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Straw application and soil organic carbon change: A meta-analysis

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Electronic Supplementary Material (ESM)

The authors are fully responsible for both the content and the formal aspects of the electronic supplementary material. No editorial adjustments were made.

Table S1. Characteristics of the studies included in this review

Study ID	Location	Latitude and longitude	Data set	Straw type	Straw quantity	Depth*(cm)	Duration
(Aulakh et al. 2001)	Ludhiana, India	30°54'N, 75°48'E	S-M, SM-M	wheat, rice	6000 kg/ha	0–15	4 years
(Bai et al. 2019)	Zhuanghang, China	30°52'N, 121°23'E	SM-M	wheat & rice	3000 kg/ha	0–40	6 years
(Campbell et al. 2001a)	Ontario, Canada	45°20'N, 73°58'W	SM-M, M-Z	wheat	NA	0–15	10 years
(Campbell et al. 2001b)	Saskatchewan, Canada	51°30'N, 105°37'W	SM-M	wheat	NA	0–30	43 years
(Chen et al. 2017)	Hubei, China	30°52'N, 112°50'E	SM-M	wheat & rice	R:9000 & W:4000 kg/ha, R:8000 & W:5000 kg/ha, R:8500 & W:6000 kg/ha	0–20	3 years
(Chen et al. 2018)	Ruprechtshofen, Austria	48°08'N,15°13'E	SM-M	vetch	2700 kg/ha	0-15	4 years
(Cheng et al. 2016)	Yamagata, Japan	38°15'N, 140°15'E	SM-M	rice	6000 kg/ha	0-25	30 years
(Dinesh et al. 2015)	Ludhiana, India	30°56'N, 75°52'E	SM-M	rice	NA	0–15	24 years
(Dou et al. 2016)	Liaoning China	43°31'N, 124°48'E	SM-M	maize	7500 kg/ha	0–25	23 years
(Du et al. 2009)	Hebei, China	37°53'N, 115°42'E	SM-M, M-Z	maize & wheat	9000 kg/ha	0–20	18 years
(Du et al. 2010)	Hebei, China	37°44'N, 115°41'E	SM-M	wheat	3700 kg/ha	0–20	8 years
(Duiker and Lal 1999)	Ohio, USA	40°00'N, 83°01'W	SM-M	wheat	1600 kg/ha	0–20	9 years
(Ebhin Masto et al. 2006)	New Delhi, India	28°38'N, 77°10'E	SM-M	maize & wheat	NA	0-15	35 years
(Esther et al. 2014)	Shanxi, China	34°36'N, 108°52'E	S-Z	maize, wheat	7.5 g/ha	0–20	2 months
(Fuhrmann et al. 2019)	Los Banos, Philippines	14°11'N, 121°15'E	SM-M	rice	6000 kg/ha	0-15	2 years
(G.R et al. 2019)	Anand, India	22°35'N, 72°55'E	S-Z	legume	NA	0-15	3 months
(Ghimire et al. 2012)	Chitwan, Nepal	27°39'N, 84°21'E	S-Z, M-Z, S-M	rice	4000 kg/ha	0–50	4 years
(Giacometti et al. 2013)	Po valley, Italy	44°33'N, 11°24'E	S-Z, M-Z, S-M	maize & wheat	7500 kg/ha	0-20	44 years
(Guo et al. 2018)	Anhui, China	33°13'N, 116°37'E	M-Z, SM-M	wheat	6000 kg/ha	0-20	6 years
(Gura and Mnkeni 2019)	South Africa	32°46'S, 26°5'E	SM-M	maize & wheat	NA	0-10	7 years
(He et al. 2017)	Zhejiang, China	30°25'N, 120°17'E	SM-M	rice	7500 kg/ha	0–20	18 months
(Hu et al. 2014)	Edmonton, Canada	53°48'N, 113°32'W	S-Z	wheat	7500 kg/ha	0–15	16 months
(Huang et al. 2017)	Chongqing, China	29°48'N, 106°24'E	S-Z	maize, wheat, rape, rice, broad, bean	40 g/ha	0–20	4 months
(Jiang et al. 2017)	Liaoning, China	41°32'N, 123°23'E	SM-M	maize	8000 kg/ha	0–20	6 years
(Kiboi et al. 2018)	Tharaka-Nithi, Kenya	00°98'S, 37°08'E	SM-M	maize	5000 kg/ha	0-20	1 years
(Kushwaha et al. 2000)	Varanasi, India	25°18'N, 83°1'E	SM-M	rice	NA	0-20	2 years
(Li et al. 2018)	Shanxi, China	35°11'N, 111°05'E	SM-M	maize	10500 kg/ha	0-10	11 years
(Liqun et al. 2014)	Yangzhou, China	32°19'N, 119°48'E	SM-M	rice, wheat. wheat & rice	6000 kg/ha	0–21	3 years

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Table S1 to be continued

Study ID	Location	Latitude and longitude	Data set	Straw type	Straw quantity	Depth*(cm)	Duration
(Lisboa et al. 2019)	Piracicaba, Brazil	22°72'S, 47°77'W	S-Z	sugarcane	NA	0-10	2 years
(Liu et al. 2010)	Gansu, China	35°16'N, 107°30'E,	SM-M	maize & wheat	NA	0-15	30 years
(Lou et al. 2011)	Liaoyang, China	41°40'N, 119°28'E	S-Z, M-Z, S-M, SM-M	maize	4819 kg/ha	0–20	12 years
(Ma et al. 2019)	Changshu, China	31°33'N, 120°42'E	S-Z, M-Z, S-M	wheat	4800 kg/ha	0–20	2 years
(Malhi et al. 2011)	Alberta & Breton, Canada	53°25'N, 113°32'W 53°07'N, 114°28'W	S-Z, M-Z, S-M, SM-M	wheat	7500 kg/ha	0–15	25 years
(Meena et al. 2016)	Karnal, India	29°40'N, 76°59'E	S-Z, M-Z, S-M	rice	14000 kg/ha	0-15	3 years
(Nawaz et al. 2017)	Faisalabad, Pakistan	31°8'N, 73°8'E	SM-M	rice	NA	0-20	3 years
(Okeyo et al. 2016)	Kenya	0°08'N, 34°25'E	SM-M	maize	2000 kg/ha	0-13	7 years
(Paul et al. 2014)	Pantnagar, India	28°97'N, 79°41'E	S-Z, M-Z, S-M	wheat & rice	NA	0-20	4 years
(Ping et al. 2015)	Liaoning China	40°52'N-46°18'N, 121°38'E–131°19'E	S-Z	maize	7500 kg/ha	0–20	1 year
(Qiu et al. 2016)	Liaoning China	43°31'N, 124°48'E	SM-M, M-Z	maize	NA	0–20	22 years
(Singh et al. 2006)	Ludhiana, India	30°56'N, 75°52'E	SM-M	maize & wheat	NA	0-15	32 years
(Singh et al. 2018)	New Delhi, India	28°38'N, 77°10'E	S-Z	wheat	2500 kg/ha	0-15	3 years
(Singh and Raghubanshi 2003)	Varanasi, India	25°18'N, 83°1'E	S-Z	legume	NA	NA	2 years
(Song et al. 2015)	Liaoning China	43°31'N, 124°48'E	SM-M, M-Z	maize	7500 kg/ha	0–20	22 years
(Song et al. 2016)	Shanghai, China	31°42'N, 121°33'E	SM-M	wheat, wheat & rice	NA	0–15	4 years
(Song et al. 2019)	Chongming, China	31°41'N, 121°31'E	SM-M	wheat & rice	NA	0–40	6 years
(Soon 1998)	Beaverlodge, Canada	53°25'N, 113°32'W	SM-M	NA	NA	0-15	11 years
(Tian et al. 2018)	Chongqing, China	29°48'N, 106°24'E	SM-M	rape, maize	8000 kg/ha	0–20	1 year
(van Groenigen et al. 2011)	Carlow, Ireland	52°86'N, 6°94'W	SM-M	wheat	2800 kg/ha	0–30	20 years
(Wang et al. 2015)	Fujian, China	26°1'N, 119°3'E	SM-M	rice	3300 kg/ha	0-15	1 years
(Wang et al. 2014)	Henan, China	35°10'N, 114°32'E	SM-M	maize & wheat	NA	0-20	7 years
(Wu et al. 2017)	Hunan, China	28°37'N, 112°80'E	SM-M	rice	NA	0-20	20 years
(Xionghui et al. 2012)	Hunan, China	28°37'N, 112°80'E	SM-M, M-Z	rice	4500 kg/ha	0–20	3 years
(Yang et al. 2012)	Shanxi, China	34°17'N, 108°1'E	SM-M	maize & wheat	4500 kg/ha	0-20	20 years
(Yin et al. 2014)	Fujian, China	26°05'N, 119°18'E	S-Z	rice	20 g/ha	0–15	6 years
(Yu et al. 2006)	Liaoning China	43°31'N, 124°48'E	SM-M, M-Z	NA	7500 kg/ha	0–20	20 years

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Table S1 to be continued

Study ID	Location	Latitude and longitude	Data set	Straw type	Straw quantity	Depth*(cm)	Duration
(Yue-feng et al. 2017)	Liaoning, China	42°14'N, 123°48'E	S-Z	na	6000 kg/ha	0–20	2 years
(Zhang et al. 2014)	Liaoning China	42°27'N, 122°28'E	SM-M	maize	9000 kg/ha	0-20	7 years
(Zhang et al. 2015)	Ningxia, China	35°79'N, 106°45'E	SM-M	maize	NA	0–40	4 years
(Zhang et al. 2017)	Yangling, China	34°20'N, 108°24'E	S-Z, M-Z, S-M	wheat	8000 kg/ha	0-20	3 years
(Zhang et al. 2016)	Ningxia, China	35°79'N, 106°45'E	SM-M	maize	NA	0–40	4 years
(Zhang et al. 2018)	Henan, China	35°00'N, 114°24'E	S-Z	maize	NA	0–20	4 years
(Zhao et al. 2014)	Hebei, China	37°53'N, 115°42'E	SM-M	maize & wheat	NA	0–20	13 years
(Zhao et al. 2016)	Hebei, China	37°53'N, 115°42'E	SM-M	maize	9000 kg/ha	0–20	30 years
(Zhao et al. 2018)	Shanxi, China	34°36'N, 108°52'E	SM-M	wheat, maize, maize & wheat	NA	0–15	7 years
(Zhu et al. 2017)	Changewu, China	38°52'N, 107°88'E	S-Z	maize	10 g/ha	NA	35 days

*The depth here refers to the depth range of the data extracted from the literature; maize & wheat, wheat & rice means rotation tillage; S – straw application; Z – unfertilised control; SM – straw application and mineral fertilization treatment; M – mineral fertilisation treatment; NA – not mentioned

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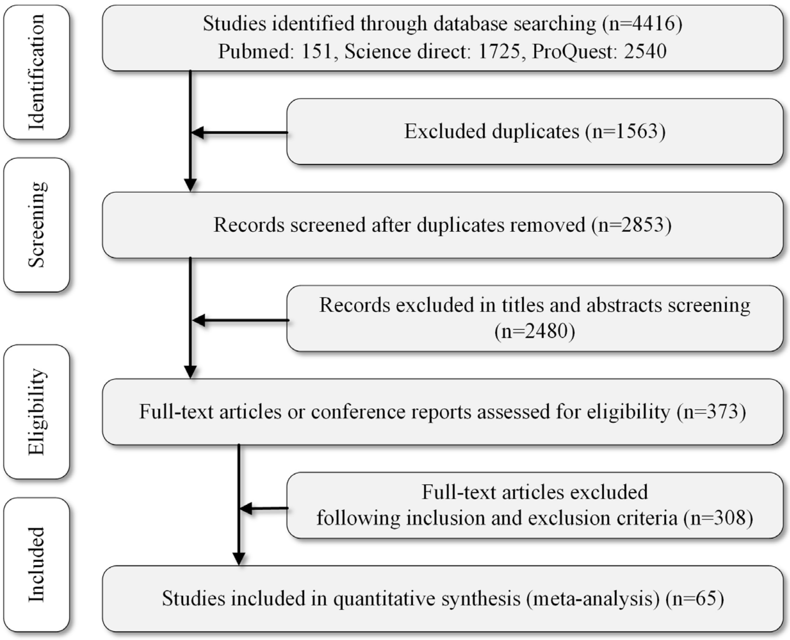

Figure S1. Summary of the study selection process

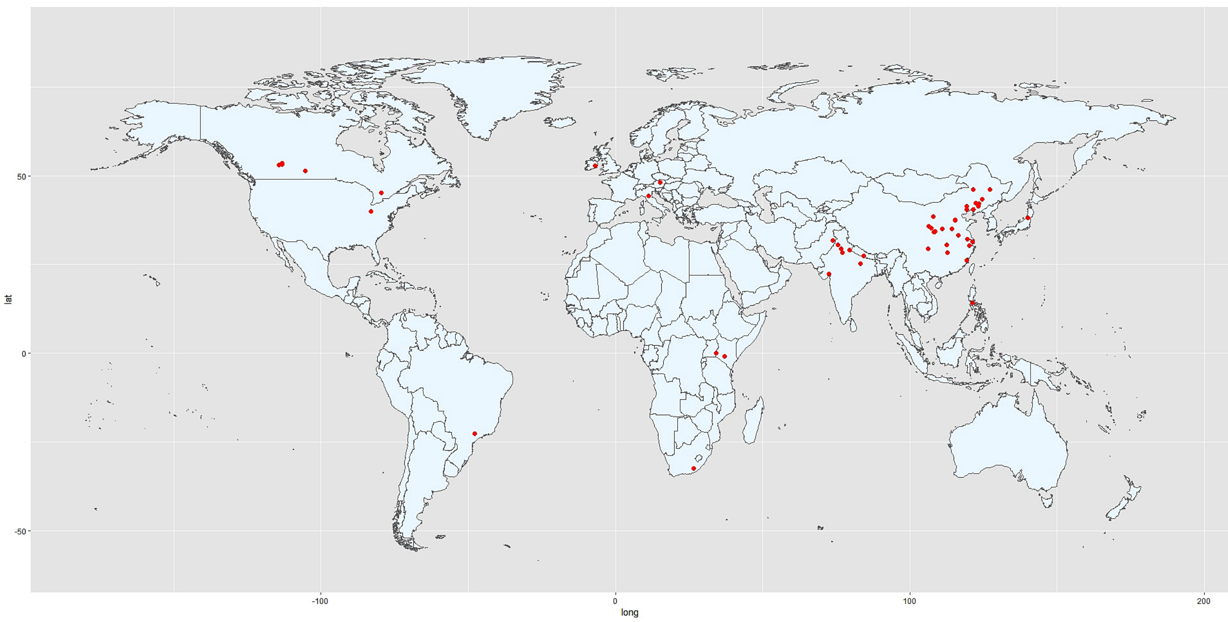

Figure S2. Geographical locations of the experimental sites

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