



**SOUTH DAKOTA STATE  
UNIVERSITY EXTENSION**

# Managing Soil for Carbon Storage

Table 1. Soil organic carbon concentration in studies implementing soil health practices in South Dakota (SD).

Study	Location	Duration (year)	Treatments	Crop Rotation	Depth (in)	Soil Organic Carbon Concentration (%)
Tobin et al., 2020	Beresford, SD	3	Grass CC Blend	Corn – Soybean – Rye	0-2	2.84a
			Legume CC Blend			2.68a
			Equal CC mix			2.59a
			No CC			2.66a
			Grass CC Blend		2-4	2.35a
			Legume CC Blend			2.17b
			Equal CC mix			2.15b
			No CC			2.04b
Chalise et al., 2020	Brookings, SD	10	No Removal	Corn – Soybean	0-2	2.62a
			Corn Residue Removal			2.15b
			No Removal		2-6	2.10a
			Corn Residue Removal			1.98a
Chalise et al., 2020	Brookings, SD	10	Rye-Vetch CC and Vetch CC.	Corn – Soybean	0-2	2.40a
			No CC			2.38a
			Rye-Vetch CC and Vetch CC.		2-6	2.06a
			No CC			2.02a
Maiga et al., 2019	Brookings, SD	14		Corn – Soybean	0-2	1.55b
				Corn – Soybean – Winter Wheat – Oat		2.20a
				Corn – Soybean	2-6	1.58a
				Corn – Soybean – Winter Wheat – Oat		1.51a
				Corn – Soybean	6-12	0.79a
				Corn – Soybean – Winter Wheat – Oat		0.88a
				Corn – Soybean	12-24	0.65a
				Corn – Soybean – Winter Wheat – Oat		0.67a

CC is cover crop, NT is no tillage and CT is conventional tillage. Different letters following the number indicate statistical significance at p=0.05.

Study	Location	Duration (year)	Treatments	Crop Rotation	Depth (in)	Soil Organic Carbon Concentration (%)
Maiga et al., 2019	Beresford, SD	24		Corn – Soybean	0-2	3.49b
				Corn – Soybean – Winter Wheat – Oat		3.72a
				Corn – Soybean	2-6	2.44a
				Corn – Soybean – Winter Wheat – Oat		2.42a
				Corn – Soybean	6-12	2.00b
				Corn – Soybean – Winter Wheat – Oat		2.23a
				Corn – Soybean	12-24	1.33b
				Corn – Soybean – Winter Wheat – Oat		2.0a
Sangotayo et al., 2023	Brookings, SD	12	No Dairy Cow Manure	Corn – Soybean, Wheat added in 2020	0-16	2.01a
			1.9 tons acre <sup>-1</sup> Dairy Cow Manure			2.19a
			12 tons acre <sup>-1</sup> Dairy Cow Manure			2.17a
			24 tons acre <sup>-1</sup> Dairy Cow Manure			2.18a
Sangotayo et al., 2023	Beresford, SD	17	No Cattle Manure	Corn – Soybean, Wheat added in 2020	0-16	1.80b
			1.5 tons acre <sup>-1</sup> Cattle Manure			2.00b
			8.3 tons acre <sup>-1</sup> Cattle Manure			1.90b
			16.5 tons acre <sup>-1</sup> Cattle Manure			2.40a

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Study	Location	Duration (year)	Treatments	Crop Rotation	Depth (in)	Soil Organic Carbon Concentration (%)
Alhameid et al., 2017	Beresford, SD	23	NT	Corn – Soybean	0-3	2.93a
				Corn – Soybean – Wheat		2.52c
				Corn – Soybean – Wheat – Oat		2.9a
			CT	Corn – Soybean		2.48c
				Corn – Soybean – Wheat		2.47c
				Corn – Soybean – Wheat – Oat		2.72b
			NT	Corn – Soybean	3-6	2.34b
				Corn – Soybean – Wheat		2.32b
				Corn – Soybean – Wheat – Oat		2.56a
			CT	Corn – Soybean		2.05c
				Corn – Soybean – Wheat		2.38b
				Corn – Soybean – Wheat – Oat		2.37b
			NT	Corn – Soybean	6-12	1.84b
				Corn – Soybean – Wheat		1.81b
				Corn – Soybean – Wheat – Oat		2.19a
			CT	Corn – Soybean		1.65c
				Corn – Soybean – Wheat		1.89b
				Corn – Soybean – Wheat- Oat		1.88b
			NT	Corn – Soybean	12-24	1.31ab
				Corn – Soybean – Wheat		0.96b
				Corn – Soybean – Wheat- Oat		1.41a
			CT	Corn – Soybean		1.5a
				Corn – Soybean – Wheat		1.56a
				Corn – Soybean – Wheat – Oat		1.36a
Sturm 2022	Dakota Lakes Research Farm, SD	30	Irrigated	Corn – Soybean	0-2	1.92b
				Corn – Corn – Soybean – Wheat – Soybean		2.35a
				Corn – Corn – Soybean – Wheat		2.49a
				Continuous Corn		2.5a
				Corn – Soybean	2-6	1.53b
				Corn – Corn – Soybean – Wheat – Soybean		1.75a
				Corn – Corn – Soybean – Wheat		1.72a
				Continuous Corn		1.72a
CC is cover crop, NT is no tillage and CT is conventional tillage. Different letters following the number indicate statistical significance at p=0.05.						

Study	Location	Duration (year)	Treatments	Crop Rotation	Depth (in)	Soil Organic Carbon Concentration (%)
Sturm 2022	Dakota Lakes Research Farm, SD	30	Dryland	Wheat – Broadleaf – Corn – Broadleaf	0-2	2.46a
				Wheat – Corn – Broadleaf		2.31a
				Wheat – Wheat – Sorghum – Corn – Broadleaf		2.30a
				5-year Wheat after Switchgrass		1.78b
				Wheat – Broadleaf – Corn – Broadleaf	2-6	1.85a
				Wheat – Corn – Broadleaf		2.00a
				Wheat – Wheat – Sorghum – Corn – Broadleaf		2.05a
				5-year Wheat after Switchgrass		2.02a
CC is cover crop, NT is no tillage and CT is conventional tillage. Different letters following the number indicate statistical significance at p=0.05.						