

**V(A). Planned Program (Summary)**

**Program # 1**

**1. Name of the Planned Program**

Global Food Security and Hunger

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

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

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

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

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

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

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

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

### 2. Brief description of the target audience

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

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

**3. How was eXtension used?**

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

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	1861680	80000	27743	0

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

**Patent Applications Submitted**

Year: 2012  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2012	Extension	Research	Total
<b>Actual</b>	25	80	105

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	30

### **Output #2**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	35

### **Output #3**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	25

### **Output #4**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	50

### **Output #5**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	170

### **Output #6**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	80

### **Output #7**

#### **Output Measure**

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

<b>Year</b>	<b>Actual</b>
2012	400

**Output #8**

**Output Measure**

- Global Agriculture & Hunger: Research studies

<b>Year</b>	<b>Actual</b>
2012	1

**Output #9**

**Output Measure**

- Aquaculture: Research studies

<b>Year</b>	<b>Actual</b>
2012	1

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

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

## **Outcome #1**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

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

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

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

#### **What has been done**

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

#### **Results**

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

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

#### 4. Associated Knowledge Areas

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

### Outcome #2

#### 1. Outcome Measures

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

#### 2. Associated Institution Types

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

#### 3a. Outcome Type:

Change in Knowledge Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2012	0

#### 3c. Qualitative Outcome or Impact Statement

##### **Issue (Who cares and Why)**

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

### **What has been done**

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

### **Results**

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

## **4. Associated Knowledge Areas**

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

## **Outcome #3**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

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

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

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

#### What has been done

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

#### Results

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

### 4. Associated Knowledge Areas

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

### Outcome #4

#### 1. Outcome Measures

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

#### 2. Associated Institution Types

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

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

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

**What has been done**

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

**Results**

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

**4. Associated Knowledge Areas**

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

## **Outcome #5**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

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

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

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

#### **What has been done**

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

#### **Results**

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

state.

#### 4. Associated Knowledge Areas

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

#### Outcome #6

##### 1. Outcome Measures

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

##### 2. Associated Institution Types

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

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	0

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

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

### **What has been done**

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

### **Results**

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

## **4. Associated Knowledge Areas**

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

## **Outcome #7**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

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

### **3a. Outcome Type:**

## Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2012	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

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

#### What has been done

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

#### Results

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

### 4. Associated Knowledge Areas

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

## **Outcome #8**

### **1. Outcome Measures**

Aquaculture Research

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

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

#### **What has been done**

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

#### **Results**

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

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
704	Nutrition and Hunger in the Population

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

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

### **Brief Explanation**

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

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

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

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

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

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

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

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

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

## **Key Items of Evaluation**