Supporting Online Material

Title: One size does not fit all: Conservation farming success in Africa more dependent on management than on location

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Supporting Table S1

Summary statistics of elevation, slope gradient, and mean annual temperature and precipitation.

Site characteristics	Mean	Max.	Min.	SD‡	Range
Elevation (m a.s.l.)	921	1427	533	300	894
Slope gradient* (degrees)	1.28	4.72	0.00	1.02	4.72
MAP† (mm)	796	1399	490	258	909
MAT† (°C)	20.6	34.8	10.1	8.9	24.7

* SRTM-DEM from CGIAR-CSI
† Lusaka Meteorological station; MAT Mean annual temperature: MAP Mean annual precipitation (21-year averages)
‡ SD Standard deviation

Supporting Table S2: Soil physical and chemical properties of the studied farms in the three agroecological zones (AEZ).

	AEZ I		AEZ II		AEZ III	
Soil properties	Mean	CV†	Mean	CV	Mean	CV
Silt + clay (%)	47.8	47	23.7	39	52.6	40
pH (KCl)	6.00	8	5.84	8	5.02	9
Total C (mg g^{-1})	18.5	47	8.9	52	17.9	54
Total N (mg g^{-1})	1.29	43	0.61	44	1.10	48
Available P (mg kg^{-1})	21.4	196	14.4	230	21.4	77
S (mg kg^{-1})	9.55	77	2.76	182	1.58	238
CEC* ($mmol_c$ kg^{-1})	318.3	493	187.3	865	101.8	64
K ($mmol_c$ kg^{-1})	2.6	172	0.9	470	0.3	72
Ca ($mmol_c$ kg^{-1})	22.5	42	7.4	76	9.0	55
Mg ($mmol_c$ kg^{-1})	8.1	72	1.9	206	3.0	46
Na ($mmol_c$ kg^{-1})	1.0	441	0.5	789	0.1	86
Fe (mg kg^{-1})	73.8	33	32.8	30	28.5	30
Zn (mg kg^{-1})	4.36	111	4.02	104	7.36	113
Mn (mg kg^{-1})	1.53	296	0.74	605	1.24	73
Cu (mg kg^{-1})	52.9	35	55.4	46	36.9	48

*CEC, potential cation exchange capacity
†CV, coefficient of variation (%)

Supporting Table S3

Maize grain yield under either traditional (TF) or conservation farming (CF) for all agroecological zones during the 2007/08 cropping season compared between plots that were identified prior to the cropping season and those that were randomly allocated at harvest ("random") to avoid farmer bias (means followed by standard deviation in brackets; n=280 for all sites; only sites considered where both treatments were available on the same farm (number of observations indicated in the table are lower than total number of farms due to missing values)).

Farming System	Grain yield (t ha^{-1})
TF	1.16 (0.60)
TF Random	1.18 (0.70)
P value	0.83
LSD (0.05)	0.20
Observations	83
CF	1.11 (0.56)
CF Random	1.21 (0.55)
P value	0.23
LSD (0.05)	0.17
Observations	85

Supporting Table S4

Variable loading coefficients between soil properties and maize yields of the first four principal components (PC) under both TF and CF and their individual and cumulative variance and eigenvalues (factor loadings in bold are considered highly weighted).

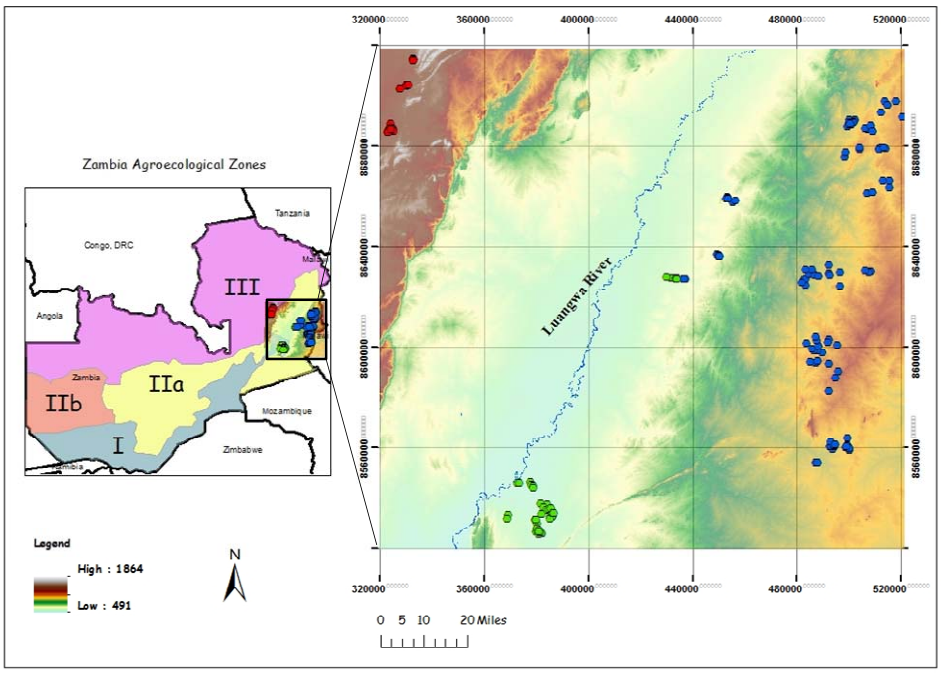
Soil properties	PC1	PC2	PC3	PC4
Silt + clay	**0.916**	0.122	-0.016	-0.072
pH	-0.008	0.265	0.241	**0.787**
C	**0.929**	0.123	-0.039	0.001
N	**0.918**	0.228	0.029	0.022
P	-0.036	0.127	**0.755**	-0.122
S	0.165	**0.846**	0.018	-0.004
CEC*	-0.001	**0.744**	0.035	0.103
K	0.510	0.668	0.335	0.079
Ca	**0.785**	0.446	0.100	0.188
Mg	**0.791**	0.457	0.194	0.101
Na	0.476	**0.769**	0.101	-0.006
Fe	0.422	**0.742**	0.121	0.006
Zn	0.078	0.138	0.423	-0.649
Mn	**0.714**	0.094	-0.007	-0.240
Cu	0.072	0.030	**0.798**	0.136
Proportion of variance explained (%)	5.00	3.46	1.63	1.20
Cumulative variance (%)	33.3	56.4	67.3	75.3
Eigenvalue (no dimension)	6.90	2.01	1.37	1.02

*CEC, cation exchange capacity

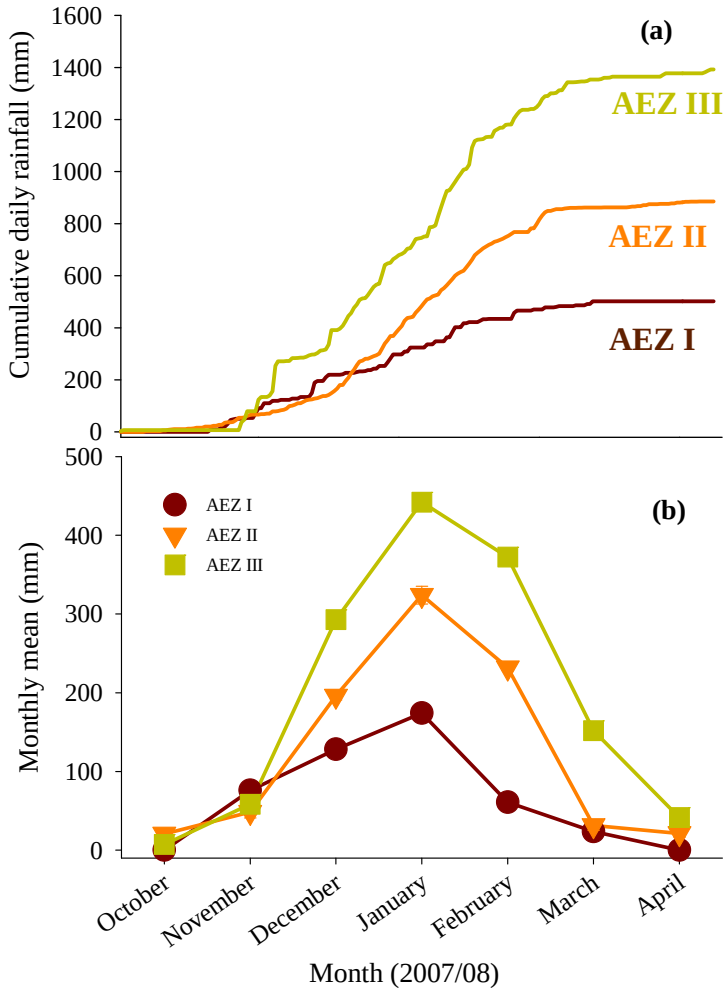
Supporting Table S5

Variable loading coefficients of site variables with principle components (PC), the eigenvalues and proportion of principle components explaining crop yield under CF (factor loadings in bold and italic are considered highly weighted).

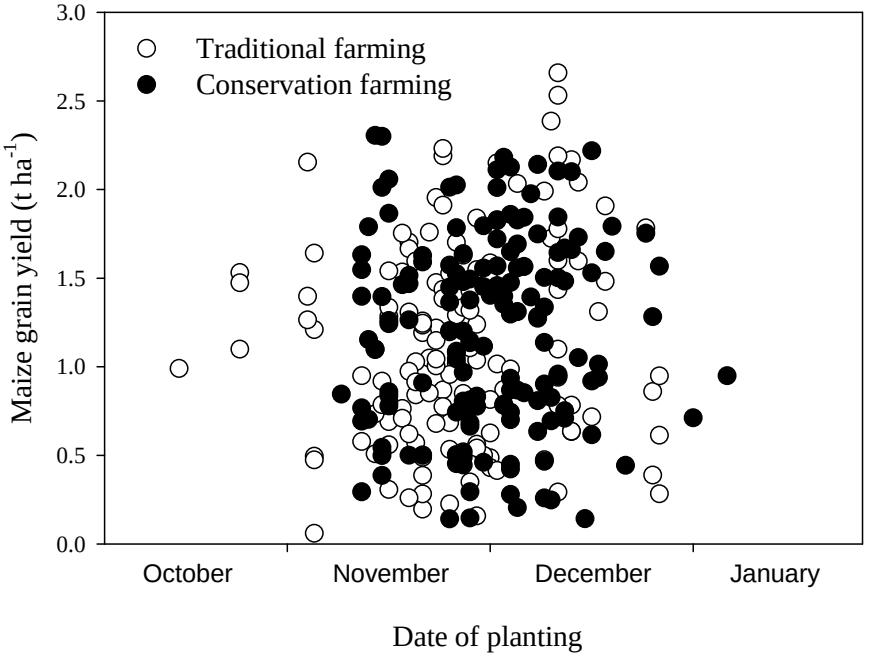
Site variables	PC1	PC2
Rainfall	0.083	**0.885**
Slope aspect	0.008	-0.398
Elevation	0.090	**0.944**
Slope gradient	0.162	**0.727**
Curvature	**0.994**	0.096
Curvature profile	**-0.894**	-0.093
Curvature plan	**0.896**	0.069
Proportion of variance explained (%)	2.63	2.39
Cumulative variance (%)	37.6	71.7
Eigenvalue (no dimension)	2.86	2.21



Supporting Fig. S1. Locations of farms where yield measurements and soil characterization were carried out in eastern Zambia (symbol color denote agroecological zone; green: AEZ I, blue; AEZ II, red: AEZ III).



Supporting Fig. S2. (a) Cumulative daily rainfall recorded by farmers throughout the rainy season 2007/2008; and (b) average monthly rainfall (means, standard deviations are mostly smaller than the symbols; n=92, 156, 32 for AEZ I, II, III, respectively).



Supporting Fig. S3. Relationship between planting date and crop yield under conservation and traditional farming in eastern Zambia (n=157 and 142, respectively, where full data were available).