

MARYLAND'S HEALTHY SOILS PROGRAM

Maryland Department of Agriculture

June 2020



Conservation is a powerful message among MD producers

- Soil Conservation Districts were established in Maryland during the 1940's to assist farms with conservation goals
- Expanded by MDA and partners – we are a trusted source of financial and technical assistance
- Well-organized and well-defined program delivery
- Most importantly, soil health is being widely recognized for meeting multiple goals – improved crop production, resiliency (climatic and economic), and carbon sequestration

Significant conservation adoption

Nationally, the 2017 Ag Census ranks MD #1 for cover crop acres and #2 for no-till acres, as a percentage of available cropland

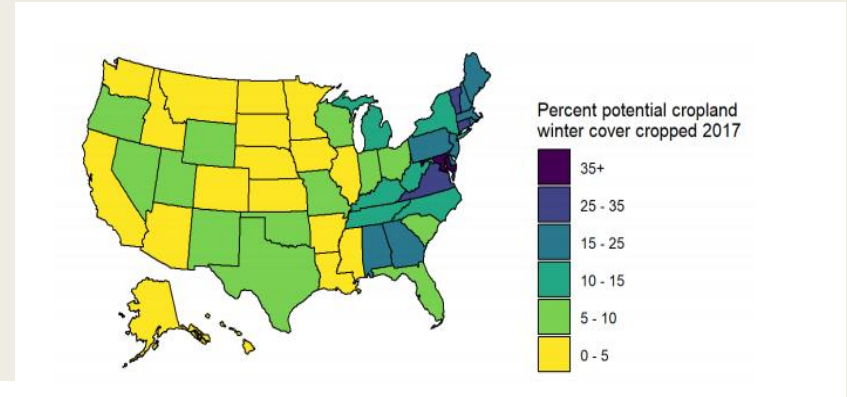


Table 3. Percent of each state using no-till versus conventional or conservation tillage based on 2017 Census of Agriculture. Data shown for each state is ranked by percent no-till and includes acreage data of the three types of tillage systems that respondents were asked about.

Rank	State	Percent No-till	No-till Acres	Conventional Acres*	Conservation Acres
1	Tennessee	78.6%	2,342,696	251,843	384,849
2	Maryland	74.0%	826,999	97,850	192,692
3	Virginia	73.5%	1,021,330	129,607	237,949
4	Montana	73.2%	8,050,902	1,005,851	1,934,271
5	Kentucky	68.4%	2,398,002	440,151	669,980
6	Pennsylvania	67.2%	1,611,121	298,405	487,115
7	West Virginia	60.2%	68,191	28,901	16,102
8	Delaware	56.4%	242,599	77,772	109,487
9	Nebraska	56.2%	10,256,995	2,059,060	5,950,801
10	Alabama	53.2%	765,35	258,752	413,298
11	South Dakota	52.3%	7,656,188	2,674,782	4,300,330
12	North Carolina	50.6%	1,909,178	1,144,480	720,784
13	Kansas	47.8%	11,197,898	4,501,045	7,746,948

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Figures courtesy of Soil Health Institute's *PROGRESS REPORT: Adoption of Soil Health Systems*

2017 Healthy Soils legislation

- Establishes MDA as the state lead on healthy soils
- Charges MDA to develop a program:
 - Improves health, yield, and profitability of soils
 - Increases biological activity & carbon sequestration in agricultural soils
 - Promote further education and adoption of healthy soils practices
- Consider incentive-based program(s) including research, technical, and financial
- Coincides with state's increased GHG reduction goals
 - State's draft GGRA plan includes MDA's Healthy Soils Program as adaptation and resiliency strategy
 - US Climate Alliance partner state/Natural & Working Lands Work Group member

Initial Steps...

- Creation of Healthy Soils Program
 - Soil Health Coordinator hired
 - Webpage created
- With strong adoption to date of core soil health practices, state is evaluating producer goals and needs
- Recent initiatives informing our MDA Program:
 - Extended season cover crop
 - USDA-RCPP grant for soil health (mid-shore counties)
 - NFWF grant for soil health (statewide)
 - MDA Soil Health Advisory Committee



Grant objectives

- Direct farmer assistance
 - Technical **and** financial
 - Multi-specie and extended season cover crop
 - Precision nutrient management,
 - Conservation tillage, or
 - Prescribed grazing
- Soil health data assessments – advance our collective knowledge
- Staff training (soil conservation districts and crop advisors)
- Outreach
- Findings will be shared and discussed through the MDA Advisory Committee to inform the further development of the state program



Soil Health Advisory Committee

- 32-member Committee representing diverse stakeholder groups: producers, not-for-profit organizations, state and federal agencies, academia, and state legislature
- **Objective:** Offer guidance to MDA on the framework of a Healthy Soils Program that accomplishes the legislative charge
- Full Committee meetings held in December 2019 and March 2020
 - *Focus group sessions, webinars, and producer “virtual” showcase events since teleworking began*

Initial Committee input

- Preliminary list of conservation practices have been evaluated across multiple soil health metrics
 - *Informed by extensive literature review of carbon sequestration performed by Dr. Sara Via, UMD*
- Committee has prioritized conservation practices to a smaller list and will focus on program needs to understand and advance adoption
 - ***All prioritized practices align with Appendix K of GGRA Plan***
 - *Practices also largely align with WIP 3 goals*
 - *Existing ability to track and report across multiple goals, and improve tracking as program develops*
- Permanent funding source still needed consistent with state investment to date in water quality

Greenhouse Gas Reductions From Agriculture: Menu of Recommended Practices

GHG estimates from comet-planner.nrel.colostate.edu/COMET-Planner_Report_Final.pdf

NRCS Conservation Practices	Description of practice	GHG Reduction		
		CO ₂	N ₂ O	Sum
Cropland Management				
Conventional Tillage to No Till (CPS 329)		0.42	-0.11	0.31
Conventional Tillage to Reduced Tillage (CPS 345)	Reduced tillage = strip till	0.13	0.07	0.20
N Fertilizer Management (CPS 590)	Improve N fertilizer management to reduce by 15% through 4R or nitrification inhibitors	0.00	0.11	0.11
Replace N Fertilizer w/ Soil Amendments (CPS 590)	Soil amendments include compost, manure	1.75	0.00	1.75
Conservation Crop Rotation (CPS 328)	Decrease fallow or add perennial crop to rotation	0.21	0.01	0.22
Cover Crops (CPS 340)	Add seasonal cover crop to cropland	0.32	0.05	0.37
Insert forage planting into rotation (CPS 512)	Add annual or perennial forage to rotation	0.21	0.01	0.22
Mulching (CPS 585)	Add high carbon mulch to cropland	0.32	NA	0.32
Land use changes- add herbaceous plants				
Conservation Cover (CPS 327)	Convert to permanent unfertilized grass, legume, pollinator or other mix, ungrazed	0.98	0.28	1.26
Forage and biomass planting (CPS 512)	Convert to grass, forage or biomass plant	0.21	0.01	0.22
Riparian herbaceous cover (CPS 390)	Convert area near water to permanent unfertilized grass	0.98	0.28	1.26
Contour buffer strips (CPS 332),	Covert strips to permanent unfertilized grass, legume, pollinator or other mix	0.98	0.28	1.26
Field border (CPS 386)	Convert strips to permanent unfertilized grass/legume to reduce runoff	0.98	0.28	1.26
Filter Strip (CPS 393)	Convert strips to permanent unfertilized grass/legume	0.98	0.28	1.26
Grassed Waterway (CPS 412)	Convert strips to permanent unfertilized grass/legume to filter water	0.98	0.28	1.26
Vegetative barrier (CPS 601/342)	Plant stiff vegetative cover on hillsides or by streams to reduce erosion; can be used in critical areas	0.98	0.28	1.26
Land use changes- add woody plants				
Convert unproductive cropland or grassland to farm woodlot (CPS 612)	Plant trees and shrubs in marginal cropland to restore diversity, improve water quality	1.98	0.28	2.26
Tree & shrub establishment (CPS 612)	Plant trees and shrubs	1.98	0.28	2.26
Riparian Forest Buffer Establishment (CPS 391)	Replace strip of cropland near water with woody plants	2.19	0.28	2.47
Alley Cropping (CPS 311)	Replace 20% of annual cropland with woody plants	1.71	0.03	1.74
Multistory Cropping (CPS 379)	Replace 20% of cropland with trees & shrubs of different heights, could be permaculture	1.71	0.03	1.74
Hedgerows (CPS 422)	Replace strip of cropland with one row woody plants, could combine with Conservation Cover for pollinators	1.42	0.28	1.70
Grazing				
Silvopasture (CPS 381)	Add trees and shrubs to grazed pastures (> 20 plants/acre)	1.34	0.00	1.34
Prescribed grazing/rotational grazing (CPS 528)	Short-term intense grazing in small paddocks	0.26	0.00	0.26

Note: Some implementation guidelines not listed in the NRCS Conservation Practice Standards (CPS) may be required to ensure adequate carbon sequestration and alignment with the GHG reduction estimates from COMET-Planner.

EXAMPLE	Mt CO ₂ e				
	(ac-yr) ⁻¹	Unit	2006	2018	2030
Reduced Tillage, leaving ~30% residue		Acres	167,021	194,122	242,876
	0.2	Mt CO ₂ e/yr	33,404	38,824	48,575
No-Till, leaving at least 60% residue		Acres	524,923	647,072	626,233
	0.31	Mt CO ₂ e/yr	162,726	200,592	194,132
Cover Crop		Acres	127,614	395,862	470,891
	0.37	Mt CO ₂ e/yr	47,217	146,469	174,230
Conservation Crop Rotation		Acres	unknown		
	0.21	Mt CO ₂ e/yr	0	0	0
N Fertilizer Management, reduce synthetic N by 15%		Acres	unknown		100,000
	0.11	Mt CO ₂ e/yr	0	0	11,000
Replace N fertilizer with organic amendments, i.e., manure or compost		Acres	unknown		50,000
	1.75	Mt CO ₂ e/yr	0	0	87,500
Mulching		Acres	unknown		
	0.32	Mt CO ₂ e/yr	0	0	0
Cropland Management Subtotal			243,347	385,886	515,437
TOTAL Mt CO₂e Sequestered			368,384	580,266	667,954

KEY TAKEAWAYS

1. Initial estimates of carbon sequestered has been completed
2. Numeric goals for implementation of many practices already exist and can be readily tracked
3. Most of the prioritized practices are annually implemented resulting in significant cumulative impact to GHGs → ~6 MMt CO₂e by 2030

Next steps for the MDA Healthy Soils Program

- Will need to balance our efforts
 - *Cropland practices that effect the productivity of the soil – physical, chemical, and biological – for greatest acreage impact (65% of MD farmland),*
 - *while agroforestry practices capture more carbon/acre*
- Promoting advanced adoption of these practices will take education and assistance
- MDA and our partners are well poised to deliver messages, but funding for implementation is critical
- Funding for working lands allows MD to continue in our national leadership role

Questions?

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