

# REPORT OF THE TASK FORCE TO EXPLORE INCORPORATING THE SUBJECT OF AGRICULTURE IN EXISTING CURRICULAR AREAS



MAY 2015



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Special thanks to **Miranda Hill-Okojie**, Management Associate, Maryland State Department of Education, for managing the electronic survey.

Photos on the cover of the two chefs (left on second row) and the two girls trimming plants (right on second row) are courtesy of Edwin Remsberg, University of Maryland Extension, College Park, MD.

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## EXECUTIVE SUMMARY

The subject of agriculture currently exists in educational programs, both formal and informal, across the state of Maryland. Agriculture and agricultural education have played, and continue to play, a key role in Maryland. Students of all ages learn about agriculture through formal and informal means in Maryland. Agriculture can be found throughout all learning levels, pre-K through adult. Agriculture education programs are supported by many resources including fiscal and human capital. In addition to paid instructors in the formal programs, thousands of volunteers and paid instructors support agricultural programs in informal settings.

When this legislation was introduced, and subsequently passed by the Maryland General Assembly, Chapter 672, ***Education – Task Force to Explore Incorporating the Subject of Agriculture in Existing Curricular Areas*** was added to the Annotated Code of Maryland. The assembled Task Force was comprised of representatives from the: Maryland State Department of Education (MSDE), University of Maryland Extension (UME), University of Maryland, College of Agriculture and Natural Resources, University of Maryland Institute of Applied Agriculture, University of Maryland, Eastern Shore, Maryland Agricultural Education Foundation (MAEF), Maryland Farm Bureau, Maryland Grain Producers Association, Maryland Pork Producers Association, Maryland Association of Soil Conservation Districts, Delmarva Poultry Industry, Inc., Maryland Dairy Industry Association, Maryland Department of Agriculture, Maryland Association of Boards of Education, Local School Systems; and FFA. Invited, but respectfully declined, was the Maryland Cattlemen's Association.

The charge to the Task Force was to:

*Explore options for incorporating the subject of agriculture in all existing curricular areas*

The Task Force undertook a series of actions to assist in exploring various options for incorporating agriculture into existing curricular areas. It examined current programs that exist in local school systems both individual courses in science and as electives, and Career and Technology Education Agricultural Programs of Study, which consist of a series of sequential courses leading to a Career and Technology Education Completer Program. Presentations were also made on additional programs such as those offered by University of Maryland Extension, the Environmental Literacy Program, the Partnership for Children and Nature, Farm to School, and the Agriculture Discovery Program.

Through participation in an exercise that examined Strengths, Weaknesses, Opportunities and Threats (SWOT), Task Force members brought out many ways in which the subject of agriculture can be incorporated into existing curricular areas.

The four recommendations of the Task Force were designed to meet the charge of the Task Force. They are:

1. **STUDENTS: Establish a free online interactive venue for students, *Maryland Agriculture Academy (MAA)*, which includes multimedia resources and activities, and showcases the over 200 career opportunities in the agriculture profession.**

**Rationale:**

A broadened understanding of what agriculture includes and the career opportunities available is critical to engage students. This searchable venue, featuring lectures and interactive videos would be available 24/7 for use by students in classes or outside of the school day based upon interest or as assigned by teachers.

2. **EDUCATORS: Provide a curriculum and professional learning resource system on the integrated teaching of agriculture, aligned to Maryland content standards for administrators, counselors and teachers.**

**Rationale:**

There is a need for a single repository of resources for educators including mini lectures, lesson plans, classroom activities, fact sheets, hands-on lab experimentation, webinars, as well as research and development materials. Teachers, professors, and extension personnel throughout the state could contribute to the site. The site would include a rubric or evaluation tool to vet the materials in terms of instructional value, curricular connections, appropriate grade level, and/or course. In addition, a matrix which maps the integration of these resources into the existing standards and curriculum would be provided. Professional learning activities will be required to engage educators in using these resources.

3. **ELEMENTARY AND MIDDLE SCHOOL PROGRAMS: Expand the pipeline to agricultural careers and education through elementary and middle school programs.**

**Rationale:**

Two existing programs, *Ag in the Classroom* and *AGsploration: The Science of Maryland Agriculture*, are outstanding resources available to assist teachers in the elementary and middle school levels to bring agriculture to everyday instructional experiences, helping to change outdated perceptions and focus on agriculture literacy and STEM (science, technology, engineering, and math) curriculum aligned with the Maryland State Department of Education science and health learning standards. As most elementary and middle school teachers have little or no personal experience in this field, it is critical to make these programs more accessible to them through technology.

Two local school systems currently offer agricultural programs for elementary and middle school students. It is recommended that both of these agricultural programs be replicated in other school systems.

The **elementary school** program provides students, K-5, with concepts in agriculture, the Chesapeake Bay and environmental science using a hands-on approach. Science, social studies and environmental literacy standards are the driving force to the science, technology, engineering, and math (STEM) focused investigations that are used to engage learning among the students. Lessons focus on the importance of the bay and what steps are involved in being “environmentally friendly farmers.” Field trips allow students to experience real-world examples of what they learn in the classroom. The **middle school** program offers an exploratory agriculture program for students in grades 6-8. Students engage in hands-on activities related to understanding the agricultural industry and its importance to producing food and fiber for a worldwide economy. Emphasis is placed on exploring the new technologies for the 21<sup>st</sup> century with the agricultural applications in science, technology, engineering and math (STEM). During each grade level different areas of the agricultural industry are explored using state-of-the-art facilities.

**4. HIGH SCHOOL PROGRAMS: Expand the state’s rigorous high school agricultural programs of study which lead to postsecondary credit and industry certification and increased readiness for entry into college and careers.**

**Rationale:**

Provide information to local school systems to encourage the adoption of existing state approved agricultural programs of study. The ***Curriculum for Agriculture Sciences Education (CASE)*** is a national program of study that offers students a rigorous curriculum and incorporates the National Academic Standards and Agriculture Food and Natural Resources (AFNR) Content Standards. Students learn about all aspects of agricultural sciences. The **Environmental Studies and Natural Resources** program of study covers both environmental and natural resource management technologies and current issues related to these fields of study. It incorporates green technologies and the impact of today’s environment on our natural resources with an emphasis on research and the ethics involved in making decisions that impact our ecosystem. Students engage in technical research and writing as it relates to real-world problem solving. The **Certified Professional Horticulturalist (CPH)** program of study is based on requirements for the Certified Professional Horticulturist (CPH) certification used by the Maryland “Green Industry.” Students complete a sequence of courses which include: Introduction to Environmental/Plant/Animal Science, Foundations of Horticulture, Plant Production, and Landscape Design and Management. Students have the opportunity to earn the Student-Level CPH certification by taking and passing the industry exam.

Implementation of the recommendations will require continued collaborative action among the stakeholders who served on this Task Force as well as the organizations which they represent. In some instances, additional resources will also be needed in order to implement the recommendations.

The Task Force also discussed several broader recommendations for future consideration. Topics included: developing a strategic plan for expanding and integrating agricultural programs; establishing an agricultural course that meets high school science graduation requirements; aligning the biotechnology course to Advanced Placement (AP) biology; and developing agricultural standards of practice.

## **BACKGROUND AND CHARGE TO THE TASK FORCE**

Agriculture and agricultural education have played, and continue to play, a key role not only in Maryland, but nationally and globally as well. According to the report *Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources, and the Environment, United States 2015 – 2020*, issued May 11, 2015 from the United States Department of Agriculture's (USDA) National Institute of Food and Agriculture and Perdue University, the nation's agricultural businesses are generating almost 60,000 high-skill agriculture-related jobs per year. In contrast, the nation's universities are graduating just over 35,000 students annually with the necessary degrees to fill those jobs, leaving almost 40 percent of these jobs unfilled. Technology has created a demand for people with certain skill sets that did not exist ten years ago. Agricultural graduates are enjoying increasing salaries now on par with business school graduates and most have their choice of several job offers.

During the next five years, employment opportunities for those with expertise in food, agriculture, renewable natural resources, and environmental industries are expected to outpace those with the qualifications to fill these positions, according to the report. Almost 30 percent of these positions will be in science, technology, engineering, and mathematics (STEM) areas. The strongest STEM job market areas are predicted to be for plant scientists, food scientists, sustainable biomaterials specialists, water resources scientists and engineers, precision agriculture specialists and farm-animal veterinarians. These areas can be further broken down to animal behavior and ethology, animal sciences, botany and plant pathology, conservation biology, entomology, environmental science, nutrition science, sustainability studies, and wildlife biology. A strong employment market is also expected for e-commerce managers and marketing agents, ecosystem managers, agriscience educators, crop advisors, and pest control specialists.

Careers in agriculture are essential in addressing food security, renewable energy resources, sustainable food systems, environmental quality and ensuring clean water resources, in order to feed over nine billion people by 2050, as estimated by the United Nations in 2013. Agriculture careers help to address some of the world's most challenging problems.

Production agriculture starts with farming and grows from there. Maryland's agricultural production is as diverse as the state and important to the state's economy, environment, food supply and quality of life. Maryland agriculture includes poultry and grain, livestock and equines, forests and nurseries, orchards and vineyards, dairy and ice cream, vegetables and fruits. Improved strategies protect the environment and the food supply and use technology to increase yields while reducing chemical use and land use. Developing and executing these strategies requires broadening of one's perception of Agriculture and expanding the many agricultural careers. There are many businesses that support Maryland's production and processing from banking and information technology services to law and tractor supply. Agriculture is Maryland's largest



commercial industry with more than 12,000 farms covering more than two million acres or roughly 32% of total land area used for farming.

As long ago as 1990, Congress saw the need to address concerns about better ways to produce the products needed without compromising future resources. The Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA), Public Law 101-624, the "Farm Bill" defined the term *sustainable agriculture* as an integrated system of plant and animal production practices having a site specific application that will, over the long term: satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agricultural economy depends; make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole.

In Maryland, students of all ages learn about agriculture through formal and informal means. Formal education is generally school-based instruction delivered by certified professional educators. These educators follow standards established by the school system. Agriculture concepts provide a context for learning and improve students' critical thinking skills through the exploration of the interconnectivity of agriculture, math, science, social studies, health, and culinary arts. Elementary, middle and high school courses, as well as college and university courses are considered formal education programs.

Informal education occurs through a variety of experiences that may be anecdotal or through intentional instruction by educators, with or without formal teacher training, and in informal settings. Informal education may include: state and local fairs, farm visits, purchases made from local fruit and vegetable stands, farmers' markets, informal adult classes, 4-H, FFA, community gardens, locally grown products that are served in school lunches, and summer youth programs. Agriculture touches everyone's life – from the basic need for food, produced and preserved safely, to the many agricultural related careers that support Maryland's economic and workforce needs.

Agriculture is a science and thus offers many related opportunities and careers. By expanding the notion of agricultural education to include veterinary science, turf management, food development/research, food science, nutrition, food preservation, food safety and the environment, students will have a broader spectrum of agriculture related careers from which to select as they pursue their life's work.

In the 2012 session, the Maryland General Assembly recognized the importance of expanding knowledge and understanding of agriculture's broader role in the State's communities when it passed a bill that became §4-111.3 (Chapter 672), ***Education – Task Force to Explore Incorporating the Subject of Agriculture in Existing Curricular Areas***. It established a Task Force in which the State Board of Education and the University of Maryland Extension, after consultation with local boards of education and specific organizations which included representatives from the: Maryland State Department of Education (MSDE), University of Maryland Extension (UME),

University of Maryland, College of Agriculture and Natural Resources, University of Maryland Institute of Applied Agriculture, University of Maryland, Eastern Shore, Maryland Agricultural Education Foundation (MAEF), Maryland Farm Bureau, Maryland Grain Producers Association, Maryland Pork Producers Association, Maryland Association of Soil Conservation Districts, Delmarva Poultry Industry, Inc., Maryland Dairy Industry Association, Maryland Department of Agriculture, Maryland Association of Boards of Education, Local School Systems; and FFA, explore options for incorporating the subject of agriculture, including sustainable agriculture and other agricultural issues, in all existing curricular areas. Also invited to participate as a member of the Task Force, but respectfully declined, was the Maryland Cattlemen's Association.

The charge to the Task Force was to:

*Explore options for incorporating the subject of agriculture in all existing curricular areas*

After researching the existing programs, both formal and informal, determining the gaps through an exercise of examining the Strengths, Weaknesses, Opportunities and Threats (SWOT), the Task Force was able to dialogue about the recommendations. It has put much thought and analysis into the recommendations described in this report.

## THE TASK FORCE PROCESS

The Task Force was comprised of entities stated in the law and additional organizations that promote Agriculture which the Task Force members thought important to include, such as University of Maryland (UM) College of Agriculture and Natural Resources (AGNR), Frederick County Public Schools Elementary Agriculture Education Teacher, Baltimore County Public Schools Middle School Agriculture Education Teacher, Kent County Public Schools High School Agriculture Education Teacher, Prince George's County Public Schools Chief Executive Officer (Superintendent), Baltimore City Public Schools Career and Technology Education (CTE) Director, Maryland Department of Agriculture (MDA) staff member, University of Maryland Extension 1890 Programs Administrator, University of Maryland Institute of Applied Agriculture faculty member, and the State FFA officer.

University of Maryland Extension and Maryland State Department of Education, together with the Maryland Agricultural Education Foundation, launched the work of the Task Force in December 2014 with two electronic meetings that confirmed membership and organized a Plan of Work. Two face-to-face meetings were held on January 20, 2015 and May 4, 2015.

Task Force members also contributed to the gaps and deliberations using e-polling. At the face-to-face meetings, members shared information about their respective agriculture programs and suggestions for enhancing current educational efforts. A SWOT (Strengths, Weakness, Opportunities, and Threats) was conducted. Challenges facing agriculture education as well as promising practices to enhance current and agricultural education efforts surfaced for consideration.

The resulting recommendations were provided to all Task Force members via a web-based survey instrument. Task Force members' responses, reactions, and suggested changes were recorded on the web-based instrument, allowing sufficient time in order to receive everyone's feedback. The results were tabulated, and incorporated into the recommendations.

A draft report was written and each Task Force member was given the opportunity to review and provide feedback on several occasions. All feedback was considered in preparing the final report.

## RECOMMENDATIONS

The recommendations were developed from the contributions, discussion, SWOT analysis, and deliberations of Task Force members during the face-to-face meetings and through e-polling. Documents discussed, data presented, activities conducted and feedback garnered were part of the deliberations that went into these recommendations.

The recommendations target students, instructors, the pipeline of elementary and middle school students as well as high school students and programs leading to postsecondary credit and career readiness. The recommendations address opportunities for incorporating Agriculture into existing curricular areas.

The Task Force respectfully makes the recommendations listed below. The recommendations serve to build on the current strengths of Agriculture programs in Maryland, both formal and informal, as well as to suggest fresh ideas and initiatives. Some of the recommendations will need additional resources in order to implement.

The four recommendations of the Task Force were designed to meet the charge of the Task Force. They are:

- 1. STUDENTS: Establish a free online interactive venue for students, *Maryland Agriculture Academy (MAA)*, which includes multimedia resources and activities, and showcases the over 200 career opportunities in the agriculture profession.**

**Rationale:**

A broadened understanding of what agriculture includes and the career opportunities available is critical to engage students. This searchable venue, featuring lectures and interactive videos would be available 24/7 for use by students in classes or outside of the school day based upon interest or as assigned by teachers.

- 2. EDUCATORS: Provide a curriculum and professional learning resource system on the integrated teaching of agriculture, aligned to Maryland content standards for administrators, counselors and teachers.**

**Rationale:**

There is a need for a single repository of resources for educators including mini lectures, lesson plans, classroom activities, fact sheets, hands-on lab experimentation, webinars, as well as research and development materials. Teachers, professors, and extension personnel throughout the state could contribute to the site. The site would include a rubric or evaluation tool to vet the materials in terms of instructional value, curricular connections, appropriate grade level, and/or course. In addition, a matrix which maps the integration of these resources into the existing standards and curriculum would be provided.

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**Rationale:**

Provide information to local school systems to encourage the adoption of existing state approved agricultural programs of study. The *Curriculum for Agriculture*

**Sciences Education (CASE)** is a national program of study that offers students a rigorous curriculum and incorporates the National Academic Standards and Agriculture Food and Natural Resources (AFNR) Content Standards. Students learn about all aspects of agricultural sciences. The **Environmental Studies and Natural Resources** program of study covers both environmental and natural resource management technologies and current issues related to these fields of study. It incorporates green technologies and the impact of today's environment on our natural resources with an emphasis on research and the ethics involved in making decisions that impact our ecosystem. Students engage in technical research and writing as it relates to real-world problem solving. The **Certified Professional Horticulturalist (CPH)** program of study is based on requirements for the Certified Professional Horticulturist (CPH) certification used by the Maryland "Green Industry." Students complete a sequence of courses which include: Introduction to Environmental /Plant/Animal Science, Foundations of Horticulture, Plant Production, and Landscape Design and Management. Students have the opportunity to earn the Student-Level CPH certification by taking and passing the industry exam.

Implementation of the recommendations will require continued collaborative action among the stakeholders who served on this Task Force as well as the organizations which they represent. In some instances, additional resources will also be needed in order to implement the recommendations.

The Task Force also discussed several broader recommendations for future consideration. Topics included: developing a strategic plan for expanding and integrating agricultural programs; establishing an agricultural course that meets high school science graduation requirements; aligning the biotechnology course to Advanced Placement (AP) biology; and developing agricultural standards of practice.

## APPENDIX A

### Inventory of Agriculture in Education in Maryland Summary MAEF January 2015

#### Summary

##### • Pre-K through Elementary

- **Formal Education** - in schools
  - 4 - public school programs
  - 2 - private school programs
  - 1 - private non-profit program (MAEF)
- **Non-formal Programs in Formal Settings**
  - 5 - private non-profit programs (MAEF (2), Wash FB, County FB Miss programs)
  - 1 - Public school program (Frederick @ Urbana)
- **Professional Development**
  - 1- annual program delivered by private non-profits (MAEF with MGA)
  - Periodic Unscheduled Single Day - delivered by private non-profits (MAEF with MGA)
- **Non-formal Programs in Non-Formal Settings**
  - Fairs & Festivals - throughout Maryland
  - Maryland Agriculture Showcase - at fairs & festivals throughout Maryland

##### • Middle School Ag & Natural Resources

- **Formal Education**
  - 5 - public school programs (Hereford, Balt. County Lab, Greenstreet, Great kids Farm & Oakdale MS)
  - 3 - Public school environmental education centers
  - 1 - private school (McDonough)
- **Non-formal Programs**
  - 6 - private non-profits
  - 28 - Farm Based Education programs
- **Professional Development**
  - 1 - Public school (Prince George's)
  - 2 - Private non-profits (MAEF and Hard Bargain)

##### • High School

- **Formal Education**
  - 48 - High schools with Ag curriculum
  - 43 - Public high schools with FFA chapters

##### • Post Secondary

- 6 - 2 year institutions
- 2 - 4 year institutions

**Other Notes:**

- **CASE** - Curriculum for Agricultural Science Education
- **MSDE** - Maryland State Department of Education
- **MAEF** - Maryland Agricultural Education Foundation, Inc.
- **MATA** - Maryland Agriculture Teacher's Association
- **UMCP** - University of Maryland College Park
- **UMES** - University of Maryland Eastern Shore



## APPENDIX B

### Maryland Agriculture in Education Inventory

Program	Grade Level	Entity Delivering Programs	Formal
<b>Pre-K – 5 (Elementary)</b>			x
Barnyard Basics (new curriculum)	Pre-k	MAEF/classroom teachers	
Teacher Training Workshops	k-5	MAEF/MGA	x
Mobile Science Labs	k-8	MAEF	x
Professional Development	5-Mar	MAEF/MGA	x
Ag Literacy	k-5	MAEF/Volunteers	x
Local and State Fairs	Prek-6	MAEF	x
Ag and the Bay Classroom (Urbanna)	k-5	Classroom teacher	x
Mobile Ag Literacy unit (Wash. County)	k-5	Volunteers	x
Miss Maryland Ag and County Reps	K-5	volunteers	x
Ag & the Bay at Swan Harbor	K-5	MAEF	x
McDonough School, Roots Farm, Inde School, Baltimore Co	K-8	School w/MAEF consulting	x
Crellin ES, BARN Program, Garrett Co	K-5	School w/MAEF consulting	x
Greenstreet Academy, Baltimore City	K-8	Mixed incl MAEF	x
Harford Glen Env. Ctr., Harford County PS	5 <sup>th</sup>	School, Master Gardners, MAEF	x
Park School, Baltimore City	K-5	School, MAEF consult	x
<b>Middle School Ag &amp; Natural Resources</b>			
Hereford Middle School, BCPS	6 <sup>th</sup> – 8 <sup>th</sup>	School	x
Ag Lab – Baltimore County Middle Schools	6 <sup>th</sup> – 8 <sup>th</sup>	School	x
McDonough School, Roots Farm, Inde School, Baltimore Co	6 <sup>th</sup> – 8 <sup>th</sup>	School & MAEF	x
B.U.G.S., Living Classrooms, Baltimore City	6 <sup>th</sup> – 8 <sup>th</sup>	Various community gardens & MAEF	
Peralstone Center, Baltimore County	6 <sup>th</sup> – 8 <sup>th</sup>	Campus farm	
Harford Glen Env. Ctr., Harford County PS	6 <sup>th</sup> – 8 <sup>th</sup>	School, Master Gardner	x
Schmidt Env. Center, Prince George's County, PGCPS	6 <sup>th</sup> – 8 <sup>th</sup>	School, MAEF, UME	x
Claggett Farm, CBF, Southern MD	6 <sup>th</sup> – 8 <sup>th</sup>	School systems	x
Evergreen Heritage Center, Western MD	6 <sup>th</sup> – 8 <sup>th</sup>	Schools, Frostbury U, MAEF	
Oxon Hill Farm National Park, Washington D.C.	6 <sup>th</sup> – 8 <sup>th</sup>	Schools, MAEF, NPS	
Shepherdspring Farm, Point of Rocks, MD	6 <sup>th</sup> – 8 <sup>th</sup>	Schools, Heifer Intl	
Oakdale Middle School	6 <sup>th</sup> – 8 <sup>th</sup>	Club	
Great Kids Farm, Baltimore City, MD	6 <sup>th</sup> – 8 <sup>th</sup>	Schools, early MAEF consult	x
Sassafras Env. Ctr, Kent County, MD	6 <sup>th</sup> – 8 <sup>th</sup>	Schools, MAEF, Washington College	
National Colonial Farm, Accokeek, MD	6 <sup>th</sup> – 8 <sup>th</sup>	National Parks, AFF, MAEF	

<b>Professional Development:</b>			
Leopold Education Project Teacher Training	6-12/Undergrad	MAEF	x
Schmidt Env Ctr/Prince George's Co PS	6-8 <sup>th</sup>	PGPS, MAEF, UMDE	x
Ag & Env Science Faculty In-Service	6-8/Teams	MAEF	x
Hard Bargain Farm/PG & Charles Co PS	K-8	PGPS, Alice Ferguson Fdn, MAEF	x
<b>Careers:</b>			
Career kits	6 <sup>th</sup> – 12 <sup>th</sup>	MAEF	x
<b>Farm Based Education Sites/Outreach:</b>			
	<b>Type</b>	<b>Audience</b>	
National Colonial Farm, Accokeek, MD	NPS	K-12/Public	
Pearlstone Center, Hampstead, MD	Non-Prof	K-12/Public	
Fox Haven Farm & Learning Ctr. Jefferson, MD	Non-Prof	K-12/Public	
Hard Bargain Farm, Accokeek, MD	Non-Prof	K-12	
Maryland Ag Resource Center, Cockeysville, MD	Partnership	Schools/Public	
Caroline County Culinary Center	Schools	HS	
Montpelier Farms, PG Co	Comm	K-12/Public	
Kilby Cream, Cecil Co	Comm	K-3	
Sassafras ELC, Kent Co	Non-Prof	6,7,8	
City Ranch, Baltimore City	Non-Prof	3 <sup>rd</sup> -12 <sup>th</sup>	
Claggett Farm, St Mary's Co	Non-Prof	5 <sup>th</sup> – 12 <sup>th</sup>	
Zakiah Farms, Calvert Co	Comm	6,7,8	
Elioak Farms, Howard Co	Comm	K-3/public	
Evergreen Heritage Ctr., Allegheny Co.	Non-Prof	6,7,8	
Oxon Hill Farm, PG Co.	NPS	K-8 <sup>th</sup> /public	
Kinder Farm, AA Co.	County	K-8 <sup>th</sup> /public	
South Mountain Creamery, Wash Co.	Comm	K-8 <sup>th</sup> /public	
ShepherdSpring Farm, Frederick Co.	Non-Prof	6,7,8 <sup>th</sup>	
Brickyard Farm, Mont. Co.	Non-Prof	K-12	
The Good Farm, Wicomico Co.	Comm	K-12	
Washington Co Ag Education Ctr.	Partnership	6,7,8 <sup>th</sup> /public	
Serenity Farm, Charles Co.	Comm	6,7,8 <sup>th</sup>	
Butler's Orchard, Frederick Co	Comm	K-3/public	
Colchester Farm, Kent Co	Comm	6,7,8 <sup>th</sup>	
Holly Ridge Farm, Worcester Co	Comm	K-12/Public	
Hawks Hill Farm, Harford Co.	Comm	K-3/Public	
Weber's Farm, Baltimore Co.	Comm	K-8 <sup>th</sup> /Public	
C&O Canal, Western MD Co's	NPS	6,7,8 <sup>th</sup> /Public	
<b>High School</b>			
Southern Garrett High School	9-12 CASE	Public School	x
Northern Garrett High School	9-12 CASE	Public School	x
Allegany CTC	11-12 CASE	Public School	x
Hancock High School	7-12 CASE	Public School	x
Clear Spring High School	9-12 County	Public School	x
Boonsboro High School	9-12 County	Public School	x
Washington County Tech. High School	11-12 Env. Studies	Public School	x
Smithsburg High School	9-12 CASE	Public School	x
Middletown High School	9-12 County	Public School	x
Brunswick High School	9-12 County	Public School	x
Frederick High School	9-12 County	Public School	x

Frederick Career & Technology Center	10-12 County	Public School	x
Urbana High School	9-12 County	Public School	x
Tuscarora High School	9-12 County	Public School	x
Oakdale High School	9-12 county	Public School	x
Linganore High School	9-12 County	Public School	x
Walkersville High School	9-12 County	Public School	x
Catoctin High School	9-12 County	Public School	x
Damascus High School	9-12 County	Public School	x
Calvert High School	9-12 CASE	Public School	x
Forrest Center	11-12 Horticulture	Public School	x
Gwynn Park High School	9-12 CASE	Public School	x
Robert D. Stethem Educational Center	11-12 County	Public School	x
Southern High School	9-12 CASE	Public School	x
Century High School	9-12 CASE	Public School	x
Francis Scott Key High School	9-12 CASE	Public School	x
Harford Tech High School	9-12 Vet. Sci & hort	Public School	x
North Harford High School	9-12 Nat. & Ag Mag	Public School	x
Hereford High School	9-12 CASE	Public Schools	x
Western School of Technology	Env. Studies	Public Schools	x
Liberty High School	9-12 CASE	Public School	x
Manchester Valley High School	9-12 CASE	Public School	x
North Carroll High School	9-12 CASE	Public School	x
South Carroll High School	9-12 CASE	Public School	x
Westminster High School	9-12 CASE	Public School	x
Winters Mill High School	9-12 CASE	Public School	x
W.E.B. Debois High School	9-12 CASE	Public School	x
Caroline Career & Tech Center	10-12 CASE	Public School	x
Cecil Career & Tech Center	11-12 CPH	Public School	x
Dorchester Career and Tech Center	11-12 CASE	Public School	x
Easton High School	9-12 CASE	Public School	x
Kent County High School	9-12 CASE	Public School	x
Parkside Career and Tech Center	11-12 Hort	Public School	x
Queen Anne's High School	9-12 CASE	Public School	x
Worcester Technical High School	10-12 CASE	Public School	x
Phoenix Academy	9-12 CASE	Public School	x
Center of Applied Technology North	9-12 Env. Studies	Public School	x
High Point High School	9-12 Env. Studies	Public School	x
Fairmont Heights High School	9-12 Env. Studies	Public School	x
Independence School	Env Studies	Public School	x
Ben Franklin High School	9-12 CASE	Public School	x

## APPENDIX C

### ***University of Maryland Extension Associated School Programs***

1) ***AGsploration: The Science of Maryland Agriculture*** is a statewide curriculum designed to increase middle school student agriculture literacy and STEM (science, technology, engineering, and math) skills. The curriculum consists of 22 peer-reviewed lessons with experiential, hands-on activities; teacher's guide; pre-packaged materials kit; and evaluation materials. Each lesson is aligned with Maryland State Department of Education science and health learning standards. Topics include production agriculture, environmental science, and nutrition. The program was developed by faculty of University of Maryland Extension with support from researchers and industry professionals. The curriculum for ***AGsploration*** has reached more than 15,000 Maryland residents since 2010, and more than 300 teachers have been trained to utilize the curriculum. The focus for 2014-2015 is to provide training and curricular materials to youth educators in order to expand implementation of the program outside the scope of University of Maryland Extension.

2) The ***Kids Growing with Grains program*** is supported through a grant by the Maryland Grain Producers and administered by faculty from University of Maryland Extension and Maryland Agricultural Experiment Station. Since 1994, the Kids Growing With Grains program has been held at the Western Maryland Research and Education Center in Keedysville, Maryland (Washington County). Schools with mostly urban population are invited to come to WMREC for a day of learning. For most of the audience, this is their first trip to a farm. Students participating in the all-day field trip visit four different "stations" to learn about grain production, consumption, and nutritional benefits.

At the end of the day, students return to school with worksheets, recipes, and a "Grain Jar" they have made. The jar contains a sample of oats, wheat, barley, soybeans, and corn. Teachers return with additional teaching materials so the students can continue to learn about grains and reinforce what they have learned throughout the day. The Kids Growing With Grains program has been adapted and taken directly to schools by Extension faculty to share the message that grains are a part of the a healthy, balanced diet.

3) **Montgomery County Adventures in Science** - is a hands-on educational program for children ages 8-14. It is a partnership between Adventure In Science, Inc. and the University of Maryland Extension 4-H program.

4) Maryland's **Food Supplement Nutrition Education (FSNE)** offers nutrition education programs to help Supplemental Nutrition Assistance Program (SNAP) households and those eligible for SNAP. FSNE programs are provided at no cost to support the work of community agencies serving SNAP-eligible individuals and families, such as literacy centers, local food banks, soup kitchens, WIC offices, senior centers, community centers, neighborhood groups, and homeless shelters. Many materials are available in both English and Spanish. FSNE programs reach students, teachers, and

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parents in low income communities including after-school sites, summer meal programs and public schools where 50% or more students qualify for free or reduced-price school lunch. The goal of the FSNE school-based programs is to integrate key nutrition messages into the school curriculum, policies, the lunchroom, and family shopping and meals.

**5) Baltimore County Tech Wizards** - A Science, Engineering and Technology (SET) Mentorship program for youth in “at-risk” communities. This program started in 1998 as a citywide collaborative between 4-H youth and adult leaders, agencies, and community stakeholders. Partnership to strengthen communities, and increase leadership opportunities for youth 12-18.

## APPENDIX D

### Some examples of how the subject of Agriculture is delivered in school systems

#### Maryland State Department of Education:

##### *Division of Curriculum, Assessment, and Accountability:*

- **Science:** The Next Generation Science Standards address agriculture through the Earth and Human Activity standard which begins in grade 5 and continues through high school.
- **Environmental Science:** Courses include agriculture in the context of human impact.
- **Social Studies:** Standards address geography in geography and economics with indicators that run throughout the curriculum on all grade levels. The new C3 standards are very broadly written so that curriculum writers can work content into the process. For example: Geography: Explain how cultural patterns and economic decisions influence environments and the daily lives of people in both nearby and distant places.

##### *Division of Career and College Readiness:*

- **Curriculum for Agriculture Science Education (CASE):** This is a national program of study that offers students a rigorous curriculum and incorporates the National Academic Standards and Agriculture Food and Natural Resources (AFNR) Content Standards. Students learn about all aspects of agricultural sciences and may take additional courses based on their area of interest. Courses offered as part of the program include: Introduction to Agriculture, Food and Natural Resources; Principles of Agricultural Sciences – Plant; Principles of Agricultural Sciences – Animal; Animal and Plant Biotechnology; Food Science and Safety; and Agricultural Business, Research and Development. The program offers students the opportunity to earn college credit upon successful program completion.
- **Horticultural Services: Certified Professional Horticulturist (CPH):** This program of study is based on requirements for the Certified Professional Horticulturist (CPH) certification used by the Maryland "Green Industry." Students complete a sequence of courses which include: Introduction to Environmental /Plant/Animal Science, Foundations of Horticulture, Plant Production, and Landscape Design and Management. Students have the opportunity to earn the Student-Level CPH certification by taking and passing the industry exam.

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- **Environmental Studies/Natural Resources:** This program of study covers both environmental and natural resource management technologies and current issues related to these fields of study. This program incorporates green technologies and the impact of today's environment on our natural resources. The program includes an emphasis on research and the ethics involved in making decisions that impact our ecosystem. Students engage in technical research and writing as it relates to real-world problem solving. Students earn college credit through articulation agreements with Maryland colleges.

## APPENDIX E

### Strengths, Weakness, Opportunities and Threats Summary

#### **STRENGTHS**

Broad standards

Flexibility

Diversified

Agriculture is a science

Agriculture is a vehicle to teach other content, e.g., math, social studies, science, culinary arts and health; basically, can be applied to any field

Curriculum is available

Existing programs including:

- FFA
- UMD Extension
- Master Gardener
- 4H

Natural progression/structure of courses

Dual enrollment and certificate programs

Building capacity (youth and adult)

Use of technology

MAEF goes out to educate throughout the State, to encourage the infusion of agriculture from K-12 and into post-secondary

MSDE support of CASE

Local schools and Local Education Agencies (LEAs) have a high level of control over what is taught in schools

Niche agriculture in Maryland; local sourcing

No farms equals no food

#### **WEAKNESSES**

Not required in school

Volunteers are needed

Exposure to agricultural diversity is difficult

Agriculture has the stigma of the “blue jeans farmer”

FFA farm required

Teacher training

Teacher attitudes

Students are far removed from agriculture

Perception of agriculture is of only production agriculture

No farms/no food disconnect

Lack of/limited funding

Lack of agriculture community collaboration

Lack of integrating agriculture into non-agriculture classes – only agriculture-interested students take agriculture



Lack of opportunities for agriculture professional development  
Agriculture is not seen as a science  
Middle school students aren't exposed to agriculture as a career  
Most teachers don't recognize the career opportunities in agriculture for students  
Local schools and LEAs have a high level of control over what is taught in schools

## **OPPORTUNITIES**

Develop a consistent thread through K-12  
Integrate turf grass and sports medicine into agriculture education  
Teachers can teach concepts involving agriculture  
Critical thinking skills improve through the realization that everything is interconnected  
Integrate FFA students with other groups such as business clubs  
Strengthen relationship between K-12 and university  
Provide access to agriculture curriculum to teachers, e.g., using Georgia's curriculum  
Local product into school lunches so teachers can expand agriculture opportunity  
School gardens  
Building capacity  
Use of technology  
Collectively and collaboratively work together  
Raise awareness of agriculture in the Next Generation Standards  
Catering to local needs (economic development)  
Expand vision/understanding to include vet science, turf, food, science, nutrition, food preservation, food safety, and the environment  
Advocate for agriculture policies  
Bridge gap between agriculture and environmentalism  
Find agriculture scholarships  
Provide internships (international)  
FFA – pals program  
CCRS  
Literacy is content-free  
Disciplinary literacy C3  
Shift: not a new cost  
Driving question can have agriculture focus (Blackboard resource bank)  
Marketing  
Show examples, not the wrong examples  
Videos  
Examples of lessons  
Timing: expose and recruit in middle school

## **THREATS**

Local (re: building) leadership controls what is taught  
Funding  
Constant tug of war between farms and environmental groups  
Don't have curriculum infusion of agriculture

Teacher overload  
Anti-production agriculture movement  
Lack of understanding of modern agriculture  
Not a curriculum priority  
Other priorities for funding in science – agriculture is not included (ex., climate change)  
Professional Development competes with other subjects  
Less professional development in agriculture  
Lack of time  
Testing  
Agriculture classes assigned to unwilling students