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# NUTRIENT MANAGEMENT ANNUAL REPORT

HELPING CITIZENS MANAGE NUTRIENTS SINCE 1989

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The fiscal year 2016 (FY 2016) Nutrient Management Annual Report highlights the programs of the University of Maryland's College of Agriculture and Natural Resources (AGNR), which include nutrient management in crop production, animal production, nursery and greenhouse industries, and urban environments.

The guiding principle behind nutrient management planning and implementation, as outlined in the Maryland Water Quality Improvement Act of 1998, is that nutrients applied in any form should balance with plants' nutrient needs. In agricultural production systems, managing nutrients to meet, not exceed, crop needs may increase profitability and improve the health of the Chesapeake Bay and its tributaries.

Regardless of land use, improperly or excessively applied nutrients can leach into the groundwater or exit landscapes via runoff from precipitation and then migrate into Maryland's waterways. Once in the water, excess nutrients upset the Bay's ecological balance by causing algal blooms and contributing to eutrophication and degradation of wildlife habitat.

*For more information on the College of AGNR, visit [www.agnr.umd.edu](http://www.agnr.umd.edu)*



## Agricultural Nutrient Management

The University of Maryland Extension's (UME) Agricultural Nutrient Management Program (ANMP), which is funded by the Maryland Department of Agriculture (MDA), provides (1) nutrient management planning services to Maryland farmers through a network of nutrient management advisors located in all county Extension offices and (2) continuing education and technical support to certified nutrient management consultants and certified farm operators via nutrient management specialists.

### 2016 Priorities

A formal agreement between the MDA and the University of Maryland (UMD) details the nutrient management planning priorities for the ANMP. The agreement targeted several groups of farmers for assistance with developing or updating nutrient management plans in FY 2016:

1. farmers who have filed a notice of intent (NOI) as a Concentrated Animal Feeding Operation (CAFO);
  - a. and whose Comprehensive Nutrient Management Plan (CNMP) was being prepared by their Soil Conservation District; or
  - b. who need an updated nutrient management plan to remain in interim compliance while they awaited the development of the CNMP by their Soil Conservation District; or
  - c. who had previously developed a CNMP with a nutrient management component that required updating.
2. farmers who have filed a NOI as a Maryland Animal Feeding Operations (MAFO) or who are registered under the MAFO permit who require a current nutrient management plan to complete permit requirements or maintain their permit, respectively;
3. farmers with pollution problems or referred as non-compliant by MDA through an enforcement procedure;
4. farmers participating in the Manure Transport Project and those with a Maryland Agricultural Cost-Share (MACS) application pending for animal waste storage and poultry mortality composters;
5. updating nutrient management plans for the existing clientele with animal operations and expired plans developed by the nutrient management advisors; and
6. first come, first serve for any other farmer who must comply with the Water Quality Improvement Act.



# Agricultural Nutrient Management (Continued)

## 2016 Progress and Achievements

Under the ANMP, UME nutrient management advisors:

- prepared nutrient management plans for 30 Manure Transport Project clients, allowing transportation and application of manure on 7,274 acres;
- wrote nutrient management plans or updated them to partially fulfill permit requirements for 171 CAFO or MAFO clients;
- conducted the Phosphorus Site Index for 243 clients on 1,175 fields;
- implemented the Pre-Sidedress Nitrate Test (PSNT) for 26 producers with a total of 3,748 acres. This resulted in an estimated reduction of over 24,700 pounds of nitrogen applied;
- implemented the Fall Soil Nitrate Test (FSNT) for over 150 fields in 11 counties. This resulted in an estimated reduction of over 39,000 pounds of nitrogen applied;
- wrote 597 new nutrient management plans for 216 Maryland producers for approximately 16,000 acres. The nutrient management advisors updated 5,693 plans for approximately 1,400 clients farming 246,000 acres. (Figure 1).

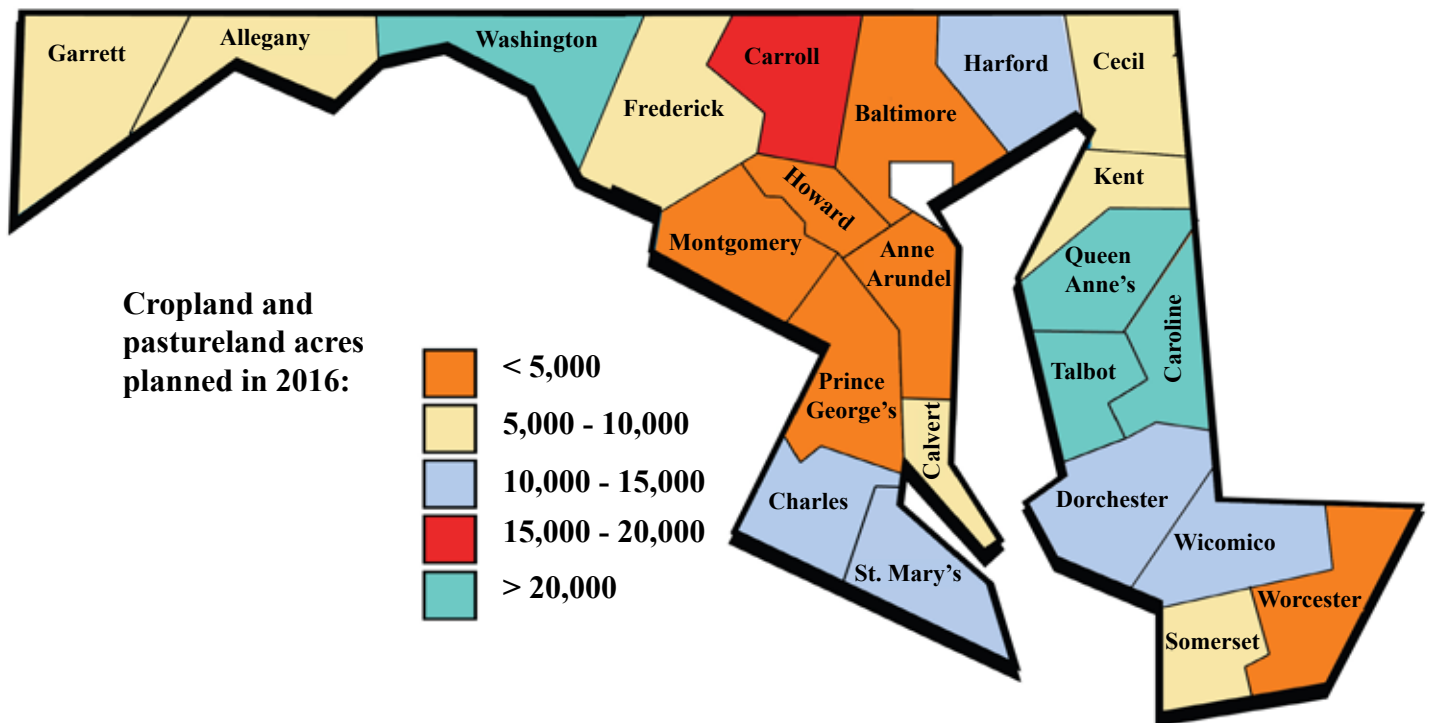


Figure 1. Farmland acres planned per county in fiscal year 2016 by University of Maryland Extension nutrient management advisors.



## Continuing Education

MDA and the College of AGNR co-sponsored continuing education programs to help certified nutrient management consultants and certified farmers meet their continuing education requirements in 2016.

- Seven face-to-face workshops had 81 attendees. Workshop topics included:
  - *How to Write a Nutrient Management Plan*
  - *Phosphorus Risk Tools (Phosphorus Site Index and Phosphorus Management Tool)*
  - *Revised Universal Soil Loss Equation Version 2 (RUSLE2)*
  - *Sustainable Soil Management and Nutrient Management for Urban Growers*
- Three webinars had 123 attendees. Sessions were offered via the University of Maryland's web conference system in 2016. The topics were:
  - *Using Web Soil Survey,*
  - *Food Safety Modernization Act – Implications for Nutrient Management Consultants,*
  - *Annual Phosphorus Loss Estimator (APLE),*
  - *Lime and its Relationship between Soil Fertility and Soil Type,*
  - *Gypsum and its Beneficial Use in Crop Production and Soil Management, and*
  - *The Role of Agriculture in Mitigating Climate Change.*
- UME coordinated with other organizations to provide Maryland certified clients with information about continuing education opportunities sponsored by eXtension's Livestock and Poultry Environmental Learning Center (LPELC), the American Society of Agronomy's webinars, and the USDA-Natural Resources Conservation Service's (USDA-NRCS) East Technology Support Center webinar series.

*For more information on the ANMP, visit <http://extension.umd.edu/anmp>*


## Pre-certification Exam Training

Twenty-two (22) individuals attended *Fundamentals of Nutrient Management*—a course designed to help participants prepare for the MDA nutrient management certification exam.

## Farmer Training and Certification

- Twenty-six (26) farmers were certified through the Farmer Training and Certification (FTC) initiative to write their own nutrient management plans. To date, 591 farmers have been certified through this training initiative.
- After initial certification, University of Maryland nutrient management specialists assisted farmers with updating nutrient management plans and using *NuMan Pro* software.
- Plan writing help sessions were offered at five different locations to provide certified farmers with assistance in updating their nutrient management plans.

## ANMP Web Site

The ANMP web site (<http://extension.umd.edu/anmp>) provides users with access to general information about the program, training materials, publications and resources for developing nutrient management plans. The ANMP also maintains a web page listing training opportunities and current events on the social media site, Twitter ([www.twitter.com/UMANMP](http://www.twitter.com/UMANMP)). 

## Nutrient Management Software

*Nutrient Management Pro Maryland Professional Edition (NuMan Pro)* software version 4.2 was released in December 2015. The release updated soils data for all Maryland counties and included features to streamline reporting requirements for certified nutrient management consultants as well as several technical upgrades.

Stand-alone versions of the *Phosphorus Site Index (PSI) Updated Edition 2015* and the *University of Maryland Phosphorus Management Tool (PMT) Updated Edition 2015* were also released in December 2015. These software products streamline the calculation of the two phosphorus risk tools for those who do not use NuMan Pro 4.2.

## Nutrient Applicator Training

Thirty-one (31) face-to-face Nutrient Applicator Training sessions were held, allowing 677 operators to either receive or renew their nutrient applicator vouchers. Seven (7) individuals attended an online session.



## Poultry Farm Management Workshop



UME, in cooperation with Soil Conservation Districts, USDA-NRCS, Delmarva Poultry Industry, MDE and MDA, offered a Poultry Farm Management Workshop and Certification course designed to help new and existing poultry growers comply with their National Pollutant Discharge Elimination System (NPDES) CAFO permit.

Workshop topics included:

- basic farm management;
- brooding management;
- poultry welfare;
- basic poultry ventilation;
- site management and maintenance of poultry houses, pump rooms, manure sheds, composters;
- manure and mortality handling;
- vegetative environmental buffers;
- nutrient management and financial record-keeping;
- the CAFO permitting process; and
- farm inspection.

Maryland certified farmers, certified consultants and applicator voucher holders received four continuing education credits for attending this workshop. In 2016, poultry farm management workshops were held on Maryland's Eastern Shore with 100 participants. A Poultry Mortality Composting Short Course and Demonstration was held at University of Maryland Eastern Shore certifying 25 farmers.

# Nutrient Management Training for Lawn Care Professionals

Professional Lawn care applicators are required to have both pesticide and fertilizer certification. In FY 2016, the fertilizer exam was offered 27 times at various locations throughout the state. MDA and UME offered a review session before each exam. One hundred ninety (190) new people became certified Professional Fertilizer Applicators (PFAs) this year, bringing the total number of certified individuals to 1,697. Employees who are trained and registered with MDA may apply fertilizer under the direct supervision of a PFA. Currently, 1,855 individuals are registered as Trained Employees. Each business location that offers fertilizer applications to turf must have a fertilizer business license. Nine hundred twenty-two (922) businesses in MD are licensed to fertilize turf.

PFAs are required to complete two hours of continuing education each year. In FY 2016, MDA and UME offered 42 re-certification classes. In some cases, organizers were able to incorporate the two hours of fertilizer training into longer pesticide re-certification seminars. In other cases, MDA and UME offered two-hour stand alone classes at various locations from Cumberland to Salisbury.

## Turfgrass

Heavy equipment traffic and landscape contour grading on new residential lots can cause compacted soils with low fertility, which can lead to excess runoff and higher fertilizer demands than found in older residential developments. This project evaluated the combined benefit of compost incorporation prior to turfgrass establishment and the use of a lawn seed mixture containing microclover as a means of reducing N fertilizer use at three residential sites in Maryland. Each site had a non-amended area where the homeowners managed the lawn as they preferred and an amended area. Results indicate the following.

- Surface incorporation of two inches of compost prior to turfgrass establishment dramatically improved the infiltration and reduced runoff at two of three locations when compared to non-amended areas.
- The reductions in runoff were not large enough to significantly reduce nitrogen or phosphorus load losses.
- Turfgrass ratings indicated that lawns with microclover will perform better in northern regions of the Chesapeake Bay watershed than in the southern regions and these lawns should be mowed regularly to maintain the health of the microclover.

# Nutrient Management Research for Crops

Researchers in the University of Maryland's Department of Environmental Science and Technology and Plant Science and Landscape Architecture have on-going projects designed to improve the understanding and management of nutrients in crop production.



*Photo: Farmers and scientists are showing increasing interest in mixing multiple species of plants into cover crops instead of using a single species. Mixed species cover crops may be more effective at capturing nutrients and making them available to cash crops. Research suggests that diverse cover crops (legumes, brassicas, grasses, and others), may be more effective at supporting diverse below-ground biology and improving overall soil quality.*

*(Photo courtesy of Ray Weil)*

## On-going Projects

- **Investigating nitrogen deep in agricultural soil profiles, innovative cover crop systems, and tillage to capture and recycle nitrogen for the benefit of water quality and crop production**

The long term goal of planting cover crops is to develop systems that pay for themselves by recycling nitrogen (and other valuable nutrients like sulfur) from deep in the soil profile.

Twenty sites in Maryland and Pennsylvania are involved in a two-year study that compared nitrogen capture and recycling ability of forage radish, two small grains (triticale or rye), and a three-species cover crop mixture (ryegrass, legume, and brassica species). The study also looks at comparisons of planting cover crops using various planting techniques, such as after corn silage, aerial seeding into standing crops, early-harvested short season hybrids, and late spring interseeding. Results are anticipated in 2017.

In a second study at the University of Maryland Central Maryland Research and Education facility in Beltsville, researchers conducted a study to determine at what depths forage radish, cereal rye, and clover could recover nitrogen. A naturally occurring nonradioactive isotope of nitrogen that can be traced through the plant-soil system, N-15, was applied at 3.3 and 6.6 feet soil depth for September 1 and October 1 planting dates. Preliminary data indicate that both forage radish and cereal rye cover crops were able to access the N-15 that was buried at 3.3 feet deep if they were planted September 1 but not when planted on October 1. Very small quantities of N-15 were removed by any of the species where the tracer was placed 6.6 feet deep. Field work will be completed in fall 2016 with corn harvest. Analysis of the corn for N-15 will allow greater understanding of nitrogen cycling between the soil, various cover crop species, and the subsequent corn crop.

- **Response of irrigated, full-season soybean to poultry manure**
- **Nitrogen fertilization and malting barley quality**  
The impact of a range of nitrogen rates on the quality of malting barley is under investigation.
- **Efficacy of starter phosphorus (P) on corn**  
The impact of starter P on corn yields produced under with a wide range of soil test P levels is under investigation.
- **Nitrogen fertilization of wheat and Fusarium head blight**  
Fusarium head blight of wheat is a concern because the organisms produce mycotoxins, compounds that are toxic to humans and livestock. A study of nitrogen fertilization rates on the severity of Fusarium infection has been initiated.





## Completed Projects

- **Long-term cropping system effects on soil phosphorus**

This study began in 2001, and its current objective of comparing the influence of cropping system (grain system vs. forage system) on changes in soil phosphorus was concluded at the end of the 2014 season. Data indicate that changes in soil phosphorus occur very slowly, which means that it may take decades to bring fields with excessively high soil phosphorus down to optimum levels. A peer-reviewed article will be published in FY 2017.

## Animal Nutrient Management

Researchers in the University of Maryland's Department of Animal and Avian Sciences are studying how nutritional factors and feed management interact to affect phosphorus and nitrogen digestibility and retention in animals.

*For more information, visit <http://ansc.umd.edu>*

### Poultry On-going Projects

- Causes and solutions for late lameness in broilers: the relationship between nutritional factors (calcium, phosphorus, micronutrients, vitamin D and/or K)
- Effectiveness of currently used and new forms of phytase enzymes in decreasing phosphorus in diets fed to broilers
- Impact of dietary calcium and phosphorus on effectiveness of phytases
- Availability of calcium from limestone and impact of limestone particle size and solubility on calcium and phosphorus availability as well as effectiveness of different phytases
- Development of *in vitro* fast assays to determine calcium availability from limestone, based on correlations with *in vivo* work
- Work on-going on generating a robust matrix of ingredient digestible Ca values (limestones, phosphates, soybean meal)
- Use of the dietary imprinting concept where changes in early nutrition could improve the broilers' ability to:
  - Perform well when low phosphorus diets are fed in the finisher and withdrawal phases, and
  - Deposit breast muscle such that breast yield does not change when low protein diets are fed in the finisher and withdrawal phases. This would allow producers to decrease the amount of phosphorus and nitrogen in the finisher and withdrawal phases that account from between 55 to 70 percent of the feed broilers consume without negatively impacting performance. The ultimate goals are to decrease phosphorus and nitrogen in litter without affecting performance.
- Defining requirements for calcium and phosphorus as affected by age and breed – modeling work on all data currently being done

# Emerging Waste-to-Energy Technologies

## Completed Projects

- **Anaerobic Digestion with Nutrient Capture**  
A lab-scale system that combined anaerobic digestion (AD) and nutrient capture system (NCS) for producing energy and recovering nutrients from poultry litter was tested in collaboration with Planet Found Energy Development, LLC. Operating conditions were optimized and Planet Found Energy Development, LLC. plans to have a large-scale digester operational by late 2016. The facility will produce a digestate that can be utilized as a soil amendment and struvite, a magnesium ammonium phosphate fertilizer material.



*Top photo: Anaerobic digester  
(Photo courtesy of Stephanie Lansing)*



*(Background photo courtesy of Anastasia Vvedenskaya,  
ANMF Communications Specialist)*

# Nursery and Greenhouse Nutrient Management Program

Under provisions of the Water Quality Improvement Act of 1998, Maryland's nursery and greenhouse operators must develop water and nutrient management plans to ensure that nitrogen and phosphorus are not lost to surface and ground-water from production sites in the state. The University of Maryland's Nutrient Management Program for the Nursery and Greenhouse Industry works with the industry to help develop these plans and promotes other sustainable practices that minimize environmental impacts through education and research. Data have been included in this report to reflect University of Maryland Extension programming during FY 2016.

## Training

A number of nutrient management training opportunities were offered for nursery and greenhouse operators and the landscape industry in 2015-16:

- **Farmer Certification Training:** Growers were certified to write their own nutrient management plans. Trainings were held at the Central Maryland Research and Education Center. Ten operators and consultants attended these certification programs. Six growers were certified by the MDA at the follow-up sessions in May in Annapolis.
- **Continuing Education Units:** The team also conducted five other nutrient management programs (for a total of 8 CEU or voucher credits) throughout the fall of 2015 and winter, spring and summer of 2016, reaching a total of approximately 50 persons.

## Research and Extension

- **SCRI-Water3 - Reduce, Remediate, Recycle:** Informed Decision-Making to Facilitate Use of Alternative Water Resources and Promote Sustainable Specialty Crop Production (2014-2019): A 5-year USDA-funded national specialty crops project involves an interdisciplinary UMD team providing national support for Objective R1 – reduction of irrigation and agrochemical runoff (nutrients, herbicides, and pesticides). The project involves deploying and supporting two sensor networks at two commercial nursery and greenhouse operations in Maryland and four networks at research facilities at UMD, Virginia Tech, Michigan State, and Oregon State Universities. Another primary objective of this interdisciplinary research is to investigate and quantify relationships between irrigation and root disease management practices, to disrupt pathogen life cycles in production areas, and to reduce the requirements for remediation.  
*Further information about the project can be found at <http://watereducationalliance.org>*
- **Water and Nutrient Management for Strawberry Operations:** A study funded by the Walmart Foundation for investigating the use and effectiveness of sensor networks for irrigation and frost protection was initiated in 2014. During the first year, networks were established on two commercial strawberry operations in Maryland as well as a replicated research sensor network at the Wye Research and Education Center. Presentation of research results were made national conferences in California and Georgia in 2015. The research was continued for a second year during 2015/16. This initial research led to the Maryland team being included in a national USDA-SCRI Planning grant awarded in 2016, focused on the sustainable production of strawberries in the US. The MD team will provide expertise in precision irrigation, nutrient management, and economics for both field and greenhouse production of strawberries. More information is available from <http://wordpress.uark.edu/sberries/2016/01/04/scri-project/>  
*Further information on this project can be obtained on the project outreach and information website at <http://sensingberries.net>*
- **Knowledge Center for Water, Nutrient and Plant Health Management:** The Knowledge Center currently has over 1,350 registered users. The Center has 26 learning modules on various aspects of substrate, irrigation, nutrient and pathogen management for nursery and greenhouse operations.  
*General information can be found at <http://waternut.org> and learning modules can be accessed at <http://waternut.org/moodle>*

# Urban Nutrient Management



**Top photo:** A newspaper and weed barrier is used to control weeds and protect the soil in the Field of Greens Community Garden in Riverdale, MD.

(Photo courtesy of Jon Traunfeld)



**Middle photo:** A Baltimore urban farm was created on a vacant lot.

(Photo courtesy of Jon Traunfeld)



**Bottom photo:** A Riverdale, MD community garden.

(Photo courtesy of Anastasia Vvedenskaya)

## Home and Garden Information Center

The Home and Garden Information Center (HGIC) website emphasizes earth-friendly gardening practices and showcases many practical videos and fact sheets that relate to composting, using fertilizer, soil testing, and soil improvement.

- HGIC's Certified Professional Horticulturists answered 5,075 "Ask an Expert" online questions, 13 percent of which were related to soil, fertilizer, and composting.
- The HGIC was able to facilitate the distribution of MDA educational materials and over 1,000 soil sample test kits to Maryland residents.
- The HGIC YouTube channel currently has 2,271 subscribers and features 147 educational videos. Eleven (11) of the educational videos cover information related to soil, fertilizer, and composting practices. Video topics included:
  - *Soil Testing*: 5,408 total views (1,278 views in 2016)
  - *No Till Gardening*: 8,523 total views (1,968 views in 2016)
  - *Barley Cover Crop: Smother, Mow, Turn Under*: 962 total views (190 views in 2016)
  - *Advanced Composting in the Derwood Demo Garden*: 2,202 total views (1,427 views in 2016)
  - *Managing Crimson Clover*: 1,508 total views (473 views in 2016)
  - *How to Fertilize your Lawn and Protect the Chesapeake*: 200 total views (195 views in 2016)
  - *Types of Mulch for Your Garden*: 644 total views (117 views in 2016)
  - *Composting for Your Garden*: 2,105 total views (309 views in 2016)
  - *Composting: Varieties of Composting Bins*: 3,718 total views (443 views in 2016)
  - *Vermicomposting: Using Worms to Make Compost for Your Garden*: 12,132 total views (2,402 views in 2016)
  - *Vermicomposting: Varieties of Bins for Composting with Worms*: 1,355 total views (116 views in 2016)

For more information about the Home and Garden Information Center, visit <http://extension.umd.edu/hgic>

## Master Gardener Program

The mission of Master Gardeners is to "educate Maryland residents about safe, effective, and sustainable horticultural practices that build healthy gardens, landscapes, and communities." This program is coordinated by the state office, housed at the Home and Garden Information Center, and administered through 21 County/City Extension offices across the state.

- Master Gardeners are trained by UME field and campus faculty and receive basic and advanced training in soils, fertilizers, and composting.
- In FY 2016, Master Gardener volunteers engaged in over 50,000 hours of horticultural education. Of those volunteer hours, approximately 588 hours were exclusively dedicated to the topics of soils, composting, and urban nutrient management.
- Master Gardeners devoted over 400 hours to educating residents about UME turf fertilizer recommendations.
- The Charles County Environmental Resources Division partnered with faculty, staff, and volunteers from the UME Charles County office to offer two composting and rain barrel workshops to Maryland residents in 2016.

For more information about the Master Gardener program, visit <https://extension.umd.edu/mg>

## Grow It Eat It Program

The mission of this program, a collaboration between the HGIC and MG programs, is to help people improve human and ecological health by growing their own food using sustainable gardening practices.

- In FY 2016, Master Gardeners engaged in over 6,000 volunteer hours in activities related to backyard and community food production. Best practices for soil health and nutrient management were widely discussed during those activities.
- UME Master Gardeners in Montgomery County collaborated with the Department of Environmental Protection, Division of Solid Waste Services (DSWS). The Montgomery County Master Gardeners held three events for the public in which they were able to distribute 228 backyard Geobin compost bins and approximately 228 compost thermometers. The bins and thermometers were supplied by the DSWS at no cost.

For more information about the Grow It Eat It program, visit <http://extension.umd.edu/growit>

## Bay-Wise Landscape Management

Bay-Wise training in 2016 focused on: the history and condition of the Chesapeake Bay; hydrology; wells and septic systems; lawn fertilizers; the Bay and the Fertilizer Use Act of 2011; critical areas and coastal zone management; soil compaction; stormwater management (including rain gardens, the SMART tool); integrated pest management; native plants; riparian buffers; and ecologically sound landscape maintenance.

- Forty-six (46) new Master Gardener volunteers received training in Bay-Wise Landscape Management techniques. To date, 1,304 Master Gardeners from 21 counties and Baltimore City have been trained in Bay-Wise techniques.
- In FY 2016, Bay-Wise Master Gardeners certified a total of 107 landscapes in Maryland, including 7 newly trained Bay-Wise Master Gardeners who had their personal landscapes certified as Bay-Wise demonstration sites, bringing the total to 594 demonstration sites.
- To date, Master Gardeners in 19 Maryland counties certified 1,676 private properties (residential landscapes) as Bay-Wise. Master Gardeners throughout the state certified an additional 193 public landscapes as Bay-Wise.

For more information about the Bay-Wise Landscape Management Program, visit: <http://extension.umd.edu/baywise>

(Background photo courtesy of Anastasia Vvedenskaya, Communications Specialist)



*Top photo: Making Black Gold - Susan Eisendrath (UME Master Gardener and UME Master Composter) adds nitrogen-rich coffee grounds to the UME Montgomery County Derwood Demonstration Garden compost.*

*(Photo courtesy of Susan Eisendrath)*



*Middle photo: Cambridge Main Street's "Green Team" proudly display the new stormwater management installation.*

*(Photo courtesy of Robbie Hanson)*



*Bottom photo: Native plants at the Calvert County Master Gardener Demonstration Garden.*

*(Photo courtesy of Wanda MacLachlan)*

# Center for Educational Partnership's Community-based Gardens



The Center for Educational Partnership (CEP) supports urban agriculture and nutrition education in the Riverdale area of Prince George's County. *The Gardens at The CEP* include: the Sheridan Street Community Garden and Field of Greens Community Gardens. There is a special focus on supporting local food production, school gardens, and youth development. Urban Agriculture can increase local access to fruits and vegetables and can improve nutrition knowledge, attitudes, and dietary intake. Community Gardens can help decrease storm water runoff, and air pollution, while increasing urban biodiversity.

- In July 2015, The Gardens at the CEP hosted a Composting Program with The Accokeek Foundation. This program, with 15 people in attendance, targeted gardeners who were interested in starting or sustaining composting initiatives. University of Maryland Extension – Prince George's County (UME-PGC) also utilized the Prince George's County Department of the Environment, Tree ReLeaf Program to obtain 70 native fruit trees to make additions to the food forest.
- In September 2015, UME-PGC partnered with HGIC to organize an Advanced Master Gardener Training introducing the technical and social implications of Community Gardens. During the one day training, 15 attendees had the opportunity to participate in a garden practicum that highlighted the use of raised beds, rainwater drainage, soil management, specialty crops, and weed identification.
- In November 2015, CEP hosted 63 volunteers for the second Annual Winter Work Day, including families, students, staff, and neighborhood residents.
- UME-PGC, the Food Equity Council, the Soil Conservation District, and many other partners worked together to pass an Urban Tax Credit Bill (CB-74-2015). This bill establishes a tax credit for real property that is used for agricultural purposes. Urban farming contributes to improving our soils, increasing food access, and creating more vibrant communities in Prince George's County and across Maryland.
- In fall 2015 and early spring 2016, UME-PGC staff continued to partner with William Wirt Middle School to engage approximately 135 students in interactive learning environments utilizing the garden as the classroom. UME-PGC staff members taught lettuce cup terrarium, germination rate, compost, and scientific method lessons. The UME AmeriCorps VISTA member has started a robust youth gardening program, partnering with local schools, afterschool programs, and a local church to learn about agriculture, local foods, and soils.

*Top and middle photos: Baltimore, MD  
Urban Community Gardens.*

*Bottom Photo: A Riverdale, MD commu-  
nity garden.*

*(Photos courtesy of Anastasia Vvedenskaya)*



## Terp Farm

Terp Farm is the University of Maryland's sustainable farming operation dedicated to growing produce for the campus dining program, supporting educational opportunities for students, and providing food to those in need. In 2014, Dining Services, in collaboration with the College of AGNR and the Office of Sustainability, launched the three-year pilot program for the farm. The College of AGNR provided five acres at the University of Maryland Central Maryland Research and Education Center in Upper Marlboro, MD. There are two types of growing areas for crops: two acres of in-ground fields and a season-extending high-tunnel. Terp Farm helps fulfill a component of Dining Services' Sustainable Food Commitment to purchase 20 percent local and sustainable foods by 2020. This year, Terp Farm continued to expand its program.



- It hosted 771 visitors for educational programming including, weekly labs, course visits, tours, volunteer opportunities and workshops;
- It organized the first annual Terp Farm Fall Harvest Festival with 492 attendees, including 362 students and 39 volunteers;
- It produced 11,350 pounds of produce for use by UMD Dining Services;
- It donated 10 percent of produce to UMD Campus Pantry and Capital Area Food Bank; and
- It obtained MD Good Agricultural Practices (GAP) Certification and hosted the Maryland GAP Mock Audit in collaboration with Future Harvest Chesapeake Alliance for Sustainable Agriculture, Maryland Extension, and Maryland Department of Agriculture.



## IN CLOSING

In 2016, the College of Agriculture and Natural Resources' nutrient management programs continued to conduct research on nutrient utilization in crop production and animal nutrition, as well as educate the public on fertilizer management and sustainable horticultural practices. These research and education efforts allow the College to meet nutrient management initiatives to continue to improve and protect the health of the Chesapeake Bay and Maryland's tidal and nontidal waterways while maximizing the state's economic potential.

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