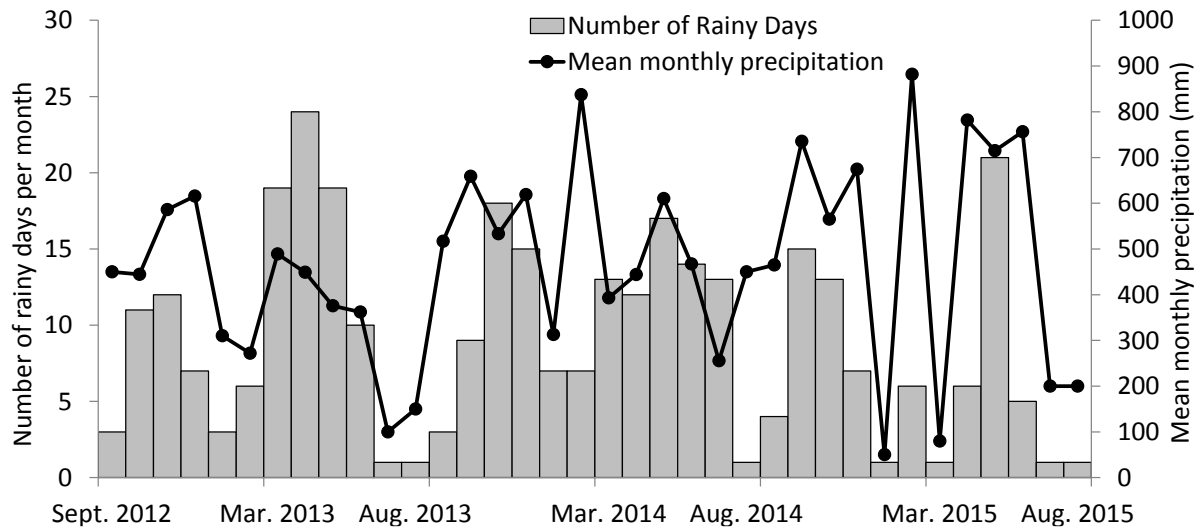


S 1: Weather conditions at Kapsengere, western Kenya during three consecutive years of maize cultivation on an Ultisol after amendment with Tithonia green manure, urea and biochar



S 2: Physical-chemical properties of the soil (0-0.2 m) and the amendments used in the field trial in western Kenya (n=6 replicates for soil; triplicate measurements for amendments; means with standard errors in brackets).

Property	Biochar	Soil	Green manure (<i>T. diversifolia</i>)	
			Property	
pH	6.3 (0.1)	6.0 (0.1)	N (mg kg ⁻¹)	21.5 (0.5)
C (g kg ⁻¹)	868 (11)	23.3 (0.1)	P (mg kg ⁻¹)	2.3 (0.1)
N (g kg ⁻¹)	27.0 (0.9)	21.0 (0.9)	K (mg kg ⁻¹)	43.2 (1.2)
P (mg kg ⁻¹)	135 (3.7)	9.30 (0.2)	Ca (mg kg ⁻¹)	13.6 (0.2)
K (mg kg ⁻¹)	1490 (14)	223 (10)	Na (mg kg ⁻¹)	72.7 (0.9)
Ca (mg kg ⁻¹)	1920 (17)	1950 (10)	Fe (mg kg ⁻¹)	951 (10)
Na (mg kg ⁻¹)	180 (7.3)	15.9 (0.6)	Zn (mg kg ⁻¹)	89.7 (1.6)
Mg (mg kg ⁻¹)	150 (4.5)	312 (9.4)	Mg (mg kg ⁻¹)	2.6 (0.0)
Al (mg kg ⁻¹)	559 (9.8)	939 (16)	S (mg kg ⁻¹)	2.5 (0.0)
S (mg kg ⁻¹)	36.5 (1.4)	14.0 (0.8)	Mn (mg kg ⁻¹)	264 (5)
Fe (mg kg ⁻¹)	164 (5.7)	67.2 (1.6)	Cu (mg kg ⁻¹)	11.0 (0.2)
Zn (mg kg ⁻¹)	108 (2.4)	13.5 (0.4)	B (mg kg ⁻¹)	53.2 (1.6)
Mn (mg kg ⁻¹)	188 (4.9)	782 (14)	Mo (mg kg ⁻¹)	1.3 (0.0)
Cu (mg kg ⁻¹)	0.77 (0.1)	1.97 (0.1)		
B (mg kg ⁻¹)	1.07 (0.0)	0.33 (0.0)		
C.E.C (meq 100 g ⁻¹)	18.2 (0.6)	16.2 (0.5)		
EC (S mm ⁻¹)	196 (6.5)	88.0 (1.2)		
Silt (%)	nd	17.6 (0.3)		
Sand (%)	nd	10.8 (0.4)		
Clay (%)	nd	71.6 (2.0)		

nd = not determined

S 3: Effect of tithonia green manure, urea and biochar on NH₃, N₂O, WFPS, NH₄⁺-N, and NO₃⁻-N

Treatment ID	NH ₃ -N			N ₂ O			WFPS			NH ₄ ⁺ -N			NO ₃ ⁻ -N		
	($\mu\text{g m}^{-2}\text{hr}^{-1}$)	SE		($\mu\text{g m}^{-2}\text{hr}^{-1}$)	SE		(% v/v)	SE		(mg kg ⁻¹)	SE		(mg kg ⁻¹)	SE	
1 (B ₀ T ₀ U ₀)	1.10	0.10	bc	1.03	0.14	ab	36.89	1.59	a	1.58	0.11	a	2.18	0.26	c
2 (B ₀ T _{2.5} U ₀)	1.33	0.08	a	1.14	0.10	a	37.26	1.55	a	1.55	0.12	ab	2.65	0.24	a
3 (B ₀ T ₅ U ₀)	1.38	0.10	ab	0.97	0.15	b	32.72	1.76	bc	1.59	0.16	a	2.44	0.32	b
4 (B ₀ T ₀ U ₁₂₀)	1.50	0.06	a	0.77	0.09	cd	34.65	1.50	b	1.32	0.07	c	2.09	0.20	c
5 (B ₀ T _{2.5} U ₁₂₀)	1.46	0.08	a	0.88	0.15	bc	31.73	1.56	b	1.47	0.16	b	2.51	0.27	a
6 (B ₀ T ₅ U ₁₂₀)	1.51	0.05	a	0.83	0.12	cd	33.30	1.42	b	1.44	0.10	b	2.69	0.31	a
7 (B _{2.5} T ₀ U ₀)	0.58	0.08	cd	0.58	0.07	e	29.57	1.06	c	1.26	0.09	c	1.81	0.19	d
8 (B _{2.5} T _{2.5} U ₀)	0.45	0.07	d	0.69	0.11	d	31.22	1.33	bc	1.47	0.11	b	1.92	0.22	cd
9 (B _{2.5} T ₅ U ₀)	0.98	0.11	bc	0.78	0.12	c	33.29	1.49	b	1.38	0.15	c	2.08	0.23	c
10 (B _{2.5} T ₀ U ₁₂₀)	1.28	0.11	b	0.77	0.11	c	33.48	1.55	b	1.49	0.10	b	2.30	0.22	c
11 (B _{2.5} T _{2.5} U ₁₂₀)	1.24	0.11	b	0.91	0.14	bc	33.78	1.59	b	1.40	0.14	bc	2.28	0.28	bc
12 (B _{2.5} T ₅ U ₁₂₀)	0.88	0.09	b	0.83	0.09	c	32.66	1.36	b	1.54	0.10	ab	2.66	0.24	a