2012 University of Maryland and University of Maryland - Eastern Shore Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The 2012 Accomplishment Report consists of the University of Maryland Extension (UME), Maryland Agricultural Experiment Station (MAES), and Agricultural Experiment Station (AES) results and accomplishments. UME and MAES at the University of Maryland College Park (UMCP) are in partnership with AES at the University of Maryland Eastern Shore (UMES), and, as such, they coordinate their research and extension activities to the maximum extent possible.

In 2009, UME developed a strategic plan to reflect the priorities of the University of Maryland and the National Institute of Food and Agriculture. This plans provides the framework for the 2012 Annual Report of Accomplishments. Similarly, MAES and AES developed its POW for 2013-2017 using the framework identified by NIFA. However, UME is now underway with a new strategic plan that will frame the 2015-2020 Plan of Work.

The plan for UME emphasizes key outcomes, impacts in critical areas, and "marshaling our intellectual resources" into nonformal educational programs that work together to deliver measurable results for the economy, the environment, and the community. This approach parallels that of UMCP, UMES, MAES, AES, and the College of Agriculture and Natural Resources to achieve impact on the big societal issues important to Maryland and, ultimately, to the global community.

The UME impact areas (referred to as Initiatives 1-4) represent major programmatic initiatives that UME directs resources to accomplish. These impact areas are a broad-based method of dividing the critical needs identified by the planning process into manageable units. Key outcomes are the goals within each impact area. Impact leadership teams consist of field-based Extension Educators, Extension Specialists, and Faculty Extension Assistants who work together to provide overall statewide leadership for programmatic efforts. These teams are responsible for collectively achieving the goals, measuring the impacts using suitable evaluation methods and tools, and reporting findings to stakeholders. Impact teams are linked to each other through common target and primary audiences served, the topics and subjects taught, and outcomes and impacts achieved. Impact leadership teams, across the major programmatic initiatives, develop signature programs that are replicable, measurable, and recognized at the state and national levels.

The MAES and AES coordinates its research projects in the challenge areas identified by the USDA-NIFA. Its research focus ranges from plant and animal genomics to nutrients, health, environment, and economics of production systems. Both basic and applied research are conducted by the faculty to cover the topics of important value to animal and plant production systems with both environmental and economic sustainability.

The four major program areas in the UME and MAES strategic plans are:
Initiative 1: LOCAL FOOD & AGRICULTURE SYSTEMS
Key Outcome: Agriculture and food production will be sustainable and profitable and produce a safe, abundant, affordable, and accessible food supply.
This initiative is reported under Planned Program, "Global Food Security and Hunger."
Initiative 2: ENVIRONMENT AND NATURAL RESOURCES

Key Outcome: Individuals and communities will become stewards to manage the environment for the mutual benefit of people, ecosystems, wildlife, natural resources, and economic interests.
This initiative is reported under Planned Programs, "Climate Change" and "Sustainable Energy."

Initiative 3: HEALTHY LIVING

Key Outcome: Youth, individuals, and families will make informed decisions about their health, finances, food, housing, and overall well-being.
This initiative is reported under Planned Programs, "Childhood Obesity," "Food Safety," and "Family & Community Resiliency."

Initiative 4: RESILIENT COMMUNITIES

Key Outcome: Improve human capacity to achieve desired community outcomes and be prepared to respond to uncertainties of economics, health, climate, and security.
This initiative is reported under Planned Programs, "Childhood Obesity, Food Safety," and "Family & Community Resiliency."

Total Actual Amount of professional FTEs/SYs for this State

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	80.0	15.0	54.0	15.0
Actual	80.0	15.0	54.0	12.2

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

The merit review process for UME faculty occurs annually when the faculty member is formally evaluated by the Program Leader (Assistant Director). The AGNR Program Leader evaluates AGNR Educators and Specialists; FCS Program Leader, the FCS Educators and Specialists; and the 4-H Program Leader, the 4-H Educators and Specialists. Input is obtained from the County Extension Director (CED) or Area Extension Director (AED). Emphasis is placed on program impacts and the difference made to constituents and the residents of Maryland during the preceding 12 months. Each faculty member is evaluated on individual merit. Documents used for the merit review are approved Individual Extension Plan (IEP), Curriculum Vitae, MCERS reports, and Teaching Effectiveness Summary.

All research faculty have a departmental home, and while there are subtle differences between the departments, they all have a peer-review system wherein assigned faculty or a faculty committee review the annual performance criteria of each faculty member and assign a merit ranking. These criteria, from a research perspective are evaluated, in general, on grantsmanship, publications, the quality of the journal (based on a citation index), and invited and/or contributed scientific talks and seminars. These are also the same criteria that are used to evaluate promotion and tenure decisions. The peer committee recommendations are reported to the respective department chair who provides his/her input and then

provides a final ranking and conducts the annual review. This process is followed for tenured, tenure-track, and research faculty appointments.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups
- Survey of selected individuals from the general public

Brief explanation.

Stakeholder participation is encouraged through local Extension Advisory Councils, 4-H Club leaders (volunteers), and various surveys targeted to UME clients. The UME customer satisfaction survey is used to insure that existing stakeholders are being heard. Social media strategies are also now being used to solicit feedback (Facebook, web sites, blogs). In 2013-134 feedback sessions will be held throughout the State of Maryland to solicit feedback for the new 2014-18 strategic plan.

The administrative officers of the MAES, AES, and UME sit on and attend a wide array of committees with the State's agricultural leaders. Such continuous contact with the agricultural leadership, including the Maryland Secretaries of Agriculture, Natural Resources and Environment, provides additional contact to keep current the research and education issues examined by research and extension in the State's two land-grant universities. The groups include the Maryland Agricultural Commission, the Maryland Grain Producers Association, the Delmarva Poultry Industry, the Southern Maryland Agriculture Commission, the Maryland Association of Soil Conservation Districts, Department of Housing and Community Development, Maryland Department of the Environment, and many other similar groups. Both research and extension faculty also seek stakeholder inputs through their participation and presentation of their projects to stakeholder audiences in state, regional, and national workshops and conferences.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

End-of-class surveys are used to gather input from individuals attending UME workshops and other events. In addition, follow-up surveys are conducted with stakeholders.
The UME Facebook page is used as a method to solicit feedback from our stakeholders.
The College of Agriculture and Natural Resources utilizes a Dean's Leadership Council consisting of a broad cross-section of agricultural industry leaders to provide input on major directions for the College's research, teaching and extension agenda. The Advisory Council meets periodically to discuss rising issues in the State.
The administrative officers of the MAES, AES, and UME sit on and attend a wide array of committees with the State's agricultural leaders. Such continuous contact with the agricultural leadership including the Maryland Secretaries of Agriculture and Natural Resources and Environment provides additional contact to keep research and education issues examined by the research and extension in the State's two land grant universities. The groups include the Maryland Agricultural Commission, the Maryland Grain Producers Association, the Delmarva Poultry Industry, the Southern Maryland Agriculture Commission, the Maryland Association of Soil Conservation Districts, Rural Maryland Council, MARBIDCO, and many other similar groups.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

Brief explanation.

UME draws upon the expertise of approximately 145 UME Educators, Specialists, and administrators in ongoing, informal needs assessment. UME field-based educators solicit feedback from local Extension Advisory Councils and other stakeholder groups. Survey work with all groups participating in programs is performed on a regular basis to assess needs. Analysis of secondary data for Maryland is also used, including the updated data from the 2010 U.S. Census, USDA National Agricultural Statistics, Maryland Departments of Planning, Agriculture, Natural Resources, Economic Development, and Maryland Department of Health and Mental Hygiene (and many more) and environmental scanning at the national, regional, state, and local levels.

MAES and AES have identified state agencies such as the Maryland Department of Agriculture, Maryland Department of Natural Resources, and Maryland Department of Environment as stakeholders for the important role that they play in economics, environmental, diseases, and public policies related to diverse land uses. MAES and AES scientists also have identified USDA-ARS

scientists from Beltsville, Maryland, and State College, Pennsylvania as stakeholders due to their common research interests. In addition, our own UME educators are the best research stakeholders because they often use the results of research conducted by the MAES and AES scientists to respond to questions from the public across the state. Therefore, MAES and AES collect input from all these entities by participating in joint committee meetings and other related communication platforms (e.g., workshops, conferences, etc.). MAES has also formed a Faculty Research Council composed of both research and extension faculty that will serve as another body of stakeholder input to identify research needs in 2012 and beyond.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other (Strategic Plan Development)

Brief explanation.

This information was used to: Set program priorities for our strategic plan 2009-2013; determine statewide staffing plans for UME; develop new job descriptions for county and regional extension positions; develop new initiatives for the College and UME; allocate financial resources, primarily operating expenses for program and curriculum development; and, to assist in revamping strategic initiatives as needed to deal with current budgetary shortfalls and staffing challenges.

MAES and AES used the information obtained from the stakeholders to focus on research issues that are important to the state with respect to production, marketing, economics, public-economic-environmental policies, biotechnology, ecosystem services, animal and human health, energy issues, etc. This information, combined with the national priorities set by USDA-NIFA was used to set the research priorities and monitor progress.

Brief Explanation of what you learned from your Stakeholders

UME, MAES, and AES are still vital to the citizens of Maryland. The agriculture community requested that UME spend more time in community resource and economic development, primarily providing support for the small and beginning and young farmers. Topics included: Business and market plan development; Inter-generational transfer of assets; Niche markets; Home based businesses; Rural urban interface issues; and Agricultural awareness. In order to meet this need, there was support for the establishment of a Maryland Rural Enterprise Development Center (MREDC). Two tenure-track educators were hired to deal specifically with community resource and economic development issues in Maryland.

In 2012, the demand continued for agricultural literacy, including understanding the national, state, and local food systems. Maryland's citizens want to know where their food comes from and how to prepare it in ways that are healthy and affordable. In addition, customers continue to ask for information on growing home gardens and food preservation. Therefore, an agricultural literacy program for school-age children, "AGSploration" has been developed and delivered in class rooms across Maryland. The UME Grow It/Eat It program continues to attract many first-time gardeners who want to grow their own produce. The Grow It/Eat It network (web-based) now has almost 4,000

members. A resurgent interest of home food preservation was expressed by Maryland residents and UME responded with a program (Grow It, Eat It, Preserve It) to teach people how to preserve their own food. An Urban Agriculture Extension Educator was hired to meet the ongoing demands for agriculture education in the northern region of Maryland, which includes the City of Baltimore.

MAES and AES researchers in cooperation with the UME educators learned that their research should focus on issues needing answers through research; thus, they focused on topics of both state and national importance. Topics included the development of new BMPs to reduce negative agricultural impacts on water quality, especially the Chesapeake Bay; ecosystem health using bioindicators, development of new varieties of crop seeds that are disease resistant; genomics on plants and animals for efficient storage of nutrients and reduction of such nutrients as phosphorus in the animal waste, thus helping to minimize nutrient loading to stream systems and the Chesapeake Bay via runoff; development of bioenergy using new technologies such as anaerobic digesting of animal waste, identification of grass genotypes that are non-food sources, and combustion of biomass such as switch grass, etc.; study of the H1N1 virus and its vector of transmission; and alternate uses of tobacco such as pharmaceutical purposes.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
3295990	1313743	3032424	1505898

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3295991	1313742	2122697	1057229
Actual Matching	3295991	1313742	2122697	1505898
Actual All Other	3295991	1313742	2122697	0
Total Actual Expended	9887973	3941226	6368091	2563127

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	791033

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%	10%	15%	20%
205	Plant Management Systems	10%	10%	10%	20%
216	Integrated Pest Management Systems	15%	10%	10%	15%
311	Animal Diseases	10%	10%	10%	10%
503	Quality Maintenance in Storing and Marketing Food Products	5%	10%	5%	0%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	15%
602	Business Management, Finance, and Taxation	10%	10%	10%	0%
604	Marketing and Distribution Practices	10%	10%	10%	0%
608	Community Resource Planning and Development	10%	10%	10%	10%
704	Nutrition and Hunger in the Population	10%	10%	10%	10%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	24.0	4.0	16.0	4.0
Actual Paid Professional	24.0	4.0	16.0	0.9
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
988797	394123	1516212	149055
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
988797	394123	1516212	374754
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
988797	394123	1516212	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• UME, MAES, and AES will have a combined focus to ensure that Maryland agriculture and food production will be sustainable and profitable and produce a safe, abundant, affordable, and accessible food supply.
• Research coordinated through MAES and AES on crop and animal breeding, parasitology, specialty crops, pesticides, market analysis, economic sustainability, and policy analysis will be performed, while UME will be involved in local and regional efforts to assist agricultural and natural resource entrepreneurs.
• Research conducted through MAES, AES, and UME will generate vital information to increase productivity using genomics, breeding, and adaptation of alternate crops with economic and environmental sustainability.
• Through UME's Impact Teams and MAES's research projects, the following planned program activities will be emphasized: IPM; Value Added & Speciality Crops; Grow It-Eat It; Annie's Project; Best Management Practices in Crop and Animal Agriculture; Technologies for the Genetic Improvement of Crops and Animals; Agronomic Fruit & Vegetable Production; Dairy Analysis; and Small/Beginning Farmers Program.
• On-line educational programs, field trials, twilight tours, seminars, workshops, on-farm research & demonstrations and individual farm consultations will be used to educate Maryland farmers, Agriculture industry professionals, Soil Conservation District personnel, USDA-NRCS conservationists and extension faculty.
• New research and technologies developed by the MAES and AES will be transferred via UME on-farm demonstrations and twilight tours.
• Training programs will be developed to improve nutrient management practices, IPM, diagnostic skills, identification and control of invasive species, water management practice improvements and reductions, biosecurity and animal health.

2. Brief description of the target audience

- Food Stamp Recipients
- Limited Income Families
- School age youth on free-reduced meals
- New immigrants
- Students

- Plant growers and Breeders
- Retailers
- Producers
- Female Farmers

3. How was eXtension used?

UME educators are involved in several eXtension communities of practice (CoPs).

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1861680	80000	27743	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	25	80	105

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- IPM (Green Industry & Agronomic Crops): Fact sheets, short courses, workshops, field trials, twilight tours, curriculum, websites, grants awarded.

Year	Actual
2012	30

Output #2

Output Measure

- Community Resource & Economic Development: Publications, seminars, workshops, grants and curriculum developed.

Year	Actual
2012	35

Output #3

Output Measure

- Biosecurity, BMP's and Animal Health: In-service training, seminars, publications, grants, presentations, websites, research trials, and workshops.

Year	Actual
2012	25

Output #4

Output Measure

- Pasture Management, Rotational Grazing & Dairy Analysis: Pasture walks, variety trials, in-service training, grants, publications, budgets, websites, farm analysis performed & workshops

Year	Actual
2012	50

Output #5

Output Measure

- Grow It-Eat It: Number of workshops, publications and grants.

Year	Actual
2012	170

Output #6

Output Measure

- Agronomic, Fruit & Vegetable Crop Production: Number of variety trails, twilight tours, seminars, workshops, publications, and grants.

Year	Actual
2012	80

Output #7

Output Measure

- Small/Beginning Farmers and Annie's Project: Number of workshops, number of participants; publications, grants and new partnerships.

Year	Actual
2012	400

Output #8

Output Measure

- Global Agriculture & Hunger: Research studies

Year	Actual
2012	1

Output #9

Output Measure

- Aquaculture: Research studies

Year	Actual
2012	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	IPM (Green Industry & Agronomic Crops): Number of IPM scouts and producers that can identify threshold level; number of pest management programs; Number implementing research based recommendations; certification in Pesticide Safety; field trails.
2	Community Resource & Economic Development: Number of business people, advisory groups, development agencies, rural leaders and potential farmers interested in developing new AGNR businesses; Favorable policies created to encourage AGNR enterprises; New AGNR businesses established; Business and marketing plans developed; Number of Communities integrating UME information for land use decisions and improved growth management concepts; Pubs developed; Number of people downloading AGNR enterprise information from MREDC web site; and Regional collaborations.
3	Bio-security, BMPs and Animal Health: Number of educational seminars held for producers, allied industry personnel and government workers; number of producers implementing biosecurity and BMP measures; new training curriculum developed; and number of resources and collaborative efforts with Extension Disaster Education Network (EDEN).
4	Farm Management & Agricultural Profitability: Number of farmers/livestock owners adopting best management practices; Number of farmers/livestock owners adopting rotational grazing strategies; Number farmers (Dairy, Beef, Equine, Sheep/Goats) increasing profitability as a result of these programs; new variety trails; Extension, NRCS and SWCD personnel trained; new practices (BMPs & rotational grazing) recommended; and number of dairy farmers implementing changes as a result of Dairy Analysis.
5	Home Food Production: Number of Master Gardeners trained; Number of people establishing new back yard gardens; number of new community supported agriculture (CSA) gardens established; and Number of new "Salad Tables" established.
6	Agronomic, Fruit & Vegetable Crop Production: Number of producers attending programs, twilight tours and workshops; Number producers/growers developing basic diagnostic skills in identifying invasive insects, diseases and weeds; Number of producers who write and update their own nutrient management plan; Number of producers adopting production management practices that will improve their profitability; Number of producers selling products at local markets; Number of producers who increase profitability; Number adopting field research practices dealing with improved crop varieties, invasive species, weeds and diseases; Number adopting methods to be more efficient in their water use in livestock and crop production.
7	Small/Beginning Farmers (Agronomic & Green Industry: Number of new farm enterprises established as a result of our programs; Number successfully completing Annie's Project; Number of women who have implemented change in their family farming operation after attending Annie's Project; Number of new/beginning farmers and Annie's Project graduates participating in additional UME AGNR programs, twilight tours and workshops; and number of farmers who become certified in nutrient management planning and/or pesticide safety.
8	Aquaculture Research

Outcome #1

1. Outcome Measures

IPM (Green Industry & Agronomic Crops): Number of IPM scouts and producers that can identify threshold level; number of pest management programs; Number implementing research based recommendations; certification in Pesticide Safety; field trails.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nursery, greenhouse and landscape management is Maryland's second largest agricultural industry (valued at $1.96 billion in 2008). This industry requires cost-effective and environmentally safe materials and methods to control insects and diseases and to efficiently use water and nutrients. The IPM program was developed to help Maryland greenhouse and nursery managers stay on top of current insect, disease and fertility problems with greenhouse crops and to sustain and expand the use of IPM techniques.

What has been done
Stakeholders were trained in how to use ecologically based IPM strategies for managing key physiological disorders, diseases, nematodes, insects, and weed pests associated with vegetable plantings. MAES developed practical programs for educators, growers, and their advisors that are environmentally sound, healthy, socio-economically viable and have practical applications for all vegetable growers. Demonstrated the use of weather-based fungicide applications that improve spray timing, maintain disease control and yield while reducing fungicide applications by 40-50%.

Results
Our research has shown that pumpkins grown on no-till cover crops have reduced levels of fruit rot including black rot (Didymella bryoniae) and Plectosporium blight (Plectosporium tabicinum). Growing pumpkin cultivars that have resistance to powdery mildew can reduce the amount of fungicide needed for a healthy crop by 50%. We are developing advanced sensor technology to precisely monitor plant water use, thereby affording better control of irrigation water applications

and increasing the efficiency of water and nutrient use in nursery and greenhouse operations. By using cost-effective networks of soil and environmental sensors, we are providing growers with real-time remote information about soil moisture and plant water use on their computers and smart phones.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Community Resource & Economic Development: Number of business people, advisory groups, development agencies, rural leaders and potential farmers interested in developing new AGNR businesses; Favorable policies created to encourage AGNR enterprises; New AGNR businesses established; Business and marketing plans developed; Number of Communities integrating UME information for land use decisions and improved growth management concepts; Pubs developed; Number of people downloading AGNR enterprise information from MREDC web site; and Regional collaborations.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Surveys of rural communities indicate an overwhelming need for education programs in financial issues, business planning, sustainable agriculture, entrepreneurship, value-added, alternative enterprises/crops, land use planning, farm profitability and support for small and beginning farmers, rural-urban interface conflicts and AGNR marketing.

What has been done
Conducted statewide seminar, "Maximizing the CSA Marketing Model" to provide training for existing and potential CSA farmers. Identified new trends and opportunities for CSAs. Developed a new fact sheet for CSAs as a marketing model. Identified and trained core group of CSA mentors to offer consultation. Worked with a group of eleven fruit and vegetable producers in Garrett County to organize a producer cooperative. UMES offers the annual Small Farm Conference and bus tour to explore successful farm operations.

Results
Start-up CSAs in Maryland have the technical and business resources to grow their business and be profitable through the Maryland Rural Enterprise and Development Center. Small producers in Garrett County delivered $28,000 of local produce to twelve restaurants and grocery stores in 2012. The Small Farm Program has reached over 500 clients to increase farm profitability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Bio-security, BMPs and Animal Health: Number of educational seminars held for producers, allied industry personnel and government workers; number of producers implementing biosecurity and BMP measures; new training curriculum developed; and number of resources and collaborative efforts with Extension Disaster Education Network (EDEN).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Broiler (meat chickens) production is the largest agricultural revenue generator in Maryland. Approximately 40 percent of the cash farm income in Maryland is from broiler production. Maryland produced 300,500,000 broilers (1,433,400,000 pounds) in 2010 and ranked eighth among the states in the number of broilers produced. In 2010, Maryland broiler production value was $690,899,000.

What has been done
Poultry Farm Management Training & Certification for New Growers was developed for potential poultry growers as part of the New Source Performance Standard for EPA's CAFO. Quarterly commercial poultry
workshops have also been held since 2008. Research has worked to establish a novel vaccination strategy against porcine reproductive and respiratory syndrome in pigs targeting memory cytotoxic T lymphocytes (CTLs).

Results
Over 50 percent of commercial poultry producers have used the research-based Extension information to improve flock performance,12% increased flock income, and 48% maintained compliance with CAFO and MAFO regulations. Research results will provide a novel strategy for PRRS vaccination, which is the number one devastating infectious disease hurting the swine industry. In addition, development of new diagnostic reagents in the detection of CTL response to PRRSV infection is in urgent need.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
601	Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Farm Management & Agricultural Profitability: Number of farmers/livestock owners adopting best management practices; Number of farmers/livestock owners adopting rotational grazing strategies; Number farmers (Dairy, Beef, Equine, Sheep/Goats) increasing profitability as a result of these programs; new variety trails; Extension, NRCS and SWCD personnel trained; new practices (BMPs & rotational grazing) recommended; and number of dairy farmers implementing changes as a result of Dairy Analysis.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Urban sprawl leads to high land values, placing added pressures for decreasing farmland and increasing scrutiny on environmental issues such as water and air quality. Our farmers must become efficient in reduced labor cost, reduced feed cost, and increased revenues from value-added products to have profitability.

What has been done
The Southern Maryland Agricultural Development Commission (SMADC)and UME obtained funds to purchase freezer trailers to transport meats in Southern Maryland from farms to slaughter houses. Research has focused on developing wheat germplasm with competitive grain yield, disease resistance and quality and on developing Fusarium head blight resistant germplasm utilizing mostly US native resistance through traditional breeding and additional selection using molecular markers.

Results
Prince George's county farmers rented the freezer trailer almost 20 times, with a market value of almost $25,000 in livestock products. A management intensive grazing (MIG) program within dairy systems was developed. Detection of a novel Quantitative Trait Locus for FHB resistance on the wheat chromosome 2DS is important for breeding for FHB resistance. This will be used for DNA marker assisted selection in our breeding program and also in other soft red winter wheat breeding programs to enhance the genetic resistance of wheat to FHB. The advanced line MD07026-H2-7-12-9 is the product of DNA marker selection combining several favorable alleles for diasease resistance in a single package. This line may have a significant impact as a new variety for Mid-Atlantic wheat growers by reducing their disease risks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
311	Animal Diseases
503	Quality Maintenance in Storing and Marketing Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

Home Food Production: Number of Master Gardeners trained; Number of people establishing new back yard gardens; number of new community supported agriculture (CSA) gardens established; and Number of new "Salad Tables" established.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Interest in home and community food production has grown over the past two years in Maryland due to the 2008 recession, and a growing public desire for locally grown foods. Less than 30% of adult Marylanders consume five servings of fruits and vegetables each day. Many Marylanders desire fresh, locally grown vegetables, either to purchase or to grow themselves, but lack the space, time, or knowledge to create and maintain a garden of their own.

What has been done
Grow It Eat It has become one of the top three Master Gardener programs and has helped attract new MG trainees. In 2012, the Grow It Eat It campaign was directed by a team led by the Extension Specialist. The team included HGIC collaborators, MG Coordinators, GIEI Team Leaders, and dozens of MG volunteers. GIEI teams of MGs continued to operate in 13 counties and Baltimore City, with support from HGIC staff. 129 classes taught by MGs to approximately 3,000 residents in 2012.

Results
Approximately 816 new gardeners registered their gardens and joined the GIEI Network in 2012 bringing the total to 10,044 gardeners (a 9% increase over 2011). Sixteen GIEI video clips featuring the Extension Specialist received 63,270 views in 2012. Nineteen online food gardening fact sheets authored by Extension Specialist received 159,952 views. Approximately 229,558 website user sessions and 183,339 unique visitors in 2012, an 82% increase over 2011, and a doubling of the increase experienced from 2010 to 2011. 58% of GIEI web visitors are out-of-

state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems
503	Quality Maintenance in Storing and Marketing Food Products

Outcome #6

1. Outcome Measures

Agronomic, Fruit & Vegetable Crop Production: Number of producers attending programs, twilight tours and workshops; Number producers/growers developing basic diagnostic skills in identifying invasive insects, diseases and weeds; Number of producers who write and update their own nutrient management plan; Number of producers adopting production management practices that will improve their profitability; Number of producers selling products at local markets; Number of producers who increase profitability; Number adopting field research practices dealing with improved crop varieties, invasive species, weeds and diseases; Number adopting methods to be more efficient in their water use in livestock and crop production.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maryland is home to a robust agriculture industry with a proud tradition of supporting economic development, providing safe and affordable foods and maintaining essential open space and working lands for all to enjoy. Maryland farmers tend 1.25 million acres of grain crops, 75,000 acres of vegetable and fruit crops, 260,000 acres of forage crops and pasture acreage. Farmers need to be profitable through crop production efficiency and land management.

What has been done

In 2012, 11 agronomy days across Maryland reached over 640 farmers. Research has focused on developing wheat germplasm with competitive grain yield, disease resistance and quality. The focus is on developing Fusarium head blight resistant germplasm utilizing mostly US native resistance through traditional breeding and additional selection using molecular markers.

Results

The average agronomy day participant reported an increase in profitability between $23.12 and $32.12 per acre as a result of attending an agronomy day meeting. Research produced a linkage map from the doubled haploid population of MD01W233-06-1/SS8641 using 1786 polymorphic SNPs from the Illumina Infinium chip, one morphological marker and 29 polymorphic Simple Sequence Repeat (SSR) markers that did not have significant segregation distortion. When the phenotypic data for Fusarium Head Blight (FHB) from Maryland and North Carolina was mapped, a novel Quantitative Trait Locus for FHB resistance was detected on chromosome 2DS near the SSR marker gwm261. A new wheat advanced line (MD07026-H2-7-12-9) that combines 3 stacked genes for FHB, resistance to leaf rust, resistance to powdery mildew, early heading date, high test weight.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #7

1. Outcome Measures

Small/Beginning Farmers (Agronomic & Green Industry: Number of new farm enterprises established as a result of our programs; Number successfully completing Annie's Project; Number of women who have implemented change in their family farming operation after attending Annie's Project; Number of new/beginning farmers and Annie's Project graduates participating in additional UME AGNR programs, twilight tours and workshops; and number of farmers who become certified in nutrient management planning and/or pesticide safety.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the 2007 US Agriculture Census, small-scale agriculture is on the rise. As demands for local, fresh, and safe food continue to increase among rural and suburban communities, younger and demographically diverse populations are expressing a desire to farm. In addition, the number of women farmers continues to increase, according to the 2007 Agriculture Census.

What has been done

The Small Farm Training Institute provides horticultural training and marketing of products to urban farmers who are new to farming and who have little or no agricultural experience. Annie's Project has expanded into a statewide program and has reached over 350 women and their farm operations. The University of Maryland Extension (UME) is a partner in training and business planning assistance to current and prospective shellfish growers.

Results

The UMES Small Farm Extension Program has designed and supervised construction of a new generation of high tunnels for seven non-profit organizations and interested private companies. With local technical support through Baltimore City Extension, these seven non-profit groups and Big City Farms, LLC, have produced and marketed over 150,000 pounds of fresh local products through grocery stores, Whole Foods, restaurants, and farmers markets last year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems
311	Animal Diseases
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

Aquaculture Research

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Striped bass spermatozoa are used to fertilize in vitro the eggs of white bass to produce the hybrid sunshine bass for the striped bass aquaculture industry. Few sources of striped bass juveniles are available that aren't obtained from wild-caught parents. Improvements to methods to cryopreserve sperm from genetically selected male striped bass should help producers make rapid increases, both biologically and economically, by expanding the seasonal availability of genetically improved fingerlings which will help lower costs of production.

What has been done
Studies have been conducted to determine the optimal freezing rate for the cryopreservation of striped bass sperm. The effects of freezing rate (-10, -15, -20 and -40 oC/min) on striped bass sperm gamete quality was examined utilizing Sybr-14 and propidium iodide to determine viability, cellular ATP concentration using a luciferin-luciferase bioluminescence assay and computer assisted sperm analysis to characterize sperm motion.

Results
Improved methods to cryopreserve striped bass sperm can be immediately used by the industry to conserve germplasm from genetically improved lines, supplement limited supplies of semen when spermiating males are difficult to obtain and allow selective breeding programs to expand. Isolation of RNA from striped bass sperm has far reaching implications for teleost male fertility but also is the foundational requisite for significant genomic and proteomic research that now appears promising for fish species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Urban sprawl and State Budgets)

Brief Explanation

Overall, we have been able to meet our strategic goals through the use of Impact Teams and more focused programs. We are also doing a better job at reporting impacts.

The recovering economy has allowed UME to hire seven new Extension Educators, with one specifically focused in Urban Agriculture.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In order to gauge the impact of agricultural education in Maryland, surveys were conducted using the automated clicker response system at the end of major conferences attended by agricultural producers. As an example, at the Southern Maryland Crops Conference, producers were asked "Based on the knowledge and skills you gained from Extension programming throughout the year, what might be the total value in dollars saved or dollars earned per acre ($/acre)". Respondents indicated an average return of $22.09 per acre. Producers were also asked "How many total acres do you farm?". Respondent's indicated an average of 364 acres per operation for a total acreage of 30,562 acres. The total value of Extension programming to those attending the conference was $675,113. Finally, producers were asked to estimate "How many total acres (wooded or tilled) will this programming help keep preserved for agricultural use?. Respondents indicated that the Extension programming helped preserve 62287 acres was farm or woodland.

The Oyster Education and Training project began in 2011 with five two-tank systems. First years production was an estimate 32 million seed oysters. Response from evaluations indicated that growers were pleased with the project but wanted more capacity. In 2012, with the increase in approved leases and increased demand from growers for quality seed, additional tanks were placed at two sites and two new sites were added. The total production increased to 242 million seed oysters.

This Spotted Wing Drosophila early detection proactive program alerted most of the

small fruit growers of Maryland and Delaware to the presence of this pest on their farms. An over average of fruit loss to the SWD is estimated at 25-35%. Without the early warning on each grower's farm the losses could have been 60-80%. This difference increased growers' net income by 35% and instead of a loss for the season they made money (although not as much as in previous years).

A survey was conducted with 7 of the Garrett Growers Cooperative members prior to the end of 2012. 86% of the farmers indicated they had increased the percentage of farm income from fruit and vegetables in the past two years. The farmers were asked to report the amount of fruit and vegetables sold to various outlets. Before the beginning of the SARE Grant only one producer sold 10% of their produce to wholesale outlets (restaurants and grocery stores). After participating in the project, the farms averaged 44% of their produce sold to wholesale outlets. 86% of the farms also indicated they had increased their sales of fruits and vegetables with two farms indicating they had greatly (over 50%) increased their sales.

End of class surveys asked Digital Farming workshop participants about actions they plan to take as a result of the session 94% will register their business on national mapping pages, 100% will download agriculture and business applications, 95% will market products through social media, 96% will increase farm efficiency by incorporating technology, 97% will increase their overall marketing capacity and 93% felt they could increase overall farm income. A blog has been created to stay in touch and share as technology and tools evolve.

A post Maryland-Delaware Hay Conference survey was conducted and 60 responses were collected. The survey showed that of that 45 of the 60 that responded managed pasture on nearly 6,000 acres and 38 managed over 3200 acres of hay ground. The survey also asked those that had attended previous conferences if they had implemented any new practices that made their farm more profitable as a result of attending the conference, 88% indicated they had implemented new practices and gave examples such as rotational grazing, adding water troughs and lane ways, etc. Participants were also asked how much profitability these new practices added to their yearly income. Thirteen respondents indicated a monetary value, 2 indicated between $250 and $500, 7 indicated $500 to $1000, 1 indicated $1,000 to $2500 and 3 indicated $2500 or more.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%	10%	15%	0%
111	Conservation and Efficient Use of Water	10%	10%	5%	10%
112	Watershed Protection and Management	15%	20%	10%	20%
123	Management and Sustainability of Forest Resources	5%	5%	5%	5%
131	Alternative Uses of Land	10%	5%	5%	15%
133	Pollution Prevention and Mitigation	10%	10%	25%	10%
205	Plant Management Systems	15%	10%	10%	20%
216	Integrated Pest Management Systems	10%	10%	10%	20%
403	Waste Disposal, Recycling, and Reuse	5%	10%	15%	0%
608	Community Resource Planning and Development	10%	10%	0%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	3.0	11.0	3.0
Actual Paid Professional	12.0	1.0	15.0	2.6
Actual Volunteer	16.0	3.0	11.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
659198	262748	363891	293695
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
659198	262748	363891	496894
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
659198	262748	363891	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• UME, MAES, and AES will have a combined focus to help producers plan and make decisions in adapting to changing environments, sustaining economic vitality, and taking advantage of emerging economic opportunities offered by climate change mitigation technologies.
• UME, MAES, and AES will also develop research and education programs that generate knowledge to develop agriculture systems that maintain high productivity in the face of climate changes and reduce greenhouse gas emissions.
• In an effort to meet these objectives, UME, MAES, and AES will develop research and action teams that will focus on: Alternative energy and biofuels; Aquatic resources; Biodiversity/ecosystem services; Energy conservation; Forest resources; Integrated Pest Management; Invasive and exotic species; Land Use; Nutrient management; Recreational resources; Waste management; Waste utilization and resource recovery; Watershed restoration; and Wildlife resources.
• UME, MAES, and AES will conduct workshops, demonstrations, symposia, twilight tours, forums and research to educate producers, farmers and citizens about adapting management practices to benefit the environment and minimize climate change impacts.
• MAES, AES, and UME will develop and expand collaborative research and education programs with partners and stakeholder and develop new web based and media educational materials.

2. Brief description of the target audience

- Maryland citizens;
- Master Gardeners and Naturalists;
- Land developer and owners;
- UME and MAES faculty;
- USDA-NRCS conservationists;
- Soil Conservation District personnel;
- MDA program staff;
- MDE program staff;
- Producers;
- Farmers;
- Nursery and Greenhouse industry personnel;
- Forest landowners;

- 4-H youth;
- County planning and zoning program staff;
- AGNR industry;
- Nonprofits;
- Appropriate state and municipal government officials;
- Primary and Secondary Science Teachers;
- Media; and
- Maryland homeowners.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	143870	286000	14743	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	3	24	27

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Nutrient Management Planning, Waste Management Systems, Composting and Water Resources (Agronomic, Livestock & Green Industry): Short courses; Workshops; Twilight tours; Field days; Seminars; In-service training; Grants; Publications; and Websites.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Chesapeake Bay, Water Resources, Nutrient Management and Composting (Residential): Water Resources-Short courses; In-service training; Volunteers trained; and New relationships, policy & technology developed.

Year	Actual
2012	478

Output #3

Output Measure

- Management and Sustainability of Forest/Wildlife Resources (Forest landowners, Forest Industry and Loggers): Publications; Workshops; Distance Education Courses; Field trials; Demonstrations; Grants; and Web sites.

Year	Actual
2012	2000

Output #4

Output Measure

- Alternative Crop Production: Workshops; Seminars; In-Service training programs; Variety trials; Field days; Twilight tours; Publications; Grants; and Participants in alternative/ethnic crop production programs.
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Nursery & Greenhouse Crop Production: Workshops; Seminars; Twilight tours; Field days; Grants; In-service training programs; Web sites; Publications; and Producers attending educational programs.
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Pesticide Safety Education: Workshops; Seminars; Demonstrations; Grants; Web sites; Publications; and Participants in educational/certification programs.
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- New Technologies-Using High Tunnels to Remain Competitive in a Global Market: Workshops; Field trials; Demonstrations; Twilight tours; Grants; Publications; and Participants in educational programs.
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Master Gardener Program: Workshops; Seminars; Advanced training; Grants; Publications; and Participants in educational programs.
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Nutrient Management Planning, Waste Management Systems, Composting and Water Resources (Agronomic, Livestock & Green Industry): Number of producers implementing nutrient management plans; plans written; Producers relate nutrient management to water quality; Producers trained in plan writing; Policy makers and farmers understand the scientific issues of land applied poultry litter and poultry stockpiles; Producers using compost technology; and Policy makers access UME information.
2	Chesapeake Bay, Water Resources, Nutrient Management and Composting (Residential): Number of lawn care companies reporting fertilizer use and eliminating P from maintenance; Adoption of composting; Water wells tested; Septic tanks improved; Number of citizens adopting practices of landscape ecology and understanding the relationship among pesticides, poor septic systems and environmental health.
3	Management and Sustainability of Forest/Wildlife Resources (Forest Landowners, Forest Industry & Loggers): Number of forest landowners and loggers gain knowledge of forest stewardship and practices; Joined forests associations; Understand wildlife damage control measures; Forest Stewardship Plans implemented; and Master loggers trained.
4	Alternative Crop Production: Number of farmers growing new alternative crops; New farm enterprises; Farm markets selling new alternative crops and/or value added crops; and New varieties researched.
5	Nursery & Greenhouse Crop Production: Number of IPM scouts and producers that can identify threshold pest levels; Research based recommendations implemented, such as efficiency of water use and energy; Certification in pesticide safety; Field trials developed; Nutrient management plans developed; Growers that adopt sustainable practices that will improve crops with reduced losses; Growers implementing sustainable practices that reduce losses and reduce environmental impacts; and New crop varieties planted based on UME/MAES research.
6	Pesticide Safety Education (Agronomic & Green Industry): AGNR producers/farmers/applicators that are certified in pesticide safety; Pesticide safety practices implemented such as wearing a respirator, gloves and showering after application; Increase in knowledge of IPM techniques; Extension programs that incorporate audience response system technology, such as "clickers" into PSEPs, thus enhancing the learning environment, stimulating deeper thinking and maximizing the likelihood of a positive behavioral change; and Producers that understand the health risks associated with pesticides and their application.
7	New Technologies in a Global Market: New high tunnels established; Producers who have implemented research based practices; New varieties established; Applied research- variety trials; Producers who have increased profitability as a result of installing high tunnels; Request for workshops, seminars and twilight tours; Producers who participate in USDA's high tunnel cost share program; and Cooperators in on-farm research projects.
8	Environmental Stewardship: Master Gardeners programs developed and delivered by MGs; Plant Clinics held; and MGs who participate in MD Master Naturalist Program.

Outcome #1

1. Outcome Measures

Nutrient Management Planning, Waste Management Systems, Composting and Water Resources (Agronomic, Livestock & Green Industry): Number of producers implementing nutrient management plans; plans written; Producers relate nutrient management to water quality; Producers trained in plan writing; Policy makers and farmers understand the scientific issues of land applied poultry litter and poultry stockpiles; Producers using compost technology; and Policy makers access UME information.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Maryland Water Quality Improvement Act requires Maryland farmers as well as green industry businesses to develop and follow nutrient management plans that are approved by the State of Maryland.

What has been done
MAES researchers are developing advanced sensor technology to precisely monitor plant water use, thereby affording better control of irrigation water applications and increasing the efficiency of water and nutrient use in nursery and greenhouse operations. By using cost-effective networks of soil and environmental sensors, we are providing growers with real-time remote information about soil moisture and plant water use on their computers and smart phones.

Results
During 2012, this research program reduced water use by 37% to 69% of current best management (multiple small cyclic) irrigation practices in a number of commercial operations. In one nursery where water is drawn from a river, halving water application rates would have saved over 43 million gallons water in 2012, and $6,500 in pumping costs. In the central valley of California, where water costs are typically $750 per acre-foot, the net cost of this saved water would have been at least $100,000, without accounting for any pumping, plant growth or any

other economic benefits. Simply put, the return on investment for the entire farm network (<$25,000) in this case would have been less than 3 months. In another container-nursery, the improvement of their irrigation practices using this technology resulted in a $1 per square foot economic benefit for Gardenia, a hard-to-grow species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Chesapeake Bay, Water Resources, Nutrient Management and Composting (Residential): Number of lawn care companies reporting fertilizer use and eliminating P from maintenance; Adoption of composting; Water wells tested; Septic tanks improved; Number of citizens adopting practices of landscape ecology and understanding the relationship among pesticides, poor septic systems and environmental health.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Many sources, including agriculture and urban ecosystems, are considered culprits for pollution of the Chesapeake Bay. Urban and suburban sprawl has led to the conversion of thousands of acres of native landscape into home lawns and gardens. This growth and change in the Chesapeake Bay watershed is typically accomplished without an understanding of how these landscapes are a part of the greater ecosystem, and environmental and ecological concepts are essential to prevent continued degradation of soil and water quality.

What has been done
A well water safety program was developed that addresses the knowledge gaps concerning private well use and maintenance, and provides related septic system education and water conservation strategies to residents that use private wells.

Results
Water samples are collected and analyzed for 7 biological contaminants, total dissolved solids, pH, nitrates and arsenic (the last two added due to local concerns of high concentrations). Researchers interpret test results, and participants learn about local groundwater conditions, treatment solutions for problems discovered, and household and backyard water conservation strategies. Home drinking water samples will be tested for pH, total coliform bacteria, fecal coliforms, E. coli bacteria, Enterococcus bacteria, Salmonella, nitrates, total dissolved solids, and arsenic.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Management and Sustainability of Forest/Wildlife Resources (Forest Landowners, Forest Industry & Loggers): Number of forest landowners and loggers gain knowledge of forest stewardship and practices; Joined forests associations; Understand wildlife damage control measures; Forest Stewardship Plans implemented; and Master loggers trained.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There are 157,000 private forest landowners in Maryland who own 78% of the forest resources, which provide forest products, wildlife habitat, recreation, open space and other benefits to all Maryland citizens. Only an estimated 6% have a written forest stewardship plan to guide their activities, and fewer than 10% seek the assistance of a professional forester before harvesting timber.

What has been done
UMES conducts small landowner forestry and conservation field tours on Maryland's Lower Eastern Shore to educate farmers about forest resource management strategies, various cost-share/conservation programs available from state and government (USDA) agencies, and way to manage their natural resources. The Maryland Woodland Stewards program educates forest landowners about forest stewardship, and the participants commit to 40 hours of extension work in the following year.

Results
2012 Maryland Woodland Stewards have so far contributed a total of 1560 volunteer hours related to the management of their land and assistance with the managements of others' land, and 300 hours in education and outreach, for a total of 1860 hours. The dollar equivalent of this contribution is more than $40,570.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
205	Plant Management Systems
608	Community Resource Planning and Development

Outcome #4

1. Outcome Measures

Alternative Crop Production: Number of farmers growing new alternative crops; New farm enterprises; Farm markets selling new alternative crops and/or value added crops; and New varieties researched.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Nursery & Greenhouse Crop Production: Number of IPM scouts and producers that can identify threshold pest levels; Research based recommendations implemented, such as efficiency of water use and energy; Certification in pesticide safety; Field trials developed; Nutrient management plans developed; Growers that adopt sustainable practices that will improve crops with reduced losses;

Growers implementing sustainable practices that reduce losses and reduce environmental impacts; and New crop varieties planted based on UME/MAES research.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Pesticide Safety Education (Agronomic & Green Industry): AGNR producers/farmers/applicators that are certified in pesticide safety; Pesticide safety practices implemented such as wearing a respirator, gloves and showering after application; Increase in knowledge of IPM techniques; Extension programs that incorporate audience response system technology, such as "clickers" into PSEPs, thus enhancing the learning environment, stimulating deeper thinking and maximizing the likelihood of a positive behavioral change; and Producers that understand the health risks associated with pesticides and their application.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

New Technologies in a Global Market: New high tunnels established; Producers who have implemented research based practices; New varieties established; Applied research- variety trials; Producers who have increased profitability as a result of installing high tunnels; Request for workshops, seminars and twilight tours; Producers who participate in USDA's high tunnel cost share program; and Cooperators in on-farm research projects.

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Environmental Stewardship: Master Gardeners programs developed and delivered by MGs; Plant Clinics held; and MGs who participate in MD Master Naturalist Program.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)
- Other (funding)

Brief Explanation

Overall, we have been able to meet our strategic goals through the use of Impact Teams and more focused programs. We are also doing a better job at reporting impacts. A strategic staff plan has been developed for UME that focuses on providing adequate geographic and programmatic coverage of tenure-track educators and faculty educator assistants. However, UME is still limited in climate change expertise and is working to develop that expertise among educators, specialists, and researchers.

The limitation for research has always been shortage of funds. Our faculty achieved excellent research findings in the area of climate variability and land use impacts on our water resources and the environment despite limited funds. Again, UME, MAES, and UMES need more positions and expertise in this area, which requires additional resources.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Nutrient Management Education participants were asked to report how training has impacted their farm business: 74% better manage nutrients, 67% keep better nutrient application records, 40% better estimate and apply manure, 45% maintain or improve condition of soil, and 86% meet regulatory requirements.

Seventy percent of participants in Nutrient Management Education have reduced the use of nutrients. On average, participants report a profit of $7.49 per acre through the use of best practices learned in Nutrient Management Education workshops.

Pesticide Private Applicators use information learned in class for crop production (81%), pesticide safety (88%), better recordkeeping (70%) and update on regulatory issues (72%). Pesticide Private Applicators 90% of participants report managing pesticides better and 69% report reducing the amount of pesticides used. Ninety-nine percent of the state's 6,200 farmers have nutrient management plans, which comprises 99.8% of the state's 1.3 million acres of crop land.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Family & Community Resiliency

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	10%	20%	30%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%	5%	30%	0%
724	Healthy Lifestyle	10%	20%	20%	0%
801	Individual and Family Resource Management	10%	0%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%	5%	0%	0%
806	Youth Development	60%	50%	20%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	3.5	13.0	4.0
Actual Paid Professional	20.0	3.5	13.0	0.0
Actual Volunteer	8516.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
823998	328435	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
823998	328435	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
823998	328435	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• The traditional rural economic development tools of available land and cheap labor no longer apply. Rural entrepreneurship and sustainable development of our rural landscapes hinge on utilizing technology, new partnerships with urban stakeholders and decision makers, and retaining our human resources by developing profitable and community-centric businesses.

• Communities value a well-trained workforce and will pursue opportunities to increase the skills levels of citizens, especially young people. A well-trained workforce benefits communities, increasing attractiveness for businesses to establish in a locale.

• Attracting successful businesses equips communities to be more sustainable, expanding their economic base.

• Training and education will result in stronger leadership and civic engagement.

• Increasing and building stronger and civically-engaged leaders will strengthen communities.

• Leadership can be defined in many ways and can be demonstrated by individuals, groups, and communities.

• Identify existing resources and data that would feed into the needs and resources assessment regarding intentional engagement work within and around community development by a University System.

• Community mapping and resource assessment

• Define and develop, for community members to participate in, quality, research-based programs in economic development, agricultural and natural resources, family asset management, and youth development.

• Define and develop, for community members to participate in, quality events and opportunities, such as train-the-trainer educational experiences. These events would focus on building leadership, entrepreneurship, workforce readiness and Science, Technology, Engineering and Mathematics (STEM).

• Develop Webinars, fact sheets, seminars, workshops, entrepreneurial coaching, and meetings to support program efforts

• Develop leadership training workshops

• Identify, recruit, and develop emerging leaders

• Train leaders how to develop their own public actions on issues affecting their community

• Train leaders how to create space and venues for community residents to discuss public issues

• Delivery of signature programs that incorporate a leadership development/civic engagement component

• Contributions to eXtension.org Community of Practice focusing on Financial Securit

• Implement "Reading Makes Cents" Curriculum on financial literacy for school-age youth

• Deliver Basic Financial Education for First Term Soldiers at Walter Reed

• Implement Financial Education Program for Geographically Dispersed Military Families

- Development of a Deployment Database of Resources for Military Families to support financial literacy and family resiliency topics
- Development of a distance education counseling network for isolated and geographically dispersed military families
- Financial education for University of MD faculty and staff
- Financial Education for MSRP participants

2. Brief description of the target audience

- Youth and adult residents of Maryland
- Collaborative partners
- County/City Extension Advisory Councils/Boards
- Community members including young people and adults.
- Community decision makers
- Businesses
- Transitional workforce
- Community decision makers
- Immigrants
- Limited resource individuals and families
- People engaging in Urban Agricultural Enterprises
- Businesses in the community
- First Term Soldiers
- Geographically dispersed military families
- Employees
- Retirement system participants

3. How was eXtension used?

Extension educators are members of Communities of Practice (CoPs).

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	111443	730078	70540	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	0	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Factsheets & publications, curricula, meeting with partners, in-services, workshops
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Nutrition: The number of individuals who demonstrate adoption of healthy eating practices based on the 2005 My Pyramid and the 2005 Dietary Guidelines for Americans, including the number who adopt or plan to: Choose a variety of colors of fruits and vegetables; choose high fiber foods; choose lower fat dairy products; choose smaller portions of foods; choose whole grain foods; read food labels before making purchase; make foods at home instead of buying convenience foods; plan meals before shopping at grocery store.
2	Food Safety: The number of individuals that indicate change in behavior related to good personal hygiene including hand washing, cooking foods adequately, avoiding cross contamination, keeping foods at safe temperature
3	Volunteer Development: The number of UME trained 4-H volunteers who provide leadership and guidance for 4-H youth development programs.
4	4-H Clubs: The number of 4-H club leaders and volunteers who demonstrate an application of the essential elements of youth development and model experiential learning.
5	Youth Outreach: Teen and adult volunteers in after school and military partnership programs and youth enrolled.
6	Healthy Living: Read labels before using hazardous household chemicals; Identify potentially hazardous products that affect indoor quality; take steps to control humidity in homes; use safe practices with household products to improve indoor air quality. Health Literacy: increased awareness of how to access research-based health information; understand connection between health literacy and financial literacy.
7	Financial Literacy Education: An increase in basic financial literacy; An increase in ability to make both short- and long-term decisions regarding credit, debt, estate planning, spending and saving

Outcome #1

1. Outcome Measures

Nutrition: The number of individuals who demonstrate adoption of healthy eating practices based on the 2005 My Pyramid and the 2005 Dietary Guidelines for Americans, including the number who adopt or plan to: Choose a variety of colors of fruits and vegetables; choose high fiber foods; choose lower fat dairy products; choose smaller portions of foods; choose whole grain foods; read food labels before making purchase; make foods at home instead of buying convenience foods; plan meals before shopping at grocery store.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Less than 30% of adult Marylanders consume five servings of fruits and vegetables each day, the minimum amount generally recommended for good health by the Centers for Disease Control (CDC). Eating more fruits and vegetables is associated with less obesity and better health, yet the percentage of obese youth and adults in Maryland and in the U.S. has doubled over the past 25 years (CDC). Many Marylanders desire fresh, locally grown vegetables but lack the space, time, or knowledge to create and maintain a garden of their own. Importantly, a large percentage of low-income residents have limited access to fresh produce.

What has been done
Classes; workshops; train-the-trainer series; multi-session education; exhibits; social marketing messages; social media use to communicate recommended practices; Dietetic intern training; healthy food preparation workshops and demonstrations; child care provider training; after school sessions for 4-H Youth; summer day camps; in-school enrichment programs; systems environmental changes in schools; partnerships to develop educational programs.

Results
The Home and Garden Information Center worked with collaborators to make 2012 the Year of Leafy Greens as a promotion and education effort. During the 2001‐2012 school year, a total of 34 schools in the state of Maryland participated in the ReFresh program that focuses on cafeteria nudges and classroom‐based nutrition education to increase student preferences for and selection of fruits and vegetables in the cafeteria.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Food Safety: The number of individuals that indicate change in behavior related to good personal hygiene including hand washing, cooking foods adequately, avoiding cross contamination, keeping foods at safe temperature

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Volunteer Development: The number of UME trained 4-H volunteers who provide leadership and guidance for 4-H youth development programs.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With the typical busy lifestyle of Americans, it is important that organizations effectively recruit volunteers to support their ability to deliver programs to the community. In order to maintain enough adult volunteers to meet the needs of the many young people across the state, UME must continually recruit new individuals to serve as volunteers. Volunteer recruitment has become a necessary driving force behind all successful volunteer-based organizations and is thus being emphasized by UME leadership.

What has been done

The Maryland Volunteer Association provides training opportunities for Maryland 4-H volunteers. Members also serve as mentors to new 4-H volunteers and/or new clubs. The Maryland 4-H Volunteer and Teen Forum provides professional development opportunities for 4-H adult volunteer leaders. Online training for volunteers is also provided.

Results

The 4-H Maryland Volunteer Forum provides volunteers with the knowledge to expand horizons beyond the local level, to better understand 4-H at the regional and national levels. Volunteers and teens learn about opportunities to be involved in planning and evaluating specific statewide programs, to serve on state committees, and to serve as chaperones for state and national programs. Three hundred fifteen volunteers from all across Maryland networked with one another at the Volunteer Forum and shared their knowledge about the 4-H Youth Development program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

4-H Clubs: The number of 4-H club leaders and volunteers who demonstrate an application of the essential elements of youth development and model experiential learning.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Maryland 4-H program's core mission is to help youth reach their fullest potential as individuals through the development of life skills. Studies indicated that participation in 4-H Clubs contributes to positive youth development and that youth who belong to 4-H clubs do better in school, are more motivated to help others, and are developing skills in leadership, public speaking, self-esteem, communication and planning, and are making lasting friendships.

What has been done

Essential elements of 4-H youth development have been incorporated into the training programs for volunteers. 4-H educators have been provided with a tool for self-assessment of 4-H clubs to determine how well the essential elements of 4-H are incorporated into 4-H club programs. The Maryland 4-H Volunteer Association provides multiple professional development training opportunities in a variety of formats.

Results
UME has approximately 62,000 youth learning about science, engineering, and technology; 23,000 engaged in citizenship learning and activities; and, almost 48,000 participating in building healthy lifestyle programs. The total number of adult volunteers is 5,351.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

Youth Outreach: Teen and adult volunteers in after school and military partnership programs and youth enrolled.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Currently, the state of Maryland has nearly 26,500 military youth aged six to eighteen. Additionally there are nearly another 16,000 under the age of six. Maryland's military includes Army, Navy, Marines, Air Force and Coast Guard in Active Duty, Guard and Reserves represented in nineteen counties of our twenty-three counties and Baltimore City. Every county has at least four of the five military branches represented. At any given time at least twenty percent of our military youth are affected by the deployment of a loved one.

What has been done
As part of ongoing support at military installations of their 4-H programs, the 4-H 101 curriculum was developed to deliver 4-H concepts in a hands-on training to military volunteers and partners,

staff at the military installation youth centers where the 4-H Military Clubs are primarily located, and to community 4-H volunteers. Maryland 4-H provides support to 8 military installations, each with a Youth Center, and provides training on 4-H concepts and curriculum, develops 4-H club programming, and supports 4-H events at each of these installations.

Results

Every year Maryland 4-H military programs reach hundreds of military children across Maryland through programming, activities and camps. These opportunities support the youth where they live and connect them to their communities for on-going support and community engagement. This, in tern, offers peace of mind to our service members on deployment that their children and families are being looked after while they are away; offers the youth the awareness that they are not alone in their experiences; and gives the community the opportunity to give back to our military families.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

Healthy Living: Read labels before using hazardous household chemicals; Identify potentially hazardous products that affect indoor quality; take steps to control humidity in homes; use safe practices with household products to improve indoor air quality. Health Literacy: increased awareness of how to access research-based health information; understand connection between health literacy and financial literacy.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maryland residents face health hazards in the built environment including: toxic materials (lead, asbestos, pesticide and household products); dangerous gases (carbon monoxide and radon); hazards that cause and contribute to asthma (dust allergens, molds, and pests); and other safety

and health concerns. Health literate people understand health information and have the skills to use that information in making health decisions and accessing health services.

What has been done

UM Extension's Healthy Homes Program addresses environmental health and safety concerns that collectively have an economic cost of over $100 billion annually. The HealthSmart Impact team uses a multi-disciplinary approach to create programs for audiences ranging from 4-H youth to child care providers and community health workers. Researchers received a second year of funding to determine which methods of dissemination of health messages will be most positively received by rural mothers.

Results

2,505 4-H youth and adults participated in interactive safety lessons. For household and electrical safety, all youth participants have learned to conduct home safety audits that can greatly reduce the risk of accidents in and around the home. Team educators introduced over 900 residents to the seven principles of Healthy Homes through workshops ranging from indoor air and water quality, hazardous chemicals, and Integrated Pest Management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
806	Youth Development

Outcome #7

1. Outcome Measures

Financial Literacy Education: An increase in basic financial literacy; An increase in ability to make both short- and long-term decisions regarding credit, debt, estate planning, spending and saving

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Low financial literacy, consumer indebtedness, low saving rate, low financial assets, expensive health care and long-term care, and insufficient retirement planning are all areas of concern for Maryland residents. Individuals and families need to be empowered with knowledge, attitudes, and skills to practice successful financial management, and eventually become financially secure in later life. Participation in personal finance educations programs help individuals learn how to reduce debt and increase savings.

What has been done

The UME Money Club for Adults was conceived of and piloted in Cecil County in 2011 and 2012 in collaboration with the Elkton Department of Housing and Cecil County 4-H Youth Development to use of on-line financial management tools and informational websites. Dollars and Sense is a program to strengthen the foundation of financial knowledge and skills.

Results

Participants in the Dollars and Sense Program are using spending plans, have engaged in positive financial behavior changes, and had written down goals for their money. UME Money Club participants have increased efforts to budget food dollars, plan meals, and buy generic or store brands.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

935 students from 34 schools involved in the Refresh nutrition and education program completed pre and post student surveys. Students from schools with nutrition education and cafeteria nudges selected more fruit and vegetable items in cafeteria lunchrooms. Students in intervention schools were found to consume more fruits and vegetables after the program than students in control schools. Students in intervention schools showed a higher likelihood of eating fresh fruits and vegetables at lunch and reported eating larger amounts of fruits and vegetables consumed than children in control schools. The number of fruits and vegetables offered in the cafeteria was higher for intervention schools. The percentage of students reporting they could choose fruits and vegetables in the school cafeteria and could prepare fruits and vegetables at home, was

higher for intervention schools than for control schools. Positive outcomes were highest for schools including both nutrition education and cafeteria nudges. Control schools experienced a consistent decline in both fruit and vegetable offerings and student selection throughout the school year.

The GIEI blog saw a steep increase in popularity from 2011 to 2012: 66,016 "views" (up 32%); 49,282 "unique visitors" (up 37%); and 99,514 "pages viewed" (up 30%). (Google Analytics). The Extension Specialist monitors the blog and works closely with Erica Smith, the blog leader. Also posted six blog entries, responded to comments, and posted comments on other entries.

816 new gardeners registered their gardens and joined the GIEI Network in 2012 bringing the total to 10,044 gardeners (a 9% increase over 2011). 16 GIEI video clips featuring the Extension Specialist received 63,270 views in 2012. http://www.youtube.com/user/UMDHGIC. 19 online food gardening fact sheets authored by Extension Specialist received 159,952 views. 229,558 website user sessions and 183,339 unique visitors in 2012, an 82% increase over 2011, and a doubling of the increase experienced from 2010 to 2011. 58% of GIEI web visitors are out-of-state.

Three hundred fifteen volunteers from all across Maryland networked with one another at the 4-H Volunteer Forum and shared their knowledge about the 4-H Youth Development program. Ninety-two percent of volunteers reported that they would take home new and innovative ideas and concepts to share with others. Ninety-one percent report that they feel as though participation in the 4-H Maryland Volunteer Forum will make them a better volunteer.

End of Session Surveys for the UME Money Club classes, Stretching Food Dollars, indicated that:
55% intended to increase effort to budget money to spend for food each month;
67% intended to increase effort to plan meals before shopping at the grocery store;
46% intended to increase effort to check foods on hand before making a grocery list;
46% intended to increase effort to use a grocery list when grocery shopping;
36% intended to increase effort to read grocery ads before making a shopping list;
36% intended to increase effort to buy generic or store brands instead of national brands.

The Dollars and Sense program participants indicate that:
82% are more likely to request/review credit report(s) annually (n = 107)
72% are more likely to develop a spending plan (budget) (n = 107)
70% are more likely to set financial goals (n = 107)
71% are more likely to track income and spending (expenses) (n = 107)
Two-to-four month follow-up evaluation of 31 successful phone contacts indicate that 61% (n=19) of those surveyed were actively using a spending plan, 97% (n=30) could identify at least one positive financial behavior change that they made since attending the class, and 65% (n=20) had written down at least one SMART goal for their money.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
403	Waste Disposal, Recycling, and Reuse	40%	30%	50%	20%
601	Economics of Agricultural Production and Farm Management	60%	70%	50%	80%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	1.0	4.0	1.0
Actual Paid Professional	4.0	1.0	4.0	4.9
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
164800	65687	242594	292531
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
164800	65687	242594	248448
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
164800	65687	242594	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Short course and training seminars for industry personnel and growers;
- Conduct basic and applied research in alternative fuel sources, energy saving techniques and recycling of green waste products;
- Contribute to trade and peer reviewed journal publications.

2. Brief description of the target audience

- Nursery, greenhouse, poultry growers and managers;
- In-state bioenergy industry;
- Research community at large.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	572	0	1822	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	17	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of workshops, seminars & twilight tours; Publications; Grants; Extension faculty engaged in programs.

Year	Actual
2012	335

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of participants attending programs; Growers implementing new energy savings/conservation options; New energy systems installed; and Producers who participate in USDA's Rural Energy Audit Program.

Outcome #1

1. Outcome Measures

1. Alternative Energy Options and Energy Conservation & Efficiency (Agronomic, Poultry, Dairy & Green Industry): Number of participants attending programs; Growers implementing new energy savings/conservation options; New energy systems installed; and Producers who participate in USDA's Rural Energy Audit Program.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
UME is helping to move the industries toward sustainable practices and in adopting solar, wind, ground water heating and cooling, using more gas efficient cars and trucks, and switching to lower input light sources. These strategies will reduce input costs for producers/operators and reduce the consumption of non-renewable sources of energy.

What has been done
MAES research is developing technologies for efficient conversion of biomass and animal waste into bioenergy. A small-scale anaerobic digestion system capable of converting combined horseradish and animal waste into bioenergy was built and is in testing mode. Also, the use of algae as a nutrient scrubber and source of biofueld was tested and found to be an efficient strategy in a small-scale system.

Results
The Alternative Energy for Commercial Horticulture Industry in Maryland program works with commercial greenhouse operations and nursery owners in the state to adopt solar arrays, wind turbines, geothermal, biofuels, high efficiency wood stoves, energy saving methods and other alternative methods of energy. Some of the impacts as a result of this program include: The Ruppert Companies plans to install a 300 kilowatt solar array at their landscape and to conduct a one day educational tour of greenhouse operations in Northern Nursery, one of which is using miscanthus grass in pelletized form as an alternative energy source. Research on anaerobic

digestion of animal waste and conversion of algae to biofuel produced promising results in terms of refining the technology.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

UME has limited capacity to address this planned program. However, through the efforts of our Natural Resources Impact Team, it is planned to build capacity in this area and have an action team established within the next two years. The poultry, dairy, and green industry are very interested in alternative sources of energy and more energy savings techniques that make their operations more efficient and profitable. Research on the conversion of biomass to bioenergy was at its infancy, but it is envisioned that with more research funding Maryland scientists will move forward in developing economically and environmentally sound methods to convert biomass and waste into biofuels.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UME's work in this program area has not matured to the point that evaluation results can be reported.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	70%	70%	70%	70%
724	Healthy Lifestyle	30%	30%	30%	30%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	1.5	5.0	1.5
Actual Paid Professional	8.0	1.5	0.0	0.1
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
329599	131374	0	21171
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
329599	131374	0	28086
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
329599	131374	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Develop/implement training for cafeteria/food service workers using Walk the Line curriculum.

- Workshops and professional development for Growing Healthy Habits, Farm-2-School, and Walk the Line.
- Create effective materials and programs that meet standards of health literacy.
- Investigate taste preference and trying new fruits and vegetable measures for statewide evaluation.
- Educational programs for cafeteria and food service workers and school administrators.
- Educational programs targeting pre-schoolers and their parents through train-the-trainer approach for child care and pre-school teachers.
- Up For the Challenge curriculum implemented for school-age youth in 3 sites targeted to geographically dispersed military families/youth.
- Contribute articles and expertise to eXtension.org Community of Practice for Food, Fun, and Fitness
- Develop Social Marketing and Social networking strategies to engage target audiences in Healthy Living dialogue
- Conduct applied research to inform educational program interventions.

2. Brief description of the target audience

- School-age youth
- Parents of school-age youth
- Teachers
- Cafeteria/Food service workers
- School administration
- Providers of before and aftercare
- Limited Income Mothers and Children
- Food Stamp recipients
- Geographically dispersed military families

3. How was eXtension used?

Members and contributors to FFF Community of Practice, which is used as resource for clientele.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	47554	0	47460	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	0	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 1. Growing Healthy Habits: # workshops; # train-the-trainer sessions; # school gardens developed; # community gardens developed; # new partnerships to implement GHH.

Year	Actual
2012	1242

Output #2

Output Measure

- 2. Walk The Line: # sessions conducted; # school cafeteria workers trained; # cafeterias participating

Year	Actual
2012	820

Output #3

Output Measure

- 3. Farm 2-School: # Sessions conducted; # schools participating; # farmers participating; # New partnerships developed.

Year	Actual
2012	167

Output #4

Output Measure

- 4. Eating Smart/Being Active: # youth served; # sessions; # supporting resources developed.

Year	Actual
2012	820

Output #5

Output Measure

- 5. Up For the Challenge: # sessions conducted; # youth reached; # teachers/afterschool providers trained; # schools implementing

Year	Actual
2012	228

Output #6

Output Measure

- 6. Strong Women, Healthy Hearts: # women completing program; # sessions conducted; # partnerships developed to implement program
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Fruit & Vegetable Consumption: # youth planning to increase consumption of fruits and vegetables.
2	2. Healthy Eating & Physical Activity: # of individuals and families who gain awareness, knowledge, or skills regarding healthy eating and physical activity
3	3. Policy Change: # schools, businesses and organizations with increased awareness of needed systems changes that will positively impact intake of healthier foods.
4	4. Systems Changes: # schools, businesses or organizations making systems changes to promote healthy lifestyles
5	5. Physical Activity: # youth and adults including physical activity in daily routine at least three times weekly

Outcome #1

1. Outcome Measures

1. Fruit & Vegetable Consumption: # youth planning to increase consumption of fruits and vegetables.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the Maryland Behavioral Risk Factor Surveillance Survey, 36% of Maryland residents are overweight or obese and 45% participate in no vigorous physical activity. Overweight children are more likely to remain overweight as adults and are at increased risk for coronary heart disease, high blood pressure, Type II diabetes, gallbladder disease, and some cancers. This epidemic, which causes about 300,000 premature deaths each year nationally, also accounts for approximately 9 percent of national health care expenditures.

What has been done
A garden-based program, Growing Healthy Habits introduces children to fruit and vegetables through multiple tasting experiences as they grow, harvest, and prepare foods. The Expanded Food and Nutrition Education Program (EFNEP) provides education to youths from 6-12 years old at schools as an enrichment of the curriculum, in after-school care programs, through 4-H EFNEP clubs, day camps, community centers, neighborhood groups, and gardening and cooking workshops.

Results
Growing Healthy Habits programming reached 500 youth, resulting in students tasting and consuming significantly more fruits and vegetables. The 1890 EFNEP program has targeted preschool children ages 3-5. Teachers were trained on indoor gardens and food demonstrations, and cafeteria staff were trained on fruit and vegetable preparation. Parents and caregivers learned on healthy food choices, the importance of exercise, food resource management, and indoor gardening. This family-centered programming helped increase awareness of good

nutritional habits in young children as well as their parents.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

2. Healthy Eating & Physical Activity: # of individuals and families who gain awareness, knowledge, or skills regarding healthy eating and physical activity

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Maryland Behavioral Risk Factor Surveillance Survey indicates that 36% of MD residents are overweight or obese and 45% participate in no vigorous physical activity. Overweight children are more likely to remain overweight as adults and are at increased risk for coronary heart disease, high blood pressure, Type II diabetes, gallbladder disease, and some cancers. This epidemic, which causes about 300,000 premature deaths each year nationally, also accounts for approximately 9 percent of national health care expenditures.

What has been done
A garden-based program, Growing Healthy Habits introduces children to fruit and vegetables through multiple tasting experiences as they grow, harvest, and prepare foods. FSNE implemented a texting pilot project called Text2BHealthy in 4 counties and Baltimore City. Text2BHealthy is designed to reach parents of school-age children at FSNE schools in an effort to provide a greater chance of family and at home behavior changes.

Results
FSNE was offered in 18 counties and Baltimore City and reached 44,127 participants for a total of 248,529 direct contacts. Program results show increased tasting of new fruits and vegetables by students, increased preference for fruits and vegetables, and positive changes in teacher and classroom nutrition-related behaviors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

3. Policy Change: # schools, businesses and organizations with increased awareness of needed systems changes that will positively impact intake of healthier foods.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Overweight and obesity have reached epidemic proportions nationwide and have become two of the most critical issues of our time. Over the years, environmental changes have resulted in trends toward inactivity and poor diets. It has been stated that children establish eating habits early in life and these are often the results of interactions with parents and caregivers.

What has been done
ReFresh is a partnership between Maryland State Department of Education (MSDE) and the University of Maryland Extension (UME) to utilize partnerships between food service staff, instructional staff, and UME educators within the school setting to work to increase students preference and selection of fruits and vegetables. FSNE provided classroom-based nutrition education in low income schools and in the development of the ReFresh curriculum for 4th and 5th grade students.

Results

Students in intervention schools offering the ReFresh program were found to consume more fruits and vegetables after the program than students in control schools. Students in intervention schools showed a higher likelihood of eating fresh fruits and vegetables at lunch and reported eating larger amounts of fruits and vegetables consumed than children in control schools.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

4. Systems Changes: # schools, businesses or organizations making systems changes to promote healthy lifestyles

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

5. Physical Activity: # youth and adults including physical activity in daily routine at least three times weekly

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Physical activity plays a vital role in the prevention of obesity and its complications. According to the Behavioral Risk Factor Surveillance System, more than half of Marylanders do not engage in physical activity at levels consistent with the 2008 Physical Activity Guidelines for Americans. Up to 23% of adults in the state did not participate in any physical activities or exercise during the past month. The Youth Risk Behavior Survey of 2007 found that 69% of Maryland high school students did not meet the recommended levels of physical activity.

What has been done

Up for the Challenge program was released in 2006 and distributed to over 120 Army installations worldwide. Since then, it has been used by Army Child and Youth Services (CYS) staff in military after-school programs for youth from ages 5-18. It has also been used nationally by Extension systems in several states including New Hampshire, Florida, Virginia, New Mexico and Pennsylvania, among others.

Results

Almost 250 individuals were reached in train-the-trainer sessions for educators in multiple states. UME educator, in response to a request from the 4-H Military Partnership, conducted a national training in to 60 extension and military professionals. In 2011, the Army developed a new fitness initiative known as Be Fit Be Strong and identified Up for the Challenge as one of the curricula they would like to use in their healthy lifestyle youth programming worldwide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

There are more people in need of nutrition education than ever before, especially children, and the situation becomes even more critical. The number of families receiving food stamps is at an all-time high in Maryland. Obesity rates for youth as well as adults are at an all-time high. In these difficult times, having food to eat becomes more important to parents and caregivers than worrying about healthy food to eat. However, UME's programs are addressing these challenges and the organization is building more capacity to address the issue.

The diversity of Maryland's population continues to grow and expand. UME needs more bi-lingual educators on staff to serve our Hispanic audience. In addition, there are indigenous people from many countries in great need of nutrition education, yet we do not have the capacity to fill that need.

More research efforts are underway. However, additional funding would help to employ more graduate students to continue and expand research efforts.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Findings from ReFresh Program Evaluation: 935 students from 34 schools completed pre and post student surveys. Students from schools with nutrition education and cafeteria nudges selected more fruit and vegetable items in cafeteria lunchrooms. Students in intervention schools were found to consume more fruits and vegetables after the program than students in control schools. Students in intervention schools showed a higher
likelihood of eating fresh fruits and vegetables at lunch and reported eating larger amounts of fruits and
vegetables consumed than children in control schools. The number of fruits and vegetables offered in the cafeteria was higher for intervention schools. The percentage of students reporting they could choose fruits and vegetables in the school cafeteria and could prepare fruits and vegetables at home, was higher for intervention schools than for control schools. Positive outcomes were highest for schools
including both nutrition education and cafeteria nudges. Control schools experienced a consistent decline in both fruit and vegetable offerings and student selection throughout the school year.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	100%	100%	100%	100%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	1.5	5.0	1.5
Actual Paid Professional	8.0	1.5	5.0	3.7
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
329599	131375	0	300777
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
329599	131375	0	357716
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
329599	131375	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Develop technical assistance programs for UME
- Develop and/or adapt food safety materials and resources for UME Educators
- Collaborate with local, regional, and national partners
- Develop safe food educational materials/ resources and disseminate USDA food safety materials to consumers and producers
- Conduct trainings and workshops, including train-the-trainer workshops
- Conduct evaluations
- Promote and support Maryland Farm to School and other agricultural literacy programs
- Conduct data analysis, needs assessments, environmental scans, and asset mapping
- Network internally and externally with collaborators, partners, and affiliates
- Raise community and stakeholder awareness of local food issues
- Contribute to relevant eXtension Communities of Practice
- Develop online food safety modules
- Conduct social marketing awareness education focusing on food safety
- Conduct basic and applied research to inform program development regarding food borne illnesses and beneficial and safe compounds in the food.

2. Brief description of the target audience

- Consumers: Youth, adults, older adults
- Commercial: Fruit and vegetable producers
- Food service workers, childcare workers, community-based organizations
- Service agencies related to food production, promotion, consumption, protection, education

3. How was eXtension used?

Several educators are members of eXtension.org Communities of Practice (CoPs).

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2438	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	10	34	44

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 1. Food Safety Practices: # training sessions; # trained; # courses developed; # publications; # Mass Media

Year	Actual
2012	1295

Output #2

Output Measure

- 2. Good Agricultural Practices (GAP): # of fruit and vegetable farmers implementing Good Agricultural Practices;# of fruit and vegetable producers attending GAP training; # of GAP workshops, seminars, consultations.

Year	Actual
2012	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Food Safety Practices: Participants will gain basic food safety knowledge and skills, resulting in an intent to adopt the following: Follow the key safe food handling recommendations (clean; separate; cook; chill) -Wash hands before working with food -Clean food preparation utensils and surfaces -Wash fruits and vegetables before eating and preparing - Keep raw food/meat separate from ready to eat foods -Cook and chill food to safe temperature using a food thermometer -Store foods at a safe temperature using an appliance thermometer
2	2. Good Agricultural Practices (GAP): Maryland's fruit and vegetable producers implement Good Agricultural Practices in their operations to prevent contamination and ensure a safe food supply.

Outcome #1

1. Outcome Measures

1. Food Safety Practices: Participants will gain basic food safety knowledge and skills, resulting in an intent to adopt the following: Follow the key safe food handling recommendations (clean; separate; cook; chill) -Wash hands before working with food -Clean food preparation utensils and surfaces -Wash fruits and vegetables before eating and preparing - Keep raw food/meat separate from ready to eat foods -Cook and chill food to safe temperature using a food thermometer -Store foods at a safe temperature using an appliance thermometer

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
During the past 30 years, there has been an increased incidence of food borne illnesses. Currently, one in four Americans suffers from food borne illness each year. Some foods, such as fruits and vegetables, are often consumed raw or with limited preparation. In addition, the U.S. agriculture and food systems are vulnerable to disease, pest, or poisonous agents that occur naturally or are intentionally or unintentionally introduced.

What has been done
A research project entitled Preventing Foodborne Illnesses Among Vulnerable Older Adults Through the Home-Delivered Meal Program is developing and pilot testing a food safety training course for staff, volunteers and clients of home-delivered meal programs. Older adults who receive home-delivered meals are especially vulnerable to foodborne illness, as they have a high prevalence of health conditions that can weaken the immune system.

Results
Through the webinar for State Units on Aging and training session at the MOWAA conference, over one hundred state representatives and other individuals have been trained on how to administer the Food Safety on the Go course to home-delivered meal programs within their states. The curriculum is in high demand and has been incorporated already in several states as

a component of the nutrition sites training programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

2. Good Agricultural Practices (GAP): Maryland's fruit and vegetable producers implement Good Agricultural Practices in their operations to prevent contamination and ensure a safe food supply.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food safety for leafy greens and tomatoes needs scientifically-based consensus food safety metrics for leafy greens and tomatoes. This research examines industry-proposed metrics intended to help ensure that leafy greens and tomato growers are implementing good agricultural practices and hygienic controls for microbiological safety.

What has been done
This research project has as objectives to (a) validate the proposed metrics to ensure their applicability in a variety of growing regions and their ability to withstand scientific challenge, (b) develop potential additional metrics with improved predictability, performance and cost attributes, and (c) identify improved approaches and techniques that allow the attainment of the metrics to be objectively verified in a rapid, simple, and cost effective manner.

Results
Internet-based survey instruments have been designed to elicit cost information from leafy greens and tomato growers and packers. The grower survey contains questions about the frequency with which water, soil amendments, and product are sampled; the frequency with which fields are inspected for wildlife encroachment and flooding; the frequency of contamination incidents; preventive actions; and the costs incurred in sampling, field inspections, responses to

contamination incidents, and preventive measures. The packer survey contains questions about the frequency with which water, the packing environment, and product are sampled; the frequency with which packing and transportation equipment are inspected; the frequency with which remedial actions were necessary; preventive actions; and the costs incurred in sampling, remedial actions, and preventive measures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

The demand for food safety education and research continues to increase. More resources are needed to meet research and outreach needs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Since two pilot tests in 2011, we have been gathering feedback from programs that participated in the pilot tests, through written and internet-based course evaluations. We conducted a 4-month follow up survey of pilot test programs, and asked programs to evaluate the content of the course; report which modules were most relevant to them; discuss the strengths and weaknesses of the course; and report any changes in their food safety practices as a result of taking this course. We had also asked pilot test programs to measure the refrigerator temperatures of a specific number of new clients, to determine whether these clients' refrigerators were at 40 degrees or below and thus able to maintain food at a safe temperature. We have received measurements of clients' refrigerator temperatures from programs, and from results to date, it appears that approximately one third of client refrigerators may be at unsafe temperatures of over 40 degrees. We are using the information we have collected from programs as part of our outcome evaluation, and plan to include it in an article on project results.

Key Items of Evaluation