"Imagination and farming go hand-in-hand!"
Exclaimed the Crops Master. Do you think it’s mere coincidence that Hunters and Gatherers around the globe simultaneously, in the blink of a celestial moment, took up the pen and scroll, created language, domesticated plants and animal, built towns and cities, and settled down to farming. Most likely Hunters and Gatherers held a council meeting about 7,000 years ago, put their heads together in a brainstorming session, and conjured the new age “Frontal Cortex Farmer”. “Finally, with farming, they declared, all of the human brain would have something to do.”

Our frontal cortex is required for such a simple concept: “If I save a tenth of my harvest for seed, plant it timely, I will harvest again and again.” All of a sudden, as we become farmers, there arises a need for science, technology, engineering, mathematics, economics, law and politics. The amazing thing is that right from the beginning there will be two types of Frontal Cortex Farmers; the ones who actually farm, and those that think about it.

“Alas, we all need to become Frontal Cortex Farmers!” decrees the Crops Master. I normally, would poke some fun at those that farm by thoughts and dreams, but now I compelled to enlist them. We need every one of sound mind to once again engage their frontal cortex and become farmers. I am afraid that many have resorted back to being Hunters and Gatherers in our convenience of food. Use your imagination, and all of your being, to see yourself as a farmer. How would you farm differently? What kind of a farmer would you become? Become a Frontal Cortex Farmer, put your brain on agriculture, to weigh and measure fairly all science, and let your imagination be as dependable as the reality of a harvest.

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Maryland/Delaware Forage Council
Southern MD Hay & Pasture Conference
January 11, 2017

Make plans to attend the Southern Maryland Hay & Forage Conference in Waldorf, MD.

Topics will be presented covering all aspects of hay and pasture production. The programs will address key issues and concerns facing hay and pasture producers.

The conferences also features displays and exhibits by numerous agribusinesses. Attendees will be able to obtain information on seed, fertilizer, equipment, fencing, etc. needed for hay and pasture production and management.

For more information, contact the St. Mary's County Extension office or NRCS/Soil Conservation District offices in MD.

Central Maryland Vegetable Growers Meeting
January 27, 2017

This well sponsored, large grower meeting always offers a great deal of vegetable industry information. Pesticide recertification credits are awarded for attending this meeting. For full meeting details, and to register call the Baltimore County Ext office at 410-771-1761.

Southern Maryland Vegetable & Fruit Production Meeting
February 8, 2017

Make plans to attend the Southern Maryland Vegetable and Fruit Production Meeting on February 8, 2017, at A-Maze-N-Place, Clements, MD in St. Mary’s County.

This meeting will provide Private Applicator Recertification & Nutrient Applicator Voucher Recertification

Speakers will provide IPM updates and present on a broad range of production topics. Also meeting sponsors will showcase their products and services, and state vegetable organization leaders will be present to recruit and answer your questions. Please attend and make this meeting the best ever.

Call St. Mary’s County Extension office at (301) 475-4482

Maryland Buyer-Grower Expo
January 25, 2017

The Maryland Department of Agriculture's annual Buyer-Grower Expo will be held on January 25, 2017 from 10am - 2pm at the Navy-Marine Corps Memorial Stadium "N" Room in Annapolis, MD.

Annapolis, MD. The show connects Maryland growers, producers, and processors with buyers from grocery retailers, restaurants, schools, institutions, and other venues.

The event drew more than 300 attendees in 2016. Participants include buyers from grocery retailers, restaurants, schools, institutions, and other venues. Also attending will be distributors, economic development officials, extension agents and county agricultural marketing officials.

The event showcases a wide range of local products including: fruits and vegetables; meats (beef, chicken, turkey, etc.); cheese; seafood (aquaculture oysters); and specialty products (locally made ice cream, soups, chocolate, coffee, flour, wine and more).

To register for the event, visit MarylandBest.net.

For questions or help registering, contact Stone Slade at MDA at 410- 841-5779 or stone.slade@maryland.gov.
Bay Area Fruit School  
February 17, 2017  
Attention all fruit growers!  
Plan to attend the Bay Area Fruit School on February 17, 2017 at the WYE Research and Education Center in Queenstown, MD from 8:30 a.m. to 3:30 p.m.

This all day meeting will provide Private Pesticide Applicator Recertification Credit.

Topics to be presented:
• Compost, wood chips and the nutritional needs of blueberry plants
• Current research on spotted wing drosophila management in small fruits
• Fruit maturity and quality of new apple varieties grown in high-density systems
• Developing management tactics for the brown marmorated stink bug
• Current tree fruit disease issues
• MDA pesticide updates and applicator credits

For full meeting details and registration call Debbie Dant, WYEREC at 410-827-8056, Ext. 115.

Field Crops & Pasture IPM Workshop  
March 14, 2017  
Make plans to attend the Field Crops & Pasture IPM Workshop, on March 14, 2017 at the Anne Arundel Extension Office from 6:00 p.m. to 9:00 p.m. This workshop will explore advanced concepts of pasture and field crop production in the Southern Maryland region from establishment to harvest, including animal utilization. Topics will include: Crop selection; integrated crop management; soil fertility; weed control; insect control; and disease control for soybeans, corn, wheat, barley and hay crops.

Private Pesticide Applicator Recertification & Nutrient Applicator Voucher Recertification will be awarded for full class participation.

Register on-line for this event at: http://extension.umd.edu/anne-arundel-county or contact the Anne Arundel County Extension Office at 410-222-3906.

Food Safety Modernization Act (FSMA) 4 Day Workshop

Each training is a 4-day workshop with one day for produce safety training and 3 days for preventive controls training. A detailed agenda will be available upon registration.

February 8-11, 2017  
Baltimore County extension office, Cockeysville, MD

February 22-25, 2017  
Wye Research and Education Center Queenstown, MD

March 8-11, 2017  
Western Maryland Research and Education Center Keedysville MD

$20 for produce safety training only,  
$40 for PC rule training only,  
and $50 for hybrid training

https://goo.gl/forms/zgkLb5JZmdBH1Ctj2

Live On-Line Session  
Nutrient Management Voucher Recertification  
April 7, 2017

If you would like the opportunity to learn from home, yet still be engaged, then be sure to enroll in the Live On-Line Nutrient Management Voucher Recertification Training, scheduled from 4:00 to 6:00 p.m. on April 7, 2017.

This session will focus on fertility and production related topics for all field crops, fruits and vegetables. This Adobe Connect recertification session will be live via the internet directly from the University of Maryland. Adobe Connect is a student interactive system that will document your attendance. To Participate in a live Adobe Connect Session, a high speed cable or satellite internet connection is required.

Nutrient Management Voucher Recertification Credit will be awarded for full 2-hour session participation.

Registration by April 5th is required in order to receive Adobe Connect login instructions.

Register on-line for this event at: http://extension.umd.edu/anne-arundel-county or contact the Anne Arundel County Extension Office at 410-222-3906.
As we near the end of 2016, it is a good time to reflect on the accomplishments and challenges of the past year. Each year, we in UMD Extension set annual goals and expectations based on needs of clientele and the communities that we serve. In the Spring of 2017, we will be sharing with you our 2016 Annual Report which reports on our efforts to offer programs that meet community needs. We would appreciate any feedback and comments as you read about the variety of exciting programs being organized and taught by our educators to help provide “Solutions in your Community”.

Please let us know if there are topics about food, nutrition, farming, gardening and/or 4-H that you or your community are especially interested in and we will provide resources!

http://extension.umd.edu/sites/default/files/_docs/December%20202016.pdf

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**Climate Science for Farmers**

The University of Maryland Extension is proud to announce the formation of the new Climate Science for Farmers Extension team. The team will be headed by Dr. Sara Via, Professor, Department of Entomology, University of Maryland College of Computer, Mathematical and Natural Sciences. In 2017, we hope to make Climate Science for Farmers a program feature in statewide extension newsletters and meetings.

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If you would like the opportunity to learn from home, yet still be engaged, then be sure to enroll in this Live On-Line Private Pesticide Recertification Training, scheduled for from 4:00 to 6:00 p.m. Friday, April 21, 2017.

The session will focus on pesticide use and related topics for all field crops, fruits and vegetables. This Adobe Connect recertification session will be live via the internet directly from the University of Maryland. Adobe Connect is a student interactive system that will document your attendance. To participate in a live Adobe Connect session a high speed cable or satellite internet connection is required.

Private Pesticide Applicator Recertification Credit will be awarded for full 2-hour session participation. Registration by April 19th is required in order to receive Adobe Connect login instructions.

Register on-line for this event at: http://extension.umd.edu/anne-arundel-county or contact the Anne Arundel County Extension Office at 410-222-3906.

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Save the Date!

WMREC Fruit Meeting will be held on Thursday, February 16th

More information available soon at extension.umd.edu/smallfruit

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Northeast and Northern Forests Regional Climate Hub Assessment of Climate Change Vulnerability and Adaptation and Mitigation Strategies

https://extension.umd.edu/sites/default/files/_docs/NortheastRegional%20Hub%20Vulnerability%20Assessment.pdf

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Comprehensive Strategy for Reducing Maryland’s Vulnerability to Climate Change

Phase II: Building societal, economic, and ecological resilience

https://extension.umd.edu/sites/default/files/_docs/MDClimatChangeAdaptationAgriculture.pdf
The Farmer Training and Certification workshops provide opportunities for producers with cropland and pastures who use commercial fertilizer and/or manure to learn how to write nutrient management plans for their operation that meet Maryland Department of Agriculture’s regulations. Individuals with fields or pastures high in soil test phosphorus may require additional training and a greater time commitment.

Required Skills:
Competency in high school math, familiarity with using a keyboard, and the ability to save and retrieve files is essential for completion of the course and nutrient management plan development.

You will receive:

- **A comprehensive training binder** – the training binder will be used during the class, serve as a reference during the exam, and as a valuable resource when you write future plans for your operation.
- **Certification** – producers who pass the exam will be certified by MDA to write their own nutrient management plans.
- **Voucher training credits** – this class will fulfill the nutrient applicator voucher training requirements.

**Registration Information**
- Space is limited and registrations are accepted on a first-come basis; therefore, **register early**.
- Paid registrations must be received 10 days before the first class. For more information, please call 410-841-5959. Classes will be cancelled if there is insufficient enrollment.

9:30 AM – 4:30 PM each day ($35, includes lunch on first day)

**#1** January 17 & January 30
University of Maryland Wye Research and Education

**#2** January 24 & February 10
University of Maryland Extension Howard County office

**#3** February 28, March 2 & 7, March 16 & 28
University of Maryland Extension Frederick County Office

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**Subscription Information**

**Terp Farm Newsletter!**

We’ll be sending monthly updates of what we’re up to at the Terp Farm - thanks for following along!

[Terp Farm Newsletter Subscription](http://mda.maryland.gov/resource_conservation/Pages/nutrient_management_training_program.aspx)

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**PLAN AHEAD!**

Update your Nutrient Management Plan this winter, before the spring rush!

By Emileigh Lucas
Nutrient Management Advisor
UME Anne Arundel County

It’s easy to be in compliance with Maryland’s Nutrient Management Law with a little preparation. The following is some guidance to make the process more efficient:

**Who needs a plan?**
- Producers who gross $2,500 income or have 8,000 lbs or more live animal weight.
- Look at your current or most recent plan to find the expiration date; plans can be written for varying lengths of time, but no more than three years.
- If conditions under the “Plan Update Requirements” have changed, even before the expiration of the plan, producers will need an update; these include changes in the planned crop, nutrient sources, acreage managed, and the number of animals.

**Why should you start now?**
- Soil analyses are good for three years, so whether you sample now or in the spring, you will still get a full three growing seasons from your soil tests in most cases.
- If needed, manure analyses can be taken now for the 2017 growing season.
- Most advisors are less busy this time of year, especially before January, and can get your plan done quickly. You can guarantee you have a plan in hand before you want to apply nutrients, therefore complying with MDA regulations.

**What information do you need to provide?**
- Indicate field boundaries on an aerial map of your farm
- The crop that you plan to plant in each field this coming growing season, your yield goal for the crop based on your past yields (if available), and if you intend to plant cover crops
- The number, average weight, and turn-out schedule of all animals on the farm, as well as information about manure storage
- The quantity and type of bedding used
- Updated soil analyses (good for three years from analysis date)
- If manure is used on the farm, updated manure analysis (good for one year from analysis date)
- If perennial fruit crops are grown, a tissue analysis (good for three years from analysis date)
- General information about your operation to allow the nutrient management consultant to develop an accurate, useful plan that meets regulatory requirements
- Note: Fields requiring the PSI or UMPMT may require additional information and data collection

**Who can write a Nutrient Management Plan?**
- A certified Nutrient Management Consultant from your county extension office, or a private planner listed on MDA’s website
- Operators can become certified to write their own nutrient management plan for their operation; see the following link for training and certification information: [http://mda.maryland.gov/resource_conservation/Pages/nutrient_management_training_program.aspx](http://mda.maryland.gov/resource_conservation/Pages/nutrient_management_training_program.aspx)
PERSONAL RISK MANAGEMENT PLAN
"HOW TO"
FOR FARMERS AND RANCHERS

PRINCESS ANNE, MD - A personal risk management plan is the takeaway for farmers and ranchers who attend a series of workshops offered by the University of Maryland Extension Program at UMES. The Developing Personal Risk Management Plans workshops will be held at the Prince George’s Soil Conservation District in Upper Marlboro from 9 a.m. to 4 p.m. on each of the following Saturdays: January 21, February 18, and March 25, 2017.

The workshops are organized to teach farmers how to understand and implement farm business planning principles for successful risk management decision making. Participants are encouraged to attend all three workshops, as each workshop builds upon the next. In the end, each farmer will have developed a plan that’s suited to his or her own situation.

Featured workshop presenters include Albert Essel, former Ag. Economist and now Dean/1890 Extension Administrator with Lincoln University and Laurence M. Crane, Vice President - Program Outreach & Risk Management Education with National Crop Insurance Services and invited Ag. Educators and agents from University of Maryland College Park, the University of Maryland Eastern Shore, and Delaware State University.

Pre-registration is required to participate and spaces are limited to the first 40 registrants. Lunch will be provided. Scholarships will be available as an incentive for participants traveling from a considerable distance.

For detailed information, visit http://umessmallfarm.com or contact Berran Rogers at (410) 651-6693/7729, Candy Walter Hefel at cjwalter@umes.edu, or Michele Howard at mlhoward@umes.edu.


Did you miss the 2016 Mid Atlantic Crops School?

The school has a YouTube page where many of the past talks are posted.

Right now 22 of this year’s presenters are up on the page, including: Soybean Nutrient Needs, Understanding Urease Inhibitors, Closing the Yield Gap between Double Crop and Full Season Soybeans, and A three part series on managing the value of poultry litter

https://www.youtube.com/channel/UCfOY-qqNjjIC1W0043Zr0Q

If you have a YouTube account, please consider subscribing to the channel, which will allow us to get a shorter URL.

2016 Maryland Corn
Hybrid Performance Tests
MGPUB Report 2016155
http://www.psla.umd.edu/extension/md-crops

A fee-based, corn hybrid performance-testing program is offered to seed corn companies by the University of Maryland’s Extension Service and Agricultural Experiment Station. The results from these replicated trials provide agronomic performance information about the corn hybrids tested at five Maryland locations considered representative of the state’s geography and weather conditions. See the link for summaries on the agronomic and production information for each test site.

Hearing loss prevalence declining in U.S. adults aged 20 to 69 years

For more information on how we support Chesapeake Bay restoration, please visit our website, www.extension.umd.edu/watershed.
Women In Agriculture to conduct Annual Conference

The 16th Annual MidAtlantic Women in Agriculture Regional Conference will be held on February 9, 2017 at Dover Downs Hotel and Casino in Dover, Delaware. The conference goals are to offer women who are involved with agriculture the opportunity to come together to learn about current issues and topics so they can make informed decisions concerning their agribusinesses and family lives. Sessions will cover marketing, financial management, human resources and much more.

An optional preconference will also be offered. This inter-active hands on workshop will take place on February 8, 2017 from 1-5pm. Participants can choose between two track offerings: Yielding Financial Sustainability or Native Pollinators. A Harness Racing Reception will immediately follow the preconference. The reception is included with the purchase of a pre-conference or main conference ticket.

The cost of the conference is $55. A discount will be given if tickets are purchased before 1/1/2017. The cost for the preconference is $35. For more information or to register visit the website www.extension.umd.edu/womeninag call 410-822-1244 or email Victoria Corcoran at vgc@umd.edu. If you require special assistance to attend the conference please contact us at least two weeks prior. The event is open to all and hosted in cooperation with the University of Maryland Extension, University of Maryland Eastern Shore, Delaware Cooperative Extension, Delaware State Extension, Rutgers Cooperative Extension and Virginia Cooperative Extension.

Farm Management Classes for Women

Annie’s Project courses have been announced for 2017! Courses will be held in Delaware and Maryland. Annie’s Project is a discussion-based workshop bringing women together to learn from experts in production, financial management, human resources, marketing and the legal field. Annie’s Project provides a relaxed, fun dynamic way to learn, grow and meet other women in agriculture. Participants are encouraged to interact and connect with presenters and fellow participants. Annie’s Project courses empower women in agriculture to be better business partners through networks and by managing and organizing critical information.

Annie’s Project will be held at the following Maryland locations: Cecil County, Central Maryland, Caroline County, Howard County, Southern Maryland and Allegany County. Women Managing Commercial Poultry, an Annie’s Project Course with a focus on the female poultry producer and will be held at Georgetown and Dover Delaware.

The cost of the course including meals and materials is $75. For more information visit www.extension.umd.edu/annies-project, email Victoria Corcoran at vgc@umd.edu or call Talbot County Extension Office at 410-822-1244. Space is limited, so register today. If you require special assistance to attend the classes please contact the site at least two weeks prior. The program is open to all and is sponsored by the University of Maryland Extension, University of Maryland Eastern Shore and Delaware Cooperative Extension. Annie’s Project has been approved for FSA Borrower Training. For more information, please contact your FSA loan officer.

Horticulture Technology Newsletter

A yearly publication released in December by University of Maryland Extension & the Maryland State Horticultural Society. It contains articles on recent research and a special section on the Mid-Atlantic Fruit and Vegetable Convention that takes place in Hershey, PA.

https://extension.umd.edu/smallfruit/horticulture-technology-newsletter

Branching Out, Maryland’s Forest Stewardship Education newsletter, is published four times per year by University of Maryland Extension. Branching Out provides educational information, current news and events and is intended to reach anyone interested in forest stewardship including landowners and natural resource professionals.

You can review past issues of Branching Out by visiting http://extension.umd.edu/news/newsletter/branching-out
High Path Avian Influenza
Outbreaks in 12 Countries, Could Enter U.S. Through Migratory Flyways

ANNAPOLIS, MD (Dec. 13, 2016) – The Maryland Department of Agriculture is calling for a renewed effort this winter by all poultry producers to intensify their biosecurity efforts. Recent High Path Avian Influenza outbreaks in Western Europe, Russia, Israel, India, Korea, and now Japan mean Maryland poultry growers, large and small, are at a much higher risk of seeing High Path Avian Influenza (HPAI) destroy their flocks.

"While we have been fortunate to date, we must be vigilant and cannot afford to take any risks. All growers, no matter their flock size or location, must increase their vigilance and take precautions now," said Agriculture Secretary Joe Bartenfelder. "We know it's difficult to maintain a high level of biosecurity alert day after day, but it is better than the alternative. We have to do all we can to keep this virus out of our poultry flocks."

The Eurasia HPAI outbreaks are caused by HPAI H5N8, which has very close similarities to the virus that caused so much devastation in the United States in 2015. In Japan, the very recent HPAI outbreaks are caused by HPAI H5N6 - a new HPAI viral strain - and it is too early to tell how much devastation it will cause.

"These two HPAI viruses are a real threat that our growers must take seriously," said State Veterinarian Dr. Michael Radebaugh. "These viruses can be carried by waterfowl migrating this winter southward across the Bering Strait into Western Canada and could be introduced into the lower 48 states through one of the four U.S. migratory flyways."

To maintain a sanitary, bio-secure premise, each grower shall, at a minimum:

- Restrict access to poultry by posting a sign stating "Restricted Access," securing the area with a gate, or both.
- Take steps to ensure that contaminated materials on the ground are not transported into the poultry growing house or area.
- Provide the following items to anyone entering or leaving any area where poultry are kept:
  - Footbaths and foot mats with disinfectant;
  - Boot washing and disinfectant station;
  - Footwear change or foot covers.
- Cover and secure feed to prevent wild birds, rodents or other animals from accessing it.
- Cover and properly contain poultry carcasses, used litter, or other disease-containing organic materials to prevent wild birds, rodents or other animals from accessing them and to keep them from being blown around by wind.
- Allow MDA to enter the premises during normal working hours to inspect your biosecurity and sanitation practices. Growers should report any unusual bird deaths or sudden increases in very sick birds to the Animal Health Program at 410-841-5810 or after hours to 410-841-5971. All growers and others interested in HPAI are strongly encouraged to read up about HPAI and biosecurity measures on the MDA website.

HPAI can be easily transmitted from bird to bird and from contaminated equipment to birds. Prior to 2014, there have been only three HPAI outbreaks in commercial poultry in U.S. history (1924, 1983 and 2004). To date, the HPAI strains that have been found in the United States have not been detected in humans; however, similar viruses have infected humans in other countries.

While the risk of human infection is very low, people in direct contact with known infected or possibly infected birds should take precautions to protect against infection. This includes wearing appropriate protective equipment when exposures could occur and maintaining good hygiene. These recommendations can be reviewed at: http://www.cdc.gov/flu/avianflu/h5/worker-protection-ppe.htm. In general, everyone 6 months old and older should get the yearly flu vaccine; this can prevent someone exposed to HPAI being infected by multiple influenza viruses.

While there is no evidence that people can acquire HPAI by eating poultry products, all poultry identified with HPAI are destroyed and prohibited by law from entering the marketplace. As a general reminder, all poultry and eggs should be handled properly and cooked to an internal temperature of at least 165° F.

For more information visit the CDC website and the CDC's Recommendations for Worker Protection.

Regional Partnership Project to Support Nutrient Management Needs on Maryland and Virginia Dairies

ANNAPOLIS, MD (Jan. 3, 2016) – A regional partnership project between Maryland, Virginia, and Sustainable Chesapeake has been awarded a grant of $4,575,000 from the USDA's Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP).

The RCPP grant will provide $3.5 million in funding for dairies in Maryland to implement best management practices to address nutrient management needs over the next five years—the Maryland Department of Agriculture will provide $3.5 million in matching funds. Dairy farmers in Virginia will receive support to accelerate their nutrient management planning process.

"This project provides important assistance to help farmers address some of the biggest natural resource challenges in the Chesapeake Bay Watershed," said Governor Larry Hogan. "Creating a clean and healthy Bay continues to be a top priority of our administration."

"RCPP brings together regional partners with similar issues to address in making water quality improvements," said Maryland Secretary of Agriculture Joe Bartenfelder. "We are pleased that our partnership with Virginia and the nonprofit Sustainable Chesapeake will bring additional NRCS resources to our dairies so they can continue to operate profitably and meet Chesapeake Bay goals."

Sustainable Chesapeake is a nonprofit 501 (c)(3) organization the seeks and develops projects that reduce pollution and result in tangible benefits for the people responsible for implementing them. Their efforts build teams and develop projects that demonstrate how restoring the Chesapeake Bay can also achieve multiple farm, business, and community goals.

Authorized under the 2014 Farm Bill, RCPP is USDA’s new, innovative program that promotes coordination between NRCS and its...
**2016 Annual Implementation Reporting Forms in the Mail; Now Available On-Line**

ANNAPOLIS, MD (Dec. 29, 2016) – The Maryland Department of Agriculture today announced that 2016 Annual Implementation Reporting Forms (AIRs) and instructions will be mailed the first week of January to about 5,500 Maryland farmers who are regulated under the Nutrient Management Program. These farmers are required to manage their farms using nutrient management plans and submit AIRs to the department by March 1 describing nutrient applications made during the previous calendar year. The 2016 reporting forms are currently available on the department’s website.

This year’s reporting form is similar to last year’s form with the addition of several questions concerning innovative practices used to manage manure resources that help Maryland to meet its Chesapeake Bay restoration commitments.

Confined Animal Feeding Operations (CAFOs) operating under a permit from the Maryland Department of the Environment should submit one combined AIR/CAFO Reporting Form along with a manure analysis to the Nutrient Management Program.

Farmers should follow these guidelines when completing their 2016 AIR:

- Use the pre-filled reporting form that arrives in the mail. Additional reporting forms and instructions are can be downloaded from the website.
- Do not leave spaces blank. If nutrients were not applied, place a zero in the box.
- If the information requested does not apply, write N/A in the box.
- Use the pre-printed envelope to mail the report by the March 1 deadline. Affix appropriate postage.
- Failure to submit a reporting form may result in fines and/or loss of eligibility to receive cost-share funds.

“I urge all Maryland farmers to begin gathering records needed to complete your Annual Implementation Reports,” said Maryland Agriculture Secretary Joe Bartenfelder. “We need you to submit these reporting forms by the March 1 deadline so that we can fully account for everything that you are doing to protect water quality in local streams, rivers and the Chesapeake Bay.”

Farmers should check their mailboxes for this year’s nutrient management reporting form beginning January 4. For more information, farmers should contact their regional nutrient management office.

The Maryland Department of Agriculture is seeking to fund one or more projects demonstrating proven and innovative technologies that manage agricultural manure and on-farm generated waste in a manner that improves its utility as a fertilizer, changes its form or function for alternative uses, or produces energy or other marketable products. The project must reduce the movement of nitrogen and/or phosphorus that is associated with animal manure produced on Maryland farms to the surface waters of the State.

http://mda.maryland.gov/resource_conservation/counties/AnimalWasteGrant2017_FINAL.pdf

**Board of Public Works Approves $85,000 in Grants to Support Wine Industry Awarded from the Maryland Wine and Grape Promotion Fund**

ANNAPOLIS, MD (Dec. 21, 2016) – Governor Larry Hogan today announced Board of Public Works approval of grants totaling $85,000 in state funding to the Maryland Grape Growers Association and the Maryland Wineries Association for the promotion of Maryland’s growing wine industry. The grant awards, which were recommended by the Maryland Wine and Grape Promotion Council, will be used for marketing, research, advertising, retail/festival promotions, activities that promote the growing of wine grapes, and educational seminars.

The Governor’s Advisory Commission on Maryland Wine and Grape Growing and the Maryland Wine and Grape Promotion Council were established in 2005 to promote the production of Maryland wine and wine grapes in the State. The Council is responsible, upon advice from the Commission, with recommending to the Board of Public Works how to allocate grants from the Maryland Wine and Grape Promotion Fund.

The Board of Public Works is made up of Governor Larry Hogan, State Comptroller Peter Franchot, and State Treasurer Nancy K. Kopp

**2017 Maryland Grape & Wine Industry Annual Conference February 10 & 11**

The 2017 Maryland Grape & Wine Industry Annual Conference is set for Friday, February 10 and Saturday, February 11, at the Sheraton Baltimore North which is located at 903 Dulaney Valley Rd, Baltimore MD.

This outstanding event offers a wealth of business and technical information for those with existing vineyards and/or wineries as well as those who are considering establishing a vineyard or winery. Speakers include industry leaders from across the mid-Atlantic region covering both the practical science and the business aspects of running a vineyard and/or winery.

An agenda and online registration is now available at the MGGA website and you may type or copy this link into your browser to access it.

http://marylandgrapes.org/eventsannualconference.shtml

On behalf of the Board of Directors of the MGGA, we look forward to seeing you at the conference.
Food and Drug Administration’s revised Veterinary Feed Directive

As of January 1, 2017, animal producers will not be able to purchase feeds over the counter that contain antimicrobials deemed important for human health.

Instead, to buy and use feeds containing those antimicrobials, animal producers must be authorized by a licensed veterinarian who is operating under the Food and Drug Administration’s revised Veterinary Feed Directive, or VFD, rule.

The VFD rule has been in effect for 20 years, but it affected only a small number of producers and just a few antimicrobials. As of January 1, changes to the rule will mean that it will impact most animal producers and apply to many more antimicrobials.

The antimicrobials that will be covered by the VFD rule are considered “medically important,” because they are important for human health. A list of medically important antimicrobials is in Appendix A of FDA’s Guidance for Industry #152:


And, information on drugs transitioning from over-the-counter status to VFD status is available here: http://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/ucm482107.htm.

Also, after January 1, animal drug sponsors will have removed the claims of “growth promotion” and “feed efficiency” from the labels of medically important antimicrobials. Animal drug sponsors, in cooperation with CVM, are currently changing the labels for their products so that production claims such as “growth promotion” or “feed efficiency” will be gone from labels, thus those uses will no longer be permitted.

These changes will have a significant effect on the animal production industry. We believe that you, in your role as a County Agricultural Agent, can help animal producers learn about the changes and how to comply.

Animal producers must have a VFD order – issued by a licensed veterinarian, operating under a veterinarian-client-patient relationship – to use a feed with a medically important antimicrobial. (To find out more about veterinarian-client-patient relationships, see Guidance for Industry #120, which you can get to from the VFD page listed below.)

The feed distributor that the producer works with must receive the order before releasing the VFD feed to the animal producer. The veterinarian can, for example, give the producer a second copy of the order (one for the producer to keep, and one for the producer to give to the feed distributor), or the veterinarian could send the order directly to the feed distributor.

The animal producer must use VFD feeds only in accordance with the VFD order. In other words, the producer can feed only those animals identified by the order, and only during the time period specified in the order. Feeding animals other than those specified in the VFD order or feeding them beyond the expiration date of the VFD order is considered an “extra-label” use of feed. That’s an illegal use. Once the order expires, if continued treatment is required, the animal producer must get a new VFD order from the veterinarian.

We understand that there are some questions concerning the use of antimicrobials in feed for show animals, including animals used in FFA and 4-H shows. If you or the animal producers you work with have specific questions about the VFD rule and show animals, please send those questions to this e-mail address: AskCVM@fda.hhs.gov. Your questions will be promptly answered.

A veterinarian’s involvement is important because veterinarians have the medical training necessary to diagnose the disease and to identify the appropriate antimicrobial for the specific situation. The veterinarian’s involvement will help to ensure judicious use of antimicrobials.

Here’s how you can find out more about the VFD rule.

More information, including brochures in both English and Spanish for producers, veterinarians, retailers, and distributors, is available on FDA’s VFD page:


(Information about the reasons for the change is in Food and Drug Administration Guidance for Industry #213, which you can find here:


Should you have additional questions, please contact AskCVM@fda.hhs.gov. And, for other information about safe feed, please come to www.FDA.Gov/SafeFeed, a site maintained by CVM’s Animal Feed Safety System Team.

The National Chicken Council has developed a program, Chicken Check In, that invites consumers to see how chickens are raised.

The Chicken Check In provides answers to questions about chicken production in the United States and gives Americans a close look at the lives of the birds and how they get to our tables every day.

Though the videos are focused in the southern United States, the practices are similar to meat-chicken production on the Delmarva Peninsula.

The site offers consumers the opportunity to get a close look at how chickens are raised, from the farm to grocery store shelves. From videos to answers to frequently asked questions, Chicken Check In is a resource for consumers to get the information they might seek about chicken care.

“The mission of Chicken Check In is to provide those who have questions with the level of information they want regarding the care and safety of the chicken they eat,” said National Chicken Council Vice President Tom Super. “We’re committed to continuing to build consumer trust by having open conversations and inviting Americans to ask the questions they have now and in the future as they learn more about chicken production.”

Click her to go to the site: http://www.chickencheck.in/

Follow us on Twitter @dpichicken and on Facebook.
USDA Provides New Cost Share Opportunities for Organic Producers and Handlers

Organic Producers and Handlers May Apply for Certification Cost Share Reimbursements; Expanded Eligibility for Transition and State Certification Cost

WASHINGTON, Dec. 21, 2016 – The U.S. Department of Agriculture (USDA) today announced that starting March 20, 2017, organic producers and handlers will be able to visit over 2,100 USDA Farm Service Agency (FSA) offices around the country to apply for federal reimbursement to assist with the cost of receiving and maintaining organic or transitional certification.

"USDA is committed to helping the organic sector grow and thrive through a wide variety of programs, and part of that commitment is making it easy for stakeholders to access our services. That's why, starting March 20, producers will be able to visit their local FSA offices to access organic certification cost-share reimbursements for up to 75 percent of the cost of organic certification," said FSA Administrator Val Dolcini. "This will provide a more uniform, streamlined process nationwide; and it will give organic producers a chance to learn about other valuable USDA resources, like farm loans and conservation assistance that can help them succeed."

USDA is making these changes to encourage increased participation in the National Organic Certification Cost Share Program (NOCCSP) and the Agricultural Management Assistance Organic Certification Cost Share Program, and at the same time provide more opportunities for organic producers to access a full range of USDA programs, such as disaster protection and loans for farms, facilities and marketing. Producers can also access information on nonfederal agricultural resources, and get referrals to local experts, including organic agriculture, through USDA's Bridges to Opportunity service at the local FSA office.

In the past, state departments of agriculture administered the cost share programs. States that still want to administer the program will have the opportunity to do so by applying for funding by Feb. 17, 2017. "The Agricultural Marketing Service (AMS) and the National Organic Program look forward to this exciting opportunity to leverage the Farm Service Agency's rural footprint to reach more organic producers and handlers," said AMS Administrator Elanor Starmer. "At the same time it is important to recognize and continue the valuable partnerships with states that remain at the core of the program."

Eligible producers include any certified producers or handlers who have paid organic or transitional certification fees to a USDA-accredited certifying agent. Application fees, inspection costs, fees related to equivalency agreement/ arrangement requirements, travel/ per diem for inspectors, user fees, sales assessments and postage are all eligible for a cost share reimbursement from USDA. Once certified, producers and handlers are eligible to receive reimbursement for up to 75 percent of certification costs each year up to a maximum of $750 per certification scope—crops, livestock, wild crops and handling. Today's announcement also adds transitional certification and state organic program fees as additional scopes.

To learn more about organic certification cost share, please visit www.fsa.usda.gov/organic or contact a local FSA office by visiting http://offices.usda.gov. Under the Obama administration, USDA has signed five major organic trade arrangements and has helped organic stakeholders access programs that support conservation, provide access to loans and grants, fund organic research and education and mitigate pest emergencies. To learn more about USDA support for organic agriculture, visit our updated organic portal at www.usda.gov/organic.

EPA Prohibits 72 Inert Ingredients from Use in Pesticides

The U.S. Environmental Protection Agency (EPA) is taking action to remove 72 ingredients from its list of ingredients approved for use in pesticide products.

Manufacturers wishing to use these ingredients in the future will have to provide EPA with studies or information to demonstrate their safety. EPA will then consider whether to allow their use.

EPA is taking this action in response to petitions by the Center for Environmental Health, Beyond Pesticides, Physicians for Social Responsibility and others. These groups asked the agency to issue a rule requiring disclosure of 371 inert ingredients found in pesticide products. Instead, EPA will evaluate potential risks of inert ingredients and reduce risks, as appropriate.

Many of the 72 inert ingredients removed with this action are on the list of 371 identified by the petitioners as hazardous. EPA is taking this action after considering public comments on its October 2014 proposal. EPA's list of approved inert ingredients will be updated after the Federal Register publication.

Most pesticide products contain a mixture of different ingredients. Ingredients that are directly responsible for controlling pests such as insects or weeds are called active ingredients. An inert ingredient is any other substance that is intentionally included in a pesticide that is not an active ingredient.

Read the list of 72 chemicals removed from the list of pesticide ingredients.

Read EPA's current approach on inert ingredients and the May 22, 2014 response to the petitioners.

General information on inert ingredients:

Pesticide Worker Protection Standard “How to Comply” Manual

EPA in conjunction with the Pesticide Educational Resources Collaborative (PERC) Exit is making available a guide to help users of agricultural pesticides comply with the requirements of the 2015 revised federal Worker Protection Standard. You should read this manual if you employ agricultural workers or handlers, are involved in the production of agricultural plants as an owner/manager of an agricultural establishment or a commercial (for-hire) pesticide handling establishment, or work as a crop advisor.

This “How to Comply” manual includes:

• Details to help you determine if the WPS requirements apply to you.
• Information on how to comply with the WPS requirements, including exceptions, restrictions, exemptions, options, and examples.
• "Quick Reference Guide"- a list of the basic requirements (excluding exemptions, exceptions, etc.)
• New or revised definitions that may affect your WPS responsibilities.
• Explanations to help you better understand the WPS requirements and how they may apply to you.
EPA Pesticide Program Updates
From EPA's Office of Pesticide Programs

This updated 2016 WPS How to Comply Manual supersedes the 2005 version. Changes to the standard have made the 2005 version obsolete.
The first document below is the entire manual. The documents which follow are the individual chapters and appendices.
You will need Adobe Reader to view some of the files on this page. See EPA's About PDF page to learn more.

How to Comply with the Worker Protection Standard for Agricultural Pesticides:

Preamble
Introduction to the Worker Protection Standard
Chapter 1: Determining your WPS Responsibilities
Chapter 2: Requirements for Agricultural Employers
Chapter 3: Additional Worker Employer Requirements
Chapter 4: Additional Handler Employer Requirements
Chapter 5: Requirements for Commercial Pesticide Handler Employers
Chapter 6: Exemptions and Exceptions
Chapter 7: Compliance with the Worker Protection Standard
Appendix A: Worker Protection Standard Definitions
Appendix B: Worker Protection Standard Criteria
Appendix C: Worker Protection Standard Checklists
Appendix D: Additional Resources

EPA Takes Action to Prevent Poisonings from Herbicide

The U.S. Environmental Protection Agency (EPA) is finalizing safety measures to stop poisonings caused by ingestion of the herbicide paraquat, which can also cause severe injuries or death from skin or eye exposure.

Since 2000, there have been 17 deaths – three involving children – caused by accidental ingestion of paraquat. These cases have resulted from the pesticide being illegally transferred to beverage containers and later mistaken for a drink and consumed. A single sip can be fatal. To prevent these tragedies, EPA is requiring:

- New closed-system packaging designed to make it impossible to transfer or remove the pesticide except directly into the proper application equipment;
- Special training for certified applicators who use paraquat to emphasize that the chemical must not be transferred to or stored in improper containers;
- Changes to the pesticide label and warning materials to highlight the toxicity and risks associated with paraquat.

In addition to the deaths by accidental ingestion, since 2000 there have been three deaths and many severe injuries caused by the pesticide getting onto the skin or into the eyes of those working with the herbicide. To reduce exposure to workers who mix, load and apply paraquat, EPA is restricting the use of paraquat to certified pesticide applicators only. Uncertified individuals working under the supervision of a certified applicator will be prohibited from using paraquat.

Paraquat is one of the most widely used herbicides in the U.S. for the control of weeds in many agricultural and non-agricultural settings and is also used as a defoliant on crops such as cotton prior to harvest.

EPA proposed similar measures last March and took public comment.

Actions on specific pesticides are one way that EPA is protecting workers from pesticide exposure. EPA's Final Certification and Training and Worker Protection Standard rules will also protect pesticide applicators and farmworkers.

Learn more about paraquat and the new measures to reduce risk: https://www.epa.gov/ingredients-used-pesticide-products/paraquat-dichloride
To view the docket on www.regulations.gov: EPA-HQ-OPP-2011-0855-0112

EPA Requires Stronger Standards for Applying the Riskiest Pesticides

Improved training and minimum age requirements will help protect people and the environment.

WASHINGTON--Today, the U.S. Environmental Protection Agency (EPA) is finalizing standards for applicators who apply restricted-use pesticides that are not available for purchase by the general public, and require special handling.

"We are committed to keeping our communities safe, protecting our environment and protecting workers and their families,” said Jim Jones, EPA Assistant Administrator for the Office of Chemical Safety and Pollution Prevention. "By improving training and certification, those who apply these restricted use pesticides will have better knowledge and ability to use these pesticides safely."

Today's action will reduce the likelihood of harm from the misapplication because the pesticides may only be applied by a certified applicator or someone working under their direct supervision. EPA's stricter standards would require all people who are certified to apply restricted use pesticides to be at least 18 years of age. These certifications must be renewed every five years.

EPA is requiring specialized licensing for certain methods such as fumigation and aerial application that can pose greater risks if not conducted properly. For further protection, those working under the supervision of certified applicators will now receive training to use pesticides safely and to protect their families from "take-home" pesticide exposure.

EPA expects the benefits of this rule to include fewer acute pesticide incidents to people, reduced chronic exposure and reduced incidents of ecological harm from pesticideuse.

States and Tribes may issue licenses to pesticide applicators with an EPA-approved program who can demonstrate the ability to use these products safely. The final action also updates requirements for state plans.

The final rule includes flexibility for states to continue portions of their existing programs that are equivalent to the revised rule. EPA will work with states to review and approve updated certification plans.

Learn more: https://www.epa.gov/pesticide-worker-safety/revised-certification-standards-pesticide-applicators
U.S. EPA Releases Final Report on Impacts from Hydraulic Fracturing Activities on Drinking Water Resources

EPA’s report concludes that hydraulic fracturing activities can impact drinking water resources under some circumstances and identifies factors that influence these impacts

WASHINGTON - The U.S. Environmental Protection Agency (EPA) is releasing its scientific report on the impacts from hydraulic fracturing activities on drinking water resources, which provides states and others the scientific foundation to better protect drinking water resources in areas where hydraulic fracturing is occurring or being considered. The report, done at the request of Congress, provides scientific evidence that hydraulic fracturing activities can impact drinking water resources in the United States under some circumstances. As part of the report, EPA identified conditions under which impacts from hydraulic fracturing activities can be more frequent or severe. The report also identifies uncertainties and data gaps. These uncertainties and data gaps limited EPA’s ability to fully assess impacts to drinking water resources both locally and nationally. These final conclusions are based upon review of over 1,200 cited scientific sources; feedback from an independent peer review conducted by EPA’s Science Advisory Board; input from engaged stakeholders; and new research conducted as part of the study.

"The value of high quality science has never been more important in helping to guide decisions around our nation’s fragile water resources. EPA's assessment provides the scientific foundation for local decision makers, industry, and communities that are looking to protect public health and drinking water resources and make more informed decisions about hydraulic fracturing activities," said Dr. Thomas A. Burke, EPA's Science Advisor and Deputy Assistant Administrator of EPA's Office of Research and Development. "This assessment is the most complete compilation to date of national scientific data on the relationship of drinking water resources and hydraulic fracturing.”

The report is organized around activities in the hydraulic fracturing water cycle and their potential to impact drinking water resources. The stages include: (1) acquiring water to be used for hydraulic fracturing (Water Acquisition), (2) mixing the water with chemical additives to make hydraulic fracturing fluids (Chemical Mixing), (3) injecting hydraulic fracturing fluids into the production well to create and grow fractures in the targeted production zone (Well Injection), (4) collecting the wastewater that returns through the well after injection (Produced Water Handling), and (5) managing the wastewater through disposal or reuse methods (Wastewater Disposal and Reuse).

EPA identified cases of impacts on drinking water at each stage in the hydraulic fracturing water cycle. Impacts cited in the report generally occurred near hydraulically fractured oil and gas production wells and ranged in severity, from temporary changes in water quality, to contamination that made private drinking water wells unusable.

As part of the report, EPA identified certain conditions under which impacts from hydraulic fracturing activities can be more frequent or severe, including:

- Water withdrawals for hydraulic fracturing in times or areas of low water availability, particularly in areas with limited or declining groundwater resources;
- Spills during the management of hydraulic fracturing fluids and chemicals or produced water that result in large volumes or high concentrations of chemicals reaching groundwater resources;
- Injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity, allowing gases or liquids to move to groundwater resources;
- Injection of hydraulic fracturing fluids directly into groundwater resources;
- Discharge of inadequately treated hydraulic fracturing wastewater to surface water resources;
- Disposal or storage of hydraulic fracturing wastewater in unlined pits, resulting in contamination of groundwater resources.

The report provides valuable information about potential vulnerabilities to drinking water resources, but was not designed to be a list of documented impacts.

Data gaps and uncertainties limited EPA’s ability to fully assess the potential impacts on drinking water resources both locally and nationally. Generally, comprehensive information on the location of activities in the hydraulic fracturing water cycle is lacking, either because it is not collected, not publicly available, or prohibitively difficult to aggregate. In places where we know activities in the hydraulic fracturing water cycle have occurred, data that could be used to characterize hydraulic fracturing-related chemicals in the environment before, during, and after hydraulic fracturing were scarce. Because of these data gaps and uncertainties, as well as others described in the assessment, it was not possible to fully characterize the severity of impacts, nor was it possible to calculate or estimate the national frequency of impacts on drinking water resources from activities in the hydraulic fracturing water cycle.

EPA’s final assessment benefited from extensive stakeholder engagement with states, tribes, industry, non-governmental organizations, the scientific community, and the public. This broad engagement helped to ensure that the final assessment report reflects current practices in hydraulic fracturing and uses all data and information available to the agency. This report advances the science. The understanding of the potential impacts from hydraulic fracturing on drinking water resources will continue to improve over time as new information becomes available.

For a copy of the study, visit www.epa.gov/hfstudy.

About EPA's Pesticides Program
Overview of EPA’s program evaluating potential new pesticides and uses, providing for special local needs and emergency situations, reviewing safety of older pesticides, registering pesticide producing establishments, enforcing pesticide requirements, pesticide issues in the works, overview of risk assessment in the pesticide program

Types of Pesticides
Pesticides are often grouped according to the type of pest they control or by chemical or source. type of pest, chemically-related

Frequently Asked Questions
Answers to questions from the public.

Fact Sheets
Search general interest and technical fact sheets, health and safety, regulatory actions, specific chemicals

Information Sources
Additional information of general interest. General information, hotlines, information centers, databases

Pesticide Program Reports
Reports produced by the Office of Pesticide Programs Annual Reports, Performance Management & Accountability, Pesticide Industry Sales and Usage, Progress Reports, Restricted Use Products Reports

Pesticide News Stories
Pesticide related articles appearing in news media

Publications | Glossary | A-Z Index |
County Website Features:

Anne Arundel County Extension website:  
[http://extension.umd.edu/anne-arundel-county](http://extension.umd.edu/anne-arundel-county)

Ag Newsletter Production Pointers  
The current and past agricultural newsletter additions are available for viewing or copy at:  

Ag Bulletins  
An agricultural bulletin page is also available for viewing or copy under our hot topics section at:  

Ag Web Modules  
Website features in Anne Arundel County - Agricultural Program Teaching Modules:  

1. Pasture Management  
2. Pasture Herbicides  
3. Handling Tall Fescue Toxicity Events  
4. Modern Vegetable Production Technology for Early Market  
5. Vegetable Herbicides for Controlling the Top 10 Weeds of Southern Maryland  
6. Sustainable Low Input Strip-Till & No-Till Vegetable Planting Tactics  
7. Fruit Establishment Tactics to Maximize Our Coastal Plain Advantage  
8. Vineyard and Orchard Weed Control  
9. Vineyard Establishment Supplies & Equipment

Farmer School  
On-Line Farming Education Series

“Tomorrow’s Farmers” Web Modules”  

Whether you grew up on a farm or not, the web modules will open your eyes to the world of farming. A course designed for the young and old alike. It just may make a farmer out of a "city kid" or a "hayseed."

Newsletter Renewal

To continue receiving this newsletter, you must renew your subscription by completing and returning the attached Newsletter Renewal Form or submitting online at:  
[http://extension.umd.edu/anne-arundel-county/agriculture/natural-resources/agriculture-newsletter-subscription](http://extension.umd.edu/anne-arundel-county/agriculture/natural-resources/agriculture-newsletter-subscription)

4-H News  
Amanda Wahle, 4-H FEA  
University of Maryland

Are you between 8 and 18 or know someone who is? If so have you considered joining 4-H?  
The Anne Arundel County 4-H program is growing and is always looking for new members and volunteers. The program has community clubs located throughout Anne Arundel County but is also looking for volunteers and members to lead new groups. There are a variety of projects members can participate in including animal science, environmental sciences and human sciences. We are also looking for adults to do seminars or presentations to help 4-Hers learn how they can further their projects.

To receive more information, please contact Amanda Wahle in the Anne Arundel Extension Office at 410-222-3900 or at:  
[awahle@umd.edu](mailto:awahle@umd.edu)

Gardening questions? Pest Problems?  
The Home and Garden Information Center can help!  
Visit the HGIC website at:  
[http://extension.umd.edu/hgic](http://extension.umd.edu/hgic)
Anne Arundel County Extension
https://extension.umd.edu/anne-arundel-county

4-H Youth Development
For more information, contact Amanda Wahle at awahle@umd.edu or call 410-222-3900

Family & Consumer Sciences
For more information, contact Vanessa Bright vbright@umd.edu or call 410-222-3903

Agriculture & Natural Resources
For more information, contact Dave Myers myersrd@umd.edu or call 410 222-3906

Master Gardener Program
For more information, contact Mike Ensor mensor@umd.edu or call 410-222-3906

Nutrient Management
For more information, contact Emileigh Rosso Lucas erosso@umd.edu or call 410-222-3906

Food Supplement Nutrition Education Program
For more information, contact LaTasha Coleman locolema4@umd.edu or call 410 222-3903

Thanks for Partnering
Thanks for partnering with the University of Maryland Extension, and supporting our programs. I also hope you enjoy this newsletter. If you are no longer interested in receiving this newsletter, please call or write the office for the removal of your name from the mailer.

R. David Myers, Principal Agent
Agriculture and Natural Resources
University of Maryland Extension
Anne Arundel & Prince George’s Counties

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97 Dairy Lane
Gambrills, MD 21054
410-222-3906  Fax 410-222-3909

Prince George’s County Extension
6707 Groveton Drive
Clinton, MD 20735
301-868-8783

Manufacturers, or Companies mentioned within this newsletter are not to be considered as sole endorsements. The information has been provided
Spray Program for Multi-Tree Fruit Orchards

Many local orchards are composed of multi-fruit combinations producing fresh market apples, peaches, pears, plums, nectarines, and cherries. Aggressive fruit tree spray programs are required to achieve high quality fruit. These multi-fruit orchards create many spray management challenges for the achievement of good pest control in accordance to label guidelines. Therefore, the following multi-fruit orchard spray program for the control of major tree fruit pests and diseases may offer some assistance: Labeled as noted in 2017 for All Tree Fruit – Pomes: Apples & Pears Stones: Peaches, Plums, Nectarines, and Cherries.

**Fungicides** [FRAC] *Rate Notes

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captan® 80WDG</td>
<td>3-5.0 lbs</td>
<td>General Protectant (Not Labeled for Pears; Reduce Rates for Cherries)</td>
</tr>
<tr>
<td>Dormant Oil [NC]</td>
<td>4.0 gal</td>
<td>Apply Temp 35-85°F F</td>
</tr>
<tr>
<td>Kocide® DF [M1]</td>
<td>6.0 lbs</td>
<td>Other Fixed Coppers (Stones: Dormant Spray Only)</td>
</tr>
<tr>
<td>Rally® 40W</td>
<td>4.0 ozs</td>
<td>Powdery Mildew</td>
</tr>
<tr>
<td>Sulfur 95W [M2]</td>
<td>3.0 lbs</td>
<td>General Protectant</td>
</tr>
<tr>
<td>Gem® 500 SC [11]</td>
<td>3.0 ozs</td>
<td>Brown Rot &amp; Peach Scab (Stones Only)</td>
</tr>
<tr>
<td>Adamant® 50WG [3/11]</td>
<td>6.0 ozs</td>
<td>Brown Rot, Peach Scab &amp; Powdery Mildew (Stones Except Plums)</td>
</tr>
<tr>
<td>Pristine® [7/11] or Tombstone®</td>
<td>14.5 ozs</td>
<td>Brown Rot, Powdery Mildew, Scab, Rusts &amp; Fruit Spots (Limited to 4 Sprays/Season With Only 2 Consecutively)</td>
</tr>
<tr>
<td>Indar® 2F [3]</td>
<td>6.0 ozs</td>
<td>Powdery Mildew &amp; Rusts</td>
</tr>
<tr>
<td>Toppin-M® 70W [1]</td>
<td>8.0 ozs</td>
<td>General Protectant</td>
</tr>
<tr>
<td>Ziram 76DF [M3]</td>
<td>5.0 lbs</td>
<td>Dormant Peach Leaf Curl (Capitn Substitute for Pears)</td>
</tr>
<tr>
<td>Agrimycin® 17 W</td>
<td>24.0 ozs</td>
<td>Fireblight Control (Apples &amp; Pears Only)</td>
</tr>
</tbody>
</table>

**Insecticides** [IRAC] *Rate Notes

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imidan® 70W [1A]</td>
<td>2.0 lbs</td>
<td>Curcillo, SWD, Scale &amp; Fruit Moths</td>
</tr>
<tr>
<td>Actara® [4A]</td>
<td>4.5 ozs</td>
<td>Aphids &amp; Curcillo</td>
</tr>
<tr>
<td>Lorsban® Advanced [18]</td>
<td>1.5 qts</td>
<td>Dormant &amp; Trunk Borer</td>
</tr>
<tr>
<td>Acramite® 50WS [25]</td>
<td>1.0 lbs</td>
<td>Mites Only</td>
</tr>
<tr>
<td>Sevin® 50W [1A]</td>
<td>4.0 lbs</td>
<td>SWD, Japanese Beetles, Hornets &amp; Sap Beetles (Apple Thinning Agent)</td>
</tr>
</tbody>
</table>

*Rate for 50-100 gal Acre Concentrate Spray **Be sure to follow all labels closely for PHI and REI!

**Multi-Fruit Spray Calendar**

**March 15 - Dormant Spray**
- Dormant Oil 4.0 gal (Scales & Mites)
- Kocide® DF 6.0 lbs
- Lorsban® 4E 1.5 qts (Mites)

**April 5 - Peach Bloom**
- Apple Tight Cluster
- Captan® 80WG 3.0 lbs

**April 15 - Peach Petal Fall**
- Apple Bloom
- Captan® 50W 3.0 lbs
- Indar® 2F 6.0 ozs
- Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)

**April 25 - Peach Shuck Split**
- Apple Petal Fall
- Pristine® 14.5 ozs
- Winter® 4.0 ozs (Curcillo)
- Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)

**May 5 - 1st Cover Spray**
- Captan® 80WDG 4.0 lbs (Cedar Apple Rust - Higher Rates for Wetter Conditions)
- Indar® 2F 6.0 ozs (Powdery Mildew & Rusts)
- Actara® 4.5 ozs (Curcillo & Aphids; PHI: 35- Days Pomes, 14-Days Stones)

**May 15 - 2nd Cover Spray**
- Captan® 80WG 3-4.0 lbs
- Rally® 40W 4.0 ozs (Peach Rusty Spot Only)
- Warrior® 4.0 ozs (Curcillo; PHI 21-Days Pomes, 14-Days Stones)

**June 1 - 3rd Cover Spray**
- Captan® 80WDG 3-4.0 lbs
- Toppin-M® 70W 8.0 ozs (Apple Scab Resistance Likely)
- Imidan® 70W 2.0 lbs (Curcillo, Scale & Fruit Moths; PHI: 7-Days Pomes, 14-Days Stones)
- Acramite® 50WS 1.0 lbs (For Mites if Required PHI: 7-Days Pomes, 3-Days Stones)

**June 15 - 4th Cover Spray**
- Captan® 80WDG 3-4.0 lbs
- Sulfur 95W 3.0 lbs (0-day PHI; Stones Only)
- Tombstone® 2.0 ozs (Borers, Curcillo & Fruit Moths; 7-Day PHI)

**July 1 - 5th Cover Spray**
- Early Peach Harvest
- Captan® 80WDG 3-4.0 lbs (0-day PHI; 1-day REI); or Pristine® 14.5 ozs (Early Stomes 0-day PHI; Limited to 4 Sprays/Season With Only 2 Consecutively)
- Tombstone® 2.0 ozs (Borers, Curcillo & Fruit Moths - 7-Day PHI)

**July 15 - 6th Cover Spray**
- Peach Harvests
- Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI)
- Rally® 40W 4.0 ozs (0-day PHI; except apples 14-days)
- Sevin® 50W 4.0 lbs (Japanese Beetle & Moths - 5-day PHI for All Fruit)

**August 1 - 7th Cover Spray**
- Peach Harvests
- Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI)
- Pristine® 14.5 ozs (Early Pomes 0-day PHI)
- Sevin® 50W 4.0 lbs (Japanese Beetle & Hornets - 5-day PHI for All Fruit)

**August 15 - 8th Cover Spray**
- Early Apple Harvests
- Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI)
- Pristine® 14.5 ozs (Pomes 0-day PHI)

**September 1 - 9th Cover Spray**
- Apples and Pears Only
- Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI)
- Pristine® 14.5 ozs (Pomes 0-day PHI)
- Sevin® 50W 4.0 lbs (Japanese Beetle & Hornets - 5-day PHI for All Fruit)

**September 15 - Trunk Bore Spray**
- Lorsban® 4E 1.5 qts (Post Harvest for Borers)

**Organic Approach Substitutions:**

<table>
<thead>
<tr>
<th>Conventional Product</th>
<th>Organic Certified Product (OMRI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captain® &amp; Toppin-M®</td>
<td>Surround® or Sulfur or Lime Sulfur</td>
</tr>
<tr>
<td>Rally®</td>
<td>Kailgreen® (Powdery Mildew Eradicant)</td>
</tr>
<tr>
<td>Listed Insecticides</td>
<td>Neem® or Pyganic® or Entrust® (Stone Fruits Only)</td>
</tr>
<tr>
<td>Agrimycin®</td>
<td>Agrimycin® or Fixed Copper (Apples &amp; Pears Except During Bloom)</td>
</tr>
<tr>
<td>Gramoxone® or Roundup®</td>
<td>Avenger® or Burnout® or AXE®/BioSafe® or (Soytech® nm ORMI label)</td>
</tr>
</tbody>
</table>

*Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George’s County Orchards, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research orchards. Remember to always read the label.*

R. avid Myer
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Spray Program for Multi-Small Fruit Plantings

Many local farms are composed of multi-small fruit combinations producing fresh market blackberries, raspberries, blueberries, strawberries and grapes. Aggressive fruit spray programs are required to achieve high quality fruit. These multi-small fruit plantations create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-small fruit spray program for the control of major small fruit pests and diseases may offer some assistance:

Labeled as noted in 2017 for All Small Fruit – Strawberries, Brambles: Blackberries, Raspberries, Blueberries, and Grapes.

FungiCides: [FRAC]  *Rate  Notes

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime Sulfur [M2]</td>
<td>10.0 gals</td>
<td>Dormant Fall Sanitizer</td>
</tr>
<tr>
<td>JMS® Stylet Oil [NC]</td>
<td>1.0 gal</td>
<td>Apply Temp 35-85°F</td>
</tr>
<tr>
<td>Kocide® DF [M1]</td>
<td>2.0 lbs</td>
<td>Other Fixed Coppers</td>
</tr>
<tr>
<td>Captan® 50W [M4]</td>
<td>2.0 lbs</td>
<td>General Protective</td>
</tr>
<tr>
<td>Ziram® 76DF [M3]</td>
<td>5.0 lbs</td>
<td>General Protective</td>
</tr>
</tbody>
</table>

(Insecticide use Thiram®)

Sulfur 95W [M2]  3.0 lbs  General Protective

(Rate for 50-100 gal Acre Concentrate Spray)

(March 5 - 4ozs  Lime Sulfur 10.0 gals  Kocide DF 2.0 lbs (0-day PHI))

(Rate for 50-100 gal Acre Concentrate Spray)

June 15 - Strawberry 4th Cover & Harvest Spray/ Blueberry 3rd Cover & Early Harvest/ Bramble 1st Cover/ Grape 2nd Cover

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Elevate® 1.5 lbs (0-day PHI)
- Sevin® 50W 4.0 lbs (Sap Beetle, 5-Day PHI)

July 1 - Strawberry Renovation/ Blueberry 4th Cover & Harvest/ Bramble 2nd Cover & Early Harvest/ Grape 3rd Cover

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Pristine® 14.5 ozs (0-day PHI)
- Rally® 40 W 4.0 ozs (Except Blueberry, 0-day PHI)
- Brigade®WS 12.0 ozs (0-3 PHI)

July 15 - Strawberry Post Harvest/ Blueberry 5th Cover & Harvest/ Bramble 3rd Cover & Harvest/ Grape 3rd Cover & Veraison

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Switch® 11.0 ozs (0-day PHI)
- Sulfur 95W 3.0 lbs (0-day PHI)
- Or Kocide DF 2.0 lbs (0-day PHI)
- Malathion 2.0 pts (0-3 PHI)

August 1 - Strawberry Post Harvest/ Blueberry 6th Cover & Harvest/ Bramble 4th Cover & Harvest/ Grape 4th Cover & Early Harvest

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Pristine® 14.5 ozs (0-day PHI)
- Sevin® 50W 4.0 lbs (Japanese Beetle, 5-Day PHI)

August 15 - Strawberry, Blueberry & Bramble Post Harvest/ Grape 5th Cover & Harvest

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Elevate® 1.5 lbs (0-day PHI)
- Phostrol® 4.0 pts (0-day PHI)
- Sevin® 50W 4.0 lbs (Hornets - 5-Day PHI for All Fruit)

September 1 - Strawberry Post Harvest/ Grape 6th Cover & Harvest

- Captan® 50W 2.0 lbs (0-3 Day PHI & 2-Day REI)
- Phostrol® 4.0 pts (0-day PHI)
- Sevin® 50W 4.0 lbs (Hornets - 5-Day PHI for All Fruit)

November 25 - Fall Dormant

- Lime Sulfur 10.0 gals
- Kocide DF 2.0 lbs (0-day PHI)

Herbicides: [HRAC]  *Rate  Notes

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gramoxone® [22]</td>
<td>1.0 qts</td>
<td>Burndown, Direct Spray</td>
</tr>
<tr>
<td>Roundup® [9]</td>
<td>1.0 qts</td>
<td>Burndown, Shielded &amp; Direct Spray</td>
</tr>
<tr>
<td>Devrinol® 50 DF [15]</td>
<td>4.0 lbs</td>
<td>Spring/Summer 35-day PHI</td>
</tr>
<tr>
<td>Princep® 4L [5]</td>
<td>1.0 qts</td>
<td>Spring Dormant, Avoid High pH Soils</td>
</tr>
<tr>
<td>Solica®m [12]</td>
<td>2.5 lbs</td>
<td>Spring/Fall Dormant, 1-yr Established</td>
</tr>
<tr>
<td>Aim® [14] or Shark® [14]</td>
<td>2.0 ozs</td>
<td>(Except strawberry)</td>
</tr>
<tr>
<td>Venue® [14] (Grapes only)</td>
<td>2.0 ozs</td>
<td>(Except strawberry)</td>
</tr>
<tr>
<td>Chateau® [14]</td>
<td>12.0 ozs</td>
<td>After Harvest to Spring Bud Swell</td>
</tr>
<tr>
<td>Surflan® [3]</td>
<td>2.0 qts</td>
<td>Spring/ Summer, Prowl 60-day PHI</td>
</tr>
<tr>
<td>Post® [1]</td>
<td>1.5 pts</td>
<td>Summer Grasses, Variable PHI</td>
</tr>
<tr>
<td>Sinbar® [5]</td>
<td>4.0 ozs</td>
<td>Fall Dormant, 1-yr Established</td>
</tr>
</tbody>
</table>

*Lowest Use Rate Recommended Initially

Organic Approach Substitutions:

Conventional Product  Organic Certified Product (OMRI)

- Captan®  Surround® or Sulfur or Lime Sulfur
- Rally®  Captain®
- Listed Insecticides  Neem® or Pyganic® or Entrust® or Dipel®
- Gramoxone® or Roundup®  Avenger® or Burnout® or AXE®/BioSafe® or (Soythe® no OMRI label)

* Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George’s County small fruit production, and may vary by location in Southern Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research fruit plots. Remember to always "Read the Label".

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TEACHING PROGRAM

- A new course was offered to teach students how to critically evaluate research with this year's topic of managing obese horses and ponies.
- Terp equestrians traveled to 8 different farms and equine businesses this year learning and developing skills in forage testing, showing young warmbloods in hand, managing lesson facilities, training racehorses, rescuing starved horses, handling foals, and monitoring the recovery of horses after intense exercise.
- In April, students witnessed the birth of two new foals! Four foals are expected in 2017.
- Students trained, prepared, and sold Maryland's Miracle and Blazing Terp in January grossing $9,500 for the breeding program.
- Our first Sport Horse, Cornerstone UMD, was shown in-hand by students at the International Sport Horse Registry/Oldenburg Registry Inspection this summer.
- Congrats to Maryland’s Best for becoming the second UMD foal to win at the racetrack! We now have a 100% win record for our Thoroughbred foals that have gone on to race!

Enrollment in equine courses increased 21% over last year.

APPLIED RESEARCH

Our turfgrass research received $21,000 in grant support.

Our studies investigating novel uses of turfgrasses on horse farms are well underway. The first study is testing the wear tolerance of 16 turfgrasses while the second study in collaboration with Virginia Tech is investigating the palatability of the turfgrasses. We aim to investigate turfgrasses in a study using overweight ponies with new MS graduate student, Kristina Davis, next year.

A big thanks to the Maryland Agricultural Experiment Station for supporting our research.

Horses graze turfgrasses to determine which ones they prefer.
EXTENSION PROGRAM

· We co-hosted the Professional Association of Therapeutic Horsemanship International’s Regional Conference with the MD Council of Equestrian Therapies welcoming 200 people to our College Park campus in March.

· County Extension educators in Worcester, Montgomery, and Harford counties hosted education events for 87 people tackling important topics like equine nutrition, saddle fitting, and horse pasture management.

· While hosting the USDA’s National Environmental Impacts of Horse Operations Working Group, we traveled to Washington D.C. to visit with the American Horse Council and environmental grant organizations.

· Dr. Burk gave 12 invited talks on nutrition and pasture management educating 569 people from MD, VA, and DE.

· The Equine Session at the Mid-Atlantic Nutrition Conference was a huge success with 6 equine nutrition experts educating 75 people about feeding the elite equine athlete.

· Certified Journeyman Farrier Mike Poe did a fantastic job educating 40 people in our Farrier Short Course held over four consecutive nights in October.

HIGHLIGHTS & SPOTLIGHTS

Thank you to our donors, sponsors, and supporters over the past year!

Mr. & Mrs. James Steele
Mr. and Mrs. Ken Garber
Mr. Edward Hunter
Mr. Larry Johnson
Mr. Mike Poe
Mr. Richard Golden
Mrs. Jane McElree
Mrs. Kathleen Ansaldi
Ms. Anna Stewart
Ms. Izabel Jedral
Fasig Tipton Company, Inc.
Heritage Stallions
Hilltop Farm Inc.
Maryland Horse Breeders Association
Maryland Horse Industry Board
Newsome Seed
Northview Stallion Station
Select Breeder’s Services
Southern States Incorporated

Congratulations to our Maryland Eventing Team for placing 6th at the National Intercollegiate Eventing Championships.

· After graduation in May, breeding program alum Caroline Speiker is now working at Ashford Stud in Lexington, KY where the famed Triple Crown winner American Pharoah stands at stud.

· Congratulations to our Maryland Equestrian Team for hosting the regional finals and for having 2 members qualify for Zone Finals.

· Timothy Shellem was recognized by the Animal and Avian Science Department as the Outstanding Staff Member of the Year.

· Aubrey Jaqueth placed 2nd in the Graduate Student Poster Contest at the Mid-Atlantic Nutrition Conference.

· Jennifer Reynolds was awarded the Maryland 4-H Horse Program Youth Development Professional of the Year Award.

Visit us online:

https://extension.umd.edu/horses

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Jennifer Reynolds
Coordinator, Equine Extension Activities
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The importance of farming in Maryland
Agriculture is the largest commercial industry in Maryland, employing about 350,000 people, on almost 13,000 farms covering two million acres.

What is changing?
Over the past century, both minimum and maximum temperatures have been increasing. In the future, Maryland should expect higher temperatures, more intense precipitation in the fall and winter, and an increase in short-term droughts in the summer. The two most active farming regions in Maryland are also two of the most vulnerable to the impacts of climate change. The eastern shore is vulnerable to sea level rise, drought, and flooding and the north central region to increased precipitation variability, including flooding and drought. Because of this:

- Water management will become a larger concern.
- Rising temperatures, carbon dioxide, and ozone will increase stress on nearly all crop and livestock species.
- Pests and diseases, such as soybean rust will likely plague farmers in the future.

Who should be concerned?
As the climate changes, farmers, the farm credit industry, and regulators of agricultural management practices will likely face a large and growing degree of uncertainty. These changes occur in the current context of high economic uncertainty and small profit margins and are likely to result in increased costs to both farmers and consumers.

Poultry in Peril
Poultry is the number one agriculture industry in the state and eighth in the nation, bringing in $640 million in 2009. While warming temperatures will require less heat in the winter, the need for better cooling systems is increasing, with record temperatures seen in the summers of 2010 and 2011. Increased temperatures reduce growth rates, increase mortality, and potentially increase the prevalence of Salmonella. More intense storms and sea level rise place poultry houses at risk of flooding. In September 1999, Hurricane Floyd flooded the Butler farm on the Pocomoke River, resulting in the loss of 25,000 chickens. Indirect impacts on poultry farmers may arise from changes in food supply. Warmer night temperatures, higher maximum temperatures, and a likely increase in fungal prevalence may impact poultry feed in the state, reducing profit margins.

Credit: Flickr [timg_fabulous]

Drought, flooding, and extreme weather are some of the main causes of failed crops and all of these issues are associated with climate change. Data: 1981–2009, crop insurance claim reasons, University of Maryland Extension Service.
Impending risks to farming

Increased temperature and precipitation variability may translate into increased production costs. For example, increased energy usage for animal cooling, additional water usage for irrigation, and the need for more frequent pest treatments, will add to the total cost of farm operation. Loss of viable farmland to sea level rise and an increase in crop damage due to intense storms will also have a negative impact on a farm’s bottom line.

Warmer winters and increasing salinity from sea level rise may also threaten the health of oyster beds in the Bay and increase the presence of *Vibrio*, a foodborne pathogen. This threatens the state’s burgeoning aquaculture industry. However, oyster beds are capable of withstanding large environmental changes and buffering climate impacts, which stresses the importance of managing this species for a changing climate.

A longer growing season and higher carbon dioxide levels may initially benefit some crops, however, temperature increases, increased frequency of drought, and increased ozone may negate this effect. When optimal temperatures are exceeded for crops, their life cycles are shortened, which can significantly reduce their viability and yield.

Weed species may out-compete crops with higher carbon dioxide levels and wetter winters may promote the growth of plant disease, such as the fungus that causes wheat scab.

Both drought and flooding conditions have negative effects on agriculture, resulting in production losses and requiring increased irrigation. Although farmers are accustomed to adapting to both dry and wet years, the variability and extremes associated with climate change are more difficult to predict. Delays in harvest and cover crop planting, like those that occurred in September of 2011 due to heavy rains, are likely to become more common.

Drought conditions reduce crop yields and dry pasture grasses where grazing animals feed. In certain areas, increased winter precipitation may cause fields to flood and delay spring planting. This may hamper a farmers’ ability to produce and competitively market early-season, high-value crops such as melons, sweet corn, and tomatoes.

In areas such as the lower eastern shore, where water drainage ditches are used to manage standing water from current average storms, the insufficiency of this drainage infrastructure to manage future high water flows will make it more difficult for an individual farmer to manage soil moisture. More intense fall and winter storms will also impact storage capacity of waste lagoons and may increase overflows into nearby waterways.
we must take action now to prepare for the impacts of a changing climate

Adaptation Toolbox: Climate Change Impact Area Mapper

The Climate Change Impact Area Mapper is an online tool provided by the Maryland Department of Natural Resources for management decision-making, planning, and education purposes. The Climate Change Impact Area Mapper brings together multiple data layers from different sources to illustrate land areas in Maryland that are projected to be the most sensitive to anticipated changes in climate. The layers include areas vulnerable to sea level rise, storm surge, flooding, drought, and rising temperatures.


The Climate Change Impact Mapper includes several different layers related to agriculture, such as drought risk (low risk—light yellow; high risk—red).

Adaptation strategies:

<table>
<thead>
<tr>
<th>Product (ranked by 2007 market value, USDA Census)</th>
<th>Climate impact</th>
<th>Adaptation strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>Increased cooling costs; decreased production; changing disease presence</td>
<td>Improve energy efficiency of housing; bioenergy use; improve ability to monitor disease and quarantine</td>
</tr>
<tr>
<td>Grains, oilseeds, dry beans, peas</td>
<td>Increased irrigation use; winter flooding; changes in crop yield quantity and quality</td>
<td>Diversify cultivar and crop types; improve water management systems; improve pest forecasting</td>
</tr>
<tr>
<td>Nursery, greenhouse, floriculture, sod</td>
<td>Increased cooling costs; water stress</td>
<td>Establish emergency response systems; improve energy efficiency of housing</td>
</tr>
<tr>
<td>Milk and dairy</td>
<td>Decreased milk productivity; changing disease presence; low-quality pasture during drought</td>
<td>Increase shade and cooling; improve ability to monitor disease and quarantine; manage pastures for drought</td>
</tr>
<tr>
<td>Cattle and calves</td>
<td>Changing disease presence; heat stress; low-quality pasture during drought</td>
<td>Increase shade and cooling; improve ability to monitor disease and quarantine; manage pastures for drought; farm heat-tolerant breeds</td>
</tr>
<tr>
<td>Vegetables, melons, potatoes, other crops, hay</td>
<td>Increased irrigation use; winter flooding; changes in crop yield quantity and quality</td>
<td>Diversify cultivar and crop types; improve water management systems; improve pest forecasting</td>
</tr>
<tr>
<td>Horses, ponies, mules, burros, donkeys</td>
<td>Heat stress; low-quality pasture during drought</td>
<td>Increase shade and cooling; manage pastures for drought education about heat stress</td>
</tr>
<tr>
<td>Fruit trees, nuts, berries</td>
<td>Increased irrigation use; increased pest damage</td>
<td>Diversify cultivar and crop types; improve water management systems; improve pest forecasting</td>
</tr>
</tbody>
</table>

Credit (top to bottom): Ben Fertig, Jane Thomas, Adrian Jones, thebittenword.com
planning guidelines

A changing climate will affect the success of farming across the state and require specific strategies to guard against impacts from extreme weather, rising temperatures, and disease. The agricultural community should consider the implementation of the following management practices to reduce risk and build resilience.

<table>
<thead>
<tr>
<th>Management practices</th>
<th>Risk management</th>
<th>Water quality</th>
<th>Crop and species diversification</th>
<th>Pest, weed, and disease management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant heat-, disease-, and drought-tolerant cultivars, and longer or earlier maturing cultivars.</td>
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<tr>
<td>Reduce impacts of pests through crop rotations and integrated pest management.</td>
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<tr>
<td>Develop efficient early-warning systems for likely invasions of insects, weeds, and diseases.</td>
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<tr>
<td>Explore incentives for agricultural bio-fuel development, methane recapture, and carbon and nutrient trading.</td>
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<tr>
<td>Establish emergency response plans for drought, extreme heat, flooding, and damaging winds.</td>
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<tr>
<td>Evaluate the effectiveness of best management practices during extreme heat, drought, and large rainfall events.</td>
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<tr>
<td>Revise targets for agricultural land preservation in light of sea level rise, future drainage, and crop diversification needs.</td>
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</tr>
<tr>
<td>Invest in techniques to promote water-use efficiency, such as rainwater capture, improved irrigation systems, better water allocation, and livestock watering areas.</td>
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<tr>
<td>Develop and expand local food production through community gardens, school programs, and regional foodshed mapping.</td>
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<tr>
<td>Encourage local growers to attract pollinators by planting appropriate habitats, building bee homes, and discouraging insecticide and pesticide use.</td>
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<tr>
<td>Provide improved access to markets and finance (e.g., microcredit), enhanced insurance, and technology transfer programs.</td>
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<tr>
<td>Pursue aquaculture opportunities in areas impacted by sea level rise.</td>
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</tr>
</tbody>
</table>

For additional information

Department of Natural Resources’ Climate Change Website: www.dnr.maryland.gov/climatechange
Drainage Management: http://mda.maryland.gov/resource_conservation/Pages/pda_pwa.aspx
Nutrient Management: http://mda.maryland.gov/resource_conservation/Pages/nutrient_management.aspx
Maryland’s Coastal Atlas: http://www.dnr.maryland.gov/ccp/coastalatlas/
Northeast Regional Climate Center: http://www.nrcc.cornell.edu/

Brochure produced by: Marcus Griswold, UMCES
Zoe Johnson, MDNR
Caroline Wicks, IAN-UMCES

Scientific content:
Scientific and Technical and Adaptation and Response Working Groups of the Maryland Commission on Climate Change

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John R. Griffin, Secretary

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