

## Supplementary Information

Converting highly productive arable cropland in Europe to grassland: – a poor candidate for carbon sequestration.

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**Supplementary Table S1. Cropping treatments.** Treatments applied in set-aside to arable and arable to set-aside land use conversion experiments at Wellesbourne.

<b>Arable to set-aside</b>	<b>Prior to experiment</b>	<b>2007/2008</b>	<b>2008/2009</b>	<b>2009/2010</b>
Treatment 1	Arable >30 years	Arable	Arable	Arable
Treatment 2	Arable >30 years	Arable	Set-aside	Set-aside
Treatment 3	Arable >30 years	Arable	Arable	Set-aside
<b>Set-aside to arable</b>		<b>2007/2008</b>	<b>2008/2009</b>	<b>2009/2010</b>
Treatment 1	Set-aside 12 years	Set-aside	Set-aside	Set-aside
Treatment 2	Set-aside 12 years	Set-aside	Arable	Arable
Treatment 3	Set-aside 12 years	Set-aside	Set-aside	Arable

**Supplementary Table S2. Soil carbon stocks.** Soil carbon (t ha<sup>-1</sup>, 0-30 cm) measured in set aside and cropped land at 14 (17 paired comparisons) sites across England.

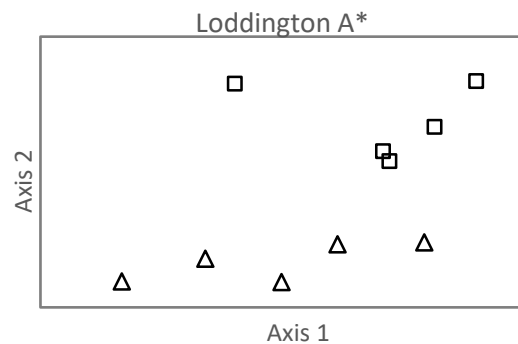
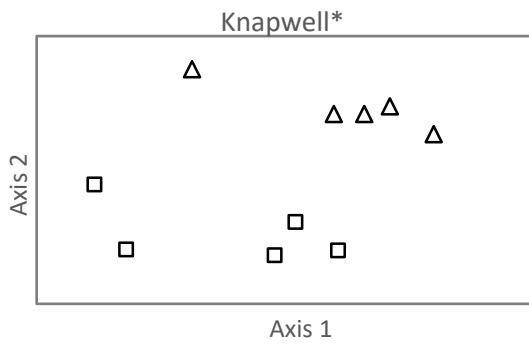
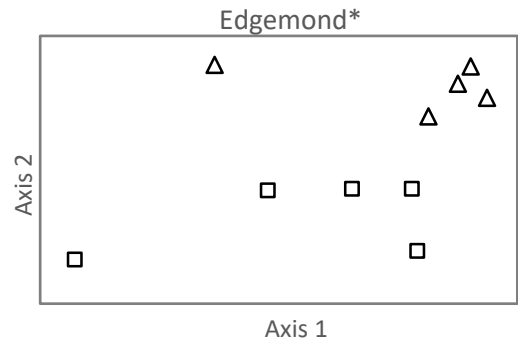
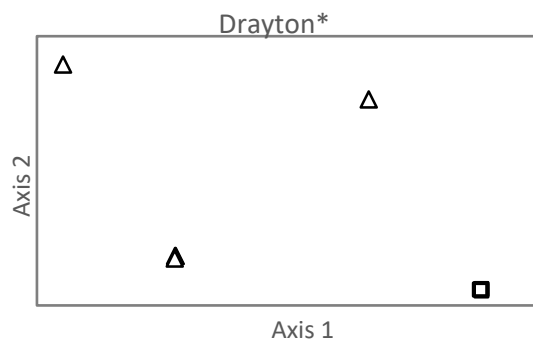
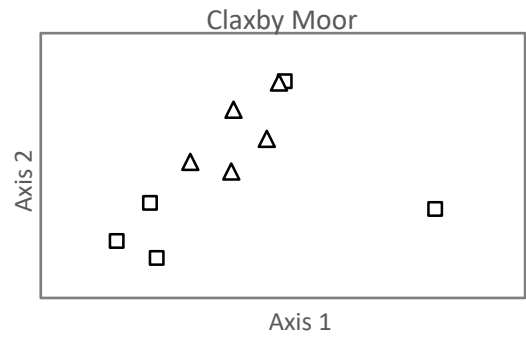
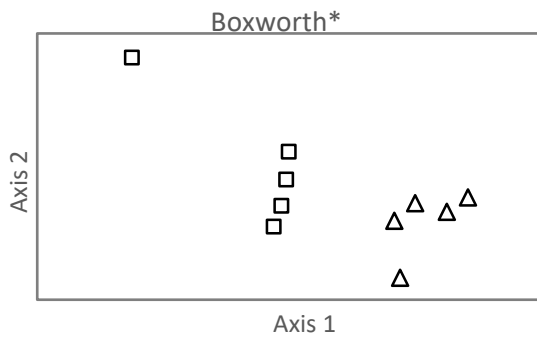
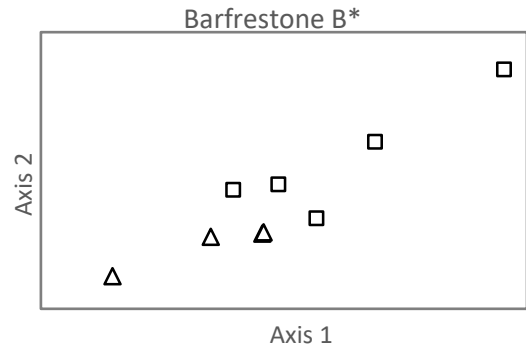
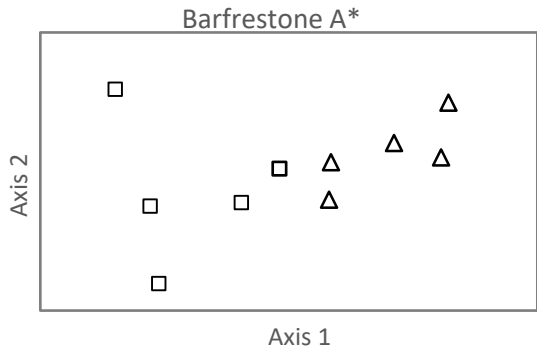
Cropping	<i>Arable</i>	<i>Set-aside</i>	
Mean	90.38	88.57	
<i>Model Fixed term</i>	<i>d.f.</i>	<i>F statistic</i>	<i>P</i>
Cropping	1,7	0.24	0.643
Age	1,9	0.84	0.607
Cropping.Age	1,9	0.73	0.674

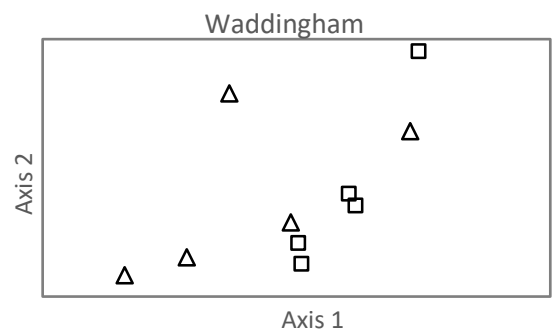
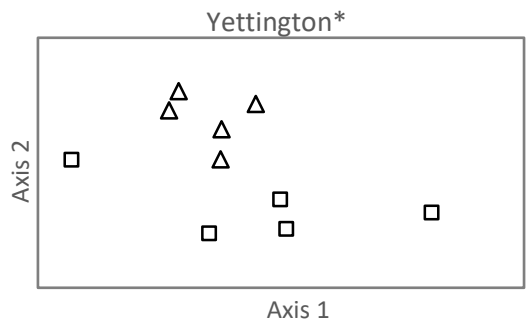
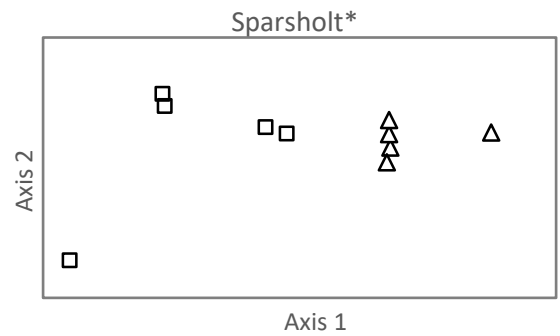
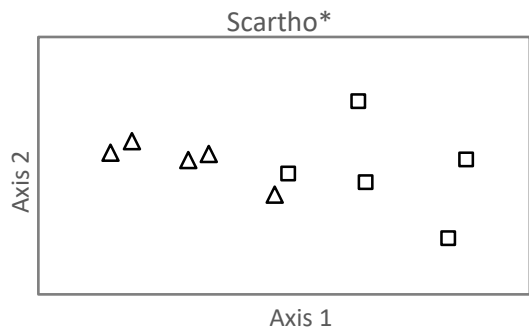
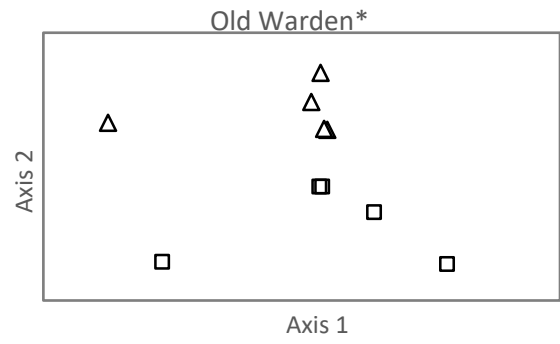
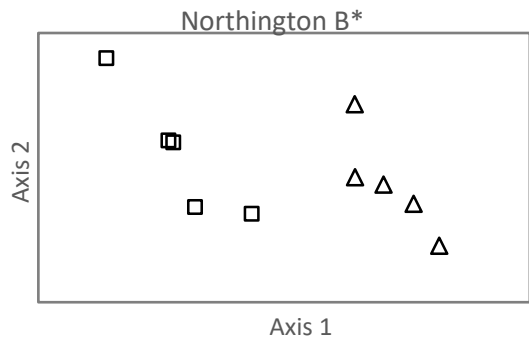
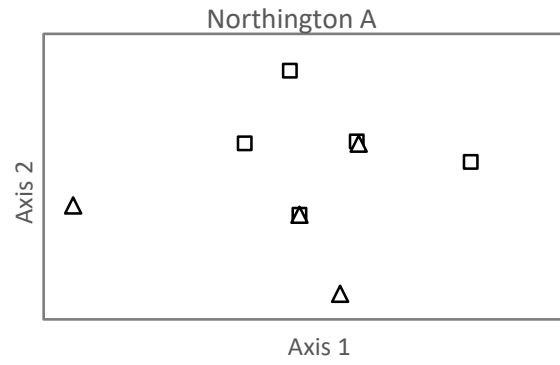
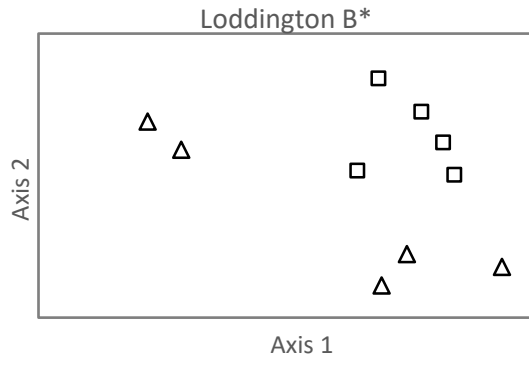
**Supplementary Table S3. SOC concentration.** Soil carbon(%) measured at different depths in set aside and cropped land at 14 sites (17 paired comparisons) across England.

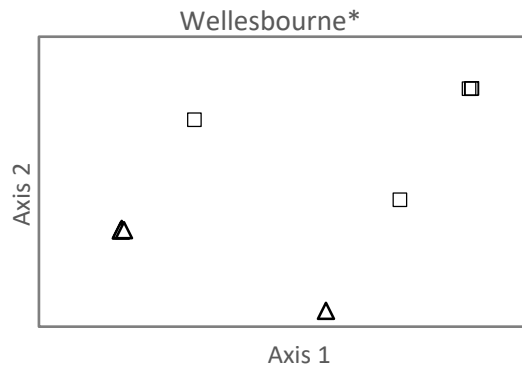
Depth	0-10cm	10-30cm	
Cropping			
Arable	2.53	2.21	
Set-aside	2.87	1.99	
<i>Model Fixed term</i>	<i>d.f.</i>	<i>F statistic</i>	<i>P</i>
Cropping	1,47	0.74	0.393
depth	1,47	69.90	<0.001
Cropping.depth	1,47	15.97	<0.001

**Supplementary Table S4. SIMPER analysis.** Similarity percentages of PLFA contributing more than 5% dissimilarity between set-aside and arable for all site analysis of landscape scale study.

Species	Average Abundance arable	Average Abundance set-aside	Average Dissimilarity	% Contribution	Cumulative %
C18:1w7	4.51	8.26	5.87	14.85	14.85
C18:1w9	2.97	5.02	3.45	8.73	23.58
C16:0	3.12	5.37	3.42	8.65	32.22
phthalate	2.68	4.02	2.84	7.2	39.42
C16:1w7c	2.16	3.69	2.58	6.53	45.94
C19:0cy	1.93	3.14	2.22	5.62	51.57







**Supplementary Figure S1** NMDS plots of PLFA profiles from soils sampled 0-10 cm for 17 paired arable (□) and set-aside (Δ) farm sites in England. \* indicates statistically significant difference between set-aside and arable.