.002)
Mixed farms									
SID (land-use)	0.554	0.116	0.000	0.500	0.595	0.631	0.760	0.424	$SID = 0.524 + 0.004t$ (0.004) (0.001)
SID (field crops)	0.646	0.159	0.000	0.615	0.691	0.739	0.851	–0.047	$SID = 0.616 - 0.001t$ (0.007) (0.001)
DIV	2.561	0.694	1.000	2.061	2.575	2.993	4.982	0.539	$DIV = 2.391 + 0.009t$ (0.024) (0.002)

SID – Simpson Index of Diversity; *DIV*– Diversity Index; 1Q, 3Q – first and third quartile, respectively; *t* – time (year)
Source: The Farm accountancy data network (FADN)

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Table S5. Diversity indices and heterogeneity of farms

Index	*SID* (land-use)		*SID* (field crops)		*DIV*	
	mean	SD	mean	SD	mean	SD
Type of farming						
Field	0.475	0.002	0.617	0.002	2.134	0.008
Mixed	0.558	0.002	0.646	0.002	2.575	0.010
t-value [d*f*]	–31.053***	[10 324]	–8.882***	[10 246]	–33.564***	[10 324]
Management practice						
Conventional	0.511	0.136	0.636	0.153	2.330	0.684
Organic	0.469	0.150	0.513	0.242	2.112	0.671
t-value [d*f*]	7.030***	[10 324]	17.411***	[10 246]	7.379***	[10 324]
Localisation in ANCs						
Non_ANCs	0.493	0.002	0.622	0.002	2.267	0.008
ANC_J	0.548	0.002	0.646	0.003	2.420	0.012
ANC_H	0.535	0.005	0.633	0.009	2.562	0.031
F-statistics [d*f*]	194.140***	[2, 10 323]	24.490***	[2, 10 245]	78.840***	[2, 10 323]
Altitude						
< 300 m	0.476	0.002	0.610	0.003	2.217	0.010
300– 600 m	0.539	0.002	0.646	0.002	2.405	0.009
> 600 m	0.547	0.006	0.631	0.012	2.568	0.042
F-statistics [d*f*]	308.520***	[2, 10 323]	60.720***	[2, 10 245]	118.070***	[2, 10 323]
Economic farm size						
Small	0.419	0.174	0.486	0.215	1.827	0.565
Medium	0.481	0.135	0.614	0.151	2.133	0.576
Large	0.536	0.097	0.688	0.112	2.480	0.586
Very large	0.586	0.077	0.702	0.090	2.787	0.638
F-statistics [d*f*]	745.350***	[3, 10 322]	850.030***	[3, 10 244]	1 135.710***	[3, 10 322]

*** significant at α = 1%; *SID* – Simpson Index of Diversity; *DIV* – Diversity Index; ANC – Areas of natural or other specific constraints; ANC_J – Areas of natural or other specific constraints (Other and specific); ANC_H – Areas of natural or other specific constraints (Mountains)

Source: The Farm accountancy data network (FADN)

Table S6. Spearman's rank correlation

Index	Decoup. payment	Greening	Environ. subsidies	Agri-Envi-Climate Measures	Subsidies for organic farming	Natura 2000	Subsidies for ANCs	Other rural develop. payments	Total subsidies on crops	Other subsidies
SID (land-use)	0.414***	0.408***	0.457***	0.444***	–0.039***	0.067***	0.405***	0.107***	0.317***	0.414***
SID (field crops)	0.499***	0.454***	0.287***	0.297***	–0.127***	–0.015	0.210***	0.099***	0.256***	0.496***
DIV	0.483***	0.474***	0.394***	0.392***	–0.057***	0.035***	0.328***	0.083***	0.398***	0.521***

*, **, *** significant at α = 10, 5, and 1%, respectively; *SID* – Simpson Index of Diversity; *DIV* – Diversity Index; ANC – Areas of natural or other specific constraints; Spearman's rank correlation coefficients for Greening measures are calculated for the period 2015–2020.

Source: The Farm accountancy data network (FADN) and authors' own calculations

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Table S7. Panel regression with Simpson Diversity Land-use Index as dependent variable – random effects model estimates with Mundlak's adjustment

SID (land-use)	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
Tot. subsidies	0.040	0.007	0.000	0.028	0.007	0.000	–	–	–	–	–	–	–	–	–
Direct payments	–	–	–	–	–	–	0.004	0.004	0.331	0.001	0.003	0.786	0.001	0.003	0.878
Environ. subsidies	–	–	–	–	–	–	0.000	0.000	0.223	0.001	0.000	0.095	0.001	0.000	0.081
Disadvantage areas	–	–	–	–	–	–	0.002	0.000	0.001	0.001	0.000	0.004	0.001	0.000	0.011
Other rur. dev. subsidies	–	–	–	–	–	–	0.000	0.000	0.206	0.001	0.000	0.020	0.001	0.000	0.021
Tot. subsidies on crop	–	–	–	–	–	–	0.001	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.107
Other subs.	–	–	–	–	–	–	0.001	0.002	0.742	0.001	0.002	0.704	0.001	0.002	0.605
Labour productivity	0.009	0.002	0.000	0.006	0.002	0.007	0.011	0.002	0.000	0.009	0.002	0.000	0.008	0.002	0.000
Crop intensity	–0.039	0.021	0.064	–0.035	0.022	0.109	–0.043	0.022	0.048	–0.040	0.022	0.071	–0.039	0.022	0.077
Fertilizers intensity	–0.001	0.005	0.881	0.000	0.005	0.954	–0.001	0.005	0.786	–0.001	0.005	0.811	–0.001	0.005	0.807
Tot. subsidies_gm	–0.007	0.007	0.312	–0.008	0.007	0.241	–	–	–	–	–	–	–	–	–
Direct payments_gm	–	–	–	–	–	–	0.001	0.006	0.810	–0.005	0.006	0.363	–0.005	0.006	0.361
Environ. subsidies_gm	–	–	–	–	–	–	0.004	0.001	0.000	0.004	0.001	0.000	0.004	0.001	0.000
Disadvantage areas_gm	–	–	–	–	–	–	0.003	0.001	0.000	0.002	0.001	0.013	0.002	0.001	0.010
Other rur. dev. subsidies_gm	–	–	–	–	–	–	0.005	0.001	0.000	0.004	0.001	0.000	0.004	0.001	0.000
Tot. subsidies on crop_gm	–	–	–	–	–	–	0.005	0.001	0.000	0.004	0.001	0.000	0.004	0.001	0.000
Other subs._gm	–	–	–	–	–	–	0.005	0.004	0.253	0.004	0.004	0.380	0.004	0.004	0.336
Labour productivity_gm	–0.007	0.005	0.160	–0.006	0.005	0.284	–0.009	0.005	0.068	–0.008	0.005	0.125	–0.008	0.005	0.128
Crop intensity_gm	–0.015	0.026	0.566	–0.015	0.026	0.564	0.043	0.027	0.106	0.033	0.027	0.222	0.032	0.027	0.233
Fertilizers intensity_gm	–0.004	0.008	0.653	0.002	0.008	0.830	0.007	0.008	0.334	0.009	0.008	0.238	0.009	0.008	0.236
Organic farmer (dummy)	–	–	–	0.004	0.008	0.648	–	–	–	–0.017	0.014	0.198	–0.017	0.014	0.201
Mixed farmer (dummy)	–	–	–	0.006	0.005	0.262	–	–	–	0.002	0.005	0.712	0.002	0.005	0.706
Period (2014–2020)	–	–	–	0.012	0.003	0.000	–	–	–	0.011	0.003	0.000	0.008	0.003	0.016
Altitude 300–600 m	–	–	–	0.033	0.005	0.000	–	–	–	0.019	0.006	0.001	0.019	0.006	0.001
Altitude > 600 m	–	–	–	0.013	0.015	0.389	–	–	–	–0.005	0.013	0.680	–0.005	0.013	0.711
Small farm	–	–	–	–0.063	0.013	0.000	–	–	–	–0.068	0.013	0.000	–0.066	0.013	0.000
Medium farm	–	–	–	–0.035	0.008	0.000	–	–	–	–0.036	0.007	0.000	–0.034	0.007	0.000
Large farm	–	–	–	–0.004	0.003	0.216	–	–	–	–0.004	0.003	0.281	–0.003	0.004	0.461
NATURA 2000 area	–	–	–	–	–	–	–	–	–	–	–	–	–0.001	0.008	0.950

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Table S7. To be continued

SID (land-use) Variable	Model 1			Model 2			Model 3			Model 4			Model 5		
	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
t	–	–	–	–	–	–	–	–	–	–	–	–	0.001	0.001	0.211
Constant	–0.022	0.060	0.708	0.189	0.070	0.007	0.258	0.064	0.000	0.445	0.072	0.000	0.443	0.072	0.000
Sigma (u)	0.102	–	–	0.096	–	–	0.096	–	–	0.093	–	–	0.092	–	–
Sigma (e)	0.072	–	–	0.072	–	–	0.072	–	–	0.072	–	–	0.072	–	–
Rho	0.669	–	–	0.641	–	–	0.637	–	–	0.624	–	–	0.623	–	–
R^2 (Within/ Between/ Overall)	0.036	0.233	0.227	0.041	0.292	0.265	0.031	0.316	0.297	0.393	0.344	0.315	0.039	0.344	0.316
Wald χ^2 [*df*]	577.56	[8]	0.000	782.60	[16]	0.000	962.07	[18]	0.000	1 117.57	[26]	0.000	1 124.83	[28]	0.000

SID – Simpson Index of Diversity; NATURA 2000 – network of nature protection areas in the territory of EU; tot. subsidies – total subsidy (SE605) in logs; direct payments – decoupled payments (SE630) in logs; environ. subsidies – environmental subsidies (SE621) in logs; other rur. dev. subsidies – other rural development subsidies (SE623) in logs; disadvantage areas – subsidies for farming in ANCs (SE622) in logs; tot. subsidies on crop – total subsidies on crops (SE610) in logs; other subs. – other subsidies in logs, crop intensity – cropping intensity in logs; labour productivity – labour productivity in logs; fertilizers intensity – fertilizers intensity in logs; organic farmer (dummy) – dummy variable for organic farming; period (2014–2020) – dummy variable for period 2014–2020; mixed farmer (dummy) – dummy variable for mixed farming; altitude 300–600 m – dummy variable for altitude 300–600 m; altitude > 600 m – dummy variable for altitude more than 600 m; small farm – farms with economic size ≤ 50 000 EUR; medium farm – farms with economic size 50 001–500 000 EUR; large farm – farms with economic size 500 001–1 000 000 EUR; NATURA 2000 area – dummy variable for the gain of NATURA 2000 payments; _gm – group-mean; *t* – time (year). When interpreting dummies, the base group are very large, conventional management farmers, who operate up to 300 m altitude.

Source: The Farm accountancy data network (FADN) and authors' own calculations

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Table S8. Panel regression – *SID* (field crops)

SID (field crops)	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
Tot. subsidies	0.040	0.011	0.000	0.037	0.011	0.001	–	–	–	–	–	–	–	–	–
Direct payments	–	–	–	–	–	–	0.005	0.005	0.386	0.004	0.005	0.390	0.005	0.005	0.384
Environ. subsidies	–	–	–	–	–	–	0.001	0.000	0.012	0.001	0.000	0.036	0.001	0.000	0.029
Disadvantage areas	–	–	–	–	–	–	0.000	0.000	0.325	0.000	0.000	0.397	0.000	0.000	0.312
Other rur. dev. subsidies	–	–	–	–	–	–	0.001	0.000	0.030	0.000	0.000	0.069	0.000	0.000	0.065
Tot. subsidies on crop	–	–	–	–	–	–	0.001	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000
Other subs.	–	–	–	–	–	–	0.006	0.002	0.002	0.005	0.002	0.004	0.005	0.002	0.004
Labour productivity	0.000	0.003	0.940	–0.001	0.003	0.708	0.003	0.003	0.259	0.002	0.003	0.402	0.002	0.003	0.408
Crop intensity	0.189	0.030	0.000	0.187	0.030	0.000	0.187	0.029	0.000	0.183	0.030	0.000	0.183	0.030	0.000
Fertilizers intensity	0.001	0.006	0.912	0.002	0.006	0.783	0.001	0.006	0.840	0.001	0.006	0.812	0.002	0.006	0.797
Tot. subsidies_gm	0.009	0.011	0.407	0.008	0.011	0.458	–	–	–	–	–	–	0.019	0.008	0.013
Direct payments_gm	–	–	–	–	–	–	0.019	0.008	0.014	0.019	0.008	0.013	0.019	0.008	0.013
Environ. subsidies_gm	–	–	–	–	–	–	0.001	0.001	0.534	0.001	0.001	0.270	0.001	0.001	0.273
Disadvantage areas_gm	–	–	–	–	–	–	0.007	0.001	0.000	0.005	0.001	0.000	0.005	0.001	0.000
Other rur. dev. subsidies_gm	–	–	–	–	–	–	0.000	0.002	0.841	0.000	0.002	0.994	0.000	0.002	0.958
Tot. subsidies on crop_gm	–	–	–	–	–	–	–0.001	0.001	0.451	0.000	0.001	0.926	0.000	0.001	0.932
Other subs._gm	–	–	–	–	–	–	0.008	0.005	0.119	0.005	0.005	0.289	0.005	0.005	0.297
Labour productivity_gm	0.003	0.006	0.627	0.000	0.006	0.981	0.002	0.006	0.686	–0.002	0.005	0.742	–0.002	0.005	0.750
Crop intensity_gm	–0.041	0.035	0.238	–0.017	0.034	0.625	0.020	0.035	0.576	0.020	0.035	0.568	0.020	0.035	0.565
Fertilizers intensity_gm	–0.014	0.010	0.136	–0.013	0.010	0.175	–0.005	0.009	0.548	–0.009	0.009	0.347	–0.009	0.009	0.335
Organic farmer (dummy)	–	–	–	–0.059	0.023	0.009	–	–	–	–0.047	0.022	0.033	–0.046	0.022	0.035
Mixed farmer (dummy)	–	–	–	0.005	0.007	0.506	–	–	–	0.001	0.007	0.905	0.001	0.007	0.915
Period (2014–2020)	–	–	–	0.002	0.004	0.524	–	–	–	–0.003	0.004	0.502	–0.002	0.004	0.596
Altitude 300–600 m	–	–	–	0.058	0.007	0.000	–	–	–	0.037	0.007	0.000	0.036	0.007	0.000
Altitude > 600 m	–	–	–	0.091	0.017	0.000	–	–	–	0.061	0.017	0.000	0.060	0.017	0.001
Small farm	–	–	–	–0.027	0.015	0.073	–	–	–	–0.033	0.015	0.023	–0.034	0.015	0.021
Medium farm	–	–	–	0.013	0.010	0.177	–	–	–	0.011	0.009	0.215	0.011	0.009	0.229
Large farm	–	–	–	0.018	0.004	0.000	–	–	–	0.018	0.004	0.000	0.017	0.004	0.000
NATURA 2000 area	–	–	–	–	–	–	–	–	–	–	–	–	–0.039	0.012	0.001

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Table S8. To be continued

SID (field crops) Variable	Model 1			Model 2			Model 3			Model 4			Model 5		
	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
t	–	–	–	–	–	–	–	–	–	–	–	–	0.000	0.001	0.911
Constant	–0.108	0.066	0.105	–0.027	0.078	0.729	0.053	0.067	0.430	0.134	0.078	0.085	0.133	0.078	0.086
Sigma (u)	0.116	–	–	0.107	–	–	0.108	–	–	0.104	–	–	0.104	–	–
Sigma (e)	0.083	–	–	0.083	–	–	0.083	–	–	0.083	–	–	0.083	–	–
Rho	0.659	–	–	0.623	–	–	0.629	–	–	0.611	–	–	0.610	–	–
R^2 (Within/ Between/ Overall)	0.072	0.357	0.266	0.078	0.424	0.313	0.073	0.433	0.320	0.081	0.458	0.338	0.082	0.459	0.339
Wald χ^2 [*df*]	664.85	[8]	0.000	831.20	[16]	0.000	892.48	[18]	0.000	1 030.470	[26]	0.000	1 047.16	[28]	0.000

SID – Simpson Index of Diversity; NATURA 2000 – network of nature protection areas in the territory of EU; tot. subsidies – total subsidy (SE605) in logs; direct payments – decoupled payments (SE630) in logs; environ. subsidies – environmental subsidies (SE621) in logs; other rur. dev. subsidies – other rural development subsidies (SE623) in logs; disadvantage areas – subsidies for farming in ANCs (SE622) in logs; tot. subsidies on crop – total subsidies on crops (SE610) in logs; other subs. – other subsidies in logs, crop intensity – cropping intensity in logs, labour productivity – labour productivity in logs; fertilizers intensity – fertilizers intensity in logs; organic farmer (dummy) – dummy variable for organic farming; period (2014–2020) – dummy variable for period 2014–2020; mixed farmer (dummy) – dummy variable for mixed farming; altitude 300–600 m – dummy variable for altitude 300–600 m; altitude > 600 m – dummy variable for altitude more than 600 m; small farm – farms with economic size ≤ 50 000 EUR; medium farm – farms with economic size 50 001–500 000 EUR; large farm – farms with economic size 500 001–1 000 000 EUR; NATURA 2000 area – dummy variable for the gain of NATURA 2000 payments; _gm – group-mean, *t* – time (year). When interpreting dummies, the base group are very large, conventional management farmers, who operate up to 300 m altitude.

Source: The Farm accountancy data network (FADN) and authors' own calculations

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Table S9. Panel regression – *DIV*

DIV	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
Tot. subsidies	0.191	0.029	0.000	0.129	0.028	0.000	–	–	–	–	–	–	–	–	–
Direct payments	–	–	–	–	–	–	0.003	0.012	0.823	–0.010	0.010	0.348	–0.005	0.011	0.619
Environ. subsidies	–	–	–	–	–	–	–0.003	0.002	0.164	–0.002	0.002	0.241	–0.003	0.002	0.176
Disadvantage areas	–	–	–	–	–	–	–0.001	0.002	0.758	–0.002	0.002	0.465	0.000	0.002	0.941
Other rur. dev. subsidies	–	–	–	–	–	–	–0.001	0.002	0.675	0.000	0.002	0.878	0.000	0.002	0.962
Tot. subsidies on crop	–	–	–	–	–	–	0.011	0.001	0.000	0.010	0.001	0.000	0.011	0.001	0.000
Other subs.	–	–	–	–	–	–	0.029	0.007	0.000	0.029	0.007	0.000	0.026	0.007	0.000
Labour productivity	0.002	0.010	0.856	–0.013	0.009	0.151	0.013	0.009	0.167	0.002	0.009	0.801	0.007	0.009	0.485
Crop intensity	–0.250	0.076	0.001	–0.219	0.077	0.004	–0.256	0.076	0.001	–0.242	0.077	0.002	–0.253	0.078	0.001
Fertilizers intensity	–0.080	0.021	0.000	–0.075	0.021	0.000	–0.072	0.021	0.000	–0.065	0.020	0.001	–0.065	0.021	0.001
Tot. subsidies_gm	0.009	0.030	0.773	–0.002	0.030	0.942	–	–	–	–	–	–	–	–	–
Direct payments_gm	–	–	–	–	–	–	–0.014	0.023	0.547	–0.047	0.022	0.036	–0.047	0.022	0.037
Environ. aubsidies_gm	–	–	–	–	–	–	0.007	0.004	0.067	0.005	0.004	0.137	0.005	0.004	0.147
Disadvantage areas_gm	–	–	–	–	–	–	0.011	0.004	0.003	0.010	0.004	0.015	0.009	0.004	0.026
Other rur. dev. subsidies_gm	–	–	–	–	–	–	0.023	0.007	0.001	0.020	0.007	0.004	0.019	0.007	0.005
Tot. subsidies on crop_gm	–	–	–	–	–	–	0.027	0.004	0.000	0.026	0.004	0.000	0.026	0.004	0.000
Other subs._gm	–	–	–	–	–	–	0.087	0.017	0.000	0.071	0.017	0.000	0.067	0.017	0.000
Labour productivity_gm	–0.013	0.021	0.551	0.002	0.022	0.911	–0.033	0.020	0.108	–0.023	0.021	0.262	–0.024	0.020	0.242
Crop intensity_gm	0.020	0.092	0.830	–0.013	0.091	0.888	0.107	0.096	0.269	0.074	0.097	0.443	0.083	0.097	0.396
Fertilizers intensity_gm	0.035	0.034	0.299	0.054	0.033	0.102	0.064	0.032	0.046	0.082	0.032	0.010	0.082	0.032	0.010
Organic farmer (dummy)	–	–	–	–0.142	0.071	0.045	–	–	–	–0.053	0.066	0.418	–0.055	0.066	0.404
Mixed farmer (dummy)	–	–	–	0.054	0.024	0.024	–	–	–	0.045	0.024	0.061	0.045	0.024	0.062
Period (2014–2020)	–	–	–	0.063	0.013	0.000	–	–	–	0.018	0.013	0.161	0.056	0.015	0.000
Altitude 300–600 m	–	–	–	0.050	0.025	0.048	–	–	–	0.032	0.028	0.255	0.030	0.028	0.282
Altitude > 600 m	–	–	–	0.094	0.078	0.228	–	–	–	0.062	0.078	0.429	0.057	0.078	0.461
Small farm	–	–	–	–0.355	0.059	0.000	–	–	–	–0.371	0.055	0.000	–0.385	0.055	0.000
Medium farm	–	–	–	–0.204	0.044	0.000	–	–	–	–0.204	0.041	0.000	–0.217	0.042	0.000
Large farm	–	–	–	–0.051	0.021	0.014	–	–	–	–0.047	0.020	0.020	–0.058	0.021	0.005
NATURA 2000 area	–	–	–	–	–	–	–	–	–	–	–	–	0.059	0.047	0.204

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Table S9. To be continued

DIV	Model 1			Model 2			Model 3			Model 4			Model 5		
Variable	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$	coef.	SE	$P > \|z\|$
t	–	–	–	–	–	–	–	–	–	–	–	–	–0.008	0.003	0.004
Constant	–0.628	0.222	0.005	0.547	0.288	0.058	0.884	0.242	0.000	1.910	0.278	0.000	1.929	0.277	0.000
Sigma (u)	0.465	–	–	0.451	–	–	0.439	–	–	0.426	–	–	0.426	–	–
Sigma (e)	0.352	–	–	0.349	–	–	0.349	–	–	0.348	–	–	0.348	–	–
Rho	0.636	–	–	0.624	–	–	0.613	–	–	0.601	–	–	0.601	–	–
R^2 (Within/ Between/ Overall)	0.035	0.326	0.285	0.047	0.350	0.302	0.049	0.390	0.364	0.058	0.404	0.372	0.058	0.406	0.373
Wald χ^2 [df]	909.99	[8]	0.000	1 094.12	[16]	0.000	1 299.48	[18]	0.000	1 447.60	[26]	0.000	1 463.83	[28]	0.000

DIV – Diversity Index; tot. subsidies – total subsidy (SE605) in logs; direct payments – decoupled payments (SE630) in logs; environ. subsidies – environmental subsidies (SE621) in logs; other rur. dev. subsidies – other rural development subsidies (SE623) in logs; disadvantage areas – subsidies for farming in ANCs (SE622) in logs; tot. subsidies on crop – total subsidies on crops (SE610) in logs; other subs. – other subsidies in logs, crop intensity – cropping intensity in logs, labour productivity – labour productivity in logs; fertilizers intensity – fertilizers intensity in logs; organic farmer (dummy) – dummy variable for organic farming; period (2014–2020) – dummy variable for period 2014–2020; mixed farmer (dummy) – dummy variable for mixed farming; altitude 300–600 m – dummy variable for altitude 300–600 m; altitude > 600 m – dummy variable for altitude more than 600 m; small farm – farms with economic size ≤ 50 000 EUR; medium farm – farms with economic size 50 001–500 000 EUR; large farm – farms with economic size 500 001–1 000 000 EUR; NATURA 2000 area – dummy variable for the gain of NATURA 2000 payments; _gm – group-mean, *t* – time (year). When interpreting dummies, the base group are very large, conventional management farmers, who operate up to 300 m altitude.

Source: The Farm accountancy data network (FADN) and authors' own calculations

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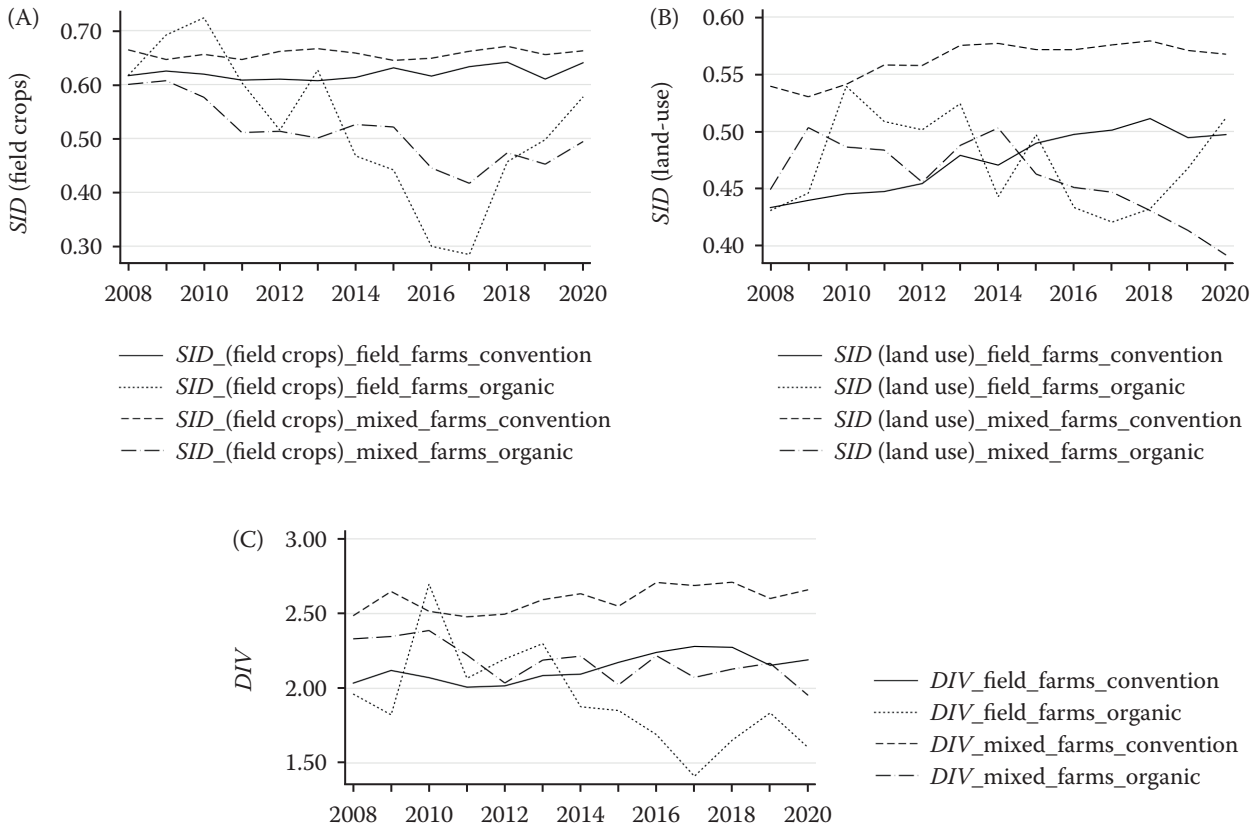

Figure S1. Diversity indices development in field crops/mixed farms with conventional/organic management practice – (A) *SID* (field crops), (B) *SID* (land-use), and (C) *DIV*

SID – Simpson Index of Diversity; *DIV* – Diversity Index
Source: The Farm accountancy data network (FADN)

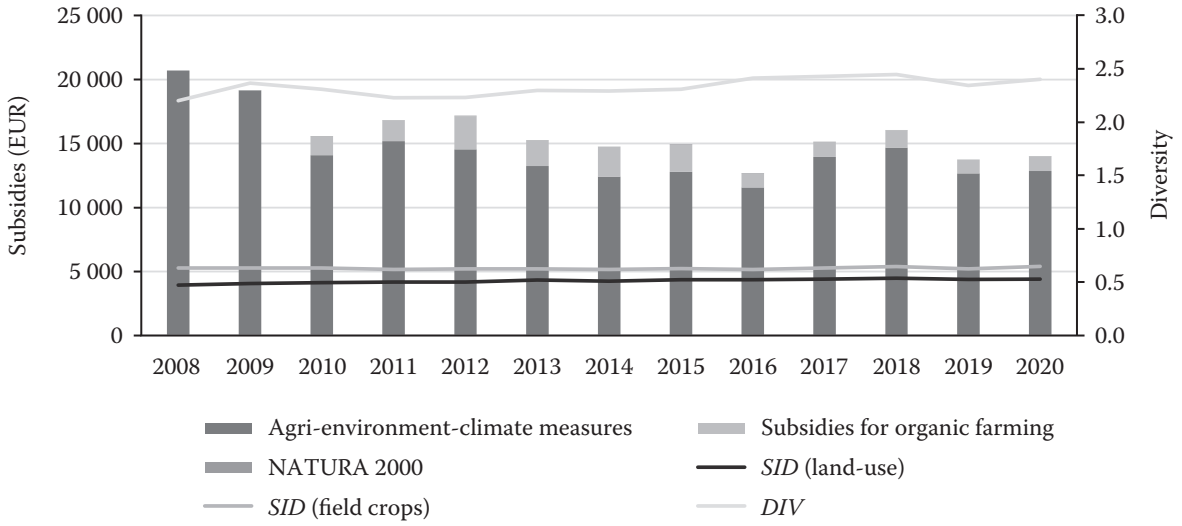

Figure S2. Development of diversity indices and the subsidies from Rural Development Programme (EUR)

SID – Simpson Index of Diversity; *DIV* – Diversity Index; NATURA 2000 – network of nature protection areas in the territory of EU
Source: The Farm accountancy data network (FADN) and Eurostat (2023)