Supplementary material

Table S1 - Soil type and properties at different sites in Austria and Sweden.

Site	Experiment	Soil texture	Clay	SOC	C:N	pH
			(%)			
Austria						
AT1	CB	Loam	33	2.17	10.6	7.6
AT2	CB	Loam	33	2.17	10.6	7.6
AT3	CB	Loamy silt	17	1.45	9.0	7.1
AT4	CB	Loamy silt	16	0.88	8.4	5.5
AT5	CB	Sand loam	23	2.1	10.3	7.6
AT6	CB	Sand loam	23	2.1	10.4	7.5
AT7	SF	Loam	34	2.82	11.5	7.6
AT8	SF	Loam	34	2.81	11.4	7.6
AT9	SF	Loam	29	3.26	10.4	7.7
AT10	SF	Loam	18	2.8	11.3	7.7
AT11	SF	Silty clay	30	2.8	10	6.8
AT12	SF	Loamy	29	3.26	10.4	7.7
AT13	SF	Loamy	27	0.98	8.2	6.3
AT14	SF	Loamy silt	18	1.54	9.5	7.5
AT15	TS	Sand loam	22	1.9	10.6	7.5
AT16	TS	Sand loam	22	1.94	10.3	7.5
Sweden						
SE1	CMP	Sandy clay loam	15	1.28	12.8	7.7
SE2	CMP	Loam	15	2.40	13.5	7.0
SE3	CMP	Silty sand	10	2.05	13.9	6.3
SE4	CMP	Silty clay	5.6	2.19	10.4	6.4
SE5	CMP	Silty loam	10	2.54	13.2	6.1
SE6	CMP	Silty clay	50	2.21	10.9	6.9
SE7	ROT	Silty clay loam	36	2.07	11.6	6.1
SE8	ROT	Sandy clay loam	25	1.99	10.5	6.0
SE9	ROT	Silt loam	<5	1.99	14.2	5.4
SE10	ROT	Silty clay loam	36	2.55	10.9	5.6
SE11	TS	Heavy clay	47	1.16	10.7	6.9
SE12	TS	Silty loam	18	2.78	10.7	6.1
SE13	TS	Silty clay loam	38	1.16	10.7	6.1

Table S2 - Statistical analysis comparing effects of A) treatment within sites in Austria; and B) sites for specific treatments on *k* and *S*.

Site	A) Treatment	*k*	*S*	B) Site	*k*	*S*
			Carbon balance			
AT1	GM	.0087^{ns}	.132^{ns}			
	FW	.0079	.110			
	BS	.0078	.147			
	FYM	.0069	.151			
AT2	GM	.0055^{ns}	.423 ab			
	FW	.0061	.439 a			
	BS	.0045	.344 b			
	FYM	.0048	.380 ab			
AT3	0 N	.0177^{ns}	.213^{ns}			
	40 N	.0147	.182			
	90 N	.0125	.186			
	120 N	.0147	.165			
	CFW	.0143	.176			
	CGM	.0165	.185			
	CS	.0121	.173			
	CSS	.0150	.188			
	CFW+80	.0167	.207			
	CGM+80	.0139	.176			
	CS+80	.0177	.177			
	CSS+80	.0128	.171			
AT4 & AT6	CRR	.0061 b	.185^{ns}	AT4	.0058 b	.213 a
	CRI	.0087 a	.172	AT6	.0089 a	.144 b
AT5	CRR	.0083^{ns}	.312^{ns}			
	CRI	.0083	.319			
AT5 & AT6	CRR	.0080 b	.231^{ns}	AT5	.0083^{ns}	.315 a
	CRI	.0093 a	.228	AT6	.0089	.144 b
			Soil fertility			
AT7 & AT9	60 N	.0140^{ns}	.379^{ns}	AT7	.0128^{ns}	.338 b
	90 N	.0120	.392	AT9	.0118	.417 a
	120 N	.0115^{ns}	.363^{ns}			
	145 N	.0127	.392			
AT8	60 N	.0164	.305			
	90 N	.0153	.335			
	120 N	.0130	.335			
	145 N	.0135	.326			
AT10 & AT11	0 P	.0087^{ns}	.124^{ns}	AT10	.0082 b	.113 b
	150 P	.0093	.140	AT11	.0105 a	.156 a
	300 P	.0095	.129			
AT12 AT13 AT14	0 N	.0066 b	.174^{ns}	AT12	.0093 a	.148 b
	60 N	.0090 ab	.150	AT13	.0072 b	.195 a
	120 N	.0084 ab	.162	AT14	.0086 ab	.141 b
	180 N	.0095 a	.160			
			Tillage systems			
AT15	CT	.0092 b	.198 a			
	SRT	.0147 a	.154 b			
	DRT	.0105 b	.197 a			
AT16	CT	.0087^{ns}	.439^{ns}			
	SRT	.0100	.465			
	DRT	.0118	.421			
AT15 & AT16				AT15	.0115^{ns}	.183 b
				AT16	.0102	.442 a

Mean values followed by the same letter within treatments and within sites did not differ according to Tukey's test (p<0.05). ns: not significant.

Table S3 - Statistical analysis comparing A) different treatments within sites in Sweden; B) different sites presenting the same treatments in Sweden; and C) different treatments and sites for Tillage System (TS) experiment category in Austria and Sweden.

A) Treatment	*k*	*S*	B) Site	*k*	*S*
	Combined management practices				
FYM/NPK	.0195 a	.253 a	SE1	.0150 ab	.125 d
0FYM/0NPK	.0130 b	.206 b	SE2	.0167 ab	.129 d
			SE3	.0147 ab	.361 a
			SE4	.0084 b	.118 c
			SE5	.0301 a	.270 b
			SE6	.0210 a	.335 ab
	Rotation systems				
SC	.0166 a	.263^{ns}	SE7	.0144 b	.323 a
L	.0137 b	.267	SE8	.0133 b	.337 a
			SE9	.0202 a	.199 b
			SE10	.0130 b	.200 b
	Tillage systems				
CT	.0122 b	.251 b	SE11	.0145^{ns}	.267 ab
SRT	.0130 ab	.275 ab	SE12	.0131	.294 a
DRT	.0153 a	.299 a	SE13	.0130	.247 b
DS	.0126 ab	.279 ab			

C) Tillage systems experiment in Austria and Sweden

Treatment	*k*	*S*	Site	*k*	*S*
	Tillage systems				
CT	.0113 b	.298 b	SE11	.0175 a	.279 b
SRT	.0115 ab	.370 a	SE12	.0130 a	.294 b
DRT	.0143 a	.336 ab	SE13	.0130 a	.247 b
			AT16	.0102 b	.442 a

Mean values followed by the same letter within treatments and within sites did not differ according to Tukey's test (p<0.05). ns: not significant.

Table S4 – Correlation coefficients between the mean TBI parameters (*k* and S) calculated after 60* and 90 days and pedo-climatic parameters, in Austria and Sweden.

Parameter	Austria		Sweden		Austria and Sweden			
	k	*S*	*k*	*S*	*k*	*S*	k_{60}*	S_{60}*
MAT	0.410	-0.038	-0.586*	0.016	-0.751***	-0.290	-0.796***	0.374
MAT_{TBI}	-0.417	-0.339	-0.073	-0.784**	-0.634***	-0.497*	-0.447	0.223
TAP	-0.580*	-0.020	0.392	-0.233	-0.533**	-0.328	0.083	-0.140
TP_{TBI}	-0.479	-0.026	0.310	-0.216	-0.394	-0.251	0.549*	-0.450
PET	-0.289	0.155	-0.263	0.305	-0.656***	-0.174	-0.630*	0.650
PET_{TBI}	-0.233	0.133	-0.152	0.208	-0.480*	-0.094	-0.254	-0.138
AI	0.428	0.108	-0.465	0.374	-0.232	0.229	-0.564*	0.428
AI_{TBI}	0.334	-0.044	-0.323	0.307	0.023	0.198	-0.432	0.330
T x P	-0.617*	-0.059	-0.122	0.003	-0.686***	-0.307	-0.583*	0.257
Re_{clim}	-0.707**	-0.756**	-0.067	-0.373	-0.603**	-0.538**	-0.247	0.153
Re_{temp}	-0.597*	-0.829***	-0.167	-0.746**	-0.617**	-0.628**	-0.237	0.159
Re_{wat}	-0.519	-0.013	0.167	-0.034	0.077	0.087	-0.007	0.148
pH	0.480	0.059	-0.077	-0.216	-0.288	-0.237	-0.517*	0.144
Clay	0.151	0.098	-0.165	0.237	-0.153	0.150	-0.534*	0.272
SOC	0.409	0.049	0.222	0.103	0.243	0.015	0.070	0.196
C:N ratio	0.044	0.300	0.541*	-0.287	0.642***	0.063	0.697**	-0.508*

*k_{60} and S_{60} are the values for TBI collected after approximately 60 days, at the 13 sites in Sweden, and 5 sites in Austria.

MAT: mean annual temperature; MAT_{TBI}: mean temperature during TBI period; TAP: total annual precipitation; TP_{TBI}: total precipitation during TBI period; PET: potential evapotranspiration; PET_{TBI}: potential evapotranspiration during TBI period; AI: aridity index; AI_{TBI}: aridity index during TBI period; TxP: temperature times precipitation factor; Re_{clim}: climatic factor model; Re_{temp}: temperature factor model; Re_{wat}: soil moisture factor model.

Figure S1– Model adjusted to the green and rooibos tea mass loss fraction at 13 sites in Sweden and one site in Austria. Errors bars represent SD of the data.