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The supply of multiple ecosystem services requires biodiversity across spatial scales

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Supplementary Table 1. Relative ecosystem service (ES) priority for each stakeholder group (local residents, nature conservation associations, agriculture and tourism sectors) for the four major ecosystem services supplied by grasslands within the study regions: aesthetic value (indicated by acoustic diversity and total flower cover), fodder production (shoot biomass and forage quality), biodiversity conservation (bird species richness) and carbon sequestration (i.e. soil carbon stocks). ES priority was calculated as the proportion of the total priority points allocated to the service within a social survey, averaged across the individual responses within each stakeholder group.

Ecosystem service	Indicators	Weightings for each stakeholder group			
		Local residents	Nature conservation associations	Agriculture	Tourism
Aesthetic value	Acoustic diversity + Total flower cover	0.26	0.18	0.15	0.32
Fodder production	Shoot biomass + Forage quality	0.22	0.15	0.49	0.16
Biodiversity conservation	Bird species richness	0.35	0.45	0.26	0.34
Carbon sequestration	Soil carbon stocks	0.17	0.22	0.11	0.18

Supplementary Table 2. Current average proportion of the different land-cover types, and past average proportion of grasslands within a 1000-m landscape of each grassland plot in the three Biodiversity Exploratories region.

			Schwäbische Alb	Hainich-Dün	Schorfheide-Chorin
Current landscape-level land use	% croplands		14.98	34.29	24.70
	% grasslands		36.66	30.03	45.85
	% forests		41.41	30.68	21.24
	% roads		0.55	0.62	0.73
	% urban areas		6.39	4.35	4.60
	% water bodies		0.01	0.03	2.88
Past landscape-level land use	% grasslands	year 1820/50	30.34	8.60	27.36
		year 1910/30	26.56	5.97	25.50
		year 1960	30.82	7.64	22.45

Supplementary Table 3. The values of χ^2 and R^2 for the different structural equation models. Models were fitted to four multifunctionality measures: cultural, aboveground regulating and provisioning, and belowground regulating ecosystem service multifunctionality. Model fits were assessed using one-sided Chi-squared tests.χ^2 and P-values indicate whether the model covariance significantly differs from the observed one (non-significant P-values indicate good model fits). The R^2 indicates the amount of variance in the cultural, aboveground regulating and provisioning, and belowground regulating ecosystem service multifunctionality explained by the model. n = 150 biologically independent samples.

Multifunctionality measure	χ^2	P-value	R^2
Cultural ecosystem services	**22.44**	**0.17**	**0.17**
Aboveground regulating ecosystem services	**22.44**	**0.17**	**0.06**
Aboveground provisioning ecosystem services	**22.44**	**0.17**	**0.42**
Belowground regulating ecosystem services	**22.44**	**0.17**	**0.17**

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