

The High Cost of Manure

Why Maryland Should End its Animal Waste
Technology Fund

October 2026



KEY TAKEAWAYS



- 1. The Animal Waste Technology Fund has failed on its basic promise.** After more than \$15 million in public dollars spent over more than a decade, Maryland has little evidence that the Animal Waste Technology Fund – created to support economically viable technologies that reduce nutrient pollution from animal waste – has produced measurable nutrient reductions, water-quality improvements, or public health benefits.
- 2. Animal waste technologies don't solve the underlying manure problem.** They do not eliminate excess manure or its nutrients. Instead, they transform manure into new waste streams that still require management and disposal, all while the industrial animal agriculture system generating huge volumes of manure remains largely unchanged.
- 3. The program entrenches factory farming.** Animal waste technologies have high capital costs, depend on continued government subsidies, and tend to favor the largest animal feeding operations, which are the same systems generating excessive manure and pollution.
- 4. Funded projects are disproportionately sited in already overburdened communities.** The program fails to assess environmental justice impacts or ensure community safeguards when determining funding. Almost all of the funded projects have been located in communities identified as overburdened by Maryland's Environmental Justice Screening Tool.
- 5. The Animal Waste Technology Fund lacks adequate accountability and transparency.** Failed and stalled projects, repeated extensions and limited public information make it difficult to determine whether projects are operational or delivering the environmental benefits for which they received public funding.
- 6. Maryland should shift from subsidizing animal waste technologies to preventing pollution at its source.** This includes phasing out the Animal Waste Technology Fund, redirecting funds toward proven conservation practices and farmer-transition programs, and strengthening animal feeding operation oversight and enforcement.

Introduction

For more than a decade, Maryland has funded anaerobic digesters and other waste-conversion technologies through its Animal Waste Technology Fund (AWTF), to address the growing manure problem created by animal feeding operations (AFOs), including large-scale industrial animal operations commonly known as factory farms. Anaerobic digesters break down manure in oxygen-free tanks to produce factory farm gas, also known as manure biogas, while other animal waste technologies process manure into products like fertilizer, fuel, or biochar. The fund was created to support economically viable technologies that reduce nutrient pollution from animal waste to help protect public health and the environment and provide farmers with alternative ways to manage manure. Yet, the underlying problem has only grown. Hundreds of industrial AFOs throughout Maryland continue to generate enormous volumes of manure, often in excess of the nutrient needs of surrounding cropland, contributing to persistent water and air pollution and threatening public health.

This report details how the AWTF has failed to demonstrate that these technologies can meaningfully address Maryland's manure problem. Since its creation in 2013, the fund has obligated more than \$15 million in taxpayer dollars to 14 projects,¹ with a quarter of those projects apparently having failed or remaining "in progress" years after receiving state support. Moreover, at least half these funds have gone to corporations and entrepreneurs—not Maryland farmers. The program has also provided almost no publicly available evidence that its investments have produced measurable reductions in nutrient pollution or lasting environmental and public health benefits.

More fundamentally, animal waste technologies do not eliminate the enormous volumes of manure generated by factory farms. In fact, they depend on the continued production of large quantities of animal waste and, rather than addressing the underlying pollution problem, transform manure into new waste streams that still require management and disposal. These systems also tend to favor the largest industrial operations, as there are

high capital and operating costs involved, disadvantaging small and mid-sized producers using superior waste management practices. As a result, Maryland's investment of public dollars in animal waste technology entrenches the industrial animal agriculture systems responsible for generating excessive, highly polluting manure in the first place. Finally, these animal waste technologies can generate additional environmental, public health, and safety concerns for already overburdened communities living nearby.



Ultimately, Maryland should stop using taxpayer dollars to attempt to engineer its way out of a problem rooted in the scale and concentration of factory farms. Instead, public resources should be directed toward approaches that strengthen accountability for AFOs and support farmers in adopting proven conservation practices or transitioning away from the factory farming model.

This report examines the AWTF's shortcomings and highlights how specific funded projects under this program illustrate why Maryland should phase out the fund and redirect its resources toward more effective solutions.

Factory Farm Pollution in Maryland

Along Maryland's Eastern Shore, a dense concentration of hundreds of chicken AFOs has contributed significantly to water pollution, with little relief to those who live nearby. These operations each house hundreds of thousands of birds, generating massive volumes of manure that contaminate both air and water resources.² This waste is periodically applied to spray fields, despite containing pathogens, antibiotic-resistant bacteria, and heavy metals, and frequently in excess of crop needs.³ For example, one study found that in 2019, more than half of the poultry operations in Maryland whose records were available reported to the state that they had over-applied manure to their crop fields.⁴ Excess manure readily runs off into nearby waterways, driving nutrient pollution downstream and degrading water quality.⁵



Drinking water contamination is a particular concern on the Eastern Shore. Testing has consistently found unsafe nitrate levels across the region, and in Wicomico and Worcester Counties, more than one third of residents may have been exposed to water above safe standards.⁶ Nitrates are linked to a variety of serious health issues, including colorectal cancer, thyroid disease, neural tube defects,

and “blue baby syndrome.”⁷ These burdens also raise serious environmental justice concerns: low-income communities and communities of color are disproportionately located near AFOs and bear the brunt of this intense pollution.⁸

Factory farm pollution also contributes to the degradation of the Chesapeake Bay. Agriculture is the largest source of water pollution in the United States,⁹ and agricultural runoff is the largest source of pollution entering the Bay.¹⁰ AFO manure in particular “is a primary source of nitrogen and phosphorus to surface and groundwater” and around 95% of Maryland’s AFOs are located in the Chesapeake Bay watershed.¹¹ Excess nitrogen and phosphorous flowing into the Bay from animal waste has led to algal blooms, eutrophication, dead zones, and declines in aquatic life populations. The Maryland Department of the Environment (MDE) attributes about half of the total excess nutrients in the Chesapeake Bay to agriculture.¹²

Yet rather than addressing the scale and concentration of industrial animal agriculture, Maryland has invested millions of public dollars through the AWTF in technologies intended to process, burn, gasify, or otherwise convert animal waste. As the following sections demonstrate, these investments have come at a significant taxpayer expense while failing to meaningfully reduce pollution.

What is the Animal Waste Technology Fund?

Maryland established the Animal Waste Technology Fund (AWTF) in 2013 to “encourage the development and implementation of economically feasible technologies that help protect the public health and the environment by reducing the amount of nutrients from animal waste to enable farmers to meet nutrient management requirements and provide alternative animal waste management strategies to farmers.”¹³ The bill analysis notes that “agriculture faces increasingly challenging goals to restore the Chesapeake Bay” and thus the fund could provide “new answers to [the] manure challenge.”¹⁴ Funding for the program

is provided through the Chesapeake and Atlantic Coastal Bays Trust Fund, a dedicated environmental fund that supports Chesapeake Bay restoration activities.¹⁵

Each year, MDA solicits applications for the AWTF. According to the agency, eligible projects “should demonstrate the potential to: enhance public health and environmental well-being; offer alternative waste management solutions for the agricultural sector; and have a positive economic development impact in the state.”¹⁶ Projects that provide “climate and community benefits” receive additional consideration.¹⁷ However, it is unclear how much weight these benefits carry in the project selection process, particularly since MDA has recently identified quantifying them as an “opportunity” for the program.¹⁸

Public health and environmental benefits are central to how projects are supposed to be evaluated. Internal review documents provided by MDA reflect five criteria used by the Technical Committee to evaluate applications, listed in order of importance.¹⁹ The first asks reviewers to consider “[t]he extent to which the Project demonstrates...[it] will improve the public health and the environment resulting in the reduction of nitrogen and phosphorus transport to the waters of the State...”²⁰

Yet, there is remarkably little information demonstrating whether funded projects actually achieved these promised benefits.²¹ MDA does not make any final reports available online, despite the fact that the AWTF Grant Agreement signed by awardees requires them to provide a final report to MDA at the end of their grant period.

Since its establishment, the AWTF has obligated more than \$15 million tax dollars to various technologies, including anaerobic digesters, with at least half of the awards going to corporations and entrepreneurs rather than Maryland farms.²² At least 25%¹ of that funding has been spent on projects that are either failed to move forward or are “in progress,” despite having been awarded funds a decade ago.²³ For other projects, publicly available information is insufficient to determine whether they remain operational or continue to provide the environmental benefits for which public funds were awarded. The following sections examine this record in greater detail.



Case Studies

Below are just a few examples of projects that highlight the need to reexamine the AWTF and the use of public funds to subsidize animal waste technology projects over proven conservation practices and farm-transition programs that would achieve greater environmental benefits.

CleanBay Renewables

In 2016, CleanBay Renewables was awarded a \$1.4 million AWTF grant to build a manure-to-energy plant in Somerset County, using poultry litter as the feedstock.²⁴ Like many of these types of projects, state and federal subsidies, along with tax credits, were essential for it to be economically feasible. In addition to the Maryland grant, CleanBay Renewables was also awarded a \$22 million grant through USDA's Fertilizer Production Expansion Program.²⁵



From the outset, this facility was framed as a solution to both manure management and climate concerns associated with the poultry industry. CleanBay claimed it would be able to repurpose more than 150,000 tons of chicken litter annually²⁶ and argued that converting poultry litter into manure biogas and fertilizer would reduce nutrient pollution, “significantly” cutting water pollution and greenhouse gas emissions, all while creating economic opportunities on Maryland’s Eastern Shore, including 26 full-time jobs.²⁷

CleanBay also characterized poultry litter as a “superior feedstock” compared to other types of manure.²⁸ This is a baffling claim since raw poultry litter is dry and emits little methane under current production methods,²⁹ so large volumes of water must be added to the manure.³⁰ This not only diverts precious water resources but also has the potential to create novel methane emissions from digester leakage.

CleanBay planned to construct the facility in Westover, Maryland. Throughout the process, residents had concerns about the amount of waste that would be brought to the facility and the impact it would have on their quality of life. CleanBay had modified their site plan four times, each change increasing the project’s size.³¹ County officials acknowledged there was “no limit” on how much waste could be brought to the facility each day.³² Despite these concerns, the Planning and Zoning board approved the project and allowed it to move forward. At the same time, CleanBay was attempting to build another similar facility in Georgetown, DE where public outcry was even stronger—and included a lawsuit arguing that this was an industrial refinery being built in a community zoned for agriculture.³³

Despite Maryland disbursing more than \$800,000 of the \$1.4 million AWTF award, and the company being awarded a \$22 million grant from USDA, \$400 million in tax credits, and a 15-year agreement with BP to purchase the methane gas produced by the facility,³⁴ CleanBay Renewables’ operation never reached commercial production. In 2025, the company was subject to a forced asset sale due to defaulting on its loans, which included its AWTF-funded facility and all subsidiaries.³⁵ When MDA presented to the General Assembly on the AWTF at the end of 2024, it noted that for this particular project, it had transitioned to annual reporting and there was “no known startup date or status.”³⁶

EarthCare LLC

In 2021, EarthCare LLC was awarded a \$2.24 million grant from the AWTF to construct a gasification and dryer facility in Wicomico County that would convert poultry litter into “Ecochar,” a soil amendment intended to help trap carbon.³⁷ The project claimed it would convert up to 30,000 tons of litter into 4,100 tons of Ecochar each year.³⁸

The proposal quickly generated community concerns about the facility’s public health and environmental impacts. Studies show gasification plants release heavy metals, tars, and toxic gases into the environment, causing air pollution linked to various health harms.³⁹ EarthCare LLC was also seeking a special exemption to the county’s zoning code, claiming it was a composting facility, which is very different in both nature and scope than a gasification plant.⁴⁰

In January 2022, MDA withdrew the AWTF award for EarthCare LLC. Confusingly, when MDA announced the funding for the project, it noted that the company oversaw 11 similar projects in the U.S. and abroad and had “extensive experience with this technology.”⁴¹ Yet, when MDA revoked the award, it stated that the “concept was promising” and encouraged the company to reapply when they were “more prepared to move forward with the project.”⁴²



Photo obtained from Maryland Department of Agriculture

The episode raises questions about accountability: How did a project that was unprepared to actually move forward receive a multi-million dollar grant award in the first place?⁴³ It also highlights a broader gap in the program: Despite the potential effects of these facilities on nearby residents, the AWTF did not include formal community or environmental justice assessment as part of its application process.

International BioRefineries, LLC

In 2020, International BioRefineries, LLC (“InBio”) was awarded a \$1.9 million AWTF grant for a biorefinery plant to convert chicken litter into “value-added products” using fast pyrolysis, a technology that uses heat to quickly decompose the waste.⁴⁴ Six years later, the project has not begun operating.

Initially, InBio partnered with Elysian Fields, an eight-house poultry operation in Wicomico County, run by the Chesnik family.⁴⁵ However, the relationship quickly deteriorated: The poultry operation reported that over the course of four years, their property was left in complete disarray with materials left throughout the yard, hazardous materials left unsecured on site, and damage to buildings on their property.⁴⁶ The farm was receiving just \$1 per month to lease the property to InBio.

In 2024, InBio decided to relocate the planned biorefinery to Salisbury, leaving the Chesniks to deal with the damage and clean up. By that point, MDA had allowed InBio to amend and extend their grant agreement, despite original grant terms requiring the project to be completed within two years.⁴⁷ The Department ultimately permitted four extensions. InBio’s quarterly reports provide little explanation for the lengthy delays: from October 1, 2022 to March 31, 2024, the quarterly reports submitted by the company are almost identical, with InBio claiming “all the major components for the project are on site and assembly of the equipment is partially complete.”⁴⁸

InBio’s relocation to Salisbury was met with significant pushback from the community. MDE allowed InBio to simply transfer their air pollution control permit to the new location, without any public notice or input.⁴⁹ The proposed facility would have been located near at least 80 residences in a community that was already overburdened by pollution. Meanwhile, when InBio



According to the Chesniks, InBio left extensive debris on their property, including these bags filled with material used in the pyrolysis process that were left outside in the weather for years and ripped open. The Chesniks worried what they might do to the environment or to animals. Photo courtesy of Michele Chesnik.

applied to get the proper zoning permit from Wicomico County, the company described the proposed structure as a "storage building" with a "storage occupancy" use, and the permit was approved on that basis.⁵⁰ Despite the continued delays and apparently misleading approach to securing zoning permits, MDA once again extended the project's completion deadline to December 31, 2025, and provided an additional \$500,000 in grant funding.⁵¹

After community members brought the facility's intended use as a poultry litter biorefinery to the attention of the county, Wicomico County investigated and issued a stop-work order. The County Board of Appeals determined that the facility was not a permitted use in the A-1 Agricultural-Rural zoning district, and the Circuit Court affirmed

that decision.⁵² The Court specifically found that the proposed operation would create processed commercial products, including biochar, biofuel, and synthetic gas, and therefore did not qualify as an agricultural use under county law.⁵³ InBio has since appealed that decision, and the case is currently pending before the state's Appellate Court.

The InBio project illustrates several recurring problems with the AWTF including years-long delays, repeated extensions beyond the original grant period, additional public funding despite the lack of an operational facility, limited transparency about progress, and significant siting and community concerns. Six years after the original award, the state still has no operational project—and no demonstrated nutrient-reduction or other environmental benefits—to show for its investment.



Problems with the AWTF

Animal waste technologies can create additional environmental and environmental justice concerns.

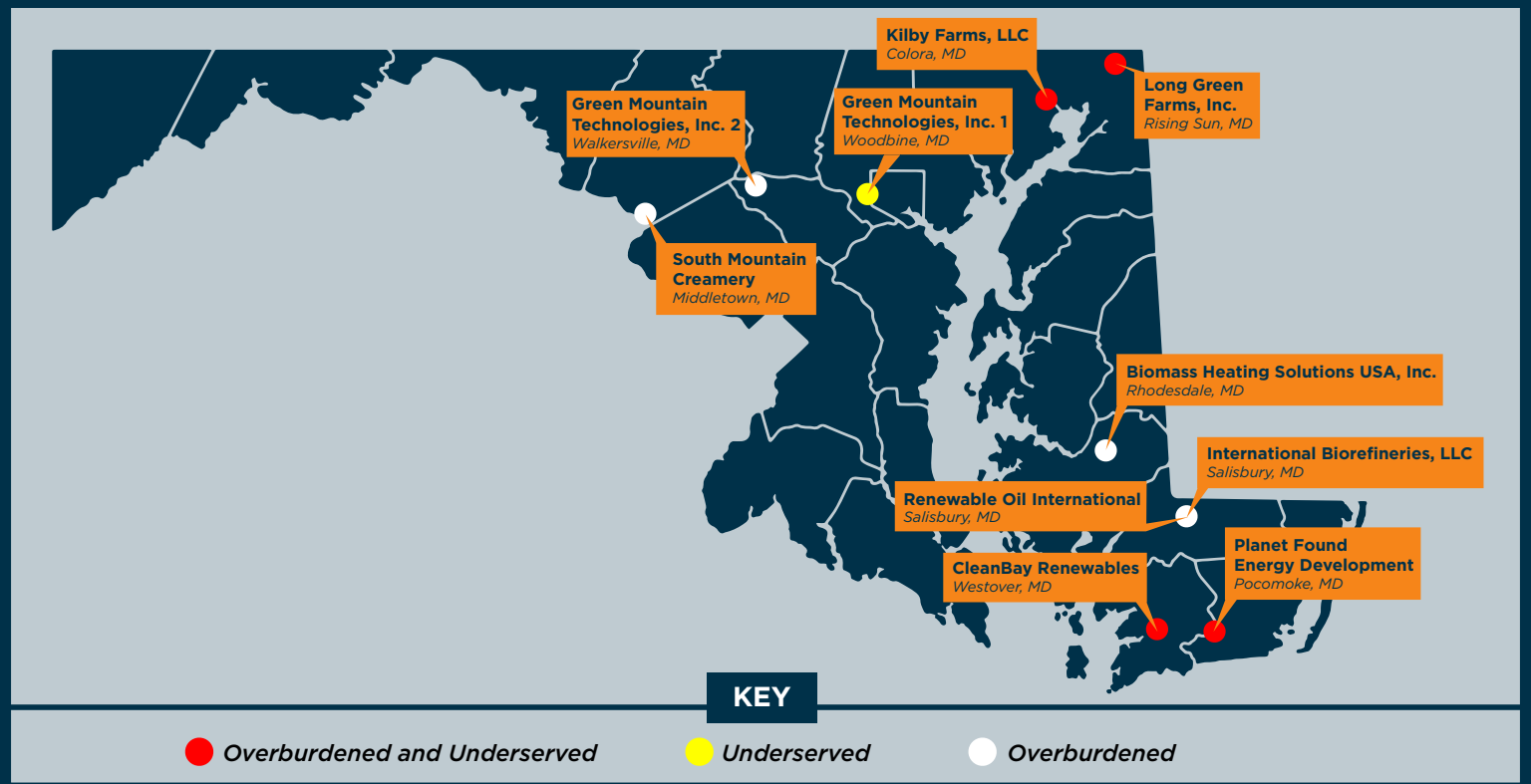
The environmental, public health, and quality-of-life impacts associated with AFOs are well documented. Animal waste technologies generate additional environmental, public health, and safety concerns for communities living nearby, compounding burdens on these communities.

Manure digesters that are used to produce factory farm gas illustrate some of these risks. Anaerobic digestion can increase ammonia pollution during storage and land application.⁵⁴ Digestion also does not eliminate nitrogen or phosphorous from manure. Instead, these nutrients remain in digestate, the leftover byproduct of digestion, which is often land-applied, and still contributes to water pollution.⁵⁵ Factory farm gas projects also introduce additional safety risks from pipelines, truck traffic to transport manure or

biomethane through communities, and more toxic air pollution from biogas processing than is produced by fossil gas.⁵⁶

In addition to the concerns around the processes to produce biochar mentioned above, there are also environmental and public health implications from the use of poultry litter biochar itself. Because poultry litter often contains arsenic from feed additives, biochar made from it can retain concentrated arsenic, putting nearby waterways at risk if biochar is land-applied. One study found arsenic levels as high as 99 ppm in poultry litter biochar.⁵⁷ Pyrolysis, which is also used to produce biochar, concentrates rather than removes phosphorus from poultry litter, which has already high concentrations of phosphorus. As a result, land-applying poultry litter biochar risks the same nutrient over-application and runoff problem as raw litter or digestate.⁵⁸ Land application of biochar can also create particulate-matter concerns for air quality and human health as fine biochar particles are able to easily become airborne.⁵⁹

Figure 1: **Funded Projects and Environmental Justice Designations in Maryland**



These concerns are particularly important given where AWTF-funded facilities have been proposed or located. Of 13 projects² that received funding through the program, 10 were sited in communities identified by Maryland's Environmental Justice Screening Tool as overburdened, with three considered both overburdened and underserved.³

Ultimately, Maryland should be directly regulating industrial animal agriculture pollution and protecting environmental justice communities, not incentivizing continued factory farm pollution to create a “marketable end use” for the excessive manure the industry produces.

The AWTF is an ineffective use of taxpayer dollars that entrenches industrial livestock operations.

There is almost no evidence, after decades and millions of public dollars spent, that the AWTF has met its statutory objective of creating “economically feasible technologies” that reduce nutrients from animal waste in the state.

A 2023 assessment of the program by the University of Maryland (UMD) noted that the various technology supported by the fund faces significant economic barriers, including high upfront costs and expensive operating and maintenance costs—with digesters being particularly costly.⁶⁰ The assessment also notes that the economic viability of these projects relies on continued taxpayer subsidies.⁶¹ MDA similarly acknowledged in 2024 that these technologies don't survive without an ongoing government support, stating that they are “not economical” to private vendors.⁶²

The assessment further states that the economics of animal waste technology projects, like anaerobic digesters, tend to favor larger operations due to the high capital costs and the economies of scale they achieve.⁶³ As a result, the systems the AWTF funds are intended to primarily benefit and entrench large-scale, highly polluting factory farms. This aligns with previous research from Friends of the Earth and the Socially



Responsible Agriculture Project, which found that anaerobic digesters require significant scale to profitably produce manure biogas, and as a result, incentives for factory farm gas production disproportionately benefit large-scale operations that can capitalize on available subsidies.⁶⁴ That research also found that subsidizing manure biogas production creates perverse incentives for factory farms to produce as much manure as possible through herd size expansion, consolidation, or both, and to manage manure in ways that maximize methane capture potential instead of methane reduction.⁶⁵

Most fundamentally, these technologies do not eliminate the massive volumes of waste—and their nutrient loads—generated by industrial animal agriculture. They rely on (and may encourage production of) consistent, large amounts of animal waste and instead, convert the manure into other nutrient-dense products that still require careful management and disposal. As the UMD Assessment explains: Anaerobic digesters, and other technologies for converting animal waste to energy, do not eliminate the need for a land base for nutrient application, as those technologies

leave nutrient-dense residuals. Total cropland and available cropland receiving manure is declining in Maryland over time.⁶⁶

Public subsidies for these technologies can therefore create a costly cycle: taxpayers help finance systems for managing excessive quantities of manure while the agricultural structure generating those quantities remains largely unchanged. Rather than treating excess manure primarily as a technological problem in need of a marketable end product, Maryland should prioritize policies that prevent and reduce pollution at its source.

The AWTF lacks adequate accountability, transparency, and community safeguards.

The AWTF was created to support technologies that would reduce nutrient pollution, assist with manure management, and help improve Maryland's water quality. Yet despite millions of dollars invested in these projects, MDA provides little publicly available information demonstrating whether funded projects consistently achieved these outcomes over the long term. As mentioned previously, MDA does not publish information showing measurable nutrient reductions, environmental benefits, or even the continuing operational status of some projects.

The program also lacks safeguards for communities that may be affected by AWTF-funded facilities. Although applicants are expected to demonstrate the potential to "enhance public health and environmental well-being," the AWTF does not appear to assess environmental justice impacts, meaningfully engage communities, or demonstrate how potential community harms will be avoided or mitigated. This is inconsistent with the Moore Administration's stated commitment to environmental justice, particularly as AFO pollution disproportionately impacts communities of color and low-income communities in Maryland⁶⁷ and animal waste technologies can exacerbate that pollution. As the case studies above demonstrate, residents have repeatedly raised concerns about the siting and impacts of AWTF-supported projects, sometimes only after projects have already received state support or permits.

A program financed with public environmental funds should be able to demonstrate both that its investments produce measurable environmental benefits and that they do not impose additional burdens on communities already facing disproportionate pollution. The AWTF lacks transparency, post-award accountability, and community safeguards necessary to provide that assurance.

Policy Recommendations

The AWTF's track record, which includes failed and stalled projects, weak oversight, and no publicly demonstrated water quality or public health benefits, shows that the fund is not achieving its statutory purpose. At the same time, the economics of the technologies it supports remain dependent on continued public subsidies and tend to favor the largest, most polluting factory farms.

Maryland should stop subsidizing speculative animal waste technologies and redirect public resources toward conservation practices that deliver meaningful and measurable pollution reduction, support farmers pursuing more sustainable and climate-friendly agricultural production and hold AFOs accountable for the pollution they generate.

Prohibit state funding for anaerobic digesters and other manure-to-energy systems.

Digesters and similar technologies do not eliminate excess manure. Rather, they transform and concentrate nutrients into new waste streams that still require management and disposal, all while carrying high capital and operating costs that make many of the projects dependent on continued government support. These systems also tend to favor the largest, most highly polluting factory farms, due to economies of scale. As a result, public subsidies entrench the very industrial animal agriculture systems responsible for generating excessive pollution in the first place. Maryland should bar the use of state funds to subsidize manure digesters or comparable manure-to-energy systems that process animal waste for energy for fuel production.

Instead, limited public conservation dollars should support practices and programs with demonstrated environmental benefits and reduce pollution at its source.

Phase out and repeal the Animal Waste Technology Fund.

The AWTF has obligated over \$15 million to animal waste technologies, yet MDA has failed to demonstrate that these investments have produced measurable reductions in nutrient pollution or other environmental and public health benefits. MDA does not make final project reports publicly available, leaving the public with little information about whether funded projects achieved the outcomes used to justify their awards. The General Assembly should repeal the AWTF's statutory authorization and sunset the program, including ending new solicitations. As part of the phaseout, MDA should be required to publish final reports for all outstanding AWTF projects, including the amount of state funding provided, project status, whether the project achieved its stated environmental objectives, and the disposition of any unspent or recouped grant funds.

Redirect AWTF funds toward proven conservation practices and support for farmers transitioning away from AFOs.

Maryland's manure problem is fundamentally one of concentration and scale. The state's hundreds of AFOs generate manure volumes that often exceed what surrounding cropland can absorb. Public investment should therefore support reducing the amount of manure produced at its source through investment in proven conservation practices that prevent nutrients from reaching waterways and helping farmers transition toward agricultural systems that generate less concentrated animal waste.

Priorities should include:

- The Maryland Ecosystem Incentives Program, which provides farmers and landowners with a range of financial incentives to adopt conservation practices that improve water quality, soil health, biodiversity, and climate resilience.⁶⁸
- Technical assistance and financial support for farmers seeking to transition away from AFO-scale livestock and poultry production toward specialty crop production or lower-density, pasture-based operations.

Invest in stronger AFO oversight, monitoring, and enforcement.

Conservation incentives should complement—not substitute for—effective enforcement of environmental requirements for the operations generating pollution. Maryland's oversight of AFOs has failed to keep pace with the scale of pollution these facilities generate, leaving MDE unable to adequately inspect, monitor, or enforce against factory farms that continue to degrade the state's waterways and air quality. The state should dedicate additional resources to AFO oversight and enforcement, including sufficient staffing for inspections and compliance monitoring, improved monitoring of water quality in areas with high concentrations of AFOs, greater transparency about violations and enforcement actions, and meaningful penalties that deter noncompliance.^h

The state should also strengthen the AFO Water Discharge General Permit to improve regulation of industrial-scale AFOs and close major loopholes that have let factory farms escape meaningful oversight. This includes setting enforceable limits on manure runoff, requiring facilities to control ammonia emissions, regularly monitoring nearby waterways and wells, and ensuring transparency for affected communities.

Conclusion

After two decades of public investment, Maryland's AWTF has failed to deliver meaningful solutions to industrial AFO waste pollution. Instead, the program has devoted millions of public dollars to costly and sometimes unsuccessful projects while leaving the underlying problem—the concentration of more animal waste and nutrients than surrounding land can sustainably absorb—unaddressed.

Maryland should stop funding failed animal waste technologies and redirect those resources toward pollution prevention, proven conservation measures, stronger AFO oversight, and support for farmers transitioning toward less pollution-intensive forms of agriculture. Public dollars should fund approaches that can demonstrate real improvements in water quality, public health, and the well-being of affected communities.



Appendix A. 2023 Evaluation Criteria

The Committee shall evaluate each Proposal to discern whether it meets the goal of the Animal Waste Technology Program—that being, to develop and implement an economically feasible technology that will: (a) Help protect the public health and the environment by reducing the amount of nutrients from animal waste to enable farmers to meet nutrient management requirements; and (b) Provide alternative waste management strategies for farmers.

To this end, the Committee, in evaluating each Proposal, shall utilize the five criteria listed immediately below (Note: The importance of each criterion is listed in descending order; and unless stated otherwise, any sub-criteria within a criterion has equal weight.):

1. The extent to which the Project demonstrates the following: a. The Project will improve the public health and the environment resulting in the reduction of nitrogen and phosphorus transport to the waters of the State; and b. The Project will help preserve the viability of the agricultural industry by improving animal waste management strategies.
2. The particulars of the animal waste technology project and whether, in descending order of importance, the technology:
 - a. Treats/addresses a majority (by weight or volume) of on-farm generated manures;
 - b. Treats/addresses comingled on-farm generated manures and other animal wastes as defined in the Proposal;
 - c. Treats/addresses a majority (by weight or volume) of animal wastes other than on-farm generated manures, as defined in the Proposal; or
 - d. Provides innovative designs and demonstrations of farm equipment that promote improved nutrient application and nutrient efficiency of animal wastes.
3. The Grantee's readiness to begin implementing the Project and ability to complete it in a timely manner as demonstrated by: a. The expertise of key personnel and, in particular, their expertise in relation to implementing the proposed technology; b. The sufficiency of staffing and, in particular, the employees and/or contractors named to develop/install/construct/implement the proposed technology; and c. The external financing available to develop/install/construct/implement the proposed technology (other than the requested grant sum).
4. The Project will have both a positive economic development impact in the State and demonstrate economic feasibility. Economic impact and feasibility may be demonstrated by one of the following: producing higher value end-products that may offset animal waste disposal costs, improving management of animal wastes, or resulting in on-farm savings (time, utilities, etc.) from the operation and maintenance of the technology.
5. The investment that others, including the Grantee, have in the proposed technology, including its development and implementation.

Appendix B. Table of Funded Projects

Project Name	Funding Award	Type of Project	Location & EJ Screening Assessment	Status
Biomass Heating Solutions USA, Inc. Phase 1 & 2 (Missouri-based)	\$970,000	Fluidized bed combustion (Thermochemical)	Double Trouble Farm, Rhodesdale, MD Overburdened; not underserved	COMPLETE- NO LONGER OPERATIONAL
Green Mountain Technologies, Inc. (Washington State-based)	\$150,790	In vessel composter/ turnkey – equine	Woodbine, MD Not overburdened; underserved	COMPLETE- OPERATIONAL STATUS UNKNOWN
Veteran Compost (Maryland-based)	\$237,520	In vessel composter/ turnkey – dairy	Walkersville, MD Overburdened; not underserved	COMPLETE- OPERATIONAL STATUS UNKNOWN
Veteran Compost (Maryland-based)	\$350,302	Aerated Static Pile Composting	Moving locations	Secured all permits with county. County Executive chose not to renew lease and is actively working with applicant and MDA on new site selection.
CleanBay Renewables (Maryland-based)	\$1,400,000	Thermophilic Anaerobic Digester with Nutrient Capture System	Westover, MD Overburdened; underserved	FORCED ASSET SALE-NOT OPERATIONAL
Planet Found Energy Development Phase 1 (Maryland-based)	\$676,144	Anaerobic digestion with nutrient separating system	Pocomoke City, MD; Worcester County Overburdened; underserved	COMPLETE- OPERATIONAL
Planet Found Energy Development Phase 2 (Maryland-based)	\$222,000	Nutrient recovery and bagging system	Pocomoke City, MD; Worcester County Overburdened; underserved	Acquired by Chesapeake Utilities Corporation in November 2022
Kilby Farms, LLC (Maryland-based)	\$1,850,412	Anaerobic digestion	Colora, MD; Cecil County Overburdened; underserved	COMPLETE- OPERATIONAL
Renewable Oil International	\$1,200,000	Fast pyrolysis	Salisbury, MD; Wicomico County	Unknown what happened to funding
International Biorefineries, LLC (Maryland-based)	\$1,947,490 +\$500,000	Fast pyrolysis (rapid thermal decomposition)	Salisbury, MD Overburdened; not underserved	STOP WORK ORDER UPHELD; IN LITIGATION OVER ZONING PERMIT

Sustainable Chesapeake	\$725,267	Manure injection technology at 3 dairy farms.	Cecil, Frederick & Carroll County Specific locations unknown	COMPLETE- OPERATIONAL
Earth Care, LLC (Indiana-based)	\$2,240,000	Gasification and dryer facility.	Salisbury, MD; Wicomico County Overburdened; not underserved	Funding revoked.
UMD Assessment & Strategy Phase 1&2	\$714,294	"Strategic Planning"	N/A	COMPLETE
Long Green Farms, Inc. (Maryland-based)	\$1,546,723	On-farm anaerobic digester	Rising Sun, MD; Cecil County Overburdened; not underserved	IN PROGRESS
South Mountain Creamery (Maryland-based)	\$505,744	Protective cover and flare system and an advanced manure separation system.	Middletown, MD; Frederick County Overburdened; not underserved	IN PROGRESS
UMD Assessment & Strategy Phase 3	\$70,000	"Community Engagement"	N/A	IN PROGRESS

Endotes

1. 15 total projects were funded, but two were assessments of the fund by the University of Maryland and one project had funding revoked. Another project was awarded funding (Renewable Oil International), but there is no publicly available evidence that it is operational. Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials (pp. 8–9). https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf (does not include the UMD assessment funded in 2025).
2. U.S. Environmental Protection Agency. (2024). Evaluation of Maryland's 2022–2023 and 2024–2025 milestones (p. 6). https://www.epa.gov/system/files/documents/2024-05/2024_maryland_2022_2023_2024_2025_evaluation_draft_ms2.pdf
Environmental Integrity Project. (2021, October 28). Blind eye to Big Chicken: Frequent violations, but few penalties for Maryland's chicken industry (p. 14). <https://environmentalintegrity.org/wp-content/uploads/2021/10/MD-Poultry-Report-10-28-21.pdf>
Environmental Integrity Project. (2020, April 22). Poultry industry pollution in the Chesapeake region: Ammonia air emissions and nitrogen load higher than EPA estimates (pp. 13–15). <https://environmentalintegrity.org/wp-content/uploads/2020/04/EIPPoultry-Report.pdf>
Environmental Integrity Project. (2021, October 28). Stagnant waters: Despite two decades of Bay cleanup efforts, no improvement for phosphorus pollution on Maryland Eastern Shore (p. 5). <https://environmentalintegrity.org/reports/stagnant-waters/>
3. Hellerstein, D., Vilorio, D., & Ribaudo, M. (Eds.). (2019). Agricultural resources and environmental indicators, 2019 (Economic Information Bulletin No. 208). U.S. Department of Agriculture, Economic Research Service. <https://www.ers.usda.gov/publications/93025>
Blanes-Vidal, V., Suh, H., Nadimi, E. S., Lofstrom, P., Ellermann, T., Andersen, H. V., & Schwartz, J. (2012). Residential exposure to outdoor air pollution from livestock operations and perceived annoyance among citizens. *Environment International*, 40, 44–50. <https://doi.org/10.1016/j.envint.2011.11.010>
4. Environmental Integrity Project. (2021, October 28). Blind eye to Big Chicken: Frequent violations, but few penalties for Maryland's chicken industry (p. 14). <https://environmentalintegrity.org/wp-content/uploads/2021/10/MD-Poultry-Report-10-28-21.pdf>
5. Halden, R. U., & Schwab, K. J. (2008). Environmental impact of industrial farm animal production. Lewis & Clark Law School. <https://law.lclark.edu/live/files/6699-environmental-impact-of-industrial-farm-animal>
Hribar, C. (2010). Understanding concentrated animal feeding operations and their impact on communities. National Association of Local Boards of Health; Centers for Disease Control and Prevention. <https://stacks.cdc.gov/view/cdc/59792>
6. Shwe, E. (2020, October 21). Report: Eastern Shore has unhealthy levels of nitrate in drinking water due to CAFOs. *Maryland Matters*. <https://marylandmatters.org/2020/10/21/report-eastern-shore-has-unhealthy-levels-of-nitrate-in-drinking-water-due-to-cafos/>
Assateague Coastal Trust. (2022, February 2). Community science initiative detects nitrate in Lower Eastern Shore residents' private wells. <https://www.actforbays.org/post/community-science-initiative-detects-nitrate-in-lower-eastern-shore-residents-private-wells>
7. Ward, M. H., Jones, R. R., Brender, J. D., de Kok, T. M., Weyer, P. J., Nolan, B. T., Villanueva, C. M., & van Breda, S. G. (2018). Drinking water nitrate and human health: An updated review. *International Journal of Environmental Research and Public Health*, 15(7), 1557. <https://doi.org/10.3390/ijerph15071557>
8. Hribar, C. (2010). Understanding concentrated animal feeding operations and their impact on communities. National Association of Local Boards of Health; Centers for Disease Control and Prevention. <https://stacks.cdc.gov/view/cdc/59792>
Hall, J., Galarraga, J., Berman, I., Edwards, C., Khanjar, N., Kavi, L., Murray, R., Burwell-Naney, K., Jiang, C., & Wilson, S. (2021). Environmental injustice and industrial chicken farming in Maryland. *International Journal of Environmental Research and Public Health*, 18(21), 11039. <https://doi.org/10.3390/ijerph182111039>
9. U.S. Geological Survey. (n.d.). Agricultural contaminants. <https://www.usgs.gov/mission-areas/water-resources/science/agricultural-contaminants>
10. Chesapeake Bay Program. (n.d.). Agricultural runoff. <https://www.chesapeakebay.net/issues/threats-to-the-bay/agricultural-runoff>
11. U.S. Environmental Protection Agency. (n.d.). Estimated animal agriculture nitrogen and phosphorus from manure. <https://www.epa.gov/nutrientpollution/estimated-animal-agriculture-nitrogen-and-phosphorus-manure>
12. U.S. Environmental Protection Agency. (2015). Maryland animal agriculture program assessment. <https://www.epa.gov/sites/production/files/2015-09/documents/marylandanimalagricultureprogramassessment.pdf>
13. Maryland Department of the Environment. (n.d.). Pollution in the Bay. <https://mde.maryland.gov/programs/water/tmdl/tmdlimplementation/pages/pollution-in-the-chesapeake.aspx>
14. Maryland General Assembly. (2012). House Bill 1304. https://mgaleg.maryland.gov/2012rs/fnotes/bil_0004/hb1304.pdf
15. Ibid.
16. Maryland General Assembly. (2026). Fiscal year 2027 budget documents: Department of Agriculture (p. 23). <https://mgaleg.maryland.gov/pubs/budgetfiscal/2027fy-budget-docs-operating-LOOA-Department-of-Agriculture.pdf>
17. Maryland Department of Agriculture. (n.d.). Animal Waste Technology Grants. https://mda.maryland.gov/resource_conservation/pages/innovative_technology.aspx
18. Ibid.
19. Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials (p. 4) [Presentation]. https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf
20. Maryland Department of Agriculture. (2023). Appendix A: Review elements [Internal program document].
21. Ibid.

21. MDA's presentation to the General Assembly simply denotes a project's status. Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials. https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf
22. Ibid.
23. Ibid. Note: two of the 14 projects were assessments of the fund by UMD.
24. Maryland Department of Agriculture. (2016, September 2). State awards \$1.7 million for innovative manure management projects in Somerset and Anne Arundel counties. <https://news.maryland.gov/mda/press-release/2016/09/02/state-awards-1-7-million-for-innovative-manure-management-projects-in-somerset-and-anne-arundel-counties/>
25. Though it is unclear if it ever actually received the money. DailyDAC Editors. (2025, July 28). Public notice of asset sale: CleanBay Renewables, Inc., and its several subsidiaries. <https://www.dailydac.com/public-notice-of-asset-sale-cleanbay-renewables-inc-and-its-several-subsidiaries/>
26. Delmarva Daily Times. (2020, July 28). Natural gas pipeline, chicken litter bio-refinery partner on Eastern Shore energy project. <https://www.delmarvanow.com/story/news/2020/07/28/natural-gas-pipeline-chicken-litter-bio-refinery-partner-project/5493012002>
27. Maryland General Assembly. (2023). [Committee testimony concerning CleanBay Renewables and animal waste biogas]. https://mgaleg.maryland.gov/cmte_testimony/2023/ecm/14513_03072023_192614-610.pdf
28. Ibid.
29. This is not to say dry poultry litter is harmless, however. The litter—a combination of feces, urine, water and sawdust or other bedding—is typically stored in outdoor piles. Chemicals and nutrients run off from the litter into waterways, and aerosolized particles from the dust impact air quality, causing adverse human health impacts and putrid odors.
30. Singh, K., Lee, K., Worley, J., Risse, L. M., & Das, K. C. (2010). Anaerobic digestion of poultry litter: A review. *Applied Engineering in Agriculture*, 26(4), 677–688. <https://doi.org/10.13031/2013.32061>
31. According to at least one resident, from 2015-2021, there was a 33,000% increase in the amount of waste the company proposed to truck to the Westover facility. Somerset County Planning Commission. (2021, July 1). Planning Commission meeting minutes. https://cms7files1.revize.com/somersetcountymd/document_center/Minutes/Planning%20Commission/2021/07-01-2021%20minutes%20APPROVED.pdf
32. Ibid.
33. Delmarva Daily Times. (2021, November 18). Lawsuit filed to block construction of factory farm biogas facility. <https://www.delmarvanow.com/story/news/2021/11/18/lawsuit-filed-block-construction-factory-farm-biogas-facility/8656447002>
34. bp Supply, Trading & Shipping. (2021, August 24). CleanBay Renewables to sell bp RNG derived from poultry litter. <https://www.bp.com/en/global/bp-supply-trading-and-shipping/news/press-releases/cleanbay-renewables-to-sell-bp-rng-derived-from-poultry-litter.html>
35. DailyDAC Editors. (2025, July 28). Public notice of asset sale: CleanBay Renewables, Inc., and its several subsidiaries. <https://www.dailydac.com/public-notice-of-asset-sale-cleanbay-renewables-inc-and-its-several-subsidiaries/>
36. Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials (p. 8) [Presentation]. https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf
37. Maryland Department of Agriculture. (2021, June 29). Department awards \$2.9 million in Animal Waste Technology Fund grants. <https://news.maryland.gov/mda/press-release/2021/06/29/departments-awards-2-9-million-in-animal-waste-technology-fund-grants/>
38. Ibid.
39. Jacinto, C. (2018). Environmental impact and occupational risk in gasification plants processing residues of sewage sludge and refuse-derived fuel: a review. *International Journal of Occupational and Environmental Safety*, 2:2, 50–63. https://research.unl.pt/ws/portalfiles/portal/11377711/CJacinto_out_2018_IJOES.pdf
40. Wicomico County. (2022, January 20). Planning and zoning meeting agenda. https://www.wicomicocounty.org/AgendaCenter/ViewFile/Agenda/_01202022-872
41. Maryland Department of Agriculture. (2021, June 29). Department awards \$2.9 million in Animal Waste Technology Fund grants. <https://news.maryland.gov/mda/press-release/2021/06/29/departments-awards-2-9-million-in-animal-waste-technology-fund-grants/>
42. WBOC. (2022, January 31). Funding pulled for waste disposal project in Wicomico County. https://www.wboc.com/news/agriculture/funding-pulled-for-waste-disposal-project-in-wicomico-county/article_6c30e378-7d6e-11ec-b7bc-f7095d3969ba.html
43. One member of the Technical Committee did rank this project lowest, which is an “incomplete or poor proposal for funding.” Maryland Department of Agriculture. (2021). Animal Waste Technology Fund review elements [Internal program review document].
44. Maryland Department of Agriculture. (2020, June 4). Department awards Animal Waste Technology grant to biorefinery project in Wicomico County. <https://news.maryland.gov/mda/press-release/2020/06/04/departments-awards-animal-waste-technology-grant-to-biorefinery-project-in-wicomico-county/>
45. Ibid. Specifically, Willard, MD. Initially, Renewable Oil International MD, LLC received a \$1.2 million grant AWTF for a biorefinery at this same site in 2015, but it's unclear what ultimately happened. It doesn't appear on MDA's list of projects. Maryland Department of Agriculture. (2015, August 25). MDA awards \$1.2 million for innovative manure management project in Wicomico County. <https://news.maryland.gov/mda/press-release/2015/08/25/mda-awards-1-2-million-for-innovative-manure-management-project-in-wicomico-county/> Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials (p. 7-9) [Presentation]. https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf

46. This includes holes left in buildings that allowed pigeons to roost inside, which was particularly concerning to the farm from a disease perspective.
Chesnik, [first name unavailable]. (n.d.). Email correspondence with Maryland Department of Agriculture [Email correspondence; on file].
47. Maryland Department of Agriculture. (n.d.). International BioRefineries, LLC grant agreement [Grant agreement; on file].
48. Maryland Department of Agriculture. (n.d.). International BioRefineries, LLC quarterly reports [Quarterly reports; on file].
49. The air permit has since been revoked.
50. Wicomico County Circuit Court. (n.d.). Opinion and order concerning International BioRefineries, LLC [Court document; on file].
51. Maryland Department of Agriculture. (n.d.). International BioRefineries, LLC grant agreement [Grant agreement; on file].
52. Wicomico County Circuit Court. (n.d.). Opinion and order concerning International BioRefineries, LLC [Court document; on file].
53. Ibid.
54. Holly, M. A., Larson, R. A., Powell, J. M., Ruark, M. D., & Aguirre-Villegas, H. (2017). Greenhouse gas and ammonia emissions from digested and separated dairy manure during storage and after land application. *Agriculture, Ecosystems & Environment*, 239, 410–419. <https://doi.org/10.1016/j.agee.2017.02.007>
- Kupper, T., Häni, C., Neftel, A., Kincaid, C., Bühler, M., Amon, B., & VanderZaag, A. (2020). Ammonia and greenhouse gas emissions from slurry storage—A review. *Agriculture, Ecosystems & Environment*, 300, 106963. <https://doi.org/10.1016/j.agee.2020.106963>
- Harper, L. A., Flesch, T. K., Powell, J. M., & others. (2010). The effect of biofuel production on swine farm methane and ammonia emissions. *Journal of Environmental Quality*, 39(5), 1624–1631. <https://doi.org/10.2134/jeq2010.0172>
55. Chojnacka, K., & Moustakas, K. (2024). Anaerobic digestate management for carbon neutrality and fertilizer use: A review of current practices and future opportunities. *Biomass and Bioenergy*, 180, 106991. <https://doi.org/10.1016/j.biombioe.2023.106991>
56. Macor, A., & Benato, A. (2020). A human health toxicity assessment of biogas engines regulated and unregulated emissions. *Applied Sciences*, 10(20), 7048. <https://doi.org/10.3390/app10207048>
57. Evans, A. M., Boney, J.W., & Moritz, J. S. (2017). The effect of poultry litter biochar on pellet quality, one to 21 d broiler performance, digesta viscosity, bone mineralization, and apparent ileal amino acid digestibility. *Journal of Applied Poultry Research*, 26(1), 89–98. <https://www.sciencedirect.com/science/article/pii/S105661711930087X?via%3Dihub>
58. Deinert, L., Hossen, S., Ikoyi, I., Kwapiński, W., Noll, M., & Schmalenberger, A. (2023). Poultry litter biochar soil amendment affects microbial community structures, promotes phosphorus cycling and growth of barley (*Hordeum vulgare*). *Applied Soil Ecology*. <https://doi.org/10.1016/j.apsoil.2023.105057>
59. Ravi, S., Sharratt, B. S., Li, J., Olshevski, S., Meng, Z., & Zhang, J. (2016). Particulate matter emissions from biochar-amended soils as a potential tradeoff to the negative emission potential. *Scientific Reports*, 6, <https://doi.org/10.1038/srep35984>
- Ravi, S., Li, J., Meng, Z., Zhang, J., & Mohanty, S. (2020). Generation, resuspension, and transport of particulate matter from biochar-amended soils: A potential health risk. *GeoHealth*, 4(11), <https://doi.org/10.1029/2020GH000311>
60. University of Maryland Extension. (2023). Final report: Animal Waste Technology Fund assessment. (pg. 101) https://extension.umd.edu/sites/extension.umd.edu/files/2023-10/Final.Report.AWTF_Assessment.pdf
61. Ibid.
62. Maryland General Assembly. (2024). Joint Committee on Chesapeake and Atlantic Coastal Bays Critical Area presentation materials (pg. 4) [Presentation]. https://mgaleg.maryland.gov/meeting_material/2024/mjm%20-%20133722006015444127%20-%20JCCIBPresentationMaterials_9-25.pdf
63. University of Maryland Extension. (2023). Final report: Animal Waste Technology Fund assessment. https://extension.umd.edu/sites/extension.umd.edu/files/2023-10/Final.Report.AWTF_Assessment.pdf
64. Waterman, C., & Armus, M. (2024). Biogas or Bull****? The deceptive promise of manure biogas as a methane solution. *Friends of the Earth*. <https://foe.org/resources/biogas-or-bull/>
65. Ibid.
66. University of Maryland Extension. (2023). Final report: Animal Waste Technology Fund assessment. (p. 101). https://extension.umd.edu/sites/extension.umd.edu/files/2023-10/Final.Report.AWTF_Assessment.pdf
67. Hall, J., Galarraga, J., Berman, I., Edwards, C., Khanjar, N., Kavi, L., Murray, R., Burwell-Naney, K., Jiang, C., & Wilson, S. (2021). Environmental injustice and industrial chicken farming in Maryland. *International Journal of Environmental Research and Public Health*, 18(21), 11039. <https://doi.org/10.3390/ijerph182111039>
68. Maryland Department of Agriculture. (n.d.). Maryland Ecosystem Incentives Program Program. https://mda.maryland.gov/resource_conservation/Pages/Ecosystem-Incentives.aspx
69. The Baltimore Sun. (2026, June 17). Violations at chicken rendering plant raise alarms in Dorchester County. <https://www.baltimoresun.com/2026/06/17/dorchester-rendering-plant-wastewater-violations-transquaking/>