

Supporting Information

Tables S1 to S6

Table S1 Spearman correlations between soil erodibility and environmental variables under FL and AO

Table S2 Spearman correlations between soil erodibility and environmental variables under NG and PG

Table S3 Spearman correlations between soil erodibility and environmental variables under SB and CK

Table S4 Spearman correlations between soil erodibility and environmental variables under DP and BL

Table S5 Principal component analysis (PCA) of environmental attributes

Table S6 Soil erodibility calculated using data from plots at Ansai station (from Zhang et al., 2001)

List 1 Abbreviations used in this study

Table S1 Spearman correlations between soil erodibility and environmental variables under FL and AO

Environmental variable	Farmland					Apple orchards				
	I	II	III	IV	V	I	II	III	IV	V
Ele	-0.304	-0.021	0.069	-0.100	-0.350	0.546	0.579	-0.121	0.606	0.458
SP	0.409	0.303	0.406	0.403	0.351	-0.043	-0.177	-0.321	-0.181	-0.018
SA	0.382	0.370	0.164	0.467	0.479	0.046	0.067	-0.210	0.176	-0.070
SG	<u>-0.781</u>	<u>-0.669</u>	<u>-0.485</u>	<u>-0.641</u>	<u>-0.799</u>	0.166	0.052	0.054	0.214	0.114
SS	<u>0.591</u>	<u>0.540</u>	<u>0.610</u>	<u>0.591</u>	<u>0.532</u>	0.175	0.178	0.008	0.303	0.045
SBD	0.036	-0.170	-0.217	0.042	0.047	0.132	0.175	0.369	0.254	0.101
Por	-0.039	0.167	0.280	0.004	-0.037	-0.184	-0.235	-0.567	-0.296	-0.182
AAR	0.281	0.407	0.513	0.316	0.274	-0.335	-0.379	-0.110	-0.293	0.318
VC	0.194	-0.082	-0.110	-0.017	0.152	0.174	0.191	0.027	0.286	0.174
AB	0.277	0.063	0.002	0.151	0.233	0.087	0.059	0.429	0.202	0.075
VH						-0.236	-0.162	-0.515	-0.200	-0.215
LB						0.361	0.228	0.494	0.199	0.382
PD						0.632	0.606	0.011	0.640	0.587
Cro						-0.483	-0.541	-0.005	-0.498	-0.470
BD						-0.268	-0.324	0.188	-0.249	-0.270
BN						-0.352	-0.405	0.079	-0.396	-0.316

Annotation: I, II, III, IV and V represent K_{EPIC} , K_{NOMO} , K_{M-NOMO} , K_{Torri} and $K_{Shirazi}$, respectively. Ele denotes elevation, SP denotes slope position, SA denotes slope aspect, SG denotes slope gradient, SS denotes slope shape, SBD denotes soil bulk density, Por denotes porosity, AAR denotes average annual rainfall, VC denotes vegetation coverage, AB denotes aboveground biomass, VH denotes vegetation height, LB denotes litter biomass, PD denotes plant density, Cro denotes crown width, BD denotes basal diameter, and BN denotes branch number. Significant correlations ($P < 0.05$) are shown in bold, and very significant correlations ($P < 0.01$) are shown in bold and underlined.

Table S2 Spearman correlations between soil erodibility and environmental variables under NG and PG

Environmental variable	Native grasslands					Pasture grasslands				
	I	II	III	IV	V	I	II	III	IV	V
Ele	-0.393	<u>-0.515</u>	-0.360	<u>-0.580</u>	-0.338	-0.309	-0.373	-0.182	-0.473	-0.236
SP	0.111	0.083	-0.158	0.051	0.118	0.543	0.543	0.389	0.543	0.524
SA	0.154	0.094	0.008	0.039	0.075	0.036	0.143	0.107	0.536	0.036
SG	0.082	0.080	0.430	0.114	0.089	-0.127	-0.170	-0.127	-0.259	-0.028
SS	0.285	0.321	0.061	0.291	0.307	0.348	0.348	0.422	0.348	0.323
SBD	-0.016	0.073	-0.238	0.115	0.002	-0.100	-0.082	-0.182	0.036	-0.245
Por	-0.121	-0.192	0.130	-0.210	-0.110	0.118	0.064	0.018	-0.027	0.255
AAR	0.245	0.399	0.412	0.413	0.220	0.1401	0.446	0.346	0.460	0.401
VC	-0.228	-0.330	-0.139	-0.293	-0.184	-0.175	-0.234	0.000	-0.414	-0.161
AB	0.235	0.205	-0.028	0.180	0.155	-0.064	-0.118	0.091	-0.191	-0.064
VH	0.117	0.163	0.224	0.194	0.045	0.045	-0.018	0.345	-0.127	0.045
LB	0.245	0.255	0.266	0.306	0.253	-0.128	-0.118	-0.032	0.100	-0.241

Annotation: I, II, III, IV and V denote K_{EPIC} , K_{NOMO} , K_{M-NOMO} , K_{Torris} , and $K_{Shirazi}$, respectively. Ele denotes elevation, SP denotes slope position, SA denotes slope aspect, SG denotes slope gradient, SS denotes slope shape, SBD denotes soil bulk density, Por denotes porosity, AAR denotes average annual rainfall, VC denotes vegetation coverage, AB denotes aboveground biomass, VH denotes vegetation height, and LB denotes litter biomass. Significant correlations ($P < 0.05$) are shown in bold, and very significant correlations ($P < 0.01$) are shown in bold and underlined.

Table S3 Spearman correlations between soil erodibility and environmental variables under SB and CK

Environmental variable	Sea buckthorn					<i>Caragana korshinskii</i>				
	I	II	III	IV	V	I	II	III	IV	V
Ele	0.207	0.071	0.111	0.268	-0.129	0.253	0.344	0.498	0.350	0.164
SP	0.080	0.219	-0.265	-0.086	0.294	0.119	0.119	0.182	0.204	0.077
SA	0.176	0.154	0.407	0.462	0.121	0.000	0.094	0.206	0.147	-0.147
SG	-0.344	-0.482	-0.186	0.013	<u>-0.654</u>	0.233	0.190	0.362	0.325	0.105
SS	-0.051	0.027	-0.504	-0.430	0.273	-0.051	-0.118	-0.133	-0.079	-0.198
SBD	0.114	0.189	-0.061	0.250	0.204	0.191	0.249	0.259	0.319	-0.131
Por	0.121	-0.032	-0.239	-0.311	0.104	-0.024	-0.055	0.051	-0.065	0.174
AAR	0.238	0.366	0.549	0.315	0.370	-0.545	-0.502	-0.233	-0.410	-0.498
VC	-0.253	-0.079	0.074	-0.009	-0.149	0.072	-0.016	-0.325	-0.048	0.004
AB	0.450	0.507	0.225	0.339	0.529	-0.077	-0.197	-0.278	-0.226	-0.082
VH	0.336	0.461	0.232	-0.061	0.443	-0.211	-0.293	-0.392	-0.286	-0.148
LB	0.325	0.204	0.182	0.257	0.132	-0.185	-0.307	-0.366	-0.416	-0.079
PD	-0.279	-0.418	-0.154	-0.100	-0.543	0.092	-0.024	-0.239	-0.065	0.120
Cro	0.064	0.046	-0.143	-0.261	0.011	-0.358	-0.335	-0.267	-0.296	-0.350
BD	-0.104	-0.061	-0.257	-0.429	-0.032	-0.199	-0.275	-0.316	-0.235	-0.159

Annotation: I, II, III, IV and V denote K_{EPIC} , K_{NOMO} , K_{M-NOMO} , K_{Torri} and $K_{Shirazi}$, respectively. Ele denotes elevation, SP denotes slope position, SA denotes slope aspect, SG denotes slope gradient, SS denotes slope shape, SBD denotes soil bulk density, Por denotes porosity, AAR denotes average annual rainfall, VC denotes vegetation coverage, AB denotes aboveground biomass, VH denotes vegetation height, LB denotes litter biomass, PD denotes plant density, Cro denotes crown width, and BD denotes basal diameter. Significant correlations ($P < 0.05$) are shown in bold, and very significant correlations ($P < 0.01$) are shown in bold and underlined.

Table S4 Spearman correlations between soil erodibility and environmental variables under DP and BL

Environmental variable	David's peach					Black locust				
	I	II	III	IV	V	I	II	III	IV	V
Ele	0.049	0.098	0.168	-0.084	-0.056	<u>-0.523</u>	<u>-0.553</u>	-0.149	<u>-0.515</u>	<u>-0.511</u>
SP	-0.323	-0.393	-0.362	-0.118	-0.165	<u>0.493</u>	<u>0.378</u>	<u>0.335</u>	<u>0.394</u>	<u>0.502</u>
SA	0.336	0.191	0.100	0.318	0.382	-0.059	-0.087	-0.099	-0.080	-0.056
SG	-0.473	-0.539	<u>-0.602</u>	-0.564	-0.333	0.286	0.250	-0.006	0.206	<u>0.368</u>
SS	-0.138	-0.222	-0.142	-0.011	-0.120	-0.016	0.012	-0.136	-0.002	0.042
SBD	-0.168	-0.168	0.042	-0.147	-0.091	0.010	0.052	<u>0.321</u>	0.057	-0.009
Por	0.134	0.308	-0.070	0.147	0.441	0.208	0.133	-0.249	0.091	0.310
AAR	-0.092	0.007	0.183	0.169	-0.106	0.151	0.217	-0.038	0.208	0.106
VC	<u>-0.837</u>	<u>-0.787</u>	<u>-0.723</u>	<u>-0.837</u>	<u>-0.794</u>	0.274	0.221	-0.060	0.213	<u>0.370</u>
AB	<u>0.769</u>	<u>0.650</u>	0.490	<u>0.692</u>	<u>0.804</u>	-0.017	-0.085	0.112	-0.065	-0.049
VH	<u>-0.594</u>	-0.531	-0.448	-0.392	-0.552	0.104	0.023	-0.007	0.067	0.142
LB	-0.056	-0.217	-0.196	-0.126	0.035	<u>0.433</u>	<u>0.426</u>	0.228	<u>0.454</u>	<u>0.429</u>
PD	0.329	0.294	0.154	0.000	0.315	0.092	0.111	-0.095	0.090	0.156
Cro	<u>-0.671</u>	<u>-0.580</u>	-0.448	-0.469	<u>-0.622</u>	0.276	0.227	0.134	0.250	0.274
BD	<u>-0.713</u>	<u>-0.615</u>	-0.490	<u>-0.580</u>	<u>-0.664</u>	0.217	0.129	-0.053	0.140	0.199
BN	-0.559	-0.406	-0.287	-0.315	-0.545	0.315	0.269	0.301	0.307	0.275

Annotation: I, II, III, IV and V denote K_{EPIC} , K_{NOMO} , K_{M-NOMO} , K_{Torri} and $K_{Shirazi}$, respectively. Ele denotes elevation, SP denotes slope position, SA denotes slope aspect, SG denotes slope gradient, SS denotes slope shape, SBD denotes soil bulk density, Por denotes porosity, AAR denotes average annual rainfall, VC denotes vegetation coverage, AB denotes aboveground biomass, VH denotes vegetation height, LB denotes litter biomass, PD denotes plant density, Cro denotes crown width, BD denotes basal diameter, and BN denotes branch number. Significant correlations ($P < 0.05$) are shown in bold, and very significant correlations ($P < 0.01$) are shown in bold and underlined.

Table S5 Principal component analysis (PCA) of environmental attributes

Principal component	FL		AO	NG	PG	SB	CK	BL		DP		
	PC1	PC2	PC1	PC1	PC1	PC1	PC1	PC1	PC2	PC3	PC1	PC2
Eigenvalue	1.93	1.03	1.00	1.47	—	2.48	1.07	2.51	1.41	1.00	3.49	1.38
Variance (%)	48.15	25.78	100.00	48.88	—	62.05	53.61	35.87	20.07	14.31	58.14	22.93
Cumulative (%)	48.15	73.93	100.00	48.88	—	62.05	53.61	35.87	55.94	70.25	58.14	81.07
Factor loading												
AAR	0.55	0.59		0.58		-0.61	0.73					
SG	-0.40	0.78		0.72		0.82		0.49	0.72	-0.33	0.73	0.11
SS	0.84	-0.21										
SP	0.87	0.19						0.68	-0.32	0.24		
AB						-0.83					-0.49	-0.69
PD			1.00			0.86						
Cro											0.95	-0.19
Ele				-0.79			0.73	-0.75	-0.00	0.19		
VH											0.94	-0.27
BD											-0.33	0.83
LB								0.74	-0.14	-0.08		
BN								0.57	0.43	-0.06		
VC								0.39	0.18	0.86	0.91	0.32
SBD								0.47	-0.74	-0.24		

Annotation: NG denotes native grasslands, AO denotes apple orchards, FL denotes farmland, PG denotes pasture grasslands, SB denotes sea buckthorn, CK denotes *Caragana korshinskii*, DP denotes David's peach, BL denotes black locust, PC denotes principal component, AAR denotes average annual rainfall, SG denotes slope gradient, SS denotes slope shape, SP denotes slope position, AB denotes aboveground biomass, PD denotes plant density, Cro denotes crown width, Ele denotes elevation, VH denotes vegetation height, BD denotes basal diameter, LB denotes litter biomass, BN denotes branch number, and VC denotes vegetation coverage. The highly weighted factor loadings are shown in bold.

Table S6 Soil erodibility calculated using data from plots at Ansai station (From Zhang et al., 2001)

Slope degree	Slope length	Soil erodibility	Average
5	20	0.0437	
10	20	0.0421	
15	20	0.0446	
20	20	0.0428	0.0432
25	20	0.0452	
28	20	0.0409	

Note: The plots had no vegetation cover.

List 1 Abbreviations used in this study

AAR - average annual rainfall

AB - aboveground biomass

AO - apple orchards

BD - basal diameter

BL - black locust

BN - branch number

c - organic carbon content

CK - *Caragana korshinskii*

CLA - percentage clay content

Cro - crown width

Dg – Naouerian logarithm of geometric mean of the particle size distribution

DP - David's peach

Ele - specific elevation

FL - farmland

K - soil erodibility

LB - litter biomass

MDS - minimum data set

NG - native grassland

OM - organic matter content

PCA - principal component analysis

PCs - principal components

PD - plant density

PG - pasture grassland

Por - porosity

SA - slope aspect

SAN - percentage sand content

SB - sea buckthorn

SBD - soil bulk density

SG - slope gradient

SIL - percentage silt content

SP - slope position

SS - slope shape

USLE/RUSLE - universal soil loss equation/revised universal soil loss equation

VC - vegetation coverage

VH - vegetation height