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To: House Economic Matters Committee

From: Dr. Sara Via, Professor and Climate Extension Specialist,
University of Maryland College Park

Sara Via

Re: Testimony in support of HB 8

Increasing soil health helps not just farmers, but all Marylanders through a combination of environmental and economic benefits. Practices that boost soil health allow farmers to produce healthy crops using fewer inputs, reduce the flow of nutrients and agricultural chemicals to Chesapeake Bay, slow soil erosion and the sedimentation of our waterways, and increase the profitability of Maryland agriculture. They also help to slow climate change by storing some of the carbon that plants remove from the atmosphere in the soil of Maryland farms.

The landmark legislation that created the Healthy Soils Program in 2017 (HB1063) made Maryland one of the very first states in the nation to formalize a strategy to improve soil health that also prioritizes carbon sequestration. Maryland became a national leader in the use of healthy soils practices by encouraging the use of agricultural practices that increase water quality and reduce the pollution of Chesapeake Bay. Now, Maryland is cementing that leadership position by recognizing that these and other agricultural practices will also slow climate change.

The passage of HB 8 will launch the next phase of Maryland's Healthy Soils Program by providing an ongoing source of base funding to develop a joint incentive program to increase adoption of farming practices that will not only improve soil health and boost water quality, but will also help slow climate change and help Maryland reach its greenhouse gas reduction goals.

Unfortunately, the legislation establishing the Healthy Soils Program did not include the funding required to accomplish its goals. Despite this lack of funding, the Maryland Department of Agriculture (MDA) has made significant progress in developing a strong evidence-based program to increase the use of farming practices that boost soil health and sequester carbon. The funding provided by HB 8 will allow MDA to finalize development of this important program

Sequestering carbon in the soil is a key "natural climate solution" that complements and extends Maryland's efforts to reduce GHG emissions. Scientists now realize that reducing emissions will not be enough to hold global warming to 2^{o}C. It is also necessary to draw CO_2 from the atmosphere. Although there are various technological methods for removing atmospheric CO2, none are ready to be used on a large scale in any cost-effective way. In contrast, effective strategies for sequestering carbon in soils and woody plants are available now and extremely cost-effective, with many of the key practices coming in at less than \$100/Mt CO_2e.[1] Passage of HB8 will benefit all Marylanders by providing an effective and economical way to reach our goals for reducing greenhouse gas emissions.

From 2017–2020, I worked with MDA to evaluate the scientific basis of practices that sequester carbon in agricultural soils. As one of the few scientists in MDA's Healthy Soils Consortium, I took on the task of performing a detailed review of the scientific literature on this topic to evaluate the efficacy of a wide range of carbon-sequestering agricultural practices.

As a result of this work, I developed a menu of recommended evidence-based agricultural practices that will effectively sequester carbon in Maryland's agricultural soils (attached as Appendix 1). This list of recommended practices includes expected GHG reductions per acre per year for each practice, calculated using the current method of choice, COMET-Planner (developed by Colorado State University, USDA and NRCS).[2]

I cannot stress strongly enough how important it is to require that policy be grounded in solid scientific evidence. This is true in general, but it is particularly important in the area of carbon sequestration. Many poorly supported claims have been made about "carbon farming" in the popular press and low-level non-peer reviewed scientific outlets.

The evidence-based of recommended carbon-sequestering practices attached to this testimony provides the scientific basis for the new incentive programs being developed at MDA to improve soil health and sequester carbon. **As part of MDA's planned contributions to greenhouse gas reductions in Maryland, this menu of recommended practices was entered by MDA as Appendix K in the 2019 Greenhouse Gas Reduction Plan.**

I am confident that the funding provided to the program by HB8 can be leveraged in the coming years to obtain significant ongoing funding from both federal and private sources. This will make the new incentive program for carbon sequestration every bit as successful as our ground-breaking program to incentivize the use of cover crops.

In sum, I recommend a positive report for HB 8. It will allow MDA and the Healthy Soils Program to increase the adoption of evidence-based methods to improve soil health and sequester carbon. This program is an important part of Maryland's GHG reduction efforts and it will have significant environmental and economic co-benefits for all Marylanders.

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1 National Academies of Sciences, Engineering, and Medicine. 2019. *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda.* Washington, DC: https://doi.org/10.17226/25259

2 Swan, A., SA Williams, K. Brown, A. Chambers, J Creque, J. Wick, and K. Paustian. 2015. COMET-Planner. Carbon and Greenhouse Gas Evaluation for NRCS Conservation Practice Planning. Available at: http://comet-planner.com/

3 Via, S. 2021. *Increasing Soil Health and Sequestering Carbon in Agricultural Soils: A Natural Climate Solution*. The Iszaak Walton League of America and the National Wildlife Federation.

RECOMMENDED PRACTICES FOR CARBON SEQUESTRATION IN AGRICULTURE

Greenhouse Gas Reductions From Agriculture: Menu of Recommended Practices				
GHG estimates from comet-planner.nrel.colostate.edu/COMET-Planner_Report_Final.pdf		GHG Reduction		
NRCS Conservation Practices		Mt CO2e/ac/yr		
Cropland Management	**Description of practice**	CO_2	N_2O	Sum
Conventional Tillage to No Till (CPS 329)	No-till or similar practice leaving >30% crop residue	0.42	-0.11	0.31
Conventional Tillage to Reduced Tillage (CPS 345)	Use of tillage practice leaving 15-30% of crop residue	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	NE	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	NE	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, harvested	0.21	0.01	0.22
Riparian herbaceous cover (CPS 390)	Convert area near water to permanent unfertilized gra	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)	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)	could combine with Conservation Cover for pollinators	1.42	0.28	1.70
Grazing				
Silvopasture (CPS 381)	Add trees & shrubs to grazed pastures (> 20 plants/ac	1.34	NE	1.34
Prescribed grazing/rotational grazing (CPS 528)	Any form of Management Intensive Grazing (MIG)	0.26	NE	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.

NE = Not estimated