

## *Supplementary Material*

### **Supplementary Tables**

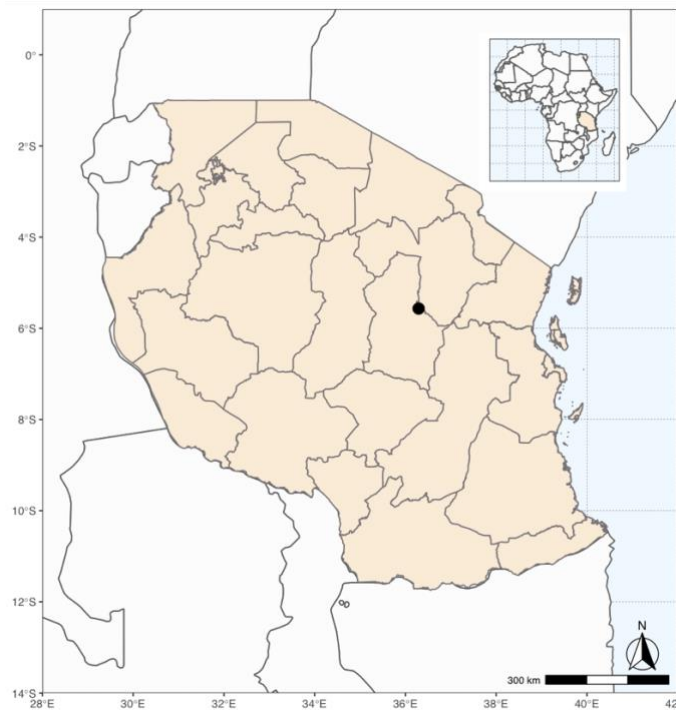
**Supplementary Table 1.** Site soil physicochemical properties (0-20 cm depth). SE = standard error, n = 5.

Property	Mean	SE
Sand (%)	82.60	0.40
Silt (%)	5.00	0.89
Clay (%)	12.40	0.75
pH	5.16	0.20
Organic carbon (%)	0.54	0.16
Total N (%)	0.04	0.00
C:N ratio	14.00	3.49
Available P (ppm)	10.08	0.19
Extractable K (ppm)	237.9	74.1
CEC (meq 100 g <sup>-1</sup> )	4.80	0.37
Base saturation (%)	59.60	8.27
Exchangeable Sodium Percentage	5.20	0.58

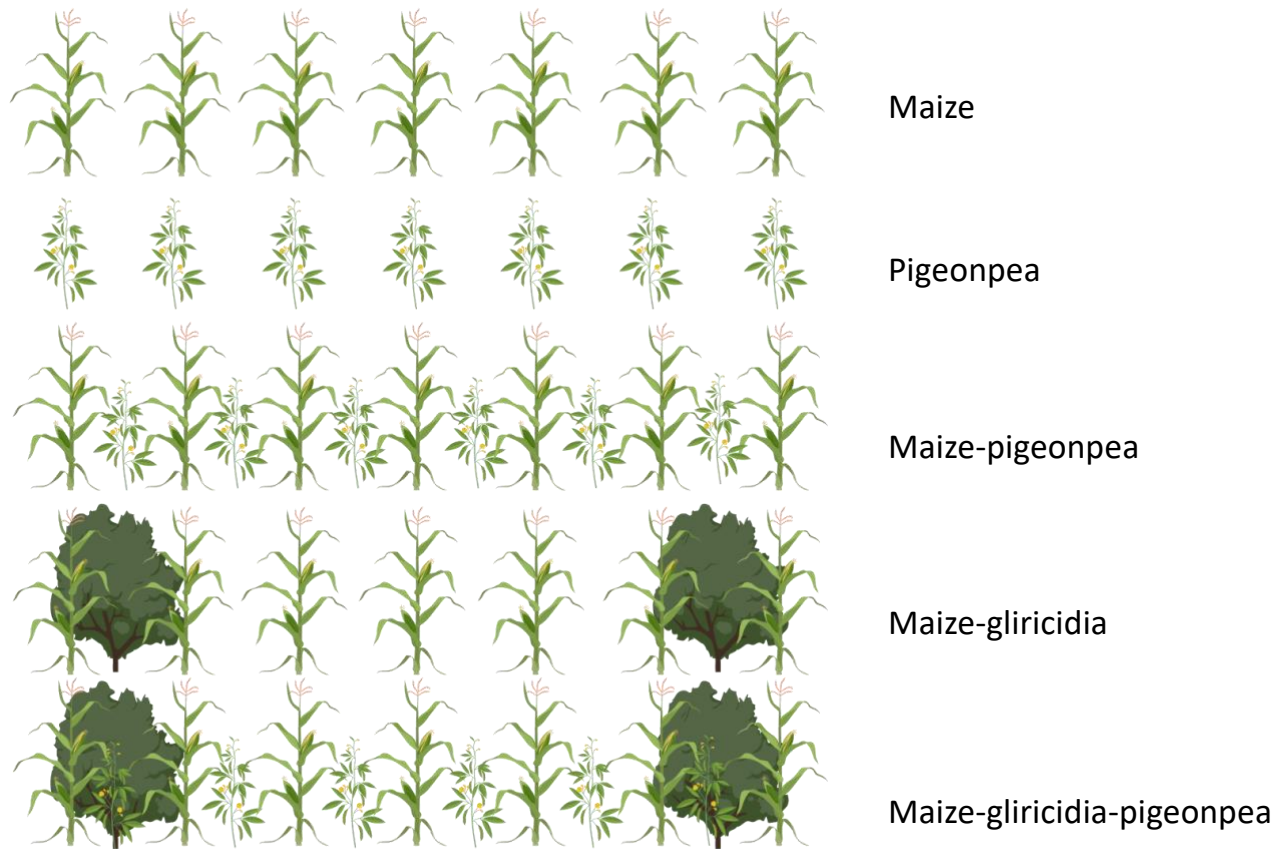
**Supplementary Table 2.** Effects of water, cropping system, and fertilization on means of maize grain yield at 12% moisture, pigeonpea dry grain yield, and whole-system total dry grain yield. Cropping system abbreviations: M, Maize; P, Pigeonpea; MP, Maize-pigeonpea; MG, Maize-gliricidia; MGP, Maize-gliricidia-pigeonpea. Asterisks indicate significant differences between ambient and drought means within a cropping system-fertilization treatment combination (\*\*  $p < 0.01$ , \*  $p < 0.05$ ).  $n = 3$  (fertilized MGP  $n = 2$ ). See Figures 3 and 4 for significant treatment effects and error.

Fertilization	Cropping system	Maize yield		Pigeonpea yield		Total grain yield	
		Ambient rainfall	Drought	Ambient rainfall	Drought	Ambient rainfall	Drought
Unfertilized	M	2.64	3.09	-	-	2.33	2.72
	P	-	-	1.17	1.33	1.17	1.33
	MP	1.39	2.56	0.63	0.48	1.86	2.73
	MG	3.20	1.63	-	-	2.82	1.43
	MGP	3.21	1.61	0.48	0.27	3.30	1.69
Fertilized	M	7.08**	2.96	-	-	6.23**	2.61
	P	-	-	0.96	0.91	0.96	0.91
	MP	5.64*	2.27	0.75	0.59	5.72**	2.59
	MG	5.10	3.28	-	-	4.49	2.88
	MGP	2.59	4.01	0.32	0.48	2.60	4.01

## Supplementary Figures



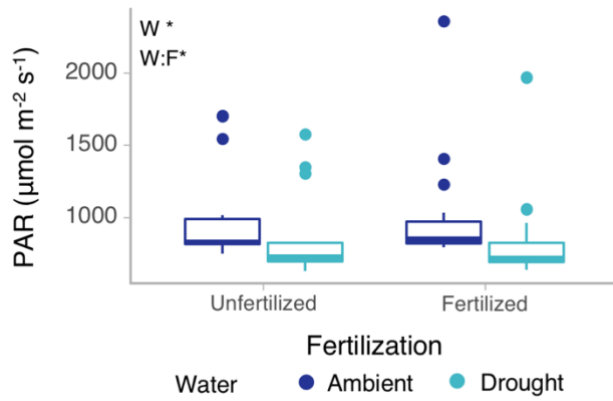
**Supplementary Figure 1.** Map showing the location of the experimental site, indicated by the solid black circle (●), in Manyusi village, Kongwa District, Dodoma, Tanzania ( $5^{\circ} 33' 56.16123''$  S,  $36^{\circ} 17' 29.85319''$  E, elevation 1206.6 m).



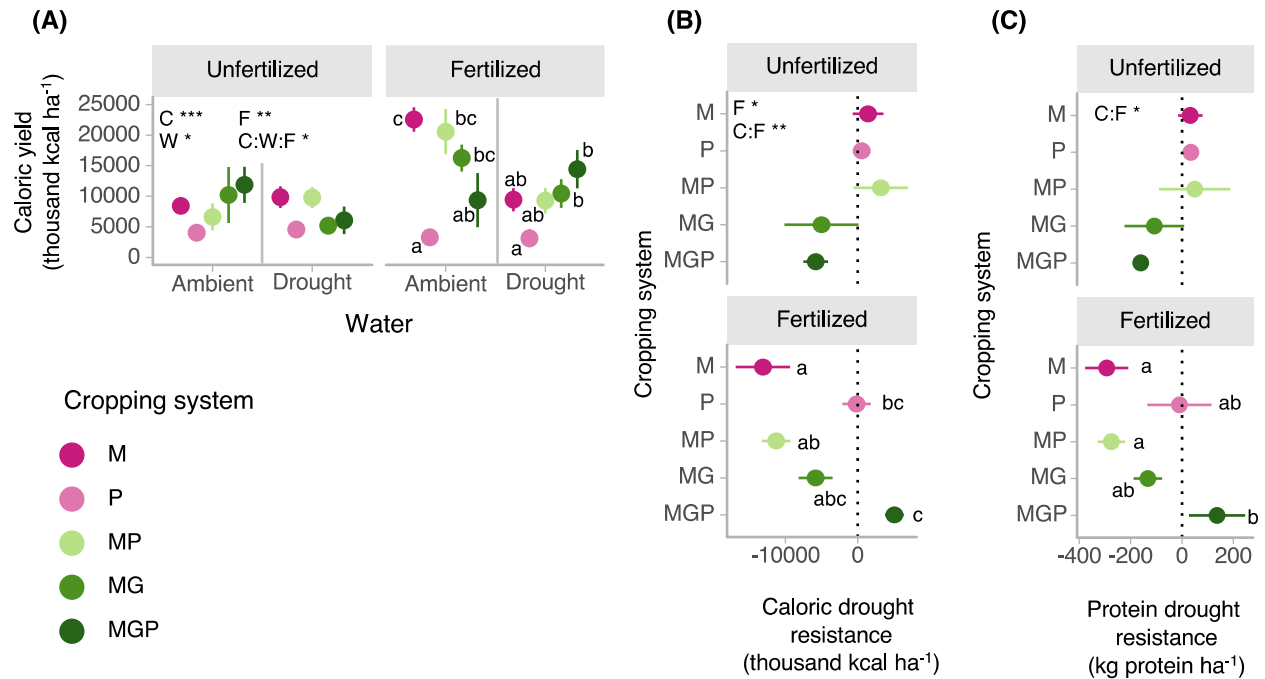
**Supplementary Figure 2.** Cross-sectional diagram of row spacing for each cropping system. The row spacing of maize in both monoculture and intercropping was 75 cm between rows. The same row spacing was used for pigeonpea. In intercropping plots, pigeonpea rows were planted between maize rows as shown here. Row spacing for gliricidia was 4 m. Created with BioRender.com.



**Supplementary Figure 3.** Photographs of rainout shelter during maize vegetative growth (left) and near harvest (right). See Figure 1 for rainout shelter design diagram and details.



**Supplementary Figure 4.** Effects of rainout shelters on photosynthetically active radiation (PAR). Treatment factor abbreviations: W, Water; F, Fertilization. Asterisks indicate significance of treatment effects (\*  $p < 0.05$ ).  $n = 15$ .



**Supplementary Figure 5.** (A) Effects of water, cropping system, and fertilization on whole-system caloric yield. Effects of cropping system and fertilization on (B) caloric yield drought resistance and (C) protein yield drought resistance; dotted lines indicate high drought resistance (zero change due to drought). Cropping system abbreviations: M, Maize; P, Pigeonpea; MP, Maize-pigeonpea; MG, Maize-gliricidia; MGP, Maize-gliricidia-pigeonpea. Treatment factor abbreviations: C, Cropping system; F, Fertilization. Asterisks indicate significance of treatment effects (\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ ). Means sharing the same letter are not significantly different within a panel of a graph ( $\alpha = 0.05$ ). Error bars = standard error;  $n = 3$  (fertilized MGP  $n = 2$ ).