



Supplement of

Organic wastes from bioenergy and ecological sanitation as a soil fertility improver: a field experiment in a tropical Andosol

A. Krause et al.

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Table S1. Provision of plot data for Fig. 2: untreated Andosol and soil treated with biogas slurry, compost, and CaSa-compost; measured using ceramic pressure plates.

	pF	θ	Error (θ)
Andosol ceramic plate	0	0,593	0,013
	1,8	0,357	0,014
	2,5	0,292	0,014
	3	0,262	0,007
	4,2	0,228	0,022
Biogas slurry	0	0,621	0,022
	1,8	0,355	0,028
	2,5	0,294	0,028
	3	0,268	0,025
	4,2	0,221	0,021
Compost	0	0,634	0,045
	1,8	0,344	0,028
	2,5	0,286	0,025
	3	0,250	0,041
	4,2	0,227	0,022
CaSa-compost	0	0,594	0,029
	1,8	0,353	0,021
	2,5	0,290	0,015
	3	0,265	0,015
	4,2	0,223	0,020

Table S2: Fitted parameters of the PDI model of the untreated Andosol version of the unconstrained Mualem-van Genuchten (MvG) model, curve shown in Fig. 2.

fitted Parameter	Unit	Value	Min	Max	2.5%	97.5%
alpha	1 cm^{-1}	0.0441	0.00001	0.5	0.0361	0.0538
n	-	3	1.01	15	2,622	4,622
th_r	$\text{cm}^3 \text{ cm}^{-3}$	0.358	0	0.4	0.352	0.364
th_s	$\text{cm}^3 \text{ cm}^{-3}$	0.556	0.1	1	0.55	0.562

with pF(dry) set to 6.8 and a set to -1.5

Table S3. Provision of plot data for Fig. 3: Total above-ground biomass production and marketable crop yields given as g per plot.

Total above-ground biomass production [g plot ⁻¹]								
	Onion	Carrot	Cabbage	Beans	Maize			
Control Andosol	880	a	1312	a	no	192	a	7177 a
Biogas slurry	1211	ab	2439	a	7417	b	360	ab 10028 a
Compost	1679	b	2991	a	8571	b	518	b 11086 ab
CaSa-Compost	1516	ab	2169	a	9390	b	1244	c 15173 b

Yields of food crops [g plot ⁻¹]								
	Onion bulb (air-dried)	Carrot (fresh)	Head of Cabbage (fresh)	Beans	Maize grains (air-dried)			
Control Andosol	444	a	918	a	n.a.	497	a	
Biogas slurry	691	ab	1707	a	4320	b	n.a.	1181 ab
Compost	1056	b	2093	a	4950	b	n.a.	1431 bc
CaSa-Compost	1088	b	1518	a	6101	b	n.a.	1973 c

Different letters reflect means differing significantly from one another (HSD, Tukey test, $\alpha=0.05$; n=4 for the untreated control plots and n=5 for the amended plots). n.a. not available

Table S4. Provision of plot data for Fig. 4: Total nutrient concentration in DM, total nutrient uptake, and air-dry grain yield. The response levels (relative nutrient concentration, relative nutrient uptake, and relative biomass) are given relative to the control treatment's performance, which was set 100 %.

	Total nutrient concentration in dry maize grains						Relative nutrient concentration in dry maize grains					
	N g kg ⁻¹	P g kg ⁻¹	K g kg ⁻¹	Ca g kg ⁻¹	Mg g kg ⁻¹	Zn mg kg ⁻¹	N %	P %	K %	Ca %	Mg %	
Control Andosol	15,9	2,3	4,4	0,1	1,0	22,1	100,0	100,0	100,0	100,0	100,0	
Biogas slurry	16,5	2,6	4,0	0,1	1,0	18,0	103,6	113,5	91,5	74,8	97,9	
Compost	15,6	2,5	3,6	0,1	1,0	19,0	98,2	108,4	82,9	82,3	99,2	
CaSa-Compost	16,8	3,0	3,9	0,1	1,1	18,2	105,8	128,8	88,2	75,8	109,4	
	Total nutrient uptake in dry maize grains						Relative nutrient uptake in dry maize grains					
	N g plant ⁻¹	P g plant ⁻¹	K g plant ⁻¹	Ca g plant ⁻¹	Mg g plant ⁻¹	Zn mg plant ⁻¹	N %	P %	K %	Ca %	Zn %	
Control Andosol	0,33	0,05	0,09	0,00	0,02	0,46	100,0	100,0	100,0	100,0	100,0	
Biogas slurry	0,79	0,13	0,19	0,00	0,05	0,87	240,8	263,6	212,6	173,9	227,5	
Compost	1,13	0,18	0,27	0,01	0,07	1,38	343,8	379,4	290,3	288,0	347,2	
CaSa-Compost	1,51	0,27	0,35	0,01	0,10	1,63	456,1	555,2	380,2	326,5	471,4	
	Total biomass air-dry grain yield g plant ⁻¹			Relative biomass air-dry grain yield %								
Control Andosol	33,0			100								
Biogas slurry	68,0			206								
Compost	89,6			271								
CaSa-Compost	119,1			361								

Different letters reflect means differing significantly from one another (HSD, Tukey test, $\alpha=0,05$; n=3).



Fig. S1. The soil profile. The blade of the machete was ~0.3 m
The photograph was taken by A. Krause on February 2nd, 2014.



Fig. S2. The experimental site - 10 days after initiating the experiment with sowing of maize.
The photograph was taken by A. Krause on March 14th, 2014.



Fig. S3. The experimental site - 22 days after initiating the experiment with sowing of maize.
The photograph was taken by A. Krause on March 26th, 2014.



Fig. S4. The experimental site - 30 days after initiating the experiment with sowing of maize.
The photograph was taken by A. Krause on May 2nd, 2014.

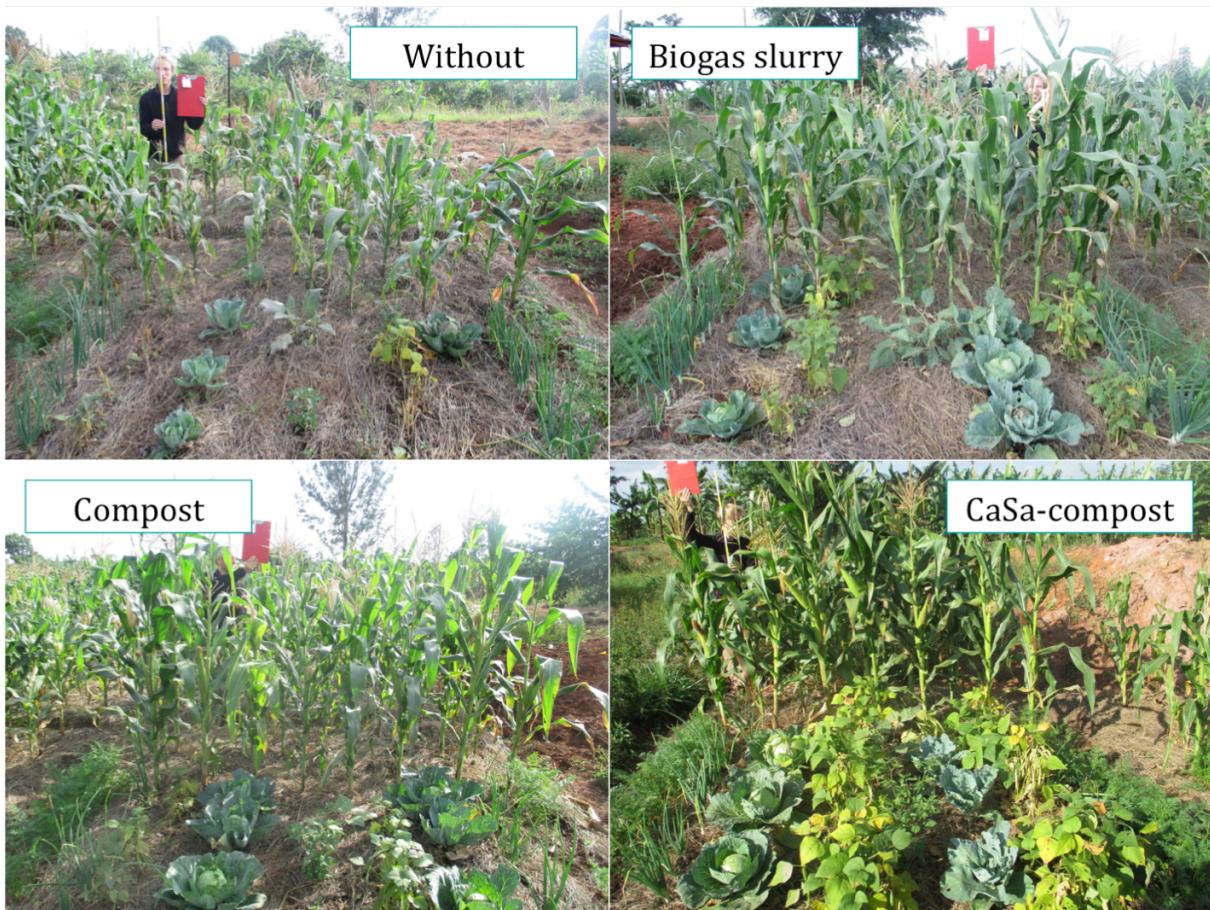


Fig. S5. Progress of the experiment - 60 days after initiating the experiment with sowing of maize: an untreated plot (without) compared to plots amended with biogas slurry, compost and CaSa-compost.
These photographs were taken by A. Krause on June 2nd, 2014.

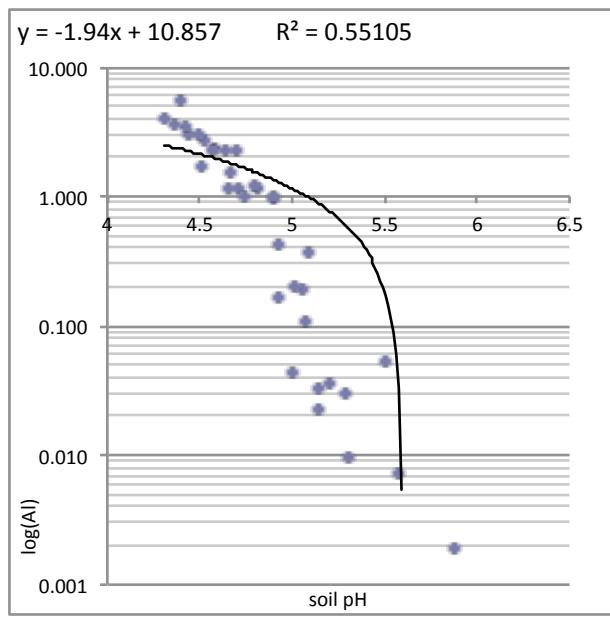


Fig. S6. Regression analysis: concentration of exchangeable Al against the pH for discussion in Sect. 3.5.

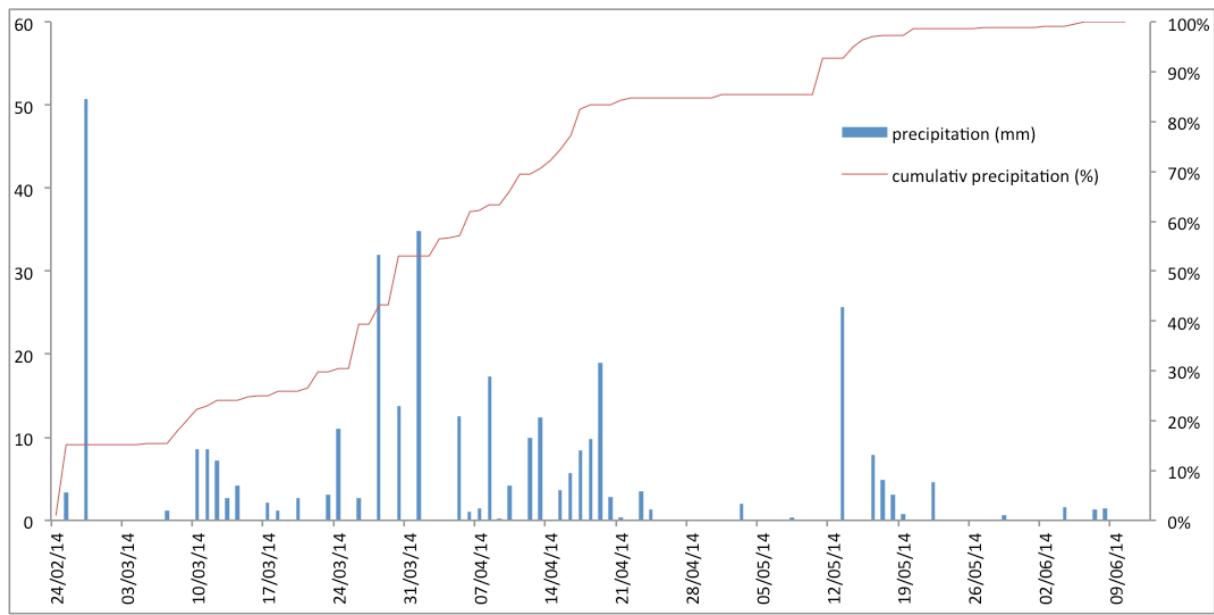


Fig. S7. Daily precipitation in mm (right-hand ordinate) and cumulative precipitation in % (left-hand ordinate) during the course of the experiment from February to June 2014.

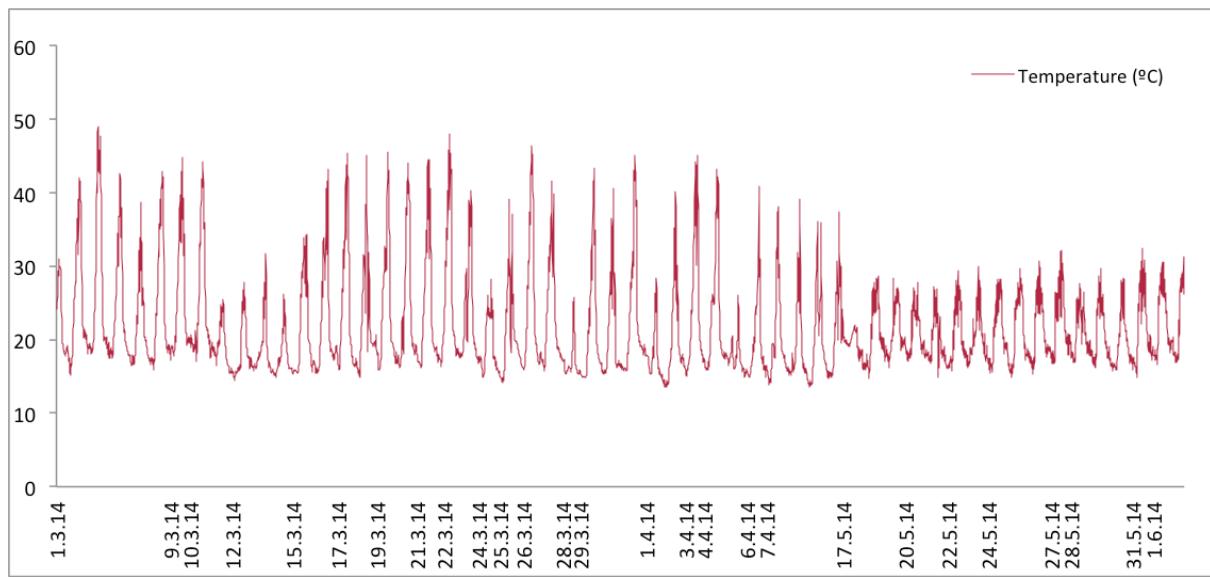


Fig. S8. Daily temperatures in ° C during the course of the experiment from March to June 2014.

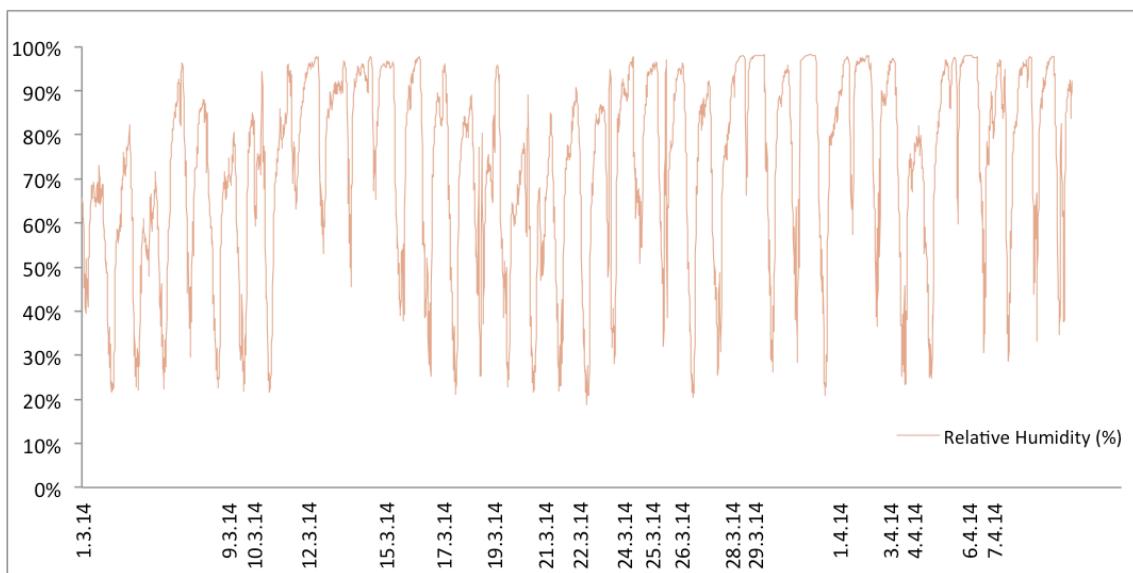


Fig. S9. Daily humidity in % during the course of the experiment from March to May 2014; in June it was not measured due to technical problems with the device.