Annual Report of Accomplishments and Results

Maryland Joint Extension and Research Report

on the

Maryland Joint Extension and Research Plan of Work

As Submitted July 15, 1999

For

Fiscal Year 2004
Ending September 30, 2004

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Maryland Agricultural Experiment Station
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Summary

This document constitutes the Annual Report of Accomplishments and Results for the fiscal year 2004 (October 1, 2003 to September 30, 2004) for the research and extension activities in Maryland subject to the Agricultural Research, Extension and Education Reform Act of 1998. This includes activities of the Maryland Cooperative Extension, a joint enterprise of the University of Maryland and the University of Maryland Eastern Shore, the Maryland Agricultural Experiment Station and the research activities at the University of Maryland Eastern Shore.

Accomplishments are reported for the five goals of the US Department of Agriculture as required. The report is organized as follows:

Part A. Planned Programs

REE Goal 1.	**To Achieve an Agricultural Production System that is Highly Competitive in the Global Economy**
REE Goal 2.	**A Safe, Secure Food and Fiber System**
REE Goal 3.	**A Healthy, Well-nourished Population**
REE Goal 4.	**Achieve Greater Harmony (Balance) between Agriculture and the Environment**
REE Goal 5.	**Enhanced Economic Opportunity and Quality of Life for Americans**
Goal 6.	**Agricultural Communications, Enhancing Customer Service/Satisfaction Information Technologies.**
Goal 7.	**Multicultural and Diversity Issues**

Part B. Stakeholder Input Process
Part C. Program Review Process
Part D. Evaluation of the Success of Multi and Joint Activities
Part E. Multi-state Extension Activities
Part F. Integrated Research and Extension Activities
Appendix: Tables of Resource Expenditures by Planning Goal (FORM CSREES-REPT 2/00) for:

Multi-state Extension Activities
Integrated Activities (Hatch Act Funds)
Integrated Activities (Smith-Lever Act Funds)

This report of accomplishments and results organizationally corresponds with the original plan of work submitted in 1999. The plan of work can be found at the following web site:

http://www.agnr.umd.edu/intranet/plan99/powoutline.htm

Parts B-F repeat some of the working from the original plan of work for clarity of presentation. Comments and explanations on the Accomplishments and Results added for this report are shown in ***bold italics*** in Parts B-F. Each section of this report begins on a separate page.

Part A. Planned Programs

Outline of Example Programs

REE Goal 1. To Achieve an Agricultural Production System that is Highly Competitive in the Global Economy

1.1. Adopt management practices for agriculture production that improve profitability and increase efficiencies

Project 1.1.1. Integrated Beef Cattle Research and Education Project
Project 1.1.2. Monitoring Approaches and Alternative Control Tactics to Facilitate IPM for Landscape Plants
Project 1.1.3. Converting Dietary Protein into Tissue Gain or Milk in Ruminants
Project 1.1.4. Using Animal-harvested Forages to Increase Farm Profits
Project 1.1.5. Vegetable and Fruit Production (New Vineyard Establishment)
Project 1.1.6. Maryland Quality Wine Alliance
Project 1.1.7. Managing Pests in Organic Crop Production
Project 1.1.8. Sheep & Goat Production
Project 1.1.9. UMES - Characterizing Cowpea Genotypes for Drought Tolerance in the Delmarva Ecosystem
Project 1.1.10. UMES - Controlling Ineffective *Bradyrhizobium* with Phages to Enhance Nitrogen Fixation in Soybean
Project 1.1.11. UMES - Cloning a Novel Satiety Factor in Swine and its Effects on Pituitary Hormones
Project 1.1.12. UMES - Nutritional Surveys of Uncultivated Sea Vegetables from the Chincoteague Bay
Project 1.1.13. UMES- Sustainable Pasture Lamb Production
Project 1.1.14. UMES-Goat and Sheep Production Support
Project 1.1.15. UMES- Competitive Small Scale Swine Production

1.2. Adopt improved farm business management and marketing strategies

Project 1.2.1. The Dairy Analysis Program
Project 1.2.2. Farm Profitability & Marketing

1.3. Increase the use of appropriate production and marketing strategies for high value products

Project 1.3.1. Major Program Area: Small Farm Profitability
Project 1.3.2. Production of Alternative Crops with Value-added Enhancements

1.4. Increase the investment in agricultural human capital

Project 1.4.1. Community Leadership – Public Leadership Development

1.5. Facilitate informed debates of public issues concerning the neighborhood effects of agriculture, such as nuisance concerns and environmental impacts.

Project 1.5.1. Close Encounters With Agriculture
Project 1.5.2. Managing Growth in an Urban State

REE Goal 2. A Safe, Secure Food and Fiber System

2.1. Decrease the number of Maryland citizens at risk for insufficient food availability to meet nutrient needs

Project 2.1.1. Multi-County. Expand Food Safety Skills and Practices to Citizens.
Project 2.1.2. EFNEP Helps Limited-Income Families Choose Healthy and Nutritious Foods.
Project 2.1.3. EFNEP County Example
Project 2.1.4. FSNEP Program Helps Maryland Residents at Risk for Insufficient Food to Meet Nutrient Needs
Project 2.1.5. FSNEP Youth Program
Project 2.1.6. FSNEP New Curriculum

2.2. Improve consumers' knowledge and practice of safe food

Project 2.2.1. UMES - Development of Predictive Models for The Survival of *Campylobacter jejuni* on Chicken as a Function of Temperature
Project 2.2.2. Neighborhood GRIME Watch

2.3. Improve the knowledge and practice of safe food production and handling by commercial and public food industry

Project 2.3.1. Washington County. Food Safety Trainings
Project 2.3.2. Feeding the Community Safely and Feeding the Children Safely
Project 2.3.3. Seafood Safety for Industry
Project 2.3.4. Real-time Response Biosensor for *E. coli*
Project 2.3.5. Surveillance Program to Monitor Antimicrobial Resistance in Foodbourne Pathogens.
Project 2.3.6. UMES - Characterization of Antibiotic-Resistant *Salmonella* spp. Isolated from Processed Poultry
Project 2.3.7. UMES - Education Program for Improving Food Safety on the Delmarva Peninsula
Project 2.3.8. UMES - Safe and sustainable production of sheep and goat meat

REE Goal 3. A Healthy, Well-Nourished Population

3.1. Improve Maryland citizens' knowledge and practice of healthy diet and nutrition behaviors

Project 3.1.1. Diabetes Education for Limited Resource and Minority Communities
Project 3.1.2. Prevention of Obesity – A County Example

Project 3.1.3. Prevention of Chronic Disease for Limited Resource Families
Project 3.1.4. Childhood Obesity Prevention
Project 3.1.5. Healthy Living Through Physical Activity and Good Nutrition
Project 3.1.6. Wellness Works
Project 3.1.7. Evaluation of an Interactive Community Based Program

REE Goal 4. Achieve Greater Harmony (Balance) between Agriculture and the Environment

4.1. Improve the application and adoption of land-applied biosolids, manure, composted materials, and other organic byproducts.

Project 4.1.1. Nutrient Management Program
Project 4.1.2. Low Phytate Soybeans Increases Poultry Nutrition and Reduces Manure Phosphorus

4.2. Improve water quality through the adoption of sound environmental stewardship practices by the public and municipalities.

Project 4.2.1. Private Well and Septic System Management
Project 4.2.2. Deep Row Biosolid Application to Grow Trees
Project 4.2.3. Maryland Residents Receive 'Homework' Assistance
Project 4.2.4. MD Master Gardeners Program (Volunteers Help Home Gardeners Reduce Pesticide Use & Improve Water Quality)
Project 4.2.5. Greenhouse Integrated Pest Management
Project 4.2.6. Home & Garden Information Center

4.3. Maintain a water supply capable of supporting both commercial and private needs today and in the future by protecting and conserving surface and ground water resources.

Project 4.3.1. Improve Water Quality Through Water Conservation – Baywise landscape management
Project 4.3.2. Improve Water Quality – Environmental Stewardship

4.4. Maintain a water supply capable of supporting both commercial and private needs today and in the future by protecting and conserving surface and ground water resources.

Project 4.4.1. Intensive Nutrient Management for Efficient Crop Production
Project 4.4.2. Constructed Wetlands for Treating Dairy Wastewater
Project 4.4.3. UMES - Best Management Practices (BMPs) Recommendations to Improve Management of P Losses from Soil
Project 4.4.3.b. UMES - The Effect of Phosphorus and Nitrogen - Based Manure Management on Soil and Runoff Phosphorus
Project 4.4.4. UMES - Development of National and International Standards and Performance Specifications for Protective Clothing Materials
Project 4.4.5. UMES - Reduction in Animal Waste Pollution through the Use of Enzymes to Improve Phosphorus Digestion

Project 4.4.6. Characterizing Soybean and Corn Genotypes for Phosphorus Hyperaccumulation

4.5. Promote the use of rural and urban forest stewardship practices to maintain a sustainable forest resource.

Project 4.5.1. Coverts Project
Project 4.5.2. Protecting and Profiting From Forest Lands - Forestry Correspondence Course

4.6. Improve fish and wildlife habitat and species diversity, as well as promote the use of new management techniques that will manage wildlife and control damage to property, crops, and people.

Project 4.6.1. Reforestation at Western Maryland 4-H Center
Project 4.6.2. UMES -Impact of Population Reduction on Movement, Health, and Reproductive Behavior in Nutria

REE Goal 5. Enhanced Economic Opportunity and Quality of Life for Americans

5.1. Enhancing Rural Economic Opportunities

Project 5.1.1. Developing Rural Economic Strategies

5.2. Adopt effective and responsive policies and programs; Increase ability of Extension faculty to lead Public Issues Education programs; Increase the abilities of Extension volunteers to successfully carry out Extension programs;

Project 5.2.1. Managing Growth in an Urban State-Strategic Planning for Jurisdictions and State Agencies

5.3. Adopt effective leadership practices; Increase leadership ability of Youth, Adults, Extension Personnel

Project 5.3.1. Developing Community Leaders - LEAD Maryland
Project 5.3.2. Youth Civic Engagement
Project 5.3.3. 4-H Youth Development Develops Leadership Skills – A County Example
Project 5.3.4. Youth-Adult Partnerships
Project 5.3.5. Youth Civic Involvement and Leaderships Development in Baltimore City
Project 5.3.6. 4-H Club Leader On-Line Leadership Training

5.4. Strengthen skills and knowledge to achieve economic stability and financial welness

Project 5.4.1. Maryland Cooperative Extension Personal Finance Seminar for Professionals.
Project 5.4.2. Financial Stability – A County Example
Project 5.4.3. Maryland Saves

5.5. Develop and accept individual, parental, home, financial, and/or community responsibility through work, family and community involvement.

Project 5.5.1. Maryland Cooperative Extension Child Care Provider Training.
Project 5.5.2. 4-H After-School Initiative
Project 5.5.3. 4-H After-School – A County Example

5.6. Enhance the attractiveness of Maryland youth to potential employers to enable youth to be productive, contributing members of a global society; Increase the ability of Maryland youth to have caring relationships with family members, peers, and others in their communities; Increase the abilities of Maryland youth to be competent youth leaders with a strong commitment to civic and social responsibility; Strengthen Maryland youth's understanding of the importance of good health and safe and healthy lifestyles.

Project 5.6.1. Dads Make A Difference
Project 5.6.2. 4-H and County Drug Court Commissions
Project 5.6.3. 4-H Animal Science Program

5.7. Youth Development - Character/Ethics Education

Project 5.7.1. Carroll County 4-H Kids On The Block Disability Awareness Program.
Project 5.7.2. Youth Community Gardening

5.8. Youth Development - Jobs/Employment, Workforce Preparation

Project 5.8.1. Somerset County. Power Up Lab and Cyber Cafe
Project 5.8.2. Life Smarts – Teaching Teens to be Smart and Responsible Consumers and Citizens

REE Goal 6. Agricultural Communications, Enhancing Customer Service/Satisfaction Information Technologies.

Project 6.1.1. UMES - Development of a Distance Education Classroom
Project 6.1.2. UMES - Enhancing Instruction through Web-Assisted Courses
Project 6.1.3. UMES - Establishing a Geospatial Information Technology Training Center for Minority and Other Student Audiences-Phase II

REE Goal 7. Multicultural and Diversity Issues

Part A. Planned Programs

REE Goal 1. To Achieve an Agricultural Production System that is Highly Competitive in the Global Economy

Overview

There are 12,200 farms in Maryland, covering 2.1M acres; 1.5M acres are devoted to crops. Total land area in Maryland is 6.7M acres, with 62,700 employed. Maryland farms are typically small and farmland is expensive. With 169 acres, the average farm in Maryland is the 10th smallest in the nation. The estimated market value of land and buildings per acre is $2,911, the fifth most expensive in the nation. Even though Maryland has one of the most progressive Land Preservation Programs in the nation, three times more farmland is lost to development every year than is preserved. Between 1950 and 1999, the number of farms and acres of farmland has fallen 66 percent and 48 percent, respectively.

Total annual gross farm income in Maryland averages 1.7B dollars, with $220M in exports. The important commodities are poultry and eggs, nursery and greenhouse (fastest growing industry), dairy and milk products, feed/food/oil crops, meat animals, and vegetables and fruit. On average, the net income per farm in Maryland is $33,036, while off-farm income averages $20,000. Slightly more than half of the farmers describe farming as their principal occupation. A small percentage of agricultural producers are responsible for the majority of agricultural sales. Farms with gross market sales exceeding $100,000 represent 21 percent of Maryland farms by number, but their sales represent 86 percent of the total sales. Crop damage from deer and geese is estimated at $17 M annually.

The first inventory of Maryland's "green industry" indicated it has a value in sales of $1.15 B making it the second largest agriculture industry. This industry employees 15,000 and involves 10,000 acres.

The equine industry's first census indicated 87,000 horses, mules and donkeys are in Maryland. This industry employs 38,000 people and involves 685,000 acres. Maryland's equine inventory is valued at $680M ($7,810/animal) and the value of all equine related assets at $5.2 B, with $766 M in related expenditures annually.

Maryland's principal agricultural advantage is location to markets. Grain farmers benefit from the poultry industry. Fruit, vegetable, dairy, beef, swine, horticultural products, and other specialty crops are sold to the five million people in the Washington-Baltimore region.

Maryland farmers are older and aging, reflecting a national trend. Maryland farmers average 55.8 years of age, compared to the U.S. average of 53.3. Maryland residents demonstrate a strong tendency to purchase locally grown commodities and value-added products, support local farmers, and preserve open space. These residents want to preserve and protect such natural resources as the Chesapeake Bay, so environmental concerns about agriculture play an increasing and significant role in the operation of Maryland farms. Maryland's poultry industry produces the largest dollar value in production and exports a substantial portion of its production.

The primary goals are:

- Adopt management practices for agriculture production that improve profitability and increase efficiencies.
- Adopt improved farm business management and marketing practices.
- Increase the use of appropriate production and marketing strategies for high value products.
- Increase the investment in agricultural human capital.
- Facilitate informed debates of public issues concerning the neighborhood effects of agriculture, such as nuisance concerns and environmental impacts.

Outputs

For REE Goal 1, Maryland Cooperative Extension educators developed 1732 programs in 23 counties, Baltimore City, three regions of Maryland, state, multi-state, and national. Topics covered included best management practices, business planning, alternative agriculture, livestock, crop production, and sustainable agriculture.. These programs reached 69,570 people.

Outcomes and impacts were measured in individual programs. Examples of these are in the following section.

Maryland's own assessment of accomplishments. Maryland Cooperative Extension is accomplishing the goals of their five-year report. There is a balance of educational programs among the various goals and the Extension Administration Team is pleased with the accomplishments. Evaluations of outcomes from the five-year plan are conducted at the individual program level, not at the level of an aggregated REE goal.

1.1. Adopt Management Practices for Agriculture Production that Improve Profitability and Increase Efficiencies

(Key Themes – Agricultural Competitiveness, Animal Health, Animal Production Efficiency, Grazing, Innovative Farming Techniques, Ornamental/Green Horticulture, Plant Health, Plant Production Efficiency, Precision Agriculture)

(Key Themes from Goal 4: Biological Control, Integrated Pest Management, Sustainable Agriculture)

The Maryland Agricultural Experiment Station supports over 100 faculty and over 100 graduate students. Research is conducted both in the laboratory as well as at 10 research farms located off the main campus. Much of the research supported by the Maryland Agricultural Experiment Station has focused upon protection of the Chesapeake Bay. Nearly 40% of all research supported is directly related to the protection and restoration of resources of the Bay. The other major focus within this goal is the maintenance of profitable agriculture in an urban environment. Maryland farmers are under extreme pressure from a growing population. Issues such as land preservation, food safety and sustainable agriculture are high priorities.

Examples of research projects include the following:

Project 1.1.1. Integrated Beef Cattle Research and Education Project

a. Project Statement. The integrated beef cattle research and education project includes research and demonstration efforts aimed at improving the efficiency, profitability and sustainability of beef cattle production.

Predicting Future Growth Potential: A long-term study of the control of growth in beef cattle. The goal of this research is to develop a simple, rapid and inexpensive blood test to identify superior future breeding cattle at the earliest possible age.

Exploring the Use of Ultrasound: A comprehensive assessment of the use of ultrasound technology to evaluate carcass composition in live beef cattle. The goal of this work is to develop a rapid and accurate method to assess key carcass traits in the live animal, improve the accuracy of selection for superior breeding cattle, and reduce carcass variation at the time of processing.

Alternative Beef Cattle Feeding Systems: An evaluation of the use of available alternative and non-traditional feedstuffs in the diets of beef cattle. The goal of this work is to develop feeding systems which maintain animal performance, reduce total feed costs and utilize available byproduct or non-traditional feeds.

Year-Round Grazing Systems: A comparison of pasture and forage production systems to provide extended and year-round grazing opportunities for beef cattle. This includes the combined use of adapted cool and warm season grasses and inter-seeded legumes to extend the grazing season and provide adequate nutrient flow for all classes of beef cattle.

Assessing Emerging Animal Health Technology: An evaluation of the efficacy and economics of emerging animal health products. Studies have been conducted on the impact of a new sustained release dewormer on growth performance of nursing beef calves and on the efficacy of a complete metaphylaxis program to control bovine respiratory disease in recently weaned feeder cattle.

b. Impacts.

- Earlier and more accurate selection of breeding cattle resulting in significantly reduced whole herd production costs ($300-$350/head) compared to traditional post weaning growth evaluation practices.

- Earlier and more rapid assessment of key carcass characteristics associated with added value in beef breeding bulls and heifers.

- Reduced cash feed costs at all stages of the beef production cycle equivalent to a savings of $60 to $140 per head per year.

- Improved rate of weight gain and fed efficiency in growing calves with subsequent savings of $18 to $21 per head per year.

- Reduced morbidity and mortality in young growing beef calves with an overall improvement in production efficiency and profitability.

- Research focused on improved methods of early selection will reduce the number of head needed to provide future breeding stock thereby reducing feed needs, waste production and land use by individual beef producing units. Improvements in growth rate, feed efficiency and product (carcass) composition will result in a more consumer friendly product produced more efficiently at a reduced cost. The use of alternative feedstuffs and improved use of pastures and forage will reduce animal competition for human foods such as grains. Advances in the control and maintenance of animal health will reduce the therapeutic use of animal health products, improve beef quality assurance and increase consumer confidence in the safety and integrity of the food supply.

c. Source of Funding: Maryland Agricultural Experiment Station, Private Donor Support.

d. Scope of Impact: National.

Project 1.1.2. Monitoring Approaches and Alternative Control Tactics to Facilitate IPM for Landscape Plants

a. Project Statement. This research develops management approaches that reduce the reliance on synthetic pesticides to manage insect pests in landscapes and nurseries. We have investigated the roles of fertilization, irrigation, exposure to sunlight, colonization, vegetational complexity and the impact of natural enemies in contributing to the pest status of the azalea lace bug on azaleas. Fertilization, irrigation, exposure to sunlight and colonization events contributed little to the population dynamics of this pest. Vegetational diversity and natural enemies are the major determinants of the status of this insect as a pest in landscape habitats. A second project evaluates boxwood cultivars for their levels of resistance to the boxwood leafminer. This project was conducted at the US National Arboretum and Longwood Gardens and significant levels of resistance to the boxwood leafminer were detected. The mechanism of resistance appears to be antibiosis rather than antixenosis or tolerance. An evaluation of pheromone lures was performed for clearwing borers common in the mid-Atlantic region. A checklist of borers caught by commercially available lures was completed. Several formulated biological control agents are under evaluation in nursery and landscape settings.

b. Impacts.
Economic. By understanding the effect of vegetational diversity on pest occurrence landscapes can be designed to reduce the potential for pest populations to reach outbreak levels. This in turn reduces the maintenance costs associated with landscape management. By producing boxwood that are resistant to their major insect pests

nursery growers can realize a significant competitive advantage. Consumers who use these resistant cultivars lower their maintenance costs. Plant growers and landscape managers who use pheromone traps will treat clearwing borers in a more efficacious manner thereby reducing losses in production and maintenance. Using microbial biological agents reduces the reliance on synthetic pesticides in nurseries and landscapes.

Product Quality. Product Quality is improved through pest resistant landscape design, use of resistant plant cultivars, and pinpoint application of insecticide treatments will result on better plant quality.

Environmental. Reduced use chemical insecticides to produce plants and maintain landscapes will reduce adverse impacts on beneficial insects and non-target organisms found in nurseries and landscapes. Reduced insecticide inputs reduce the risk of environmental contamination in the sensitive ecosystems surrounding the Chesapeake Bay.

Human/Animal Health. A reduction in insecticide sprays to control insect pests reduces exposure of humans and animals to dangerous insecticides thereby reducing health risks. The use of biological control agents instead of these insecticides further reduces risks to animals and humans.

Social. Maintaining the beauty of landscape plants increases the aesthetic quality and value of home, commercial, and institutional landscapes.

c. Source of Funding: Hatch Project MD-H-188.

d. Scope of Impact: National.

Project 1.1.3. Converting Dietary Protein into Tissue Gain or Milk in Ruminants

a. Project Statement. Although ruminants convert human inedible plant material into high quality human edible food, they are very poor at converting dietary protein and energy into tissue gain or milk. This is a particular problem in ruminants fed forages and grasses where production is low and the efficiency of depositing dietary nitrogen into animal products may reach only 15%.

b. Impacts. The overall goal of this project is to investigate two aspects of ruminant metabolism that may contribute to nitrogen inefficiency: 1) amino acid and energy metabolism by the gut tissues and 2) urea recycling. The ability to identify the critical control points and regulators of these processes has great potential to improve efficiency and production of ruminants. This research will lend itself to the development of feeding strategies that optimize performance and reduce nutrient wastage in ruminants.

c. Source of Funding: Hatch.

d. Scope of Impact: International.

Maryland Cooperative Extension educators developed 780 programs that were held in 23 counties, Baltimore City, three regions in Maryland, statewide, multi-state, and national. Topics covered were best management practices for plant, poultry, and animals systems; geographic information systems and biotechnology; optimizing pasture and forage resources on the farm; economically sound alternatives that mitigate runoff of nutrients and pesticides from the farm; composing and the use of nutrient management plans on small farms. These programs reached 19,524 people.

Examples of educational programs include the following:

Project 1.1.4. Using Animal-harvested Forages to Increase Farm Profits

a. Project Statement. The objective of this Extension program is to increase farm profitability through the reduction of farm expenses with a secondary objective of attracting the next generation to the farm by improving the farm family's quality of life.

Farmer-to-farmer discussion groups such as pasture walks provide a viable means of disseminating information. These two-hour workshops take place on farms currently practicing management-intensive grazing (MiG). Producers are able to witness first-hand the practices that make MiG effective. This year 110 producers participated in 5 walks in Frederick County. Total number of participants for pasture walks is lower than in 2003, but participation per walk has risen from 26.7 to 27.5. An additional 75 producers were reached with research-based information on grazing systems during farmer workshops in Frederick and Howard Counties. During 2004, three dairymen have begun using grazing for a portion of their animals. An additional 51 producers and agri-service representatives were reached with research-based information on grazing systems during farmer workshops in Frederick and Howard Counties.

b. Impacts. Based on the five-year average financial data from 27 Maryland farms, of which 9 are grazing operations, graziers have a higher profit per hundred pounds of milk sold ($4.01 vs. $2.62), per cow ($566 vs. $513), and total dollar profits ($49,487 vs. $44,605) compared to confinement operations. This demonstrates that high farm profits can be achieved without expanding herd size or chasing high production per cow.

Extension educators, have continued grass variety trial research at the Western Maryland Research and Education Center(WMREC). Five years of data collection from replicated plots is completed. To simulate grazing, these plots are harvested every 13 to 30 days. Nearly 4,000 samples have been collected, weighed, dried and weighed again as part of this project. Date analysis will be completed following the 2004 harvest season.

New plots were planted in 2004, but due to extensive summer annual weed infestations, limited harvest data collected.

c. Source of Funding: Smith-Lever 3B&C and state general funds.

d. Scope of Impact: Multi-County Specific.

Project 1.1.5. Vegetable and Fruit Production (New Vineyard Establishment)

a. Project Statement. New vineyards are established throughout the state in the most efficient and economical manner. Entrepreneurs utilize proper site selection, ground preparation, establishment techniques, and make educated variety choices to get new venture off to efficient start.

b. Impacts. Worked with 100+ entrepreneurs at various stages from discussion, planning, establishment, and expansion of new vineyards. Through formal educational programs, personal site evaluations, and conversation, vineyards were planned and establishes in the most efficient and economical manner, including proper site selection, ground preparation, establishment techniques, and variety choices to get new venture off to efficient start. There was an estimated 30 acres (10+% increase) planted at an average cost of $7,000 per acre for a total addition of approximately $210,000 to the Maryland agricultural economy. A greater increase is anticipated for 2005.

c. Source of Funding: Smith-Lever 3B&C, state general funds, and Tri-County Council

d. Scope of Impact: Multi-State and Multi-County Specific

Project 1.1.6. Maryland Quality Wine Alliance

a. Project Statement. Establish a MD Quality Wine Alliance (MDQWA) for the Association of Maryland Wineries to evaluate and set a quality standard designation for commercial MD wines, and set minimum quality standards for all wines produced in the state bearing the designation; include educational component.

b. Impacts. Three evaluation sessions were conducted and the 12 commercial wineries were provided with objective analysis and constructive criticism of strengths and weaknesses of wine and how to improve. One specific event resulted in the saving of 1200 gallons of wines that were "saved" as a result of observations of flaw and instructions on how to correct. As part of the program, four educational sessions relating to specific timely viticultural and enology topics were conducted – see teaching. Fruit quality in the vineyard (extremely challenging vintage due to wet conditions) and wine quality improved as the result of the program.Managing Pests in Organic Crop Production.

c. Source of Funding: Smith-Lever 3B&C and state general funds.

d. Scope of Impact: Multi-state and multi-county.

Project 1.1.7 Managing Pests in Organic Crop Productions

a. Project Statement. Organic crop production is one of the fastest growing segments of Maryland agriculture. Organic farmers strive to manage arthropod pests by a combination of cultural and biological strategies. Pesticides are used only as a corrective tool to resolve specific pest problems. Unlike conventional pesticides, the effectiveness of these products is not well documented by scientific experimentation. There has been limited research directly focused on organic production systems throughout the United States, including Maryland.

University of Maryland scientists and extension educators in cooperation with colleagues at the Maryland Department of Agriculture, conducted on-farm studies to evaluate the effectiveness of inoculative releases of Mexican bean beetle parasitoids in combination with the use of a trap crop and neem-based bioinsecticides. Results indicate that an early season trap crop of snap beans followed by releases of parasitic wasps can suppress pest populations below damaging levels. Field tests also identified several new insecticides that are effective and economically feasible for control of problematic insect pests in organic crop production.

b. Impacts. Organic crop production can provide a profitable alternative for new farmers and a means of enhancing profitability for conventional farmers. This project provides effective and environmentally compatible management strategies that minimize organic crop losses. Results will have a major impact on the sustainability of organic production and allow for market expansion by Maryland organic growers. The project also will leverage additional funding from public and private sources to support a long-term organic research and educational program for Maryland.

250 farmers and researchers learned about organic cover crop selection and management at a professional development conference, an organic research twilight tour, and a regional sustainable agriculture conference. Extension field faculty serve as a member and vice chairman of the Maryland Organic Certification Advisory Committee (appointed by the Secretary of Agriculture). This group focuses on policy issues regarding organic certification of the 78 certified organic farms (encompassing over 3,500 acres) and retailers in Maryland. Other efforts included teaching 50 Master Gardeners techniques of organic gardening. The advanced topics in organic and sustainable practices program attracted 38 participants to learn about topics including organic transition systems, weed control and farm budgeting.

c. Source of Funding: Hatch Act, Smith-Lever 3(b) & (c), special research grants and State funding, 1890 Extension.

d. Scope of Impact: Multi-county and Multi-State.

Project 1.1.8. Sheep & Goat Production

a. Project Statement. Producers will implement management practices that maximize their profitability and/or quality of life, while minimizing environmental and animal welfare impacts.

b. Impacts. Over 528 people attended sheep and/or goat educational programs, conferences, workshops, and short courses. Twenty producers reduced feed grain costs by 30% or more by mixing their own simple feed rations, as demonstrated in research and educational programs. Fourteen producers borrowed equipment from WMREC to weigh, handle, pregnancy test, or disbud animals. Thirty-eight producers applied for and received USDA disaster, ewe lamb, or wool payments as a result of information provided by extension program. Seventy-seven percent of producers have requested premise ID numbers, in compliance with the National Scrapie Eradication Program (USDA data). The Maryland Small Ruminant Page (web site) had 279,000 hits in 2004 and has now been moved to MD. 82 % of respondents (n=35) to an on-line survey indicated that they visited the web site at least several times per month. 100 % of respondents found information on the web site that helped them manage their sheep and/or goat enterprises. 95 % found information on the web site that saved them money or increased their profits. 234 sheep and goat producers and students attended IPM workshops and 100% are now using famacha system in one form or another to determine the parasite status of their animals and/or make deworming decisions.

One-hundred entries were received for the new online Maryland Sheep & Goat Directory. Five (humane) on-farm slaughter posters were requested by producers. Fencing and shelter were set up for sheep/goat research program at WMREC. Approval was granted to start research program in 2003, but goats were not received from UMES due to health problems in source flock.

c. Source of Funding: Smith-Lever 3B&C, state general funds and SARE Chapter 3

d. Scope of Impact: Multi-State and multi-county.

Project 1.1.9. UMES-Characterizing Cowpea Genotypes for Drought Tolerance in the Delmarva Ecosystem

a. Project Statement. This project introduces a drought tolerant crop into the farming system of the Delmarva region to protect farmers from complete loss of farm income when corn and soybean fail during periods of drought.

The specific objectives are to:

- Characterize cowpea genotypes in terms of suitable planting times and maturity, high and stable yields and its components, nutritional quality and cook ability, resistance to drought, high temperature and insect pests, and develop IPM technology.
- Study the yield potential to enhance cowpea yield by spraying plants with PPFM

- Develop elite rhizobia strains for effective nodulation and N_2 fixation with cowpea under drought and high temperature stress, and examine the interactions between the rhizobia and cowpea cultivars for high N_2 fixation
- Develop extension and training materials on cowpea production, processing and utilization, nutritional values and health. Greenhouse and field trials were conducted at UMES under rain-out shelters to examine the response of genetically diverse cowpea genotypes to drought stresses.

Under non-watered stressed conditions cowpea genotypes California Blackeye 5, Champion and Mississippi Silver gave higher seed yield. Under the same conditions, the highest biological yield was given by genotypes Two Crop Brown, White Acre and Elite. Under water stressed conditions, genotypes California Blackeye 5 and Champion gave similar seed yield. However, the highest biological yield under water stressed condition was given by genotypes Texas Cream 8, California Blackeye 5, and Mississippi Silver. Further, Quickpick Pinkeye and Elite were identified as early maturing genotypes. Field experiments were also conducted in two seasons to determine the possibility of growing cowpea as an alternative crop in the cropping system of the Delmarva region. The results showed significant differences in grain and biological yields of various genotypes. Genotypes Colossus, Mississippi Silver and California Blackeye 5 gave significantly higher seed yields. The highest biological yield was provided by genotypes Champion (11,596 kg/ha), White Acre (9.447 kg/ha) and California Blackeye 5 (9,447 kg/ha) making these genotypes good candidates to be used for green manuring or as cover crops in the Delmarva region. Genotypes Quickpick Pinkeye and Elite were found to be early maturing where they matured in about 65 days, and, therefore, might escape the terminal drought. In other experiments, cowpea plants were inoculated with bradyrhizobia at sowing and Pink Pigmented Facultative Methylobacteria (PPFM) were applied at the flowering stage to study their effects on seed yield, biological yield and other agronomic characteristics. Elite bradyrhizobia strains (CG 003, CG 016 and CG 020) were identified and found to be more effective on most cowpea genotypes than all commercial bradyrhizobia strains tested. Field studies were also conducted to determine the effect of insecticide (cypermethrin + dimethoate) spray applications, sowing dates (June 9 and June 20, 2003) and insect pest resistance in diverse cowpea genotypes in the Delmarva Peninsula region. Results show that there was 30% increase in cowpea seed yield as a result of spraying the mixture of cypermethrin + dimethoate insecticides. The damage to cowpea pods was also significantly reduced in the sprayed treatments. The first and second sowing dates of cowpea sprayed treatments gave 30 % and 45 % increase in seed yield over the first and second unsprayed dates of sowing cowpea treatments, respectively. Studies were conducted to identify antibiosis to corn earworm (CEW) in diverse cowpea genotypes which had been identified to provide better yields in the Delmarva region. Results indicate that some genotypes of cowpea such as Mississippi Silver and Quickpick Pinkeye provided consistently lower weights of larvae, including, have higher levels of antibiosis to corn earworm larvae than genotypes Champion and Dixielee. These superior genotypes need to be evaluated for multiple pest resistance and other desirable agronomic traits. The antibiosis could be integrated with other methods of cowpea pest

management to reduce the amount of insecticides for the management of CEW and other insect pests of cowpea.

b. Impact. Anticipated impacts from this project include:

- Stabilized and enhanced production of cowpea in dry years.
- Farmers assured of an alternative economic income in dry years.
- Stabilized and/or improved incomes for growers in the Delmarva region.
- Enhanced sustainable cropping systems through large foliage deposition, application of elite *Bradyrhizobia*, reduced mineral fertilizer application for ensuing crops, and use of PPFM technology.
- Contribution of trained minority graduates to the workforce locally and internationally.

c. Source of Funding: CSREES -Capacity Building

d. Scope of Impact: National

Project 1.1.10. Controlling Ineffective *Bradyrhizobium* with Phages to Enhance Nitrogen Fixation in Soybean

a. Project Statement. Increasing demand for food and feed protein could be met by enhancing the production of legumes, such as soybean Legume production contributes to agricultural sustainability, farm profitability and prosperity. Problems limiting soybean production in the Delmarva and other dry regions are:

- Lack of drought-tolerant cultivars,
- Lack of soybean microbial inoculant (s) containing efficient N_2-fixing bacteria, bradyrhizobia, mychorrhizae (VAM),
- Compatibility between soybean cultivars and bradyrhizobia strains.
- Drought and elevated summer temperatures.

Currently, farmers apply large quantities of chemical fertilizers (N, P) to overcome some of these problems. Using agricultural chemicals is expensive, pollutes the environment, and is hazardous to human, animal and the environment. For example, excess nitrate-N released from agricultural lands to drinking water causes methemoglobinemia in infants, cancer and respiratory illness in humans. It also causes eutrophication, ecosystem damage, plant toxicity, and stratospheric ozone depletion. On the other hand, using effective biofertilization approach can supply soybean with up to 97% of its N requirements. Therefore, the main goal of this project was to develop a biological control system to eliminate the nodulation by undesirable ineffective bradyrhizobia strains causing chlorosis causing strains in soybean. This will result in enhancing soybean nodulation, N_2 fixation, growth and productivity. To achieve this goal, laboratory, greenhouse and field experiments were conducted to:

- Identify and select *Bradyrhizobium* strains that can effectively nodulate and fix nitrogen with soybean under stress conditions.

- Enhance biological nitrogen fixation in soybean using strain-specific bacterial viruses for biological control of ineffective indigenous *Bradyrhizobium japonicum*.
- Select bradyrhizobia strains that are compatible with and produce effective biological nitrogen fixation with specific soybean cultivars.
- Facilitate technology transfer to UMES students and farmers to enhance agricultural research, development and productivity.
- Transfer the technology to the private sector (seed and inoculant companies) to enable production of high-quality, stress tolerant inoculants for farmers.

During the course of these studies elite bradyrhizobia strains and agronomically important soybean cultivars were identified, and their plant microbe-interactions were examined. Selected stress-tolerant native bacterial strains were found to be highly efficient with soybean cultivars (AG 4902, AG 4903). These can be used to inoculate soybean grown under the conditions of the Delmarva region and other areas with similar conditions. These strains were genetically and phenotypically characterized, and grouped into three groups, *B. japonicum*, *B. elkanii*, and *Bradyrhizobium* spp. Also, several rhizobiophages, *Bradyrhizobia* viruses, were isolated, characterized and used as biological control agents to enhance soybean nodulation and biological nitrogen fixation. Using specific rhizobiophages to control ineffective and inefficient indigenous *Bradyrhizobia* strains required the identification of symbiotically competent, rhizobiophage-resistant *B. japonicum* strains that are able to promote growth and yield of their soybean hosts.

b. Impact. The expected outcomes of the project upon completion include:

- New technology to enhance nodulation and nitrogen fixation by soybean through biological control techniques.
- Enhanced soybean yield in the Delmarva region.
- Enhanced cereal crop yield in rotation with soybean.
- Improved socio-economic well-being of soybean growers in the Delmarva region.
- Enhanced sustainable soybean production in the Delmarva region.

c. Source of Funding: CSREES -Capacity Building

d. Scope of Impact: National and international

Project 1.1.11. UMES - Cloning a Novel Satiety Factor in Swine and its Effects on Pituitary Hormones

a. Project Statement. Previous research has shown that urocortin may be able to impact appetite and growth hormone secretion without causing a stress response in rats and pigs. Urocortin or related hormones (such as antagonists) have been looked at by other researchers as possible treatment of obesity and depression in humans. It might also be used in modulating growth and carcass quality (fat content) in pigs. A

collaborator briefly screened a porcine cDNA library with mouse primers and had no positives. An initial clone identified through RT-PCR in the same laboratory is now thought to possibly be mouse DNA contamination and not pig urocortin. The cloning efforts started at the University of Maryland Eastern Shore (UMES) in collaboration with the Department of Natural Sciences identified both urocortin 1 and 2 partial gene sequences in pig DNA but failed to discover urocortin 3 in the pig. RT-PCR is currently being conducted for mRNA presence and determine tissues in the pig in which message can be found. Two UMES doctoral level graduate students previously conducted biotechnology-based research in efforts to get a cDNA sequence for pig urocortin and conducted a preliminary pituitary cell culture experiment with USDA-ARS collaborators (there seemed to be an influence of urocortin on LH and GH though there was not enough data to run statistical analyses). The graduate students have transferred those techniques through training each other, other graduate students and teaching biotechnology techniques to three undergraduate summer internship students and 4 undergraduate students here at UMES. A mammalian primary cell culture lab was established at UMES and a procedure developed and USDA-ARS researchers verified with hormone assays that the culture system works. The first primary mammalian cell culture experiment for UMES was conducted and samples have been shipped to USDA-ARS in Athens, GA for analysis. Most of the proposed new equipment was purchased and scientists and students from many areas have used it or plan to use it in research and teaching. Students in biology, plant science and animal science as well as microbiology and food science have all used the updated equipment/facilities.

b. Impacts. For the first time known, a partial DNA sequence for urocortin was identified in the pig. New, modern equipment for biotechnology laboratories updated two areas, and a mammalian cell culture lab (and procedures for swine primary pituitary cell culture) was established. These laboratory areas are now being used collaboratively by several scientists and students, increasing the research and teaching capacity of UMES. Students were trained in new techniques at different institutions and then developed the procedures and trained more students at UMES, also increasing the research capacity of this University. Novel information about this hormone obtained using these techniques and laboratories could impact human health as well as enhance swine production.

c. Source of Funding: CSREES- Capacity Building.

d. Scope of Impact: National.

Project 1.1.12. UMES - Nutritional Surveys of Uncultivated Sea Vegetables from the Chincoteague Bay

a. **Project Statement.** Sea vegetables, often called seaweeds, are photosynthetic, multicellular, macroalgae with ecological and economic uses. Unlike Asia, where sea vegetables have been traditionally used as food, seaweed research in the west has concentrated more on taxonomy, systematics, and ecology. Few studies have addressed detailed nutritional benefits and antioxidant properties of individual sea vegetable

species. There is a need for continued, comprehensive research on "organic" and "natural" foods to develop increased awareness of the long-term benefits of consumption of nutrient-rich seaweeds that also have antioxidant, antimutagenic, and anticoagulant properties besides enhancing thyroid function, prevention of birth defects and cardiovascular diseases. The overall goal of this project is to advance the body of knowledge in applied natural sciences and human nutrition through initiating research on nutritional surveys of some of the abundant sea vegetable species in the Chincoteague Bay with the hope of opening avenues for applications of these nutrient-rich algae for food and nutraceutical products. Through this project, public awareness on seaweed farming will be promoted, and will help communities to be aware of the fact that sea vegetables that are sometimes acting as "nuisance species" for seagrasses and other aquatic species, could actually be transformed into new cash crops and could generate many new job opportunities for the local and regional people in the Delmarva Peninsula, thereby contributing to the economic development of the region. Seaweed harvesting and processing will help many aquafarmers in coastal areas of the Delmarva Peninsula where alternative employment is scarce. By combining research and outreach, the project can provide needed enhancement of the Nation's food and agricultural research system.

b. Impact. The project has increased over 100 graduate and undergraduate students and other symposium attendees' awareness of the potential health and nutritional benefits of edible seaweeds especially, those attending the Edible Algae Symposium. It will also enable the researcher to collaborate with private and public organizations, including industries, local and regional aquafarmers to promote wild harvesting of sea vegetables, and possibly lead to the development of a local/regional seaweed industry that could positively impact the economy of the regional population to a considerable extent.

c. Source of Funding: CSREES- Capacity Building.

d. Scope of Impact: Delmarva Peninsula/National.

Project 1.1.13. UMES- Sustainable Pasture Lamb Production

a. Project Statement. The number of sheep being produced is increasing nationally, with number of breeding sheep increasing in the past year for the first time in a decade. There is potential for the production of faster growing more efficient crossbred animals in a more sustainable manner to boost this industry. Currently, most producers are raising traditionally crossbred meat-wool crosses in a dual-purpose type of system. With the decline in demand for wool and increased desire for healthier, safer "pasture-raised" meat, there is now a need to focus on producing heavily muscled meat animals that can be raised in a low input, pasture-based production system. Promoting the use of Katahdin hair sheep ewes and a terminal sire ram to provide high quality pasture raised lambs will improve lifestyle satisfaction for producers by providing acceptable profits, while also enhancing the environment and protecting community values. In addition, communities benefit from having more small farms in business, and the availability of healthier meat choices.

b. Impacts. Two experiments have been conducted at UMES with a third starting soon. Results have been published as peer-reviewed abstracts and presented at National scientific meetings as well as in the Maryland Sheep and Goat Newsletter (over 300 viewers). Several farmers have requested use of sire breeds demonstrated at the UMES studies and a few have already started their on-farm studies. One organic farmer/producer completed a comparison study last year and continued the study this year because of his satisfaction with the first years' results. Workshops were conducted on parasite control methods (IPM) and ultrasound. Over 20 workshops attendees have been exposed to sustainable parasite control information and over 300 readers have been exposed to sustainable agriculture research and have been exposed to the SARE (Sustainable Agriculture Research and Education) program. Four new producers are raising crossbred sheep on pasture using one of the sire breeds or types demonstrated in the research at UMES. Four new producers have conducted on-farm research. Three producers applied for on-farm SARE grants in different areas of sustainable agriculture interest. Three new producers are using sustainable parasite control methods (such as checking eye-lid color and rotational or multi-species grazing) that reduce the amount of chemical de-wormers needed.

c. Source of Funding: CSREES- NE SARE (Sustainable Ag Res & Edu) and 1890 Extension.

d. Scope of Impact: National, international and regional.

Project 1.1.14. UMES-Goat and Sheep Production Support

a. Project Statement. Small ruminant (goat and sheep) production is a growing alternative agricultural enterprise, especially in the east. Small ruminants are ideal for small acreages and offer farmers/producers a chance to make a profit without excessively high input costs. In addition, the increasing immigration of ethnic populations preferring goat and/or sheep meat means that demand for meat products from these animals will continue. Currently, much of the meat satisfying the demand is imported. Therefore, there is a vast opportunity for local and national producers to profit from this alternative enterprise.

b. Impacts. Several workshops have been hosted; personnel have spoken at several local, state and regional small ruminant production workshops/seminars, including one in Jamaica. Several research and demonstration grants were funded, a directory was implemented for producers (collaboration among MCE personnel throughout the state), hair sheep and meet goat research was conduction at UMES and on producer farms. Several newsletter articles were written. Ten farmers bought goats/hair sheep to add onto their current farming enterprise. Surveys indicated that producers agreed that they would change something about their lifestyle, management styles or farm operations to improve their business or satisfaction based on information presented at workshops or seminars. The majority of respondents also indicated that they would like to see more small ruminant programs offered.

c. Source of Funding: 1890 Extension and NE SARE (CSREES).

d. Scope of Impact: State, regional national and international.

Project 1.1.15. UMES- Competitive Small Scale Swine Production

a. Project Statement. Although the number of swine on the Delmarva Peninsula has dramatically decreased, small producers are still trying to find methods to maintain their viability in this industry. Increasingly, swine producers have focused on low-input, alternative, sustainable production systems for swine such as outdoor production systems or production for specialty markets (i.e. BBQ pig market, freezer meat, show animal sales). These types of systems are more likely to be profitable in the current local environment.

b. Impacts. Training has been (through workshops) and continues (through one-on-one training) to be offered on artificial insemination in swine. Several articles have been written in a regional newspaper, a 4-H swine project program was conducted in 2001-2002 and a marketing collaboration was discussed with local livestock/meat producers. Over 1/3 of the 4-H youth involved in the swine 4-H market hog project have continued with the project and the number of youth showing swine at the local 4-H fairs increased by 50%. The quality of swine exhibited at the local fairs has increased (as communicated by the judges of the shows). Three producers have shared their experience in alternative production (outdoor) and in specialty markets (BBQ pigs/freezer pork). Three new local consumers were convinced that freezer pork was more cost efficient than retail pork and have since contacted local farmers about purchasing freezer pork. One local producer learned artificial insemination and information about direct marketing and developed her own label and is marketing value-added products (direct marketing pork) at local Farmers' Markets.

c. Source of Funding: 1890 Extension.

d. Scope of Impact: State, regional national and international.

1.2. Adopt Improved Farm Business Management and Marketing Strategies

(Key Themes – Agricultural Profitability, Risk Management)

Maryland Cooperative Extension educators offered 268 programs in 16 counties, Baltimore City, three regions in Maryland, state, multi-state, and national. Topics included improving profitability, liquidity, solvency of farm operations through improved record-keeping systems; increasing the use of information systems; improving short and long-run business planning; managing agricultural enterprises through a better understanding of tax policies, federal programs, and other federal/state policies; and reducing financial risks through forward pricing,

crop insurance mechanisms, and diversification of farm level enterprises. These programs reached 3,540 people.

Examples of educational programs include the following:

Project 1.2.1. The Dairy Analysis Program

a. Project Statement. *Farm Financial Management*. The objective of this program is to help Maryland farmers improve their business management skills to improve management productivity, increase profitability, and fulfill their long-term goals. It is accomplished through workshops, seminars, and individual on-farm consultations involving farm business management, strategic and tactical planning, record keeping, financial analysis and computer applications for farm managers, educators, lenders, and others. Workshops and seminars are prepared and conducted at the request of, and in teamwork with Extension Educators, Specialists and others. This program has a major focus on dairy farms and small farms. Currently, 40 farms participate in this program. The program involves adaptive research on business planning techniques, crop and livestock enterprise analysis, farm machinery economics, crop insurance, computer use in agriculture, economics of alternative agricultural enterprises and economics of sustainable agriculture methods. The program is also carried to the College Park campus through the AREC 306 Farm Management course. The program methods and results are described below.

b. Impacts. *Business Planning for Maryland Agribusinesses* - This method was developed in 1998 and continued through 2004. The objective is to provide managers of commercial farms, small farms, greenhouses, and nurseries with education and assistance in developing effective business plans for their businesses. A business plan is a set of detailed written documents that will help them manage their operations in the short-term and long-term. It is an organized collection of all the important ideas that include mission statements, annual goal statements, resource inventories, marketing plans, production plans, financial plans and business structure plans. A business-planning seminar has been presented to a total of 624 farmers as part of the Frederick County Small Farm education series since 1996, with 80 participating in 2004. The Dairy Analysis program (1997-2003 data) shows dairy grass managers net $103 more per cow per year than conventional MD dairy farms.

In addition, a *Dairy Farm Management Program* was developed. This method provides specific financial and business planning tools to Maryland dairy farm managers. Analytical tools have been developed to help dairy Farm Managers manage their operations. The *Maryland Dairy Farm Business* summary is a major component of this program. In this summary, dairy farmers are taught how to use their IRS Schedule F tax forms to analyze the financial condition of their farms. The information on their tax schedules is converted to a per cwt basis so that they are able to see the specific strengths and weaknesses of their businesses. They are also able to compare their businesses with other dairy farms in Maryland and in the northeast to identify their strengths and weaknesses. All farmers participating in this summary show a high level

of understanding of their individual financial analysis. The summary conducted in 2004 includes 28 diary farms. This summary is available in printed form and was presented to 86 participants nine workshops and about 50 participants are pasture walks in Baltimore, Frederick, and Washington Counties.

c. Source of Funding: Smith-Lever 3B&C and state general funds.

d. Scope of Impact: Multi-County Specific.

Project 1.2.2. Farm Profitability & Marketing

a. Project Statement. Farming is becoming very complex, with pressure from land development, severe weather conditions, regulations and fluxuations in the markets making it difficult for farmers to make a profit. Farmers must become aware of grain marketing techniques to assist them in making a profit.

b. Impacts. Research indicates that 2/3's of all grain producers market in the bottom 1/3 of the yearly price range of a given commodity. The program objectives are to improve producers' knowledge of marketing techniques and to enable producers to develop and implement marketing plans on their own operations. The long-term objective of the Montgomery County grain marketing educational program is for County grain producers to market in the top 1/3 of the yearly price range on a consistent basis. Results are achieved through a series of workshops planned and conducted by this agent. Twenty workshops were conducted in 2004. An extensive handout was developed for each program. Educational topics included grain basis, futures markets, grain options, price outlook, estimating costs of production, crop insurance, developing a marketing plan and the use of an ever-growing number of cash alternatives. The participants develop and carry out a yearly marketing plan for corn, soybeans and wheat through the use of a model farm under this agents' leadership and guidance.

An average of 11 farmers attended the bi-weekly workshops but more than 30 farmers in Montgomery, Frederick and Howard Counties attended one or more of the educational activities. A survey of 12 farmers indicated 100% incorporated multiple marketing strategies learned through grain marketing workshops into their operations. Corn sales prices for the group averaged $2.79 per bushel. The top 1/3 of the yearly price range was $2.85 per bushel. With an overall average of $2.79 and 53 % of all transactions completed in the top 1/3 of the market, Montgomery County farmers were significantly better corn marketers than their counterparts across the country. The bottom 1/3 of the yearly price range was $2.40 per bushel. The Montgomery participants made no sales in the bottom 1/3 of the market. The application of an additional $0.39 per bushel to the 14,000 acres of corn farmed by the program participants netted County farmers $764,400.00 in added gross income for the year. Soybean sales were even more impressive averaging $6.99 per bushel. The top 1/3 of the yearly soybean price range was $6.91 per bushel. The bottom 1/3 was 6.01 per bushel so Montgomery County farmers averaged about $1.00 per bushel better than their counterparts nationwide. The impressive sales price was achieved by making good forward cash sales and by use of multiple grain options transactions along with

risk management hedges. Marketing program participants farm 12,000 acres of soybeans so their $1.00 per bushel marketing advantage would have grossed an additional $576,000.00 in yearly income. Yearly wheat sales were not as impressive but still above average. The group average sales price was $3.54 per bushel, $.08/bu. above the average marketer and solidly in the middle 1/3 of the yearly price range. The program participants grow 6,500 acres of wheat so an additional $.08 per bushel would improve their yearly net income by $32,240.00. Longer-term data illustrate in a clear fashion the outstanding effectiveness of this program. Over the past four years, Montgomery County Extension grain marketing program participants have averaged $2.57 per bushel marketing 240,000 bushels of grain. The top 1/3 of the price range over the past four years has been $2.58/bushel. The Montgomery marketers have shown consistent excellence by maintaining an average corn sales price that few farmers are attaining on a national level. Soybean sales over the past four years have averaged $6.11 per bushels for Montgomery County program participants. This places the average sales in the top 10 percent of the market over the past four years and exceeds the typical soybean marketer by an average of $.86/bushel over a four year period. Wheat sales averaged in the middle 1/3 of the average price range for the four-year period, still above average. Wheat sales for Montgomery participants were $.16/bushel higher than the national average.

c. Source of Funding: Smith Lever 3 b & c and MDA state funds.

d. Scope of Impact: Multi-County.

1.3. Increase the Use of Appropriate Production and Marketing Strategies for High Value Products

(Key Themes – Adding Value to New and Old Agricultural Products, Diversified/Alternative Agriculture, Niche Market, Organic Agriculture, Small Farm Viability).

Maryland Cooperative Extension educators offered 175 programs in 14 counties, three regions in Maryland, state, multi-state, and national. Topics included increasing access to markets by profitably selling high-quality ornamental horticultural products; practicing post-harvest handling techniques to increase product quality and improving market access; adding value to traditional agricultural products; and increasing economic bargaining power of small and part-time farmer by cooperative bargaining. These programs reached 5,078 people.

Examples of educational programs include the following:

Project 1.3.1. Major Program Area: Small Farm Profitability

a. Project Statement. According to the 1997 U.S. Census of Agriculture, the number of full-time farms decreased 12 percent from 1992 to 1997. The USDA defines a small farm as one having a gross farm income of less than $100,000 per year; therefore 90 percent of the farms (1,304) in Frederick County are small farms. The future of agriculture and Extension depends on the sustainability of these farms as agricultural

small businesses. Educating new farm operators on the basics of agriculture, farm/business management, and marketing is essential to their financial success.

The Beginning a Successful Small Farm Operation educational series was developed in 1996 in Frederick County to provide an opportunity for small farm operators to obtain basic education in agriculture, marketing, and business. Since 1996, the educational series has consistently maintained a strong participation by the small farm segment of the agricultural community in Central Maryland. Between 1996 and 2004, 649 small farm operators from around the Central Maryland region have attended 11 basic farming small farm series and three specialty courses on enterprise development.

b. Impact. As a result of this county effort, five other Maryland Counties (Howard, Harford, Cecil, Talbot & St. Mary's) have initiated a similar program, utilizing the core curriculum developed in Frederick County. In 2004, a "*Small Farm & Forest Focus Team*" developed two resource lists to enhance scholarship for faculty. Agent/team reviewed 26 submitted materials and made them available for use to other faculty on the MCE Teaching Materials Resource List. The MCE Teachers Bureau List has six faculty listed who will teach in other areas of the state. Eighteen new and revised teaching materials that included scripted PowerPoint slide shows and fact sheets that have been requested in 2004 by Educators in six new states and Baltimore County (total 38 states). Teaching materials are now available by download on the MCE website www.smallfarmsuccess.info. A survey of 37 participants from the spring small farm series showed that all will continue their farming venture in 2005; data shows that they gained confidence in their ability to develop a quality of life/successful family farm. Local agents, as part of the county Education and Public Relations Committee, assisted with the development and implementation of the Family Festival @ The Farm, which is an open house on 10 participating farms. The festival attracted over 17,500 visitors from all over the region. The objective of the festival is to promote agri-tourism and the rural quality of life.

c. Source of Funding: Smith-Lever 3 B & C, 1890 Extension and state general funds.

d. Scope of Impact: Multi-County Specific.

Examples of research projects include the following:

Project 1.3.2. Production of Alternative Crops with Value-added Enhancements

a. Project Statement. The Upper Eastern Shore of Maryland, also known as the corn-belt of the Mid- Atlantic, produces corn, soybeans, and wheat as its principal agronomic. Recently, losses in local buying competition coupled with national overproduction of these commodities have reduced the prices received by farmers for these commodities. Data indicate that farmers are currently experiencing negative cash flows with many farmers leaving the industry altogether. If our farmers are going to become profitable, and if land and natural resources are to be preserved through a sustainable agricultural community, it is

important for value-added products and new markets to be identified. Ongoing, sophisticated research is required to identify value-added products as well as locate profitable niche markets.

The Maryland Cooperative Extension (MCE) teamed with the Chesapeake Fields Institute (CFI), a 501(c)(3) organization chartered in the year 2000 to address the loss of profitability in traditional agricultural markets throughout farms. By working with local agribusiness, government officials, and community leaders, MCE and CFI have developed a plan that will result in farmers gaining knowledge and skills that will move them toward greater sustainability. The longterm objective of this project is to enable farmers to engage in the production of alternative crops through which value-added enhancements are to be achieved. MCE has assembled a team of researchers at the University of Maryland that possess rich backgrounds in cereal chemistry, plant genetics, crop production, food science, and market feasibility. This diverse set of academic backgrounds ensures a comprehensive approach to developing value-added products and markets and has received major grants to finance the project.

b. Impacts. An effective extension mechanism integrating value-added research with field management practice has been developed. What makes this mechanism unique is the fact that farmers are involved in a research-oriented effort that will facilitate adding value to their crops. This mechanism is innovative in that it is the result of major collaborations with area farmers, extension offices, government officials, and academic institutions from all over Maryland. Subsequently, a sustainable/profitable agricultural community will emerge. The research outcomes from this project are expected to contribute to the knowledge of alternative crop production and value-added product development. Ultimately, achievement of the long-term objective will result in preservation of the land through environmentally sound farming practice that is profitable.

As a measurable outcome, this mechanism is expected to directly lead to improved and more profitable farming practices, as well as enhanced quality of life for Maryland farmers and their rural communities. The diverse research team ensures that a comprehensive approach to developing value-added products/ markets will occur. Additionally, the effective coordination of scholarly research and extension that is the cornerstone of this project is expected to lead directly to improved and profitable farming practices. This mechanism could serve as a model for enhancing quality of life for farmers and their rural communities nationwide.

In 2004, the grower base increased to 33 farmers from eight Maryland counties growing 4,993 acres of identity preserved crops. Growers produced over 3,161 acres of soybeans for the Japanese food market and shipped over 100 containers from Port of Baltimore. In addition grower contracted and grew crops for 2 Organic food contracts and harvested 500 acres of specialty bread wheat**.**

c. Source of Funding: Maryland Center for Agro-Ecology, Inc.

d. Scope of Impact: National.

1.4. Increase the Investment in Agricultural Human Capital

(Key Themes – Managing Change in Agriculture)

Maryland Cooperative Extension educators offered 10 programs in 6 counties, three regions in Maryland, state, multi-state, and national. Topics included farmers understanding issues facing agriculture and natural resources and improving their leadership skills; improving management and personnel skills; and farm families improving the transfer of management skills from one generation to the next. These programs reached 205 people.

Examples of educational programs include the following:

Project 1.4.1. Community Leadership (Public Leadership Development)

a. Project Statement. The world is becoming increasingly complex. People communicate more quickly, are increasingly interdependent, and turn more quickly to litigation when they are in conflict. As Maryland's communities adjust to these changes, the value of effective leadership rises. Maryland's increasing urbanization puts new pressures on it's agriculture and natural resources, at the same time that farms and agribusinesses struggle to remain economically viable, environmentally friendly, and good neighbors. To meet these challenges, leaders committed to the future of Maryland agriculture must be able to resolve complex problems successfully in skillful, thoughtful and innovative ways.

MCE provides public leadership development programs for various communities in Maryland. Our standard practice is to provide knowledge and skills to our learners, which will help them solve future problems. We have created several programs designed specifically to increase leadership skills of participants:

LEAD Maryland, which focuses on developing leaders for Maryland agriculture. This is a partnership with the University of Maryland College of Agriculture and Natural Resources, the Maryland Department of Agriculture, the Maryland Farm Bureau, the Maryland Grain Utilization Board, and the Maryland Agricultural Education Foundation.

The Water Resources Leadership Initiative (WRLI), which focuses on establishing a network of informed and effective leaders who are water resource stakeholders from public and private sector organizations.

b. Impacts. The long-run impacts of public leadership development programs are difficult to gauge. One indicator is that participants from prior groups in the LEAD Maryland and WRLI programs have continued their involvement by helping teach, host field trips, and facilitate learning events for subsequent groups. LEAD Maryland has attracted support from over 15 local, state and national organizations and is recognized

statewide as a premier leadership program. The start-up summary of LEAD Maryland will serve as a reference and guide for the start up of other agriculture leadership programs. As of 2004, 96 fellows have graduated from the LEAD MD program. WRLI has graduated 70 students as of 2004.

c. Source of Funding: Smith-Lever 3b&c, state general funds and private funding.

d. Scope of Impact: Multi-County Specific.

1.5. Facilitate Informed Debates of Public Issues Concerning the Neighborhood Effects of Agriculture, such as Nuisance Concerns and Environmental Impacts

(Key Themes –Public Issue Education, Adult and Youth Development)

Maryland Cooperative Extension educators offered 45 programs in 15 counties, three regions in Maryland, state, and multi-state. Topics included increasing the knowledge of citizens to better participate in community decisions; better understanding of the role of agriculture in providing them a safe, affordable supply of food and fiber; and public officials making better informed decisions about the neighborhood effects of agriculture. These programs reached 3,416 people.

Examples of educational programs include the following:

Project 1.5.1. Close Encounters With Agriculture

a. Project Statement. *Close Encounters With Agriculture* is an outreach educational program geared toward Montgomery County fourth grade students. The program emphasizes nutrition, the environment and their inter-relationship with production agriculture. This agent served as overall chairman of the Executive Committee, coordinating the solicitation of funds, educational materials and promotional items for take home goody bags. This educator also provided leadership for the educational activities conducted in the production agriculture segment of the program and coordinated volunteer participation. Subcommittees for the environmental segment and the nutrition segment were responsible for the development and implementation of those portions of the program. The agricultural program segment consisted of five learning stations featuring live animals with hands on learning activities.

b. Impacts. A total of 2,723 students and teachers participated over a 10-day period in 2004. Teacher evaluations and pre/post testing were used to determine program effectiveness. Teacher evaluation scores averaged 4.89 out of 5.0 in the area of importance of topics for youth, 4.82 to indicate the interest of students in topics presented, 4.57 as to its relevance to the fourth grade curriculum, 4.86 for appropriateness of materials for age/grade of students and 4.93 for the quality of presentations. Teachers rated the overall trip as a 4.86 out of a high of 5.00 and 100 percent felt their students had a much better understanding of agriculture as a direct result of the field trip. Overall, students' pretest scores averaged 33% correct as compared to 67 correct on the posttest. This agent developed the production agriculture

section of the test where students' pretest scores averaged 20% correct as compared to 70% correct on the post-test. Production agriculture pre/post test questions included:

- How much does a pig weigh when it is marketed? (250lbs.)
- How many sodas will one bushel of corn provide sweetener for? (325)
- How many Big Macs can you get from one steer? (600)
- How much milk will a cow produce in one day? (150 ½ pints)
- Peas and soybeans belong to what family of plants? (legumes).

Volunteers donated an estimated 1090 hours for this program. According to Volunteer Sector, a coalition of leading non-profits groups, volunteer time was valued at $17.19 per hour in 2003. Based on these criteria, the total monetary value of the hours donated to Close Encounters would be $18, 737.10.

c. Source of Funding: Smith-Lever 3b& c, state general funds and private donated hours.

d. Scope of Impact: County Specific.

Project 1.5.2. Managing Growth in an Urban State

a. Project Statement. Maryland has two regions identified as the second-most and the ninth-most threatened farming regions by an American Farmland Trust report. The Maryland Office of Planning predicts that if current trends continue, 500,000 more acres of open land will be lost to development over the next 25 years (Bay Journal 1997).

University of Maryland MAES & MCE faculty developed a multi-disciplinary research effort in the Patuxent watershed to analyze the evolution of land-use change. Their goal: to determine how policy mechanisms, land-use controls, nonpoint source pollution regulations, wetland permitting and transportation affect farmland loss and residential development patterns. They also developed farmland-owner workshops on tax issues related to agricultural land preservation.

b. Impacts. Additional funding granted for Farmland Protection under the 2002 Farm Bill. Increased citizen and farmer involvement in the development of comprehensive plans. Legislation introduced in Maryland House to grant tax-free easement payments. Assessment of important agricultural lands needing protection improved. Eight MCE count agents assisted the MD. Agriculture Land Preservation Foundation in a one day forum to develop guidelines and identify issues relating to land use policy.

c. Source of Funding: Smith-Lever 3b& c.

d. Scope of Impact: Multi-County Specific.

Part A. Planned Programs (continued)

REE Goal 2. A Safe, Secure Food and Fiber System

Overview

There is a need to improve food safety at all points in the food production and distribution chain. Although few data are available specifically for Maryland, the issues in our state are similar to the national issues outlined in the Food Safety Initiative. These issues affect everyone from food producers and processors to retailers, food service handlers, and consumers. HACCP (Hazard Analysis Critical Control Points) is a systematic way of implementing preventative measures to ensure food safety and includes contamination prevention, detection, and ongoing monitoring. As a part of HACCP and new food safety inspection initiatives, rapid pathogen detection and food borne illness monitoring programs will be needed from the farm to the processing plant to the retailer. Model HACCP programs for these various clientele need to be available. Extension and Experiment Station research programs need to develop better pathogen detection and monitoring techniques. The HACCP, Good Manufacturing Practices (GMP), and Sanitation Standard Operating Procedures (SSOP) requirements must be met, but the average small to medium food producer, processor, direct marketer, distributor, and retailer in Maryland will need support and training to do so.

Consumers are frequently unaware of basic tenets of food safety: the importance of cooking and storage temperatures and the need to wash hands and utensils frequently. Consequently, almost 50 percent of food borne illness is estimated to be caused by improper handling or preparation by the consumer.

The primary goals are:

- Decrease the number of Maryland citizens at risk for insufficient food availability to meet nutrient needs.
- Improve consumers' knowledge and practice of safe food handling.
- Improve the knowledge and practice of safe food production and handling by commercial and public food industry.

Outputs.

For REE Goal 2, Maryland Cooperative Extension educators developed over 550 educational programs, resulting in over 1,100 educational presentations, which were held in 23 counties, Baltimore City, all three regions in Maryland, statewide, multi-state, and national. Topics covered were food insecurity and hunger, food safety for consumers and food safety for commercial enterprises. These programs reached over 30,600 people.

Outcomes and impacts were measured in individual programs. Examples of these are in the following section.

Partners in these programs included Maryland Food Council, Center for Poverty Solutions, Maryland Food Bank, Capitol Area Food Bank, Maryland Food Hospitality Education Foundation, Restaurant Association of Maryland, school systems, county health departments, the Maryland

Department of Health and Mental Hygiene, county social services departments, the Maryland Department of Human Resources, the Eastern Shore Health Education Center. Cooperation with other members of the land grant system included VA, West VA, DE, NJ, and PA.

Maryland's own assessment of accomplishments. Maryland Cooperative Extension is accomplishing the goals of their five-year plan. There is a balance of educational programs among the various goals and the Extension Administration Team is pleased with the accomplishments. Evaluations of outcomes from the five-year plan are conducted at the individual program level, not at the level of an aggregated REE goal.

UMES' commitment to a safe, secure food and fiber system has been consolidated with the construction of the new Food Science and Technology Building that was dedicated on September 12, 2003. This new building provides state-of-the art teaching and research facilities for the doctoral program in food science and technology. This facilities supports work in the following areas: identification of pathogens and spoilage microorganisms; research in food preparation and handling, product testing, and product development; analysis of food composition and research in food safety, food quality, and product shelf life; research on food handling and packaging; animal holding area; and raw product handling facilities including fast-freezing, and many other areas.

2.1. Decrease the Number of Maryland Citizens at Risk for Insufficient Food Availability to Meet Nutrient Needs

(Key Themes – Food Security, Food Resource Management)

Hunger and food insecurity affected 10.5% of the U.S. households in 1998. USDA's report on Household Food Security in the U.S., Economic Research Service (2000) indicated that Marylanders are disproportionately affected by food insecurity. In 1996-1998 7.1% of Maryland's households were food insecure, with 40% of these clustered Baltimore City. While urban poverty is a serious issue, Maryland's rural population also suffers from serious lack of access to food resources. This issue especially affects children. Maryland Cooperative Extension educators developed at least 150 programs, which were held in all 23 counties, Baltimore City, three regions in Maryland, statewide, multi-state, and national. With a goal of increasing awareness and application of knowledge and practice of safe food handling, all nutrition education classes reflected a food safety component. Topics covered were food sources and availability, purchasing and preparation. These programs reached approximately 7,700 people. *Feeding the Community, Safely!* and *Feeding the Children, Safely!* were presented to over 2,500 participants through 80 educational programs in 15 Maryland counties during 2003.

Examples of educational programs include the following:

Project 2.1.1. Multiple Counties - Expand Food Safety Skills and Practices to Citizens

One county example:

a. Project Statement.

Feeding the Children-SAFELY! A need was identified in the child-care providers training program for food safety education, and thus *Feeding the Community-SAFELY* program underwent major revisions to meet the requirements for licensure of child-care providers. A six-person Extension team led by this educator developed the program. Evaluation material were developed in FY 03.

Feeding the Community-SAFELY! Was developed to provide occasional quantity cooks, and other food handlers with safe food handling information. This educator was part of a 5-person FCS team that developed the two-hour program. Educators developed and assembled resource kits for 23 FCS county units and adapted/ developed the curriculum, helped obtain Health Department endorsement, and obtained external reviewers. The curriculum was burned on a CD and in FY 02, translated into Spanish was subsequently revised to meet the USDA guidelines for the general consumer.

b. Impacts.

Feeding the Children-SAFELY!

- The CD's were distributed to 7 Universities/ teachers in FY 04
- The program was used in 6 Maryland counties. Presentations were given to Head Start, Child and Adult Care Food Program Children's Resource Center, and parent groups.

Feeding the Community-SAFELY!

- In FY 04, five Maryland counties reported presenting 19 program to approximately 290 participants.
- Audiences included Welfare to Work, Food Service, State Fair, and Department of Social Services workers.
- Eight Universities/ Educators requested the CD containing the package program in FY 04.

Other Program Success

- The three-person Food Safety team was awarded the NEAFCS Clean Homes Healthy Families Award. The award included a $500.00 check for use in the food safety programs. This was the first time this award was given on a national level.
- The team was asked by USDA's Food Safety Director to present the Maryland Food Safety program at a Congressional Briefing on Capitol Hill in September 2004.

c. Source of Funding: Smith-Lever 3B&C and state general funds.

d. Scope of Impact: Multi-County Specific.

Project 2.1.2. EFNEP Helps Limited-Income Families Choose Healthy and Nutritious Foods

a. Project Statement. Eating a healthy diet can be a challenge for anyone, but it's an even greater challenge for individuals and families with limited resources. Extension's Expanded Food and Nutrition Education Program (EFNEP) at the University of Maryland helps limited-income families and youth acquire knowledge, skills, attitudes, and behavior changes necessary to maintain nutritionally sound diets and enhance personal development. EFNEP adults are taught individually or in small groups by Extension Nutrition Assistants trained by Extension Educators. EFNEP youth are taught in summer or year-round enrichment programs conducted at public schools, in after-school programs by 4-H staff and volunteers or EFNEP staff.

b. Impacts: In 2004, in 9 counties and Baltimore City, twenty-five (69) Extension Nutrition Assistants reached 2,400 limited resource families as well as an additional 10,751 young people in collaboration with schools, after school programs and summer enrichment programs. Demographic, economic and program participation data was collected from all participants.

Nutrition/health/dietary impact data were collected and analyzed for dietary and nutritional quality, and feedback was provided to each participant. As a result of their participation in EFNEP 88 percent of adult participants showed improvement in one or more food resource management practices, 91 percent showed improvement in one or more nutrition practices, and 75 percent showed improvement in one or more of the food safety practices. When it comes to youth participants, 92 percent of 7,231 youth now eat a variety of foods, 90 percent of 7,189 youth increased knowledge of the essentials of human nutrition, 91 percent of 6,518 youth increased their ability to select low cost, nutritious foods, and 89 percent of 6,191 youth improved practices in food preparation and safety. Carefully validated cost benefit analysis have established that the EFNEP intervention in Maryland results in $10.64 future cost savings for every dollar invested. In Maryland this translates into approximately $16.8M savings through the adult and youth programs.

c. Source of Funding: EFNEP Program funds –USDA Smith-Lever 3(d) and state general funds.

d. Scope of Impact: State-wide.

Project 2.1.3. EFNEP County Example

a. Project Statement: The projected outcome of this program area was to improve the knowledge and skills of health professionals related to obesity and chronic disease prevention and treatment. The need to educate other professionals is well-established since obesity rose by 57% in Maryland in the last decade. Obesity costs Maryland $2.5 billion/year in health care expenses and lost productivity (Obesity Targeted, 2004). This provides justification of obesity education, in addition to obesity being strongly correlated to the incidence of diabetes and hypertension.

The Educator, who is viewed as the source of ongoing, reliable nutrition education for professionals, taught 14 specialized trainings to 413 health professionals which is nearly three times the number reached in 2003. The in-depth trainings typically averaged two hours each. Of the 14 sessions, nine were advanced diabetes and weight management trainings for physicians, dietitians, nurses, and other health professionals at hospitals, health departments, and nursing homes. Some of these were recognized trainings that provided continuing medical education credits. Another five trainings focused on food safety, supplements, and stress management.

b. Impacts. Post-test dada indicated that 78% of the professional participants had a "complete understanding" of diabetes meal planning versus 14% prior to the training. One physician stated that the in service "reaffirmed my belief that portion control is the most critical factor" in diabetes and obesity prevention and treatment. Post-test revealed that 67% reported that they now had significantly improved their confidence level in assisting patients with nutrition. A nurse reported that she had a "much better understanding of artificial sweeteners, carbohydrate counting, and diabetic exchanges." One training also focused on food safety and revealed that only 6% of participants had a "complete" understanding of the causes of foodborne illness prior to the training in comparison to 86% after the training.

When the professionals were surveyed three months after the training, 87% stated they utilized the information for patient education. It also revealed that 80% of their clients have used the information to decrease portion sizes, 67% to reduce blood glucose, and 83% to improve quality of life through diet and exercise. This type of impact from professional trainings substantially penetrates the community through the vast numbers of individuals reached. It is projected that the professionals reached an average of 70 individuals which results in 29,000 more clients being educated. If a more 1,000 clients used the strategies to prevent obesity, the result would be $6,000 in health care savings/ person(Reuters, 2004) saving $6 M total.

c. Source of Funding: EFNEP Program Funds- USDA Smith-Lever 3(d) and state funds.

d. Scope of Impact: multi-county specific.

Project 2.1.4. FSNEP Program Helps Maryland Residents At Risk for Insufficient Food to Meet Nutrient Needs

a. Project Statement. The Maryland FSNEP is a collaborative program of FNS, UMD, and the MD Department of Human Resources, providing nutrition education to low income families in 13 Maryland Counties and Baltimore City. The goal of FSNEP is to help families improve dietary quality, increase physical activity, improve food security, develop food resource management skills, and handle food safely.

b. Impact. FSNEP programs were offered in 2004 in 14 counties and Baltimore City. Campus programs included FSNEP Evaluation and the Digital Inclusion Project. Compared to 2003, the program reached 31% more youth (29,1430; approximately the same number of adults (11,680); and 8% more agency staff (2,428).

Funding increased 37% (from $2,400,510 in 2003 to $3,294,000 in 2004). FSNEP has made a substantial contribution to funding in participanting counties, allowing for an increase in staff and operating funds. In 2004, FSNEP provided $800,000 to participating counties. (Since it's inception in 2000, county FSNEP funding has totaled over $3 M).

In 2004, FSNEP funded 3 FSNEP administrative staff; 3 project staff; 4 graduate students on campus. In the counties, FSNEP funded 11 FEA's and 6 program assistants.

A number of key partnerships with state agencies continued in 2004. The MD Department of Education is now a collaborator on the Baltimore County/ Baltimore City Teacher Training projects, providing continuing education credit to participating teachers. The MD Department of Health and Mental Hygiene continued its partnership with us in the Baltimore Social Marketing/JumpSmart project, and endorsed the WalkWays program for county health department use. Our positive relationship also continued with the MD Food Bank and the MD Department of Human Resources. DHR provided $95,000 in funding, and Vince Kilduff demonstrated his continued support by representing MD FSNEP at 3 Baltimore health fairs and attending the Fall 2-day FSNEP Conference in Annapolis. Both Vince and his supervisor, Kevin McQuire, participated in the FNS/CSREES site visit, providing extremely positive endorsement of the MD FSNEP. As a result of their visiting the MD FSNEP, FNS designated MD as an exemplary FSNEP program and requested that we present a 90 minute training on our curriculum and program development initiatives at the FNS National Conference in September 2005.

We continued to improve upon the FSNEP evaluation system, using both quantitative and qualitative data. Participants reported strongly statistically significant changes in intended post-test behavior on the following behaviors:

- Use the food guide pyramid to plan meals/ snacks (t=9.082, n=42)
- Prepare meals using at least three food groups (t=4.394, n=46)
- Choose smaller portions of food (t=6.990, n=44; t=4.046, n=14 among those participating in two sessions; t=9.000, n = 0 among those participating in three sessions)
- Bring home leftover foods from restaurant meals (t=4.911, n=41)
- Look for more ways to eat fruits and veggies (t=4.625, n = 42)
- Include 30 minutes of physical activity during the day (t=5.457, n=64)
- Plan meals before making a list, before shopping (t=5.780, n=21)
- Use unit prices to compare cost (t=5.351, n=28)

- Check foods on hand before making grocery list (t=4.457, n=21)
- Cook hamburger until it browns (t.4.927, n=45)

We collected qualitative data from adult and youth participants. Data showed participants are:

- Marking healthier food choices
- Aware of the importance of physical activity
- Reading and understanding nutrition facts labels
- Eating a greater variety of fruits and vegetables
- Trying new foods
- Decreasing portion size

c. Source of Funding: FNS-USDA, MD Department of Human Resources, community collaborators, and state general funds.

d. Scope of Impact: State-wide.

Project 2.1.5. FSNEP Youth Program

a. Project Statement. Youth programs were implemented in 10 counties and Baltimore City. Compare to 2003, the program reached 31% more youth (29,1430 participants). 32 FSNEP staff members participated in a 2-day Youth Summit and developed a strategic plan for youth programs. Based on decisions made at the summit, we trained 51 educators and collaborators who subsequently implemented the following new youth programs in 2004: *Color Me Healthy*; *Power of Choic*e; and *JumpSmart* (developed by L. Lachenmaryr).

b. Impacts. Because of the barriers posed by IRB for youth participants, we depended upon qualitative data from FSNEP educators and collaborators to assess program impact:

"The continued habit of handwashing has become a very good routine at the center. We are at the point where we do not have to remind the students(21 M, 29 F, ages 7-15) to wash before they eat of after they use the bathroom. They realized the importance of good handwashing and I have seen a decrease in sickness this year at the center.

"Our students are more willing to try a variety of new (healthy) foods. They brag about trying new foods. It has become an esteem booster!"

After learning about the food pyramid, children often ask me to help them read the fat and sugar content on their milk cartons at lunch and on items they bring for snack… When we had a "grocery store" in the dramatic area, they loved looking for the food pyramid and reading the dietary labels on boxes and containers. They began to think about which food had less fat and sugar, and would be better for them to eat."

Students are eating more fruits and vegetables at lunch, choosing healthier alternatives and substitutes, learning recipes to cook on their own, less tired and more alert, checking their food labels, and tasting new foods.

c. Source of Funding: FNS-USDA, MD Department of Human Resources, community collaborators, and state general funds.

d. Scope of Impact: State-wide

Project 2.1.6. FSNEP Curriculum

a. Project Statement. MD FSNEP developed 3 new curricula in 2004 based on program priorities identified in the Youth Strategic Plan and the Adult Strategic Plan. 51 educators and collaborators were trained at the Fall FSNEP conference on content and methodology of each. (*WalkWays* and *JumpSmart*) Health by Design is a learner-centered curriculum based on dialogue learning theory. It includes leaders guide, participant materials and support materials for 5 lessons.

b. Impacts. HBD was implemented in Garrett, Carroll, Baltimore, and Charles counties, reaching 462 participants in 2004. Participants reported strongly statistically significant changes in intended post-test behavior on the following behaviors:

- Choose lower fat meats (t=6.822, n=39; t=9.753, n=12 among repeat participants)
- Choose lower fat snacks (t=5.107, n=30; t=7.386, n=14 among repeat participants)
- Choose fruits and veggies as snacks (t=5.895, n=23)
- Choose higher fiber foods (t=6.420, n=19)
- Read food label before buying (t.7.546, n=29)
- Choose a variety of colors of fruits and vegetables (t=5.429, n=59)
- Balance calories with activity (t=11.207, n=88)

c. Source of Funding: FNS-USDA, MD Department of Human Resources, community collaborators, and state general funds.

d. Scope of Impact: State-wide

2.2. Improve Consumers' Knowledge and Practice of Safe Food Handling

(Key Themes – Food Safety)

The effects of washing with 10% salt and phosphate solutions on physical, sensory, and microbial properties of frozen chicken breasts were studied. Washing chicken breast with trisodium phosphate (TSP) or sodium tripolyphosphate (STPP) significantly improved microbial, textural, and sensory properties of frozen chicken breasts.

Over 400 programs resulting in 782 presentations to over 20,000 participants took place in 2004.

Examples of educational programs include the following:

Project 2.2.1. UMES - Development of Predictive Models for the Survival of *Campylobacter jejuni* on Chicken as a Function of Temperature

a. Project Statement. This study was done to model the kinetics of *Campylobacter jejuni* survival on cooked chicken breast patties and in broth as a function of temperature. A three phase linear model fits the primary survival curves well at all incubation temperatures, regardless of model medium. Lag time and specific death rate were calculated from the primary survival model at each temperature. Secondary models that predicted lag time and specific death rate as a function of temperature were also developed. The Davey and Boltzmann models were identified as appropriate secondary models for lag time and specific death rate, respectively, based on goodness of fit (r2) and prediction bias (Bf) and accuracy factor (Af) tests.

b. Impacts. This study helps to provide safe handling practice guideline for poultry products. The data collected in this study will be incorporated into the USDA, ARS Pathogen Modeling Program, where they can be used to predict the risk of Campylobacter.

c. Source of Funding: USDA/CSREES, Evans-Allen.

d. Scope of Impact: National and regional.

Project 2.2.2. Neighborhood GRIME Watch

a. Project Statement. Neighborhood CRIME Watch was developed by 4 county educators. It is an interactive tool for teaching proper hand washing. The tean designed and constructed a 10'x10' black fabric lined tent, purchased a hand washing sink, black lights, and glo germ. Participants put glo germ on their hands, enter the tent, and view the "glowing pretend germs". They then proceed to the hand washing station where the instructors teach proper hand washing techniques. Participants then wash their hands and enter the tent again to see if their hands still glowed.

b. Impacts.

- Project was presented at U. of Maryland Day, Frederic County Fair, Montgomery County Fair, Carroll County Fair, Frederick County CE Open House, USDA Press Conference, Lions Club Kids Fest, Safeway Barbeque Bash and the Howard County Hospital. Approximately 5,609 people were reached in FY 04.
- The USDA Director of Food Safety requested that Grime Watch be presented at the International Food Safety Conference in Orlando Florida in 2002. In FY 03 her office requested information on developing the GRIME Watch for National use. In

2004, USDA requested that the GRIME Watch be presented at a Press Conference in Landover Maryland and to join them in a display at a two day Safeway Barbeque Bash.

- Verbal interviews were conducted with 533 participants. 370 participants reported that they will change their hand washing behabior, 176 respondents indicated they would wash their hands longer as a result of this intervention. Some of the comments from participants included: "I will definitely wash my hands longer", "This is the best outreach for the University that I have seen (Engineering Professor U. of Md.)", "this is perfect", "I can't tell you how often I tell my children that it's important to wash your hands well", and "This is amazing how people get into this" (Soap and Detergent representative).

c. Source of Funding: Smith-Lever, grants, and state general funds.

d. Scope of impact: Statewide.

2.3. Improve the Knowledge and Practice of Safe Food Production and Handling by Commercial and Public Food Industry

(Key Themes – HACCP, Foodborne Illness, Safe Food)

Maryland Cooperative Extension educators developed dozens of educational programs, which were held in most counties, Baltimore City, three regions in Maryland, statewide, multi-state, and national. Topics covered were Hazard Analysis Critical Control Points (HACCP), Good Manufacturing Practices (GMP), and Sanitation Standard Operating Procedures (SSOP).

Examples of educational programs include the following:

Project 2.3.1. Washington County. Food Safety Trainings.

a. Project Statement. Participants will gain knowledge and information and develop skills to reduce foodborne illness. In cooperation with Department of Social Services, this county offered four - 2 hour Food Safety trainings for 55 Assisted Living Care Managers and their staff. Participants included Home Care managers and all regular staff as well as designated substitutes. DSS supervisors also participated in the training. The focus of the training was the safe handling and storage of food from the farm to the table. Participants received 2 hours of credit toward their state required licensing and accreditation.

b. Impacts. Based on end-of class questionnaires, participants indicated the following:

- Before training 19% had very little or some understanding of recommended food storage practices
- Before training 30% had very little or some understanding of recommended temperatures for cooking potentially hazardous foods.

- Before training 28% had very little or some understanding of the foods that are safe and appropriate for serving seniors and other susceptible populations.
- After training 51% felt they had quite a bit or a lot of understanding of recommended food storage practices.
- After training 72% felt they had quite a bit or a lot of understanding of recommended temperatures for cooking potentially hazardous foods.
- After training 53% felt they had quite a bit or a lot of understanding of the foods that are safe and appropriate for serving seniors and other susceptible populations.

As a result of attending the food safety training:

- 91% of participants felt to a great extent they more able to select, store and handle foods properly.
- 100% planned to use the suggested food handling techniques to select, store and prepare foods properly for the people in their care.
- 89% felt they were very likely to change/improve their food selection, storage and preparation of food as a result of attending this training.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: County Specific.

Project 2.3.2. Feeding the Community Safely and Feeding the Children Safely

a. Project Statement. During 2004, two previously developed food safety programs continued to be delivered on a state-wide basis. The programs were "*Feeding the Community Safely*" and "*Feeding the Children Safely*." The programs were packaged on a CD-ROM and distributed to all FCS educators working in the food safety area in 2003. The programs addressed basic consumer food safety principles (e.g., personal hygiene, preventing cross-contamination, avoiding temperature abuse) and emphasized preventing food borne illnesses. The programs included a PowerPoint presentation, learning activities, handouts, discussion questions, and a pre/post evaluation instrument.

b. Impacts. The St. Mary's County Educator (FES) partnered with the Environmental Health division of the St. Mary's County Health Department to offer safe food handling classes to prevent food borne illness in the community. 82 food handlers, who serve food occasionally at public events, and restaurant employees, participated in one of four 3-hour training sessions conducted by this educator using MCE's "Feeding the Community Safely" Power Point presentation. MCE registers participants and produces the materials. This educator orders supplies, advertises and coordinates the program, teaches the classes, prepares certificates and conducts evaluation. Sanitarians from Environmental Health assist during the class and provide interpretation of local and state regulations.

For 2 Feeding the Community classes taught by this educator, 81-94% of the 32 participants that completed End of Class Reaction Forms rated the class a "5", meaning they very much so felt the class was relevant, of quality and of utility to them. A 3-6 month follow-up survey completed by 37% of participants (22/60) reveals that, since the class, 16-55% more participants are engaging in desired food safety practices in 4 critical areas of food safety: handwashing, checking food temperatures, cooling hot foods properly and reheating foods.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State-wide.

Project 2.3.3. Seafood Safety for Industry

a. Project Statement. The U.S. Food and Drug Administration indicated that the control of histamine in susceptible fish species was the agency's number one Hazard Analysis Critical Control Point (HACCP) compliance problem, and that the seafood industry should expect increased regulatory scrutiny.

b. Impacts. A team was organized from both coasts and received funding from the National Sea Grant Office to develop a national training program. Nine universities participated in 2003, and made significant progress toward meeting the stated objectives. Drafts were prepared for a brochure, static display, resource list, three model histamine control/monitoring plans for commercial fishermen, video script and website plan. Seafood organizations and regulators are providing input into all phases of the project.

Progress continued on a related grant (USDA, Virginia Tech, lead institution) to identify the effect of commercial fish harvesting and handling procedures on the formation of histamine. Maryland commercial fishermen and a fish processor participated in the study. Fish temperature histories were recorded, histamine-forming bacterial species were isolated from fish and fish-contact surfaces, and histamine levels were quantified in fish tissue. A third grant (USDA) was finalized to investigate the effects of high hydrostatic pressure on inactivation of either the microorganisms or enzymes responsible for histamine formation.

Previous changes in HACCP guidance issued by the U.S. Food and Drug Administration were at least partially responsible for seafood industry confusion, non-compliance reports and even the regulatory detention of products. In response, a model HACCP plan previously prepared by the Seafood Specialist was revised and supplemented with sample record-keeping forms for posting on the Seafood HACCP Alliance website (U.C.Davis) and for use in Alliance Train-the-Trainer programs. In 2003 these guides were further refined and expanded to include model Sanitation Standard Operating Procedures and corresponding forms for complying with federal

and state record-keeping requirements. Similar materials have been downloaded widely for international use.

c. Source of Funding: Smith-Lever 3b&c, 1890 Extension state general funds and Seagrant.

d. Scope of Impact: Multi-state.

Examples of research projects include the following:

Project 2.3.4. Real-time Response Biosensor for *E. coli*

a. Project Statement. The goal of this study is to enable quantitative whole-cell biosensing by developing a novel dynamic system for the immobilization of stress-responsive luminous bacteria. To date, many genetically engineered strains containing selected stress-responsive *E.coli* promoters fused to the *Photohabdus luminescens* luxCDABE reporter have been developed. Use of the five-gene lux reporter system allows facile monitoring of gene expression because all components necessary for light production are present in the cell. The bioluminescence reporter has advantageous properties such as real-time response, excellent sensitivity, and large dynamic range because the product of its pathway, light production, can be easily detected. Moreover, not only do the responses of an organism to environmental insult supply instantaneous light signals, they also provide insight into the molecular mechanisms of toxicity because these responses also include repair mechanisms specific for the damage occurred.

b. Impacts. This research will focus on establishing a dynamic mechanism for the immobilization of bioluminescent E. coli that might lead to the development of quantitative whole-cell biosensors capable of monitoring food safety. The significance of the project is two-fold. First, of the various reporter systems available, bacterial bioluminescence has the unique advantage that gene expression can be monitored in real time without cell lysis. The stress-responsive luminous bacteria are capable of fingerprinting the specific stresses by responding with an SOS (real time) light signal. Second, the integrated cell immobilization mechanism enables rapid assembly of a biosensor for quantitative analysis of the light signals, which would have been greatly hindered in a suspension cell system. Should the signal reproducibility and stability be confirmed, it is expected that the results of the proposed research could establish procedures for rapid incorporation of similarly constructed biosensing strains.

c. Source of Funding: JIFSAN Competitive Grant.

d. Scope of Impact: International.

Project 2.3.5. Surveillance Program to Monitor Antimicrobial Resistance in Foodbourne Pathogens.

a. Project Statement. *Campylobacter* is a common cause of bacterial foodborne illness worldwide. The pathogen is frequently present in animal products, particularly in poultry. During the last decade, many bacteria that cause human diseases, including *Campylobacte*r, have developed resistance to antimicrobials commonly used for treatment. There is currently a great deal of speculation regarding the role that therapeutic and sub-therapeutic use of antimicrobial in animals has played in accelerating the development and dissemination of antimicrobial resistant bacteria. Since the discovery of the growth-promoting and disease-fighting capabilities of antimicrobials, farmers, fish-farmers and livestock producers have used antimicrobials in everything from apples to aquaculture. With livestock production increasing in developing countries, reliance on antimicrobials is likewise expanding - often without guidelines in those nations where antimicrobials are sold without prescription. With the trends toward globalization and the relaxing of trade barriers, inadequate standards and enforcement in one nation means all others are vulnerable. Research is urgently needed to determine the potential role of antimicrobials used in animal production environments on emergence and spread of bacteria antimicrobial resistance in both veterinary and human medicine. In this proposed study, we plan to initiate a surveillance program to monitor antimicrobial resistance of foodborne pathogens in retail meat products in China. The specific objectives of this study are to examine and characterize antimicrobial resistance of *Campylobacter* isolated from retail chickens in China.

b. Impacts. Microbial food safety is an increasing public health concern in the United States. The U.S. Centers for Disease Control & Prevention estimated that each year in the United States there are approximately 76 M foodborne illnesses. While most of them go undiagnosed, and thus, unreported, approximately 325,000 cases result in hospitalizations, and 5,000 cases are fatal. An- timicrobials are frequently prescribed empirically for treating diarrheal illness, including campylobacteriosis. Some studies have showed that increase in bacterial antimicrobial resistance is associated with antimicrobial use in food animal production. Food products in the U.S. have been imported from many different countries. Given the global nature of antimicrobial resistance, it is especially important to conduct studies on antimicrobial resistance of bacterial pathogens in developing countries, where inappropriate antimicrobial usage may be more common. The findings of this study will provide useful information to better understand antimicrobial-resistant bacteria in food imported from developing countries.

c. Source of Funding: USDA/ Scientific Cooperation Research Program.

d. Scope of Impact: International

Project 2.3.6. UMES- Characterization of Antibiotic-Resistant *Salmonella* spp. Isolated from processed Poultry

a. Project Statement: *Salmonella* spp. are recognized as major food-borne pathogens in the United States, causing an estimated 1.4 M cases of salmonellosis and over 500 deaths annually. Food of animal origin, especially poultry and poultry products, has

been implicated in outbreak of human salmonellosis. Antibiotic resistance increases the mortality rates due to food borne illness and has been linked to overuse or misuse of antibiotics not only in human medicine but also of veterinary medicine and agriculture. The overall objective of this study is to characterize the antibiotic-resistant *Salmonella* spp. isolated from chicken presented for processing at poultry plants. The specific objectives are as follows:

- To compare incidence of antibiotic-resistant *Salmonella* spp. on pre- and post-chill processed chicken.
- To determine the antibiotic resistance-associated genes and the genetic relatedness of *Salmonella* spp.
- To develop the predictive model for growth of *Salmonella* spp. on processed chicken as a function of strain variation.

A total of 240 pre- and post-chill whole broiler carcasses were collected from a poultry processing plant during July through December, 2004. Water samples were collected at the entrance and exit of the chiller. Temperature, pH, total and free chlorine were measured in the water samples. Carcasses were pre-enriched overnight by the whole carcass enrichment method. Pre-enriched samples were screened for *Salmonella* spp. using the BAX-PCR system. Samples positive for *Salmonella* by the BAX-PCR system were confirmed by cultural methods and serology. Water samples were enriched overnight and analyzed by the above mentioned methods.

Ninety two percent of pre-chill and 93 percent of post-chill carcass samples were positive for *Salmonella s*pp. A greater incidence of *Salmonella* was observed in pre-chill than post-chill carcasses only in August. All water samples collected at the exit of the chiller were positive for *Salmonella.* No Salmonella was detected in water samples collected at the entrance of the chiller. There was no correlation between presence of *Salmonella* on post-chill carcasses and the levels of free and total chlorine in chiller water.

Carcass and water samples will be collected monthly until June 2005 to determine the seasonal effect on the incidence of *Salmonella* spp. in pre-chill and post-chill carcasses and processed as described above. One isolates from each positive sample will be selected for antimicrobial susceptibility test by the disc diffusion method. Isolates resistant to more than two antibiotics will be tested for the presence of class 1 integrons by DNA-DNA hybridization method. Pulsed-field gel electrophoresis (PFGE) will be used to assess the genetic relatedness among the *Salmonella* spp. isolated from processed chicken. In addition, predictive models for growth of *Salmonella* spp. on processed chicken as a function of strain variation will be developed depending on the project outcome and feasibility.

b. Impacts: The results of this study will provide valuable information about the incidence of antibiotic-resistant *Salmonella* spp. and variation in their antibiotic resistance profiles isolated from pre- and post-chill processed chicken. Molecular characterization will give useful information on clonal diversity among pre- and post-

chill isolates, and more scientific base for tracking sources of contamination in poultry processing plants. The predictive microbial survival models for *Salmonella* spp. to be developed in this study will help for HACCP analysis and input information needed for microbial risk assessment to multiple interest groups such as USDA, poultry industries, retailers and consumers. These outcomes could bring national attention to food safety/molecular biology/predictive modeling research and give professional exposure to minority graduate students at UMES in the new Food Science and Technology Program. In addition, the results of this project will help the chicken producers change their management techniques and adapt necessary preventive measures to control contamination in poultry processing plants.

c. Source of Funding: USDA/CSREES and Evans-Allen.

d. Scope of Impact: Regional and National.

Project 2.3.7. UMES - Education Program for Improving Food Safety on the Delmarva Peninsula

a. Project Statement. The Delaware, Maryland and Virginia (Delmarva) Peninsula has a rich and storied agricultural heritage with chicken, seafood and fresh produce being mainstays of the economy, along with tourism. The University of Maryland Eastern Shore (UMES) has played a key role in sustaining the local agricultural economy through its research, teaching and extension/outreach programs. The opening of a new Center for Food Science and Technology in 2003 enhances the ability to deliver learning opportunities for students, as well as the local community. The overall objective of this project is to expand food safety education on Delmarva by:

- Developing and teaching a graduate level course focused on HACCP.
- Developing and teaching short courses in Food Safety/HACCP for local food producers and food handlers.
- Supporting an industry-regulator HACCP roundtable for discussion of current issues and practices in HACCP implementation.
- Increasing the institutional capacity of UMES for extension/outreach.

b. Impacts. This project will create a cadre of food safety professionals capable of teaching Food Safety/HACCP courses, auditing food safety systems and implementing practices that enhance the safety and wholesomeness of foods. A closer interaction with the regional food processing industry is being established. The HACCP roundtable discussions helped to clarify regulatory requirements so that the poultry processing companies in our region (5 companies, 11 plants) can be more effective in implementing changes to comply with those requirements. Interest in and visibility of our Food Science and Technology Ph.D. program increased.

c. Source of Funding: CSREES- Capacity Building.

d. Scope of Impact: Regional and National.

Project 2.3.8. UMES - Safe and Sustainable Production of Sheep and Goat Meat

a. Project Statement. The USDA Economic Research service estimated a cost to the U.S. of up to $37.1 B dollars annually due to illnesses from just the top seven food borne pathogens and antibiotic resistance in food borne pathogens (linked to antibiotic use in livestock) exacerbates the problem. The proposed research project includes techniques in microbiology, immunology and agricultural sciences that will be combined to create a balanced system for the research of food safety and sustainable production methods. The overall objectives are

- to determine the E. coli O157:H7 contamination in goats and sheep (and meat products) and the level of antibiotic resistance.
- determine differences in E. coli O157:H7 between goats and sheep produced using an alternative to antibiotics in the feed.

b. Impacts. Preliminary studies involving UMES goats and sheep have indicated that the presence of the food-borne pathogen E. coli O157:H7 has not been found in this flock. Two goat studies involving the use of probiotics (direct fed microbials; naturally-occurring beneficial organisms) instead of antibiotics in feedlot diets have been conducted. The use of probiotics instead of antibiotics in the first line of defense against livestock illness has been discussed at producer meetings and workshops. Applied results of probiotics studies in goats have been published in the Maryland Sheep and Goat Newsletter (over 300 viewers). A preliminary study in sheep involving probiotics has also been conducted. Various meetings and workshops with over 200 attendees have introduced probiotics to producers and 4-H youth involved in raising goats and sheep. Over 300 producers viewing the Maryland Sheep and Goat Newsletter have been exposed to probiotic use through research reports. Therapeutic antibiotic use at UMES farm has decreased by half with probiotic use. In addition, three producers now successfully use probiotics (all natural) when their animals first get stomach problems and do not antibiotics unless the sickness continues for more than 2 days. Therefore, antibiotic use in goats and sheep on 3 other farms has also decreased (on one farm by more than half).

c. Source of Funding. USDA-CSREES Evans-Allen and 1890 Extension.

d. Scope of Impact. State, Regional, National and International.

Part A. Planned Programs (continued)

REE Goal 3. A Healthy, Well-nourished Population

Overview.

Consumers need to choose healthier food behaviors because heart disease, cancer, excess weight and obesity, and osteoporosis lead to increased morbidity, lower quality of life, and, ultimately, premature death. People need to understand food composition and preparation techniques to select and prepare nutritious foods. Otherwise, they may avoid nutritious foods and use more expensive and less nutritious foods or mistake the description "low fat" for "low calorie." Consumers need integrated food and nutrition education programming, which must address the interaction of nutrition, diet, fitness lifestyle issues, and physical fitness, in order to be successful in reducing chronic disease risk, excess weight and obesity.

As a result of MCE programs, it was expected that an increased number of consumers would:

- Follow the recommendations of the U.S. Dietary Guidelines and Food Guide Pyramid, including the consumption of five fruits and vegetables per day.
- Correctly use food labels to follow the U.S. Dietary Guidelines and the Food Guide Pyramid.
- Access Extension and other science based information on diet, nutrition, and healthy lifestyles.
- Reduce their incidence of diet-related health problems by evaluating their eating patterns and lifestyle practices relative to cardiovascular disease, cancer, diabetes, obesity, and osteoporosis risk and identifying low-risk dietary and lifestyle factors to minimize cardiovascular disease, cancer, diabetes, obesity, and osteoporosis incidence.
- Limit their fat intake to 30 percent or less of energy intake.
- Increase their consumption of calcium-rich food sources.
- Increase physical activity and physical fitness and achieve or maintain a healthier weight.

Outcomes and impacts were measured in individual programs. Examples of these are in the following section.

Partners in these programs included county health departments, the Maryland Department of Health and Mental Hygiene, county social services departments, the Maryland Department of Human Resources, the Eastern Shore Health Education Center, most school systems, the UMCP Department of Health and Human Performance, FSNEP and EFNEP programs. Cooperation with other members of the land grant system included VA, West VA, DE, NJ, and PA.

Maryland's own assessment of accomplishments. Maryland Cooperative Extension is accomplishing the goals of their five-year plan. There is a balance of educational programs among the various goals and the Extension Administration Team is pleased with the accomplishments. Evaluations of outcomes from the five-year plan are conducted at the individual program level, not at the level of an aggregated REE goal.

3.1. Improve Maryland Citizens' Knowledge and Practice of Healthy Diet and Nutrition Behaviors

(Key Themes – Human Nutrition, Human Health)

Outputs. For REE Goal 3, Maryland Cooperative Extension educators developed and delivered almost 1,700 educational programs resulting in over 2,900 presentations to over 75,000 participants, which were held in all 23 counties, Baltimore City, state-wide, multi-state, and national. Topics covered were U S Dietary Guidelines, Food Guide Pyramid, consumption of five fruits and vegetables per day, use of food labels, lifestyle practices relative to disease and physical fitness.

Examples of educational programs include the following:

Project 3.1.1. Diabetes Education for Limited Resource and Minority Communities

a. Project Statement. A large number of Latinos in the county have no health insurance and therefore do not have access to health and nutrition education *Classes para Diabeticos Latinos* was planned, developed, advertised, and executed by a 3-person collaborative team to meet this need. The series of 3 classes cover general information on diabetes, problems associated with the disease and methods of controlling it. Food and nutrition demonstrations provide a means of reinforcing and applying the recommendations. Families are encouraged to attend the classes. A nurse conducts follow-up Hemoglobin A1C tests (definitive blood test that indicates how well the blood glucose levels have been controlled for the past 2-3 months), and initial surveys are completed to provide base line date for evaluation.

b. Impacts. Classes were conducted in February, May, June, and November 2004. 114 participants attended the classes.

- The mean reduction of Hemoglobin A1C levels was 1.3% at the 3-month follow-up. (A 1% increase in Hemoglobin A1C values is associated with a $600-$2000 greater per person treatment cost).
- Pre and Post-test results indicated that participants were eating more fruits and vegetables, engaging in physical activity and reading food labels.
- Five train the trainer programs were conducted for SHARE, Catholic Charities, and Spanish Catholic Center.
- 4 Universities and organizations requested the curriculum on a CD-ROM in FY04.
- The program was presented at the National and Regional NEAFCS Florence Hall award in FY04.
- Program was presented at the NEAFCS annual meeting in Nashville in FY04.

c. Source of Funding: · Smith-Lever 3(b) & (c), EFNEP Program Funds, and state general funds.

d. Scope of Impact: Educators from MCE, in conjunction with their community partners, are delivering interactive Diabetes Education and Cooking Schools in eight Maryland counties (Montgomery, Prince George's, Frederick, Allegany, Somerset, Wicomico, and Worcester.

Project 3.1.2. Prevention of Obesity – A County Example

Example of an educational program includes the following:

a. Project Statement. The projected outcome of this program area was to improve the knowledge and skills of health professionals related to obesity and chronic disease prevention and treatment. The need to educate other professionals is well-established since obesity rose by 57% in Maryland in the last decade. Obesity costs Maryland $2.5 B/year in health care expenses and lost productivity (Obesity Targeted, 2004). This provides justification for obesity education, in addition to obesity being strongly correlated to the incidence of diabetes and hypertension.

The Educator, who is viewed as the source of ongoing, reliable nutrition education for professionals, taught 14 specialized trainings to 413 health professionals which is nearly three times the number reached in 2003. The in-depth trainings typically averaged two hours each. Of the 14 sessions, nine were advanced diabetes and weight management trainings for physicians, dietitians, nurses, and other health professionals at hospitals, health departments, and nursing homes. Some of these were recognized trainings that provided continuing medical education credits. Another five trainings focused on food safety, supplements, and stress management.

b. Impacts. Post-test data indicated that 78% of the professional participants had a "complete understanding" of diabetes meal planning versus 14% prior to the training. One physician stated that the in service " reaffirmed my belief that portion control is the most critical factor" in diabetes and obesity prevention and treatment. Post-tests revealed that 67% reported that they now had significantly improved their confidence level in assisting patients with nutrition. A nurse reported that she had a "much better understanding of artificial sweeteners, carbohydrate counting, and diabetic exchanges." One training also focused on food safety and revealed that only 6% of participants had a "complete" understanding of the causes of food borne illness prior to the training in comparison to 86% after the training.

When the professionals were surveyed three months after the training ,87% stated they utilized the information for patient education. It also revealed that 80% of their clients have used the information to decrease portion sizes, 67% to reduce blood glucose, and 83% to improve quality of life through diet and exercise. This type of impact from professional trainings substantially penetrates the community through the vast numbers of individuals reached. It is projected that the professionals reached an average of 70 individuals which results in 29,000 more clients being educated. If a mere 1,000 clients

used the strategies to prevent obesity, the result would be $6,000 in health care savings/person (Reuters, 2004) saving $6 million total.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-county, state-wide, and several states have requested materials.

Project 3.1.3. Prevention of Chronic Disease for Limited Resource Families – A County Example

a. Project Statement. The main emphasis of the programming focused on prevention and treatment of diabetes as well as obesity for limited-resource families. The need for diabetes education is well-established since Maryland ranks fourth in the country in adjusted death rates from diabetes. Each year, $5.6B is spent in Maryland on diabetes and 1 in every 7 health care dollars is spent on the disease (Diabetes Center, 2004). Both Allegany and Garrett Counties are plagued with the some of the highest rates in the state (U.S. National Vital Statistics, 2000).

Prevention and treatment of diabetes as well as obesity was the focus of 24 in-depth, hands-on trainings and classes that were developed and taught by the Educator for a total 573 individuals. Since the Educator is the sole provider of this type of education in the community, requests for the trainings came from a variety of sources including Garrett College, Tri-State Health Network, social services, civic clubs, weight-loss groups, and adult day care centers.

b. Impacts. Each of these classes lasted two hours each and was part of a series held over a three-month period in order to identify substantial health impacts through pre, post, and follow-up data. Prior to the training, 46% felt certain they could effectively monitor their carbohydrate consumption versus 82% at the end. Three months after the series, 71% of participants claimed that they had made significant changes to consume appropriate amounts of carbohydrate leading to better glucose control, which results in fewer costly disease complications. One participant reported "I have been a nurse for 24 years and never knew these concepts! I now know more about nutrition and can teach others so much more." Three months after the series, one participant reported in a phone interview "I have followed the easy-to-follow meal planning techniques and have lost 25 pounds. I know it has helped my diabetes and I just feel better."

Prior to the series, only 12% of participants felt that they could effectively manage their weight and/ or diabetes in comparison to 52% at the end of the three-month long series. Nearly 60% claimed better management on a phone survey three months later. In addition, 82% reported weight loss since the training and 50% reported improvements in their blood glucose levels. With improved blood glucose levels, individuals will face fewer long-term complications resulting in significant savings in healthcare dollars. For example, if just one-half of participants (287) prevented diabetes or improved

management, each client's medical expenditures could decreased by $10,000 (Diabetes Care, 2003) resulting in a total saving of $2.9M.

c. Source of Funding: Smith-Lever 3b&c: EFNEP and FSNEP funds; and state general funds.

d. Scope of Impact: State-wide.

Project 3.1.4. Childhood Obesity Prevention.

a. Project Statement. Childhood obesity has become an epidemic in Maryland and across the country. The incidence of Type II diabetes among children is growing at an alarming rate. Maryland has the 8th highest rate of diabetes in the nation. This costs the state $2.5B annually and the country $117B. This educator has taught the Latino Diabetes program for 6 years. We have encouraged entire families to attend. We observed that most of the children were overweight and at high risk of developing diabetes and other medical problems. In 2003, this educator approached 4-H educators in Montgomery Country to assist in the development and implementation of a pilot youth program that would be implemented in conjunction with our adult program. This program was implemented in FY04.

In FY04, two pediatricians from the Spanish Catholic Health Care Clinic approached this educator. This Doctors were very concerned about the number of obese children they were seeing in their clinics, and wanted a nutrition and physical activity program to address this need. This educator held two workshops for the families and along with the FCS and 4-H educator from Frederick County is currently developing a Healthy Children, Healthy Families program that is titled *Come Cook and Play with Me*. It involves physical activity and nutrition education through with an interactive family approach.

b. Impacts. The pilot program that runs in conjunction with the adult Diabetes classes was conducted in FY04 for African American and Latino children. Thirteen classes were conducted, and 44 children were reached.

Class observations showed increased knowledge of the food guide pyramid, serving sizes, and ability to jump rope. Children demonstrated ability to prepare healthy snacks and lunches.

Two interactive nutrition and physical activity workshops were held for 25 Latino children.

c. Source of Funding: Smith-Lever 3 b& c and state general funds.

d. Scope of Impact: Multi-county.

Project 3.1.5. Healthy Living Through Physical Activity and Good Nutritious

a. Project statement. This innovative program focused on improving physical activity and nutrition through use of the "*WalkWays*" curriculum which uses a pedometer to track steps. The curriculum was modified to two-hour lessons taught as a series over four months in order to see significant behavior changes. Advanced weight management techniques were also added. With the incidence of obesity on the rise and the increase in inactivity, the need for this type of programming was evident. The Educator taught three different series totaling 13 classes reaching 320 individuals. The educator also coordinated two additional series taught in smaller segments with a total of 20 classes taught by outside trained health professionals.

b. Impacts. The evaluation of the program focused on the stages of change model as well as the number of steps achieved by participants. At the end of the four-month period, 89% of participants had reached the highest stage where they were maintaining their behavioral changes related to walking and diet. In terms of improvement in actual physical activity, an average increase of 2,500 steps each day resulted which equates to an increase of over one mile of walking each day leading to significant health improvements. At the end of the four-month series, 75% of participants reported improvements in their blood pressure and weight wile 82% saw significant changes in their energy levels. A telephone survey six months later revealed that 73% of participants reported that they continue to use the strategies. In terms of health improvements reported to them their physicians, 44% saw weight decreases, 35% report blood cholesterol improvements, and 11% experienced better blood glucose and HbAlc levels.

In summary, the Educator personally taught a total of 51 advanced trainings reaching 1,306 individuals which is a 14% increase from 2003. In addition to the planed educational programs, the Educator met th eneeds of diverse clientele requests for FCS information related to food preservation, canning, and freezing; food safety; recipe modification; stain removal; childcare issue; personal finance as well as 4-H/youth development and agricultural issues.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-County and State-wide.

Project 3.1.6. Wellness Works

a. Project Statement. In partnership with the Cancer and Cardiovascular Disease Prevention Program of the St. Mary's County Health Department, this educator co-developed and co-presented two 10-week Worksite Wellness programs for county government employees. The goals of the program were: to make employees aware of their health risks for developing chronic disease and to facilitate employee efforts to change behaviors to reduce health risks through assessment, goal setting, nutrition and health education and motivational tactics. Specifically, this educator taught group

classes on how to make journal entries, set realistic weight loss goals, use the Dietary Guidelines for Americans, read and use food labels and construct healthy meals.

b. Impacts. Pre-and post-assessments, including blood tests, body fat analysis, blood pressure readings and self-reported health behaviors, demonstrate the following program impacts on health parameters of participants:

Of the 22 out of 28 (79%(participants that completed the program:

- 10(45%) improved blood pressure (systolic decreased an average of 11mmHg; diastolic decreased an average of 6mmHG)
- 6(27%) reduced LDL cholesterol (average decrease was 20mg/dl)
- 10(45%) lowered triglycerides (average decrease was 52 mg/dl)
- 11 (50%) lost an average of 2 lbs.
- 9(41%) reduced body fat (average 0.5% decrease in body fat)
- average dialy pedometer steps per person was 5,197

100% of the 22 participants who completed the program also completed both a pre- and post-survey:

- 14(64%) reported increased fruit and vegetable intake
- 11(50%) reported an increase in physical activity
- 18(82%)reported they are making better nutrition choices, such as using less fat, cholesterol and salt.

c. Source of Funding: Smith-Lever 3 b& c, grant funds and state general funds.

d. Scope of Impact: Numerous counties.

Project 3.1.7. Evaluation of an Interactive Community Based Program

a. Project Statement. This research is evaluating the effectiveness of a community-based interactive diabetes education program delivered to low-income populations in Maryland. The diabetes education program was delivered to low-income populations in Montgomery, Prince George's, Allegany and Garrett counties, MD in 2000-2003 and is being evaluated for reduction in the levels of glycosylated hemoglobin, increase in physical activity, knowledge regarding diabetes management through diet, intent to change food and physical activity and select behavior change indicators.

b. Impacts. The health improvements resulting from this program are expected to yield substantial economic benefits for the population of Maryland. Approximately 1.8 million Hispanic Americans and 2.8 million African Americans in the United States have diabetes, and on average Hispanic Americans and African Americans are twice as likely to have diabetes as non-Hispanic white of the same age. In 1997, total expenditures attributed to diabetes and its complications were estimated at over $98

billion per year. Approximately 15% of national health care expenditures were for diabetes treatment (American Diabetes Association, 1998).

Glycosylated hemoglobin tests conducted before intervention and a 3-months post-intervention in the Latino population in Montgomery County indicated a reduction in glycosylated hemoglobin levels equivalent to 1.2%. This is of clinical and economic significance.

A 7%-8% (1%) increase in glycosylated hemoglobin levels is associated with a $600 - $2200 greater per person treatment cost. Impact data also provide evidence of highly significant improvements in knowledge of diabetes and diagetes management strategies, as well as diet and physical activity related behaviors.

c. Source of Funding: Smith-Lever 3 b& c, EFNEP and State general funds.

d. Scope of Impact: State-wide

Part A. Planned Programs (continued)

REE Goal 4. Achieve Greater Harmony (Balance) between Agriculture and the Environment

Overview

Maryland has abundant water resources. Surface water provides more than 80 percent of the state's water supply; however, ground water supplies approximately 85 percent of the total water used in Southern Maryland and the Eastern Shore. Studies have shown that both ground and surface waters contain high levels of the nutrients nitrogen and phosphorus (N and P), which adversely affect water quality, aquatic organisms, fisheries, and human health.

Under the Chesapeake Bay agreement, there is to be a 40 percent reduction in nutrient loading into the Bay by the year 2020. In agriculture areas, there are concerns about the management of inorganic and organic sources of nutrients and chemicals. In urban areas, nutrients and pesticides enter Maryland's water supply through excessive use of pesticides and fertilizers in horticultural landscape applications (commercial, public, and private). According to the 1990 census, one in five residences in Maryland have private septic systems bringing the state's total to 316,000. It is estimated that 60 percent of these systems are failing and that they contribute substantial amounts of nitrate to ground water. Other water-related issues include salt-water intrusion in coastal areas caused by high water demand and competition for finite supplies of water among residential, agricultural, and industrial uses.

Economic and demographic changes have led to a continuing loss of agricultural and forest land. These losses raise concerns about the continuing viability of agricultural and forest industries, green ways, open space for wildlife, recreational areas, amenities, and environmental quality in general. And the losses are likely to continue to the year 2020 at a rate of over 10,000 acres per year.

Maryland's population is expected to reach over 6 million by the year 2005. This population growth and redistribution, as well as commercial and industrial development, will consume farm, horticultural, and forestland. At the same time, this growing population also will demand more services and products from agricultural, horticultural, and forest industries. Conflicts between agricultural and urban land uses and their impacts on natural resources occur as development takes place in once-rural areas. As development occurs, farm and forestland is fragmented and/or lost, reducing the open space and biological diversity of the area. This forest and habitat fragmentation reduces our ability to manage and maintain the resources of a healthy state. Currently, land-use planning and management issues are being addressed by a wide variety of public and private organizations, which often lack coordination and consistency among their programs and policies. Integrated resource management and landscape diversity are key components of land-use planning, but are often not considered.

The contamination of surface and subsurface water supplies due to non-point source agricultural runoff is among the most serious environmental problems facing American agriculture today. About 60% of the rivers and lakes in the United States are polluted by agricultural runoff; rivers primarily by sediments, and lakes by nutrients. Additionally, surface and groundwater are contaminated by a variety of pesticides, and nutrient sources such as fertilizers and manure. Non-

point load of nutrients to surface waters in different regions of the U.S.A. is among the highest priorities in the country. One of the challenges for developing economically sustainable agriculture is to simultaneously reduce non-point source pollution problems and maintain farm and rural industrial incomes at reasonable levels. One solution is watershed-scale planning and management which makes it possible to target Best Management Practices (BMPs) for the greatest improvement in water quality even though watershed planning is much more complicated than field or farm scale planning.

As an 1890 Land Grant institution, UMES is committed to continue the services and applied research we provide area farmers, watermen and resort residents (Eastern Shore tourism industry). We expect to bridge the agricultural, environment, and renewable natural resource programs and find ways that farmers and businessmen can be economically enhanced while not harming the environment and do so with concern and sensitivity.. Presently many of our scientists (and those at College Park) are seeking solutions to resolve a recent Delmarva disaster that placed farmers, watermen and environmentalists at odds, and resulted in what is believed by the poultry industry to be a rush to judgment by politicians. During the summer of 1997, Delmarva made national news because of fish kills and lesionous fish in the Pocomoke River. The river provides a habitat for numerous fish species and other aquatic organisms, and it serves as a source of revenue and recreation for the inhabitants of its watershed. *Pfiesteria piscidia* has been implicated as the cause of the lesions and subsequent death of hundreds of fish. Toxins produced by this microbe are also thought to be deleterious to human health. The primary goals are:

- Adopt management practices for agricultural production that enhance natural resources.
- Improve the application and adoption of land-applied biosolids, manures, composted materials, and other organic byproducts.
- Improve water quality through the adoption of sound environmental stewardship practices by the public and municipalities.
- Maintain a water supply capable of supporting both commercial and private needs today and in the future by protecting and conserving surface and ground water resources.
- Promote environmentally sound land use plans that manage growth and value the benefits to society of farms and forest lands.
- Increase recycling and appropriate product disposal.
- Promote the use of rural and urban forest stewardship practices to maintain a sustainable forest resource.
- Improve fish and wildlife habitat and species diversity, as well as promote the use of new management techniques that manage wildlife and control damage to property, crops and people.

Outputs For REE Goal 4, Maryland Cooperative Extension educators developed 642 programs in 23 counties, Baltimore City, three regions of Maryland, state, multi-state, and national. Topics covered included water quality, water supply, land-use, recycling, forestry, nutrient management, IPM, and fish & wildlife. These programs reached 48,961 people. In addition, through the Home & Garden Information Center, 16,140 calls and 3,198 Web-based sessions were received, where expertise and guidance was provided on plant diseases, insects and IPM strategies.

Outcomes and impacts were measured in individual programs. Examples of these are in the following section.

Maryland Cooperative Extension is accomplishing the goals of their five-year plan. There is a balance of educational programs among the various goals and the Extension Administration Team is pleased with the accomplishments. Evaluations of outcomes from the five-year plan are conducted at the individual program level, not at the level of an aggregated REE goal.

4.1. Improve the Application and Adoption of Land-Applied Biosolids, Manure, Composted Materials, and Other Organic Byproducts.

(Key Themes – Agricultural Waste Management, Nutrient Management, Soil Quality, Yard Waste/Composting)

Maryland Cooperative Extension educators developed 226 programs in 23 counties, three regions of Maryland, state, multi-state, and national. Topics covered included farmers increasing their use of nutrient management plans; farmers avoiding the over-application of phosphorus on soils already deemed to be overloaded; and the farmers and citizens properly applying composted materials, manure, and other organic products to the land. These programs reached 9,861 people.

Examples of educational programs include the following:

Project 4.1.1. Nutrient Management Program.

a. Project Statement. Maryland's *Nutrient Management Program:* This program was developed by the MCE in cooperation with the Maryland Department of Agriculture. This program was a result of Maryland's 1998 Water Quality Improvement Act. This act requires farmers to have a "N" and "P" based nutrient management plan on their farm. MCE trains people how to write a nutrient management plan as well as training recently certified Nutrient Management Consultants on program and research updates on components of a nutrient management plan. The majority of recently certified consultants have little or no experience in nutrient management planning. This is the only program of its kind in the State of Maryland. Consultants are instructed in the entire nutrient management planning process. They are given instructions and written information on required plan content established by MDA: potential cost-share resources, data collection, soil and manure sampling and analyses, PSI, nutrient recommendations and the development of recommendations using computer software, plan delivery, and follow-up. Technical information material is provided for manure spreader calibration, the pre-sidedress soil nitrate test (PSNT), manure quantity generation, and record-keeping. Consultants are provided with information material that they can give to their clients to help them better understand nutrient management and the planning process. Sources of equipment and supplies that may be needed to develop plans are provided. Finally, consultants are introduced to *NuManMD* nutrient management software and guided through its functions by presentation of an

instructional scenario.

b. Impacts. Work continued in enrolling new agricultural businesses in the Nutrient Management program during January 2004, through December 2004, with a 2004 total number of 3,484 nutrient management plans written by MCE advisors on over 548,183 acres. All of the agricultural businesses were provided a written nutrient management plan with one-on-one technical service provided by MCE Nutrient Management Advisors.

Eighty clientele, representing agricultural business, nutrient management consultants & advisors, and government agencies, received six hours of classroom instruction in advanced Phosphorous nutrient management. In addition, 200 farmers, agricultural business consultants and government advisors were instructed in basic soil sciences, animal waste and sludge management, and the implications of the 1998 Maryland Water Quality Act. MCE state & regional specialists and county agents provided basic and advanced training programs.

MCE specialists provided 22 educational programs that certified 58 new consultants and 12 continuing educational programs to recertify 305 consultants. County agents taught 55 nutrient management voucher programs to 1,029 farmers.

As a result of farmers concerns for writing plans and number of consultants available in the State, MCE developed a new program in 2002 titled, *Producer-Assisted Nutrient Management Planning* (PANMP). A number of agricultural producers for writing their own nutrient management plan on a computer, but they do not have the software, training, or certification to successfully complete a plan that meets the specifications of Maryland's nutrient management regulations. The program is delivered by coordination with respective county Agricultural Educators who identify persons in their counties that want to participate. MCE-NMP staff developed a set of documents including a cover sheet and data tables that participants complete prior to the date of the PANMP workshop. Respective county MCE Agricultural Educators and usually three members of the MCE-NMP staff provide participants with instruction, guidance and technical support in a workshop environment. Approximately 12 of these workshops were held during 2004. A total of 120 agricultural operations were represented at these workshops, and plans were completed for 114 operations comprising a total of 12,476 acres.

In 2003, MCE developed a "Pilot Program" to certify farmers to write their plans. Currently for farm operators to become certified to compile their own nutrient management plans, they must complete a challenging course designed to validate and certify consultants. Currently, many farmers are not able to obtain the services of MCE-NMP Advisors due to excessive workloads of those advisors. Farmers must themselves become certified or hire a private sector consultant in order to comply with Maryland's Nutrient Management regulations. Farmers who complete this program will have a certified nutrient management plan. Farmers who pass the certification exam (given as part of this program), and who complete their nutrient management plan, will be certified. Five programs were held in 2004, in Carroll, Montgomery, Caroline, Calvert

and Frederick Counties, with 62 farmers completing the training and certified to write their own plans. This program will be repeated in 2005 in other areas of the state.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-County Specific.

Examples of research projects include the following:

Project 4.1.2. Low Phytate Soybeans Increases Poultry Nutrition and Reduces Manure Phosphorus

a. Project Statement. Soybean seeds are one of the world's most important sources of vegetable protein for human and animal nutrition. Soy protein preparations also provide minerals, but phytic acid in soy protein has been shown to reduce the bioavailability of certain essential minerals, such as Zn. The phytic acid forms chelates with metal ions including Ca, Mg, Zn, and Fe preventing these compounds from being absorbed in the intestinal tract of humans and monogastric animals such as poultry and swine.

Phytate is the principal source of phosphorus in the seed. Phytic acid is the storage form of phosphorus and accounts for 60 to 80% of the total phosphorus in soybean seeds. The unavailable phosphorus present in phytate is replaced in animal rations by adding extra phosphorus to the soybean meal. The animal excretes the unavailable phosphorus in phytic acid and manure disposal creates environmental problems in areas with high soil phosphorus. Enzyme phytase has been added to soy meal to increase phosphorus and mineral availability in poultry rations. An alternative procedure is to reduce the phytate in the seed genetically. This approach has been used with corn and high available phosphorus (HAP) corn hybrids are now being evaluated in poultry feed formulations. This approach has stimulated much interest in the Delmarva region to help reduce poultry manure phosphorus. The development of low phytate soybeans would be a desirable complement to HAP corns in reducing manure phosphorus.

b. Impacts: Breeding populations developed from crossing the Purdue low phytic acid mutant with productive Maryland and other conventional cultivars and breeding lines have been developed. Selection of individual plants with low phytic acid was completed in 2002. A large number of breeding lines were developed and evaluated during the winter of 2002-03 to identify homogeneous lines for this trait. All lines were then be evaluated in tests grown across the state in 2003 to look for productive lines that have the potential for release as new cultivars. Tests will be undertaken to determine the feeding value of these modified soybeans in meeting the nutritional requirements of Maryland's poultry industry and their utility in reducing the phosphorus content in the manure. Other projects in 2004 include : determination of the best use of phytase in boiler diets so phosphorous is minimized and documentation of changes that have occurred in litter phosphorous content after implementation of phytase use in the field. Litter phosphorous content was found to have decreased an average of 30% after 2 years of phytase use in commercial flocks in Delmarva.

c. Source of Funding: United Soybean Board, Maryland Soybean Board and Maryland Agricultural Experiment Station.

d. Scope of Impact: National.

4.2. Improve Water Quality Through the Adoption of Sound Environmental Stewardship Practices by the Public and Municipalities.

(Key Themes – Biological Control, Integrated Pest Management, Pesticide Application, Riparian Management, Soil Erosion, Water Quality: Key Themes from Goal 1: Home Lawn and Gardening)

Maryland Cooperative Extension educators developed 488 programs in 23 counties, Baltimore City, three regions of Maryland, state, multi-state, and national. Topics covered included proper applications of nutrients and pesticides by homeowners; increase knowledge of septic systems; municipalities adopt environmentally sounds practices of water and nutrient management; green industries practice bay-wise techniques; developers, loggers, and landowners reduce soil erosion; and increased installation of riparian buffers by landowners. These programs reached 57,106 people and had over 100,000 hits on its website www.MDIPM.umd.edu.

Examples of educational programs include the following:

Project 4.2.1. Private Well and Septic System Management.

a. Project Statement. The goal of this program is to educate homeowners on the importance of the maintenance of their private drinking water and onsite sewage systems. It is important for homeowners to understand how water moves through the earth and how a failing or neglected septic system or well could contaminate their drinking water and directly affect environmental and personal health.

Many Maryland residents lack education on their role in water quality degradation. Daily normal activities within homes and yards can contribute to water quality problems. This program has been designed to educate homeowners on how they directly affect water quality. Private septic systems are known polluters of the environment. Most homes with onsite wastewater treatment systems also have private wells for drinking water. It is imperative that both systems are maintained since they are in close proximity. According to the Maryland Department of Environment, more than 30,000 of the existing 427,000+ septic systems in the state are known to be failing, with estimates of 60% suspected to be failing! Yet, thousands more are being installed each year. Most of these failures are due to mismanagement and improper installation. In addition, urban residents are moving to more rural areas and are not familiar with the maintenance requirements of a septic system or well. Realtors and builders selling the

homes do not provide information on these systems. Worse, the word-of-mouth information people pass along is usually incorrect.

b. Impact. Eighteen workshops were held educating Homeowners, Realtors, Local Government Officials, Master Gardeners, Agency Personnel, Professional Planners, Service Organizations, and Environmental Groups. Over 1,200 people, including 164 Realtors received 3 continuing education credit hours by attending the Regional Specialist's training. 153 Master Gardeners received training credits, and 38 Bay-Wise Master Gardeners received additional credit hours towards their Bay-Wise Certification. On average, 54 people visit the Septic Systems web site per day, with 5/day writing for specific help. Saved at least 150 (*known*) people on average, $1600-$3000 each, by educating them on the need (or in most cases, lack of need) for expensive water treatment devices. Typically these people were told they needed a treatment device by a salesperson, when in fact they did not. At least another 150 (*known)* people saved on average $300 each by learning of the unnecessary purchase of septic system additives. This doesn't account for the people who saved money by learning from the Regional Specialist's web sites and printed materials, or who did not directly inform the Specialist of their savings. 96 certified crop consultants received continuing education credits by attending two seminars. Web pages received over 37,000 hits and more than 1,200 email questions were answered. A survey of web users found that there was a range in savings from $200 – 30,000. These savings are from better maintenance and management of their septic systems thus prolonging the life of the system.

c. Source of Funding: Smith-Lever 3b& c and state general funds.

d. Scope of Impact: Multi-county and Statewide.

Project 4.2.2. Deep Row Biosolid Application to Grow Trees

a. Project Statement. Develop applied research and education program to encourage adoption of use of municipal biosolids in deep-row applications to grow hybrid poplar trees on gravel spoil sites.

b. Impacts. A partnership was developed with private firm (ERCO, Inc.,) in Prince George's County, WSSC, and MCE to secure grant funding and implemented extension education program for industry and agency personnel. Biosolids are applied in trenches on a gravel mine spoil, and then planting the site with hybrid poplar trees to utilize the nutrients in the biosolids over a 6-year rotation time. Educator has worked cooperatively with Gary Felton of UM Biological Engineering and Eric Flamino of ERCO, Inc. on a planned series of educational and research activities this year to secure funding and wider implementation. Agent has organized and led the following activities in the last year:

MCE has secured state recognition of tree operation as qualifying for woodland assessment for tax purposes by the DNR Forest Service. This will result in property tax reduction of $21,000 per year for ERCO, Inc., and sets a precedent for other sites that may be established.

A field day was organized in October for 40 industry, university, and regulatory professionals (MDE, MDA, county agencies) that resulted in identification of additional research questions. As a result, a proposal has been requested by WSSC and other partners to answer the needed questions. A draft $100,000 proposal has been developed and will be submitted in early 2004. McIntyre-Stennis funds of $36,000/three years were secured this year.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-County Specific.

Project 4.2.3. Maryland Residents Receive 'Homework' Assistance

a. Project Description. When it comes to environmental concerns, people are quick to point their figure at easily identified "villains," such as industry and agriculture. Many are unaware that their own actions can have a positive - or negative - effect on the environment. And although printed materials on water quality protection and other environmental issues are readily available, most of these materials go unread because they are too long and complex, aren't distributed to the right people, or don't contain the information consumers want.

The Maryland Cooperative Extension Service has produced a collection of easy-to-read, understandable materials designed to educate citizens about their role in protecting water quality, their health, and the environment in general. Developed as part of an environmental program called "*Maryland HomeWork*," the materials are compiled in a loose-leaf notebook. Instead of being distributed to anyone and everyone in the hope that it will be read, the notebook has been provided to people attending a series of paired two-hour HomeWork workshops that focus on such topics as composting, water conservation, recycling, well and septic system management, and hazardous household products. In the future, all *Maryland HomeWork* materials will also be distributed to people attending Extension workshops or seminars on any of the subjects addressed in the notebook. (People interested enough in attending one type of environmental or water quality workshop are most likely to be interested in and benefit from the rest of the HomeWork material.) Three *HomeWork* Demonstration Homes have been established to showcase the practices suggested in the materials.

b. Impacts. Regional Specialist was invited to give 31 presentations. Seven of these were *National* invitations to present to a National audience. Ten were presentations at the State or multi-State level. The remaining presentations were at the county level throughout the entire state of Maryland. More than 2,250 people were in attendance at these programs. This doesn't include the number of people who heard the radio broadcasts, watched the television shows, or read the newspaper articles related to some of these programs, or the over 30,000 that visited the Regional Specialist's web sites for information. Actual teaching hours totaled 3,630. Absent from this number is the amount of one-on-one teaching via email and phone correspondence. Also, 2 Maryland Public TV and a University of Maryland TV show featuring the Regional Specialist are

aired monthly, to a *National* audience. 170 Lawn Care, 215 Greenhouse Growers, and 250 Landscape industry personnel received continuing education credits and/or re-certification credit for attending the Regional Specialist's programs. 166 EPA Region III State Pesticide Inspectors (Maryland, Delaware, Virginia, West Virginia, Pennsylvania and the District of Columbia) received re-certification credits for attending a Regional Specialist's program.

A Chesapeake Bay Trust grant was received for a *Bay-Wise Landscaping* program. In 2004, 50 Master Gardeners received *Bay-Wise* certification, and a demonstration garden was planted for use in promoting native species landscaping.

c. Source of Funding: Smith-Lever 3b&c, state general funds & Federal EPA.

d. Scope of Impact: Multi-County & Statewide.

Project 4.2.4. MD Master Gardeners Program (Volunteers Help Home Gardeners Reduce Pesticide Use & Improve Water Quality)

a. Project Statement. Because of their desire for beautiful, pest-free landscapes, home gardeners often spray pesticides without first identifying a pest and sometimes apply pesticides even when the pest is no longer active or the plant injury is minor.

The Maryland Master Gardener Program was established in 1978 to teach citizens how to adopt sustainable gardening and lawn care practices and reduce unnecessary pesticide use through the Integrated Pest Management (IPM) approach. University- trained and certified Master Gardeners serve as volunteer horticulture educators, offering IPM education and diagnostic assistance via workshops, classes, plant clinics, information booths, and special programs, like the Bay Wise Gardening Project. They walk clients through the IPM process-from correct diagnosis to monitoring, prevention and-when necessary-making targeted applications of least-toxic pesticides. They also teach home gardeners how to identify and attract beneficial insects.

b. Impacts. Created agendas and conducted four meetings (4 hours each) with the Master Gardener Advisory Board to address training, volunteer policy and management issues, and program goals. Communicated with MG coordinators and MG leaders on a regular basis. Three hundred twenty five individuals completed the Master Gardener training program in 2004. Approximately 950 Master Gardeners reported 57,500 volunteer hours in 2004, a 14% increase over 2003. The value of the 2004 volunteer service was estimated to be $1,006,250 by the Governor's Office on Volunteerism and Service. Principal Master Gardener goals are to help achieve a reduction in unnecessary pesticide and fertilizer use by Maryland residents and to promote wise use of natural resources. (www.mastergardener.umd.edu). Organize and coordinate the all-day Advanced Training for Master Gardeners at College Park (May, 2004). Twenty-two learning sessions were taught by 13 invited presenters; 160 Master Gardeners paid to attend. Thirty-one MG trainees in Queen Annes Co. took a pre- and post test developed by the state coordinator to evaluate knowledge gained in two key areas- integrated pest

management and urban nutrient management. The average score rose from 47.3% to 97.2%. Hosted N.E. Regional M.G. Conference with 410 participants. As a result of budget cuts, the M.G. program organized a new statewide strategic planning committee and developed new minimum state standards and reprinted the M.G. handbook.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-County.

Project 4.2.5. Greenhouse Integrated Pest Management

a. Project Description. Nursery, greenhouse and landscape managers in Maryland's second largest agricultural industry (valued at $1.24B in 2001) require cost-effective and environmentally safe materials and methods to control insects, and diseases and to efficiently use water and nutrients.

To help Maryland greenhouse managers stay on top of current insect, disease and fertility problems with greenhouse crops and to sustain and expand use of IPM techniques.

In a written survey conducted at MGGA educational event growers told us they need current information on what insect, disease and fertility problems were occurring in Maryland. They were also interested in using IPM methods that reduce plant losses. Toward this end we published a weekly 1- 2 page electronic e-mail list serve IPM report sent to all Maryland greenhouse and Extension offices in the state. Reports are then posted to IPMNET (CMREC web page). Obtained $1000 funding from the Maryland Greenhouse Growers Association to support technician's time working on this project.

To help growers evaluate new low risk pesticides and investigate biological control in commercial greenhouses in Maryland.

Working closely with MGGA and Maryland Cut flower Growers Association we helped develop educational outreach programs to help the Maryland greenhouse industry expand and improve in 2004. We offered three introductory classes to reach new greenhouse and cut flower growers in the State and introduce them to IPM methods as they develop their greenhouse operation plans. Involved Extension faculty in conducting these seminars to increase their contact with this agricultural community.
To expand use of IPM methods we developed new manuals in 2004 and one Extension fact sheet on greenhouse topics. Also publish 4 articles per year in MGGA HortFlash on new low risk pesticides and biological control options.

Working with national chemical companies to conduct trials to evaluate new low risk pesticide for efficacy. Results are published in refereed journals and trade journals to benefit growers.

Continued to publish a weekly 1- 2 page electronic Greenhouse IPM on current information on what insect, disease and fertility problems were occurring in Maryland.

The report is sent to Maryland greenhouse growers and Extension specialists and educators. It advises them on how to use IPM methods that reduce plant losses. Reports are then posted to IPMNET (CMREC web page).

b. Impacts: Obtained $1000 funding from the Maryland Greenhouse Growers Association to support technician's time to work on electronic greenhouse IPM alert. In 2004 we had 33 greenhouses using professional IPM scouts and 11 using in-house scouts that are trained and maintain regular contact with Cooperative Extension. These scouts received in-depth training at an 8 hour IPM scout update on March 11, 2004 which 42 people attended. We recruited participation of 5 professional scouts and 82 greenhouse managers in a bi-weekly Greenhouse IPM Alert reporting system in which insect, disease and fertility problems are sent out. The Greenhouse IPM Alerts are pulled together each week at our office and working with Ethel Dutky we put in IPM suggestions for control. This regular close contact with growers encourages use of IPM methods in growing their crops. All participating greenhouses keep plant losses under 1% per year. We were able to rapid diagnosis and get information out on poinsettia scab when it showed up in Maryland greenhouses and keep this disease from causing major economic loss. We were also able to detect the quarantine disease called white chrysanthemum rust. We put out an alert to growers and worked with MDA in finding and destroying infected plants to prevent extensive potential economic loss. We were able to keep losses below $18,000 when they could have easily exceeded $160,000 from this quarantined disease that showed up in Maryland.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-County and Statewide.

Project 4.2.6. Home & Garden Information Center

a. Project Description. The Home & Garden Information Center (HGIC) is the main center for providing information & training to citizens of Maryland on environmental, home horticultural and water quality issues. The main focal point for 2004 is to:

- grow the Home and Garden Information Center (HGIC) as a national model for delivery of environmental horticulture information and education.
- Develop and disseminate information on backyard and community food production, integrated pest management (IPM), plant problem diagnosis, composting, soils and fertilizers to MCE staff, HGIC horticulture consultants, Master Gardeners, clientele groups, and the public through classes, demonstrations, applied research, fact sheets, print and electronic media, and the Web.
- Public adoption of environmental horticulture practices- in particular, to reduce unnecessary fertilizer and pesticide use.

b. Impacts. HGIC horticulture consultants assisted, 16,140 clients. The HGIC web site had 727,238 individual user sessions in 2004; a 52% increase over 2003. 12,200 fact

sheets were ordered via the website; 94,675 fact sheets were downloaded in pdf format. HGIC consultants reviewed and amended the answers to 948 of the 3,198 e-mail questions received by HGIC in 2004. Provided expertise in numerous subject areas to 8 phone consultants who operate 3-6 HGIC phone lines from 8am – 1pm Monday through Friday, year-round. Analyzed 115 plant and insect samples and distributed 36,400 fact sheets, 8,400 magnets, 17,200 bookmarks, and 1,760 soil test kits. Provided training to volunteers in the following areas: 2-week "*Winter Schoo*l"; 8 presentations (2-3 hours each) by campus and field faculty and outside speakers; one day (Dec. 2) training at Howard County MCE office; 6 presentations by campus and field faculty on timely topics. Review and approve a newspaper column- "*Ask the Plant and Pest Doctor*"- produced by a HGIC consultant every 2 weeks. Conducted the second annual level II advanced training course in organic vegetable gardening in western MD. Produced and delivered 3p.p. presentations and did 17 hours of classroom and hands-on teaching for 25 learners. Impacts and behavior changes will be available in 2005.

Electronic survey of clients who sent in a question via e-mail related to a pest problem: 86% of respondents (n=91) reported that HGIC helped them correctly identify the problem, 51% reported that they used alternatives to chemical pesticides as a result of our recommendation, and 51% claimed that they learned how to prevent the problem next year. This translates into economic savings, fewer toxics negatively impacting the environment fewer toxic materials that homeowners and landfill operators have to deal with. The same outcome would be expected from a sample of callers to the HGIC "hotline".

c. Source of Funding: State Funds.

d. Scope of Impact: Multi-County and Statewide.

4.3 Maintain a Water Supply Capable of Supporting Both Commercial and Private Needs Today and in the Future by Protecting and Conserving Surface and Ground Water Resources.

(Key Themes – Drought Protection and Mitigation, Water Quality)

Maryland Cooperative Extension educators developed 165 programs in 23 counties, 3 regions in Maryland, state, multi-state, and national. Topics covered included communities and individuals adopting water conservation practices; and communities and municipalities officials receiving training in ground-water protection standards under the National Drinking Water Act. These programs reached 17,375 people.

Examples of educational programs include the following:

Project 4.3.1. Improve Water Quality Through Water Conservation – Bay-Wise Landscape Management

a. Project Statement. Improve water quality through water conservation and IPM techniques by the proper selection of plant material in the home landscape. Pollution of Maryland's waterways by excess phosphorous and nitrogen is a growing problem. As a result nutrient management regulation have been enacted on commercial agriculture operations and homeowners are strongly encourage to follow proper fertilization techniques around their home.

b. Impacts. The *Maryland Bay-Wise program* is organized and administered by this educator, who team teaches with an FCS Educator and the Water Quality Regional Specialist, and coordinates with 10 Master Gardener Coordinators to provide advanced training and additional support to the 393 Master Gardener volunteers from 20 different counties. Specially trained Master Gardener volunteers teach classes, make presentations at community meetings, staff exhibits at fairs and work one-on-one with local county residents to help them make environmentally sound choices when maintaining their landscapes. This use of trained volunteers greatly multiplies the efforts of the educator to provide environmental stewardship education to Maryland residents.

The three levels of change that this Extension program strives for are awareness, adaptation and adoption. The first two levels have been well underway since the inception of the Bay-Wise program, in 1996. The third is currently being demonstrated by the actions of the Master Gardeners (MGs) that have taken the advanced training course. The number of MGs trained statewide in the Bay-Wise program has increased this year from 354 to 393. There are now Bay-Wise MGs in Baltimore City, Anne Arundel, Baltimore, Calvert, Caroline, Carroll, Dorchester, Frederick, Harford, Howard, Kent, Montgomery, Prince George's, Queen Anne's, St. Mary's, Somerset, Talbot, Washington, Wicomico and Worcester counties.

Educator provided twelve hours of advanced training in Bay-Wise Landscape Management for 39 new MGs in 3 counties in 2004 and trained 28 of those Bay-Wise MGs how to certify landscapes. As part of the advanced training, Educator designed and administered a pre- and post-test evaluation. The evaluation was given to one of the two counties (Anne Arundel/Queen Anne's and Frederick) taking the advanced training this year. Frederick County test scores showed an increase in knowledge from 54% (pre) to 92% (post). Excerpts from 6-month post-training surveys from both groups indicate that 88% of the MGs that took the Bay-Wise Advanced training in 2004 have adopted at least one of the best management practices they learned in the training. Responses to the question, "What are you doing differently in your landscape as a result of the Bay-Wise training?" include, "planning a rain-garden, eliminating more lawn area, removing invasives from the landscape, use corn gluten (organic weed & feed), plant more natives, not fussing over leaves in flowerbeds, fertilizing less often and thinking more about what I am doing in the garden." Educator keeps all Bay-Wise MGs updated with a quarterly newsletter. On request, Educator taught 5 additional lessons to 137 MG interns covering such topics as basic botany, landscape design, weed management, native plants, intro to the Bay-Wise Program and xeriscaping.

This year 34 more MGs had their residential landscapes certified as Bay-Wise demonstration sites; this brings the total to 142. The MGs have planted and/or are maintaining Bay-Wise demonstration landscapes in Anne Arundel, Baltimore, Caroline, Carroll, Calvert, Frederick, Harford, Howard, Montgomery, Queen Anne's, St. Mary's, Talbot, Wicomico, and Worcester counties. Certification indicates the third level of change - adoption.

The ultimate level of MG adoption and involvement in the program is apparent when the volunteers, who have had their landscapes certified, certify their county's fellow residents' landscapes. As an example, Anne Arundel county MGs have certified 29 client landscapes: five in 2001, fifteen in 2002, four in 2003 including a monastery garden and five in 2004. Howard County MGs have certified 46 client landscapes since they began their program in 1997. The most prominent landscape certification of this year was the Government House in Annapolis by a group of Howard and Anne Arundel County Master Gardeners.

Educator also provided a class on "*Alternatives to Herbicides*" for the Master Gardener Level II Advanced training sponsored by the Home and Garden Information Center (HGIC). Eighteen Master Gardeners learned how to Eighteen Master Gardeners learned how to control pests without using traditional pesticides that are harmful to the environment. Evaluations were done by HGIC.

c. Source of Funding. Smith Lever 3b&c and State General Funds

d. Scope of Impact. Statewide

Project 4.3.2. Improve Water Quality – Environmental Stewardship

a. Project Statement. Maryland has abundant water resources. Surface water provides 80 percent of the state's water supply, however groundwater supplies approximately 85 percent of the total water used in Southern Maryland and the Eastern Shore. Under the Chesapeake Bay agreement, there is to be a 40 percent reduction in nutrient loading into the bay by year 2020. Citizens and homeowners contribute to water quality problems and solutions to improving water quality. As Maryland's population continues to drastically increase, educating the general public, homwowners and children of the ways to improve water quality is critical.

b. Impacts. Two thousand, seven hundred and twenty-three fourth graders and their parents & teachers from 27 schools (48% Caucasian, 21% African American, 16% Hispanic, 0.6% other and 14% Asian) learned how their daily actions personally affect local water quality when they visited the Montgomery County Maryland Cooperative Extension office for the "*Close Encounters With Agriculture*" program. This team effort involves all program areas in Extension, the Soil Conservation Service, local farmers and other Extension volunteers and covers three different tracks that all relate to agriculture, i.e., production agriculture, the environment and nutrition. Educator designed and team-taught twelve sessions a day, in the environment track, for the nine-day event. (Educator

taught 8 of the 9 days.) Pre- and post-visit exams indicate that the student scores increased from 21% to 60% and teachers rated the event 4.75 out of 5.0 (high).

Twenty-one 4-Hers from Montgomery County's *Adventures in Science* (AIS) program learned about soil hydrology, where their drinking water comes from and how they can affect the quality of their drinking water. 100% of AIS students surveyed said they would change at least one of their behaviors to improve water quality in their community.

One hundred and eighty-four Maryland garden club members, Frederick County fairgoers, Baltimore County and City residents learned various ways they could lessen their negative impact on the environment in six classes and seminars taught by the educator. No evaluation was administered for these classes.

Upon request, sixteen Brookside Gardens staff members learned several ways to engage youth when teaching then about botany during this three-hour train-the-trainer hands-on workshop. The staff either works directly with youth or trains their volunteers in the youth education program.

Educator's partnership with various agencies and organizations yielded many benefits in 2004. Educator provided the link between MDA's urban nutrient management working group and information previously unavailable in the form of an urban watershed survey. This much needed information was initiated three years ago when Educator provided training to surveyors in cooperation with a University of North Carolina graduate student's Ph. D. studies. The survey generated statistical information on homeowner lawn fertilizing habits that will help the working group better address outreach efforts within parts of the Chesapeake Bay watershed. A partnership with the Friends of Mount Vernon Place in Baltimore provides that community both horticulture information and a liaison to the city's horticulture division as that community takes on a multi-year project to renovate the four small historic parks that make up the nationally recognized landmark. Membership in the newly initiated Chesapeake Conservation Landscape Council provides Educator with important networking possibilities with local and regional agencies and organizations. The goal of this group is to research, promote and educate the public about conservation-based landscaping practices to benefit the Chesapeake Bay watershed. Educator's role on this council is to assist with creating a set of standards, which will be adapted by professional organizations and private individuals, and that will result in a healthier environment.

c. Source of Funding. Smith Lever 3 b&c and State General Funds.

d. Scope of Impact. Statewide and multi-state.

4.4. Maintain a Water Supply Capable of Supporting Both Commercial and Private Needs Today and in the Future by Protecting and Conserving Surface and Ground Water Resources

(Key Themes - Water Quality and Nutrient Management)

Overview - Research

The contamination of surface and subsurface water supplies due to non-point source agricultural runoff is among the most serious environmental problems facing American agriculture today. About 60% of the rivers and lakes in the United States are polluted by agricultural runoff; rivers primarily by sediments, and lakes by nutrients. Additionally, surface and groundwater are contaminated by a variety of pesticides, and nutrient sources such as fertilizers and manure. One of the challenges for developing economically sustainable agriculture is to simultaneously reduce non-point source pollution problems and maintain farm and rural industrial incomes at reasonable levels. One solution is watershed-scale planning and management which makes it possible to target Best Management Practices (BMPs) for the greatest improvement in water quality even though watershed planning is much more complicated than field or farm scale planning.

As an 1890 Land Grant institution, UMES is committed to continue the services and applied research currently provided to area farmers, watermen and resort residents (Eastern Shore tourism industry). We expect to bridge the agricultural, environment, and renewable natural resource programs and find ways that farmers and businessmen can be economically enhanced while not harming the environment and do so with concern and sensitivity to all facets.

Primary Goals

- Adopt management practices for agricultural production that enhance natural resources.
- Improve the application and adoption of land-applied biosolids, manures, composted materials, and other organic byproducts.
- Improve water quality through the adoption of sound environmental stewardship practices by the public and municipalities.
- Maintain a water supply capable of supporting both commercial and private needs today and in the future by protecting and conserving surface and ground-water resources.
- Promote environmentally sound land use plans that manage growth and value the benefits to society of farms and forest lands.
- Increase recycling and appropriate product disposal.
- Promote the use of rural and urban forest stewardship practices to maintain a sustainable forest resource.
- Improve fish and wildlife habitat and species diversity, as well as promote the use of new management techniques that manage wildlife and control damage to property, crops and people.

Adopt management practices for agricultural production that enhance natural resources.

Because of the intense competition between farming and the urban population in Maryland, much of our work has focused upon the reduction of chemicals and other exogenous inputs to farming systems. In particular, Maryland leads the nation in the development of nutrient management programs for control and reduction of nutrients on cropland. This effort began with the *Pfiesteria* outbreak of 1997 and has focused on the reduction of phosphorus to farmland. Further, due to the high cost of land and labor in Maryland, we have examined ways to reduce costly pesticide use on both cropland and in the greenhouse. Many of the best programs for reduced pesticide use in the US were developed in Maryland.

Examples of research projects include the following:

Project 4.4.1. Intensive Nutrient Management for Efficient Crop Production

a. Project Statement. Research program explores the fate of nutrients in agro-ecosystems. Efficiency of nitrogen and phosphorus utilization during different phases of numerous crop rotation systems and the evaluation of the potential for nutrient losses from production soils are the primary objectives of this research program. Nutrients applied to agricultural lands, either as purchased synthetic fertilizers, animal manures, or biosolids have three alternative fates: be utilized by the growing crop; be retained in the soil as components of dynamic nutrient cycling processes; or be lost from the soil by water transport or atmospheric volatilization processes. Nutrient losses from soil can result in detrimental impacts on surrounding natural waters including accelerated eutrophication, aquatic habitat degradation, and impairment of drinking water quality. The goal of our research is to maximize the efficiency of crop nutrient utilization while minimizing the potential for nutrient losses from agricultural land.

b. Impacts. The overwhelming majority of the 2 M acres of cropland in Maryland are fertilized with either purchased synthetic fertilizers or animal manures. These nutrient inputs contribute to the cost of production of all commodities. Efficient use of applied nutrients is essential to minimize production costs and sustain farm profitability. Evaluation of nutrient application rate and timing in Maryland's numerous crop production systems permits identification of the most agronomically and economically efficient nutrient management practices. Refinement of soil testing and other methods used to evaluate soil nutrient availability to crops enables managers to more accurately determine the quantity of fertilizer nutrient input necessary to optimize production and yield.

Adequate nutrient availability to agronomic crops is essential for both maximum production quantity and commodity quality. Grain and forage quality is affected by the balance of nutrients available to the crop during its growth. Soil and plant analyses are useful diagnostic tools for evaluation and management of nutrient availability that in turn determines commodity quality.

Although applied nutrients are essential in Maryland's crop production systems, over application of nitrogen and phosphorus may pose an environmental risk. Nitrogen and phosphorus transport from agricultural soils to surface waters can contribute to the

eutrophication of these natural water bodies and spark declines in water quality. Nitrogen leaching through soil to groundwater has been documented as a human health hazard as well as an environmental hazard. Management of nitrogen and phosphorus inputs to cropping systems that ensure adequate nutrient availability to the growing crop while minimizing the potential for excess or residual nutrients to runoff the soil surface or be leached out of the crop root zone has been a primary research focus. Management of soils that have historically received over applications of phosphorus and reducing the potential for phosphorus losses to adjacent water resources is a rapidly expanding research priority.

Preservation of a sustainable agriculture industry in the rapidly urbanizing mid-Atlantic seaboard is a daunting social challenge. Sustainable agriculture is not possible without the use of sustainable nutrient management practices. Environmental protection, habitat preservation, and water quality issues are part of our society's daily conservation and agricultural nutrient management plays a premier role in this social debate.

c. Source of Funding: Hatch Project MD-B-182.

d. Scope of Impact: National.

Improve Water Quality Through the Adoption of Sound Environmental Stewardship Practices by the Public and Municipalities

Project 4.4.2. Constructed Wetlands for Treating Dairy Wastewater

a. Project Statement. The focus of this research is to evaluate the effectiveness of wetlands constructed for treating dairy milk house waste. We are collecting monthly data on a suite of water quality parameters from various locations within wetland-based treatment systems. The parameters we analyze include biological oxygen demand (BOD), chemical oxygen demand (COD), nitrogen (ammonia, nitrate, nitrite, and total nitrogen), phosphorus (ortho-phosphate and total phosphorus), total suspended solids (TSS), pH, electrical conductivity, dissolved oxygen, and temperature. These data allow us to quantify the treatment effectiveness of the various components of the systems. Additionally, we are monitoring vegetation in the wetlands to assess changes in community structure in response to wastewater constituents. Vegetation characteristics we are monitoring include species composition and abundance in permanent plots, the species composition of buried seeds (i.e., the seed bank), and standing biomass of dominant species. Because of the importance of peat formation in the retention of certain nutrients (phosphorus in particular), we are initiating studies of the decomposition rates and nutrient retention capacity in various wetland plant species.

b. Impacts. On a regional scale, it is generally less expensive to implement measures for nutrient and solids control rather than to restore ecosystems damaged by these substances. On a local scale, constructed wetlands may be less expensive to operate than conventional wastewater treatment systems. Additionally, with a trend toward

having more animals per unit area of farmland, these systems may also have the benefit of requiring smaller land area than some waste management practices.

A better understanding of the factors controlling the effectiveness of wetland-based treatment systems will improve their design and implementation.

Milk house wastes contain high concentrations of solids and nitrogen and phosphorus compounds. These substances can result in eutrophication of downstream water bodies, damaging or altering aquatic ecosystems and the socioeconomic values that depend on them. Wetlands naturally remove solids and nutrients from water flowing through them, and we are harnessing this capacity to remove potentially damaging substances from wastewater before it is discharged to the environment. We have found that constructed wetlands significantly reduce concentrations of nutrients, solids, and oxygen demanding substances in dairy wastewater.

Reducing the quantities of nutrients and solids discharged to aquatic ecosystems will improve the health of aquatic animals. Lower nutrient levels may also prevent outbreaks of microorganisms dangerous to human health such as the dinoflagellate *Pfiesteria piscicida*.

Constructed wetlands offer an alternative to energy- and labor-intensive conventional technologies that may be more socially acceptable in some areas.

c. Source of Funding: MAES, USDA/SARE.

d. Scope of Impact: International.

Outcomes and impacts were measured in individual programs. Examples of these follow.

This project attempted to determine the effects of treating soils with agricultural gypsum (GYP); fluidized bed combustion fly ash (FBC) and anthracite refuse ash (AFA) to control phosphorus (P) loss from P-enriched soils on the Eastern Shore of Maryland. It also monitored possible groundwater contamination and, the loss of Nitrogen (N) and P due to surface run-off and soil profile movement following the application of poultry litter to P enriched soils on the Eastern Shore of Maryland.

Project 4.4.3. University of Maryland Eastern Shore - Best Management Practices (BMPs) Recommendations to Improve Management of P Losses from soil

a. Project Statement. Phosphorus (P) pollution from agriculture is a concern to water quality as P causes eutrophication; the biological enrichment of fresh water, and is the leading cause of surface water impairment in the U.S. P management on the Delmarva Peninsula is a major focus of recent environmental regulations. Many Delmarva soils have excessively high levels of soil P due to long term poultry litter application and thusly a high potential for P loss in runoff. Coal combustion by-products (CCPs) are waste materials from power plants that have been used to address agricultural soil

issues. When applied to soil, some CCPs have been used to decrease soil P solubility, suggesting that they can also lower P in runoff. The main objective of this project was to determine the effect of applying by-product gypsum to sequester soil P and reduce runoff P at a field scale.

Ten tons of gypsum / acre was added to 2 of 4 plots (0.1 ha each); runoff volume, P was measured (dissolved, particulate & total), and sediment loss. Corn and soybean yields were measured at the end of each growing season; round-up ready varieties were used, and anhydrous N 120 lbs / acre was applied to corn. The study was conducted at the UMES Agricultural Experiment Station on a site that had been treated with poultry for approximately twenty-five to thirty years.

b. Impacts. On shore land use patterns near and adjacent to water bodies contribute to P loading which promotes algal blooms and loss of fish habitats in the Chesapeake Bay watershed. Researchers at University of Maryland Eastern Shore (UMES) and USDA/ARS - University Park, PA. have found that the application of a gypsum-based coal combustion by-product flue gas desulfurization by-product (FGD) to soils with elevated (P) levels 1), decreased soil pH 2), decreased water extractable P but not plant available P in soil 3), decreased dissolved but not particulate P in runoff, but had no affect corn or soybean yields. After three years of application, gypsum is still effective in decreasing runoff dissolved P. FGD has the potential to provide a cheap and effective means of reducing pH in high pH soils and nutrification in the Chesapeake Bay watershed. Reversing the latter trend will enhance the ability of waterman to provide quality products in needed quantities, improve the economic viability of Maryland's seafood industry, and promote tourism in the Delmarva Peninsula.

c. Source of Funding: Capacity Building/CSREES/Evans-Allen and USDA-ARS, University Park, PA.

d. Scope of Impact: Regional-Delmarva Peninsula and Arkansas.

Project 4.4.3.b. UMES - The Effect of Phosphorus and Nitrogen - Based Manure Management on Soil and Runoff Phosphorus

a. Project Statement. The continual and long-term application of manure to soils at rates exceeding crop removal can result in an accumulation of phosphorus (P) in soil and exacerbate losses in runoff water. In such cases, recently mandated comprehensive nutrient management plans require manure applications to be based on either an environmental soil P threshold (i.e., 100 mg kg^{-1} as Mehlich-3 P) related to runoff P potential or crop removal rates of P, rather than previous recommendations based on crop N requirements. Even though P-based manure management is being put in place for high P soils over most of the U.S., there is little data to show that this change in nutrient planning strategy decreases P loss in runoff water. The study was initiated at the UMES Experiment Station in 2000 by establishing 18, 0.1 ha plots in corn or soybean on an Othello silt loam, which already had “excessive” soil test P (480 mg kg^{-1} as Mehlich-3 P). Soil test P as Mehlich-3 extractable P was determined in March of

each year and runoff during each flow event collected automatically with Sigma samplers for all plots and dissolved, particulate and total P measured, as well as erosion and runoff volume. Poultry litter rates were equivalent to about 75 kg P ha^{-1} for N-based applications, 30 kg P ha^{-1} for crop removal-based applications and zero for the soil P threshold-based applications. The primary focus of this study was to examine the effect of phosphorus and nitrogen - based manure management on soil and runoff phosphorus.

b. Impact. Alternative manure management required by revised nutrient planning strategies can reduce the potential for P in runoff water. Recent results show that P-based manure management reduced runoff P without decreasing crop yields; for all treatments, Mehlich-3 P remained above environmental thresholds (100 mg kg-1), and runoff dissolved P also remained above eutrophication thresholds for flowing waters (0.05 mg L-1). Continued evaluation of these strategies is needed to determine long-term implications to the management of farm nutrients.

c. Source of Funding: Capacity Building/CSREES/Evans- Allen and USDA-ARS, University Park, PA.

d. Scope of Impact: Regional-Delmarva Peninsula and Arkansas.

Project 4.4.4. UMES - Development of National and International Standards and Performance Specifications for Protective Clothing Materials

a. Project Statement. ISO 22608 Protective clothing - Protection against liquid chemicals:Measurement of repellency, retention, and penetration of liquid pesticide formulations through protective clothing materials has been published as an ISO standard.

An online system entitled Work and Protective Clothing for Agricultural Workers has been developed. This system provides access to a large body of technical data pertaining to clothing worn by agricultural workers. This information can be used to:

- Compare worker expose fabrics with those commonly used by pesticide applicators.
- Select materials and garments for specific agricultural uses.
- Design and develop garments for agricultural use . The system includes a predictive model allows the user to estimate the % penetration of pesticide through the fabric. Currently the scope of the statistical model is limited to penetration measurement of homogeneous formulations through woven fabrics.

Preliminary work related to development of performance specification is underway. First performance specification concept paper was e-mailed to ASTM task group members for their input. The concept paper was discussed at the ASTM sub-committee meeting on Chemical Protection. At the meeting it was agreed that initially one performance specification will be developed. This would include specifications for

selection, use, care and maintenance of protective clothing for pesticide users. Performance specifications that can be used as models have been obtained, and will be used to develop the proposed draft.

b Impacts. The new standard test method has the potential to be used by researchers, industry, and organizations in the US and other countries to measure the performance of textile materials against liquid pesticides. International standards and performance specifications will also assist in the selection of appropriate PPE for agricultural workers. A task group has been formed that is being chaired by a UMES professor. A preliminary draft of the performance is being developed to be distributed to task group members. In addition, individuals from the pesticide industry, governmental agencies such as the EPA, NIOSH and USDA, and international experts involved in the development and standardization of test methods have agreed to provide input (in various capacities) in the development of the proposed performance specifications.

c. Source of Funding: USDA, Evans-Allen.

d. Scope of Impact: National and international.

Project 4.4.5. UMES - Reduction in Animal Waste Pollution Through the Use of Enzymes to Improve Phosphorus Digestion

a. Project Statement. We are continuing to work on the gene component of this project. Tissues were collected from the 72 selected birds and from these birds 12 birds from the high weight and 12 from the low weight groups were identified as having superior or inferior nutrient absorption. RNA was extracted from the 24 specific birds from duodenum, jejunum, and ileum tissues. Micro arrays, constructed on glass slides, consisting of 3,840 unique chicken intestine cDNAs were screened to determine if differences in gene expression could be determined between the two extreme weight groups. Focused macro arrays constructed on nylon membranes, consisting of 384 unique cDNAs shown to be involved in Calcium and Phosphorus metabolism were further screened to also examine the differences in gene expression between the two extreme weight groups. Several genes (>20) were found to be up or down regulated between the two weight groups across multiple regions of the intestine, many of which have known relationships to Calcium and Phosphorus metabolism. The expression pattern of these genes identified by the array analyses, were verified using real-time quantitative PCR. Further characterization of the impact of these genes on nutrient absorption/utilization is needed.

b. Impacts. Identification of a genetic marker which influences phosphorus utilization will enable geneticists to evaluate and select lines which may decrease phosphorus excretion.

c. Source of Funding: CSREES - Capacity Building.

d. Scope of Impact: National.

Project 4.4.6. Characterizing Soybean and Corn Genotypes for Phosphorus Hyperaccumulation

a. Project Statement. Animal manures contain the vital plant nutrient elements N, P and potassium (K) that are often added to soil as a fertilizer. Since the manure sources contain more N than P, nutrient management plans base application rates on balancing the N with that removed by a crop. This management protocol is known to contribute to excess application of P because plants have a much lower P than N nutritional requirements. Continuous application of P fertilizers increases the risk of P loss from soil to water, causing toxic algal blooms and acceleration of freshwater eutrophication. Eutrophication has been identified as the most ubiquitous water quality impairment in the U.S. The ultimate goal of agricultural and environmental P management is to balance P inputs to the farm with outputs in primary produce such that no excess P is applied and soil P concentrations are kept at an optimum level for agronomic performance and minimal environmental impact. Important management strategies have been developed to improve plant uptake of P from soils and to enhance the use-efficiency of P fertilizers. Genetic variations in P uptake efficiencies have been reported in crops such as clover, corn and soybean. An approach to reduce high P accumulation in soil and its undesirable environmental consequences is by the adoption of plant-based P remediation strategies. Therefore, the overall goal of this project is to evaluate and characterize soybean and corn germplasm with enhanced P absorbing or hyperaccumulation capacity for use in phytoremediation strategies. Field experiments were conducted in two locations differing in P and N contents where 15, 5, 4, 2 and 2 cultivars of soybean, cowpea, corn, sorghum and grasses, respectively. Plant samples were collected at flowering stage, dried, grinded and their P contents determined. Also, soil samples were taken before planting and after harvesting and were analyzed for macro and micronutrient contents. There are indications that Sudan grass and sorghum remove higher rates of P.

b. Impacts. The main outcome of this project is to identify, characterize and/or develop high P absorbing soybean, cowpea, Sudan grass and sorghum and corn genotypes with maximum ability for P hyperaccumulation to enhance the P use-efficiency. The impacts of this project includes the followings:

- Selection of crop genotypes with high P hyperaccumulations.
- Determination of plant traits associated with high P absorption efficiency.
- Determination P removal by crops grown in the field, and 4) determination of the inheritance of P absorption traits.

c. Source of Funding: USDA, Evans-Allen.

d. Scope of Impact: National.

4.5. Promote the Use of Rural and Urban Forest Stewardship Practices to Maintain a Sustainable Forest Resource.

(Key Themes – Forest Resource Management, Natural Resources Management)

Maryland Cooperative Extension educators developed 146 programs in 23 counties, 3 regions in Maryland, state, multi-state, and national. Topics covered included forest landowners, youth, urban citizens, and conservation groups gaining knowledge in forest stewardship; urban forestry; forest landowners developing and implementing a forest management plan; forest landowners gain knowledge about alternative income enterprises; and natural resource professions will gain knowledge and enhance skills in forest management, alternative income enterprises, technological applications, and public policy conflict resolution. These programs reached 6,635 people.

Examples of educational programs include the following:

Project 4.5.1. Coverts Project

a. Project Statement. Teach forest landowners and managers to use forest management practices to improve wildlife habitat and other forest benefits. Trained cooperators will become credible advocates for sound forest and wildlife management in their communities - committing about 5 hours per month. This is a 3 and 1/2-day training workshop with 18 inside sessions and two half-day field tours. Entire program is linked to the DNR Forest Stewardship Program. Under direction of a regional specialist, the project assistant maintains regular communication with cooperators by E-mail and other means, develops newsletters, and provides follow-up and support for cooperators. About 700 applications were mailed to recruit 45 qualified applicants, of which 30 were selected for the 3.5-day training workshop. A reference manual, signs, business cards, brochures and other aids were developed for program.

b. Impacts. A formal training program was not held in 2004 due to budget cuts. However communications with coverts volunteers was still maintained and database updated. Entire program is linked to the DNR Forest Stewardship Program. Regular communication with cooperators by E-mail, newsletters, and other means is maintained.

Three newsletters were provided to cooperators to communicate regularly.
Since 1990, 346 cooperators have been trained - 24 cooperators in 2003. The educator, extension assistant, and cooperators organized a one-day refresher course attended by 38 cooperators that focused on organizing a local woodland owner association.

The annual 2004 survey was sent to active cooperators with (73) returned. Results indicated the following: 3,063 people received information on forest/wildlife management or the Coverts project from all efforts, with 2,136 of those being personal contacts. 86% had organized some event that included forestry or wildlife information, 28% used the media to inform people. Items distributed included: 177 brochures; 349 business cards, as well as reference materials. 85% took steps in managing their own properties on a total of 3,930 acres mentioned. About 34% reported that other woodland owners had sought professional management assistance as a result of their efforts,

affecting 3,265 acres. Cooperators reporting 1,652 hours devoted to outreach to friends, neighbors and community, or 39 hours per year on average - two-thirds of the goal of 60 hours per year set for the program. At $10/hr it amounts to $16,520 in volunteer time. 12,665 hours were spent by cooperators managing their own properties. At $10/hr amounts to $126,650 in labor. 100% of cooperators indicated they would like to continue as cooperators. A large number of cooperators are now involved in leadership roles in state and local natural resource organizations (forestry boards, forestry associations) and give credit to Coverts for motivating this interest.

c. Source of Funding: Smith-Lever 3b&c and state funds.

d. Scope of Impact: Multi-County Specific.

Project 4.5.2. Protecting and Profiting From Forest Lands – Forestry correspondence course

a. Project Statement. Forests cover 41 percent of Maryland. Nearly all of this forestland (90 percent) is in the hands of 130,600 private, non-industrial landowners. Increasing fragmentation of these land parcels threatens forest viability. The forest products industry is the fifth largest manufacturing industry in the state, providing more than 42,000 jobs and $4.5 B in total output.

University of Maryland faculty educate forest landowners about how to care for and profit from their property through seminars, workshops, correspondence courses, web sites, publications, newsletters, videos, and other educational efforts. One newsletter, Branching Out, reaches 5,000 private forest landowners throughout the state. A network of trained volunteer forest landowners assist in this effort by sharing information with other forest landowners, citizens, and communities through the Coverts Project outreach program.

b. Impacts. One-hundred fifty-five landowners have increased their knowledge of forestry and forest stewardship thourgh the Maryland Forestry Correspondence Course. It is estimated the course has saved participants more than $80,000 by increasing their knowledge of forestry practices. There were 47 participants enrolled in the 2004 spring and fall semesters, of which eight rolled over from previous semesters. Of these 2004 participants, 21 completed this non-credit course receiving a Certificate of Completion. While most of the participants were Marylanders, others were from Arizona, California, Canada, Idaho, Rhode Island, West Virginia and Virginia. Through this course, these landowners developed a greater understanding of their forests, determined their own goals and objectives for their woodlands, and gained the knowledge and tools necessary to design a management plan. They were furnished the resources necessary to implement their forestry practices. This course provided participants the opportunity to gain greater insight and appreciation for their natural environment, as well as an increased understanding as to how their actions impact their natural resources and economic interests for themselves and future generations. Participants were generally

pleased with the course as witnessed by positive marks on the evaluations and comments received throughout the course. Many participants expressed satisfaction and enjoyment with the course and with learning about their forests.

Sixty-three percent stated they would initiate or update a forest management plan for their property; 63% would change or adopt new forest management practices; 75% would talk with other family members about the management of land; and 63% would seek the advice of a professional forester.

c. Source of Funding: Smith-Lever 3b &c and RREA.

d. Scope of Impact: Statewide.

4.6. Improve Fish and Wildlife Habitat and Species Diversity, as Well as Promote the Use of New Management Techniques that will Manage Wildlife and Control Damage to Property, Crops, and People.

(Key Themes – Wildlife Management)

Maryland Cooperative Extension educators developed 76 programs in 23 counties, 3 regions in Maryland, state, multi-state, and national. Topics covered included rural landowners gain knowledge of wildlife management and improve wildlife habitat; urban citizens improve knowledge of urban wildlife management; natural resource professionals gain knowledge and improve their skills in wildlife management; urban and rural homeowners and agricultural businesses increase knowledge and understanding of deer and other problem wildlife species and employ wildlife damage control techniques; and local governments gain knowledge about deer and develop successful management strategies. These programs reached 3,678 people.

Examples of educational programs include the following:

Project 4.6.1. Reforestation at Western MD 4-H Center

a. Project Statement. In partnership with the Department of Natural Resources and the Garrett Soil Conservation District two reforestation projects for the Western Maryland 4-H Education Center have been planned and funded.

b. Impacts. The projects will supply 10,000 native trees to replant an area of forest clear cut in 2003. The area will become a silviculture planting demonstration site to study the effects of fencing, tree shelters, and terminal bud protection. The second project will include youth service opportunities in the planting and monitoring young trees to replant and replace older damaged trees in the hickory grove and picnic grove. Youth will plant seeds and transplant young trees to the site. A additional feature of the project will be the development of an arboretum featuring native tree species.

Grant funding in the amount of $19,671 has been committed. Additional in-kind support for planning will be provided by the partner organizations and youth volunteer.

c. Source of Funding. Smith-Lever 3B&C, state of MD DNR, Garrett County, and state general funds.

d. Scope of impact. County specific.

Project 4.6.2. UMES -Impact of Population Reduction on Movement, Health, and Reproductive Behavior in Nutria

a. Project Statement. This project examines the impact of population reduction on movement, health, and reproductive behavior in nutria. This information is necessary to develop effective control strategies to prevent further damage by nutria. The objectives of this project are: 1) to evaluate the effects of population density on home range and movement patterns of nutria (*Myocaster coypus*), 2) to ascertain if the health of the nutria population is related to harvest intensity, 3) to determine how population dynamics of nutria affect their reproductive behavior and 4) to elucidate the temporal patterns of gonadal steroid secretion in nutria during their reproductive cycle. Two treatments and two control areas were examined to determine the effect of population reduction on the movements, health, and reproductive behavior of nutria. Prior to initiating the study, nutria in all areas was identified by tagging to generate accurate population estimates. The second treatment areas underwent intensive nutria harvest by trapping and hunting to significantly reduce the resident nutria population. The control areas were not subjected to intense nutria harvest.

b. Impacts. Removal of this invasive and exotic species is important to minimize future wetland loss on the Eastern Shore of Maryland. Our findings suggest that the control or eradication of nutria is more time-consuming, labor-intensive, and expensive than originally anticipated. Nutria inhabits very remote and inaccessible habitats. In addition, trapping year-round during the extreme temperatures in summer and winter months is very difficult for field personnel.

c. Source of Funding: CSREES-Capacity Building.

d. Scope of Impact: Delmarva Peninsula/National.

Part A. Planned Programs (continued)

REE Goal 5. Enhanced Economic Opportunity and Quality of Life for Americans

Overview.

Maryland youth, families, and communities are the core components in increasing quality of life and economic opportunity. Currently, 13 percent of Maryland children ages 18 and under live in poverty. A single parent heads more than one fifth of families with children.

The current welfare-to-work effort in Maryland requires families to develop the skills and resources needed for independent living by placing a 60-month maximum time limit for welfare benefits. As parents leave welfare to go to work, additional childcare providers are needed.

The process of public decision-making is currently a significant issue for Maryland citizens and policy makers alike. Land use, food safety, and childcare are examples of potential issues involving public decision-making. Because of the inherent difficulty of the situation, it is not uncommon for critical public decisions to be postponed, indefinitely tabled, or solved in uninformed ways.

Societal and governmental needs are growing more complex, fractionated, and global. Increasingly, citizens are asked to share leadership roles in their communities. New and replacement intergenerational leaders must be prepared for these civic challenges. Youth and adult leaders must have the skills, confidence, and ability to lead diverse groups in difficult situations involving polarization of opinion, civic disengagement, and conflict. Youth civic engagement, youth-adult partnerships, and youth empowerment have become significant issues.

Volunteers provide educational, economic, and social benefits to families, individuals, organizations, and communities. Over 3,500 adults and 1,000 older teen leaders serve as Extension volunteers. Effective selection, training, involvement, and guidance are essential steps in maintaining and strengthening volunteer efforts.

The primary goals are:

- Resolve differences between competing interests/conflict management.
- Increase ability of Extension faculty to lead public issues education programs.
- Increase the ability of Extension volunteers to successfully carry out Extension programs.
- Adopt effective leadership practices and strengthen leadership competencies.
- Strengthen skills and knowledge to achieve economic stability.
- Develop and accept individual, parental, home, financial, and/or community responsibility through work, family, and community involvement.
- Enhance the attractiveness of Maryland youth to potential employers to enable youth to be productive, contributing members of a global society.
- Increase the ability of Maryland youth to have caring relationships with family members, peers, and others in their communities.
- Increase the ability of Maryland youth to be competent youth leaders with a strong commitment to civic and social responsibility.

- Strengthen Maryland youth's understanding of the importance of good health and safe and healthy lifestyles.

Outputs.
Maryland Cooperative Extension educators developed approximately 3, 000 educational programs, which were held in all 23 counties, Baltimore City, all regions in Maryland, statewide, multi-state, and national. Topics covered were youth development, volunteer leadership and development, strengthening family life, family economic stability, parenting and child-care, welfare-to-work, public issues education, training of local officials, and resolving differences, workforce preparations, character education, civic engagement. These programs reached approximately 190,000 people. .

Outcomes and impacts were measured in individual programs. Examples of these are in the following section.

Partners in these programs included numerous youth-serving agencies and groups, all public schools systems, childcare provider organizations, National 4-H Council, county health departments, the Maryland Department of Health and Mental Hygiene, county social services departments, the Maryland Department of Human Resources, the Eastern Shore Health Education Center, the financial industry (private and non-profit) and many additional governmental, NGO's, and private sector agencies, organizations, associations and businesses. . Cooperation with other members of the land grant system included VA, UDC, and all states in the NE Extension Region.

A few examples of the many public issues around which MCE has recently worked include:

Riparian buffers;
Public drainage on the Eastern Shore;
Grandparents as parents;
Availability and access of affordable child care;
Healthy lifestyles;
Community leadership development;
Affordable rental housing;
Agricultural conservation and commodity policies.

Maryland's own assessment of accomplishments. Maryland Cooperative Extension is accomplishing the goals of their five-year plan. There is a balance of educational programs among the various goals and the Extension Administration Team is pleased with the accomplishments. Evaluations of outcomes from the five-year plan are conducted at the individual program level, not at the level of an aggregated REE goal.

5.1. Enhancing Rural Economic Opportunities

Maryland Cooperative Extension educators developed 26 programs, which were held in 12 counties, Baltimore City, all three regions in Maryland, statewide, multi-state, and national. Topics covered were identifying policy alternatives and their consequences, negotiating skills,

identifying common ground, planning and implementing steps to reduce friction, appraising community benefits resulting from resolution of differences. These programs reached approximately 900 people.

Examples of educational programs include the following:

Project 5.1.1. Developing Rural Economic Strategies

a. Project Statement. Business and job retention and expansion are critical to nine Eastern Shore counties. MCE Rural Development Center at UMES in cooperation with counties has received over $12 M in grants to provide: revolving loans, technical and marketing assistance, research, feasibility studies, planning, heritage and nature-based tourism, and micro-business assistance.

c. Impact.

- Invested $1.8M in 158 Eastern Shore development projects (average $11,279 investment) and leveraged $10.3M in local share investments, total of $12.1M.
- Lent $12M to over 50 manufacturing businesses in cooperation with the 4 Lower Shore Counties. Leveraged $60M private lending. Impacted 4,000 jobs.
- Assisted the 4 One Maryland designated counties (Caroline, Dorchester, Somerset and Worcester) to develop implementation plans for funding under the program.
- Adoption and implementation of 4 county Comprehensive Economic Development Strategies.

c. Source of Funding. Smith-Lever 3b& c, 1890 Extension, state general funds and USDA Rural Development grants.

d. Scope of Impact: State of Maryland, particularly the Eastern Shore. Multi-County Specific.

5.2. Adopt Effective and Responsive Policies and Programs; Increase Ability of Extension Faculty to Lead Public Issues Education Programs; Increase the Abilities of Extension Volunteers to Successfully Carry out Extension Programs;

(Key Themes – Community Development, Public Issues Education)

Maryland Cooperative Extension educators developed over 760 programs, which were held in 23 counties, three regions in Maryland, statewide, multi-state, and national. Topics covered were policy development, public issues processes, conflict management, negotiating, and collaboration skills, framing public policy issues and including public issues education (PIE) in scope of work. Also, strategic planning processes, financial management, performance measures, and organizational climate, assessing local needs, evaluating the effectiveness of programs as part of the "*Excellence in Governance Certificate Program.*" These programs reached approximately 12,000 people.

Examples of educational programs include the following:

Project 5.2.1. Managing Growth in an Urban State-Strategic Planning for Jurisdictions and State Agencies

a. Project Statement. Maryland has two regions identified as the second-most and the ninth-most threatened farming regions by an American Farmland Trust report. The Maryland Office of Planning predicts that if current trends continue, 500,000 more acres of open land will be lost to development over the next 25 years (Bay Journal 1997).

University of Maryland faculty developed a multi-disciplinary research effort in the Patuxent watershed to analyze the evolution of land-use change. Their goal: to determine how policy mechanisms, land-use controls, nonpoint source pollution regulations, wetland permitting and transportation affect farmland loss and residential development patterns. They also developed farmland-owner workshops on tax issues related to agricultural land preservation.

b. Impacts. Additional funding granted for Farmland Protection under the 2002 Farm Bill. Increased citizen and farmer involvement in the development of comprehensive plans. Legislation introduced in Maryland House to grant tax-free easement payments. Assessment of important agricultural lands needing protection improved.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State of Maryland.

5.3. Adopt Effective Leadership Practices; Increase Leadership Ability of Youth, Adults, Extension Personnel

(Key Themes – Leadership Training and Development, Youth Leadership, Youth-Adult Partnerships, Youth Empowerment)

Maryland Cooperative Extension educators developed over 400 programs, which were resulting in over 900 presentations held in 23 counties, Baltimore City, three regions in Maryland, statewide, multi-state, and national. Topics covered were assessing leadership skills, team building, conflict management, communication, personnel and volunteer management, motivation, and team building. These programs reached over 8,735 people.

Examples of educational programs include the following:

Project 5.3.1. Developing Community Leaders - LEAD Maryland

a. Project Statement. The world is becoming increasingly complex. People communicate more quickly, are increasingly interdependent, and turn more quickly to litigation when they are in conflict. As Maryland's communities adjust to these changes, the value of effective leadership rises. University of Maryland Extension faculty are involved in offering public leadership development programs for various communities in Maryland. Partners in the program include the College of Agriculture and Natural Resources, the Maryland Department of Agriculture, the Maryland Farm Bureau, the Maryland Grain Utilization Board, and the Maryland Agricultural Education Foundation. The purpose of LEAD is to provide men and women interested in agriculture the opportunities to improve leadership, develop a network of diverse people, and increase understanding of critical issues. Twenty-three Fellows were selected for the 18-month program. The students completed 8 three day seminars, a three day trip to Washington DC, and a ten day international study trip. Teaching methods included field visits, assessments, panels, case studies, presentations, and self-discovery. Following completion of an application process and interviews, 23 new Fellows were selected to start Class III in January 2003. Class II traveled to Cuba and graduated in early 2003. Class III plans to travel to Brazil.

b. Impacts. All 23 Fellows of Class II completed the 37-day program. At the end of the program, Kellogg Foundation met with the Fellows and published a written report commending the program. Three of the Fellows were elected to the LEAD Maryland Advisory Board. All of the graduates continue to be involved in nurturing the program and mentoring the new Fellows. The program has attracted support from over 15 local, state and national organizations.

c. Source of Funding: Smith-Lever 3b&c and state extension funds and over $220,000 from non-profits and foundations; tuition from Fellows.

d. Scope of Impact: State of Maryland

Project 5.3.2. Youth Civic Engagement

a. Project Statement. Local, state and national conversations on youth development conducted by 4-H in 2001-2002, identified priorities for youth development programs. Youth civic engagement and youth as full partners were identified as two areas of focus for youth development work in the next 3-5 years. Positive youth development programs recognize the need for young people to make connections to their communities and value youth as community resources for problem-solving and building on the assets and strengths of a community. Youth and adults can work as partners to make a difference.

Program Objectives:

- Youth and adults identify and develop knowledge, skills and attitudes for effective youth and adult partnerships

- Youth in three rural Maryland communities will become engaged in community decision-making in partnership with adults in community organizations and agencies.
- Youth and adults in three rural communities will build their capacity to make community change and strengthen positive youth development opportunities for children and youth in their communities.
- 4-H clubs will be established in one of more after-school sites by youth in partnership with adult staff.

Program Development:
Funding through National 4-H Council for the Engaging Youth, Serving Community allowed for the development of pilot youth/adult partnership projects in 10 states in the northeast, including three projects in Maryland, over a two-year period. The regional training conducted in 2003 served as a model for county-based youth adult partnership training to be conducted in Carroll County in 2003 and 2004, at the State 4-H teen Council Training in January 2004, at the State 4-H Learning and Leadership Conference in June 2004 and state wide in December of 2004 as a part of the Additionally, the Carroll County YAP team is working on increasing youth participation in decision-making and leadership roles on the county fair board. In Talbot and Calvert counties, 4-H educators participated in training to support youth/adult partnerships for afterschool program development. Both county programs developed and delivered positive youth development experiences in afterschool settings. The 4-H Reading Buddies afterschool program in Talbot County engages youth as "buddies" or mentors for younger children in a literacy education program. In Calvert County, 4-H afterschool teen ambassadors were trained to start 4-H clubs in afterschool settings.

b. Impacts. All three Maryland counties participated in a national evaluation of the projects. The three counties and the state 4-H faculty member completed reports every four months to reflect on barriers, opportunities, and impacts of the project. The following participation goals were reported by the Maryland sites:

- 226 Youth Trained in Youth/Adult Partnerships
- 121 Adults Trained in Youth/ Adult Partnerships
- 325 Youth Participated with Adults in a Concrete Project
- 79 Adults Participated with Youth in a Concrete Project
- 100 Youth Recognized as Making Contributions to the Community
- Eight New 4-H Afterschool Program Clubs Started
- 35 Youth and Adults Working Together to Start Clubs
- 22 Afterschool Care Providers Received 4-H Curriculum Training
- 10 Youth Provided Leadership in 4-H Aftershool
- 1275 hours were spent by Youth and Adults working as Partners in 4-H Afterschool Clubs
- Nearly 10,000 hours were spent by Youth and Adults Engaged in Community Problem Solving in Youth/Adult Partnerships

County exmple of outcomes reported for the Maryland project include:

Talbot County:
Through qualitative evaluations, parents and teachers have noticed improved attendance by some students on days that they have the afterschool program, because if they miss school then they will have to miss Reading Buddies. In the classroom, teachers have noticed improved reading performance and comprehension. Behavioral changes in the participants include the ability to better communicate in front of their peers, increase in positive attitudes towards reading, and better sharing and empathy amongst peers. The fifth graders leaving the program have volunteered to help in future years as mentors. These youth went from 'receivers' to givers.' Parental involvement in the program has increased.

Carroll County:
Youth felt empowered to address concerns, experience decision making process, opportunity to be 'at the table' with adults in their activities, Youth were able to receive caring support from an adult other than their parents; because we involved any youth who came – no necessarily the outspoken/ popular/ always the club president type – everyone got several opportunities to speak their minds – listening to the other side was the goal – not something to suffer through.

Calvert County:
Through 4-H clubs and projects, the youth in our county are learning valuable life skills. With new 4-H after school clubs, we have been able to reach more underprivileged youth in the county. Children who don't live on farms have been able to experience raising and caring for an animal through a lease program. Our Tidewater after school club owns several sheep and the children help care for them.

Several teens have started an after school literacy club at a local elementary school and have enjoyed working with the children so much that they have decided they want to become teachers.

c. Source of Funding: Smith-Lever 3b&c, state general funds and national 4-H council grant.

d. Scope of Impact: State-wide

Project 5.3.3. 4-H Youth Development Develops Leadership Skills – A County Example

a. Project Statement. Today's youth need a variety of opportunities, safe places to live and caring adults to help them embrace changes and reach their potential. The 4-H Youth Development Program provides 4-H members and other under-served and under-represented youth with skills that help them reach their potential as individuals and to prepare them as positive contributing members of society.

Objective: After participating in various trainings, workshops and educational events, youth will increase their knowledge in specific areas, build self confidence, demonstrate making decisions and taking action to behave responsibly, practice safety, healthy food choices and physical activities and increase effective leadership skills.

Program Development: In 2004 this Educator worked with Extension Specialists and other 4-H educators and conducted county and multi-county wide workshops in leadership skills. Twenty five 4-H members attended the 4-H Officer program, 20 youth were involved in 4-H events and activities, and 85 youth attended the Young Teen weekend camp where they were trained in decision making and effective leadership sills.

In cooperation with FCE Educators, Health Educators, Extension Master Gardeners, and School Counselors this Educator taught 4 sessions 12 classes to 29 FSNEP (Food Stamp Nutrition Education Program) youth participants, 9 sessions 27 nutrition classes to 1277 4th grade youth participants in the Close Counter with Agriculture program, 4 sessions 25 classes in Healthy Life Styles and physical activities to 70 4-H members and other youth in after school programs, 3 sessions 12 classes in sewing and fashion to 65 4-H youth, 2 communication workshops and public speaking contest program to 72 youth, 3 sessions to 120 participants in the Kids Taking Charge Program, 14 sessions in horticulture to youth with disability, of Community Service for Autistic Children (CSAAC program) and 8 sessions in Mini-Society, Entrepreneurship program to 15 youth at Pine Crest Elementary school.

d. Impacts. Pre/post test and end of session evaluation were administered to measure program outcomes. Based on the evaluation colleted and verbal feedback:

- 70% of youth who participated in the leadership training demonstrated more involvement in club leadership and decision making role and are more confident and responsible to lead a county events and 4-H activities.
- 10 youth and 4 adults were trained as 4-H event facilitators. As a result, 7 youth and 3 adults taught and facilitated the county fashion revue event and the communication contest reaching 80 youth.
- 90% of youth who participated in sewing workshops and 4-H fashion revue had indicated that they learned much about sewing techniques and acquired great personal experiences in the 4-H fashion show. 95% of them entered their garment in the Montgomery Country Fair(60% were first time sewers). 15 older youth participate in promoting 4-H in local, stae and national educational programs and conferences.
- 75% demonstrated increased knowledge about preparing healthy food. 55% of the participants tried unfamiliar food during the sessions. Most of the participants plan to increase their rate of physical activities. All program participants increased their food demonstration skills and food science exhibits in local and state events.
- All CSAAC youth continued to raise more vegetables and flowers and entered their products in the Montgomery County Fair. As a result tow more master gardeners were recruited to help in future program implementation.

- 55% of youth who participated in communication workshop were able to participate in the county and state contest, and increase by 5% for the previous year.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State-wide

Project 5.3.4. Youth-Adult Partnerships – A County Example

a. Project Statement. The objectives are to encourage teens to stay involved with 4-H, include new teens, attend leadership training, extend a/y partnerships; have teens become teachers of 4-H programs and plan and carry out various 4-H related activities and programs with little adult assistance. Seven teens attended initial grant training of a/y partnerships in 2003, 6 of the 7 (85%) teach younger 4-H youth and serve as junior fair board members; 18 of 25 active members (72%) are 4-Her's who regularly learn leadership skills through classes provided by the educator and program assistant.

b. Impacts. Results of the classes indicated (pre/post test and observation) an 87% increase in learning to accept differences; and 91% indicated they improved ways to work together and get along with others.

As a result of leadership skill building and public speaking experiences provided by the educator and program assistant 6 teens attended the MD State Teen Learning Conference (10% of 59 senior 4-H members.) 3 teens serve on the MD 4-H State Teen Council. One teen serves as the vice president (MD State Teen Council) and he also serves on the MD State Fair Junior Board of Directors. One teen attended National 4-H Congress.

Skill building and encouragement by the educator resulted in 2 of the 3 (66%) senior members of a new 4-H club (93% minority membership) participating in the county and state fair and family night program.

The teens earned over 1500 service learning hours related directly to 4-H. Seven teens prepared lessons to teach elementary students to stay away from tobacco. Lessons will be presented in 2005.

75% of Caroline County 4-H high school graduates (6 of 8) in 2004 are furthering their education in college.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State-wide

Project 5.3.5. Youth Civic Involvement and Leadership Development in Baltimore City

a. Project Statement. In collaboration with community partners and Extension staff, the Educator worked to provide opportunities and training for youth and adults to increase their civic involvement and partcipation in community building, and intentionally strengthen their leadership capabilities. The objectives of the program were to increase youth leadership development skills, demonstrate leadership skills learned through partnerships with adults to implement activities in communities and use leadership skills to make a positive impact toward community building and revitalization efforts. Educator taught 31 classes to twenty youth and ten adult in Leadership Development training that included leadership, entrepreneurship, service-learning, environmental science, events planning, youth/adult partnerships, diversity, public speaking, and 4-H orientation. As a result 95% of the participants completed the Leadership Development training Ninety percent increased knowledge and skills that promote awareness in communication, decision-making, organizational skills, civic responsibility and community organizing, youth/adult partnership building, action planning, and economic, social, and environmental development. One hundred percent of the participants demonstrated skills learned by developing and managing sustainable citywide community activities in the area of leadership, service-learning, entrepreneurship, and environmental science. Evaluation methods used to assess outcomes included: group discussion, data collection, observation, and other assessment tools developed by the educator. Over three thousand participants were reached through this citywide initiative.

b. Impacts.

- Fifteen youth co-led the planning and implementation of the Baltimore City 4-H Youth Expo; which showcases the talents of youth from Baltimore City Public Schools and after school programs reaching 1,000 participants.
- Three youth collaborated with a local planning committee to help solidify the community of Upton's Master Plan. This plan is in its implementation phase and is the roadmap to how the community will serve its residence in housing, business, transportation, and other needs. They also coordinated the Third Annual Angel Tree Program by collecting and distributed holiday gifts to 240 children whose parents are incarcerated.
- Two youth in the community of Hampden coordinated a project with community members that combined art and service-learning to paint a mural under the Jones Falls Expressway. They implemented a community clean-up at a local recreation center, and developed a video on the importance of conserving the Chesapeake Bay. They also implemented a business that sold snacks at several locations in the area. The group made a net profit of $273.
- Three youth from the communities of Patterson Park, Edmonson Village, and Highlandtown co-led photography programs of children at their location recreation centers. The youth sold their work at a photography art show, and also donated several for display at the Patterson Park Recreation Center. The youth assisted in implementing the Bea Gaddy Thanksgiving & Christmas dinners and food drive at Patterson Park Recreation Center, serving 300 families
- Five youth in the Liberty Heights community prepared holiday deserts for the 60 participants of a local senior center.

- Three youth from the Forest Park community partnered with club members and Master and Community Gardeners to grow and distribute several pounds of produce to a local shelter and food bank. Those youth sold produce to local community members to raise money to purchase their school supplies.
- Four youth from the Randallstown community in Baltiore County coordinated a service project to work at the Food Bank in Baltimore City. They also sold refreshments at the Baltimore City 4-H Youth Expo, making over one hundred dollars.

One of the 4-H Leader received the Dorothy Emerson Citizenship Award. This award is given on the State 4-H level annually. As a member of the 4-H Cooperative Curriculum System Design Team, one youth co-authored the *BE the E* entrepreneurship curriculum that was published in 2004. Over 2,000 copies have been distributed nationally.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State-wide

Project 5.3.6. 4-H Club Leader On-Line Leadership Training

a. Project Statement. The New 4-H Club Leader Online Training was fully implemented with the introduction of the second and third units in January and February 2004. The opportunity to pilot-test the new training was offered to all Wicomico 4-H volunteers. The sample for the study was 20 club leaders. A qualitative study of this project is currently underway, as part of graduate studies at the University of Delaware. All participants will be interviewed as part of a qualitative research project. Based on the interviews that have been conducted, the online training has been well received and is providing information club leaders are using to improve the learning experience of their members. Comments of "I didn't know that", "that's a great idea" or "I learned something new" were common in the interviews. Every volunteer interviewed said she (several males are included in the sample but non has yet been interviewed) like being able to access training whenever she had time and liked knowing the information was readily available when needed. The completion rate of the pilot group was about 50%, mirroring what distance education literature predicted.

b. Impacts. While the pilot study was successful, it appears the online training will be of even greater value to recently recruited club leaders who have little or no 4-H experience.

The short-term impact of this new training program can be measured by the high rate of participation of club leaders, the positive evaluations received and the favorable comments posted on the Discussion Forum. The anticipated mid and long term impact is an increasing number of successful clubs and 4-H members due to a longer tenure of well-trained 4-H club leaders. The online training will be introduced statewide at a

March 2005 in-service and on an even broader scale using a link on National 4-H Headquarters site of USDA/CSREES. A similar link will soon be available on National 4-0H Council's volunteer training web page.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: State-wide

5.4. Strengthen Skills and Knowledge to Achieve Economic Stability

(Key Themes – Estate Planning, Family Resource Management, Retirement Planning, MD Saves, Financial Security for Later life)

Family financial management is critical to achieve financial security for all consumers and families in Maryland. MCE provides research-based financial management educational programs to diverse audiences including youth, women, minorities, immigrants, self-employed individuals, farm families, first time home buyers, employees, military, childcare providers, small business owners, senior citizens, government agencies and human service providers, working poor and other limited resource individuals. Delivery methods include one-on-one counseling, fact sheets, newsletters, conferences, workshops, Internet programs, and more.

Maryland Cooperative Extension educators developed over 400 programs, resulting in over 1,300 presentations, which were held in 23 counties, Baltimore City, all regions in Maryland, statewide, multi-state, and national. Topics covered were basic money management, credit use, insurance coverage, estate and retirement planning, savings and investments. These programs reached over 25,000 people. For example, in Baltimore City, MCE provided training in financial counseling to social service caseworkers that work with financially troubled families. This program has multiplied and now is reaching 1,000's of low-income individuals and families in Baltimore City.

Examples of educational programs include the following:

Project 5.4.1. Maryland Cooperative Extension Personal Finance Seminar for Professionals

a. Project Statement. Financial educators and counselors have an increasing need to keep current with an ever- changing body of knowledge. Since 1989, Maryland has offered an annual financial education seminar to meet the needs of educators in the employment of the financial industry, Land Grant Universities and the military. Ten hours of general sessions were presented by nationally recognized authors**.** Fifteen concurrent sessions were held to meet the needs of military personnel as well as the university and industry representatives

b. Impacts. Evaluation from the 17-hour seminar attended by 120 participants indicated that the participants felt presentations were excellent (4.4-4.1 on a 5-point positive Likert Scale). They "learned a great deal" (4.4 to 4.1), and felt it was "very

useful in my work" (4.4 to 4.2). Participants rated the seminar at 4.5 in "well worth my time to attend**.** Participants reported that they counseled or educated in excess of 41,000 clients/families per year. Overall, MCE increased the number of Maryland consumers who enhanced their financial literacy and money management skills, managed credit better and reduced debts, participated in savings plans and increased savings/investments, plan for a secure retirement and later life issues (e.g., estate planning, long-term care). MCE enhanced the capacity of local educators, financial counselors, and human service providers to deliver personal finance education programs to help their clients.

c. Source of Funding: Smith Lever 3b&c and state general funds. This program is partially self-funded through registration fees.

d. Scope of Impact: National. Participants came from U.S. military, credit unions, housing non-profits, housing management agencies, financial institutions, five State Cooperative Extension/LGU's, and credit counseling non-profits.

Project 5.4.2. Financial Stability – A County Example

a. Project Statement.
Consumers will gain knowledge and strengthen skills in order to improve the management of their financial resources and obtain financial stability. Economic stability issues include credit management of their financial resources and obtain financial stability. Economic stability issues include credit management and basic money management.

Prescription for Financial Wellness and *Fiscally Fit* were 2 curriculums used to teach 21 classes for 825 individuals in Basic Money Management. Partnerships were formed with the Department of Defense, community churches, and the Anne Arundel County Board of Education. A three step evaluation process with assessments at one week, four weeks, and 6 months was used with 8 classes. All classes completed pre/post tests. The usable matched returns (n=678) reported the following results.

b. Impacts.
- 78% Developed a spending plan
- 81% Started a emergency fund
- 57% Increased their emergency fund
- 22% Calculated net worth
- 41% Increased savings

Six month Follow-up evaluation (n=84) were from a sampling of participants that provided email address. 81% of respondents noted that they were able to implement and sustain one or more of the practices: Saving, debt reduction, reducing expenses and participating in retirement plan savings. Disability and loss of income were cited as reasons for not completing their plan.

Credit classes on were offered at 11 different locations and attended by 214 participants These classes included mandatory credit management classes targeted for employees who were in danger of possible job loss due to credit management. Families experiencing financial difficulty were also reached in cooperation with the following community partners: YWCA Workforce Preparation Program, Sarah's House (homeless shelter), Military Family Service Center, Anne Arundel County Public Housing Authority and the Department of Social Service Family Centers. End of Meeting evaluation (n=82) showed:

- 83% increased their knowledge of the annual percentage rate
- 72% identified unfavorable credit practices
- 64% planned to obtain a credit report
- 74% completed a Power Pay analysis*

**Power Pay* computer analysis evaluated different options for repaying debt. Sixty-one credit class participants request a Power Pay analysis. The average saving, per family that completed the proposed debt repayment schedule for 2004 was $1,694. Fifty-five percent of the Maryland Saver participants (n=20) who completed Power Pay reported average saving of $3,280 due to higher interest rates.

Money Transitions was developed to address the money management needs of individuals transitioning to other employment, re-entering the work force, facing early retirement of experiencing downsizing. This program was presented 6 times for military members, at 2 workforce preparation work site and for 2 local employers offering early retirement. Only 11% of those attending the programs had an emergency fund. Spending plans were used by 12% of the audience prior to the sessions. End of meeting evaluation showed that 87% identified 3 or more ways to maximize their financial resources during a time of transition and 72% completed a spending plan as part of the class.

c. Source of Funding: Smith-Lever3b&c and state extension funds.

d. Scope of Impact: State-wide programming.

Project 5.4.3. Maryland Saves

a. Project Statement. *Maryland Saves* is a statewide initiative designed to help Maryland Families build wealth by increasing saving and reducing debt. The current program development phase is focused on the recruitment and training of coalition partners in preparation for the hard launch in Spring, 2005.

In one county, the educator has recruited 14 partner organizations and was lead writer for the Motivational Workshop Manual to be used by partners and volunteers. The 35 page manual was used by the educator in 4 classes which trained 49 participants on how to present a *Maryland Saves* motivational workshop. Pilot programs have been conducted by the educator to train 23 regional bank managers and 28 *Habitat for*

Humanity participants. Six partners from a Baltimore bank were trained as wealth coaches and met individually with 22 of the 28 *Habitat for Humanity* participants at the conclusion of the motivational workshop training.

b. Impacts. As a result of the workshop and coaching, 20 of the 28 participants enrolled as Maryland Saver and developed a financial action plan for increase wealth. (n=20)

- 100% set a saving goal (amounts ranged from $10 - $50)
- 70% plan to reduce debt
- 55% completed a Power Pay computer analysis (see financial stability impacts)

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi- County.

5.5. Develop and Accept Individual, Parental, Home, Financial, and/or Community Responsibility Through Work, Family and Community Involvement

(Key Theme – Child Care/Dependent Care, Parenting, Grandparents as Parents)

Maryland Cooperative Extension educators developed over 200 educational programs resulting in 400 presentations, which were held in 23 counties, Baltimore City, three regions in Maryland, statewide, multi-state, and national. Topics covered were care giving, understanding children and their development, modeling appropriate behavior, nurturing family members, advocating for families. These programs reached over 23,000 people.

In 2004, Maryland Cooperative Extension (MCE) offered the gift of a new website to the community of professionals and families on child care and afterschool issues. A click on www.mcecares.org takes the user to the MCE Child Care and After School Program web site. This site features the programs MCE's 4H Youth Development and Family and Consumer Sciences Program Areas offer to enhance the quality of child care and afterschool programming through training for its professional, educational on-site programs for children and youth, and resources for families to find quality care.

For more than a decade, Maryland Cooperative Extension has provided continuing education training for child care providers across the state. MCE offers training on topics across the Core of Knowledge (Maryland Department of Human Resources, Child Care Administration) to help professionals who work in child care centers and family child care homes maintain their registration and licenses. Training locations, events and times vary depending on the jurisdiction.

Through the 4-H Youth Development program we offer programs for elementary and middle school age children in afterschool sites. 4-H clubs can be organized through an aftershool

program. Also , specific short-term educational programs such as "*Reading Buddies*" and "*Entrepreneurship*" can enhance afterschool programs. Our 4-H effort is part of the national USDA 4-H Afterschool Initiative.

The MCE Child Care and Afterschool Program website also benefits professional and families as a consortium of information about Maryland specific child care research and program evaluation, and professional education opportunities. This website is intended to be a one-stop location to learn about what's happening in child care in our state. Our goal is to enhance the quality of care for children and youth by

- Bringing together the resources of our agency's program areas and making them available to the professional community.
- Coordinating information about child care and aftershool program, research and funding activity in Maryland to support professionals who work with children, youth and families.

Examples of educational programs include the following:

Project 5.5.1. Maryland Cooperative Extension Child Care Provider Training

a. Project Statement. Regulated childcare providers in Maryland are required to have continuing education hours in health and safety and child development and curriculum to maintain their licensure. These hours are reviewed every year and must come from approved trainers in the state. Maryland Cooperative Extension has been an approved trainer since 1994. Family childcare providers and child care center directors and teaching staff is the primary audience for MCE's training. Others who attend include parents; Head Start and public school teachers and unregulated child care providers. Training covers topics in child development, curriculum, health and safety, business management and topics of professional development (such as stress management). Topics are offered at beginning, intermediate or advanced levels of professional development, depending on the needs of the audience. MCE frequently partners with other child care/early childhood groups to conduct training, thereby broadening our reach and enhancing the quality of our programs.

b. Impacts. Each year MCE trains approximately 2,000 regulated providers in the state with continuing education that can be used to maintain state registrations or licenses for child care. FTE commitment to our training varies, but an Extension educator in each county offers, on average, 3 hours per month. Evaluation data from 6 hour continuing training conferences attended by 30 to 150 participants reveals that participants feel more competent in their work with children and feel more committed to the profession of childcare. In addition, participants report more contacts with others in their field, and a greater sense of support for their work from other professionals and from parents. The training is consistently rated as being high quality and highly popular with provider audiences. MCE professionals sit on advisory councils of local Child Care Resource and Referral Centers.

c. Source of Funding: Smith Lever 3b&c, and state general funds.

d. Scope of Impact – State of Maryland. Collaborators include Child Care Administration, Maryland Committee for Children, and local childcare resource and referral and professional child care associations.

Project 5.5.2. 4-H After-School Initiative

a. Project Statement. Maryland 4-H youth development has expanded a statewide 4-H Afterschool initiative as a part of a national 4-H effort to provide extraordinary learning opportunities to school age youth in urban, suburban, and rural communities.

Objectives:

- 4-H youth development educators provide quality curriculum resources and professional development training for afterschool staff.
- 4-H youth development educators and adult and teen volunteers partner with community afterschool programs to organize 4-H clubs that provide youth positive interaction with caring adults, hands-on learning for life skill development, and service opportunities to make a difference in their communities.

b. Impacts.

- Statewide, approximately 1600 youth are participating in 4-H afterschool programs
- MCE Cares Web Site (www.mcecares.org) was developed by the MCE CCASP Focus Team. The web site offers access to training, programs resources and information, research and a calendar of MCE programs for Maryland's child care and afterschool providers and serves as a vehicle for internal communications among MCE 4-H and FCS educators.
- Youth in Somerest and Frederick counties are building technology skills through participation in community-based 4-H computer labs, funded by CYFAR New Communities Project.
- Garrett county 4-H afterschool partnerships with 21st Century Community Learning Centers have expanded the number of days that afterschool centers are open in two rural communities. The afterschool initiatives are funded by CYFAR New Communities Project.
- Talbot, Dorchester and Calvert county 4-H youth and adult partnership teams build literacy skills of elementary youth through afterschool Reading Buddies programs. Funding to support these initiatives was made possible by a 4-H JC Penney Grant.
- In Howard county, Montgomery county, Anne Arundel county and Baltimore city, Youth in afterschool programs build entrepreneurship, business, and civic skills through the 4-H Mini-Society program. Funding from the Kauffman center for Entrepreneurial Leadership supports these projects.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-county

Project 5.5.3. 4-H After School – A County Example

a. Project Statement. This county reached youth in all public elementary school from kindergarten through fifth grade through the 4-H Reading Buddies from Janunary – May 2004. Using a literature-based approach, the program is able to accommodate student differences in reading abilities and at the same time focus on meaning, interest, enjoyment and ownership.

Buddy reading allows for one or more elementary aged youth to partner with a teen to read a book of their choice form the books matching the current week's theme. By working together, the youth are able to figure out unfamiliar words and to talk about the story in a non-threatening environment to assist in comprehension (Tompkins, 2002). Budding reading allows for collaboration between students, allows youth to assist each other and develops reading fluency. The youth are able to then respond in their buddy groups through talking and sharing what they have just read in relation to their experiences. Exploring is accomplished through rereading, participating in writing hands-on activities that the teens have designed.

The effectiveness of cross-age tutoring is supported by research (Cohen, Kulik, & Kulik, 1982), and teachers report that students' reading fluency and attitudes toward school and learning improve (Labbo & Teale, 1990; Morrice & Simmons, 1991). Significant social benefits to cross-age literacy programs include the youth getting acquainted with other youth that they might not normally associate with and they also learn how to work with older and younger children in a group setting.

b. Impacts. When the test scores where reviewed for the 2003-2004 school year, there was not a significant increase in scores in the students who participated in Reading Buddies as compared to those who did not. The research has found that reading and writing have similar activities at each step and are both used to formulate meaning. Therefore, a writing component was added to allow for a whole language based approach and test scores will be reviewed in late spring for the 2004-2005 school year. The Educator completed two college level reading education classes in the fall to allow her to better support this program and complete reading inventories on site.

c. Source of Funding: Smith-Lever 3b&c and state general funds.

d. Scope of Impact: Multi-county

5.6. Enhance the Attractiveness of Maryland Youth to Potential Employers to Enable Youth to be Productive, Contributing Members of a Global Society; Increase the Ability of Maryland Youth to Have Caring Relationships with Family Members, Peers, and Others

in Their Communities; Increase the Abilities of Maryland Youth to be Competent Youth Leaders with a Strong Commitment to Civic and Social Responsibility; Strengthen Maryland Youth's Understanding of the Importance of Good Health and Safe and Healthy Lifestyles.

Maryland Cooperative Extension educators developed over 1,000 programs resulting in over 2,500 presentations, that were held in all 23 counties, Baltimore City, all three regions in Maryland, statewide, multi-state, and national. Topics covered were enabling youth to be productive, contributing members of a global society; have caring relationships with family members, peers and others; competent youth leaders with a strong commitment to civic and social responsibility; and understanding of the importance of good health and safe and healthy lifestyles. These programs reached over 100,000 people.

Examples of educational programs include the following:

(Key Themes – Children, Youth, Positive Youth Development, and Families at Risk)

Project 5.6.1. Dads Make a Difference

a. Project Statement. "*Dads Make a Difference*" (DMAD) project is a program being conducted through a partnership between the Maryland Department of Human Resources, Child Support Enforcement Administration, and the University of Maryland, Maryland Cooperative Extension. The program is a paternity education project focused on educating youth about the importance of fathers in children

This past program year Partnerships were formed with Anne Arundel and Prince George's Counties Cooperative Extension, Price George's County, Maryland National Capital Park, and Planning Commission, Greater Clay Street Community Development Committee, Anne Arundel County Public Schools, Annapolis Housing Authority, Anne Arundel County Housing Commission, Department of Recreation and Parks-Anne Arundel County and Boys and Girls Club of Annapolis/ Anne Arundel County.

Four workshops were conducted, training 17 adult volunteers and 55 teens between the ages of 13-18, to present a four lesson curriculum. These teen trainers reached 14 middle school age youth.

b. Impacts. Beginning evaluation and data analyses indicates:

- Teens are talking to others about parenting, and the DMAD program.
- Teens became viewed as resources for information about parenting and the DMAD program by peers and siblings.
- County educators reported that teens developed teaching skills, personal strategies for presenting information, and greater self-confidence as a result of their experiences in the program.

- Some teens originally involved in the program maintained involvement with the DMAD program either by serving as teen trainers or presenting at national fatherhood conferences.
- Teens who participated in the DMAD program demonstrated significantly higher levels of knowledge about fatherhood, paternity establishment and child support after receiving the training.
- Teens who participated in the DMAD program demonstrated greater awareness of the risks involved with early sexual activity and the importance of fathers establishing legal paternity and paying child support

It is encouraging that the teens who participated in the program were no more likely to become parents despite their higher risk status. The program provided the teens the opportunity to explore a variety of issues, not just paternity education, which they face as teenagers, and to engage in mutual problem-solving with their peers.

c. Source of Funding: MD Department of Human Resources and state general funds.

d. Scope of Impact: State-wide.

Project 5.6.2. 4-H and County Drug Court Commissions

a. Project Statement. The Drug Treatment Court Commission was established in Maryland in 2003 to support a collaborative, comprehensive and multi-disciplinary approach to reducing drug-related crime. To date, 10 Juvenile Drug Treatment Courts are operating in Maryland. Maryland 4-H has been invited to become a partner with the Juvenile Drug Treatment Courts in providing support for drug involved youth.

Program Objectives:

- Maryland 4-H will explore ways to partner with the Maryland Juvenile Drug Treatment Court as a way to increase outreach to underserved and underrepresented youth.
- Maryland 4-H will develop a pilot partnership with Maryland Juvenile Drug Treatment Courts in one or two communities.

Program Development:

The Assistant Director of Maryland's Drug Treatment Court Commission was invited to attend the Maryland 4-H Program Planning Conference in May 2004 to learn more about 4-H youth development programs. In October 2004, the assistant Director presented a program to the Maryland Association of Extension 4-H Agents to explain how the Drug Treatment Court and to discuss possible ways to include 4-H

b. Impacts. This project is in the very early developmental and exploratory stage. To date, one county has partnered with the local Juvenile Drug Treatment Court to provide opportunities for youth in that program to participate in 4-H programs.

c. Source of Funding: Smith-Lever 3b&c, and state general funds.

d. Scope of Impact: Multi-County.

Project 5.6.3. 4-H Animal Science Program

a. Project Statement. Maryland 4-H Animal Science program (Clover Ages 5-7 and Ages 8-18) reaches approximately 8,814 youth statewide. The Maryland 4-H program has various activities (Judging Contests, Bowls, Skillathons, Learning Days and Trainings, and Livestock Shows) throughout the year to capture these individuals to expand their knowledge in age appropriate and experiential events. These state wide events attracted approximately 2,375 individuals (26.9% of state's animal science enrollment) to participate.

From each of the events, youth are more attractive to potential employers, and are more likely to be productive members of a global society. Participants learn subject matter materials beyond what is learned in their appropriate curriculum to better prepare them in the field of animal sciences. Secondly, youth have more caring relationships with family members and peers due to the family nature of animal science events. This is evident with the caring and family-oriented projects that they complete. Since many of the animal project areas require adult and family assistance, these projects allow for family participation. Furthermore, these projects require daily care and attention. In addition, many of these events are setup as teams. Individuals must learn to work and communicate with one another.

b. Impacts. Youth from the animal sciences are increasing their abilities to be competent leaders. This is evident through the judging programs that the youth participate. In these activities, youth form decisions by utilizing critical and analytical thinking then defend their decisions in an oral defense. With this exercise, youth are learning many life skills. With participating in events such as judging, vowls, Skillathons, demonstrations, public speaking events, and exhibiting animals, youth are developing life-long skills that will assist in their development whether or not they choose to enter the Animal Sciences for a career. These learned skills consist of public speaking, analytical thinking, creativity, networking, and a broader knowledge of the project that they are learning about.

c. Source of Funding: Smith-Lever 3b&c, and state general funds.

d. Scope of Impact: Sate-wide and collaboration with DE, VA, WVA, Penn.

5.7. Youth Development

(Key Themes –Character/Ethics Education)

Project 5.7.1. Carroll County 4-H Kids On The Block Program Disability Awareness Program.

a. Project Statement. Adoption of Maryland's Public Law 94-142 (mainstreaming) has increased the number of disabled youth in the 4-H program and the local school system. The Carroll County 4-H Program and the Carroll County School System have cooperated to provide the *Kids on the Block Disability Awareness Puppeteer Program*. This disability awareness program increases knowledge and understanding of how youth can relate to disabled individuals. The program consists of 18 teens that serve as puppeteers and perform skits on various disabilities. Performances were scheduled with all 21 second and fourth grades in county elementary schools in 2003. A packet of hands-on activities was distributed to the classes. The activities were designed to allow students to experience what life is like for individuals with a disability. For example, students were blindfolded and given a cane to navigate around the room as a blind person would.

b. Impacts. Almost 3,000 elementary students, 50 day campers and over 100 Fair participants experienced disability awareness training, learning about specific disabilities and how to interact with others who are different; 25 youth learned puppetry/drama skill, teamwork, public speaking skills, knowledge of disabilities, and value of volunteering to educate others.

c. Source of Funding: Smith-Lever 3b&c, Carroll County School System, and state general funds

d. Scope of Impact: County Specific.

Project 5.7.2. Youth Community Gardening

a. Project Statement. The 4-H Community Gardening Program was a pilot project that uniquely blended environmental science, service-learning, and entrepreneurial skills to youth at an existing garden in the community of Forest Park. Twelve youth and four community and Master Gardener volunteers, this Educator, and community partners implemented the project. The objectives of the project were to have youth demonstrate skills learned, and enhance the quality of life of their community.

The initial phase of the project targeted skill development in the area of environmental science. Twelve youth were taught how to grow and maintain fruit, vegetables, and flowers in raised beds. Eighty-five percent reported and demonstrated increased knowledge and skill in this area. The youth expanded their design of a shade garden with benches they made to include working on a pond that will be completed in 2005.

The second phase of the project focused on service-learning and entrepreneurship. Emphasis was placed on enhancing the quality of life of its members, and identifying wasy to implement a business. Members of the project developed an out reach plan to retain existing community residents who had adopted and managed a raised bed in the

garden, and encourage new membership. The purpose was to promote healthy eating alternatives.

b. Impacts. Seventy-five percent of the existing members continued and there was an increase of 5% in new membership. Many of the community residents reported an increase in eating healthier as a result of growing their own fruit and vegetables. Youth and adults of the project designated and distributed portions of the produce they grew to a local shelter, senior programs, and community residents. Ninety-six percent of the youth in the project implemented a business plan that sold their produce to area residents, while learning basic business skills in the process. The youth made a profit from the business that went towards the purchase of their school supplies. Parks and People provided partial funding for the project. Members of the Maryland Lead Program and participants of the 2004 Annual Master Gardener's Conference toured the garden because of the advertised unique partnership between youth, adults and the community. Many were impressed and expressed interest in adopting a similar project in their state.

c. Source of Funding: Smith-Lever 3B&C and state general funds; grant funds.

d. Scope of Impact: City Specific.

5.8. Youth Development

(Key Themes –Jobs/Employment, Workforce Preparation)

Project 5.8.1. Somerset County. PowerUP Lab and Cyber Café'

a. Project Statement. *PowerUP Lab* The *PowerUp Lab* was organized after receiving a grant for the purpose of assisting under-served youth to obtain the skills, experiences and resources required to succeed in the digital age. It's activities are aimed at fulfilling the five promises identified by, "*America's Promise-The Alliance for Youth*" as being key to building character and competence of our young people; and include caring adults; safe places; marketable skills; and opportunities to serve.

The project in Somerset County has the following goals: to utilize exisiting Extension programs to provide better access to community members through the internet, to increase youth participation in 4-H programs building e-commerce sites for individuals to market local products, teaching the elderly computer skills to build and maintain web sites and domanins, and working with the agriculture and waterman communities to brige the digital divide. This grant has allowed the Crisfield Community to have the opportunity to enrich their population through technology by utilizing youth and adult partnerships to enhance educational and business opportunities.

The project consists of many facets that included securing a location for the facility housed is the Woodrow Wilson Community Center; this organization serves African American, White and Hispanic youth population from primarily single parent families

that have limited resources. By working cooperatively with the UMCP IT unit, an additional grant was secured from the National Science Foundation for a digital satellite, which allows for connectivity speed of 256K. Funding was also secured from MCE for a program assistant to run the lab. Finally, a donation was secured to purchase tables, chairs, and other office furniture.

b. Impacts. Youth daily sign-In sheets indicate that the number of persons using the computer lab has increased by an average of 50% in the 6 month period since receipt of the grant. A Mini poster Contest was held to promote the computer center. Youth were to develop posters to advertise the lab. As a result, 5 posters were chosen to the displayed in the community 52 posters were submitted. The winning posters will be displayed on the Somerset Commuter which servers 3500 daily. Additionally, the educator taught weekly computer classes to 13 pre-school youth on language development using the educational software package "*Sesame Street Elmo's World Learning Language*". The pre-school youth learned colors, numbers, and sounds which enhanced their ability to utilize verbal skills. All 13 youth were able to successfully complete language level seven which demonstrated they had gained skills that put them at the correct developmental state. None of the youth were at the correct developmental state when they began the classes. The outreach of the lab continually increases currently there are 13 pre-school youth attending, 27 kindergarten through six grade, and 65 youth in grades seven through twelve. 100% of these children meet the guidelines established by the federal government as at-risk youth. $82,000.00 in grants and contracts were secured to run and maintain this project. The 4-H Educator and Family and Consumer Sciences Educator cross program to run and Maintain Cyber Café'.

c. Source of Funding: Smith-Lever 3 b & c; 1890 Extension, PowerUp grant; NSF grant, County donation; state general funds and CYFAR New Communities grant.

d. Scope of Impact: County Specific.

Project 5.8.2. LifeSmarts – Teaching Teens to be Smart and Responsible Consumers and Citizens

a. Project Statement. Maryland has joined other states throughout the nation in an effort to address the need for meaningful consumer education for high school students through a program known as *LifeSmarts*. The National Consumers League operates *LifeSmarts* and works in partnership with other nonprofit government and education groups in the states. Leadership for the *LifeSmarts* program in Maryland is provided by Maryland 4-H. Program linkages include 4-H, high schools, home study students, and business. The *LifeSmarts* program teaches teens to be safe, to eat right and exercise, to use technology, and to manage their financial and environmental resources. *LifeSmarts* competitions are run as game-show style matches. The program content and competition questions focus on five key areas of consumer knowledge that teens need to know to function effectively in today's marketplace; Personal Finance; Health & Safety; Environment; Technology and Consumer Rights & Responsibilities.

b. Impact. The top two teams from an "on-line" elimination were selected to participate in the *2004 Maryland LifeSmarts Competition*. The winning state team (Frederick County 4-H) represented Maryland at the national competition in Chicago, IL and received high accolades for their performance as they won the National competition. The success of the winning state team has had a positive effect throughout the 4-H program as they have served as program ambassadors to help other 4-Hers become more knowledgeable of the program and take advantage of the benefits it has to offer. *LifeSmarts* is seen by both youth and adults as program that bridges the gap between the issues affecting today's youth and their quest to become more responsible adults. The information gained through *LifeSmarts* helps the teens, their families, and their communities. Maryland's participants were among the 330 coaches, 507 teams and 3,804 players throughout the nation who participated in the 2004 program.

c. Source of Funding: Smith-Lever 3b&c and state general funds; grant funds.

d. Scope of Impact: State of Maryland.

Part A. Planned Programs (continued)

REE Goal 6. Agriculture Communications, Enhancing Customer Service/Satisfaction Information Technologies

Project 6.1.1. UMES - Development of a Distance Education Classroom

a. Project Statement. This project established an interactive video teleconferencing classroom to delivery courses leading to the bachelor's degree. This delivery system currently transmits educational courses in early childhood-leading to a bachelor degree. Plans are underway to expand course offering to dietetics and family and consumer sciences teacher education certification. The project links students from the Eastern Shore Higher Education Center located at Chesapeake College to educational opportunities at the UMES. This project has been extremely beneficial to Head Start personnel and primary caregivers in rural area.

b. Impacts. Four students (non-traditional) will receive the bachelor of science degree in May 2005, and twelve more non-traditional students began the program Summer 2004 as Cohort #2. All courses were completed via WebCT and video-conferencing. Increase number of individuals with formal training in early childhood/child development. This project is making it possible for more rural residents to complete a college degree that will help them to be more productive in their jobs without having to leave the Eastern Shore.

c. Source of Funding: CSREES- Capacity Building.

d. Scope of Impact: Regional.

Project 6.1.2. UMES - Enhance Learning through Development of Online Courses and Materials

a. Project Statement. Technological advances over the last decade have greatly enhanced the opportunities to develop teaching modules to assist students in the learning process. Funds were sought and acquired to upgrade the technology training and development of online modules. WebCT training was provided to faculty in School of Agricultural and Natural Sciences.

b. Impacts. Preparing society ready graduates with advanced technological skills. Increased used of WebCT (content management system) for hybrid and online courses. Enhanced departmental technology infrastructure including online assessment forms were developed. Teaching module was developed for Textile Testing. The interactive modules enhanced instruction and learning.

c. Source of Funding: CSREES- Capacity Building.

c. Scope of Impact: National.

Project 6.1.3. Project 6.1.3 - UMES - Establishing a Geospatial Information Technology Training Center for Minority and Other Student Audiences-Phase II

a. **Project Statement**. Nationwide statistics indicate that minorities need additional exposure and training in scientific technological areas as career choices. This is due to the fact that their numbers in the workforce and on university campuses in science oriented discipline areas are small and need immediate rapid improvement. The purpose of this project is to provide an opportunity to minority and other race audiences to receive experiential learning and training in geospatial information technologies, GIS and GPS, in a campus setting at the high school level. Internships are provided to undergraduate students who received training for eight weeks on and off campus. High school interns spend three weeks on the UMES campus.

b. **Impacts.** Thirty - two high school student (grades 10-12) from five states, and ten undergraduate students completed three weeks and eight weeks, respectively completing training on Geo-spatial Information technologies during summers 2003 and 2004. This included exposure to Geographic Information Systems (GIS), and Global Positioning Systems (GPS). Students were placed in work groups of four (4) where they learned team dynamic concepts and developed poster presentations highlighting what they had learned during their stay at UMES. Twelve posters were generated and are on display at the plant and soils building on the University Farm.

c. **Source of Funding:** CSREES- Capacity Building.

b. Scope of Impact: National.

University of Maryland College Park Accomplishments FY04

Promote faculty and staff

- The College web site remains our key strategy for providing seamless access to the College's educational resources. It is also a major vehicle for promoting the achievements of our faculty and staff. New web tools as part of our content management system enable in depth faculty/staff profiles, on-line newsletters, calendaring system, hot topics for major events, and front-page marketing splashes as needed.
- Regular submissions to University news outlets, i.e. Outlook, Diamondback, new Terp Magazine. Stories are pitched as needed.
- AGNR published news releases are compiled from the University Clipping Service and emailed to all faculty/staff on a regular basis.
- 3 issues of MomentUM (September, February, and June) were distributed to 10,000 alumni and friends of the College. Extra copies are distributed to County Education Centers for use with local stakeholders.
- CIT coordinated media coverage and crisis communications for major events affecting the College and its faculty (academic and field). Worked closely with University Relations on College media events and marketing campaigns. Designed and developed the Building a Stronger Maryland campaign which was used by local educators to market county successes.
- Developed an online research impact system (Maryland Dividends). Research detail and impact are available to the public through a key word search.

Maintain quality leadership team, serving all units within the College

- CIT leadership team is comprised of a coordinator for each of 4 areas: media services, marketing/media relations, IT, and e-Learning as well as the administrative coordinator for the unit and myself as associate dean. This group meets bi-monthly or as needed. Major initiatives/progress/problems/successes are shared and new strategies/problem solving techniques are discussed.
- Traditionally, CIT units are almost exclusively funded by Cooperative Extension, hence the majority (75%) of CIT services are used by Extension faculty/staff whether located in the field or on campus. However, an on-going challenge for CIT is to creatively add value to existing departmental resources and research programs. New efforts are underway to address departmental websites, web branding for the College and greater support for faculty users of WebCT.

Relate outcomes and achievements to undergraduate and graduate education

- Designed and developed an on-line web-based advising system that is being shared with others departments on Campus.
- Work with the academic programs office to support alumni events (banquet, exhibits, marketing items, newsletter, etc.) Maryland Day activities, marketing of new academic scholarships/programs.

Extend College's outreach and extension mission

- 100% of MCE education centers were upgraded to high-speed ISDN connections, a significant increase from their 56K frame relay connections. This upgrade enables field faculty/staff to experience faster downloads and uploading of data, greater access to campus business functions such as ELF and travel applications, greater use of e-Learning strategies and content management via their local websites.
- Produced a CD-Rom of Extension publications, distributed free of charge to all MCE field locations. Over 75% of existing publications inventory is on the CD. Efforts are underway to place 100% of current inventory into a pdf database.
- Designed and developed a prototype for future pesticide manuals. EB 237 is an on-line searchable database with 4 major sections addressing pesticide use.
- CIT continues to provide editing and graphic design services, however, printing is outsourced using a variety of vendors. Outsourcing is also provided for business cards, letterhead, etc.
- Developed an on-line publications tracking system to facilitate timeliness and efficiency in producing publications.
- Offered a 2-week faculty development series to train campus and field faculty on a variety of topics relating to information technology, videoconferencing, web-based applications, and e-Learning.
- Supports a statewide Polycom (video over IP, H.323 standard) videoconferencing network for Extension.
- Reinitiate the MD state-wide extension conference for all faculty and staff.

Part A. Planned Programs (continued)

REE Goal 7. Multicultural and Diversity Issues

MCE is using diversity management principles and practices to implement an initiative aligned with the AGNR and UMCP Diversity Initiatives and Strategic Plans. The plan's purposes are 1) attracting and retaining a more diverse work force, 2) creating a positively charged work climate, and 3) attracting new audiences to extension programs.

University of Maryland College Park Program Updates on Progress

Compliance Activities including Employment, Employment Highlights

- State Selection Committee for Extension Faculty adopted criteria for ensuring more diverse candidate pool; search committees are diverse
- Advertised broadly to 1890, 1994, and Hispanic-serving Institutions: receive announcements of temporary and permanent positions
- Tracking systems includes gender and race/ethnicity search data
- UMES and UMCP Extension pooled resources to fund two full-time positions for bi-lingual Hispanic Program assistants on the Western and Eastern shore; resulted in award for work with diverse state residents

Compliance and Diversity Initiative Activities

- Activities and seminars about developing more accurate metrics and increasing the accuracy of reporting on compliance and diversity activities
- Workshops focused on the challenges of change and transition as part of becoming a more diverse organization
- Multiple self-assessment instruments in training seminars to enable participants to better understand themselves and their reactions to "differences," "change," and "leading change"
- Focus is on enhancing the meaningfulness of compliance activities by developing clearer linkages to organization's mission and work, based on a new Affirmative Action Plan accepted by USDA CSREES in January 2004.
- Pilot project implementation of a Limited English Proficiency Policy for which MCE was recognized as a model by the USDA Civil Rights Office.
- The MD Agricultural Experiment Station were reviewed for affirmative action compliance during the summer of 2004.

2003-2004 MCE Training Participation Related to Diversity Management

White	AfAmer	NatAmer	Asian	Hisp	N/R*		Male	Female	Total
423	80		1	3	103*		158	452	610
69%	14%				17%		26%	74%	100%

*MCERS sessions conducted in counties (Maryland Cooperative Extension Reporting System)

Training included a total of sixty-two sessions of these titles:

- *"Interpreting and Using MCERS Reports to Implement the Affirmative Action Plan"*

- *"How to Use Maryland Relay as an Accommodation for People with Disabilities"*
- *"Initiating Programs in Diverse Communities"*
- *"UNIV 100:Personal Style" (Personality Type and Self-Management for students)*
- *"Personal Style and Influence" and "Managing Up" (including bias based on type)*
- *"EEO Advisor Essentials" (Program and employment discrimination training)*
- *"Federal Compliance Review Preparation for 4-H Faculty and Staff"*
- *"Central Civil Rights File"*
- *"Mastering the Change Curve"*
- *"Leading Change at Every Level"*
- *"Work-life" Balance*

Part B. Stakeholder Input Process

University of Maryland at College Park, MD

The College of Agriculture and Natural Resources following the lead of the University of Maryland began the process of developing a strategic plan for the college including both Maryland Cooperative Extension and the Maryland Agricultural Experiment Station. The process was completed and the plan is now available to faculty, staff, students and stakeholders. The information from the Key Informant process described below was used as an input in the plan development process. The strategic plans are available as follows:

For the University: **http://www.provost.umd.edu/Strategic_Planning/**

For the College: **http://www.agnr.umd.edu/FacultyStaff/index.cfm?Parent=173&ID=292**

Administrative Committees

The Dean's Leadership Council met during the reporting period and provided important feedback from the client groups they represent. In addition the Dean and Director is able to seek specific input from this group as need arises.

Extension Advisory Councils

County Extension Advisory Councils (EAC) meet on a regular basis in most of Maryland's counties and Baltimore City. The EAC's provide insight into and support for the local extension programming. The Regional Extension Directors meet with the EAC's for the counties in each region on a regular basis. In addition the Assistant Directors/Program Leaders and Associate Director occasionally meet with these EACs. Maryland Extension Advisory Council (MEAC) did not meet during the reporting period.

Outcomes 2002

The planning document, Outcomes 2002: A Framework for Our Future, drafted in 1997 continues to serve as a guide for extension programming in Maryland. This is a transition year between "Outcomes 2002" and the new "MCE Strategic Plan for 2008."

MCE Planning Process

MCE began a strategic planning process in the fall of 2002. This process resulted in a revision of the Outcomes 2002 document. The new document is called the "MCE Strategic Plan for 2008" and was fully implemented in 2004.

Key Informant Process

A Key Informant Survey was designed to acquire input from stakeholders. The goal was to hear from Maryland residents who are not part of the usual clientele of Maryland Cooperative Extension and the Agricultural Experiment Station. In the fall of 1999, two questionnaires (community and food systems) were developed and pilot-tested with the Maryland Extension Advisory Council. During the winter, three counties pilot-tested the process and questionnaire. From April until October, MCE personnel collected data from over 200 persons who represented selected sectors of the community and food system. All counties and Baltimore City were represented. Results were shared within the College and with community groups, local and state officials, and other interested groups. MCE uses the information as it continues the planning process for its next five-year plan. The key information process will be repeated in 2005.

Customer Questionnaire

No customer questionnaires were used during the reporting period.

User Input Through WWW

The WWW was not used for user input during the reporting period.

University of Maryland Eastern Shore at Princess Anne, MD

Stakeholder Advisory Council

The plant and soils, and portions of the animal science research units of the UMES Agricultural Experiment Station have chosen the area of *nutrient management and environmental stewardship* as a major focus area. As such, our stakeholder input process includes establishing a *Stakeholder Advisory Council* composed of researchers, educators, poultry producers on the Delmarva Peninsula, The Maryland Department of Agriculture, Chesapeake Bay Foundation, and at least two row crop farmers. This group provides critical feedback, and assists in planning our research efforts to better serve the needs of the community relative to nutrient management. The committee meets annually during an annual symposium which will be held at UMES.

The first such symposium and meeting of the **Stakeholder Advisory Council** was held on August 8-9, 2004. This symposium provided an excellent opportunity for the students at UMES to be exposed to applied environmental science, enable students to share in and critique scientist research, and work with scientists and land managers in the region to address environmental and economic challenges of various problems associated with nutriment management landscapes.

Somerset County Soil Conservation District (SCSCD)

a partnership has been established with SCSCD to assist UMES in planning and achieving objectives relative to agricultural research. Several members of this association also belong to the above given advisory Council. A joint publication was produced in December, 2003 titled "*Managing Drainage Ditches to Reduce Nutrient Loss."* This organization has assisted us in securing various stakeholder audiences for us to present our research objectives and secure input and assistance.

UMES' Agribusiness Advisory Council which previously focused its efforts on providing advice and counsel to the Dean and faculty on matters pertaining to the department's mission, goals, and strategic planning, was reconstituted to focus primarily on the new Ph.D. program in Food Science and Technology.

Part C. Program Review ProcessMerit Review Process

Maryland Cooperative Extension like most other Cooperative Extension System institutions has not historically developed a wide-ranging merit review process in the past. The Plan of Work is an articulation of MCE's approach to Merit Review. The University of Maryland Eastern Shore School of Agricultural and Sciences (SANS) and the Ag Experiment Station follows the merit review procedures utilized by the University.

Local Program Reviews

Each MCE Extension Educator is required to develop or update and Individual Extension Plan (IEP also called a Job Description in some MCE documents) each year. These IEP's are updated annually and review internally by Region Extension Directors and State Program Leaders for 4-H Youth Development; Family and Consumer Sciences; and Agriculture and Natural Resources. IEP are shared with the Educator's County/City Extension Advisory Council for merit review and comment. The EAC's are widely representative of the clientele of the county or Baltimore City. ***The IEP process was streamlined during 2004 as a result of faculty comments that the process was too complicated. An on-line IEP is currently being developed.***

Each county has developed (and annually updates) a unit plan of work (UPOW). This UPOW is developed and updated with the local Extension Advisory Council. All academic departments with MCE Specialist faculty also develop similar unit plans of work. Focus Teams, consisting of multi-disciplinary faculty, were developed in 2003 to facilitate priority programming. The MCE State Program leaders and administration review these plans to determine the level of conformity with the County/City UPOWs. These will be available for review on the MCE internal web site.

UMES' Ag Experiment Station conducted a three-day strategic planning workshop for Agriculture and Human Ecology faculty in January. The outcome- an updated strategic plan produced from this meeting is being used to guide the research and teaching activities of these departments. At the encouragement of the workshop facilitators, collaborative initiatives with other units external to SANS are being involved in activities that can enhance research and teaching activities in SANS. Two major initiatives are underway focusing on technology and food safety.

In addition to the strategic planning document mentioned above, each unit in SANS submits individual faculty goals and objectives and departmental goals and objectives every year. These goals are linked with the Schools and are reviewed annually.

Recently, the University began revising its strategic plan and implemented a new program review procedure. This process allows each department and SANS to determine its strengths and weaknesses. Human Ecology's dietetics program and family and consumer sciences teacher education program, along with agriculture education underwent reviews by their respective accrediting bodies in October and November 2003. No significant changes are expected for these programs. Program reviews for Agriculture and Human Ecology programs were completed in November of 2005

State Program Reviews

Ideas and issues arising from local and departmental UPOWs are developed into a state plan of work (SPOW). The State Plan of Work takes on two separate forms; the Joint Extension/ Research Plan of Work as submitted to the US Department of Agriculture and a local document

(currently identified at Outcomes 2002). The SPOW is sent to select 1862 and 1890 extension administrators for merit review. The Northeast Region's Extension Directors have agreed to participate in a shared review of State Plans of Work.

Comprehensive Program Reviews

MCE will conduct a comprehensive and detailed program review of each of the program areas listed above at least every 4 to 6 years. An outside review panel selected specifically for the purpose of the review will conduct these reviews. This panel will seek input from local and state stakeholders as well as well faculty as they assess the overall program in the selected area. The first such review occurred in MCE in the fall of 1996 when a detailed review of the 4-H Youth Development program was conducted. This review, conducted by a panel of 4-H Youth Development professionals from other states, resulted in a review document that is currently being used to guide major changes in the program directions of the program. A 4-H Review Summary is provided as a part of this Plan of Work.

MCE will initiate similar program reviews in Agriculture and Natural Resources and Family and Consumer Sciences programming areas over the next five years. These reviews while costly provide considerable guidance to the administration on formulating programming responses to the plan of work. ***No action has been taken on these reviews as of this reporting period.***

Peer Review Process

Peer Review has long been a part of the Maryland Agricultural Experiment Station's approach to funding research as required under the Hatch Act. This process will be continued on all specific projects. ***All aspects of this review process continue during the reporting period.***

Hatch Projects.

Extend peers in compliance with the guidelines of USDA review all state research projects funded by federal formula funds.

Regional Research Projects.

An external peer committee in compliance with the guidelines of USDA reviews all regional research projects funded by federal formula funds.

Northeast Research, Extension and Academic Programs.

A peer committee in compliance with the guidelines of USDA reviews all NREAP and related projects funded by federal formula funds.

MAES/MCE Competitive Grants.

All projects funded through the MAES/MCE Competitive Grants program are reviewed in accordance with the federal guidelines for project review by a panel of scientist from UMCP, UMES and other research institutions located in Mid-Atlantic region including USDA-BARC, Johns Hopkins University, University of Delaware and Virginia Polytechnic Institute and State University.

External Review of Departments

Most units of the College have undergone external review processes that include Extension and Research efforts. The Dietetics Review has been completed and a meeting was held February 2004 with the Acting Dean of the College, however, a decision has not yet been announced. We are awaiting appointment of a new Chair prior to review initiation. The

Department of Nutrition and Food Science and Department of Veterinary Medicine are due for external reviews in 2005. In 2006 Department of Agricultural and Resource Economics will participate in an external review.

Part D. Evaluation of the Success of Multi and Joint Activities

Substantial cooperation exists between research and extension in Maryland's two land-grant institutions. This cooperation starts with the administrative level linkages and includes joint appointments and a competitive grants program.

UMCP Administration.

This cooperation is directed by the administration of Maryland Cooperative Extension and the Maryland Agricultural Experiment Station which are managed by Dr. Bruce Gardner, Interim Dean of the College of Agriculture and Natural Resources, Director of Maryland Cooperative Extension and Director of the Maryland Agricultural Experiment Station, and his designated Associate Directors. They form a single management team of agriculture research, extension and education at the University of Maryland, College Park.

UMES Administration.

The UMCP administrative team and the agricultural extension and research administrative team of the University of Maryland Eastern Shore work closely in developing programs for Maryland. Dr. Henry Brooks is the Administrator of 1890 Extension Programs at UMES where extension is a campus wide effort. Dr. Henry Brooks reports directly to the UMES President. He is also a part of the MCE administrative team. Dr. Carolyn Brooks is the Dean of the School of Agricultural and Natural Sciences at UMES. She also works closely with MCP administrative team to bring closer ties to MAES.

Joint Appointments.

MCE and MAES jointly fund a number of UMCP academic department faculty members. These joint appointments provide for integrated approaches to applied research and extension. Most State Specialists (all faculty members in academic departments) with MCE appointments have at least a partial appointment in MAES. Scientist/Specialists with such appointments are in a position to assess the needs of agricultural and related clientele through personal contacts or through MCE field faculty (Extension Educators). They can with these assessments design both applied research approaches and extension education programs to meet the identified needs. The strength of joint appointments in academic departments is the synergy of work relationships with research scientist working on more basic research needs.

Competitive Grants Program.

MAES provides primary funding for and manages a competitive grants program for agricultural and natural resources research scientists in Maryland. Funding is open to any University of Maryland System institution. The competitive grants program is jointly managed by UMES and UMCP. The program encourages cooperative research/extension submission. Faculty members with primarily MCE appointments have been major recipients of funding through these grant efforts. Each year a set of funding priorities is established which seek to address priority needs in the state. Field faculty are encouraged to participate in the program and often collaborate with research scientists and extension specialists to request funding. A similar extension program was initiated in 2004.

The efforts identified above continue to provide for effective collaboration among institutions and disciplines --- research and extension --- in Maryland. Collaborations among campus and field faculty are increasing, as are multi-disciplinary approaches to problems solving research. This is evident in some of the Planned Activity reports in Part A of this report. Critical needs are being met using "multi" approaches in the area of land use, animal waste management and farm profitability. Additionally, MCE has increased its research base for programs in Family, Youth and Communities by placing MCE funded positions in primarily research and instruction based departments of Nutrition and Food Sciences (in AGNR) and Family Studies (College of Health and Human Performance). These efforts closely link research efforts (not all funded by MAES) with the needs of communities in the state.

Multi-state programming efforts are also strong in the Northeast region. Maryland is a participant in these efforts. This is especially true in agricultural Extension programs. Maryland and Delaware continue to seek ways of sharing resources across boundaries. Efforts have begun with West Virginia to seek ways of sharing programming resources, where appropriate, more effectively between the states.

Given below is a list of on-going multi-state joint research projects at the UMES Agricultural Experiment Station with collaborating units that fall under POW goals:

REE Goal 2. A Safe, Secure Food and Fiber System

1. **Characterization of Antibiotic-Resistant *Salmonella* spp. Isolated from Processed Poultry**

   Collaborators: U**SDA/ARS Microbial Food Safety Research Unit, UMES**

REE Goal 4. Achieve Greater Harmony (Balance) between Agriculture and the Environment

1. **Using fertilizer trials to assess the fate of N in a coastal plain landscape**
2. **Role of sediments in mediating phosphorus transport of coastal plain ditches**
3. **Gypsum to reduce soluble and particulate P transport plots**
4. **Relationship of ditch water quality to field overland/subsurface flow**
5. **Evaluation of alternative ditch management methods**
6. **Survey of ditch sediment properties on UMES research farm**
7. **Modeling nutrient transport from field and ditches**

8. **N and P manure management plots**

   Collaborators**:** ***USDA-ARS, University Park PA, University of Maryland College Park, and the Maryland Department of Natural Resources***

9. **Mediating Exposure to Environmental Hazards through Textile Systems (NC170**)

   Collaborators: ***Cornell University, University of Illinois Urbana Champaign***

10. **Reduction in Animal Waste Pollution through the Use of Enzymes to improve phosphorus digestion**

    Collaborators: ***UMCP- USDA-ARS & Rutgers***

Part E. Multi-State Extension Activities

Multi-State Collaboration

Maryland's two Land-grant institutions have sought to collaborate with other states in providing the highest of quality research and extension education programs possible. These efforts are essential to efficient use of resources and in establishing sound research methodology. Maryland has been a participant in the Northeast Regional Research program for a number of years. Joint Research programs have been developed using the regional research approach. These projects are well established in the region.

- Northeastern Groups
  - NorthEast Research Association (NERA)
  - NorthEast Extension Directors (NEED)
- Northeast Region Joint Research-Extension Plan
- Regional Projects
  - NorthEast Research Extension Project (NEREP)
  - NorthEast Research Project (NERP)
  - NorthEast Research Extension and Academic Projects (NEREAP)
- 1890 Region

  Association of Research Directors: ARD was formed and incorporated in 1972 to coordinate most of the food and agricultural research activities among the 1890 Land-grant Universities, USDA, and other colleges and universities. Through this body, regional research projects are formulated whereby several interested institutions participate. Over the years three such efforts have occurred and supported by several 1890 Land-Grant universities on high priority issues.
- 1890 Extension Directors'

Multi-state extension efforts are extensive for MCE. As a small state with many bordering states and counties, efforts are often targeted to clients in Delaware, New Jersey, Pennsylvania, and West Virginia as well as Maryland. These programs (usually in the agricultural sciences) are often done in cooperation with extension educators in the adjoining states. Recent efforts include workshops on precision agriculture, computer use, risk management, greenhouse IPM, nursery nutrient management, vegetable production and family life. In addition, biosecurity efforts in the poultry industry extend throughout the Delmarva Peninsula states of Maryland, Delaware and Virginia.

These efforts decrease the need for duplicative faculty (especially Specialists) in the various states resulting in greater efficiency of program delivery. In some programming areas, the clients from several states may be required to develop a critical mass for program delivery.

Part F. Integrated Research and Extension Activities

Integration of Research and Extension efforts are described to some extent in a previous section. MCE and MAES programs are both managed by a single individual, Dr. Scott Angle (Interim Executive Associate Dean) in the College of Agriculture and Natural Resource. These arrangements, along with the joint funding efforts described above, are paramount in developing a close and effective integration of research and extension.

The effective utilization of joint appointments provides much of the integration of Research and Extension. Extension Specialists at the campus level are rarely hired without a joint appointment in either research or academic programs. Most new hires are well versed in research methodologies and expect to collaborate with other researchers in developing both Extension and Research programs. This is an effective integration process.

Appendix: Table of Resource Commitments by Planning Goal

The following three pages contain the required FORM CSREES-REPT (2/00) in facsimile form for:

Multi-state Extension Activities
Integrated Activities (Hatch Act Funds)
Integrated Activities (Smith-Lever Act Funds)

The forms are submitted in electronic form and are not signed.

U. S. Department of Agriculture

Cooperative State Research, Education and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities

Institutions University of Maryland
University of Maryland Eastern Shore
State Maryland

Check one: _x_ Multi-state Extension Activities
___ Integrated Activities (Evans Allen)
___ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	FY2000	FY2001	FY2002	FY2003	FY2004
Goal 1 - To Achieve an Agricultural production system that is highly competitive in the global economy	$295,994	$288,928	$290,209	$293,155	$304,881
Goal 2 - A safe, secure food and fiber system	$35,307	$34,674	$38,676	$39,069	$40,631
Goal 3 - A healthy, well-nourished population	$116,272	$117,051	$129,388	$130,702	$135,930
Goal 4 - Achieve greater harmony (balance) between agriculture and the environment	$213,177	$209,115	$210,181	$212,315	$220, 807
Goal 5 - Enhanced economic opportunity and quality of life for Americans	$110,974	$113,292	$113,528	$114,680	$119,267
Total	$771,724	$763,060	$781,982	$789,921	$821,516

_____ April 1, 2004_
Director Date

Form CSREES-REPT (2/00) Facsimile

Cooperative State Research, Education and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities

Institutions University of Maryland
University of Maryland Eastern Shore
State Maryland

Check one: ___ Multi-state Extension Activities
_x_ Integrated Activities (Evans Allen)
___ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	FY2000	FY2001	FY2002	FY2003	FY2004
Goal 1 - To Achieve an Agricultural production system that is highly competitive in the global economy	$438,858	$433,593	$412,174	$412,736	$234,554
Goal 2 - A safe, secure food and fiber system	$27,460	$25,588	$23,326	$23,358	$354,332
Goal 3 - A healthy, well-nourished population	$41,190	$38,382	$34,989	$35,036	$0
Goal 4 - Achieve greater harmony (balance) between agriculture and the environment	$270,438	$268,683	$227,364	$227,674	$610,084
Goal 5 - Enhanced economic opportunity and quality of life for Americans	$2,296	$2,296	$2,411	$2,415	$0
Goal 6 – Agricultural Communications, Enhancing Customer Satisfaction Information Technologies	$0	$0	$0	$0	$146,657
Total	$780,242	$768,543	$700,264	$701,219	$1,345,628

_____ Director

April 1, 2005 Date

Form CSREES-REPT (2/00) Facsimile

U. S. Department of Agriculture
Cooperative State Research, Education and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities

Institutions University of Maryland
University of Maryland Eastern Shore
State Maryland

Check one: ___ Multi-state Extension Activities
___ Integrated Activities (Evans Allen)
_x_ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	FY2000	FY2001	FY2002	FY2003	FY2004
Goal 1 - To Achieve an Agricultural production system that is highly competitive in the global economy	$470,142	$468,717	$458,711	$488,228	$517,521
Goal 2 - A safe, secure food and fiber system	$27,324	$24,430	$23,680	$25,204	$26,716
Goal 3 - A healthy, well-nourished population	$40,986	$36,645	$35,521	$37,807	$40,075
Goal 4 - Achieve greater harmony (balance) between agriculture and the environment	$226,613	$228,107	$201,381	$214,339	$227,199
Goal 5 - Enhanced economic opportunity and quality of life for Americans	$7,348	$7,715	$7,715	$8,212	$8,704
Total	$772,413	$765,614	$727,008	$773,790	$820,215

_____ _April 1, 2004_
Director Date

Form CSREES-REPT (2/00) Facsimile