

Table S1. Fields information (all fields) of rice straw (RS) and cow dung compost (CDC) treatments

Field name	GPS data		Plow layer (cm)	RS applied rate (t ha ⁻¹) dry weight	Applied duration (years)	Rice cultivar	Soil Type [‡]
RSM1	N 38°52'41.2"	E 140°15'20.7"	17.5	3.9	42	Haenuki	Gley L.
RSM2	N 38°52'45.0"	E 140°16'20.3"	21.2	4.5	40	Akitakomachi	Reg. A.
RSM3	N 38°52'56.7"	E 140°17'02.8"	14.7	4.0	40	Tsuyahime	Reg. A.
RSM4	N 38°51'08.0"	E 140°13'45.2"	15.7	5.3	3	Tsuyahime	Gley L.
RSI1	N 38°52'18.2"	E 140°15'23.6"	18.7	5.9	35	Tsuyahime	Gley L.
RSI2	N 38°50'43.9"	E 140°16'50.7"	15.8	5.0	40	SD1	Wet A.
RSI3	N 38°50'42.3"	E 140°16'51.2"	18.1	4.5	40	Akitakomachi	Wet A.
RSI4	N 38°50'53.9"	E 140°17'18.8"	12.8	4.0	5	Himenomochi	Wet A.
RST1	N 38°52'13.4"	E 140°16'51.3"	15.5	4.1	40	Hitomebore	Gley L.
RST2	N 38°52'30.8"	E 140°18'30.4"	15.5	6.7	40	Haenuki	Gley L.
RST3	N 38°51'43.5"	E 140°17'44.4"	15.3	5.0	35	Tsuyahime	Wet A.
RST4	N 38°51'43.6"	E 140°16'00.5"	16.7	4.9	35	Tsuyahime	Wet A.
RSH1	N 38°51'03.4"	E 140°16'26.3"	17.8	5.2	40	Haenuki	Wet A.
RSH2	N 38°50'57.4"	E 140°16'45.1"	19.8	4.2	40	Mochi	Wet A.
RSH3	N 38°51'28.0"	E 140°16'17.9"	15.8	2.7	40	Himenomochi	Wet A.
RSS3	N 38°50'46.8"	E 140°14'23.6"	19.0	5.3	18	Hitomebore	Gley L.
RSS4	N 38°50'32.2"	E 140°14'03.8"	16.7	4.2	35	Mochi	Gley L.
RSS5	N 38°50'45.1"	E 140°14'30.1"	20.7	4.2	40	Tsuyahime	Gley L.
RSMa2	N 38°51'56.3"	E 140°18'12.8"	18.7	4.6	4	Haenuki	Gley L.
RSMa3	N 38°52'03.1"	E 140°18'15.8"	14.8	3.6	35	Himenomochi	Gley L.
RSMa4	N 38°52'02.6"	E 140°18'17.3"	15.6	4.3	4	Himenomochi	Gley L.
RSMa5	N 38°51'57.3"	E 140°17'59.1"	17.0	6.4	40	Haenuki	Non-a. A.
RSN1	N 38°55'09.9"	E 140°16'53.9"	16.2	4.5	40	Hitomebore	Wet A.
RSN2	N 38°57'24.2"	E 140°17'19.7"	14.7	4.1	13	Dewasansan	Reg. A.
RSN3	N 38°58'04.8"	E 140°24'34.9"	23.0	6.0	40	Akitakomachi	Gray L.
RSN4	N 38°55'04.8"	E 140°15'53.1"	14.2	4.8	9	Koshihikari	Reg. A.
RSN41	N 38°54'53.6"	E 140°15'55.2"	14.7	4.0	9	Koshihikari	Reg. A.
RSN42	N 38°55'17.2"	E 140°15'56.5"	14.6	4.7	9	Hitomebore	Wet A.
RSN43	N 38°55'28.6"	E 140°15'58.3"	14.5	4.1	40	Hitomebore	Reg. A.
RSN5	N 38°58'00.0"	E 140°24'57.2"	18.2	3.0	40	Himenomochi	Gray L.
RSN6	N 38°58'05.0"	E 140°24'42.8"	19.0	3.8	40	Akitakomachi	Gray L.
RSN8	N 38°55'04.8"	E 140°16'25.0"	18.0	3.7	40	Haenuki	Gley L.
RSN9	N 38°55'10.0"	E 140°16'59.5"	17.2	4.0	40	Haenuki	Wet A.
RSN10	N 38°55'07.5"	E 140°17'09.0"	18.7	4.8	40	Hitomebore	Wet A.
RSN11	N 38°55'03.2"	E 140°16'47.0"	22.5	4.7	40	Koshihikari	Wet A.
RSN12	N 38°55'00.3"	E 140°16'15.5"	14.3	4.2	40	Koshihikari	Gley L.
RSN13	N 38°58'17.0"	E 140°20'32.7"	18.7	4.9	40	Haenuki	Gley L.
RSN14	N 38°58'17.5"	E 140°20'06.3"	16.5	4.2	40	Himenomochi	Gley L.
RSN15	N 38°55'08.0"	E 140°16'37.3"	17.0	3.7	40	Hitomebore	Gley L.
RSN18	N 38°56'23.7"	E 140°16'11.3"	14.1	6.9	30	Koshihikari	Wet A.
RSN19	N 38°57'41.2"	E 140°17'05.9"	16.8	4.4	13	Hitomebore	Gley L.

Field name	GPS data		Plow layer (cm)	CDC applied rate (t ha ⁻¹)		Applied duration (years)	CDC storage status	Rice cultivar	Soil Type [‡]
				Fresh weight	Dry weight				
CDM1	N 38°52'50.3"	E 140°15'14.9"	16.0	30	8.7	49	Outdoor	Akitakomachi	Gray L.
CDM1.1	N 38°52'49.1"	E 140°15'14.0"	15.7	20	4.7	40	Indoor	Haenuki	Gray L.
CDM2	N 38°52'44.6"	E 140°16'22.9"	14.7	20	4.1	25	Outdoor	Himenomochi	Reg. A.
CDM5	N 38°53'00.8"	E 140°15'55.1"	15.8	15	3.6	4	Indoor	Hitomebore	Gley L.
CDM6	N 38°52'10.7"	E 140°15'47.0"	15.5	25	5.4	60	Outdoor	Haenuki	Brown L.
CDM7	N 38°52'32.5"	E 140°15'58.2"	14.0	15	3.6	4	Indoor	Akitakomachi	Brown L.
CDI1	N 38°51'16.3"	E 140°16'26.9"	15.5	15	3.5	37	Outdoor	Hitomebore	Wet A.
CDI2	N 38°51'16.1"	E 140°16'36.9"	16.7	15	3.5	37	Outdoor	Haenuki	Wet A.
CDI3	N 38°50'53.5"	E 140°17'19.4"	15.2	15	4.0	40	Indoor	Haenuki	Wet A.
CDI4	N 38°50'45.3"	E 140°17'00.4"	15.3	15	4.0	5	Indoor	SD1	Wet A.
CDT1	N 38°50'55.4"	E 140°15'51.0"	11.8	20	4.8	10	Indoor	Himenomochi	Wet A.
CDT2	N 38°52'03.9"	E 140°18'03.4"	14.8	20	4.8	5	Outdoor	Miyamanishiki	Non-a. A.
CDH1	N 38°51'08.9"	E 140°16'10.2"	16.0	20	5.4	37	Indoor	Hitomebore	Wet A.
CDH2	N 38°51'13.8"	E 140°16'15.4"	15.3	20	5.4	37	Indoor	Haenuki	Wet A.
CDH3	N 38°51'07.5"	E 140°16'08.4"	16.7	20	5.4	37	Indoor	Tsuyahime	Wet A.
CDS1	N 38°50'46.7"	E 140°14'19.1"	17.5	25	5.4	12	Outdoor	Haenuki	Gley L.
CDMa3	N 38°52'02.8"	E 140°17'59.2"	16.3	15	4.0	51	Indoor	Haenuki	Non-a. A.
CDN2	N 38°57'25.7"	E 140°17'18.9"	16.3	10	2.3	9	Outdoor	Hitomebore	Reg. A.
CDN3	N 38°57'59.7"	E 140°24'59.6"	16.0	15	3.4	5	Outdoor	Bekogonomi	Gray L.
CDN4	N 38°55'04.0"	E 140°15'52.9"	15.0	20	6.1	9	Indoor [†]	Koshihikari	Reg. A.
CDN4.1	N 38°55'03.5"	E 140°15'55.4"	15.3	20	6.1	9	Indoor [†]	Koshihikari	Reg. A.
CDN4.2	N 38°58'12.8"	E 140°24'18.3"	15.3	15	3.4	5	Outdoor	Bekogonomi	Gray L.
CDN4.3	N 38°58'19.5"	E 140°23'42.0"	15.5	15	3.4	3	Outdoor	Akitakomachi	Gray L.
CDN5	N 38°58'36.3"	E 140°22'41.3"	16.3	15	3.4	8	Outdoor	Hitomebore	Gray L.
CDN6	N 38°58'28.5"	E 140°21'09.3"	16.7	15	3.4	8	Outdoor	Haenuki	Brown L.
CDN7	N 38°58'16.8"	E 140°20'07.0"	15.0	15	3.4	3	Outdoor	Haenuki	Gley L.
CDN8	N 38°57'31.7"	E 140°17'13.4"	18.0	10	2.3	9	Outdoor	Hitomebore	Reg. A.
CDN9	N 38°57'21.3"	E 140°17'00.4"	14.2	10	2.3	9	Outdoor	Hitomebore	Gley L.
CDN10	N 38°57'50.5"	E 140°18'05.1"	19.7	10	2.4	40	Indoor	Fukuhibiki	Gley L.
CDN11	N 38°57'50.1"	E 140°18'04.1"	15.3	10	2.4	40	Indoor	Fukuhibiki	Gley L.
CDN12	N 38°57'48.9"	E 140°18'02.2"	18.3	10	2.4	40	Indoor	Fukuhibiki	Gley L.
CDN13	N 38°55'08.0"	E 140°16'36.2"	17.0	20	7.1	29	Indoor	Haenuki	Gley L.
CDN14	N 38°58'05.8"	E 140°18'17.5"	20.2	10	2.4	25	Indoor	Akitakomachi	Gley L.
CDN15	N 38°58'06.4"	E 140°18'15.6"	15.7	10	2.4	25	Indoor	Koshihikari	Gley L.
CDN16	N 38°57'17.2"	E 140°17'06.8"	13.0	10	2.3	9	Outdoor	Hitomebore	Gley L.
CDN17	N 38°57'10.3"	E 140°16'54.5"	18.0	10	2.3	9	Outdoor	Hitomebore	Gley L.
CDN18	N 38°57'08.2"	E 140°16'57.2"	15.0	10	2.3	9	Outdoor	Hitomebore	Gley L.
CDN19	N 38°57'39.9"	E 140°17'05.4"	14.3	10	2.3	9	Outdoor	Hitomebore	Gley L.

[†]The composting was done in indoor, and we sampled after it was moved on the field. [‡]Reference data is National Agriculture and Food Research Organization 2019: Japan soil inventory, soil map. <https://soil-inventory.dc.affrc.go.jp/figure.html> (January 2019) (in Japanese). Non-a. A., Non-allophanic Andosols; Wet A., Wet Andosols; Reg. A., Regosolic Andosols; Gley L., Gley Lowland soils; Gray L., Gray Lowland soils; Brown L., Brown Lowland soils.

Table S2. Fourteen field pairs of rice straw (RS) and cow dung compost (CDC) treatments

Pair number	RS treatment	CDC treatment
1	RSM1	CDM1.1
2	RSM2	CDM2
3	RSI2	CDI4
4	RSI4	CDI3
5	RSH1	CDH3
6	RSS5	CDS1
7	RSMa5	CDMa3
8	RSN2	CDN2
9	RSN5	CDN3
10	RSN4	CDN4
11	RSN6	CDN4.2
12	RSN14	CDN7
13	RSN15	CDN13
14	RSN19	CDN19