Kevin Atticks, Secretary

2023 – Annual Status Report on Climate Change

In accordance with §2-1305 of the Maryland Environment Article

submitted December 2023

The Maryland Department of Agriculture (MDA) is a member of the Maryland Commission on Climate Change (MCCC) and works collaboratively with the Maryland Department of the Environment (MDE), other state agencies, and partners to develop and achieve plans to address climate change. Accordingly, MDA submits the information below on its programmatic efforts to advance the resilience and mitigation potential of Maryland's approximately two million acres of agricultural lands.

MDA seeks to safeguard Maryland's network of natural areas, agricultural lands, and coastal zones through its established conservation programs and practices. Land conservation offers an important mechanism for mitigating and adapting to climate change. Well managed croplands, grasslands and forests provide direct benefits in greenhouse gas (GHG) emission reductions and an opportunity to mitigate emissions associated with more developed areas. In addition, MDA encourages the development of innovative technologies geared toward helping the state reach its climate goals and facilitating career development. Agency efforts to improve the estimates of emissions reduction and carbon sequestration are currently underway and will be included in greater detail in future year reports.

MDA continues to pursue policies and programs that curb the conversion of agricultural lands and encourage the conservation of natural resources while also working with the Maryland Department of Natural Resources (DNR), Maryland Department of Environment (MDE), Maryland Department of Planning (MDP), and other partners to promote the preservation and restoration of forested, grassed, and wetland areas on agricultural lands.

I. Enhancing Sequestration Activities

A. Maryland Agricultural Land Preservation Foundation (MALPF)

The Maryland Agricultural Land Preservation Foundation (MALPF) program is MDA's flagship program for the purchase of permanent preservation easements and is one of the most successful programs of its kind in the country. Besides maintaining prime farmland and woodland as a viable local base of food and fiber production, the protection of agricultural land reduces urban development pressures, safeguards wildlife habitat, and enhances the ecology of the Chesapeake Bay and its tributaries.

Maryland has multiple land preservation goals established through legislation. In 2021, House Bill 860 was signed into law that established a goal to preserve 1,030,000 acres of productive agricultural lands by 2030 through a combination of State and County easement preservation programs.

More recently, the Maryland the Beautiful Act was enacted in 2023. This act recognizes the multiple benefits derived from protected lands throughout the state and established ambitious land conservation goals. The act established the state goal to conserve 30% of the state by 2030 and to conserve 40% of the state by 2040. As of August 2023, Maryland is on track to meet the 30% goal by 2030 (currently at 99.5% of the 2030 goal with 7 years remaining). Achieving 40x40 will be much more challenging and will depend on future funding for land preservation programs, willing sellers, and continued cooperation from all state, local, and federal partners.

2023 Milestones

- Through fiscal year 2023, 2,653 farms have been protected and land has been preserved in each of Maryland's 23 counties at a public investment of over $906 million;
- MALPF's preserved acres total 355,674 as of June 30, 2023; and
- By fall 2023, MALPF had settled 70 of the total 91 easement offers in the fiscal year 2022 application cycle and entered into 112 contracts to purchase agricultural easements in the fiscal year 2023 application cycle. These easement purchases bring a welcome influx of funds to the landowners of newly MALPF-eased farms, as well as into the agriculture industry at large.

Funding

MALPF's purchases are funded by dedicated percentages of the Real Estate Transfer Tax and the Agricultural Transfer Tax, along with county allocations. Additionally, The Great Maryland Outdoors Act, passed in 2022, will provide a one-time appropriation of ~$16.5 million to the MALPF Fund in fiscal year 2024. In fiscal year 2019, MALPF returned to the annual application cycle with full funding to the program, with a record high single year budget authorized in fiscal year 2024 under Governor Moore's first year in office.

Enhancement Opportunities

MDA is actively working to best align existing preservation and conservation programs in support of the state's climate goals. For example, MALPF-preserved farms are able to help the State of Maryland meet its renewable energy goals by establishing alternative/renewable energy systems on their properties for their agricultural and residential energy needs. MALPF policy allows for the installation and use of these systems, provided that the energy generated does not exceed 125% of the energy used on an annual basis, for residential and agricultural uses. Landowners are also allowed to be reimbursed by the energy utility/provider for excess power generated.

Challenges

As with all easement programs, with every additional property protected in perpetuity through a MALPF easement, the State accepts the responsibility of the long-term monitoring, stewardship, and enforcement of each easement. The more time passes from when the easement was purchased, and as new owners acquire the farms, the chances of violations increase significantly. With the MALPF program being more than 45 years old, the stewardship of the older easements becomes more challenging. The importance of regularly monitoring easements is crucial to both ensure the terms of the easement are being upheld, but also to foster the relationship with the landowners.

B. Retirement of Marginal and Sensitive Farmland

Conservation Reserve Enhancement Program and Conservation Buffer Initiative

The state of Maryland has participated in the federal-state Conservation Reserve Enhancement Program (CREP) since 1997. CREP aims to target high-priority conservation concerns by

offering rental payments for 10- to 15-year set-aside contracts, and other incentives to agricultural producers to protect environmentally sensitive lands, improve wildlife habitat, and reduce nutrient and sediment loss. Currently Maryland landowners can receive four types of payments: a one-time signing bonus, annual rental payments that include a per-acre incentive, cost share assistance, and a one-time practice incentive payment.

CREP goals for Maryland are to achieve 100,000 acres for water quality and wildlife benefits, including converting up to 16,000 acres of marginal land into grass, shrubs, and trees, establish 77,000 acres of grassland and forest buffers and 5,000 acres of water and wetland habitat, and restore 2,000 acres of habitat for declining, threatened, or endangered species.

To complement CREP, MDA initiated a state program known as the Conservation Buffer Initiative (CBI) in fiscal year 2021 to advance additional riparian buffer plantings. The CBI program is designed to offer flexible management and contract terms for operators and landowners.

Both CREP and CBI allow riparian buffers to address water quality and habitat, but increasingly MDA is promoting riparian forest buffers and upland tree plantings to leverage greater carbon sequestration benefits and address the state's 5 Million Tree Goal by 2031.

2023 Milestones

- As of September 2023, CREP enrollment in Maryland was at 40,513.5 acres;
- During fiscal year 2023, MDA provided cost-share for 59 CREP-related projects, totaling $400,441 in payments.
- A third year of applications for CBI occurred, resulting in approximately 330 acres of buffer plantings to be implemented;
- Bonus payments for all newly planted riparian forest buffers, through CREP and CBI, were included in the $1000 per acre payment, totaling $70,350 in payments for fiscal year 2023;
- An upland tree planting bonus of $2 per tree was created in addition to 100% cost-share to install the plantings; and
- MDA reported the planting of 129,192 trees through fiscal year 2023 in support of the 5 Million Trees goal.

Funding

The federal monies toward CREP vary with authorized funding and participation levels based on USDA incentives administered through its Farm Service Agency, while the Maryland Agricultural Water Quality Cost Share Program (MACS) offers grants, which are financed by state bond funds, to provide up to 100% of the costs to install high priority best management practices. The Conservation Buffer Initiative and state signing incentive payments, administered by MDA, are funded through the Chesapeake and Atlantic Coastal Bays Trust Fund and the Tree Solutions Now Act of 2021.

Enhancement Opportunities

In addition, easements and CREP contracts require a current soil conservation and water quality plan. These plans, developed by the local Soil Conservation District, need to be updated

every 10 years, or upon new ownership of the land. As part of updating plans, owners can discuss adding components of the Healthy Soils Program and/or Forest Management/Forest Stewardship plans to their operation. Such properties may also be eligible to participate in emerging markets for ecosystem services.

Challenges

Annual CREP enrollment continues to decline since a peak enrollment of ~74,500 acres in 2008. While many factors influence participation, the perception is many farm operators are less willing to enter into the lengthy contracts typical of CREP. The Conservation Buffer Initiative has been a strong complement to this concern due to the lesser contract term (5-10 years as opposed to 10-15 years), but the majority of enrollments continue to be grass buffers rather than tree plantings. Accordingly, MDA is looking at innovative ways to incentivize forest buffers and tree plantings to achieve multiple outcomes.

C. Healthy Soils Program

The 2017 Healthy Soils Act charged MDA with the development of a Healthy Soils Program to improve the health, yield, and profitability of Maryland's soils and promote the further adoption of conservation practices that foster soil health while increasing sequestration capacity. In support of this initiative, MDA initially collaborated with stakeholders from the Healthy Soils Consortium to complete a comprehensive scientific literature review to identify those practices that are most effective at improving soil health and building soil carbon stocks. Information from this literature review was used to create a menu of Maryland-specific conservation practices that advance soil health.

Subsequently, in 2019, the Soil Health Advisory Committee was formed to serve as a more formal advisory body to MDA. Starting from the menu of Maryland-specific conservation practices, the Advisory Committee developed further recommendations on how conservation practices and programs would advance the objectives of the Healthy Soils Program. Recommendations were submitted to MDA leadership in January 2022, and resulted in the roll out the *Cover Crop Plus* program in summer 2022, to leverage the success of cover cropping in the state and encourage earlier planting, later termination, and multi-year planning for soil health. A second program, the Healthy Soils Competitive Fund, was launched in winter 2023 to encourage innovative soil health management. Both programs capitalize on co-benefits for air and water quality and carbon sequestration that build upon Maryland's nationally recognized progressive farming practices and programs.

In addition to programmatic goals, MDA is focused on method(s) to best quantify outcomes from the Healthy Soils Program, with an intent to address farmer inquiries but also improve the state's GHG inventory by better reporting of the state's natural carbon sinks.

2023 Milestones

- *Cover Crop Plus* enrollment through fiscal year 2023 included 20 agreements, totaling nearly 4,000 acres;
- The pilot year for the Healthy Soils Competitive Fund resulted in 42 applications totaling $1.7 million in funding requests, of which 16 awardees were selected;
- Soil health evaluations on participating farms in the Healthy Soils Program remain in progress to develop metric(s) to best quantify soil health outcomes; and

- MDA, in partnership with MDE and the US Climate Alliance, initiated a project to develop protocols and to estimate the historic contribution of Maryland's agricultural soils (2006-present) using COMET software tools. Estimates for conservation tillage, cover crops, and nutrient management were included. **Preliminary results demonstrate Maryland farmers have made significant contributions to soil carbon sequestration in past decades.**

Funding

The Climate Solutions Now Act of 2022 specifies an appropriation of $500,000 in the governor's budget from fiscal years 2024-2028 for the MDA Healthy Soils Program. Through fiscal year 2023, a budget of $450,000 from the Chesapeake and Atlantic Coastal Bays Trust Fund can be utilized for the program.

Funds through USDA-Regional Conservation Partnership Program are fully obligated and grant funds from the National Fish and Wildlife Foundation will conclude in calendar year 2024.

Enhancement Opportunities and Challenges

Unpredictable market conditions for crops and farm inputs have made producers hesitant to commit to additional long term conservation practice implementation so future programming will have to be adaptive to producer needs. In addition, Maryland farmers are often early adopters of conservation so private investment seeking to monetize carbon markets and credits has resulted in a smaller opportunity for most state operators. Hence, MDA is committed to developing the best metrics and tools to quantify soil health outcomes such that future state programs and policies may reward the ecosystem services being provided by Maryland farmers.

D. Cover Crops

Recognized as one of the most cost-effective practices to mitigate residual nutrient leaching following the harvest of summer commodity grains, research has shown that the planting of cereal grain cover crops, such as rye, wheat, and barley, not only provide nutrient sequestration benefits, but also provide winter ground cover to reduce soil erosion and promote healthy soils as well. Increasing science is also quantifying the soil carbon benefits of regular cover crop implementation.

First introduced in the summer of 1997 in response to nutrient leaching concerns resulting from severe drought, the Maryland Cover Crop Program has evolved significantly over the past two plus decades. The program is nationally recognized for the significant acres planted annually, exceeding more than 40% of available acres. Importantly, the program is re-evaluated each year to ensure payment rates and incentive structures are appropriate. Increasingly, MDA is expanding its cover crop programs to meet all farmer's needs.

Cover Crop Plus is a multi-year program to encourage earlier planting, later termination, and multi-year crop rotation planning for soil health along with conservation tillage to maximize co-benefits.

The Small Acreage Cover Crop Program was created to provide financial assistance to urban and small-scale producers who do not qualify for traditional cover crop programs. Growers that plant less than ten (10) acres of qualifying cover crops—including cereal grains or cover crop seed mixes—can apply for grants up to $1,500 per grower, per year.

2023 Milestones

- The traditional cover crop program resulted in ~398,000 acres fall planted in the 2022-2023 season, totaling $24.3 million in financial assistance;
- *Cover Crop Plus* enrollment through fiscal year 2023 included 20 agreements, totaling nearly 4,000 acres; and
- The Small Acreage Cover Crop program completed its pilot year in 2023 with 33 applications approved, totaling 152 acres to be planted in cover crops.

Funding

Funding for cover crop programs are annually allocated from the Chesapeake and Atlantic Coastal Bays Trust Fund and the Bay Restoration Fund. To-date, MDA has had sufficient funding to cover the breadth of programs available to cover crop implementation.

Enhancement Opportunities

For the traditional cover crop program, MDA annually convenes a meeting of its key partners - Soil Conservation Districts and academia - to consider enhancements to the programs that 1) make the programs more efficient to administer and/or 2) refine payment incentives based on new research. MDA also works closely with technical partners to use satellite and remote sensing to add additional verification of the spring biomass produced by cover crops.

Outreach to expand participation in the *Cover Crop Plus* and Small Farm Cover Crop programs is ongoing.

Challenges

Much of the state funding dedicated to cover crop implementation is based on nutrient reductions estimated by the Chesapeake Bay Program to achieve the mandated Watershed Implementation Plan (WIP) goals. As such, the nutrient effectiveness for cover crops varies widely based on species, planting method, and planting date. Translating this effectiveness to also properly credit soil health benefits remains a need for the Chesapeake Bay Program. MDA will continue to collaborate with the Chesapeake Bay Program and monitor additional research, as it becomes available, to further refine incentive payments to ensure program funding is applied in the most cost-effective manner and achieves nutrient reduction, soil health, and climate change goals.

II. Emissions Reductions

Estimates of emissions from the agricultural sector, as included in the state's greenhouse gas inventory, represent a small portion of Maryland's cumulative emissions (less than 5%) and rely largely on data provided by the EPA State Inventory Tool (SIT). The state's forthcoming GHG Reduction Plan estimates the sector's greatest reduction potential through improved enteric fermentation and manure management (Figure 1). It is MDA's intention to work with MDE and the ag sector in the coming years to improve the estimate and quantification methods that would

draw on more locally available data and refine the reduction estimates. An updated estimate would be provided in future reports. In the interim, MDA continues to expand existing programs that result in emissions reduction activities and work with partners to monitor and quantify reductions at the farm-scale.

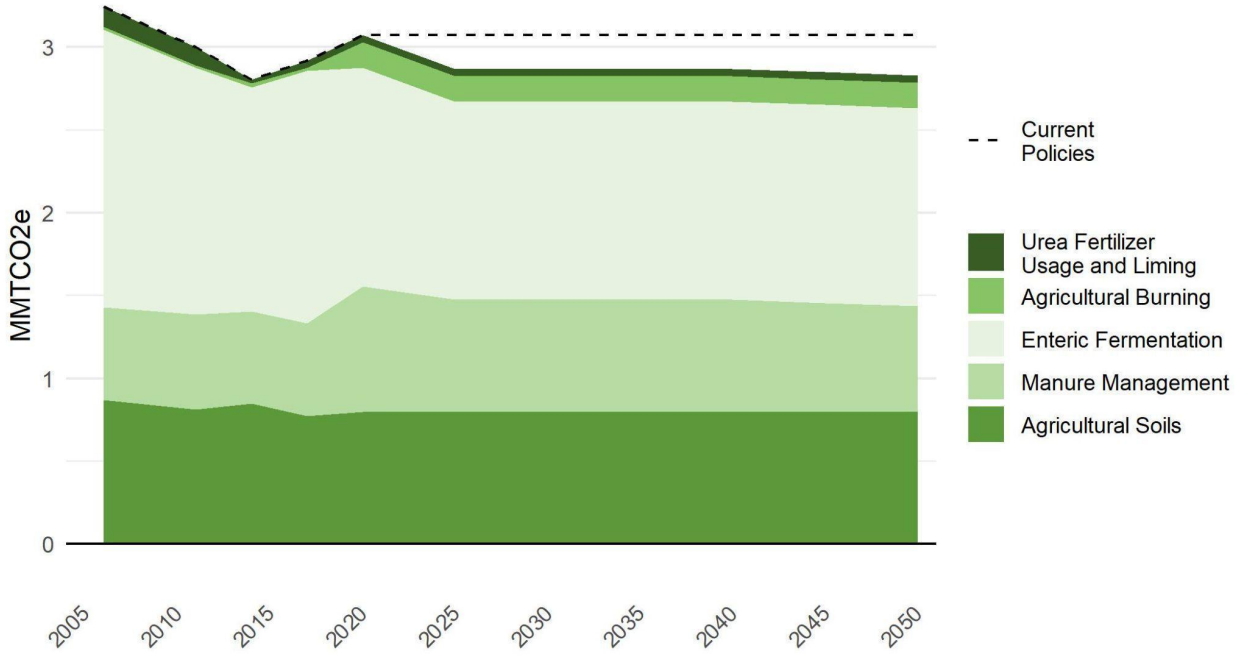

Figure 1: Maryland's agricultural sector GHG emissions trends, historical and projected, from 2006 to 2050 based on current and new policies.

A. Animal Waste Technology Fund

The Animal Waste Technology Fund (AWTF) was established in 2013, aiming to provide monetary assistance to individuals, vendors, and businesses showcasing innovative technologies towards managing animal waste. Animal waste is defined as any waste stream generated by on-farm animals or through an animal production process involving Maryland livestock. This includes, but is not limited to, dairy wastewater, carcasses, or poultry processing waste. For projects to be eligible, they must enhance public and environmental health and offer alternative waste management solutions for the agricultural sector. Research and development proposals are not eligible for funding.

The AWTF is a competitive funding grant with a primary goal of protecting our water resources from excess loads of nutrients, while still remaining profitable, and adding value to the traditional farm business model in the state. Many of the projects go hand in hand with the state's climate change goals – many of the awarded technologies also produce a qualifying renewable energy source that can support the state's goal to achieve 50% renewable energy production by 2030, as well as, a carbon rich soil amendment by-product that can be land applied to increase soil health and carbon sequestration.

To accomplish the goals of the AWTF, MDA is supported by a multi-partner Technical Evaluation Team (MDA, MDE, DNR, MEA, UM Extension, and USDA) as well as a large Advisory Committee of local, state, and industry partners. In addition, third-party monitoring of AWTF awarded projects provides value insight to the technology performance and environmental outcomes (e.g. Life Cycle Assessment) at the project scale.

2023 Milestones

- The University of Maryland Extension submitted its final commissioned report, *Maryland Animal Waste Technology Assessment and Strategy Planning*, to offer a comprehensive evaluation of the AWTF program and offer recommendations on climate change and environmental justice metrics that should be integrated into the project selections;
- MDA awarded Long Green Farms, LLC a grant of $1.5 million to construct the state's first small scale (modular) anaerobic digestion system for a small dairy herd; and
- Initial recommendations from the University of Maryland report were included in the fiscal year 2024 Request for Proposals. Additional recommendations will be considered with the Advisory Committee.

Funding

Annually, the AWTF budgets between $800,000 to $1.5 million as available for investment into technologies. Funding is provided by the Chesapeake and Atlantic Coastal Bays Trust Fund. Additional state matching funds can be requested through Maryland Energy Administration programs.

Enhancement Opportunities and Challenges

MDA is in the process of reviewing additional recommendations from the University of Maryland report, in collaboration with the Advisory Committee, to more fully incorporate climate change and environmental justice metrics that can be integrated into the project selections. Greater emphasis on the climate and community benefits of the program are key to future success.

In the interim, existing projects have provided several lessons learned about the viability and financial feasibility of the technologies at the farm and regional scale. The state would benefit from greater recognition of animal waste technologies to serve as a climate solution for the state and as a source of sustained farm revenue. As such, greater coordination across state agencies to align the review and permitting process as well as better collaboration with the utility providers that enter net metering agreements with the property are needed.

B. Maryland Resilient Food Systems Infrastructure Grants

MDA serves as co-vice chair of the Maryland Food System Resiliency Council (FSRC) established in 2021. The FSRC aims to address food insecurity while also advancing a vibrant, local food system within the state. Many of the Council's recommendations recognize the climate and equity benefits of creating a resilient food system. As such, MDA recently secured USDA funding to develop the MDA Resilient Food System Infrastructure (RFSI) program with a primary aim to build resilience in our food supply chain. RFSI supports increasing access to more and better markets for small farm and food businesses, the development of value-added products, encouraging equal and fair wages and prices, and helping establish new training and employment opportunities. The program will include selection criteria to promote "climate-resilient landscapes" consistent with USDA priorities. The RFSI will complement the

Maryland Food and Agricultural Resiliency Mechanism Grant Program (MFARM) goal to help food insecure communities and individuals secure access to necessary food, and provide a market for farmers. This program allows food banks and charitable providers in the state to request funds to purchase products that are listed in the Certified Local Farm and Fish Program and deliver them to Maryland families.

Milestones

- MDA conducted a survey to identify needs and priorities for the RFSI funding;
- Staff are actively collaborating across units to position MDA programs to address multiple goals for food insecurity, farmer profitability, and build greater resilience into the food system; and
- MDA continues to engage legislators and partners on the recommendations of the FSRC.

Funding

Funding for RSFI programs is through a $3.8 million dollar cooperative agreement with the United States Department of Agriculture.

Enhancement Opportunities

The RFSI is a new program at MDA and will be evaluated for progress and enhancement at a future date. In the interim, program criteria are being developed and will align to the 2021 Maryland Climate Adaptation and Resilience Framework among its goals.

Challenges

The RFSI is a new program at MDA and will be evaluated for challenges at a future date.

III. Environmental Justice

Maryland aims to be a national and global leader in fighting climate change. In order to do so, the state must address issues and concerns that place all communities at risk, equally. State law defines environmental justice (EJ) as “equal protection from environmental and public health hazards for all people regardless of race, income, culture, and social status.”

MDA is committed to working in collaboration with our state department counterparts, scientists, and our producers to address conditions that disproportionately affect our overburdened and underserved communities. MDA’s EJ program and policy is currently in progress, as we work to define key socioeconomic criteria and identify communities and projects.

2023 Milestones

As part of the department’s overall aim to provide producers with the support they need and to help build a resilient future for agriculture for all Marylanders, MDA’s Resource Conservation unit seeks to

- In mid-2023, MDA Office of Resource Conservation appointed a senior advisor, whose focus is integrating climate change and environmental justice initiatives into the

department's existing programs. The advisor will work closely with the Assistant Secretary and program managers to support development and implementation of our conservation programs; and

- Efforts to expand access and pursue diversity have led to MDA's Small Farm and Urban Agriculture program. The program, launched in 2022, seeks to provide financial support to support small-scale operations in urban, peri-urban, rural, and suburban areas within the state.

Funding

The Small Farm and Urban Agriculture Program is funded by the Chesapeake and Atlantic Coastal Bays Trust Fund. The program currently offers two grant programs to provide financial assistance to producers that qualify. Small Acreage Cover Crops Grants (spring and fall), and Urban Agriculture Water and Power Grants. The Urban Agriculture Water and Power Grants

Enhancement Opportunities and Challenges

At MDA, we work with our conservation partners at federal, state, and local levels in order to remain a leader in agricultural conservation. It is imperative that we pursue diversity, acceptance, and seek to provide equitable access to our services, programs, and education. As our program begins to take shape and develop, we are working to integrate EJ into our regulatory, education, and technical and financial assistance programs to ensure that small, urban, minority, and underserved communities can benefit from Maryland's healthy natural resources.