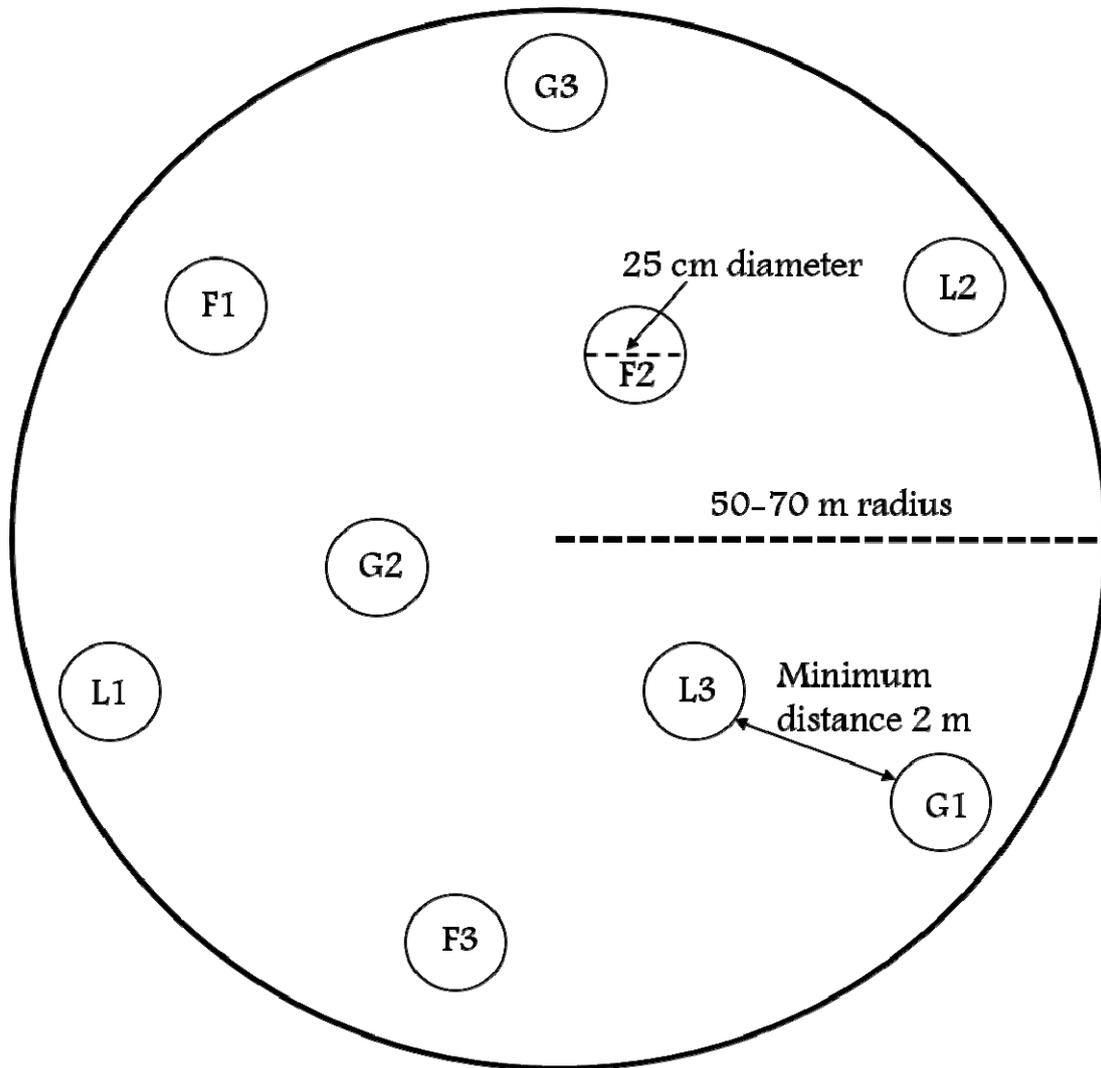# Supplementary material

Figure S1. Schematic diagram depicting the sampling design and distribution of samples in each study site. Circles refer to the points (cylinders placed 3 cm deep into the ground: height = 8cm; diameter = 25 cm) from which vegetation and soil samples were collected. F, G and L refer to sampling points dominated by forbs, grasses and legumes, respectively. The numbers following the letters F, G and L refer to the number of replicate, with 3 replicates per PFT (total of 3 PFTs per site: F, G, L) and thus nine sampling points per study site.
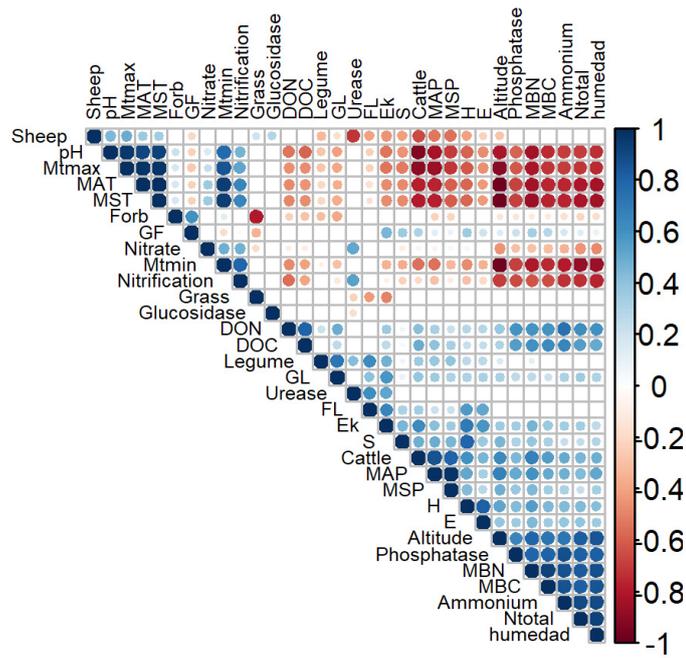
Figure S2. Correlation matrix of the variables used in the models. Positive correlations are displayed in blue and negative correlations in red color. Color intensity and the size of the circle are proportional to the correlation coefficients. In the right side of the correlogram, the legend color shows the correlation coefficients and the corresponding colors.

Table S1. Generalized diversity-interaction models for soil activity and fertility parameters (response variables). The explanatory variables include climatic variables: MTmax = mean annual maximum air temperature; MAP = mean annual precipitation; MTmin =mean annual minimum air temperature; MST = mean summer air temperature; management variables: Cattle and sheep grazers; and plant functional type diversity variables: G = Grass, L = Legume, F = Forb; FG = forb-grass, GL = grass-legume and FL = forb-legume pairwise interactions; Ek = evenness.

Soil parameter	Model	Adjusted r^2	*p*-value
	Model 1. Only environmental variables included		
Nitrate	-2.2 +1.4MTmax*** + 3.0Cattle**	0.38	<0.001
Ammonium	-1.18 - 1.0MTmax*** -0.2 MAP+ +1.5Sheep*** + 0.7Cattle	0.84	<0.001
DOC	-7.7 + 6.8MTmax** - 3.4 MTmin*** + 0.9MAP** + 1Sheep*** + 9.7Cattle***	0.79	<0.001
MBC	-0.6 – 1.9MTmax*** + 0.5MTmin* - 0.5MAP* + 1.4Sheep***	0.75	<0.001
Glucosidase	-4.6 + 6.0MTmax* - 3.2MTmin + 0.8MAP+ + 6.2Cattle+	0.17	<0.05
	0.6 + 0.7MTmax*** + 0.1MAP -0.8Cattle***		
MBN	*Model 3. Environmental variables + PFT identity effects + PFT pairwise interactions*	0.88	<0.001
DON	-0.6 + 0.5MTmin*** - 1.9MTmax*** - 0.4MAP** + 1.4Sheep*** -16.8 G -16.5 F – 10.6 L + 0.2FG*- 0.1 GL + 0.0FL – 74.1MTmin:G*-73.1 MTmin:F+ - 47.7MTmin:L	0.60	<0.001
Phosphatase	-0.6 + 0.8MTmin*** -1.3 MST** +1.4 Sheep*** -82.6 G -81.3 F+ -53.1 L +0.2FG + 0.4GL** + 0.2FL	0.63	<0.001
	-0.4 – 0.6MTmin*** + 0.9Sheep** -90.7 G -89.5 F+ -857.8 L +0.5 FG*** -0.1 GL + 0.0FL		
Total N	*Model 4. Environmental variables + PFT identity effects + evenness*	0.84	<0.001
Urease	-0.3 -0.4MTmin*** -0.4MST** + 0.78Sheep*** -11.6 G -11.5 F – 7.5 L + 0.2E_k*	0.79	<0.001
Nitrification Potential	-56.7 +29.6MTmin** + 208.9MTmax*** - 194.4MST+ - 30.3Sheep*** + 93.3Cattle*** - 41.4G – 40.9F** + 26.4L + 0.33E_k **	0.78	<0.001