

Maryland Department of Agriculture



Anaerobic Digestion Workshop
October 2, 2018

Maryland Nutrient Management

Update on FIV Soils Data, Tier Groups, Management

Next steps for PMT, transition and compliance

Enhanced Nutrient Management

Anaerobic Digestion and Nutrient Management

Practical, on-farm application and necessary BMPs needed

Land application and associated issues and considerations

Cost-Share Programs available in Maryland

Maryland Nutrient Management

Working with farmers to seek full compliance with Maryland's Nutrient Management Law

Farmers, agricultural and environmental groups cooperating to reach WIP Goals

Blending practical work experience with new technology to generate results

We are very aware of current economic conditions and issues facing farmers today

Seeking a balance between compliance and cooperation to reach state-wide goals





Maryland Fertility Index Value (FIV) Scale

- **0 - 25** = LOW, yield response is likely.
- **26 - 50** = MEDIUM, yield response is possible.
- **51 - 100** = OPTIMUM, yield response is not likely.
- **101 and greater** = EXCESSIVE, very unlikely
- **Below a P-FIV of 150, manure may be applied at a Nitrogen-based rate.**
- **A P-FIV value above 150 requires a PSI/PMT calculation before any Phosphorus can be applied.**
- **A field with a P-FIV of 500 or greater cannot receive a Phosphorus application of any kind.**

Maryland State Soil P-FIV Data Totals

(as of June 1, 2018)

Total AIR Acres (2014)	1,277,930
Total Acres Submitted	1,114,418
Percentage Reported	87.20%
Number of Fields Submitted	76,699
P FIV < 150	79.5%
P FIV 150-499	18.9%
P FIV > 500	1.6%

PMT Statewide Tier Group Data

PMT Tier Groups

1,661 Operations Reported, 187,870 acres

Tier Group A- 150-300 FIV (transition 2020)

1,313 operations, 122,705 acres

Tier Group B- 300-450 FIV (transition 2019)

252 operations, 54,271 acres

Tier Group C- >450 FIV (transition 2018)

96 operations, 10,894 acres

Phosphorus Management Tool

Overview of How it Works

RISK

7 YEAR TRANSITION SUMMARY							
	CROP YEAR						
	2016	2017	2018	2019	2020	2021	2022
Tier C - Avg. FIV P 450 and above	PSI/PMT	PSI/PMT	TM1	TM1	TM2	TM2	PMT
Tier B - Avg. FIV P 300-450	PSI/PMT	PSI/PMT	PSI	TM1	TM2	TM2	PMT
Tier A - Avg. FIV P 150 - 300	PSI/PMT	PSI/PMT	PSI	PSI	TM1	TM2	PMT
PSI = Phosphorus Site Index							
TM1 = Transition Management Phase 1							
TM2 = Transition Management Phase 2							
PMT = Phosphorus Management Tool							

** Could add time if services are not adequate.

Phosphorus Management Tool

Overview of How it Works

MANAGEMENT

PMT Risk Category	Transition Management Phase I	Transition Management Phase II	PMT
LOW	N-Based (not to exceed 3 Yr. C.R.)	3 Yr. Crop Removal	3 Yr Crop Removal
MEDIUM	3 Yr Crop Removal P	2 Yr Crop Removal	1 Yr Crop removal
HIGH	1 Yr Crop Removal	50% of 1 Yr C.R.	No Addtl. P

Next Steps- Soils Data

We will continue to target farms for Implementation Reviews, where we do not have soils data. This has and will continue to have a negative impact on our implementation compliance percentage.

We will begin random auditing for accuracy in case acreage was inadvertently missed during the reporting process.

Research Exemption Forms

Must have a specific objective and purpose

Support or supervision from the UM or qualified private company

Limited in the percentage of available cropland enrolled

Must follow the procedure outlined by the UM

Results to be shared with MDA

Limited participation to date, but this is an available opportunity

Example- One farm followed the N recommendation of PSI and Greenseeker, compared yield results, costs, and reached a conclusion, although different fields responded differently.

Anaerobic Digestion and Nutrient Management in MD.

What goes in... and what comes out.

Where does the end product go, what will it be used for?

How is the end product addressed, is it waste, manure, soil amendment?

Is there an opportunity for a regional digester and what are the benefits and concerns.

Beneficial re-use of waste water. If it has nutrients, we need to use it productively.

Any organic material applied to farmland must be tested and included in a NMP.

Financial feasibility. The NM Program does not require it and we do not want to be responsible for a farmer making an investment or commitment that does not work out.

Anaerobic Digestion and Nutrient Management in MD.

Nutrient Management Requirements for Maryland

There currently are no direct statements in NM Law regarding anaerobic digestion

Digestate can be applied to cropland according to a Nutrient Management Plan

A digester should be located on land with adequate acreage

Regional digester could be located on public land or commercial property

Concerns about bio-security and traffic

On-farm digesters, farmers are skeptical, it's "buyer beware"

There seems to be the need for adequate financial cost-share incentives

Anaerobic Digestion and Nutrient Management in MD.

Nutrient Management Issues- Benefits and any Potential Concerns

Digestion produces biogas and digestate

Bulk of material leaving digester is about 90%-95% of mass brought in

PAN- Nitrogen is more plant available after the digestion process

What about livestock, pasture and vegetables? Restrict digestate applications?

N losses- ammonia and leaching, leads to application method considerations

Anaerobic Digestion and Nutrient Management in MD.

Animal manures (dairy, beef, poultry, swine)

Food Processing Residuals (DAF from poultry, milk, potato)

Brewery Waste

Food Waste from fresh produce

Food Waste from uneaten food or plate waste

Crops grown for biogas production??

MD. Nutrient Management

Benefits/Reasons for Digestion

- Greatly reduce or eliminate odor from highly odorous manures and other organics
 - This could be the future for land application of DAF from poultry plant processing
 - Beneficial reuse of food waste
- Generation of biogas

Nutrient Capture Systems

- Separation of phosphorous from poultry litter
- Keep litter for application close to where it is generated, reduce need for transport
- Meet a need for organic growers, use of litter on high P soils
- Transport removed P to deficient regions more efficiently



Anaerobic Digestion and Nutrient Management in MD.

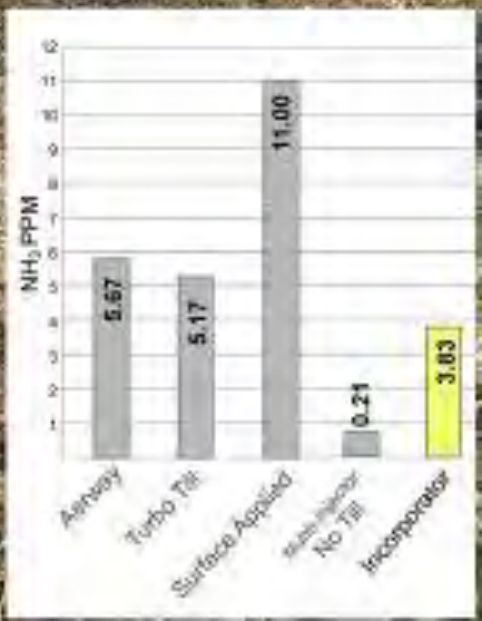
Animal Waste Technology Fund Current Projects

Retrofit to an existing anaerobic digester. The system upgrade will provide all or most of the farm's energy requirements. Also will convert more manure to solids to improve transportation to farms/fields where phosphorous can be better utilized.

Install a blending/bagging system at an existing anaerobic digester/nutrient capture system facility.

Both projects provide nutrient management benefits







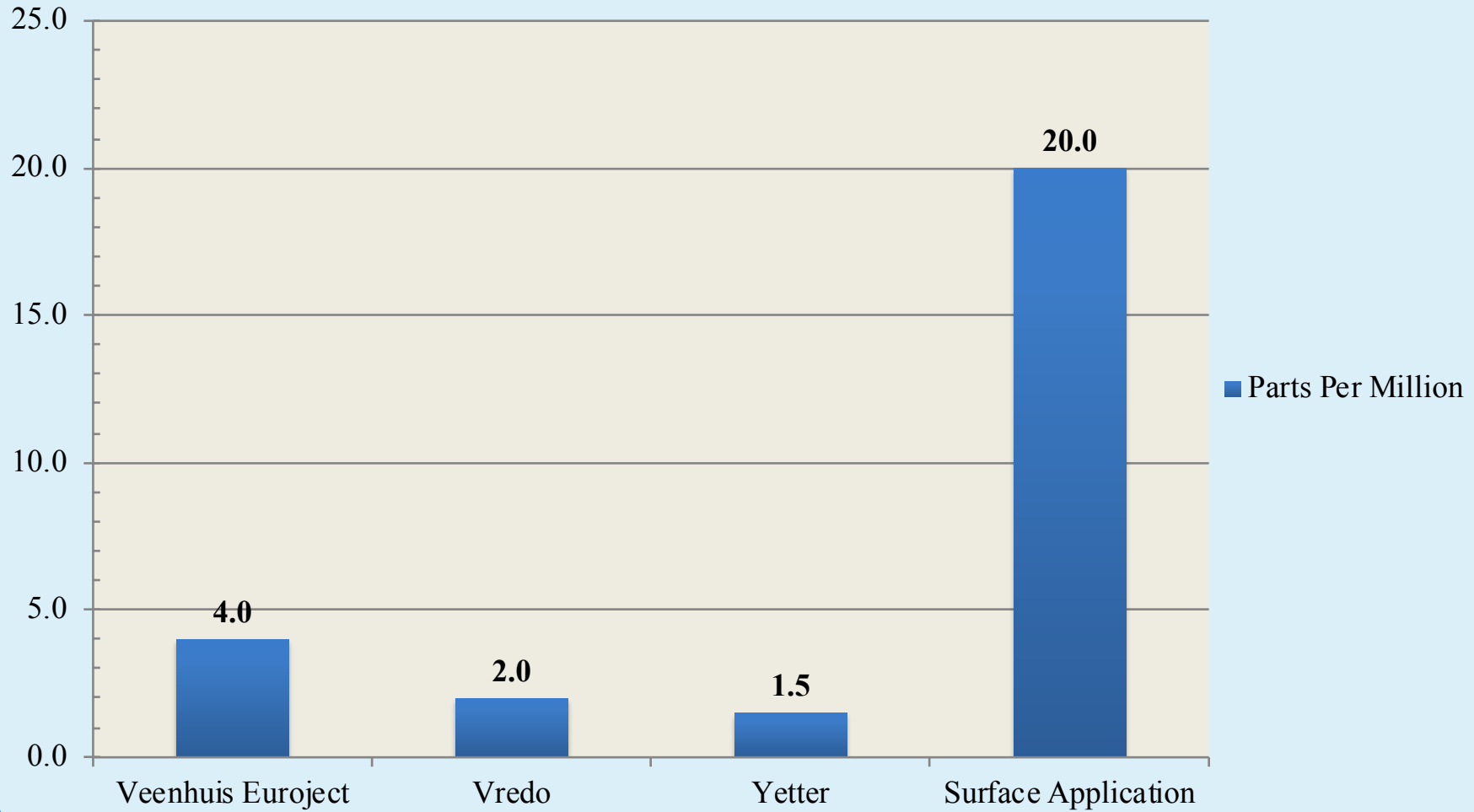








Ammonia Loss By Injection Method
October 13, 2016
DeBaugh Farms



Financial Benefit

Average Dairy Farm Manure

Total nitrogen 28 lbs. per 1,000 gallons

Organic nitrogen 17 lbs. per 1,000 gallons

Ammonia nitrogen 11 lbs. per 1,000 gallons

Ammonia nitrogen is available first year if not lost to volatilization. $11 \times \$0.76/\text{lb.} = \$8.36/1,000 \text{ gals.}$ A typical 6,000 gallon application could supply 66 lbs. of ammonia nitrogen at a value of \$50.16.

Can you afford to lose \$\$\$\$ into the air?

Anaerobic Digestion and Nutrient Management in MD.

Practices and BMPs Needed in Addition to the Digester

Solids separation

Liquid can be spray irrigated, land applied, or re-used for flushing barns

Dried separated solids can be re-used as bedding material

Composted separated solids can be field applied or sold as compost

Adequate storage for liquid and solids

Winter spreading moratorium Dec. 16-March 1

Heavy Use Areas as needed











12/01/2009



04/22/2008



04/30/2010

Funding Resources for New Environmental BMPs

MACS

(State Cost-Share Program)

Waste Storage Structures	\$200,000 limit
Heavy Use Area Protection	\$ 50,000 limit
Stream Crossing	\$ 50,000 limit
Watering Facility	\$ 50,000 limit
Fencing	\$ 50,000 limit
Spring Development	\$ 50,000 limit

Farm Limit-With Waste Storage \$300,000

Farm Limit- Without WSS \$150,000

MACS

Cover Crops, Manure Transport, Manure Incorporation and Injection.

New technology is evaluated and reviewed for efficiency benefits and new practices are added to the list for cost-share when deemed appropriate.

When a practice has gone beyond the assigned practice life, that funding is available for new practice installation.

EQIP (Federal Funding)

Current Farm Limit is \$450,000

Waste Storage Structures

Heavy Use Areas

Solids Separators

Roofed WSS

Roof Runoff

EQIP Projects are Competitive and Funds are Allocated
Based on Calculated Benefit

Chesapeake Bay Trust Fund

Provides funding for contractual positions in SCD offices

Provides funds to MDA and SCD for conservation related work

Chesapeake Bay Trust Fund

Innovative Animal Manure Technology Demonstration

2014- \$2,034,454 awarded in Projects

2015- \$1,175,943 in Projects

2016- \$1,750,302 in Projects

2018- \$2,674,975 in Projects

Non-Traditional Sources

National Fish and Wildlife Grants

Conservation Innovation Grants (NRCS)

Chesapeake Bay Trust Pioneer Grant Program

Mid-Shore Riverkeeper Conservancy

Chesapeake Bay Foundation

Maryland Department of Agriculture



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