

2017 University of Maryland - Eastern Shore and University of Maryland Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

The University of Maryland College Park (UMCP) and the University of Maryland Eastern Shore (UMES) have enjoyed a cooperative relationship in research and extension for many years. University of Maryland Extension (UME) is a collaborative partnership between UMCP and UMES. Both campuses also have their own research programs organized under the auspices of the Maryland Agricultural Experiment Station (MAES) at UMCP and the Agricultural Experiment Station (AES) at UMES. Collectively we will refer to UME, MAES, AES as UM.

The Strategic Plan for the UMCP states that, "The University of Maryland will be an institution with sweep and impact, where new ideas and ways of thinking make a difference." UME and MAES, in alignment with the University and the College of Agriculture and Natural Resources, are also focused on sweep, impact, and making a difference through outcomes that benefit Maryland's agro-ecosystem, community, youth and adults. This will be achieved by implementing relevant research and extension programs in the areas of genomics, sustainable (e.g., environmentally and economically) plant and animal production systems, healthy and nutritious food, and development of resilient communities and families.

UMES is on a "journey from excellence to eminence" and the Strategic Plan speaks pointedly to the commitment to advance productivity in research, economic development and transfer, and contribution to an enhanced quality of life in Maryland and facilitation of sustainable domestic and international economic development and competitiveness. UMES' research priorities, therefore, address environmental quality and sustainability, sustainable food production and security, human health and safety, conservation and use of coastal and marine resources, and bioenergy. Furthermore, UMES strives to educate and train the next generation of teachers, educators, and scientists in the food, agricultural and related sciences.

University of Maryland Extension will tackle the big, critically important societal issues and those that are the "most challenging and vexing." To determine what are the most challenging and vexing issues, UME engages stakeholders in dialog, scans the environment for changing conditions, analyzes data available from multiple, trusted sources, and relies upon the expertise and leadership of action teams made up of field-based educators, researchers, campus-based Extension Specialists, and stakeholders that guide program development and delivery. Coupled with the exemplary research through MAES, AES, and teaching expertise at both Universities, UME can achieve measurable impacts that build strong and resilient economies, communities, families, and individuals.

The Maryland Agricultural Experiment Station (MAES) in partnership with UME, coordinates the research arm of the College of Agriculture and Natural Resources and responds to the state and national questions related to the agro-ecosystem at all levels (e.g., genomics, plant and animal systems, community, ecosystem level, etc.) through well thought-out research and extension programs. It fosters science-based basic and applied research that ranges from plant and animal biology/physiology to animal health, food safety, ecosystem health, and economic viability of agro-ecosystem.

The Universities have identified seven areas in this 2017-2021 Plan of Work which represent major programmatic initiatives that UM will direct resources to accomplish. These impact areas are a broad-based method of dividing the critical needs identified by the planning process into manageable and focused units. MAES and AES will direct their research focus through multi-state projects, REEport (formally CRIS) projects, and MAES competitive projects to align with national priority areas identified by

USDA-NIFA. The seven initiatives are:

1. **Global Food Security & Hunger**
2. **Food Safety**
3. **Environment & Climate Change**
4. **Sustainable Energy**
5. **Childhood Obesity**
6. **Family & Consumer Sciences**
7. **4-H Youth Development**

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	107.0	14.5	54.0	24.3
2018	107.0	14.5	54.0	24.6
2019	107.0	14.5	54.0	26.7
2020	107.0	14.5	54.0	27.2
2021	107.0	14.5	54.0	27.5

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

Extension Faculty Reviews:

The merit review process for UME faculty occurs annually when the faculty member is formally evaluated by the Program Leader (Assistant Director), Associate Director, or Associate Extension Administrator as appropriate. The AG Program Leader evaluates AG Educators and Specialists; FCS Program Leader, the FCS Educators; the Environment & Natural Resources/Sea Grant Program Leader, the ENR/SG Educators and Specialists; and the 4-H Program Leader, the 4-H Educators and Specialists. Input is obtained from the 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, UMERS reports, annual impact statements, and Teaching Effectiveness Summary. For UMES, the reviews are conducted by the respective Department Chair. Extension Specialists housed in academic departments are also reviewed by their respective Program Leaders and input is given to the Department Chair on those faculty members' performance review.

Research Faculty Reviews:

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

Programmatic Reviews:

Programmatic reviews are conducted at the departmental level at the request of the respective deans, associate deans, and/or department chairs for both UMCP and UMES. They generally range in the five-to-ten year cycle. These reviews are conducted by a panel of external reviewers from prestigious departments, institutions, or federal agencies that have similar departmental or agency diversity in programmatic issues. Individual programs are rarely reviewed independently but within the context of how they fit in the mission of the college and department.

Project Reviews:

All research projects funded through MAES and AES undergo both internal and external review. There is an internal review of federal projects by at least two faculty with knowledge of the discipline, a review by the associate dean for research and associate director for MAES or research director in the case of AES, and USDA. The one exception is that MAES offers an internal competitive grant program for faculty within the college and UMES to afford preliminary research findings that increases competitiveness for these faculty to be successful in competing for external competitive grants such as AFRI (formerly NRI) and other funding sources. The panel evaluations are a set of standardized criteria such as clarity of objectives, relationship to college's mission, quality of proposed research, deliverables, etc. Currently, this process is conducted for Hatch and Evans-Allen funding only. Plans are being considered for the same internal process for McIntire-Stennis and Animal Health and Disease funding as well.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Global Food Security and Hunger: Maryland crop and livestock producers are confronted with numerous challenges that can affect their ability to produce an abundant food supply and maintain profitability. The areas of emphasis for this program will focus on the 1.25 million acres of grain crops, 75,000 acres of vegetable and fruit crops, and 260,000 acres of forage crops and pasture acreage by improving animal and crop production efficiency and land management in the program areas of nutrient and water management, integrated pest management and issues with technology of personal protective clothing for pesticide

applicators, environmentally and economically sustainable production, and grain marketing.

Environment & Climate Change: Maryland has heavily urbanized, densely populated regions as well as agriculturally diverse and forested areas which are all sensitive to forces impacting the Chesapeake Bay and other natural resources. Each of Maryland's diverse ecosystems (e.g., agriculture, forestry, urban, wetlands, aquatic, etc.) provides services for its inhabitants, thus research and education programs pertaining to the sustainable interaction with these ecosystems is envisioned and promoted by all UM entities. Natural resource education of adults, youth, and under-served communities will help to promote environmental awareness and responsible decision making, increase scientific literacy and interest of youth in science and math, and foster behavioral changes that can help communities approach a more sustainable lifestyle.

Sustainable Energy: Recognizing the state and nation's needs for energy independence through biofuels and other alternative energy sources, UM plans to build program expertise in this area over the next five years. Currently, we have faculty who work on devising efficient methods such as anaerobic digestion to convert animal waste into bioenergy and high-efficiency combustion of wood for heating. In addition, faculty are focusing on bioenergy production from algae, switchgrass, sorghum, sudangrass, sorghum x sudangrass hybrids, and Energy Beets.

Childhood Obesity: Healthy eating habits along with regular physical activity have an important role in weight control and overall health. Despite the proven benefits of these healthy habits, the CDC State Indicator Report for Maryland shows that less than 16% of adults report eating the recommended daily servings of both fruits and vegetables. Unfortunately, the statistics for adolescents are worse, with only 11% reporting daily consumption of the recommended amounts. Finding ways to increase fruit and vegetable consumption is key to improving health and well-being. Since lifelong dietary patterns begin in childhood, focusing on children, and those who feed children, is a logical focus of research and education on nutrition and health education interventions.

Food Safety: Many Americans are disconnected from the source of their food supply. It is important that consumers, especially youth, develop an understanding of where food comes from so that they can gain a greater appreciation of food safety issues in a global economy. MAES and AES supported research will focus on food safety and human health through both basic and applied research. MAES will focus on the genomics in plant breeding and testing the product in real world conditions at its research centers. MAES and AES are also fostering research on food safety from gate to the consumer and provide quantitative risk analysis on the exposure of food to bacterial and parasitic infections. UME's Healthy LivingTeam will focus on programming to help Maryland residents become educated consumers who can make informed decisions about buying, storing, and preparing food to maximize health and safety; about use of locally grown, fresh food; through home and community food production; and safe handling practices. In addition, a focus will be on helping fruit and vegetable producers understand the need for and adoption of Good Agricultural Practices (GAP).

Family & Consumer Sciences: To address community and family pressures, UME will have a focused program to improve the well-being and resiliency of individuals and families. The UME Family and Consumer Sciences program, in alignment with the national FCS program, "strengthens families, farms, communities and the economy by focusing on the human dimensions of food and agriculture: addressing priority issues through scientific research and its application; strategic partnerships; extension education; and the preparation

of the next generation of Family and Consumer Sciences professionals." In Maryland, Family and Consumer Sciences includes the areas of insuring your health, health insurance literacy, fostering healthy and safe environments, growing healthy kids, exploring new approaches to health promotion, health and nutrition, adult financial education, and youth financial education.

4-H Youth Development: Youth, families and communities need access to community resources that offer high quality youth development experiences. Maryland 4-H creates high quality youth development opportunities for culturally diverse audiences that embrace the essential elements of 4-H and contribute to positive youth development for all children and youth. 4-H provides a supportive setting for all youth to reach their full potential. Youth learn beneficial cognitive and life skills through community-focused, research-based experiential educational programs. 4-H helps youth become competent, caring citizens. Maryland 4-H is committed to positive youth development programming that involves citizenship education, civic engagement, service learning for youth, youth-adult partnerships, volunteer development for teens and adults, and experiential leadership experiences for youth and adults.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

Research and educational programs will be directed to increase efficient, healthy, and sustainable food production for the population including the under-served and under-represented. With efficient production, food prices can be controlled, thus making healthy and nutritious food available to residents despite their socio-economic status. Two programs in Maryland (both at UMCP and UMES) specifically address and will continue addressing issues related to hunger and food security of under-served and under-represented populations: The Food Stamp & Nutrition Education (FSNE) program and the Expanded Food & Nutrition Education Program (EFNEP). The Small Farm Program at UMES works to improve the standard of living and increase the farm income of small, economically and socially disadvantaged farmers through better financial planning, resource management and access to information and technology. In addition, the Small Ruminant Program at UMES targets the use of small ruminants (sheep and goats) to enhance the survival of the small family farms. Maryland's urban agriculture programs, including Grow It, Eat It!, reach out to under-served youth and adults in the urban centers. The expansion of Annie's Project throughout the state will help to insure the financial health of small farm, female operators through increased financial literacy. These educational programs will be accompanied by research projects that will focus on nutrient and water management in Greenhouse settings under controlled climate conditions. Research is being focused to produce products that are healthy and sustainable. Also, MAES disseminates the research findings to the general public, including under-served populations, by having multiple open houses in its research and education centers, as well as the annual University of Maryland Agricultural Day.

3. How will the planned programs describe the expected outcomes and impacts?

Global Food Security and Hunger: Increases in: agricultural literacy in urban and rural areas to develop residents' understanding of the food system; the sustainability and profitability of agriculture, forestry, and green industries through sustainable environmental practices; agricultural profitability and sustainability through the development of alternative enterprises and value-added products; Maryland's food system to match local production with market demand; the use and affordability of locally grown, fresh food through local market promotion and community gardens; and, a decrease in the loss of agricultural land while enhancing (promoting) value of agriculture land and open space in rural and urban areas. Research programs coordinated through MAES and AES will focus on environmentally and economically sustainable food production, thus insuring food security and helping minimize

hunger. Examples of these research and extension improvement projects are: Cropping Systems for Soil and Water Enhancement and Protection, Advanced Technologies and Genetics for the Improvement of Crops and Livestock, Integrating parasite management practices in sheep and goats, Improving Agricultural Practices that are Sustainable, Economic and Environmentally Sound in all Sectors of Agriculture, and Improving the Availability of Crops and Livestock Production in the United States.

Environment & Climate Change: Improved water quality as related to agriculture, forests, and developed lands and sustainable management of aquatic, forest, wildlife, soil and air resources. MAES and UME will conduct programs such as Nutrient Management, Drainage Design and Management to Improve Water Quality, Watershed Restoration and Protection, Soil Quality Improvement Practices such as No-Tillage, Reduced Tillage, and Cover Cropping Systems, Use of Beneficial Micro-organisms to Enhance Green Industries, Characterization and Mechanisms of Plant Responses to Ozone in the US, etc. that will have outcome in terms of both adaptation to and mitigation of Climate Change. MAES, through support from the Northeast Experiment Station Directors, hosted a one-day climate change forum in 2011 where scientists from state institutions in the Northeast and federal agency scientists attended and discussed the needed research and education needs related to climate change. The Northeast Experimental Station Directors, including Maryland, are working toward forming an understanding and joint research and education program (with Eastern Canadian institutions) on climate change adaptation and mitigation.

Sustainable Energy: Diversified energy sources and improved energy conservation and efficiencies. MAES is supporting Multi-State projects at the present time that encourage sustainable production in a bioenergy environment. We are planning to develop research and extension programs to pursue economically and environmentally sustainable bioenergy production in the State of Maryland. Faculty at MAES and AES are looking at the development of efficient methods to use bio-waste such as poultry litter, aquatic waste, feedstock, switch grass, etc. to produce alternate energy. Methods for fuel production from plant biomass, animal waste, and algae are being investigated. It is envisioned that outcomes of these research and education programs can help to convert the waste that is otherwise a pollutant to the water systems into a valuable product.

Childhood Obesity: Youth will have increased consumption of fruits and vegetables following adoption of system changes in schools for availability of healthy food choices; youth and families gain awareness, knowledge or skills regarding healthy eating and physical activity; teachers and youth leaders acquire and use basic food gardening knowledge and skills; Growing Healthy Habits curriculum implemented in schools, after-school programs, and 4-H clubs. MAES researchers are examining the relationship between diet and lifestyle factors on the nutritional status and health of vulnerable populations.

Food Safety: Increase in safe food handling practices; use of Good Agricultural Practices (GAP) by fruit and vegetable producers in Maryland; integration of organic practices; improvement in seafood safety and quality assurance; fully implemented Integrated Pest Management Systems, Reduced Risk Pesticide and Organic Production, and education for Maryland residents know how to purchase, store, handle and prepare locally grown, fresh foods. MAES supports a multi-state project titled, "Post-harvest Biology of Fruits" that supports storage life, quality, and flavor of fruits.

Family & Consumer Sciences: Maryland residents will be empowered to make informed health decisions leading to healthy living and better health outcomes. Youth and adults participating in health literacy will expand their ability to: a) get health information, 2)

understand and 3) use the information with confidence to lower risk of poor health. Marylanders will increase or improve health through increased consumption of healthy foods and physical activity. Participants in healthy homes interventions will increase their awareness of healthy homes principles and use research-based strategies to improve personal and family health by improving the health of their homes or the homes of their clients. There will be an increase in basic financial literacy and security for the future of Maryland residents, as well as an increase in youth and adults' ability to make both short- and long-term decisions regarding credit, debt and spending. Marylanders will increase home and community food production and adopt sustainable practices.

4-H Youth Development: Maryland youth, and the adults working with those youth, will demonstrate knowledge and skills in safe practices in the home and with their environments and in the health and life choices. Youth in Maryland will increase or improve health through increased consumption of healthy foods and physical activity. Maryland youth will be engaged in whole grains nutrition education programs and activities. Access and involvement in a variety of learning opportunities will result in: 1) increased physical activity; 2) increased consumption of healthful food; and, 3) improved health outcomes and reduced risk of chronic diseases over time. 4-H youth participants gain valuable knowledge and life skills related to their 4-H agriculture (animal and plant) project work and by continuing to increase agriculture awareness for all Maryland citizens at 4-H events, shows, fairs and other educational outlets. 4-H youth and families become more literate in concerns surrounding global hunger and its relationship with agriculture, understanding of food systems, and the relationship of agriculture, food, nutrition, and the economy.

4. How will the planned programs result in improved program effectiveness and/or

The planned program areas represent focused, major programmatic initiatives that UM will direct 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 established within each impact area. UME's impact leadership teams have been formed, which are made up of field-based Extension Educators, researchers, Extension Specialists, and Faculty Extension Assistants, who will work together to provide overall statewide leadership for programmatic efforts. Impact teams develop action plans for each of the impact areas and 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 will develop signature programs that are replicable, measurable, and recognized at the state and national levels. Similarly, MAES has established a "Faculty Research Council" that will help guide and identify our research vision compatible with the national programs in NIFA's identified challenge areas. This will also be accomplished with MAES' competitive grants program and strategic participation in the multi-state Projects.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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
- Other (Community-based listening sessions)

Brief explanation.

To inform this Plan of Work, the following strategies were used: 1) statewide strategic planning stakeholder data were reviewed; 2) analysis of secondary data for Maryland, including data from the 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); 3) environmental scanning at the national, regional, state, and local levels; and, 4) the strategic planning processes of the University of Maryland, the College of Agriculture and Natural Resources (AGNR), UME, the University of Maryland Eastern Shore and the School of Agricultural and Natural Sciences (SANS). The MAES goals were reflected in the AGNR strategic plan through heavy participation by the research faculty in developing the plan. Also, MAES and AES research faculty seek input from other researchers through state, regional, national, and international conferences and workshops in which they participate. The UME strategic planning process drew upon the expertise of approximately 150 UME Educators, Specialists, and administrators. 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 and determine program effectiveness. Based on findings, changes are made to program offerings.

2(A). A brief statement of the process that will be 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
- Other (Focus Groups)

Brief explanation.

Input from Maryland's residents will be solicited through local and statewide advisory councils. While UME has had county level Extension Advisory Councils (EACs) for several years, during the next five years increased emphasis will be on supporting these Councils and making sure that communication happens in consistent, two-way patterns using multiple methods (face-to-face meetings, social networking, and email). Instruments for soliciting feedback will continue to be translated to Spanish and used in applicable situations.

The College of Agriculture and Natural Resources and UME will form a statewide

advisory council consisting of a broad cross-section of agricultural, environmental, health, and youth development leaders to provide input on major directions for the College's research, teaching and extension agenda. This Advisory Council will work with administrators at UMCP and UMES to identify rising issues in the State and strategies to address those issues.

MAES has established a "Faculty Research Council" and has formed research teams around vital topics such as sustainable bioenergy, watershed sustainability and climate change, and nutrition and health, Food safety and security, genomics and biotechnology, etc. that will provide a platform for scientists to debate the integrated research and extension programs. These groups will hold meetings and will be central in attracting other faculty to join. AES has established cluster teams that will focus on priority issues where UMES has capacity to address them. As appropriate these cluster teams will involve other partner institutions and stakeholders. Additionally, SANS is establishing an Advisory Council that will provide guidance to the AES programs.

The administrative officers of the Maryland Agricultural Experiment Station 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 research and education issues examined by the research and extension in the State's two land grant universities current. 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 and many other similar groups. Again, research and extension faculty discuss priority topics with other scientists and specialists through many platforms, including electronic (e.g., webinars), symposia, and workshops.

2(B). A brief statement of the process that will be 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
- Survey of selected individuals from the general public
- Other (Focus Groups)

Brief explanation.

A strategic planning cycle started in 2013 and resulted in a new strategic plan in 2014. Listening sessions were held across every county and the City of Baltimore with stakeholder groups in 2013 to gather input from diverse external clientele and partnering

organizations. In addition, an environmental scan was conducted to identify the major issues facing Maryland in the coming years. The new strategic planning process will start in 2017 with a launch in 2018 to gather input across the state, resulting in the release of a new strategic plan for 2019.

MAES will continue collecting CRIS, REEport, and multi-state project progress reports including publications in refereed journals and conference proceedings that speak about the quality of research. Instruments for soliciting feedback will continue to be translated to Spanish and used in applicable situations.

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.

Constituent input will be utilized in a variety of ways to include:

- the budget process, particularly at the local level;
- identification of emerging issues through understanding the most critical needs that can be addressed by educational programs;
- re-directing Extension & Research programs by understanding critical needs and defining new priorities;
- in staff hiring to recruit and employ the best professionals available to affect change in an ever-changing society; and
- in action programs as we work in communities to affect positive change and to set priorities for impacting the future.

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger
2	Sustainable Energy
3	Climate Change
4	Childhood Obesity
5	Food Safety
6	Family & Consumer Sciences
7	4-H Youth Development

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

University of Maryland Extension and Research will engage in research and offer Extension programs that help maintain a viable agriculture base in Maryland. Outcomes will not only include increasing farm profitability, but also result in increasing the success of beginning farmers, preserving the number of working farms, expanding acreage and production in the aquatic environment and promoting agriculture land use, especially in urban/suburban areas. These programs will increase both economic vitality and quality of life for residents. Program efforts will result in efficient and sustainable production systems through research and increase agricultural literacy among Maryland residents, especially youth, through education. The program will help inform the citizenry of Maryland of the many positive roles agriculture plays in our life and community (i.e., locally produced food, ecosystem open space, shellfish aquaculture and community vitality).

University of Maryland Extension and the Agricultural Experiment Station at UMES will engage in research and offer Extension programs with outcomes to include training sheep and goat producers in the nutrition and management of ewes and does, implementing and improving integrated pest management practices, increasing bio-diversity and food security in the Delmarva region, and in establishing performance standards for protective clothing for pesticide operators as each area of research pertains to global food security and hunger.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	15%	90%	15%	17%
205	Plant Management Systems	10%	0%	15%	17%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	0%	2%
216	Integrated Pest Management Systems	15%	0%	10%	16%
301	Reproductive Performance of Animals	10%	10%	10%	16%
302	Nutrient Utilization in Animals	10%	0%	5%	0%
311	Animal Diseases	10%	0%	15%	0%
403	Waste Disposal, Recycling, and Reuse	10%	0%	5%	0%
601	Economics of Agricultural Production and Farm Management	10%	0%	10%	0%
602	Business Management, Finance, and Taxation	10%	0%	5%	0%
704	Nutrition and Hunger in the Population	0%	0%	5%	16%
723	Hazards to Human Health and Safety	0%	0%	5%	16%
	Total	100%	100%	100%	100%

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

The state of Maryland continues to undergo change at a rapid rate. Population is increasing, land use is changing and the engines driving economic change are at full throttle. Maryland crop and livestock producers are confronted with numerous challenges that can affect their profitability. Among the challenges are appropriate pest management practices for a wide range of insects, diseases, and weeds; utilizing nutrients in a manner that minimizes non-point source pollution of the state's water resources; managing water in an environmentally responsible manner; attaining profitability for livestock and crop commodities that experience constant price fluctuation while input costs mostly increase; and adjusting to an era that envisions agricultural producers to be both consumers and producers of energy. In addition, maintaining a viable agricultural base is valued by the general public with primary public value reflected in the preservation of open space; aesthetic value of farms; the maintenance of a local food supply and the preservation of the rural character. These challenges require Maryland's producers to utilize a variety of information resources.

2. Scope of the Program

- In-State Extension
- In-State Research

- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Interest in alternative crops/enterprises will continue.
- There will be continued cooperation of public agencies and private organizations.
- There will be continued pressure on traditional farming practices, both economically and environmentally.
 - Input costs such as energy, seed, and fertilizer will be a challenge for all producers.
 - The green industry will continue to grow and there will continue to be a growing market for plant materials.
 - Maryland agricultural land will continue to face development pressures.
 - Commodity prices will remain weak relative to production costs.
 - There will be an increasing demand for locally produced products and an increasing demand for organic and other more naturally produced products.
 - Producers need marketing assistance and are interested in getting more money for the products.
 - The number of Food Stamp recipients will continue to increase as long as unemployment remains high, resulting in increasing levels of food security for families and individuals.
 - EFNEP and FSNE programs will continue to focus on food security as a priority outcome for its limited income audiences.
 - Adequate funding will continue.

2. Ultimate goal(s) of this Program

1. Farm system profitability, including both direct and indirect economic impact, will be enhanced for agronomic, fruit, vegetable, aquaculture, nursery, greenhouse, cut flower and Christmas tree horticulture producers and turfgrass managers as they implement water and nutrient management programs, best practices management, integrated pest management, business management and marketing skills that they learn from UME and research agronomic and horticulture programs and faculty. To attain this outcome, emphasis will be placed on: A) nutrient management plan development and education and adjusting to new regulations on nutrient management including the new turfgrass management nutrient management law; B) helping growers to better diagnose pest problems and provide education about implementation of integrated pest management; C) help producers identify and adopt technologies that will improve water use efficiency for their operations; D) inform producers about energy saving practices for their operations, E) evaluate new opportunities (crops, livestock, aquaculture, energy production, etc. that can improve profitability); F) provide improved cultural techniques for crop and livestock production which increase survival efficiency and quality; G) improve marketing, farm management, and business skills of farming community; and H) educate Maryland's often misinformed citizens about agriculture's many positive benefits (i.e., locally produced food, ecosystem open space, on-farm best management practices, shellfish production) that often remediate negative environmental effects rather than cause them.

2. Animal sciences faculty will provide research and educational programs on animal best management practices (such as bio-security, nutrition, health, food safety, marketing, breeding, integrated parasite management practices, etc.) for youth and adult audiences and develop educational materials in the area of animal agriculture to support those teaching efforts. These programs and educational

materials will help livestock producers increase profitability.

3. The UME agriculture profitability team will offer programs that help maintain a viable agriculture base in Maryland. Outcomes will not only include increasing farm profitability, but also result in increasing the success of beginning farmers, preserving the number of working farms, expanding acreage and production in the aquatic environment and promoting agriculture land use, especially in urban/suburban areas. These programs will increase both economic vitality and quality of life for residents. Program efforts will result in increased agricultural literacy among Maryland residents, especially youth. The program will help inform the citizenry of Maryland of the many positive roles agriculture plays in our life and community (i.e., locally produced food, ecosystem open space, shellfish aquaculture and community vitality).

4. The 4-H youth program will continue to be a hallmark program for promoting Agriculture by having 4-H youth participants gain valuable knowledge and life skills related to their 4-H agriculture (animal and plant) project work and by continuing to increase agriculture awareness for all Maryland citizens at 4-H events, shows, fairs and other educational outlets.

5. AES participates in research related to improving production of sheep and goat meat, enhancing sustainable agriculture, improving crop niche markets, increasing use of specialty crops and bio-fertilizers, determining food security parameters on Delmarva, implementing and improving integrated pest management practices, and improving protective clothing of individuals applying pesticides.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	28.0	4.0	16.0	10.3
2018	28.0	4.0	16.0	10.3
2019	28.0	4.0	16.0	11.5
2020	28.0	4.0	16.0	11.5
2021	28.0	4.0	16.0	11.5

V(F). Planned Program (Activity)

1. Activity for the Program

- AES, MAES, and UME 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, specialty crops, 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 Action Teams and MAES and AES research projects, the following planned program

activities will be emphasized: IPM; Value Added & Specialty 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 and the use of sheep and goats to manage unwanted vegetation.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Social Media) • Other 2 (Email) 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • eXtension web sites • Web sites other than eXtension

3. Description of targeted audience

- Farmers, including new and beginning farmers, and U.S. veteran farmers
- Female farmers
- Producers
- Retailers
- Plan growers and breeders

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs offered
 - Number of applied research projects
 - Acres of land exposed to educational programming efforts
 - Number of newsletters distributed
 - Number of agronomic and fruit and vegetable winter meetings
 - Number of nutrient management plans written
 - Number of individuals reached through Extension programs
 - Number of information pieces developed
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in agricultural profitability attributable to extension and research efforts.
2	Increase in small, part-time, female, veteran, and limited resource farmers
3	Increase in the amount of agricultural land under best-management practices due to Extension programming efforts
4	Increase in the number of people growing food for health and economic reasons
5	Increase in research findings that help to ensure global food security.

Outcome # 1

1. Outcome Target

Increase in agricultural profitability attributable to extension and research efforts.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 311 - Animal Diseases
- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

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

Outcome # 2

1. Outcome Target

Increase in small, part-time, female, veteran, and limited resource farmers

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Increase in the amount of agricultural land under best-management practices due to Extension programming efforts

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

Outcome # 4

1. Outcome Target

Increase in the number of people growing food for health and economic reasons

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension
- 1890 Research

Outcome # 5

1. Outcome Target

Increase in research findings that help to ensure global food security.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 311 - Animal Diseases
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 704 - Nutrition and Hunger in the Population
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

If the economy and organizational appropriations change, the number of contacts could change as well as program delivery methods.

- Public policy, government regulations, and natural disasters could alter planned research and Extension program direction and focus.
 - State budget decreases and faculty retirements effect capacity.
 - There continues to be pressure on the price of agriculture land for urban development and there is restrictive legislation in counties that impede agriculture enterprises.
 - New housing developments keep moving further from the population centers into the rural areas of the state.

- Farmers not only must contend with an array of crop production challenges but, additionally, many of them must also be aware of the concerns of their new neighbors.
- Maryland is a state that has a citizenry that has a strong environmental conscience.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Comprehensive evaluation studies are conducted each year, including such programs as Annie's Project, Women in Agriculture, New and Beginning Farmers, and the Winter Agronomic & Fruit and Vegetable Program, Good Agricultural Practices, Vegetable IPM, and others (as examples). These studies are follow-up studies that move well beyond the end-of-session, "intent to change" data.

In addition, statewide agricultural needs assessments started in 2015 and are being planned through 2016-2017 to drive future program efforts. Other evaluation projects are constantly being planned and implemented as needs emerge and resources make possible.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

Recognizing the state and nation's needs for energy independence through biofuels and other alternative energy sources, AES, MAES, and UME are trying to build program expertise in this area over the next five years. Currently, MAES has initiated a team of scientists who are developing research in the production of biofuels using animal waste, feedstock and algae. MAES, AES, and UME researchers will pursue economically and environmentally sustainable bioenergy production procedures. In addition, research in this area will help to manage animal waste by converting it to value added product (e.g., bioenergy) and help reduce its pollution potential to the environment. Research and extension faculty are planning to evaluate most efficient digestion techniques and help farmers to implement them in their farm in cooperation with the Maryland Department of Agriculture (MDA).

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	0%	0%	0%	23%
112	Watershed Protection and Management	0%	0%	0%	27%
302	Nutrient Utilization in Animals	0%	0%	0%	35%
403	Waste Disposal, Recycling, and Reuse	80%	80%	70%	0%
511	New and Improved Non-Food Products and Processes	20%	20%	30%	15%
	Total	100%	100%	100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Maryland's Energy Administration's 2010 plan (<http://www.energy.state.md.us/>) states, "The Maryland Energy Administration (MEA) has developed a four-pronged approach to promote affordable, reliable and clean energy using monies from the federal American Recovery and Reinvestment Act (ARRA) and the state Strategic Energy Investment Fund (SEIF). Specifically, MEA will offer incentives and resources directly to Maryland consumers, businesses and communities to (1) expand energy

efficiency, (2) promote renewable generation, (3) finance clean energy innovation, and (4) provide consumers energy information." As part of Maryland's program, "Smart, Green, and Growing" initiative, these programs will help reduce household bills, create new green collar jobs, address global climate change, and promote energy independence. UM research helps to find alternatives to energy production. Recently, the State of Maryland has committed funds to implement technology that can help to manage the animal waste in the farmstead and reduce its pollution potential. One of the areas considered is to implement anaerobic digestion technologies and evaluate their efficiency and potential in sequestering N and P and also reducing methane emissions that is a greenhouse gas. All of these will help the environment and mitigate GHG emissions from animal waste besides producing bioenergy. MAES, AES, and UME faculty conduct research and educational programs on used waste products (e.g., animal waste, wood waste, etc.), used food products (e.g., cooking oil), and other non-food biomass (e.g., algae, switch grass, energy beets, woody biomass, etc.) to produce energy and reduce environmental pollution.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Both federal and private emphasis for clean and sustainable energy will continue as we are faced with vital issues such as climate change, ecosystem health, and other pressures regarding fossil fuel.
- Funds will be available from Federal and State sources to establish research and extension programs on sustainable bioenergy.

2. Ultimate goal(s) of this Program

AES, MAES, and UME will contribute to the nation's energy independence by developing biomass used for biofuels and to produce value-added bio-based industrial products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	6.0	1.0	4.0	4.5
2018	6.0	1.0	4.0	4.5
2019	6.0	1.0	4.0	4.5
2020	6.0	1.0	4.0	4.5
2021	6.0	1.0	4.0	4.5

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Demonstrations • Other 1 (Social Media) • Other 2 (Email) 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension • Other 1 (Refereed Publications) • Other 2 (Refereed Symposia)

3. Description of targeted audience

- Nursery, greenhouse, dairy farmers, poultry growers and managers
- In-state bioenergy industry.
- Research community at large.
- Farmers and producers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Extension educational programs offered
- Number of applied research projects
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in the number of educational programs offered to consumers.
2	Increase in the number of research projects on alternative energy sources and precision agriculture.

Outcome # 1

1. Outcome Target

Increase in the number of educational programs offered to consumers.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 302 - Nutrient Utilization in Animals
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Increase in the number of research projects on alternative energy sources and precision agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 302 - Nutrient Utilization in Animals
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Cost of fuel and electricity
- Government incentives such as cost share programs and tax breaks
- Environmental regulations
- Availability of technology
- Demonstrated research effectiveness

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

- Pre and post-test of knowledge gained during educational event;
- Tracking progress in research through faculty participation and presentation in scientific conferences and peer reviewed publications on bioenergy and precision agriculture.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

The Maryland Agricultural Experiment Station's (MAES) at College Park, the Agricultural Experiment Station (AES) at UMES, and the University of Maryland Extension (UME) have the key outcome over the next five years that individuals & communities will become stewards to manage the environment for the mutual benefit of people, ecosystems, wildlife, natural resources, & economic interests. In the next five years, Maryland will increase the use of Best Management Practices (BMPs) to improve water, forestry, agriculture, and land quality; increase the adoption of BMPs that reduce inputs of nutrients and sediments into the environment; and, minimize environmental impact from agriculture through best management practices. Evaluating climate variability and ozone on plant response through research will be investigated.

Maryland has heavily urbanized, densely populated regions as well as agriculturally diverse and forested areas which are all sensitive to forces impacting the Chesapeake Bay and other natural resources. Natural resource education of adults, youth, and underserved communities will help to promote environmental awareness and responsible decision making, increase scientific literacy and interest of youth in science and math, and foster behavioral changes that can help communities approach a more sustainable lifestyle.

University of Maryland Extension, MAES, and AES are well situated to provide research, education, and outreach to a variety of audiences to help improve water quality, maintain viable natural resources, and reduce our footprint on the environment. With continued and new partnerships and stakeholder engagement, MAES, AES, and UME will address divergent critical issues and emerging needs that will improve the quality of Maryland waters and the management of our natural resources in light of climate variability. MAES researchers are involved with quantification of the extreme event impacts on agro-ecosystem health using hydrologic and water-quality models and building diagnostic decision support systems (DDSS) to identify best-management practices to help alleviate the impact. AES is involved in hydrologic and water-quality modeling related to harmful algal blooms, and nutrient movement and management. Also, MAES and UME faculty are using survey mechanisms to identify farmer-led climate change adaptation strategies and help advance the methods to secure farm sustainability in light of climate-change stress.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%	100%	40%	68%
111	Conservation and Efficient Use of Water	10%	0%	0%	0%
112	Watershed Protection and Management	15%	0%	30%	15%
123	Management and Sustainability of Forest Resources	10%	0%	0%	0%
131	Alternative Uses of Land	10%	0%	0%	0%
132	Weather and Climate	10%	0%	0%	0%
133	Pollution Prevention and Mitigation	10%	0%	30%	17%
205	Plant Management Systems	5%	0%	0%	0%
216	Integrated Pest Management Systems	10%	0%	0%	0%
403	Waste Disposal, Recycling, and Reuse	10%	0%	0%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Maryland, the fifth most densely populated state in the nation, is undergoing rapid changes in population growth and migration, land cover, community character, ecosystem stability, and economic diversity. State and U.S. Census Bureau estimates predict that Maryland's population will grow from approximately 6 million today to 6.7 million by 2030. Maryland has heavily urbanized, densely populated regions as well as agriculturally diverse and forested areas which are all sensitive to forces impacting the Chesapeake Bay and other natural resources.

The anthropogenic and natural impacts on the environment are complex. In many Maryland waters and in the Chesapeake Bay, a challenge is to improve water quality and maintain viable natural resources. Studies have shown that ground and surface waters contain high levels of the nutrients nitrogen and phosphorus (N and P), sediments, and toxic contaminants, all of which adversely affect water quality, aquatic organisms, fisheries, and human health. The Chesapeake Bay Agreement's proposed 40% nutrient reduction goals for N & P were not met by its 2010 deadline. New reduction goals have been outlined by in the state's Watershed Implementation Plan, WIP to address the US EPA's Total Maximum Daily Load, TMDL to restore the bay by 2035. Concerning beneficial microorganism research, many greenhouse and nursery production operations use a combination of fertilizers, growth regulators, fungicides, and insecticides to mass-produce ornamental plants in high volumes on small acreages. Consequently, non-point sources of pollutants are having a negative impact on the quality of water in watersheds and aquifers throughout the United States. Research within the AES will inform the use of beneficial microorganisms for optimal results in growing ornamental plants while protecting water quality.

Poor water quality in the Chesapeake Bay and its tributaries leads to a decline in the health of the ecosystem. Oftentimes, problems come with sediment erosion, whether it is from construction, agriculture, deforestation, reduction of buffers or changes in land use. Loss of natural filters, for instance oyster reduction due to disease and overfishing, exacerbate water quality problems. Furthermore, management issues related to pest management, septic systems, lawn care, deforestation, air deposition (particulate matter, ammonia, vehicle emissions), and climate change also impact the stability of natural systems and the improvement of water quality.

Urban and suburban sprawl has led to the conversion of thousands of acres of our native landscape into developed lands, impervious surfaces, and home lawns or gardens. New educational strategies are needed that will first change the public's view of natural, agricultural and developed areas to show how environmental and ecological system can be restored, protected and better managed.

The Chesapeake Bay 2000 agreement has specific objectives aimed at providing all school age children with a "meaningful bay experience" and the Maryland State Board of Education now requires access to environmental education for all public school children. The American Competes Act and The National 4-H Science, Technology, Engineering, and Math (STEM) initiative has challenged the nation to produce one million new scientists and one million new ideas by 2013. Strong STEM educational programs begin with teachers connected directly to current university research.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- By having better access to knowledge, research, and trends, communities and decision makers will make better land use decisions by understanding issues, options and impacts of certain types of growth management, land consumption patterns and economic and environmental impacts of growth.
 - The green industry will continue to grow and pressure from heavy population will create the need for a green industry.
 - The Water Quality Improvement Act will not be repealed, and nutrient management regulations will not change significantly.
 - After residents understand the relationship between the pesticide use and the health of their environment, they will choose to reduce the use of harmful pesticides and fertilizers.
 - Once homeowners understand how septic systems can degrade water quality and water quality can be improved through proper maintenance of existing systems, they will better maintain their existing systems and install new innovative systems.
 - Rapid urbanization from population expansion is a given.
 - Climate change will direct policy makers to make proper resources available in order to conduct research and extension programs on adaptation and mitigation practices.

2. Ultimate goal(s) of this Program

There will be improved water quality as related to agriculture, forests, and developed lands; there will be sustainable management of aquatic, forest, wildlife, soil, and air resources; and there will be diversified energy sources and improved energy conservation and efficiencies.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	16.0	3.0	11.0	3.3
2018	16.0	3.0	11.0	3.5
2019	16.0	3.0	11.0	3.7
2020	16.0	3.0	11.0	3.7
2021	16.0	3.0	11.0	3.7

V(F). Planned Program (Activity)

1. Activity for the Program

- 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods

<ul style="list-style-type: none">● Education Class● Workshop● Group Discussion● One-on-One Intervention● Demonstrations● Other 1 (Social Media)● Other 2 (Email)	<ul style="list-style-type: none">● Public Service Announcement● Newsletters● eXtension web sites● Web sites other than eXtension
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3. Description of targeted audience

- Maryland citizens;
- Master Gardeners and Naturalists;
- Urbanites
- Land developer and owners;
- UME, MAES, and AES faculty;
- USDA-NRCS conservationists;
- Soil Conservation District personnel;
- EPA-Chesapeake Bay
- 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs (workshops, twilight tours, field days, courses) offered
 - Number of applied research projects
 - Number of Master Gardeners, Naturalists, Bay-wise, Watershed stewards, and other trained volunteers to deliver educational programs
 - Number of newsletters (electronic and paper) to the public
 - Number of individuals reach through Extension programs
 - Number of information pieces developed
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased number of citizens and communities adopting practices of landscape ecology and understanding the relationship among pesticides, poor septic systems and environmental health.
2	Number of new crop varieties, animal breed, and genotypes with climate adaptive traits.
3	Increase in management and sustainability of forest and wildlife resources.
4	Increase in nutrient management planning, waste management systems, and use of composting technology.
5	Increase in research regarding agricultural waste management, composting, water quality, and environmental health.
6	Increased number of acres of best management practices (storm water, nutrient management) implemented

Outcome # 1

1. Outcome Target

Increased number of citizens and communities adopting practices of landscape ecology and understanding the relationship among pesticides, poor septic systems and environmental health.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 216 - Integrated Pest Management Systems
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

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

Outcome # 2

1. Outcome Target

Number of new crop varieties, animal breed, and genotypes with climate adaptive traits.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 205 - Plant Management Systems
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

Outcome # 3

1. Outcome Target

Increase in management and sustainability of forest and wildlife resources.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Increase in nutrient management planning, waste management systems, and use of composting technology.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Research

Outcome # 5

1. Outcome Target

Increase in research regarding agricultural waste management, composting, water quality, and environmental health.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Research

Outcome # 6

1. Outcome Target

Increased number of acres of best management practices (storm water, nutrient management) implemented

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

- Weather
- Federal, State and County funding
- Number of extension faculty
- Grants awarded
- Costs of energy
- Federal, State and County policies

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation studies will focus on measuring reduction of nutrient and sediment as related to agriculture, forests, and developed lands; sustainable management of aquatic, forest, wildlife, soil, and air resources; and diversified energy sources and improved energy conservation and efficiencies.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

In Maryland, 4-H, FCS, FSNE (Maryland's Snap-Ed program) and EFNEP educators are teaching youth in after-school and in-school settings to positively influence fruit and vegetable consumption and physical activity with the following approaches:

1. Using low-cost cafeteria environment changes, taste testings and classroom-based nutrition education, the ReFresh--Improving School Nutrition Environments in Cafeterias and Classrooms' goal is to positively influence elementary students' fruit and vegetable preferences, attitudes and consumption. Together with school food service staff and teachers, UME educators work collaboratively to design school cafeteria modifications and provide classroom nutrition education to 4th and 5th grade students in an effort to nudge students towards self-selecting more fruits, vegetables, and whole grains.

2. UME educators start and support school/youth gardens. FSNE, FCS, MG, 4-H, and EFNEP programs work with youth gardening and nutrition.

3. Let's Move Child Care is an extension of U.S. First Lady Michelle Obama's comprehensive Let's Move initiative to solve the obesity problem within a generation. Let's Move Child Care (LMCC) goals in the areas of healthy food and beverages, physical activity, reduced screen time, and infant feeding are founded on evidence-based best practices outlined in Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs. The LMCC food and beverage best practices zero in on top changes in caloric intake in 2-6 year olds since 1989, including savory snacks and fruit juice and sweetened beverages and fried potatoes.

4. "Grains Nutrition for Youth" blends nutrition education and agriculture literacy and targets youth through two programs: a school-based educational program, "Grains All The Way" and an outdoor enrichment program, "Kids Growing With Grains". The programs focus on the health benefits of eating whole grains while exploring whole grain production, manufacturing, processing and utilization. The hands-on, practical lessons demonstrate an innovative curriculum that simultaneously creates collaborations and long term relationships with administrators and teachers in public and private schools, as well as local grain utilization boards.

5. AES programs focus on promoting healthy lifestyles for preschool children enrolled in childcare centers in a rural setting.

6. MAES researchers focus on developing relationships between diet and lifestyle and the health of the adult population. The idea is to find the proper combination of diet and lifestyle for vulnerable populations, such as older adults.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	50%	100%	100%	0%
704	Nutrition and Hunger in the Population	5%	0%	0%	0%
724	Healthy Lifestyle	35%	0%	0%	100%
801	Individual and Family Resource Management	10%	0%	0%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The health problem of overweight and obesity has increased dramatically in the state of Maryland as it has across the United States. The 2010 Maryland Behavioral Risk Factor Surveillance System, a national telephone survey conducted by the Centers for Disease Control and Prevention (CDC) and state health departments, shows that about 66% of Marylanders are classified as overweight or obese. Obesity-related diseases, such as heart disease, cancer, stroke and diabetes, are among the leading causes of death in Maryland.

Healthy eating habits along with regular physical activity have an important role in weight control. Despite the proven benefits of these healthy habits, the CDC State Indicator Report for Maryland shows that fewer than 16% of adults report eating the recommended daily servings of both fruits and vegetables. Unfortunately, the statistics for adolescents are worse, with only 7% reporting daily consumption of the recommended amounts. Finding ways to increase fruit and vegetable consumption is key to improving health and well-being. Since lifelong dietary patterns begin in childhood, focusing on children, and those who feed children, is a logical focus of nutrition education interventions.

Physical activity also plays a vital role in the prevention of obesity and its complications. According to the Behavioral Risk Factor Surveillance System, 35% of Marylanders do not engage in physical activity at levels consistent with the 2008 Physical Activity Guidelines for Americans. Up to 24% of adults in the state did not participate in any physical activities or exercise during the past month. The Youth Risk Behavior Survey of 2010 found that 84% of Maryland high school students did not meet the recommended levels of physical activity.

Overweight and obesity are the results of the interaction of multiple factors. Many environmental factors promote poor diets and a lack of physical activity. Policy and environmental change initiatives that make healthy choices in nutrition and physical activity available, affordable and easy to achieve will likely be most effective in combating obesity. A recent CDC publication, Recommended Community Strategies and Measurements to Prevent Obesity in the United States, describes the relationship in this way: Healthy policies lead to healthy environments which promote healthy behaviors resulting in healthy people.

Recognizing that reversing the obesity epidemic will have health and economic benefits to the state, University of Maryland Extension (UME) through its Food Smart impact team will provide nutrition and physical activity education programs for a culturally diverse audience across the state. Initiatives will

include education to improve individual health knowledge and behaviors, educating providers to multiply the number of people receiving health education messages, and efforts to change environments and support wellness policies that improve opportunities for residents to adopt healthy lifestyles choices. Also, MAES researchers are trying to determine the relationship between diet, lifestyle, and health of older adults, especially after hospital care and return to their communities. Results of this research will be disseminated to the public to improve the well-being of vulnerable populations, such as older adults.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Resources will be available to develop and/or identify relevant curriculum and educate the audiences we intend to reach. Audiences, including Extension faculty, will be receptive to programs and have the time to commit.

- EFNEP and FSNE educators, as well as UME educators, will also implement programs designed to reduce childhood obesity.
- Other state Extension programs will have an interest and desire to partner with University of Maryland Extension in this program effort.

2. Ultimate goal(s) of this Program

The ultimate goal is to reduce childhood obesity through increased consumption of healthy foods and increased physical activity. Systems changes will occur that will result in youth having increased access to fresh fruits and vegetables based on the adoption of system changes in schools.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	10.0	1.5	5.0	0.5
2018	10.0	1.5	5.0	0.5
2019	10.0	1.5	5.0	1.0
2020	10.0	1.5	5.0	1.5
2021	10.0	1.5	5.0	1.5

V(F). Planned Program (Activity)

1. Activity for the Program

- 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.
- Develop and implement training for School Wellness Champions in pilot test sites focusing on sustainable wellness policies that support healthy lifestyles.
 - 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Social Media) • Other 2 (Email) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • eXtension web sites • Web sites other than eXtension

3. Description of targeted 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
- Childcare providers

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs offered
- Number of applied research projects
- Number of schools and child-care partnerships in childhood obesity prevention programs
- Number of school gardens developed

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in fruit and vegetable consumption among preschoolers and youth
2	Increase in school cafeteria workers' awareness, knowledge, and skills regarding healthy eating practices
3	Increase in preschoolers and youth who include physical activity in daily routine
4	Increase in preschoolers and youth who report eating more healthy foods

Outcome # 1

1. Outcome Target

Increase in fruit and vegetable consumption among preschoolers and youth

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Increase in school cafeteria workers' awareness, knowledge, and skills regarding healthy eating practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increase in preschoolers and youth who include physical activity in daily routine

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Research

Outcome # 4

1. Outcome Target

Increase in preschoolers and youth who report eating more healthy foods

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Funding streams may divert attention in ways that are not currently considered.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Program evaluations will be implemented using a variety of techniques. A systematic approach will most often be utilized across the state to collect post/pre data via surveys to document intent to change and knowledge gain. In addition, follow-up survey research will be used to document actual changes in clients, as well as the positive benefits that have accrued because of those changes.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Many Americans are disconnected from the source of their food supply. It is important that consumers, especially youth, develop an understanding of where food comes from so that they can gain a greater appreciation of food safety issues in a global economy. This program will help participants become educated consumers who can make informed decisions about buying, storing, and preparing food to maximize health and safety. Marylanders will increase or improve:

- Food systems understanding (production; processing; distribution; access and selection)
- Use of locally grown, fresh food through support of local markets
- Home and community food production
- Safe food handling practices

More Marylanders are seeking food gardening information. In 2013-2018, more Marylanders will learn how to start a garden and grow some of their own food in home and community gardens. They will reduce chemical pesticide and fertilizer use in food garden and use sustainable practices to improve soil quality and protect water resources.

During the past 30 years there has been an increased incidence of food borne illness. 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. It is important that producers and consumers practice safe food handling to decrease the burden of food borne illness. Commercial fruit and vegetable growers in Maryland will understand and adopt the use of Good Agricultural Practices (GAP).

MAES and AES will foster research projects that focus on food safety in terms of food ingredients through several projects such as engineering for food safety and quality, enhancing Maryland grown soft wheat consumption for health promotion, development of value added utilization for Maryland grown soybean varieties and functional foods, determine prevalence of foodborne pathogens, antibiotic residues, and pathogenic resistance in seafood, determine quantity of E.coli and Salmonella in organic compost uses as fertilizer, etc. Research involving specialty crops on the Delmarva Peninsula will add to the body of knowledge concerning the food safety and economic impact of food produced under organic and conventional systems.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%	100%	100%	0%
205	Plant Management Systems	10%	0%	0%	50%
404	Instrumentation and Control Systems	10%	0%	0%	0%
501	New and Improved Food Processing Technologies	20%	0%	0%	0%
502	New and Improved Food Products	20%	0%	0%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	0%	0%	25%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%	0%	0%	25%
	Total	100%	100%	100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Foodborne illness is a major and continuing public health problem in Maryland, and is also a concern with respect to bioterrorism, food security, and emergency preparedness. During the past 30 years there has been an increased incidence of food borne illness. 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. It is important that producers and consumers practice safe food handling to decrease the burden of food borne illness. Also, in light of other diseases such as colon cancer, diabetes, etc., biotechnology research is being envisioned to reduce the incidences of such disease by developing new varieties of grain (e.g., wheat and soybean) that contain high levels of beneficial biochemicals, such as antioxidants.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Participants will be receptive to receiving training and educational materials and will be willing to change their behaviors as appropriate and to share the information they receive
- Growing concern about the safety of food supply will only heighten interest in this program area.

- The number of people interested in home food preparation and food preservation continues to increase, leading to an increased need for understanding basic food safety practices and principles
 - MAES and AES assumes that funding will be available to continue the important research projects relating to food safety to ingredients in the food that will minimize chances of certain human diseases.

2. Ultimate goal(s) of this Program

The food supply becomes safer and there is a lower incidence of foodborne illness in Maryland as documented by FoodNet surveillance data. Also, new varieties of grain will be developed such that they prevent diseases such as colon cancer, diabetes, etc. In addition, selected specialty crops will be organically managed and produced in an environmentally responsible manner on the Delmarva Peninsula. Ultimately, the population becomes healthier and there is a reduction in morbidity and mortality from foodborne pathogens.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	10.0	1.5	5.0	5.7
2018	10.0	1.5	5.0	5.8
2019	10.0	1.5	5.0	6.0
2020	10.0	1.5	5.0	6.0
2021	10.0	1.5	5.0	6.3

V(F). Planned Program (Activity)

1. Activity for the Program

- 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
 - Develop food preservation educational materials/resources and disseminate to consumers via workshops and media
 - 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.

- Protect fresh produce from pathogens during production
- Control Salmonella in poultry products
- Control Vibrio in shell fish
- Establish baseline data for the presence of certain pathogens in retail beef and veal in our region

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Social Media) • Other 2 (Email) 	<ul style="list-style-type: none"> • Newsletters • eXtension web sites • Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs offered
 - Number of applied research projects
 - Number of fruit and vegetable growers using good agricultural practices
 - Number of food processing operations using good manufacturing and sanitary practices
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in people who gain basic food safety knowledge and skills
2	Increase in fruit and vegetable farmers adopting good agricultural practices
3	Increase in applied research projects
4	Increase in processors using good practices

Outcome # 1

1. Outcome Target

Increase in people who gain basic food safety knowledge and skills

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

Increase in fruit and vegetable farmers adopting good agricultural practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 205 - Plant Management Systems
- 404 - Instrumentation and Control Systems
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Increase in applied research projects

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 205 - Plant Management Systems
- 404 - Instrumentation and Control Systems
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 4

1. Outcome Target

Increase in processors using good practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 501 - New and Improved Food Processing Technologies
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

Food supplies are always subject to natural disasters, which can then impact safety issues. Food safety issues are also compounded by the fact that the food supply system is now global and regulations across countries, industries, and other segments can vary significantly.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation studies are being conducted with fruit and vegetable growers to determine the scope and use of Good Agricultural Practices (GAP).

Educational programs collect data about intent to change food handling practices.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Family & Consumer Sciences

2. Brief summary about Planned Program

The UME Family and Consumer Sciences program, in alignment with the national FCS program, "strengthens families, farms, communities and the economy by focusing on the human dimensions of food and agriculture: addressing priority issues through scientific research and its application; strategic partnerships; extension education; and the preparation of the next generation of Family and Consumer Sciences professionals."

In Maryland, Family and Consumer Sciences includes the areas of insuring your health, fostering healthy and safe environments, growing healthy kids, exploring new approaches to health promotion, health and nutrition, adult financial education, and youth financial education.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds :Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
504	Home and Commercial Food Service	10%	100%	100%	0%
607	Consumer Economics	10%	0%	0%	0%
723	Hazards to Human Health and Safety	10%	0%	0%	0%
724	Healthy Lifestyle	40%	0%	0%	0%
801	Individual and Family Resource Management	20%	0%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	10%	0%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

1. The realities of living in poverty, living paycheck to paycheck without an emergency fund, not

knowing where the next meal is coming from, not owning assets, accessing subprime credit, being behind on payments, not having health insurance, being unbanked or under-banked, and filing bankruptcy are higher for single women, for Marylanders of color, and for single parents. Children themselves are aware of the difficulties their own families and their neighbors are facing and are sincerely interested in learning about money management. Young people report that they currently care more about financial fitness than physical fitness. 64% say that financial fitness is more important than physical fitness, and 51% believe that financial education in grades K-12 is more important as compared to physical education (31%) or sex education (18%).

2. Health literate people understand health information and have the skills to use that information in making health decisions and accessing health services. The ability to access and process information and services is affected by the demands of health education and service environments. Demand is influenced by the practice of professionals whose work is in public health. Unfortunately, the majority of American adults regularly have difficulty understanding basic health information—including instructions, insurance, consent forms, even health signage. A national study found that only 12% of the population is fully proficient. And at any given time, depending on circumstances, even those adults may not be able to understand and act accordingly due to emotional, mental, or physical state of health.

3. Vulnerable populations such as children, the elderly, and minority populations are disproportionately affected by environmental health hazards. One of the highest risks for exposure to these hazards is in the home, due to the time spent there—particularly by children and the elderly, as well as workplaces and schools. Environmental health hazards negatively impact the health and economic well-being of the individual and family as well as society. The home environment includes suburban, urban, and rural homes as well as the effects of the surrounding community—neighborhood, farm, watershed, and ambient air quality.

4. According to the CDC, injuries are the leading cause of death and disabilities for people ages 1-34 years in the U.S. Injuries can be prevented by changing the environment, individual behavior, social norms, legislation, and governmental and institutional policies. The 2013 Maryland's Advocates for Children and Youth goals recommend programs and policies to keep children and youth safe and healthy in their homes, schools and communities to foster opportunities for positive development. Adults and children must understand the ramifications that a lack of understanding/knowledge of how substances such as household and farm chemicals; drugs, alcohol and tobacco can cause illnesses and even death. Approximately 38,000 poisonings and over doses are reported to the Maryland Poison Control Center every year. In 2010, some 8.1 % of the poisonings and over dose calls to the MPC involved a drug, while 50.0% of the calls involved a non-drug substance.

5. The UME 2014-2019 Strategic Plan Steering Committee released an environmental scan for emerging trends of Marylanders. One of the key findings is that as we move forward, the breaking down of internal and external silos and the exploring new partnerships will be necessary to create a sustainable structure. This includes joining and/or facilitating new organizations or coalitions with traditional and non-traditional partners, working together to develop and deliver programming, as well as secure funding to deliver health programs.

Further, this work is to occur both within and outside the university structure. While much of the work exists in the community and efforts should be largely focused in this arena, it is at times necessary and beneficial to engage with colleagues both within and outside Extension. This includes exploring potential partnerships in AGNR, the School of Public Health and others that can contribute to the mission and goals of the Health Smart Team.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Resources will be available to develop and/or identify relevant curriculum and educate the audiences we intend to reach.
- Audiences, including Extension faculty, will be receptive to programs and have the time to commit.
- EFNEP and FSNE educators, as well as UME educators, will also implement programs designed to reduce childhood obesity.
- Other state Extension programs will have an interest and desire to partner with University of Maryland Extension in this program effort.

2. Ultimate goal(s) of this Program

Youth, individuals, and families will make informed decisions about their health, finances, food, housing, and overall well-being. Residents of Maryland will have:

- An increase in home and community food production.
- An increase in consumer food safety, handling, and food preservation practices and literacy from farm to consumer to reduce food-borne illnesses.
- An increase in agricultural literacy in urban and rural areas to develop residents' understanding of the food system.

- Increased awareness and the knowledge necessary to implement improvements that result in healthier built environments, including homes, workplaces, and schools.
- Improved air quality through reducing impact from lead paint, smoke, chemicals, radon, pests, and other poisons.

- Increased physical activity.
- Increased consumption of healthful food.
- Increase basic knowledge of health issues that can result in improved quality of life.
- Improved health outcomes and reduced risk of chronic diseases over time.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	20.0	3.5	13.0	0.0
2018	20.0	3.5	13.0	0.0
2019	20.0	3.5	13.0	0.0
2020	20.0	3.5	13.0	0.0
2021	20.0	3.5	13.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Full development and implementation of Smart Choices Curriculum for Consumers focusing on making 'smart choices' related to health insurance; continue training Extension educators across the country to be certified to teach "Smart Choices."
- Develop, pre-test, pilot-test, and implement Smart Use Curriculum focusing on maximizing the use and understanding of health insurance.
- Conduct "Smart Choice" train the trainer and consumer workshops for targeted consumer groups (farm families, etc).
- Create and publish scholarly work in support of Smart Choice curriculum and associated health insurance literacy efforts.
- Conceptualize and initiate small working forum to explore the idea of developing a "Health Extension" program in collaboration with the UMD medical community.
- Piloting, testing, and implementation of Financial Nuggets Curriculum for parents and youth.
- Plan, organize, and conduct Personal Finance Seminar for Professionals (professional development for personal finance specialists, educators, and practitioners from across the country).
- Develop, pilot, and test adapted Small Steps to Health and Wealth in the Workplace; partner with Shore Health to implement SSHW on the Shore and beyond.
- Develop, review, test, and finalize on-line modules to support MD State Retirement Program participant education.
- Train Community Health Workers in MD and DC
- Promote green cleaning as a component of healthy homes
- Conduct healthy living programming at Senior Centers focusing on healthy eating and increased physical activity.
- Develop and implement educational programs focusing on safety on the farm and at home.
- Development of FCS Volunteer Program to support key programming outreach and education.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Social Media) • Other 2 (Email) 	<ul style="list-style-type: none"> • Newsletters • eXtension web sites • Web sites other than eXtension

3. Description of targeted audience

- Extension Educators
- People who need to purchase health insurance
- Professionals/Practitioners
- Childcare providers
- Youth/4-H
- Families with specific health hazards
- Older adults
- Military families

- General audiences
- Athletes, coaches, medical professionals
- University-wide faculty
- Community Partners
- Federal/State Partners
- Professionals/Practitioners

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational workshops offered
- Number of adults and youth with increased financial literacy
- Number of adults and youth with increased health literacy
- Number of youth with increased safety awareness
- Number of adults and youth with increased understanding of healthy and safe home environments
- Number of youth and adults with increased nutrition/healthy eating understanding
- Number of applied research projects

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in children and youth who report eating more of healthy foods.
2	Individuals who report increased ability to set financial goals, make savings plans, establish emergency funds, and decrease debt
3	Increase in individuals who report the adoption of healthy eating practices (including eating more fruits and vegetables, choosing high fiber foods, choosing more whole grains)
4	Increase in people reporting the adoption of healthy home practices
5	Increase in reported confidence and capability to make smart health insurance decisions
6	Increased research findings that contribute to individuals and families well-being and quality of life.

Outcome # 1

1. Outcome Target

Increase in children and youth who report eating more of healthy foods.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

Individuals who report increased ability to set financial goals, make savings plans, establish emergency funds, and decrease debt

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increase in individuals who report the adoption of healthy eating practices (including eating more fruits and vegetables, choosing high fiber foods, choosing more whole grains)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

Increase in people reporting the adoption of healthy home practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

Increase in reported confidence and capability to make smart health insurance decisions

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Increased research findings that contribute to individuals and families well-being and quality of life.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

- Limited funding, willingness of participants, engagement of community, lack of time, demographical changes in society, effective utilization of volunteers to supplement diminished workforce.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Comprehensive evaluation of health insurance literacy program.
Follow-up evaluation studies in both financial and nutritional programs.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

4-H Youth Development

2. Brief summary about Planned Program

4-H provides a supportive setting for all youth to reach their fullest potential. Youth learn beneficial cognitive and life skills through community-focused, research-based experiential educational programs. 4-H helps youth become competent, caring citizens. Maryland 4-H has seven major program areas to achieve the Maryland 4-H Program mission, vision, and core program components:

1. Animal Sciences
2. Environmental Science & Technology
3. Expansion & Outreach
4. Healthy Living
5. Military Programs
6. Youth and Adult Leadership
7. Science, Engineering, & Technology

Youth, families and communities need access to community resources that offer high quality youth development experiences. Maryland 4-H creates high quality youth development opportunities for culturally diverse audiences that embrace the essential elements of 4-H and contribute to positive youth development for all children and youth.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%	100%	100%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Maryland's youth face a future of both opportunities and potential threats. The following priority situations areas have been identified:

1. Young people are not receiving sufficient education around financial issues and consequently are ill-prepared to take on the increased responsibility they face when they get to college and/or enter the workforce. Therefore, it is imperative that UME and Maryland 4-H strive to educate youth at a young age the importance of saving before they graduate in hopes of preparing them for a better financial future.

2. Animal agriculture is the largest component of Maryland agriculture based on value of production. According to the 2007 Census, Maryland agriculture totaled \$1.2 billion dollars of farm gate receipt, of which 66% was animal generated. Youth serve as producers of animal products. It is important that they learn best management practices that ensure production of high quality products and long-term sustainability and profitability of their enterprise. These best management practices could include but are not limited to: bio-security, quality assurance, nutrition, health, food safety, marketing, breeding, aquaculture, etc.

3. Research shows that service matters in some unexpected ways. Volunteering is associated with stronger communities, measurable health benefits, individual academic achievement, community participation and civic engagement, and opportunities for professional development. Moreover, by supporting their neighborhoods, volunteers are estimated to contribute anywhere from \$150 to \$300 billion in services and time to the national economy. Volunteers are the backbone of the 4-H program and it is vital that their training is made a top priority so that they are better equipped to go out and multiply the efforts of the faculty and staff.

4. Education is key to a vital and thriving workforce and an essential component to community development work is education of the next generation. The U.S. faces a future of intense global competition with a startling shortage of scientists. In fact, only 18 percent of U.S. high school seniors are proficient in science (NAEP 2005) and a mere 5 percent of current U.S. college graduates earn science, engineering, or technology degrees compared to 66 percent in Japan and 59 percent in China.

5. Engaging youth and adults in new and attractive technology based activities such as robotics, computer sciences, digital photography and digital media arts will lead the community into a forward thinking technology based society. This will impact the future for youth to expand their career interests in the field of science, engineering and technology. There is a need for a diverse pool of trained people for the workforce, including scientists, programmers and others who understand science and technology, to frame and solve problems and educate others.

6. Maryland continues to experience environmental changes and pressures. Population increase, changing land use from agricultural to residential, and overall ecosystem sustainability are some of these pressures. The anthropogenic and natural impacts on the environment are complex. In many Maryland waters and in the Chesapeake Bay, a challenge is to improve water quality and maintain viable natural resources.

7. Marylanders food choices are based on their knowledge, experience and access to safe, healthy and affordable food. During the past 30 years there has been an increased incidence of food borne illness. 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. It is important that producers and consumers practice safe food handling to decrease the incidence of food borne illness. Educating youth and families on growing and buying local foods, will assist in decreasing the incidence of foodborne illnesses, and increase local gardening practices.

8. With a high incidence of childhood obesity and disease, there is a need in Maryland to provide nutrition education through enrichment programs (i.e., afterschool, ag literacy class programs, club programs, and in collaboration with community partners).

9. Community Leadership and Civic Engagement is the heightened sense of responsibility to one's community. Within the Operation Military Kids (OMK) project this responsibility extends to two communities - the physical community that our military families live in and the military communities that embrace our service members and their families. It is the responsibility of the OMK project to educate the physical community on the issues our military faces and to educate military families on the support offered to them.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- 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.
 - 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.
 - 4-H will continue to be recognized as the youth development program for military kids.
 - Private funding will continue to be secured, expressing a belief in individuals' and the private sector's commitment to youth development.

2. Ultimate goal(s) of this Program

4-H provides a supportive setting for all youth to reach their fullest potential. Youth learn beneficial cognitive and life skills through community-focused, research-based experiential educational programs. 4-H helps youth become competent, caring citizens. Maryland 4-H is committed to positive youth development programming that involves citizenship education, civic engagement, service learning for youth, youth-adult partnerships, volunteer development for teens and adults, and experiential leadership experiences for youth and adults.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	17.0	0.0	0.0	0.0
2018	17.0	0.0	0.0	0.0
2019	17.0	0.0	0.0	0.0
2020	17.0	0.0	0.0	0.0
2021	17.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

1. 4-H community clubs will be conducted focusing on activities that support youth learning science and technology, healthy living, and citizenship
2. 4-H school enrichment programs
3. 4-H Operation Military Kids programs
4. Camping programs
5. State and county fairs
6. Demonstrations
7. Adventures in Science programs
8. Other special interest clubs and activities, such as Health Rocks!

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

- All youth in the State of Maryland
- All youth who are children of military parents
- All adults with an interest in becoming 4-H volunteers
- Businesses who would be interested in financially supporting 4-H programs
- Community partners

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of community club programs offered
- Number of members enrolled in school-based clubs, community clubs, 4-H military programs, and camps
- Number of youth engaged in Science, Engineering, and Technology
- Number of youth engaged in building citizenship skills
- Number of youth involved in healthy lifestyles
- Number of adult 4-H leaders
- Number of youth enrolled through the Health Rocks program
- Number of Youth Enrolled in 4-H Adventure in Science program

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in youth reporting adoption of healthy eating behaviors
2	Increase in youth who intend to engage in community projects and community leadership positions
3	Increase in the number of youth and adults adopting animal science practices that demonstrate <u>increased knowledge of raising animals in a responsible, ethical, and ecologically viable manner</u>
4	Increase in the number of youth who report aspirations to pursue science-related fields in college
5	Increase in youth who intend to pursue science-related careers
6	Increase in youth who practice environmentally responsible behaviors
7	Increase in youth and families who report becoming more literate in concerns surrounding global hunger and its relationship with agriculture, understanding of food systems, and the relationship of agriculture, food, nutrition, and the economy.

Outcome # 1

1. Outcome Target

Increase in youth reporting adoption of healthy eating behaviors

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Increase in youth who intend to engage in community projects and community leadership positions

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increase in the number of youth and adults adopting animal science practices that demonstrate increased knowledge of raising animals in a responsible, ethical, and ecologically viable manner

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Increase in the number of youth who report aspirations to pursue science-related fields in college

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Increase in youth who intend to pursue science-related careers

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Increase in youth who practice environmentally responsible behaviors

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Increase in youth and families who report becoming more literate in concerns surrounding global hunger and its relationship with agriculture, understanding of food systems, and the relationship of agriculture, food, nutrition, and the economy.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

- Change in the youth population and demographics could change outcomes
- Reduced funding could limit the number of programs being conducted and the number of youth that are reached
- An economic downturn could limit private funding to 4-H

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation data are being collected in the areas of science, healthy living, and citizenship across all 4-H educator programming. In addition, specific program evaluations are implemented as planned by educators.