

Supplementary material for

Summer irrigation of pasture enhances the transfer and short-term storage of soil organic carbon in the particulate and mineral-associated organic matter fractions

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Table S1. Standing biomass production of residual expressed as dry matter for the previously irrigated and dryland treatments. Values are means \pm standard error of mean ($n = 8$ per treatment at T1, and $n = 4$ per treatment for T2–T5). The least significant difference (LSD) between means with significance level of 5% are given when $P < 0.05$ for sampling time (T), treatment (Tr) and interaction between sampling time and treatment applied over the summer period (T x Tr).

Sampling time (T)	Treatment (Tr)		P values			LSD
	Dryland	Irrigated	T	Tr	T x Tr	T
T1	2395 \pm 135	2773 \pm 234	< 0.001	0.341	0.123	420
T2	2608 \pm 316	2518 \pm 120			0.792	485
T3	2944 \pm 175	2707 \pm 84.9			0.487	
T4	4022 \pm 333	4526 \pm 447			0.145	
T5	3874 \pm 95.7	3742 \pm 179			0.700	

Table S2. Mean $\delta^{13}\text{C}$ values of plant and soil compartments at natural abundance (NA) and during the ^{13}C chase period at sampling times T1–T5 (1, 12, 125, 237 and 349 days after the last $^{13}\text{CO}_2$ labelling event) for the previously irrigated and dryland treatments applied over the summer period. The least significant difference (LSD) between means with significance level of 5% are given when $P < 0.05$ for sampling time (T), treatment (Trt) and interaction between sampling time and treatment (T x Trt). Values in bold indicate significant differences between the dryland and irrigated treatments at $P < 0.05$.

Isotopic composition of plant-soil compartments expressed in $\delta^{13}\text{C}$ (‰)														
Compartment	Depth (cm)	Treatment (Trt)	NA	Sampling times (T)					P values			LSD		
				T1	T2	T3	T4	T5	T	Trt	T x Trt	T	Trt	T x Trt
Herbage		Dryland	-28.6	900.8	388.4	-16.7	-26.0	-28.9	< 0.001	0.064	0.005	20.8		29.5
		Irrigated		902.6	320.7	-20.4	-25.6	-29.4						
Residual		Dryland	-29.1	517.7	337.2	162.0	85.6	32.8	< 0.001	< 0.001	0.162	34.2	19.8	
		Irrigated		441.6	314.5	126.3	37.0	25.6						
Roots	0–15	Dryland	-28.9	104.0	104.7	85.2	32.9	7.8	< 0.001	0.005	0.153	25.4	14.7	
		Irrigated		134.8	111.0	139.6	28.1	21.0						
	15–25	Dryland	-28.9	76.5	45.4	74.5	-1.3	-20.2	< 0.001	0.050	0.133	18.2	10.5	
		Irrigated		54.4	61.3	57.4	-20.2	-18.9						
Rhizosphere soil	0–15	Dryland	-27.3	-5.34	-11.6	-11.5	-8.62	-11.7	0.003	0.070	0.555	4.76		
		Irrigated		-4.16	-9.16	-10.9	-0.99	-9.47						
Non-rhizosphere soil	0–15	Dryland	-27.5	-22.1	-20.6	-21.4	-21.3	-22.5	0.652	0.389	0.568			
		Irrigated		-20.9	-21.1	-21.9	-21.4	-21.5						
Whole soil	0–15	Dryland	-27.5	-20.7	-19.8	-20.3	-20.8	-21.9	0.250	0.390	0.850			
		Irrigated		-19.9	-19.8	-20.6	-20.9	-20.9						
Whole soil	15–25	Dryland	-27.4	-24.5	-23.9	-23.8	-24.1	-25.5	0.102	0.191	0.546			
		Irrigated		-24.6	-24.9	-24.5	-24.8	-25.5						

Table S3. Mean $\delta^{13}\text{C}$ values of soil particle size fractions of non-rhizosphere soil (0–15 cm depth) at natural abundance (NA), and during the ^{13}C chase period at sampling times T1, T3 and T5 (1, 125 and 349 days after the last $^{13}\text{CO}_2$ labelling event) for the previously irrigated and dryland treatments applied over the summer period. The least significant difference (LSD) between means with significance level of 5% are given when $P < 0.05$ for sampling time (T), treatment (Trt) and interaction between sampling time and treatment (T x Trt). Values in bold indicate significant differences between the dryland and irrigated treatments at $P < 0.05$.

Isotopic composition of non-rhizosphere soil (0–15 cm depth) expressed as $\delta^{13}\text{C}$ (‰)											
Fraction (F)	Treatment (Trt)	NA	Sample event (T)			P values			LSD		
			T1	T3	T5	T	Trt	T x Trt	T	Trt	T x Trt
>250 μm	Dryland	-27.7	8.29	17.4	-0.06	0.009	0.037	0.712	9.17	7.49	
	Irrigated		13.1	24.8	11.9						
53–250 μm	Dryland	-28.5	-23.0	-21.2	-16.4	0.005	<0.001	0.312	2.64	2.16	
	Irrigated		-16.1	-15.1	-13.2						
20–53 μm	Dryland	-28.0	-26.2	-25.7	-25.9	0.107	0.004	0.262		0.43	
	Irrigated		-25.6	-25.3	-24.8						
5–20 μm	Dryland	-28.1	-26.5	-26.7	-26.0	0.003	<0.001	0.219	0.34	0.28	
	Irrigated		-25.5	-26.2	-25.5						
<5 μm	Dryland	-27.1	-24.5	-23.6	-23.3	0.054	0.005	0.011		0.68	0.68
	Irrigated		-23.4	-24.1	-23.4						

Table S4. Mean $\delta^{13}\text{C}$ values of soil size particle fractions of whole soil (15–25 cm depth) at natural abundance (NA), and during the ^{13}C chase period at sampling times T1, T3 and T5 (1, 125 and 349 days after the last $^{13}\text{CO}_2$ labelling event) for the previously irrigated and dryland treatments applied over the summer period. The least significant difference (LSD) between means with significance level of 5% are given when $P < 0.05$ for sampling time (T), treatment (Trt) and interaction between sampling time and treatment (T x Tr). Values in bold indicate significant differences between the dryland and irrigated treatments at $P < 0.05$.

Isotopic composition of whole soil (15–25 cm depth) expressed as $\delta^{13}\text{C}$ (‰)											
Fraction (F)	Treatment (Trt)	NA	Sample event (T)			P values			LSD		
			T1	T3	T5	T	Trt	T x Trt	T	Trt	T x Trt
>250 μm	Dryland	-27.6	-6.60	3.43	-12.8	0.020	0.230	0.707	8.82		
	Irrigated		-8.72	-4.83	-15.1						
53–250 μm	Dryland	-28.6	-25.9	-24.0	-23.9	0.080	0.005	0.981		1.78	
	Irrigated		-23.4	-21.3	-20.9						
20–53 μm	Dryland	-28.3	-27.3	-26.5	-27.1	<0.001	<0.001	0.004	0.44	0.36	0.62
	Irrigated		-27.1	-25.9	-25.3						
5–20 μm	Dryland	-28.0	-27.2	-27.1	-26.9	0.059	0.133	0.702			
	Irrigated		-26.9	-27.1	-26.7						
<5 μm	Dryland	-27.1	-25.5	-24.4	-25.2	0.020	0.001	0.014	0.39	0.32	0.55
	Irrigated		-25.7	-25.7	-25.4						