

Supplementary Material

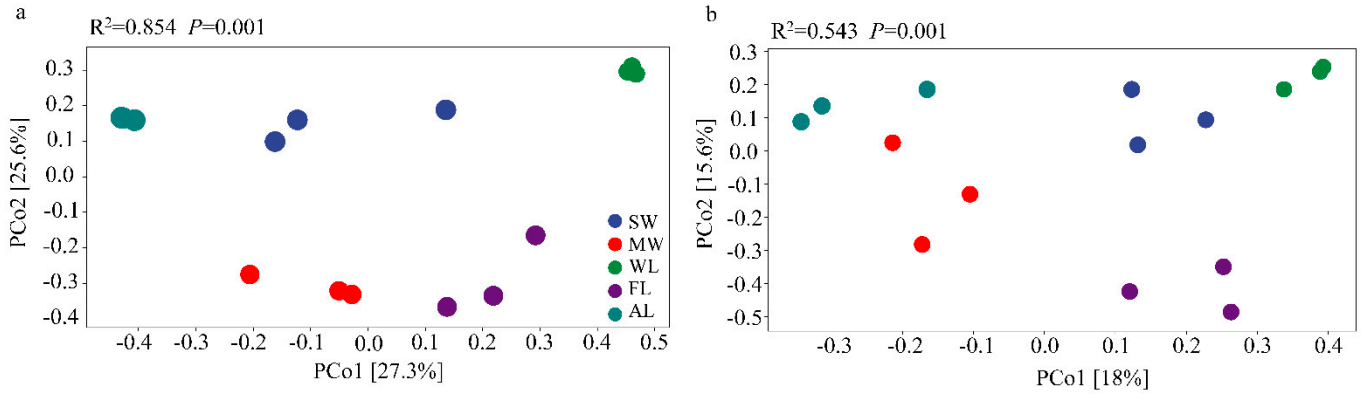


Figure S1. The nonmetric multidimensional scaling ordinations based on bray-cuits distance of (a) bacterial and (b) fungal communities in different land-use types. SW, Swamp wet-land; MW, Meadow wetland; WL, Woodland; FL, Farmland; AL, Alkaline land.

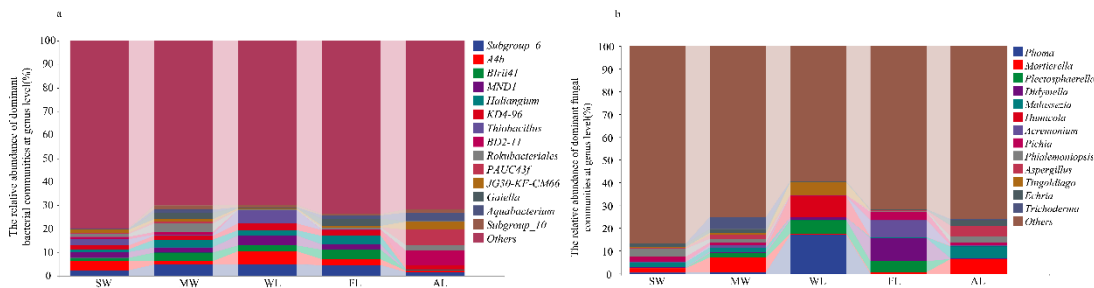


Figure S2 Soil (a) bacterial and (b) fungal community composition at the genus level. Different colors indicate different microorganisms at the levels. SW, Swamp wetland; MW, Meadow wetland; WL, Woodland; FL, Farmland; AL, Alkaline land.

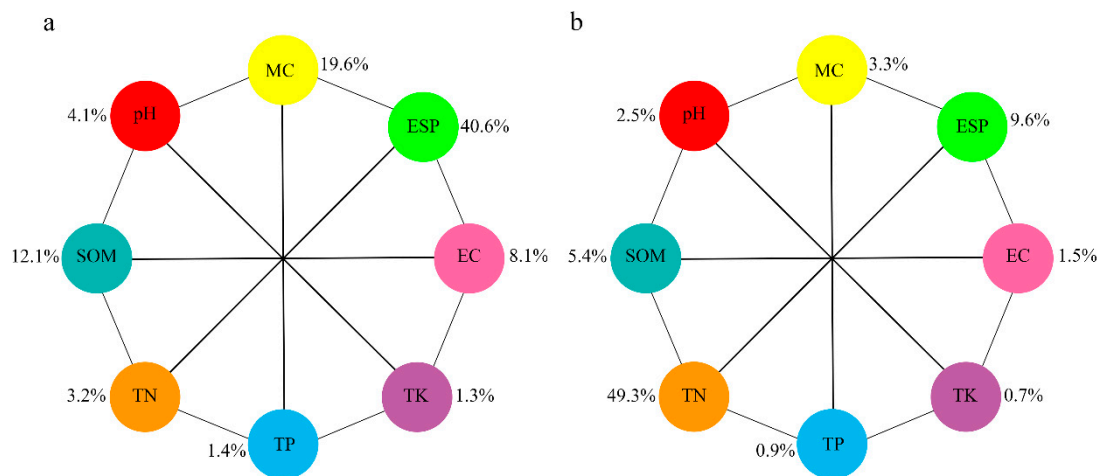


Figure S3. Variance partitioning analysis (VPA) showing the effects of soil factors on soil microbial community. (a) Bacterial community; (b) fungal community. SW, Swamp wetland; MW, Meadow wetland; WL, Woodland; FL, Farmland; AL, Alkaline land. MC, moisture content; SOM, soil organic matter; TN, total nitrogen; TP, Total Phosphorus; TK, Total Kalium; ESP, Exchange sodium percent.

Table S1 The relative abundance (>1%) of the total metabolic pathways at level 2

Pathways	WL	SW	FL	MW	AL	P value
Amino acid metabolism	5445.95±23.80	5495.85±66.96	5766.79±45.83	5758.71±114.63	5882.39±93.94	0.002

Carbohydrate metabolism	5380.44±16.72	5489.90±42.20	5754.42±23.14	5763.96±115.42	5833.55±160.44	0.000
Metabolism of cofactors and vitamins	5083.70±34.85	5300.28±77.52	5106.37±105.49	5382.52±65.81	5577.61±114.53	0.001
Metabolism of terpenoids and polyketides	4061.27±45.69	4154.72±79.63	4419.09±37.32	4583.73±139.19	4554.47±189.41	0.000
Metabolism of other amino acids	3458.86±16.92	3412.75±21.73	3443.30±27.14	3462.07±43.38	3456.26±43.35	0.359
Lipid metabolism	2899.16±48.17	2708.57±14.33	3171.08±78.92	2922.87±47.67	2881.37±25.97	0.004
Xenobiotics biodegradation and metabolism	2349.78±18.51	2056.77±15.02	2821.41±158.35	2320.87±71.68	2139.60±37.76	0.085
Energy metabolism	2229.45±13.11	2274.58±22.03	2220.73±25.82	2277.37±26.50	2298.05±35.85	0.007
Replication and repair	2135.39±14.61	2212.58±29.74	2192.88±36.74	2296.51±45.04	2373.71±73.47	0.001
Folding, sorting and degradation	1415.99±22.31	1446.85±27.83	1390.30±30.30	1494.09±35.10	1508.50±46.82	0.001
Glycan biosynthesis and metabolism	1275.94±9.77	1386.93±18.54	1201.16±23.66	1279.51±9.82	1281.21±23.13	0.001
Translation	1192.51±20.30	1274.75±34.02	1191.21±41.81	1314.85±36.64	1384.96±61.14	0.550
Biosynthesis of other secondary metabolites	1094.82±12.93	989.97±29.73	1258.18±12.13	1207.39±85.91	1028.40±53.26	0.000
Cell motility	1080.81±25.94	1083.60±22.69	886.89±47.46	953.16±34.42	1065.85±63.45	0.000
Nucleotide metabolism	669.39±3.89	701.87±9.31	676.92±14.09	713.02±9.98	749.13±21.25	0.000
Membrane transport	699.81±3.42	691.91±8.97	695.06±12.87	684.06±9.46	705.82±21.78	0.729
Cell growth and death	622.00±5.10	635.82±7.00	580.90±14.92	619.00±17.84	627.45±10.97	0.000
Transcription	357.38±4.86	364.66±6.32	377.76±8.62	395.91±11.66	395.90±12.72	0.000
Signal transduction	199.40±2.58	182.89±3.51	183.77±2.42	178.87±4.76	171.35±12.45	0.000
Transport and catabolism	144.79±2.88	138.66±5.19	165.38±3.85	151.06±2.19	143.05±0.26	0.018
Environmental adaptation	73.01±0.32	75.10±0.81	69.66±1.85	71.38±1.30	71.60±2.61	0.000
Cellular community - prokaryotes	69.09±0.94	72.16±0.37	60.21±2.05	68.31±2.70	68.83±3.39	0.000
Infectious diseases	46.37±0.94	40.25±1.40	50.43±4.91	41.36±2.98	31.43±4.48	0.000
Neurodegenerative diseases	35.11±1.07	31.06±1.26	31.93±9.30	34.48±17.66	25.71±2.53	0.381
Endocrine system	30.06±0.50	29.73±0.31	29.14±0.92	30.25±0.10	28.08±0.34	0.001
Immune system	14.81±0.35	5.82±10.07	12.95±0.71	9.04±7.84	10.61±1.56	0.000
Digestive system	11.30±0.24	10.62±0.94	11.07±0.65	9.58±0.18	7.74±0.26	0.000
Cancers	9.91±8.59	4.46±7.72	11.64±0.16	11.41±0.36	7.26±6.33	0.482
Cardiovascular diseases	1.73±0.12	1.10±0.21	1.86±0.28	1.66±0.19	0.33±0.06	0.000

SW, Swamp wetland; MW, Meadow wetland; WL, Woodland; FL, Farmland; AL, Alkaline land.

Table S2 Relative abundance (%) of fungal functional group (guild) from selected soil samples inferred by FunGuild

Guild	WL	SW	MW	FL	AL	P value
Animal Pathogen	13805.67±18755.80	3176.67±1513.79	25529.33±17316.17	11209.67±6040.44	14429.00±675.30	0.256
Plant Pathogen	10771.00±20410.33	1617.00±222.38	5630.00±3309.98	11670.00±4560.02	2865.67±878.66	0.211
Arbuscular Mycorrhizal	0.00±0.00	2.33±3.30	955.67±489.29	40.67±39.41	102.00±144.25	0.008
Ectomycorrhizal	614.33±844.49	1118.00±759.00	414.33±261.80	1676.33±443.49	2138.33±798.77	0.062
Endophyte	28916.33±9028.08	2318.00±1875.64	1492.00±283.83	10034.00±5114.33	9888.00±3838.62	0.000
Lichenized	1.67±5.24	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.452
Orchid Mycorrhizal	0.00±0.00	6.67±9.43	0.00±0.00	0.00±0.00	0.00±0.00	0.452
Dung Saprotroph	1759.33±770.40	1218.33±940.96	1525.33±453.70	6301.00±3833.48	1220.67±516.88	0.074

Fungal Parasite	2736.00±5605.50	2264.00±1196.30	1160.67±433.91	2933.33±600.86	2454.67±480.13	0.698
Leaf Saprotroph	1.00±3.15	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	0.452
Plant Saprotroph	49.33±46.39	30.33±29.80	456.00±258.54	253.33±166.18	589.00±458.54	0.173
Soil Saprotroph	49.00±82.67	38.00±43.57	56.33±75.46	224.00±160.67	275.00±309.25	0.468
Undefined Saprotroph	22274.67±26615.68	5019.67±2295.98	8314.33±1777.29	23910.67±3777.84	18758.67±5254.75	0.042
Wood Saprotroph	64.67±89.61	319.00±169.60	57.67±70.24	1092.00±209.02	204.67±172.96	0.000
Animal Parasite- Fungal Parasite	98.67±34.77	21.00±29.70	181.67±122.61	74.67±105.59	203.00±174.95	0.457
Animal Endosymbiont	596.00±1228.13	1430.33±1571.59	5136.00±6594.69	1567.33±772.39	1623.67±637.06	0.635
Ericoid Mycorrhizal	15.00±47.19	38.33±54.21	57.00±67.62	0.00±0.00	0.00±0.00	0.559
Clavicipitaceous Endophyte-Plant Pathogen	3.67±11.54	2.33±3.30	0.00±0.00	41.33±58.45	176.67±206.25	0.353
Algal Parasite-- Leaf Saprotroph- Wood Saprotroph Bryophyte Parasite- Lichen Parasite- Ectomycorrhizal- Ericoid Mycorrhizal- Undefined Saprotroph unknown	0.00±0.00	8.00±11.31	0.00±0.00	0.00±0.00	0.00±0.00	0.452
	32.67±57.91	54.00±76.37	0.00±0.00	0.00±0.00	0.00±0.00	0.474
	65249.67±53353.54	57116.00±26904.45	84305.00±46216.96	44108.67±3293.51	62175.33±10127.48	0.672