

**Changes in soil organic carbon in croplands subjected to fertilizer management:  
a global meta-analysis**

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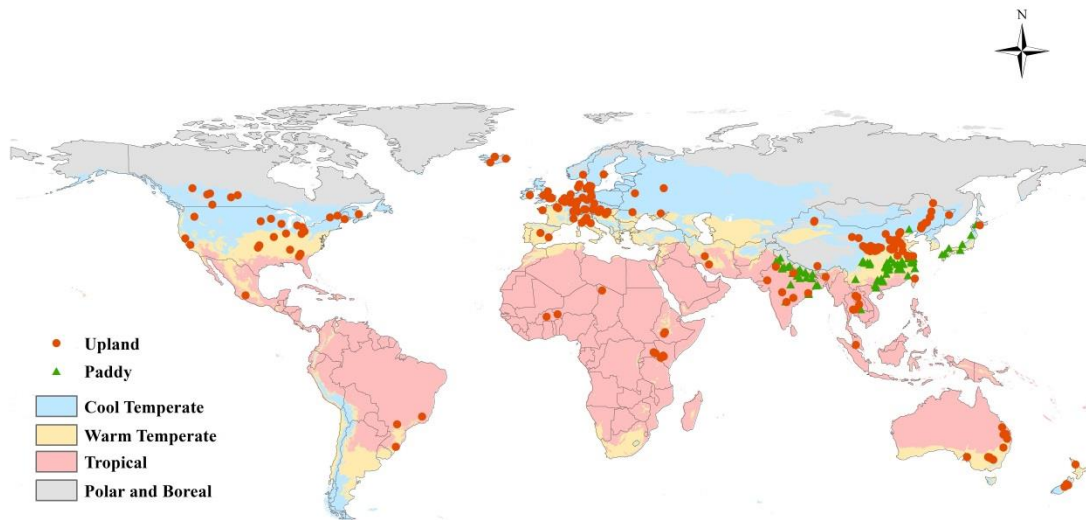
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# 1. The information of experiment sites that used in this meta-analysis



**Figure S1** Site distributions of the four management practices used in the meta-analysis (99 sites in Cool Temperate; 132 sites in Warm Temperate and 67 sites in Tropical). Map constructed in ESRI ArcMAP 10.0. Base image is obtained from the European Soil Data Center (ESDAC) (<http://eusoils.jrc.ec.europa.eu/projects/RenewableEnergy/>, accessed 15 July 2015).

**Table S1** The information of experiment sites that used in this meta-analysis. The minus sign before latitude and longitude denote south and west, while the others denote north and east. CT, WT and TR represent cool temperate, warm temperate and tropical regions, respectively. UCF, CF, CFS and CFM represent the unbalanced application of chemical fertilizers, balanced application of chemical fertilizers, straw and chemical fertilizers application, and manure and chemical fertilizers application, respectively, hereafter the same.

Country	Latitude	Longitude	Climate Zone	Initial SOC (g kg <sup>-1</sup> )	Duration of the experiment (years)	Category of fertilization	C input (Mg C ha <sup>-1</sup> yr <sup>-1</sup> )	Reference
Australia	-34.50	146.21	WT		8	CFM		Kirkby (2006)
Australia	-34.58	146.36	WT		8	CFS		Kirkby (2006)
Australia	-34.42	146.29	WT		8	CFS		Kirkby (2006)
Australia	-34.29	145.80	WT		8	CFS		Kirkby (2006)
Australia	-28.22	152.10	WT		28	UCF,CFS		Page <i>et al.</i> (2014)
Australia	-24.39	150.51	TR	17.6	27	CFS		Page <i>et al.</i> (2014)
Australia	-26.65	151.84	WT	15.3	17	CFS		Page <i>et al.</i> (2014)
Australia	-35.08	147.33	WT	9.2	26	UCF,CFS		Chan <i>et al.</i> (2011)
Australia	-26.80	150.90	TR	6.8	8	CFS	2.0	Wang <i>et al.</i> (2013)
Australia	-31.11	150.93	WT	12.8	24	CFS	1.6	Coleman <i>et al.</i> (1997)
Australia	-34.30	138.80	WT	12.6	18	CFS		Wang <i>et al.</i> (2013)
Australia	-35.20	147.50	WT	8.0	11	CFS		Wang <i>et al.</i> (2013)
Austria	47.96	14.06	CT		21,37	CF,CFM	0.4,1.4	Dersch and Böhm (2001)
Austria	47.21	15.95	CT		21,37	CF,CFM	1.7,2.8	Dersch and Böhm (2001)
Austria	48.23	16.57	WT		10,17	CF,CFS	0.6,4.8	Dersch and Böhm (2001)
Austria	48.34	14.18	CT	11.0	13	CFM	2.8	Ros <i>et al.</i> (2006)
Belarus	53.50	28.10	CT	12.3	14	CFM	2.6	Franko <i>et al.</i> (2007)

Republic								
Belgium	50.98	3.82	WT	15.6	4	CFM	3.8	Nevens (2003)
Brazil	-20.80	-42.90	TR	13.7	26	CFS		Leite <i>et al.</i> (2004)
Brazil	-23.38	-51.18	TR		21	CFS		Machado <i>et al.</i> (2003)
Brazil	-30.90	-51.60	TR	14.9	19	CFS	6.9	Bayer <i>et al.</i> (2006)
Burkina Faso	12.42	-1.35	TR	4.7	2	UCF,CFS,CFM	0.5,4.2,1.5	Ou édraogo <i>et al.</i> (2006)
Canada	52.15	-106.58	CT	20.1	10	CF,CFS	2.3,4.8	Campbell <i>et al.</i> (1998)
Canada	45.50	-73.58	CT	24.4	17	CFS	3.9	Halpern <i>et al.</i> (2010)
Canada	52.87	-104.33	CT	29.0	4	UCF,CFS	0.3,1.7	Malhi and Lemke (2007)
Canada	53.12	-114.47	CT	13.1	28	UCF,CFS	1.1,2.1	Malhi <i>et al.</i> (2011)
Canada	53.42	-113.55	CT		27	CFS	2.1	Chung <i>et al.</i> (2010)
Canada	46.60	-63.96	CT	60.9	28	UCF	1.3,1.9	Malhi <i>et al.</i> (2011)
Canada	55.22	-119.40	CT	33.5	12	CF,CFS,CFM		Soon (1998)
Canada	46.08	-71.03	CT		20	CFM	3.6	Angers <i>et al.</i> (2010)
Canada	49.70	-112.80	CT	14.8	80	CFS		Monreal and Janzen 1993
China	45.70	126.60	CT	12.9	29	CF,CFM	0.9,1.5	Xu <i>et al.</i> (2012)
China	35.20	107.70	WT	6.5	18	UCF,CFM	2.0,5.8	Guo <i>et al.</i> (2008)
China	35.00	114.40	WT	4.5	19	UCF,CF,CFM	1.0,1.2,6.5	Yu <i>et al.</i> (2012)
China	29.80	106.40	TR	12.8	12	UCF,CF,CFS,CFM	0.9,1.5,3.5,4.9	Pan <i>et al.</i> (2011)
China	28.60	121.40	WT	18.7	26	CF,CFM	2.9,5.8	Wang <i>et al.</i> (2002)
China	28.30	116.30	TR	16.2	26	CF,CFM	0.5,3.2	Bi <i>et al.</i> (2009)
China	28.27	112.82	WT	20.1	25	UCF,CF,CFS,CFM	1.0,1.2,2.8,2.4	Jun <i>et al.</i> (2007)
China	28.27	115.84	TR	14.8	21	UCF,CF,CFM	0.8,1.2,3.0	Pan <i>et al.</i> (2011)
China	30.50	105.60	WT	9.2	17	UCF, CF,CFM	0.9,1.2,4.1	Sun <i>et al.</i> (2006)
China	30.50	114.40	WT	15.9	22	UCF, CF,CFM	0.8,0.9,4.8	Hu <i>et al.</i> (2010)
China	34.28	117.29	WT	6.3	19	UCF, CF,CFM	1.1,1.4,7.3	Zhang and Zhang (2001)

China	38.93	100.45	CT	12.1	23	UCF, CF,CFM	0.8,1.4,3.7	Jiang <i>et al.</i> (2014)
China	45.67	126.58	CT	15.4	24	UCF, CF,CFM	0.9,0.9,2.9	Xu <i>et al.</i> (2012)
China	37.97	113.11	CT	13.8	10	UCF,CFS,CFM	0.6,3.3,3.3	Jia <i>et al.</i> (2008)
China	37.88	115.70	WT	6.7	26	UCF,CFS,CFM	0.8,1.4,1.3	Du <i>et al.</i> (2009a)
China	34.27	108.05	WT	6.7	21	UCF,CFS,CFM	2.1,11.9,6.9	Chen <i>et al.</i> (2012)
China	35.27	107.50	WT	6.2	30	UCF,CFS,CFM	0.4,2.2,1.6	Liu <i>et al.</i> (2010)
China	34.78	113.67	WT	6.7	18	UCF,CF,CFS,CFM	0.9,1.4,4.7,4.1	Jiang <i>et al.</i> (2014)
China	35.07	113.17	WT	5.8	1	UCF,CF,CFM		Chen <i>et al.</i> (2010)
China	40.03	116.29	WT	9.2	12	UCF,CF,CFM	0.4,1.0,2.6	Chen <i>et al.</i> (2010)
China	31.45	120.42	WT	14.0	28	CF,CFS,CFM	1.2,3.5,3.0	Ma <i>et al.</i> (2008)
China	35.32	110.07	WT	6.5	29	CFS	0.8,5.1,5.9	Wang <i>et al.</i> (2012)
China	34.60	105.64	CT	5.3	27	UCF	0.6	E <i>et al.</i> (2012)
China	34.07	108.03	WT	6.8	26	UCF,CF,CFM	0.7,0.9,3.4	Yang <i>et al.</i> (2011)
China	35.22	107.76	WT	6.1	23	UCF,CFM	0.2,6.2	Wei and Hao (2011)
China	50.25	127.46	CT	24.5	29	CF,CFM	0.4,2.0	Jiao <i>et al.</i> (2011)
China	34.27	108.08	WT	8.1	11	UCF,CFS,CFM	0.4,9.1,15.1	Sun <i>et al.</i> (2005)
China	30.43	106.43	WT	12.8	12	UCF,CF,CFS,CFM	0.4,0.6,3.0,4.1	Pan <i>et al.</i> (2011)
China	30.43	119.65	WT	15.4	11	UCF,CF,CFM	0.4,0.9,7.7	Pan <i>et al.</i> (2011)
China	40.13	116.14	WT	7.1	20	UCF,CF,CFM	1.2,2.1,3.5	Dong <i>et al.</i> (2010)
China	35.59	109.26	WT		3	CFS	4.6	Liu <i>et al.</i> (2009)
China	37.71	115.80	WT	7.0	7	CFS	4.0	Fan and Liu (2005)
China	31.92	119.52	WT	10.7	2	CF,CFS	1.3,5.9	Zhang <i>et al.</i> (2008)
China	36.16	117.15	WT	7.2	3	CF,CFS	0.6,6.9	Tian <i>et al.</i> (2010)
China	34.60	108.87	WT	9.0	4	CF,CFS	0.6,6.9	Ding <i>et al.</i> (2014)
China	34.25	106.50	CT	6.6	2	CF,CFS	0.9,6.4	Cai <i>et al.</i> (2011)
China	22.85	108.30	TR	18.2	2	CFS	2.7	Sun <i>et al.</i> (1987)

China	32.63	120.83	WT	23.1	8	UCF,CFM	0.7,4.9	Hou <i>et al.</i> (2014)
China	32.72	118.97	WT	6.4	2	CFS		Wu <i>et al.</i> (2013)
China	32.30	119.46	WT	8.5	4	CF,CFS	1.3,3.9	Liu <i>et al.</i> (2006)
China	37.85	113.08	CT	10.2	5	CF,CFS	0.5,1.4	Yan <i>et al.</i> (2010)
China	28.12	112.30	WT	17.9	21	CF,CFS,CFM	1.0,4.4,5.4	Du <i>et al.</i> (2009b)
China	32.01	120.87	WT	10.8	3	CF,CFS	0.7,5.7	Duan <i>et al.</i> (2009;2012)
China	31.60	113.28	WT	13.8	1	CF,CFS	0.6,2.2	Wang <i>et al.</i> (2013)
China	42.25	123.82	CT	14.9	7	CFS,CFM	2.3,2.7	Wang <i>et al.</i> (2000)
China	36.95	116.63	WT	4.6	2	CFS	3.4	Chen <i>et al.</i> (2004)
China	43.67	124.80	CT		5	CF,CFS	0.7,2.2	Zheng <i>et al.</i> (2006)
China	29.92	115.50	WT	17.9	4	CF,CFS	1.4,3.4	Li <i>et al.</i> (2011)
China	35.97	106.66	CT	9.0	4	CFS	4.3	Zhang <i>et al.</i> (2011)
China	29.30	88.90	CT	11.3	2	CFS	2.3	Cai <i>et al.</i> (2003)
China	35.63	114.48	WT	8.9	7	CF,CFS	0.8,5.5	Gao <i>et al.</i> (2012)
China	45.57	126.37	CT	25.3	1	CFS,CFM	4.3,3.3	Liu <i>et al.</i> (2014)
China	30.42	104.55	WT		4	CFS		Chen <i>et al.</i> (2008)
China	28.77	115.92	WT	20.1	2	CFS	2.4	Sun <i>et al.</i> (2012)
China	35.48	107.75	WT	10.1	3	CF,CFS	0.3,3.6	Wu <i>et al.</i> (2012)
China	35.90	104.08	CT	12.3	4	CF,CFS	0.4,3.3	Wu <i>et al.</i> (2012)
China	42.83	123.73	CT	9.0	3	CF,CFS	0.6,4.4	Xu <i>et al.</i> (2015)
China	47.45	126.92	CT	27.5	8	CF,CFS	0.4,2.8	Hao <i>et al.</i> (2013)
China	34.33	108.40	WT	7.1	2	CF,CFS	1.0,4.0	Zhang <i>et al.</i> (2010)
China	46.31	132.82	CT	24.4	1	CF,CFS	0.7,4.8	Dong <i>et al.</i> (2010)
China	43.80	125.40	CT	18.0	1	CF,CFS	0.5,4.1	Jiao <i>et al.</i> (2015)
China	28.92	111.55	WT	13.5	18	CF,CFS		Ma <i>et al.</i> (2011)
China	31.05	104.19	WT	18.2	6	CF,CFS	1.2,9.5	Liu <i>et al.</i> (2014)

China	29.99	115.62	WT	16.9	6	CF,CFS	0.3,2.5	Su (2014)
China	32.50	119.47	WT	16.1	2	CF,CFS	1.4,5.4	Han <i>et al.</i> (2012)
China	35.40	106.42	CT	7.0	9	CF,CFS	0.9,3.9	Mu <i>et al.</i> (2011)
China	30.85	120.16	WT	7.0	4	CF,CFS	1.5,3.6	Lin <i>et al.</i> (1997)
China	29.98	117.62	WT	19.8	7	CFS		Liu <i>et al.</i> (2015)
China	30.58	112.07	WT	15.6	3	CFS		Liu <i>et al.</i> (2015)
China	30.90	120.74	WT	24.5	2	CFS	1.1,3.0	Zhong <i>et al.</i> (2003)
China	31.97	119.30	WT	4.8	2	CF,CFS	1.2,3.3	Ma <i>et al.</i> (2010)
China	39.95	111.65	CT	6.0	4	CFS	2.2	Sun <i>et al.</i> (2009)
China	34.30	108.02	WT	9.9	4	CF,CFS		Mulati <i>et al.</i> (2012)
China	37.88	114.68	WT		6	CF,CFS ,CFM	0.4,5.8,3.7	Dong <i>et al.</i> (2009)
China	35.33	110.08	WT	7.3	2	CF,CFS ,CFM	1.0,4.8,7.7	Wang <i>et al.</i> (2010)
China	41.91	123.45	CT	8.5	3	CF,CFS ,CFM	1.0,4.0,3.8	Gong <i>et al.</i> (2008)
China	42.93	123.81	CT	9.2	3	CF,CFS ,CFM	0.4,4.1,3.9	Wu <i>et al.</i> (2002)
China	36.58	114.51	WT	7.9	3	CF,CFS ,CFM	1.0,3.4,1.8	Dong <i>et al.</i> (2010)
China	41.82	123.57	CT	8.6	12	CF,CFS ,CFM	0.6,1.9,1.9	Yan <i>et al.</i> (2004)
China	31.46	120.43	WT	10.3	5	CF,CFM	0.8,1.8	Wang <i>et al.</i> (2014)
China	40.56	116.56	CT	9.9	9	CF,CFS ,CFM	0.6,2.5,4.3	Zhang <i>et al.</i> (2007)
China	44.28	87.93	CT	4.7	20	UCF,CF,CFS ,CF M	0.4,0.4,1.5,1.2	Li <i>et al.</i> (2013)
China	32.73	115.64	WT	9.2	4	CF,CFS ,CFM	1.2,3.6,1.2	Li (2001)
China	28.26	116.92	TR	5.6	16	CF,CFS ,CFM	1.1,2.2,6.0	Li <i>et al.</i> (2010)
China	38.62	102.67	CT	9.5	19	UCF,CFS ,CFM	0.5,3.5,4.7	Zeng <i>et al.</i> (2008)
China	38.10	113.00	CT		12	CFS	2.0	Chen <i>et al.</i> (2009)
China	30.70	103.83	WT	12.3	5	CFS	3.4	Fan <i>et al.</i> (2005)
China	31.08	120.77	WT		15	CF,CFS ,CFM	0.5,2.2,2.7	Li <i>et al.</i> (2007)

China	41.67	119.47	CT	9.8	11	CFS	4.4	Lou <i>et al.</i> (2011)
China	36.85	115.02	WT	4.1	17	UCF,CFS	1.5,2.6	Niu <i>et al.</i> (2011)
China	26.75	111.87	WT	4.2	13	CF,CFS	0.3,1.0	Qin <i>et al.</i> (2010)
China	31.55	120.70	WT	14.0	25	UCF CF,CFS,CFM	0.9,1.0,4.0,3.0	Shen <i>et al.</i> (2007)
China	35.02	114.53	WT	6.5	4	CF,CFS	0.6,5.9	Wang <i>et al.</i> (2011)
China	31.55	120.63	WT	19.6	4	CF,CFS,CFM	0.8,1.7,1.4	Yang <i>et al.</i> (2005)
China	35.46	104.75	CT		5	CF,CFS	0.5,3.0	Bi <i>et al.</i> (2009)
China	35.57	106.68	CT	5.6	25	UCF,CFS,CFM	0.3,2.1,4.2	Zhao <i>et al.</i> (2009)
China	29.23	111.52	WT	6.2	31	CF,CFS	1.2,6.3	Zhao <i>et al.</i> (2009)
China	25.10	121.38	TR	14.0	5	CF,CFM	0.6,7.7	Lee <i>et al.</i> (2006)
China	44.00	87.80	CT	8.8	18	UCF,CF,CFS,CFM	0.4,0.7,2.3,4.8	Jiang <i>et al.</i> (2014)
China	43.50	124.80	CT	13.2	19	UCF,CF,CFS,CFM	0.3,1.0,2.9,3.8	Jiang <i>et al.</i> (2014)
China	37.91	114.52	WT		6	CFS	5.0	Dong <i>et al.</i> (2009)
China	37.90	115.20	WT	10.0	21	CFM	5.0	Lei <i>et al.</i> (2005)
China	35.53	105.07	CT	8.8	4	CF,CFS	0.4,4.0	Wu <i>et al.</i> (2012)
China	35.35	106.88	CT	9.3	4	CF,CFS	0.4,4.0	Wu <i>et al.</i> (2012)
China	35.08	105.25	CT	9.1	4	CF,CFS	0.4,3.6	Wu <i>et al.</i> (2012)
China	32.53	120.09	WT	5.6	3	CF,CFS	0.5,1.4	Qian <i>et al.</i> (1998)
China	32.41	120.11	WT	5.5	3	CF,CFS	0.5,1.7	Qian <i>et al.</i> (1998)
China	30.43	120.40	WT		1	CF,CFS	1.3,4.7	He <i>et al.</i> (2014)
China	29.51	112.86	WT	10.2	2	CF,CFS	0.5,1.4	Liu <i>et al.</i> (2003)
China	29.20	112.80	WT	26.0	14	CFM	8.2	Huang <i>et al.</i> (2009)
China	28.80	111.80	WT	17.1	14	CFM	7.7	Liu <i>et al.</i> (2007)
China	28.25	116.33	TR	17.6	25	CF,CFM	1.1,4.7	Yuan <i>et al.</i> (2008)
China	26.23	119.07	TR	12.5	28	CF,CFS,CFM	1.1,5.6,2.8	Li (2011)
China	25.21	110.21	TR	18.4	1	CFS	3.7	Yan (2013)



China	25.00	101.60	WT	31.4	12	UCF,CF,CFM	0.8,0.9,5.3	Wang (2000)
China	24.78	108.91	TR	18.8	1	CFS		Yan (2013)
China	24.64	110.66	TR	18.9	1	CFS		Yan (2013)
China	24.47	109.76	TR	14.7	1	CFS		Yan (2013)
China	24.16	110.81	TR	18.1	1	CFS		Yan (2013)
China	23.19	108.22	TR	18.4	1	CFS	2.8	Yan (2013)
China	22.14	108.45	TR	19.5	1	CFS		Yan (2013)
China	30.72	116.86	WT	13.0	1	CF,CFS	1.4,2.8	Li (2015)
China	31.02	117.10	WT	19.5	1	CFS	5.8	Tian (2012)
Czech Republic	50.10	14.50	CT	10.0	21	CFM	2.1	Coleman <i>et al.</i> (1997)
Denmark	55.18	11.93	CT	17.2	70	CF,CFM		Bruun <i>et al.</i> (2003)
Denmark	55.18	11.93	CT	8.5	66	CF,CFM		Bruun <i>et al.</i> (2003)
Denmark	56.50	9.57	CT	23.8	12	CFM	3.4	Chirinda <i>et al.</i> (2010)
Denmark	55.46	9.10	CT		93	CF,CFM		Anderson and Domsch (1989)
Ethiopia	7.30	38.08	TR	3.9	3	CF,CFS	0.4,3.1	Zelege <i>et al.</i> (2004)
Ethiopia	6.78	37.72	TR	5.5	3	CF,CFS	0.4,3.1	Zelege <i>et al.</i> (2004)
France	48.90	2.00	WT	11.8	115	CFS,CFM	1.6,4.0	Houot <i>et al.</i> (1989)
France	47.88	-2.73	WT	25.0	8	CFS,CFM	3.0,4.4	Viaud <i>et al.</i> (2011)
France	48.55	2.55	WT	12.1	32	CFS		Balesdent <i>et al.</i> (1990)
Germany	51.30	12.10	CT	15.1	87	CF,CFM	2.8,3.9	Kelly <i>et al.</i> (1997)
Germany	50.90	6.88	CT		32	CF,CFS,CFM	0.6,2.4,2.5	Marschner <i>et al.</i> (2003)
Germany	52.57	13.63	CT		60	UCF,CFM		Anderson and Domsch (1989)
Germany	52.03	10.63	CT		25	CF,CFS		Anderson and Domsch (1989)
Germany	50.77	7.16	WT		14	CF,CFS ,CFM		Anderson and Domsch (1989)
Germany	50.76	8.89	CT		24	UCF,CFS ,CFM		Anderson and Domsch (1989)
Germany	50.61	7.01	CT		28	UCF,CFS		Anderson and Domsch (1989)

Germany	49.43	8.39	WT		17	CF,CFM		Anderson and Domsch (1989)
Germany	48.19	11.22	CT		18	UCF,CF,CFS,CFM		Anderson and Domsch (1989)
Germany	50.40	6.55	CT		61	CF,CFM	0.8,4.4	Kürschens <i>et al.</i> (1998)
Germany	52.26	13.27	CT		54	UCF,CF,CFS,CFM	0.6,0.7,2.6,2.1	Kürschens <i>et al.</i> (1998)
Germany	48.17	11.67	CT		3	CFM	4.8	Ebertseder <i>et al.</i> (2001)
Hungary	47.32	19.00	WT	29.0	36	CFM	1.8	Falloon and Smith (2002)
Hungary	46.54	18.31	WT	25.7	29	CF	2.0	Falloon and Smith (2002)
Iceland	65.03	-14.95	CT		43	CF		Gudmundsson <i>et al.</i> (2008)
Iceland	65.68	-18.60	CT		62	CF		Gudmundsson <i>et al.</i> (2008)
Iceland	63.73	-20.10	CT		61	CF		Gudmundsson <i>et al.</i> (2008)
India	23.20	80.00	TR	5.8/6.9	28	UCF,CF,CFS, CFM		Yadav <i>et al.</i> (2000); Hati <i>et al.</i> (2007)
India	30.90	75.90	TR	3.6	12	UCF,CFS,CFM	0.8, 3.7,2.8	Aulakh <i>et al.</i> (2001); Bhattacharyya <i>et al.</i> (2007)
India	22.80	88.40	TR	7.1	34	CF,CFM		Bhattacharyya <i>et al.</i> (2007)
India	23.00	89.00	TR	8.8	19	CF,CFS,CFM	0.8,4.9,4.9	Majumder <i>et al.</i> (2008)
India	30.90	75.13	TR	4.8	8	UCF,CFS,CFM	1.0,4.1,7.2	Benbi and Senapati (2010)
India	20.42	85.92	TR	4.9	4	UCF,CFS,CFM	0.5,2.4,2.8	Bhattacharyya <i>et al.</i> (2012)
India	21.15	17.12	TR	4.1	5	CFS	1.0	Blaise and Ravindran (2003)
India	29.07	77.77	TR	4.0	4	UCF, CF,CFS	0.9,1.0,3.5	Gangwar <i>et al.</i> (2006)
India	30.93	75.87	TR	3.0	6	CF,CFS	0.5,3.3	Ghuman and Sur (2001)
India	29.03	75.08	TR	4.2	12	UCF, CFS,CFM	0.6,3.7,1.2	Goyal <i>et al.</i> (1999)
India	25.30	83.02	TR	7.9	2	CFS	6.0	Kushwaha <i>et al.</i> (2000)
India	28.48	77.21	TR	7.5	4	CFS	0.6,3.3	Prasad <i>et al.</i> (1999)
India	17.30	78.60	TR	3.7	7	UCF, CFS,CFM	0.2,1.0,1.0	Sharma <i>et al.</i> (2005)
India	28.63	77.18	TR	5.9	4	CF,CFS	1.3,8.4	Sharma <i>et al.</i> (2010)

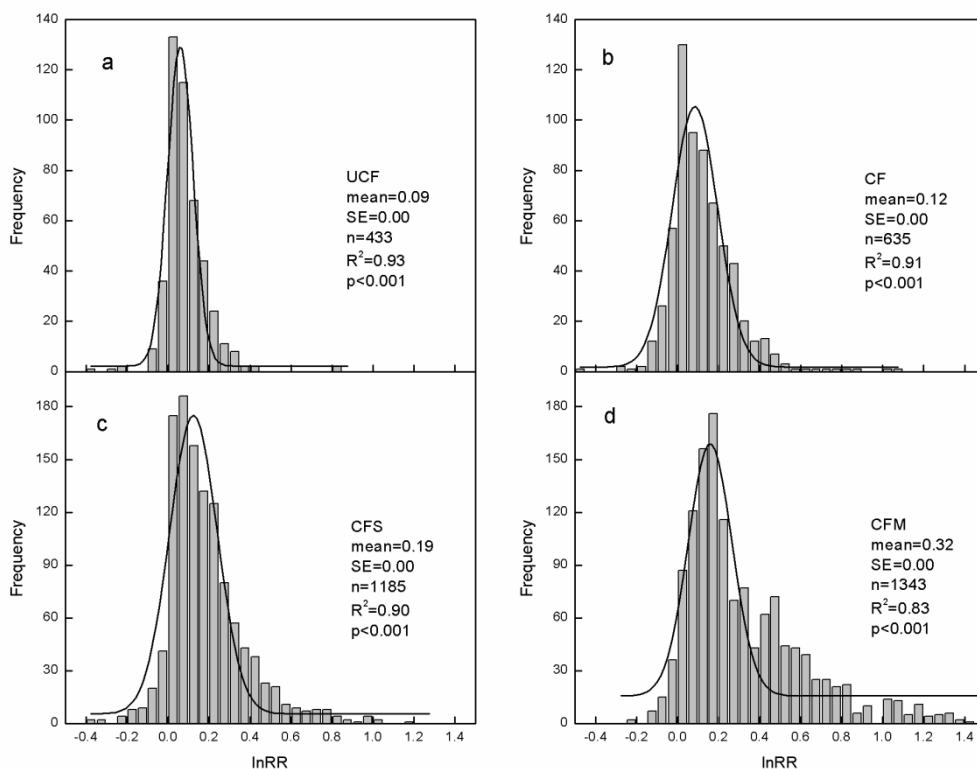
India	17.53	78.27	TR	9.2	3	UCF,CFS,CFM	1.9,4.9,5.1	Surekha <i>et al.</i> (2003)
India	32.10	76.55	WT	11.4	5	CFS,CFM	2.2,3.2	Verma and Bhagat (1992)
India	29.00	79.08	TR	14.2	15	CF,CFS,CFM	0.7,6.7,1.8	Yadav <i>et al.</i> (2000)
India	26.97	80.57	TR	2.9	13	CF,CFS,CFM	0.7,4.1,1.9	Yadav <i>et al.</i> (2000)
India	26.07	82.13	TR	3.7	14	CF,CFS,CFM	0.6,4.8,1.8	Yadav <i>et al.</i> (2000)
India	25.23	87.07	TR	4.6	14	CF,CFS,CFM	0.6,4.2,2.9	Yadav <i>et al.</i> (2000)
India	25.50	85.25	TR	5.3	5	CF,CFM	0.4,2.4	Singh <i>et al.</i> (2001)
India	25.68	91.63	TR		6	CF,CFM		Saha <i>et al.</i> (2010a)
India	20.25	85.83	TR		4	CF,CFM	0.4,5.1	Saha <i>et al.</i> (2010b)
India	26.93	80.87	TR	3.2	2	CF,CFM	2.9,6.7	Singh <i>et al.</i> (2007)
India	29.60	79.67	WT	5.1	3	UCF,CF,CFM	1.1,1.9,4.6	Saha <i>et al.</i> (2008)
India	20.56	77.14	TR		19	UCF,CFM		Sharma <i>et al.</i> (2011)
India	18.69	80.85	TR	5.6	3	CF,CFM	4.7,8.1	Dass <i>et al.</i> (2008)
India	20.00	86.00	TR	7.5	21	UCF CF,CFM	0.6,0.7,1.6	Nayak <i>et al.</i> (2009)
India	24.50	72.22	TR	3.1	18	CF,CFM	0.3,1.5	Srinivasarao <i>et al.</i> (2014)
India	28.30	83.05	WT		9	CFS,CFM	2.2,1.6	Sarkar <i>et al.</i> (2003)
Iran	29.83	52.77	WT	12.5	4	CFS	2.0	Bahrani <i>et al.</i> (2002)
Iran	32.53	51.38	WT	5.0	8	UCF,CFM	0.4,11.5	Hemmat <i>et al.</i> (2010)
Ireland	52.86	-6.94	CT	13.6	9	UCF,CFS	1.7,4.1	van Groenigen <i>et al.</i> (2011)
Italy	44.60	11.40	WT	7.7	35	CFS,CFM		Plaza <i>et al.</i> (2012)
Italy	45.09	7.60	WT	11.6	11	UCF,CFS,CFM	0.9,6.6,3.5	Monaco <i>et al.</i> (2008)
Italy	45.35	11.97	WT	1.7-105.0	39	CF,CFS,CFM	2.1,3.4,5.6	Morari <i>et al.</i> (2006)
Italy	44.43	12.13	WT	7.0	6	CFM	3.4	Bragato <i>et al.</i> (1998)
Italy	43.67	10.32	WT		25	CFS	3.3	Mazzoncini <i>et al.</i> (2008)
Italy	43.53	13.37	WT	12.4	45	CFS	6.5	De Sanctis <i>et al.</i> (2012)
Japan	36.62	137.23	WT	17.6	19	CFS	2.5	Shirato and Yokozawa (2005)

Japan	35.33	132.73	WT	17.8	19	CFS	2.5	Shirato and Yokozawa (2005)
Japan	34.63	136.50	WT	19.0	24	CFS	2.3	Shirato and Yokozawa (2005)
Japan	33.53	131.38	WT	9.0	19	CFS	2.9	Shirato and Yokozawa (2005)
Japan	42.88	143.05	CT	34.0	5	CF,CFS,CFM	0.2,1.3,2.8	Koga and Tsuji (2009)
Japan	43.23	141.82	CT		1	CFS	1.1	Naser <i>et al.</i> (2007)
Japan	33.25	130.48	WT		41	UCF,CFS	0.5,3.2	Tirol - Padre <i>et al.</i> (2005)
Japan	39.68	140.12	WT	21.4	16	CF	0.53	Shirato and Yokozawa (2005)
Kenya	0.57	34.33	TR	8.3	2	CFS	1.1	Anyanzwa <i>et al.</i> (2010)
Kenya	-0.50	37.45	TR	29.3	4	UCF,CFS	0.3,2.1	Gentile <i>et al.</i> (2010)
Kenya	-0.78	37.67	TR	5.3	4	UCF,CFS	0.3,2.1	Gentile <i>et al.</i> (2010)
Kenya	0.23	34.94	WT		2	CFM	3.5	Kimetu and Lehmann (2010)
Kenya	-1.25	36.68	WT	20.0	27	UCF,CFS,CFM	0.3,2.7,2.1	Kibunja <i>et al.</i> (2010)
Malaysia	3.03	101.70	TR	17.0	3	CF,CFS,CFM	0.6,2.2,5.2	Mubarak and Rosenani (2003)
Mexico	19.51	-101.71	WT	17.2	6	CFS,CFM	3.1,4.0	Roldán <i>et al.</i> (2003)
Mexico	19.00	102.22	TR	7.0	9	CFS	1.8	Salinas-Garcia <i>et al.</i> (2001)
Mexico	19.42	101.60	TR	33.6	9	CFS	2.2	Salinas-Garcia <i>et al.</i> (2001)
Nepal	27.35	84.88	TR	6.5	20	UCF,CF,CFS,CFM	0.3,0.5,2.7,2.0	Gami <i>et al.</i> (2001)
Nepal	26.72	87.28	TR		25	CF,CFM	0.4,3.6	Gami <i>et al.</i> (2009)
Nepal	27.52	83.42	TR		25	CF,CFM	0.4,3.6	Gami <i>et al.</i> (2009)
Nepal	27.08	84.93	TR		23	CF,CFM	0.4,4.0,3.6	Gami <i>et al.</i> (2009)
Nepal	27.65	82.35	TR	14.4	4	UCF,CFM	0.6,4.6	Ghimire <i>et al.</i> (2012)
New Zealand	-43.63	172.50	WT	31.0	6	CF,CFS	0.5,2.6	Curtin and Fraser (2003)
New Zealand	-43.78	172.02	WT		8	CFM	1.8	Murata and Goh (1997)
New Zealand	-43.65	172.48	WT		5	CFS		Goh <i>et al.</i> (2000)
New Zealand	-43.31	171.93	CT		8	CFM		Nguyen <i>et al.</i> (1995)
New Zealand	-43.54	172.47	WT		8	CFM		Nguyen <i>et al.</i> (1995)

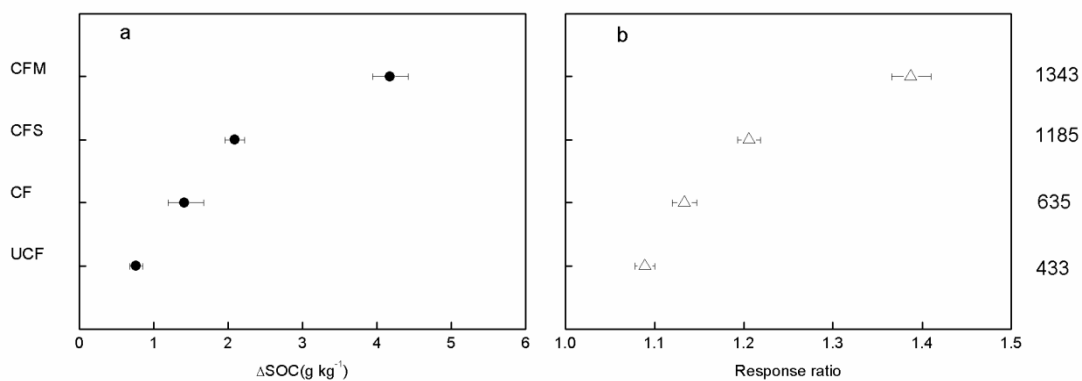
New Zealand	-44.24	171.29	WT		8	CFM		Nguyen <i>et al.</i> (1995)
New Zealand	-36.77	174.92	WT		10	CFM		Reganold <i>et al.</i> (1993)
Niger	13.25	2.30	TR	2.0	2	CFS	1.0	Michels <i>et al.</i> (1995)
Norway	59.67	10.77	CT		49	CF,CFM	0.6,4.2	Holeplass <i>et al.</i> (2004)
Romania	47.22	27.25	CT		13	UCF,CFS, CFM	0.4,3.1,3.5	Ailincai <i>et al.</i> (2011)
Russia	55.20	37.70	CT	6.4	36	CF,CFM	0.7,1.9	Shevtsova <i>et al.</i> (2003)
Spain	38.83	-0.70	WT	11.6	2	CF	0.2,1.6	García-Orenes <i>et al.</i> (2009)
Spain	40.30	-3.40	WT	5.6	17	CFS	1.2	Hernanz <i>et al.</i> (2002)
Sweden	59.82	17.65	CT	15.0	54	CF,CFS,CFM	0.8,2.2,2.8	Käterer <i>et al.</i> (2011)
Sweden	55.98	12.87	CT	31.4	34	CF,CFM		Carlgren and Mattsson (2001)
Sweden	55.82	13.50	CT	24.3	34	CF,CFM		Carlgren and Mattsson (2001)
Sweden	55.63	13.43	CT	15.4	34	CF,CFM		Carlgren and Mattsson (2001)
Sweden	54.40	13.23	CT	15.2	34	CF,CFM		Carlgren and Mattsson (2001)
Sweden	55.88	12.87	CT	11.6	34	CF,CFM		Carlgren and Mattsson (2001)
Switzerland	47.50	7.55	CT	16.3	29	CF,CFM	1.4,2.6	Leifeld <i>et al.</i> (2009)
Switzerland	47.48	8.91	CT	28.0	14	CFS	6.4	Anken <i>et al.</i> (2004)
Thailand	14.80	100.80	TR	6.5	28	CF,CFS	3.8,6.6	Shirato <i>et al.</i> (2005)
Thailand	14.87	101.65	TR	5.9	27	CF,CFS	0.7,4.5	Shirato <i>et al.</i> (2005)
Thailand	16.48	102.83	TR	5.0	26	CF,CFS	0.7,2.6	Shirato <i>et al.</i> (2005)
Thailand	14.92	103.42	TR		12	CF,CFS,CFM	0.3,1.7,3.1	Thuithaisong <i>et al.</i> (2011)
The Netherlands	53.16	6.65	CT	8.6	20	CFM		Zwart (2003)
The Netherlands	51.90	4.58	CT	18.6	29	CFM		Zwart (2003)
UK	51.80	0.40	CT	25.5	116	CF,CFM	2.7,3.3	Coleman <i>et al.</i> (1997)
UK	52.18	0.11	CT	33.0	17	CFM	2.5	Bhokal <i>et al.</i> (2011)
UK	52.78	-2.43	CT	15.0	17	CFM	2.2	Bhokal <i>et al.</i> (2011)
UK	54.13	-0.99	CT	14.0	14	CFM	1.6	Bhokal <i>et al.</i> (2011)

UK	53.53	-1.28	CT	11.0	15	CFM	4.4	Bhogal <i>et al.</i> (2011)
UK	51.98	-0.63	CT		5	CFM	2.1	Johnston <i>et al.</i> (2009)
UK	51.80	-0.37	CT		124	CF,CFM		Haynes and Naidu (1998)
UK	51.80	-0.37	CT		102	CF,CFM	0.3,3.7	Powlson <i>et al.</i> (2011)
Ukraine	46.80	36.70	WT	30.8	33	CF,CFM	1.1,1.8	Franko <i>et al.</i> (2007)
USA	40.10	-88.23	WT		51	CFM		Nafziger and Dunker (2011)
USA	50.57	4.68	CT		36	CFS,CFM	1.7,2.1	Davis <i>et al.</i> (2003)
USA	35.40	-97.60	WT	15.0	12	CFS		Dao (1998)
USA	40.00	-83.02	WT		9	CFS	4.3	Duiker and Lal (1999)
USA	36.34	-120.12	WT		6	CFS	2.3	Veenstra <i>et al.</i> (2007)
USA	33.37	-83.40	WT		12	CFS		Franzluebbers and Stuedemann (2009)
USA	34.68	-86.87	WT	11.5	10	CFS,CFM	6.3,8.2	Sainju <i>et al.</i> (2008)
USA	43.33	-89.72	CT		4	CFM	3.5	Jokela <i>et al.</i> (2009)
USA	45.70	-118.78	WT		56	UCF,CFS,CFM	1.8,2.0,3.6	Rasmussen and Parton (1994)
USA	44.17	-96.68	CT	25.4	4	UCF,CFM	1.3,5.2	Lee <i>et al.</i> (2007)
USA	42.78	-84.47	CT		34	CF,CFM	0.8,5.2	Edmeades (2003)
USA	44.88	-68.69	CT		6	CFM	1.7	Grandy <i>et al.</i> (2002)
USA	38.94	-92.31	WT		101	CF,CFM	0.6,1.9	Buyanovsky and Wagner (1998)
USA	45.00	-93.20	CT	28.5	14	CFS		Clapp <i>et al.</i> (2000)
USA	42.22	-82.73	CT	20.0	10	CFS		Jokela <i>et al.</i> (2009)
USA	40.80	-82.03	CT		12	CFS		Dick <i>et al.</i> (1998)
USA	38.50	-121.80	WT	7.9	13	CF,CFM	1.1,5.2	Doane and Horw áth (2004)
USA	36.10	-97.10	WT	20.8	111	UCF,CF,CFM	0.4,0.7,2.2	Parham <i>et al.</i> (2002);Girma <i>et al.</i> (2008)
USA	32.50	-83.90	WT	8.6	6	UCF,CFS		Sainju <i>et al.</i> (2002)

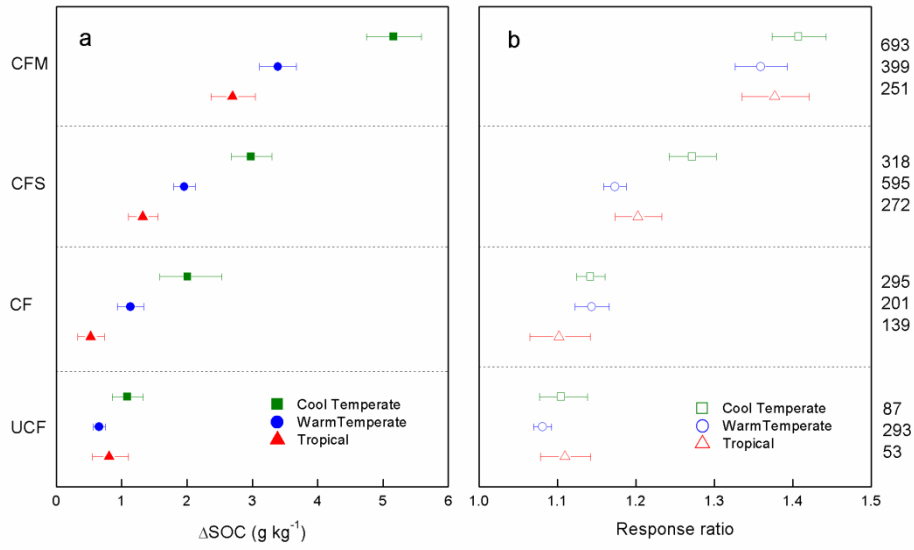
## 2. Results using multiple year observations



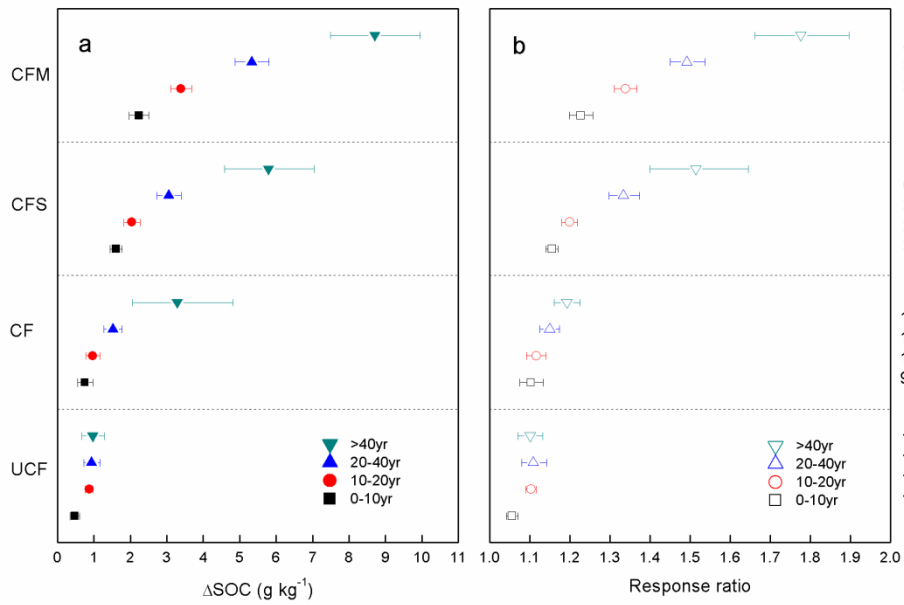
**Figure S2** Frequency distributions of response ratios (lnRR) for UCF, CF, CFS and CFM. UCF, CF, CFS and CFM represent the unbalanced application of chemical fertilizer, balanced application of chemical fertilizer, chemical fertilizer plus straw retention and chemical fertilizer plus manure, hereafter the same.



**Figure S3** Mean difference in SOC ( $\text{g kg}^{-1}$ ) (a) and the relative change (b) comparing with CK.

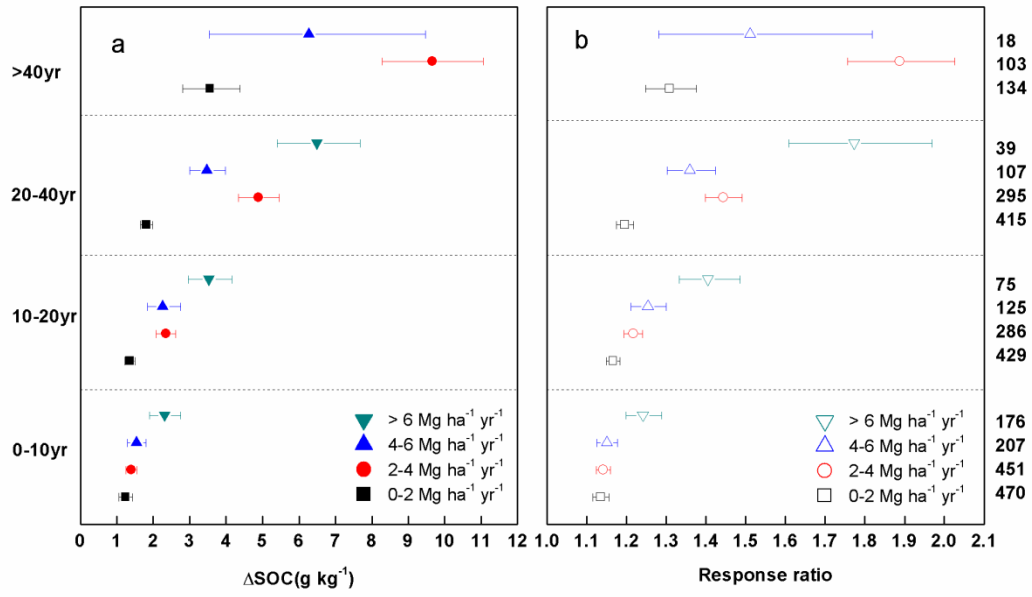


**Figure S4** Climate effects on mean difference in SOC ( $\text{g kg}^{-1}$ ) (a) and the relative change (b) comparing with CK.

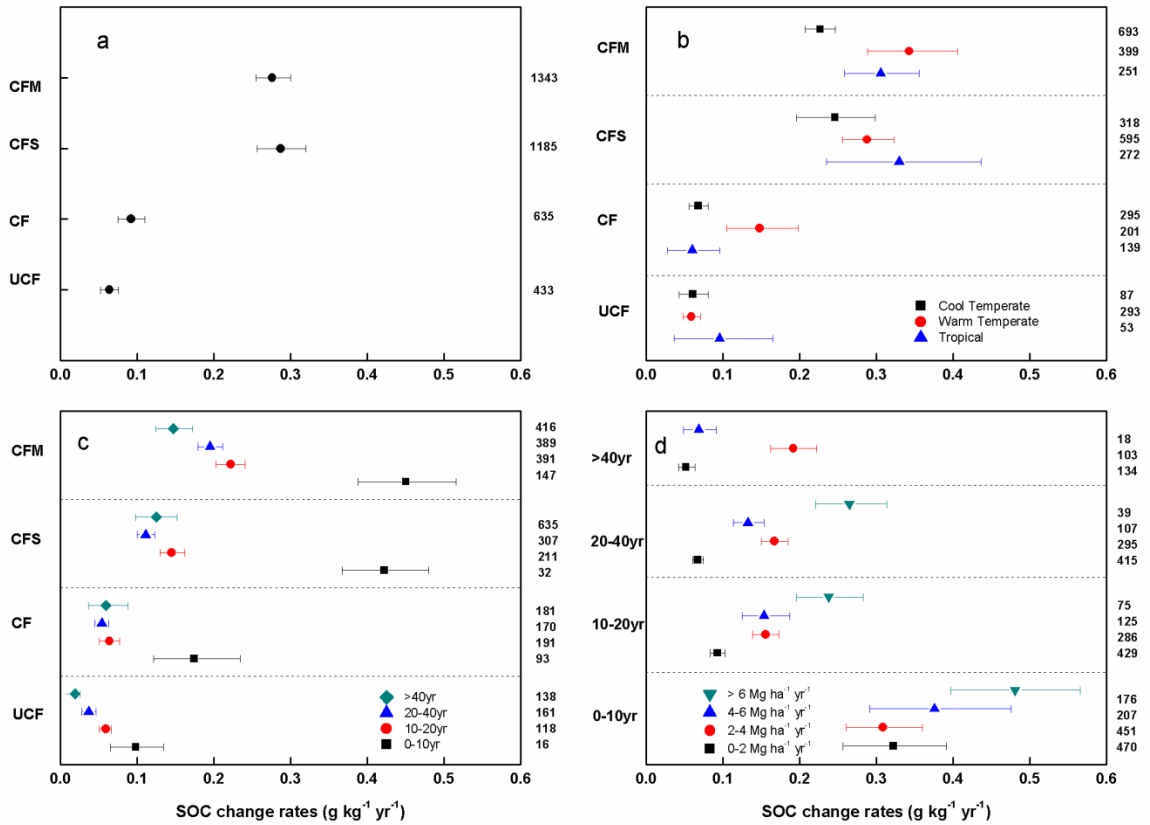


**Figure S5** Experimental duration effects on mean difference in SOC ( $\text{g kg}^{-1}$ ) (A) and the relative change (B) comparing with CK.

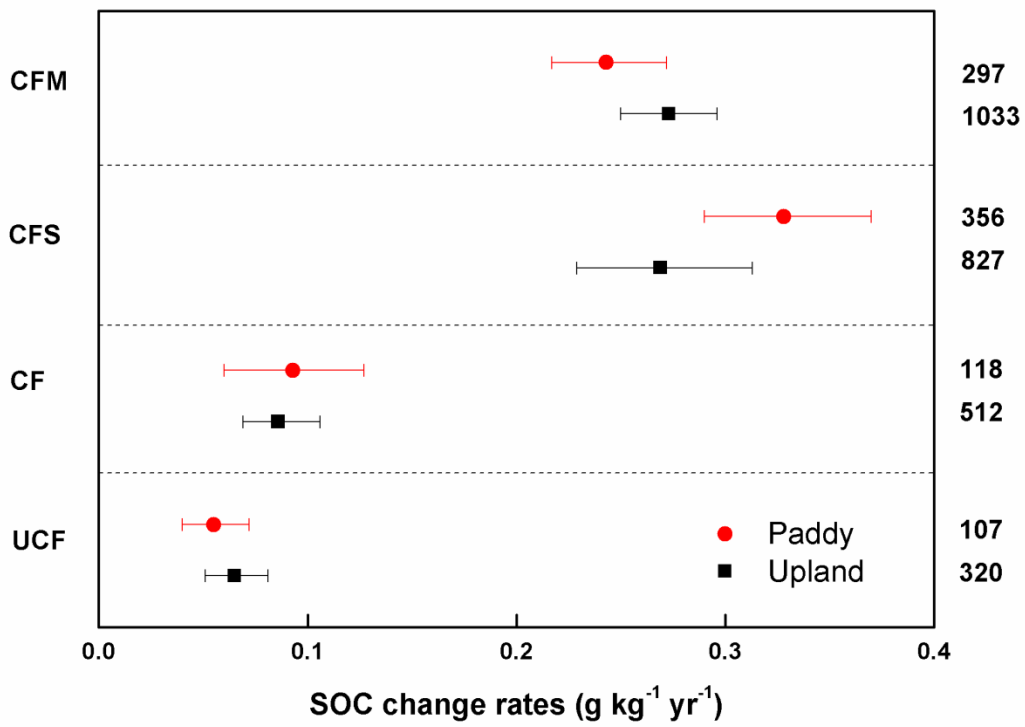




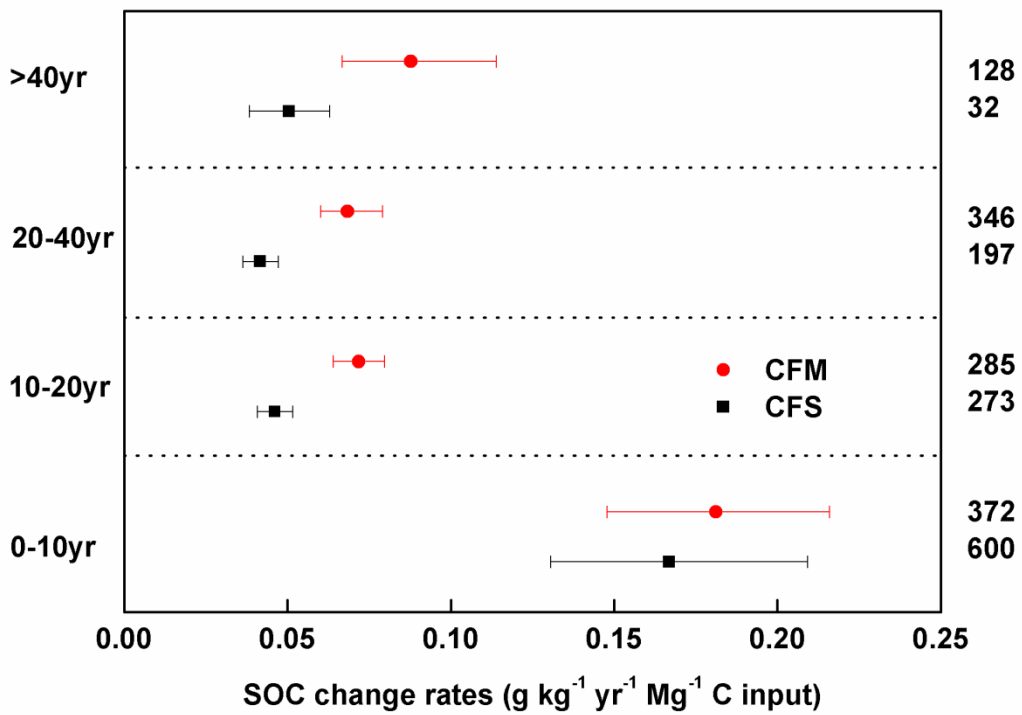
**Figure S6** C input effects on mean difference in SOC ( $\text{g kg}^{-1}$ ) (A) and the relative change (B) comparing with CK.



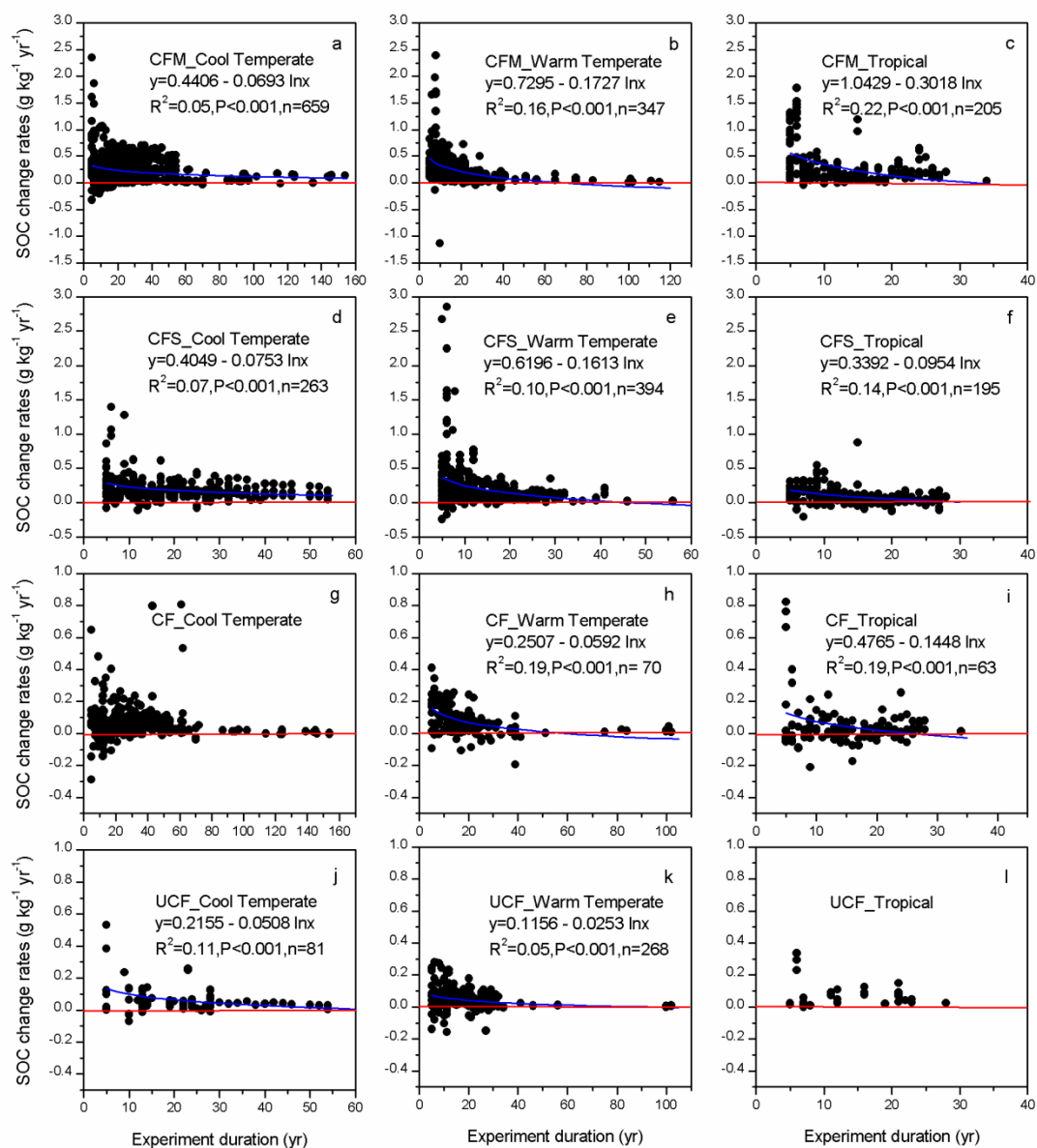
**Figure S7** Effects of main factors on SOC change rates.



**Figure S8** Effects of upland and paddy on SOC change rates.



**Figure S9** C sequestration efficiency for manure and straw under different durations.



**Figure S10** Relationships between the relative SOC change rates and duration years using the multiple year observations. Experiments with over 5 years were used to reduce the instabilities at the beginning of the experiment.

### 3. The calculation of C sequestration durations under different treatments

A natural log form was used to fit the scattered points as the equation below:

$$RCR = A - B \cdot \ln(x)$$

where  $x$  and RCR represent experiment durations and relative SOC change rates, respectively, and  $A$  and  $B$  are regressed constants. When RCR equals to zero or a lower limit (set to  $0.05 \text{ g kg}^{-1} \text{ yr}^{-1}$ ) that is difficult to detect in field experiments, the calculated  $x$  is considered as C sequestration duration.

**Table S2** The C sequestration durations under different treatments. Experiments with over 5 years were used to reduce the instabilities at the beginning of the experiment, and “-“ sign denotes no formula could be obtained through regression.

Fertilization	The last year observations		Multiple year observations	
	Lower	Upper	Lower	Upper
CFM_Cool	72	117	275	564
CFM_Warm	50	65	51	68
CFM_Tropical	26	30	27	32
CFS_Cool	46	73	110	212
CFS_Warm	37	48	34	47
CFS_Tropical	28	47	21	35
CF_Cool	-	-	-	-
CF_Warm	30	69	27	60
CF_Tropical	19	27	14	26
UCF_Cool	-	-	26	70
UCF_Warm	18	58	13	96
UCF_Tropical	-	-	-	-

**4. Initial SOC and N addition effects on SOC changes , differences among groups, publication bias and other analyses.**

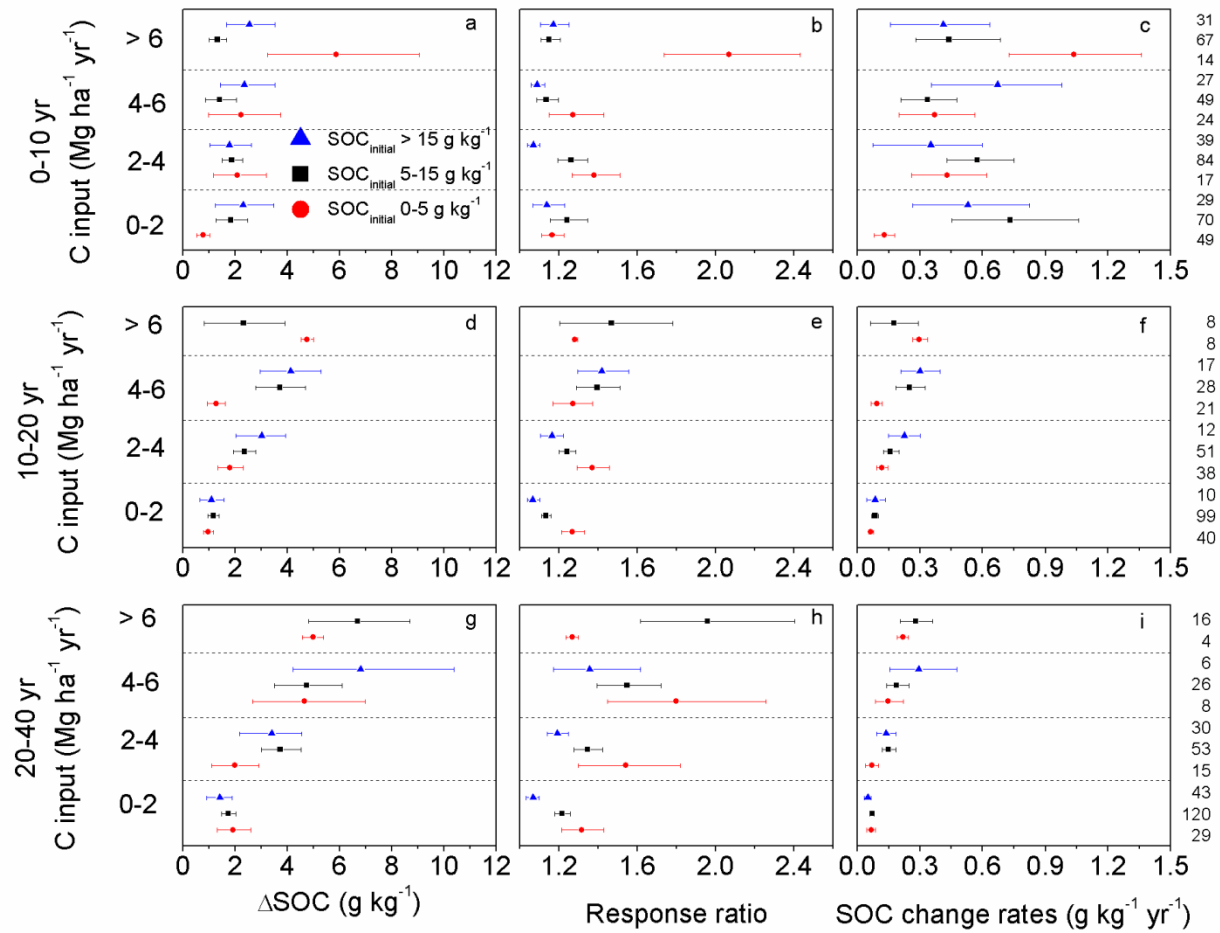
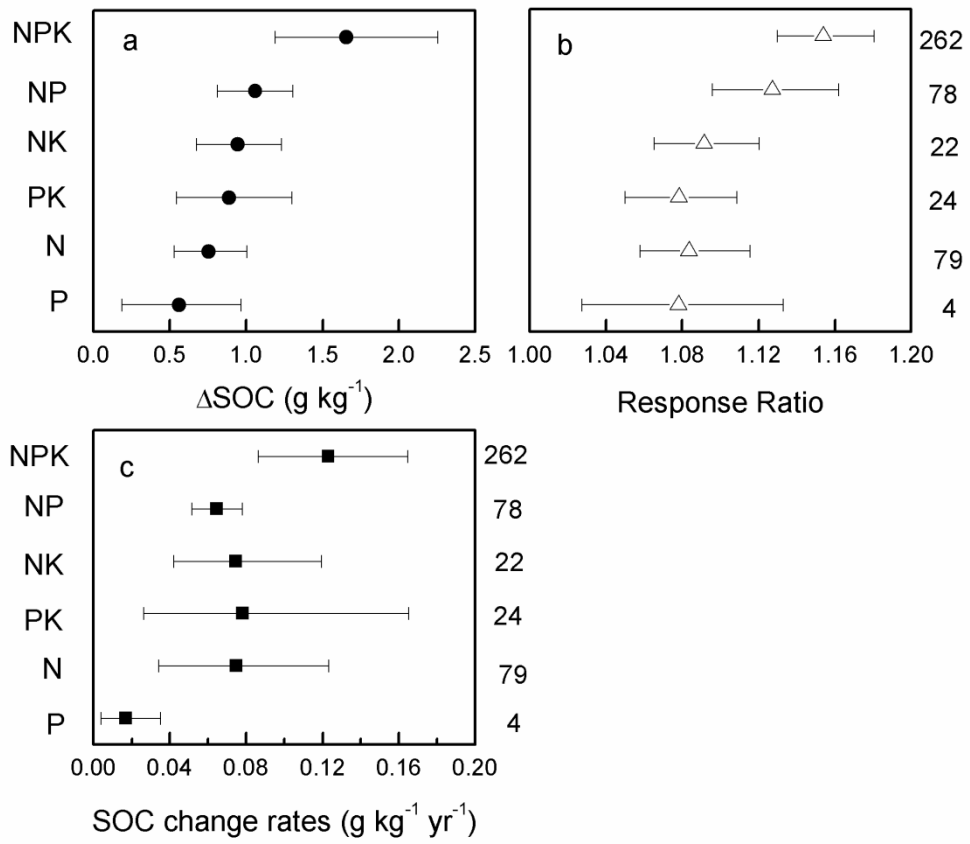


Figure S11 Initial SOC effects on SOC changes.



**Figure S12** N addition effects on SOC changes.

**Table S3** Effects of fertilization on between-group heterogeneity (Qb) in relation to the soil organic carbon changes.

Group	Categorical variable	$\Delta$ SOC		RR		RCR	
		Qb	P-value	Qb	P-value	Qb	P-value
Total	Fertilizer	1423.50	<b>0.000</b>	11.07	<b>0.000</b>	19.12	<b>0.000</b>
CFM		4.93	0.081	1.28	<b>0.000</b>	5.60	<b>0.000</b>
CFS	Climate zone	2.45	0.294	0.52	<b>0.001</b>	2.48	0.053
CF		5.47	<b>0.048</b>	0.19	0.057	1.20	<b>0.005</b>
UCF		3.70	0.159	0.00	0.846	0.04	0.444
CFM	Experimental duration	50.73	<b>0.000</b>	1.88	<b>0.000</b>	25.95	<b>0.000</b>
CFS		31.92	<b>0.000</b>	1.18	<b>0.000</b>	17.87	<b>0.000</b>
CF		22.44	<b>0.000</b>	0.01	0.986	2.77	<b>0.000</b>
UCF		9.06	<b>0.035</b>	0.11	0.061	0.26	<b>0.016</b>
0-10yr		6.27	0.099	0.28	0.143	0.82	0.707
10-20yr		69.92	<b>0.000</b>	1.34	<b>0.000</b>	1.23	<b>0.000</b>
20-30yr	C input	111.77	<b>0.000</b>	3.90	<b>0.000</b>	1.22	<b>0.000</b>
30-40yr		31.87	<b>0.000</b>	1.72	<b>0.000</b>	0.11	<b>0.000</b>
>40yr		12.14	<b>0.004</b>	1.82	<b>0.001</b>	0.12	<b>0.001</b>
0-10yr		-	-	-	-	6.42	<b>0.001</b>
10-20yr	Manure and straw efficiency	-	-	-	-	0.08	<b>0.001</b>
20-40yr		-	-	-	-	0.04	<b>0.000</b>
>40yr		-	-	-	-	0.00	0.797

**Table S4** The publication bias of major factors on SOC changes. Boldface for the Kendall's tau rank and Spearman rank indicate significant publication bias at  $p < 0.05$ .

Group	Subgroup	n	Kendall's tau rank	Spearman rank
Fertilization				
UCF		207	0.135	0.146
CF		262	0.649	0.309
CFS		620	0.650	0.367
CFM		652	<b>0.000</b>	<b>0.007</b>
Climate zone				
UCF	Cool Temperate	50	0.291	0.246
UCF	Warm Temperate	119	0.641	0.541
UCF	Tropical	38	0.050	0.079
CF	Cool Temperate	97	0.390	0.057
CF	Warm Temperate	89	0.059	<b>0.045</b>
CF	Tropical	76	0.976	0.653
CFS	Cool Temperate	182	0.951	0.843



CFS	Warm Temperate	324	0.268	0.543
CFS	Tropical	114	0.947	0.884
CFM	Cool Temperate	251	<b>0.003</b>	<b>0.007</b>
CFM	Warm Temperate	209	0.440	0.589
CFM	Tropical	192	<b>0.023</b>	0.082
	Experiment duration			
UCF	0-10yr	44	<b>0.048</b>	0.082
UCF	10-20yr	83	0.900	0.975
UCF	20-40yr	73	0.552	0.626
UCF	>40yr	7	0.881	0.819
CF	0-10yr	76	0.196	0.505
CF	10-20yr	60	0.293	0.258
CF	20-40yr	83	0.078	<b>0.043</b>
CF	>40yr	43	0.917	0.726
CFS	0-10yr	395	0.104	0.306
CFS	10-20yr	134	<b>0.036</b>	<b>0.048</b>
CFS	20-40yr	77	0.286	0.233
CFS	>40yr	14	0.139	0.409
CFM	0-10yr	205	<b>0.000</b>	<b>0.001</b>
CFM	10-20yr	182	0.777	0.997
CFM	20-40yr	200	0.756	0.352
CFM	>40yr	65	<b>0.011</b>	<b>0.038</b>
Experiment duration	C input			
0-10yr	0-2 Mg ha <sup>-1</sup> yr <sup>-1</sup>	215	<b>0.000</b>	<b>0.001</b>
0-10yr	2-4 Mg ha <sup>-1</sup> yr <sup>-1</sup>	215	<b>0.003</b>	0.086
0-10yr	4-6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	115	<b>0.000</b>	<b>0.000</b>
0-10yr	>6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	132	<b>0.001</b>	<b>0.011</b>
10-20yr	0-2 Mg ha <sup>-1</sup> yr <sup>-1</sup>	183	0.627	0.316
10-20yr	2-4 Mg ha <sup>-1</sup> yr <sup>-1</sup>	118	0.190	0.167
10-20yr	4-6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	59	0.713	0.811
10-20yr	>6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	35	0.955	0.607
20-40yr	0-2 Mg ha <sup>-1</sup> yr <sup>-1</sup>	214	0.380	0.162
20-40yr	2-4 Mg ha <sup>-1</sup> yr <sup>-1</sup>	119	0.366	0.859
20-40yr	4-6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	47	0.289	0.459
20-40yr	>6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	26	0.496	0.584
>40yr	0-2 Mg ha <sup>-1</sup> yr <sup>-1</sup>	48	0.001	0.001
>40yr	2-4 Mg ha <sup>-1</sup> yr <sup>-1</sup>	36	0.414	0.750
>40yr	4-6 Mg ha <sup>-1</sup> yr <sup>-1</sup>	13	0.393	0.459

**Table S5** Comparisons of the 95% CI of the last year results and multiple year results. Boldface indicates the 95% CI for the last year results were smaller than the multiple year results.

Group	95% CI differences			95% CI ranges			95% CI ranges		
	(Last year - Multiple year)			for the last year results			for the multiple year results		
	$\Delta$ SOC (g kg <sup>-1</sup> )	RR	RCR (g kg <sup>-1</sup> yr <sup>-1</sup> )	$\Delta$ SOC (g kg <sup>-1</sup> )	RR	RCR (g kg <sup>-1</sup> yr <sup>-1</sup> )	$\Delta$ SOC (g kg <sup>-1</sup> )	RR	RCR (g kg <sup>-1</sup> yr <sup>-1</sup> )
CFM	0.094	0.014	0.035	0.579	0.058	0.080	0.485	0.044	0.045
CFS	0.110	0.009	0.036	0.373	0.035	0.100	0.263	0.026	0.064
CF	0.567	0.023	0.043	1.043	0.051	0.078	0.476	0.028	0.035
UCF	0.117	0.013	0.018	0.287	0.035	0.042	0.170	0.022	0.024
CFM_Cool	0.258	0.024	0.032	1.101	0.093	0.072	0.843	0.069	0.040
CFM_Warm	0.348	0.037	0.093	0.909	0.103	0.210	0.561	0.066	0.117
CFM_Tropical	0.145	0.021	0.007	0.829	0.106	0.104	0.684	0.085	0.097
CFS_Cool	0.074	0.006	0.077	0.695	0.066	0.180	0.621	0.060	0.103
CFS_Warm	0.180	0.012	0.046	0.513	0.041	0.113	0.333	0.029	0.067
CFS_Tropical	0.425	0.044	0.146	0.877	0.103	0.348	0.452	0.059	0.202
CF_Cool	1.758	0.026	0.028	2.705	0.063	0.053	0.947	0.036	0.025
CF_Warm	0.422	0.041	0.105	0.826	0.085	0.198	0.404	0.044	0.093
CF_Tropical	0.190	0.043	0.045	0.598	0.120	0.113	0.408	0.077	0.068
UCF_Cool	0.279	0.042	0.008	0.750	0.104	0.046	0.471	0.062	0.038
UCF_Warm	0.134	0.015	0.024	0.314	0.038	0.047	0.180	0.023	0.023
UCF_Tropical	0.115	<b>-0.001</b>	0.024	0.667	0.063	0.152	0.552	0.064	0.128
CFM_0-10yr	0.331	0.047	0.097	0.869	0.104	0.225	0.538	0.058	0.128
CFM_10-20yr	0.165	0.017	0.012	0.742	0.073	0.050	0.577	0.056	0.038

CFM_20-40yr	<b>-0.001</b>	0.021	0.006	0.925	0.108	0.038	0.926	0.087	0.032
CFM_>40yr	0.846	0.052	<b>-0.003</b>	3.306	0.287	0.045	2.460	0.235	0.048
CFS_0-10yr	0.131	0.010	0.040	0.452	0.041	0.153	0.321	0.030	0.113
CFS_10-20yr	0.331	0.026	0.028	0.776	0.065	0.060	0.445	0.040	0.032
CFS_20-40yr	0.367	0.054	0.014	1.048	0.130	0.037	0.681	0.076	0.023
CFS_>40yr	0.729	0.024	0.018	3.194	0.270	0.072	2.465	0.246	0.054
CF_0-10yr	0.438	0.069	0.138	0.847	0.128	0.251	0.409	0.059	0.113
CF_10-20yr	0.168	0.035	0.014	0.565	0.083	0.040	0.397	0.048	0.026
CF_20-40yr	0.276	0.030	0.009	0.774	0.079	0.027	0.498	0.049	0.018
CF_>40yr	3.137	0.021	0.054	5.904	0.086	0.106	2.767	0.065	0.052
UCF_0-10yr	0.335	0.025	0.104	0.605	0.055	0.173	0.270	0.029	0.069
UCF_10-20yr	0.101	0.008	0.008	0.309	0.034	0.023	0.208	0.026	0.015
UCF_20-40yr	0.161	0.023	0.006	0.606	0.084	0.024	0.445	0.061	0.018
UCF_>40yr	<b>-0.016</b>	0.000	<b>-0.001</b>	0.600	0.063	0.013	0.616	0.063	0.014
0-10yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.363	0.038	2.239	0.726	0.079	2.374	0.363	0.040	0.135
0-10yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.178	0.029	1.661	0.484	0.065	1.760	0.306	0.037	0.099
0-10yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.290	0.027	1.995	0.812	0.077	2.179	0.522	0.051	0.184
0-10yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.138	0.015	2.553	1.000	0.104	2.722	0.862	0.089	0.169
10-20yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.110	0.014	0.215	0.391	0.048	0.234	0.281	0.034	0.019
10-20yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.183	0.023	0.467	0.716	0.069	0.501	0.533	0.046	0.034
10-20yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.732	0.059	1.101	1.640	0.147	1.163	0.908	0.088	0.062
10-20yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.188	<b>-0.011</b>	1.064	1.393	0.143	1.151	1.205	0.154	0.087
20-40yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.101	0.018	0.181	0.430	0.061	0.194	0.329	0.043	0.013
20-40yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	<b>-0.050</b>	0.018	0.440	1.058	0.112	0.475	1.108	0.094	0.035
20-40yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.519	0.059	0.785	1.500	0.180	0.825	0.981	0.121	0.040

20-40yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.139	0.030	0.226	2.410	0.390	0.319	2.271	0.360	0.093
>40yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	0.799	0.055	0.744	2.377	0.182	0.766	1.578	0.127	0.022
>40yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	1.363	0.125	0.669	4.137	0.395	0.729	2.774	0.269	0.060
>40yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	1.407	0.065	1.591	7.333	0.601	1.634	5.926	0.536	0.043

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**Table S6** Comparisons of the unweighted and weighted RR and  $\Delta$ SOC.

Group	n	Method	RR			RR differences (%)			$\Delta$ SOC (g kg <sup>-1</sup> )			$\Delta$ SOC differences (%)		
			Mean	95%CI		Mean	95%CI		Mean	95%CI		Mean	95%CI	
				Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
CFM	652	Unweighted	1.36	1.33	1.39	0.18	0.17	0.24	3.47	3.18	3.76	-0.81	-0.53	-1.12
		Weighted	1.37	1.34	1.40				3.44	3.17	3.72			
CFS	620	Unweighted	1.20	1.18	1.21	0.08	0.08	0.07	2.06	1.88	2.25	-0.97	-1.23	-0.85
		Weighted	1.20	1.18	1.21				2.04	1.85	2.23			
CF	262	Unweighted	1.15	1.13	1.18	0.14	0.12	0.15	1.66	1.19	2.24	-7.67	-2.45	-10.95
		Weighted	1.16	1.13	1.18				1.53	1.16	1.99			
UCF	207	Unweighted	1.10	1.08	1.12	0.04	0.05	0.11	0.89	0.75	1.04	-0.79	-0.53	-0.97
		Weighted	1.10	1.08	1.12				0.88	0.74	1.03			
CFM_Cool	251	Unweighted	1.30	1.25	1.34	0.19	0.23	0.17	3.54	3.01	4.10	-0.85	-0.43	-0.73
		Weighted	1.30	1.26	1.35				3.51	2.99	4.07			
CFM_Warm	209	Unweighted	1.40	1.35	1.45	2.09	1.91	2.34	3.85	3.40	4.31	0.26	0.77	0.07
		Weighted	1.43	1.38	1.49				3.86	3.42	4.31			
CFM_Tropical	192	Unweighted	1.41	1.36	1.47	1.31	0.91	1.62	2.97	2.57	3.41	-1.92	-1.91	-2.58
		Weighted	1.43	1.38	1.49				2.91	2.52	3.32			
CFS_Cool	182	Unweighted	1.19	1.16	1.22	0.56	0.35	0.70	2.05	1.72	2.41	-0.68	-0.23	-0.87
		Weighted	1.19	1.16	1.23				2.04	1.72	2.39			
CFS_Warm	324	Unweighted	1.17	1.15	1.20	0.20	0.15	0.23	2.17	1.91	2.43	-0.88	-0.84	-0.95
		Weighted	1.18	1.16	1.20				2.15	1.90	2.41			
CFS_Tropical	114	Unweighted	1.27	1.22	1.32	0.22	0.09	0.08	1.77	1.34	2.24	-1.70	-0.89	-2.19
		Weighted	1.27	1.22	1.32				1.74	1.33	2.19			

CF_Cool	97	Unweighted	1.12	1.09	1.15	0.21	0.09	0.42	2.49	1.31	4.06	-13.99	-5.58	-17.92
		Weighted	1.12	1.09	1.16				2.14	1.24	3.33			
CF_Warm	89	Unweighted	1.16	1.12	1.20	1.23	1.03	1.43	1.37	0.95	1.79	1.32	5.60	-0.11
		Weighted	1.17	1.13	1.22				1.38	1.00	1.79			
CF_Tropical	76	Unweighted	1.19	1.13	1.25	2.14	1.76	2.58	0.94	0.65	1.25	0.11	0.92	0.56
		Weighted	1.22	1.15	1.29				0.94	0.66	1.26			
UCF_Cool	50	Unweighted	1.11	1.06	1.17	0.76	0.22	1.41	1.14	0.78	1.53	-0.26	-0.38	-0.20
		Weighted	1.12	1.07	1.18				1.14	0.78	1.53			
UCF_Warm	119	Unweighted	1.10	1.08	1.12	0.29	0.27	0.30	0.83	0.67	0.98	-0.24	0.30	-0.20
		Weighted	1.10	1.08	1.12				0.83	0.67	0.98			
UCF_Tropical	38	Unweighted	1.09	1.06	1.12	-0.38	-0.48	-0.21	0.76	0.45	1.12	-2.76	-1.56	-2.60
		Weighted	1.09	1.06	1.12				0.74	0.44	1.09			
CFM_0-10yr	205	Unweighted	1.30	1.25	1.36	0.32	0.32	0.49	2.70	2.28	3.14	-0.56	-0.74	-0.73
		Weighted	1.31	1.26	1.37				2.68	2.27	3.12			
CFM_10-20yr	182	Unweighted	1.31	1.28	1.35	0.14	0.16	0.19	2.78	2.42	3.16	-1.22	-0.78	-1.52
		Weighted	1.31	1.28	1.35				2.75	2.40	3.11			
CFM_20-40yr	200	Unweighted	1.42	1.36	1.47	0.28	0.29	0.23	4.08	3.62	4.56	-0.29	0.19	-0.64
		Weighted	1.42	1.37	1.48				4.07	3.63	4.53			
CFM_>40yr	65	Unweighted	1.55	1.41	1.70	-0.08	0.14	-0.25	5.96	4.38	7.68	-1.28	-0.05	-1.28
		Weighted	1.55	1.42	1.70				5.88	4.37	7.58			
CFS_0-10yr	395	Unweighted	1.16	1.14	1.18	0.06	0.08	0.08	1.75	1.54	1.99	-1.14	-1.56	-1.26
		Weighted	1.16	1.14	1.18				1.73	1.51	1.96			
CFS_10-20yr	134	Unweighted	1.23	1.20	1.26	0.04	0.00	0.07	2.32	1.95	2.72	-1.08	-0.67	-1.14
		Weighted	1.23	1.20	1.26				2.30	1.94	2.69			
CFS_20-40yr	77	Unweighted	1.29	1.23	1.36	0.31	0.41	0.49	2.65	2.14	3.20	-0.38	-0.56	-0.81

		Weighted	1.30	1.24	1.37				2.64	2.13	3.17			
CFS_>40yr	14	Unweighted	1.38	1.25	1.53	0.01	0.13	-0.01	4.83	3.26	6.41	-0.99	-0.15	-0.19
		Weighted	1.38	1.25	1.53				4.79	3.25	6.40			
CF_0-10yr	76	Unweighted	1.15	1.09	1.22	0.21	0.11	0.22	1.00	0.59	1.45	0.60	1.18	0.90
		Weighted	1.15	1.09	1.22				1.01	0.60	1.46			
CF_10-20yr	60	Unweighted	1.15	1.11	1.20	0.14	0.16	0.12	0.97	0.69	1.27	-0.10	1.30	-1.50
		Weighted	1.16	1.12	1.20				0.97	0.70	1.25			
CF_20-40yr	83	Unweighted	1.15	1.11	1.19	0.27	0.22	0.28	1.33	0.93	1.71	0.98	5.48	-0.82
		Weighted	1.16	1.12	1.20				1.34	0.98	1.70			
CF_>40yr	43	Unweighted	1.16	1.12	1.21	-0.18	-0.06	-0.43	4.45	1.89	7.73	-16.42	-9.20	-17.39
		Weighted	1.16	1.12	1.20				3.72	1.72	6.38			
UCF_0-10yr	44	Unweighted	1.06	1.03	1.08	-0.01	-0.01	0.05	0.52	0.23	0.84	-3.09	-0.43	-3.20
		Weighted	1.06	1.03	1.09				0.50	0.23	0.82			
UCF_10-20yr	83	Unweighted	1.10	1.09	1.12	0.02	0.04	0.03	0.92	0.77	1.08	-0.54	-0.26	-0.28
		Weighted	1.10	1.09	1.12				0.91	0.77	1.07			
UCF_20-40yr	73	Unweighted	1.12	1.09	1.17	0.12	-0.02	0.03	1.10	0.81	1.41	-0.27	0.00	-0.35
		Weighted	1.13	1.09	1.17				1.10	0.81	1.40			
UCF_>40yr	7	Unweighted	1.09	1.06	1.12	0.00	-0.03	0.01	0.77	0.48	1.08	-0.65	-2.08	-0.83
		Weighted	1.09	1.06	1.12				0.77	0.47	1.07			
0-10yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	215	Unweighted	1.19	1.16	1.24	0.22	-0.07	0.52	1.78	1.41	2.15	-1.69	-0.71	-2.04
		Weighted	1.20	1.15	1.24				1.75	1.40	2.11			
0-10yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	215	Unweighted	1.17	1.14	1.21	1.77	1.16	2.46	1.59	1.36	1.83	-1.01	-1.03	-1.04
		Weighted	1.20	1.16	1.24				1.57	1.34	1.81			
0-10yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	115	Unweighted	1.14	1.11	1.18	0.75	0.38	1.19	1.65	1.26	2.07	-1.69	-1.50	-1.06
		Weighted	1.15	1.11	1.20				1.62	1.25	2.05			

0-10yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	132	Unweighted	1.24	1.19	1.30	0.93	0.82	1.22	2.42	1.95	2.95	-0.54	-1.08	-0.98
		Weighted	1.25	1.20	1.31				2.40	1.93	2.92			
10-20yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	183	Unweighted	1.17	1.15	1.20	0.74	0.61	0.98	1.24	1.06	1.44	-0.97	-0.19	-1.04
		Weighted	1.18	1.16	1.21				1.23	1.05	1.43			
10-20yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	118	Unweighted	1.24	1.21	1.28	0.91	0.66	1.12	2.35	2.01	2.74	-1.15	-1.34	-1.68
		Weighted	1.25	1.22	1.29				2.32	1.98	2.69			
10-20yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	59	Unweighted	1.29	1.22	1.37	-0.33	-0.66	-0.08	2.64	1.91	3.52	-1.51	-1.05	-2.47
		Weighted	1.29	1.21	1.36				2.60	1.89	3.44			
10-20yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	35	Unweighted	1.37	1.30	1.44	1.13	0.78	1.29	3.36	2.71	4.09	-1.22	-1.36	-1.86
		Weighted	1.38	1.31	1.46				3.32	2.67	4.02			
20-40yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	213	Unweighted	1.18	1.15	1.21	1.48	1.39	1.75	1.63	1.41	1.84	-0.31	-0.07	-0.43
		Weighted	1.20	1.17	1.23				1.62	1.41	1.83			
20-40yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	119	Unweighted	1.31	1.26	1.37	2.42	1.96	2.96	3.02	2.50	3.56	0.66	2.24	0.42
		Weighted	1.35	1.28	1.41				3.04	2.56	3.57			
20-40yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	47	Unweighted	1.41	1.32	1.50	2.04	1.30	3.02	4.14	3.41	4.93	-0.72	-0.82	-0.87
		Weighted	1.44	1.34	1.55				4.11	3.39	4.89			
20-40yr_>6Mg ha <sup>-1</sup> yr <sup>-1</sup>	26	Unweighted	1.80	1.62	2.01	0.54	0.99	0.84	6.73	5.61	7.96	-0.48	-0.87	-0.73
		Weighted	1.81	1.64	2.03				6.70	5.56	7.91			
>40yr_0-2Mg ha <sup>-1</sup> yr <sup>-1</sup>	48	Unweighted	1.24	1.16	1.34	-1.15	-0.23	-2.59	2.67	1.64	3.98	-1.20	-1.16	-2.11
		Weighted	1.22	1.15	1.31				2.63	1.62	3.89			
>40yr_2-4Mg ha <sup>-1</sup> yr <sup>-1</sup>	36	Unweighted	1.66	1.48	1.88	0.72	1.42	-0.03	6.93	4.96	9.13	-1.05	-1.21	-1.66
		Weighted	1.68	1.50	1.88				6.86	4.90	8.98			
>40yr_4-6Mg ha <sup>-1</sup> yr <sup>-1</sup>	13	Unweighted	1.43	1.20	1.80	-0.88	1.39	-2.85	5.60	2.41	9.80	-0.93	0.00	-2.47
		Weighted	1.42	1.22	1.75				5.54	2.41	9.56			



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