2012 Virginia Polytechnic Inst. & State University and Virginia State University Combined Research and Extension Annual Report of

Status: Accepted

Date Accepted: 06/27/2013

I. Report Overview

1. Executive Summary

Virginia Cooperative Extension (VCE), a partnership between Virginia Polytechnic Institute and State University (VT) and Virginia State University (VSU), and the Virginia Agricultural Experiment Station (VAES) and the Virginia State University Agricultural Research Station (VSUARS), enables people to improve their lives through research and education using scientific knowledge focused on the issues and needs of the citizens of Virginia. Audiences are involved in designing, implementing, and evaluating needs-driven programs. VCE is a dynamic organization which stimulates positive personal and societal change leading to more productive lives, families, farms, and forests, as well as a better environment in urban and rural communities.

The overall education goal is to bring about change in people's knowledge, understanding, abilities, or behavior related to an issue and/or broader changes in economic, environmental, or social conditions. Progress towards these goals is recorded by planned program at the individual and team levels. The primary, overall research goal for Virginia is to develop relevant basic and applied research data to help solve the problems of the agricultural sector and to support the economic, environmental and social health of the commonwealth of Virginia.

VAES, VSUARS, and VCE PROGRAMMATIC GOALS: VCE's goals are to: 1) develop and transfer new knowledge in applied and basic life sciences, 2) perform relevant, objective, and timely research, 3) improve the quality of life for communities and citizens in the Commonwealth, 4) use a systems approach to programming, with task-oriented work teams that respond to the needs of individuals, groups, and organizations, 5) work with at-risk, underserved, and underrepresented audiences who need specialized attention, 6) fully integrate a culturally diverse paid and volunteer staff in planning, implementing, and evaluating programs, and 7) recruit and collaborate with public and private partners to better utilize resources, heighten impact, and reach a more diverse audience.

In particular, VSU's Extension program goals are to: 1) improve local and state economies by helping small and limited resource farmers and citizens garner resources to own, operate, and sustain small businesses, 2) educate and empower socially disadvantaged farmers to produce, distribute, and market organic, locally grown, and ethnic foods to feed Virginia's citizens, 3) ensure safe food supplies by teaching small-scale growers and farm families effective food safety practices, 4) address health issues and nutrition practices that confront limited-resource urban and rural citizens, 5) help youth, families, and seniors manage money to survive during challenging economic times, and 6) enable parents and families to leave their children in high quality and safe child-care environments.

Virginia Agricultural Experiment Station is committed to developing and implementing research that addresses society's needs and expectations. The College is focused on improving human and animal health and nutrition, enhancing the quality of the environment, reducing the effects of major infectious diseases, developing value-added products, building viable communities, and preventing chronic diseases such as obesity, heart disease, and diabetes. Research programs are conducted on the main campus as well as at the Agricultural Research and Extension Centers located across the commonwealth. The research focus of VSU's Agricultural Research Station includes the following: developing production

systems that conserve natural resources; crop diversity and alternative crops; economically competitive and sustainable small-scale agricultural systems; bio-based energy production; improving food safety and quality; and value-added plant and animal products.

PLANNING AND REPORTING: VAES, VSUARS, and VCE address a broad range of problems and issues facing citizens of Virginia through focused research and educational programming. This is accomplished and reported by VAES and VSUARS through the Current Research Information System (CRIS). In addition all VT and VSU Extension and research faculty annually report through the VT College of Agricultural and Life Sciences' electronic Faculty Annual Reporting System (eFARS). This system includes annual program plans and reports focused on faculty goals, programs, outcomes, outputs, and other data. This system also provides accurate FTEs, contacts, outputs, and outcomes for each planned program. The foundation for Research and Extension programs are built on the identification and prioritization of strategic issues through annual situation analyses, which are accomplished through the examination of trends and emerging issues identified by local advisory groups (including Extension Leadership Councils) and Extension specialists. This analysis becomes the background and rationale for deciding which problems and issues will be addressed and reported on by VAES, VSUARS, and VCE.

Virginia Cooperative Extension grew in 2012 as a result of additional appropriations from the Virginia General Assembly. VCE grew from a low of 179 agents in previous years to over 220 by the end of 2012. An additional 18 positions will be filled prior to July 2013. In the fall of 2011 Secretary of Education Laura Fornash delivered a report on recommendations resulting from a General Assembly requested study on the structure and funding of Virginia Cooperative Extension. The seven recommendations in the report have been reviewed and are in various stages of implementation. Primary concerns were around communications and transparency of funding departments and local units. All recommendations should be implemented by October 2013 with actions taken readily available on the Virginia Cooperative Extension website. As a result of the extensive hiring, a District Program Leadership Team concept is being expanded statewide. The District Program Leaderhsip Teams are experienced agents representing all program areas who will provide training and mentoring to new agents on development, delivery and evaluation of programs. This effort should significantly enhance the capacity of Virginia Cooperative Extension to deliver quality programs and be able to document the impacts of those programs.

REPORTING REQUIREMENTS: All Extension faculty (agents, specialists, and administrators) and program assistants submit individual program reports. Also, county/city employees supervised by VCE conducting Extension programs submit annual program reports. Summary reports are developed from the individual reports. All research faculty are required to propose peer-reviewed Experiment Station projects submitted to USDA/NIFA, and entered into CRIS. Researchers prepare annual progress and termination reports reviewed by the VAES director before being submitted to CRIS. In addition, all 2012 research and Extension faculty are required to submit an annual report through eFARS. This state-developed system documents teaching, research, and Extension accomplishments and impacts for individual, unit, college, and organizational review. Updates to eFARS and contact reporting in 2012 continue to better align planning and reporting with the 16 planned programs presented in this report.

PLANNED PROGRAMS: 1) Childhood Obesity, 2) Climate Change Natural Resources, 3) Family Finance and Community Viability, 4) Families, and Communities, 5) Food, Nutrition, and Health, 6) Food Safety, 7) Global Food Security and Hunger - Agricultural Management, Marketing and Policy, 8) Global Food Security and Hunger - Animals and Animal Products; 10) Global Food Security and Hunger - Biotechnology and Genomics; 11) Global Food Security and Hunger - Family Nutrition Programs; 12) Global Food Security and Hunger - Local Food Systems; 13) Global Food Security and Hunger - Pest Management; 14) Global Food Security and Hunger

- Plants and Plant Products; 15) Sustainable Energy; and 16) Youth Development.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2012	Extension		Rese	arch
1 ear. 2012	1862	1890	1862	1890
Plan	283.6	20.3	184.3	14.5
Actual	305.8	19.5	233.7	14.5

II. Merit Review Process

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

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

2. Brief Explanation

Virginia Agricultural Experiment Station

Rationale and Review Committee Structure - Research under the Hatch, McIntire-Stennis, and Animal Health and Disease Acts is conducted in three colleges that constitute the Virginia Agricultural Experiment Station (VAES): 1. College of Agriculture and Life Sciences, 2. College of Natural Resources and Environment, and 3. Virginia-Maryland Regional College of Veterinary Medicine.

For each VAES project proposal submitted, the associate VAES director or the Associate Dean for Research in the project leader's college, chairs the review (hereafter referred to as the chair). The chair selects the project review committee consisting of three or more members proficient in the subject of the proposed project. They may be chosen from outside the university if recommended by the department/unit head or deemed appropriate by the chair. Faculty from other units within the university may be eligible for VAES support.

The research proposal is reviewed by the project review committee for technical merit and for fit within the mission of VAES, and is approved by the Director or Associate Director of VAESMore detail is provided below.

Proposal Development - The project leader prepares the proposal as specified in Essentials of a Project Proposal in the Administrative Manual for the Hatch (Experiment Station) Act as Amended, the Administrative Manual for the McIntire- Stennis Cooperative Forestry Program, and the Administrative Manual for the Continuing Animal Health and Disease Research Program (1992), Appendix F. Early in the new project development process, the project leader is strongly encouraged to initiate a subject search using the USDA/CSREES Current Research Information System (CRIS).

The proposed research project is reviewed by a statistician, if appropriate, to assure the design and statistical analyses are adequate. The project leader may meet with a member of the Statistics Consulting Center or the department/unit head may designate someone with statistical to serve as a departmental reviewer. The project leader then submits the proposal to his/her/unit head for peer review in accordance with departmental procedures. If the research involves animals, human subjects, or recombinant DNA, the project leader is responsible for submitting the required protocol forms to the appropriate university review committee(s). Proposals are not forwarded to USDA/CSREES without required approvals.

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Proposal Submission and Review Procedures - The department/unit head transmits the approved project proposal to the chair of the project review committee for that college with following items transmitted to the chair electronically or uploaded onto a secure website: 1) the proposal, 2) the project leader's vita, 3) The Project Certification Form, 4) A Research Project Review Form, 5) Verification of statistical review, and 6) List of three or more suggested peer reviewers. The chair selects reviewers and distributes copies of the proposal to the Project Review Committee, which returns the Project Review Forms and comments to the chair by a specified date (after at least three weeks).

Proposal selection criteria include: 1.) proposed research relevance to the goals of the department and college, the needs of the people the research would serve, and relevance to the priorities established by task forces, work groups, or commodity research committees, 2.) objectives and procedures are clearly stated, 3.)the proposed duration is realistic for the proposed research, 4.) the appropriate or desirable individuals are cooperating on this project, 5.) the project lists impacts to Virginia (and elsewhere) or anticipated economic importance, and 6.) the project leader's vita indicates the level of competence required for the proposed research.

Each reviewer recommends the proposal be: 1.) approved with no changes, 2.) approved with minor changes, 3.) revised and resubmitted, or 4.) rejected. The chair forwards reviewers' comments to the project leader and department head prior to the review. The chair directs the committee, the project leader, and the department head to review the proposal and comments. The oral review may be omitted for revised/replacement projects, at the discretion of the chair, if a majority of the review forms are checked by the reviewers as "approved with no changes" or "approved with minor changes." If an oral review is not conducted, the chair provides a written summary of the review committee comments to the project leader with a copy to the department/unit head and the review committee. An oral review is required for a project leader's initial VAES Project.

Faculty located at off-campus Agricultural Research and Extension Centers (ARECs) submit proposals to the center director who contacts the appropriate department head on campus regarding departmental policy for securing a peer review before the proposal is sent to VAES for review. The center director forwards the proposal and departmental review, if applicable, to the VAES director or associate director, who serves as chair. The chair forwards the proposal to the review committee and the subject matter department head, who is invited to participate in the review process.

Final Submission - The project leader complies with the recommendations of the Project Review Committee and submits the revised proposal to the department/unit head, accompanied by a letter delineating the changes made in response to the recommendations of the reviewers and/or a rebuttal for any recommendations, which the Project Leader does not accept. The project leader enters CRIS Forms AD-416 and AD-417 on the CRIS website.

The chair signs Form AD-416 and transmits the above items to the VAES director accompanied by a letter listing names of the reviewers and date of the oral review (if applicable). For McIntire-Stennis proposals, the Administrative- Technical Representative (A-TR) must sign Form AD-416, certifying the proposal complies with the purposes of the McIntire-Stennis Act.

The VAES director or associate director meets with the chair, department head, and project leader if there are any questions or concerns. When the project leader, the department/unit head, the chair of the project review committee, and the director agree the proposed project should be accepted, the director approves it, assigns a project number, enters Form CSREES-2008, and transmits the proposal, CRIS Forms AD-416, AD-417, and CSREES-2008 electronically to CRIS/CSREES/USDA. The CSREES project reviewer may contact the director, assistant/associate director, or project leader with questions or for additional information. If a proposed project is deferred, the CSREES project reviewer notifies the director,

who confers with the project leader, department/unit head, and chair of the project review After approval by CSREES, the director sends copies of Forms CSREES-166 (Project Review and Comment Sheet), AD-416, AD-417, and CSREES-2008 to the chair of the project review committee, department/unit head, and project leader. These documents, the proposal, and all pertinent correspondence are retained in the official project file in the VAES director's office for three years after termination of the project.

Program Review of VSU Agricultural Research

In March 2007, all programs at the School of Agriculture including those in Agricultural Research were reviewed by external experts. A six-member team selected by USDA-CSREES visited Virginia State University to conduct the review over a four-day period. The team reviewed programs, listened to faculty presentations, visited facilities, and talked to administrators. At the end of their visit, they made an oral presentation of their findings to faculty, staff and administrators. They also submitted a written report on the state of the School of Agriculture programs and made recommendations on the future direction of agricultural research at VSU. Implementation of these recommendations has already started.

Development of Proposals - Any applicant at ARS who desires to submit a proposal for consideration must first complete and submit a Request for Approval to Submit Proposals Form to the Director of Research. The Director of Research reviews the pre-proposal and notifies the applicant about a decision whether the proposal can be developed fully or not. All appropriate University and funding agencies' policies, procedures and guidelines should be adhered to when developing a proposal. Proposal development and submission deadlines are governed by the following: 1) Review and approval of Request for Approval to Submit Proposal Form takes one working day, and 2) University review and approval takes up to five working days.

Review of Full Evans-Allen Proposal - A full proposal is submitted by applicant(s) to the Director of Research for review by external anonymous experts in the respective fields. The Director of Research's Office facilitates this process. The reviewers could be from Virginia Tech, other Land Grant Universities, or State and Federal agencies. The proposal is reviewed for addressing the needs of the state and people of Virginia and the United States, the degree of relevance of the proposed research to the land-grant mission and priorities of the University, the need for initiation of research in new areas, and other matters related to grantsmanship. The reviewers are asked to pay particular attention to scientific and technical merit, opportunities for cooperation in the proposed research with other individuals and units within the University and the Virginia clientele.

Functions of the reviewers are: 1) to review all proposals for scientific and technical merit, 2) to ensure that all proposals fulfill the land-grant mission and priorities of the University, 3) to ascertain that what is being proposed lies within the full range of expertise and capability of the investigators and the University, notwithstanding their official duties, responsibilities, and assignments, and 4) to assist applicants with acceptable proposals in locating outside peers to further review the proposals, if necessary for substance and overall quality. Based on the external reviewers' comments, the Director advises the applicant to address the concerns about the proposal or develop another one that incorporates the relevant suggestions.

Extension Review Process

The review process for Extension covers all programs conducted by VCE. VCE Planned Program Teams (PPT) develop Extension programs. The PPTs review programs on an annual basis and make decisions to maintain, modify, or create new programs to meet the needs identified through external and internal stakeholder input. An annual situation analysis review conducted by local Extension units with volunteer Extension Leadership Councils and other groups informs this process. Details on the annual programming cycle are found at: http:

//intra.ext.vt.edu/support/process/documents/2010VCEProgCycleTasksandActionSteps.pdf

VCE addresses a broad range of problems and issues facing citizens of the Commonwealth through focused educational programming. This is accomplished and reported through VCE's sixteen PPTs and three State Program Leaders who serve as partners for each PPT. A web-based planning and reporting system organized around the sixteen Planned Programs includes outputs and outcomes operationalized by annual program plans and reports. Plans are built on strategic issues through situation analysis. This process collaboratively determines social, economic, and environmental problems at local, regional, and state levels. This becomes the background and rationale for deciding which problems and issues will be addressed with VCE time, energy, and human and fiscal resources.

Problems and issues identified through situation analysis at the local level are communicated throughout VCE and educational program plans are developed by interdisciplinary PPTs composed of VT and VSU specialists and agents. These teams are organized around and reflect the breadth and scope of priority problems and issues facing the citizens of the Commonwealth. Program proposals identify programming outputs, outcomes, and an evaluation plan to be conducted by the PPTs. The program proposals are reviewed by VCE programming leadership.

Program proposals from PPTs are distributed to all agent and specialist faculty on the VCE intranet and electronic planning "buy in" process. Faculty select programs for their situation by providing specific information in a Personal Action Plan (PAP), which includes the amount of time they plan to devote to the program, the key audiences, the planned delivery and evaluation methods, how they plan to reach underserved audiences. At the end of the year, each local unit and campus faculty member completes an annual accomplishment report documenting program relevance, response, and results through a narrative and impact statements.

III. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Other (focus groups, listening sessions, issue forums, key informant interviews)

Brief explanation.

Virginia Cooperative Extension and Virginia Agricultural Experiment Station work with stakeholders to receive input though local Extension Leadership Councils and many other citizen groups at local and regional levels. The citizen groups reflect the agricultural producers and the socio-economic composition of their communities and focus on conducting programs which produce outcomes based on priority needs.

A systematic analysis of educational needs is integral for VCE program planning. Through situation analysis, needs of stakeholders are assessed, analyzed, and then shape program direction and plans. Traditional methodologies include surveys, key informant interviews, issue forums, listening sessions and focus group interviews. To encourage participation, surveys are conducted with paper and web-based response options. Issue forums, listening sessions, and focus

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interviews are held in multiple locations throughout service areas in convenient and comfortable

environments for non-traditional and traditional stakeholders. Specific efforts are made to assess needs where underrepresented populations reside, and to market input sessions through communication channels used by targeted sectors of the population.

Representation on local Extension Leadership Councils (ELCs) includes all VCE programming areas: 4H/Youth Development (4H), Family and Consumer Sciences (FCS), Agriculture and Natural Resources (ANR), and Community Viability. Currently, all 106 Extension units in Virginia have an organized local ELC and all Agriculture Research and Extension Centers (ARECs) have active advisory councils. At the state level, VCE works with stakeholders through the state Leadership Council (VCELC). The group includes volunteers representing 22 planning districts in Virginia, atlarge

members appointed by the director of VCE, leaders representing Virginia's diverse population, businesses, agencies, organizations, VCE District Directors, chairs of VCE FCS, and 4H leadership councils, VCE Director from VT, VCE Administrator from Virginia State University, and deans of VSU and VT Colleges of Agriculture including the associate dean for research. State and local ELC meetings are held at times and locations convenient for the membership.

Virginia is a large, diverse state and as such, meeting locations are geographically distributed to ease travel burdens for members. Travel expenses are covered by VCE administration for meeting attendance. A faculty member works directly with the VCELC to assist with organizational development and logistics. The VSU Extension program works with stakeholders through the VCELC for the systematic analysis of educational needs to plan Extension programs. To ensure that adequate stakeholder input is received from limited-resource and underserved audiences, VSU Extension is also informed by a VSU Agricultural Advisory Committee. Formed in 2008, the 15-member committee consists of members from agricultural commodity groups, the agri-business community, and public education. Other members include Extension professionals and volunteers, farmers, and a local legislator who advocates for the VSU School of Agriculture. All members work closely with or are aware of the needs of VSU's clients.

Advisory Committees inform teaching, research, and Extension programs within VSU's School of Agriculture and research programs within VAES and the college. VCE advisory committee member guidelines were used as a basis for selecting VSU Agriculture Advisory members. Committee members represent the Extension program areas of 4-H, agriculture and natural resources, and family and consumer sciences and are invited to serve by the Extension Administrators and Dean of the School of Agriculture. VCE and the ARECs have long facilitated grassroots involvement, buy-in, and ownership in local programs. VCE formally connects with the grassroots of the state through partnerships with local volunteer ELCs. For the Virginia Agriculture Experiment Station (VAES), volunteer advisory councils provide stakeholder input. These partnerships represent the diversity of local clientele, communities, and industries across the Commonwealth.

On April 1, 2011, Dr. Edwin Jones joined Virginia Tech as Director of Virginia Cooperatie Extension and Associate Dean of the College of Agriculture and Life Sciences. Dr. Jones has traveled throughout Virginia, and in each planning district has attended a forum, each hosted by a local ELC, through which ELC members and stakeholders have been given the opportunity to provide input into VCE's future direction. These forums have been hosted in every planning district in Virginia.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use External Focus Groups
- Open Listening Sessions
- Use Surveys
- Other (Extension Leadership Councils)

Brief explanation.

The Virginia Agricultural Experiment Station (VAES) conducts research relevant to the needs and priorities of the citizens of the Commonwealth. Research projects are established based on the input of advisory committees at each of the thirteen Agricultural Research and Extension Centers (ARECs) distributed across the state. The twelve academic departments within the College of Agriculture and Life Sciences each maintain stakeholder groups and the College has its own advisory committee of producers, commodity groups, and agribusiness leaders that provide important feedback to VAES. VAES provides research-based input to the VCE programming process through faculty research and Extension specialists and administratively through AREC directors and statewide Extension program leaders. VCE formally establishes connectivity with the grass roots of the state through partnerships known as Extension Leadership Councils (ELCs). At the local level, this partnership represents the diversity of each county and city in which VCE exists as a resource. Representation includes VCE programming areas (4-H/Youth Development, Family and Consumer Sciences, Agriculture and Natural Resources and Community Viability), community leaders, and other organized community, agricultural, and youth associations and entities who partner with VCE. Extension staff and Leadership Council members work as equal partners to determine needs, establish program priorities, plan and implement solutions, identify and secure resources, market VCE and its programs, and evaluate and report program results/impacts to program stakeholders. Currently, all 107 Extension units in Virginia report having an organized local ELC. At the state level, local connectivity is achieved through the Virginia Cooperative Extension Leadership Council (VCELC). The partnership includes volunteer leaders representing the 22 planning districts of Virginia, at-large members appointed by the director and administrator, all VCE District Directors, all chairpersons of VCE state program leadership councils for FCS and 4-H, the VCE Director (VT), the VCE Administrator (VSU), the director of governmental relations at VT, and the deans of the 1862 and 1890 land grant colleges. Extension provides a formal mechanism for VSU and VT to receive stakeholder input for Extension and research programs. The situation analysis process in communities examines and determines what issues, problems, and opportunities exist that VCE resources should address

http://www.ext.vt.edu/vce/support/process/situation.html). An essential component of the process includes development of a unit profile (http://www.ext.vt.edu/vce/support/unitprofiledata.html). The unit profile developed by local agents is shared with ELCs to determine which key informants should be involved in situation analysis (http://www.ext.vt.edu/vce/support/keyinterviews.doc).

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

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- · Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- · Survey of the general public
- Other (focus groups, key informant interviews, public issues forums, listening sessions)

Brief explanation.

A systematic analysis of educational needs is integral for VCE program planning. Through situation analysis, needs of stakeholders are assessed, analyzed, and then shape program direction and plans. Traditional methodologies include surveys, key informant interviews, issue forums, listening sessions and focus group interviews. To encourage participation, surveys are conducted with paper and web-based response options. Issue forums, listening sessions, and focus group interviews are held in multiple locations throughout service areas in convenient and comfortable environments for non-traditional and traditional stakeholders. Specific efforts are made to assess needs where underrepresented populations reside, and to market input sessions through communication channels used by targeted sectors of the population.

Virginia Cooperative Extension hosted 48 strategic planning dialogues, including over 1200 traditional and nontraditional stakeholders. Through a structured, facilitated process, input was solicited with results being used to guide Extension programming over the next five years. On April 1, 2011, Dr. Edwin Jones joined Virginia Tech as Director of Virginia Cooperatie Extension and Associate Dean of the College of Agriculture and Life Sciences. Dr. Jones has traveled throughout Virginia, and in each planning district has attended a forum, each hosted by a local ELC, through which ELC members and stakeholders have been given the opportunity to provide input into VCE's future direction. These forums have been hosted in every planning district in Virginia.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- In the Action Plans
- To Set Priorities
- Other (staff professional development)

Brief explanation.

Input from stakeholders involved in situation analysis and strategic planning is utilized to shape Extension programming from a state and local perspective. Issues that are identified are researched in a collaborative process involving campus and field based faculty, with curriculum developed to shape educational programming delivered throughout Virginia by agents and volunteers. Identified needs and resulting educational programming frame Extension's budget, action plans, priorities as

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well as volunteer and staff development needs. Input also shapes the plan of work for VCE, VAES and VARS.

Brief Explanation of what you learned from your Stakeholders

Stakeholder input helped shape the future direction of Virginia Cooperative Extension and resulted in strategic goals through 2016. Additional forums conducted by the Director of Extension this past reporting year validated our strategic planning results. 2011 - 2016 Focus Areas and Goals, all established with stakeholder input follow:

2011-2016 Focus Areas and Goals

Focus Area I: Enhancing the Value of Virginia's Agriculture

- Increase the profitability and sustainability of Virginia's commercial food, fiber, animal recreation, and green industries.
- Prepare the agriculture industry for future opportunities and challenges in urban and rural environments.
- Research and disseminate methods and recommendations to ensure that consumers have access to safe, high-quality agricultural products.
- Develop and deliver programs to enhance agricultural literacy.
- Interpret policy and legislation, identify opportunities, and provide training to comply with regulations that ensure farm profitability and environmental quality.

Focus Area II: Sustaining Virginia's Natural Resources and the Environment

- Support the management, use, and sustainability of Virginia's natural resource capital for the benefit of future generations.
- Provide natural resource and environmental education.
- Provide educational resources to address urban/rural interface issues.
- Provide education to conserve and protect Virginia's surface and groundwater resources, including the Chesapeake Bay.
- Develop and deliver programs in green energy/bioenergy.

Focus Area III: Creating a Positive Future Through 4-H Youth Development

- Improve competencies of Virginia youth in the following life skills: knowledge, reasoning, creativity, personal, social, vocational, citizenship, health, and physical.
- Develop supporting environments for 4-H youth development.
- Design volunteer development systems that attract, retain, train, and energize youth and adult volunteers who are progressive and have an enduring commitment to youth.

Focus Area IV: Strengthening Virginia Families and Communities

- Improve the health of Virginians through access to adequate, safe, and nutritious food.
- Develop and deliver educational programs to increase the understanding and development of the social, cognitive, and physical capacities of Virginians.
- Increase economic stability and decrease reliance on public services by improving youth and family financial literacy and security.

Focus Area V: Cultivating Community Resiliency and Capacity

- Assist communities in developing and strengthening local economies through entrepreneurship and small business development.
- Develop and deliver educational programming to improve capacity among community members to engage in community planning, decision-making, and community leadership.

Focus Area VI: Organizational Effectiveness

- Implement the programming, local structure, and organizational structure from the 2010 Restructuring Plan.
- Invest in the recruitment and development of a diverse group of VCE educators, specialists, and staff to ensure exceptional programming, services, and leadership that addresses Virginia's needs.
- Develop an effective internal and external communication system to inform and engage

citizens, stakeholders, and partners.

• Identify and secure public and private resources that support quality programming in the focus areas.

A similar planning process to identify goals and objectives for agricultural research is currently underway as part of a college-wide strategic planning process.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)				
Exte	ension	Research		
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
7161119	2364266	5150507	2787918	

2. Totaled Actual dollars from Planned Programs Inputs					
	Extension	Rese	earch		
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
Actual Formula	6034056	2023866	4144339	2525952	
Actual Matching	8796384	2074807	9525210	2591652	
Actual All Other	26715712	612768	51338337	830154	
Total Actual Expended	41546152	4711441	65007886	5947758	

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	261966

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V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Childhood Obesity
2	Climate Change and Natural Resources
3	Family Finance and Community Viability
4	Families and Communities
5	Food, Nutrition, and Health
6	Food Safety
7	Global Food Security and Hunger - Agricultural Systems
8	Global Food Security and Hunger - Animal and Animal Products
9	Global Food Security and Hunger - Biotechnology and Genomics
10	Global Food Security and Hunger - Agricultural Management, Marketing and Policy
11	Global Food Security and Hunger - Family Nutrition Program
12	Global Food Security and Hunger - Local Food Systems
13	Global Food Security and Hunger - Pest Management
14	Global Food Security and Hunger - Plants and Plant Products
15	Sustainable Energy
16	Youth Development

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V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	20%	0%	35%	0%
703	Nutrition Education and Behavior	40%	70%	35%	0%
724	Healthy Lifestyle	40%	30%	30%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
rear: 2012	1862	1890	1862	1890
Plan	6.1	1.0	5.9	0.0
Actual Paid Professional	3.8	0.5	4.3	0.0
Actual Volunteer	244.0	0.0	0.0	0.0

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

Exte	ension	Res	earch
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
78574	138667	78631	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
111173	120200	176828	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
329943	0	974053	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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Conduct educational classes, workshops, short courses, meetings, seminars, and trainings for children, parents, teachers, school food service workers, and health and other professional groups; develop curriculum, newsletters, and other educational resources; establish and implement train-the-trainer models to promote educational opportunities; facilitate local and statewide coalitions and/or task forces; conduct assessments and community surveys; partner with community agencies and institutions to facilitate programs and community development; contribute to the creation/revision of social systems and public policies; conduct research studies and disseminate program and research results to both the professional community and lay public through journal articles, papers, reports, and public media; develop and implement marketing strategies using various outlets to promote program participation, with special attention to underserved and disadvantaged audiences; disseminate research-based information to lay audiences and address emerging needs using a variety of media and innovative technology resources; cooperate with media and other community agencies to seek effective means of targeting new and non-traditional audiences; and respond to consumer inquiries.

2. Brief description of the target audience

Childhood Obesity, Nutrition and Fitness: young children (ages 2 - 5 years); school-age children; adolescents; parents, foster parents, and grandparents; caregivers (in-home and for-profit day care providers); teachers and other school faculty for young children, youth, and adolescents; school nutrition directors and staff; school wellness committees; school nurses and other health care providers; and Extension educators.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	21600	4332	18236	0

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	5	10

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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

 Childhood Nutrition and Fitness - Number of pre-school age youth participating in Extension nutrition education, physical activity, or other obesity-prevention programs at childcare centers or schools.

Year	Actual
2012	201

Output #2

Output Measure

 Childhood Nutrition and Fitness - Number of elementary, middle, and high school-age youth participating in Extension nutrition education, physical activity, or other obesity-prevention programs in school, after-school, or recreational settings.

Year	Actual
2012	28424

Output #3

Output Measure

Childhood Nutrition and Fitness - Number of Head Start and preschool teachers, day care
providers, elementary and secondary school teachers, school nurses, school nutrition directors,
and school health and wellness committee members participating in Extension training for
implementing nutrition education, physical activity, and other obesity-prevention programs
reaching children and their parents.

Year	Actual
2012	30

Output #4

Output Measure

 Childhood Nutrition and Fitness - Number of individuals, including children, exposed to Extension-based social marketing campaigns

Year	Actual
2012	22400000

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Childhood Nutrition and Fitness - Number of pre-school age youth who try more new foods, consume more fruits and vegetables, eat a wider variety of foods, or increase their physical activity after participation in an Extension nutrition education, physical activity, or other obesity-prevention program at a Head Start or child care center or school.
2	Childhood Nutrition and Fitness - Number of select elementary, middle, or high school age youth who gain knowledge and awareness of nutrition, physical activity, or positive body image or improve at least one health- related behavior after participation in an Extension nutrition education, physical activity, or other obesity-prevention program in a school, after-school, or recreational setting.
3	Childhood Nutrition and Fitness: Number of Head Start and preschool teachers, day care providers, elementary and secondary school teachers, school nurses, school nutrition directors, and school health and wellness committee members participating in Extension training who implement a nutrition education, physical activity, or other obesity-prevention activity in their preschool, elementary or secondary school, or after-school or recreational setting.
4	Childhood Nutrition and Fitness - Number of children who made dietary and physical activity changes based on Extension-based social marketing campaign

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Outcome #1

1. Outcome Measures

Childhood Nutrition and Fitness - Number of pre-school age youth who try more new foods, consume more fruits and vegetables, eat a wider variety of foods, or increase their physical activity after participation in an Extension nutrition education, physical activity, or other obesity-prevention program at a Head Start or child care center or school.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	193

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

An estimated 13.9% of preschool-aged children in the United States are overweight. Good nutrition and physical activity is important to the growth, development, and emotional well-being of young children and to prevent childhood obesity.

What has been done

VCE conducted a variety of programs for pre-school aged youth, including the Food Friends and Mighty Moves program and I am Moving, I am Learning. Food Friends and Mighty Moves, a 12-week multi-faceted awareness and education program, promotes healthful habits, literacy, and skill building among preschool-aged children by encouraging children to try new foods and new physical activities.

Results

Teachers reported the following improvements: children trying more foods; children eating eating more fruits and vegetables; children eating a wider variety of foods, children acquiring important fine and gross motor skills, children being exposed to nature, and children moving more. Overall, the VCE programs were found to inspire changes to young children's dietary and physical activity knowledge, attitudes, and behaviors.

4. Associated Knowledge Areas

KA Code Knowledge Area

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703 Nutrition Education and Behavior

724 Healthy Lifestyle

Outcome #2

1. Outcome Measures

Childhood Nutrition and Fitness - Number of select elementary, middle, or high school age youth who gain knowledge and awareness of nutrition, physical activity, or positive body image or improve at least one health- related behavior after participation in an Extension nutrition education, physical activity, or other obesity-prevention program in a school, after-school, or recreational setting.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	20744	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Recent data indicate 17% of children and adolescents are obese. Obese children are more likely to have high blood pressure, high cholesterol, and type 2 diabetes, and a tendency to be overweight and obese as adults. Childhood obesity also has social, psychological, and economic consequences. Large children report lower self-esteem, sadness, marginalization, and lower quality of life than healthy weight children and cost approximately \$72 more per year in health-related costs.

What has been done

VCE-Family and Consumer Sciences programs reached 29,313 Virginia youth and families through educational programs focused on food, nutrition, and health. Extension Educators partnered with local and state agencies, including schools and restaurants, to provide numerous education programs across the commonwealth annually, including: Chefs Clubs in Middle School Cafeterias, which offered hands-on cooking activities to students; Cooking Matters, a family-based cooking and nutrition program; Healthy Weights for Healthy Kids, a program aimed at youth between 7 and 14 years old to prevent childhood obesity; Campers Build Healthy Futures by Building Healthy Pizzas, a day camp which included farm visits and cooking demonstrations; and the Fit Kids Menu Initiative aimed at promoting healthy choices and menu labeling targeted towards children.

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Results

The Chefs Clubs encouraged student chefs to try new foods and create healthy, seasonal foods, aligned with MyPlate. An evaluation of Cooking Matters found that every participant reporting learning one new thing as a result of the class and enjoyed family-based cooking. There was a 14% increase in the number of individuals who reported using the food label too. Finally, Healthy Weights for Healthy Kids has consistently found that children: increase fruits and vegetables eaten (by 85%); limit sweet snacks (82%); read food labels (83%); and consume more milk (94%). The Fit Kids Menu Initiative was tested with one restaurant. Menu labeling with the nutrition bargain price were found to significantly alter purchases among families with children.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Childhood Nutrition and Fitness: Number of Head Start and preschool teachers, day care providers, elementary and secondary school teachers, school nurses, school nutrition directors, and school health and wellness committee members participating in Extension training who implement a nutrition education, physical activity, or other obesity-prevention activity in their preschool, elementary or secondary school, or after-school or recreational setting.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Recent data show that 17% of children 6 to 19 years old, and 35.7% of adults are obese. Obese children are more likely to become obese as adults, at a rate as high as 50%, and have higher risk for numerous emotional and health consequences, including stigmatization, lower perceived quality of life, type 2 diabetes, osteo-arthritis, and sleep apnea. Childhood obesity also has a

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huge economic impact on Virginia and the nation. It is estimated to cost \$14.1 billion in outpatient costs and \$237.6 million in inpatient costs every year.

What has been done

Extension Educators partnered with childcare centers, schools, and other local and state agencies and non-profit groups to train volunteers to teach numerous education programs for youth on nutrition and physical activity to address childhood obesity and to expand the reach of extension programs.

Results

Several trainings were conducted by Extension Educators on childhood obesity programs, including Food Friends and Mighty Moves, and Healthy Weights for Healthy Kids, to enable partners to offer nutrition and physical activity programs at their childcare centers, camps, and other locations.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Childhood Nutrition and Fitness - Number of children who made dietary and physical activity changes based on Extension-based social marketing campaign

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	7973	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Recent data indicate 17% of children and adolescents are obese. Obese children are more likely to have high blood pressure, high cholesterol, and type 2 diabetes, and a tendency to be overweight and obese as adults. Childhood obesity also has social, psychological, and economic

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consequences. Large children report lower self-esteem, sadness, marginalization, and lower quality of life than healthy weight children and cost approximately \$72 more per year in health-related costs.

What has been done

A social marketing campaign promoting the "Eat Smart, Move More!" message related to food choices and physical activity was conducted in Virginia by the Family Nutrition Program. Children frequently have athletes who are their role models. The campaign consisted of billboards throughout Virginia where there is a high incidence of poverty, posters on buses traveling through high poverty areas, and posters distributed throughout Virginia in schools where there is a high level of poverty, and a web presence.

Results

Over 22,400,000 people viewed the social marketing campaign through billboards, posters, and bus signage throughout the state of Virginia.

A sample of youth were surveyed. The sample included 10,491 youth. The youth overwhelmingly demonstrated very positive attitudes and intent to change dietary behavior. Further, 76% of youth were likely to follow the suggestions for eating smart and moving more and 85% of youth believed that they could be an athlete by eating smart and moving move.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The economy (i.e. employment opportunities, etc.), as well as gas prices (which can, in turn, increase food prices) can directly influence food purchases and food security of families and caregivers of children and furthermore weight status.

Changes within the built food environment can also influence food access and availability and thereby dietary intake.

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Public policy changes, particularly those directed at children, can also effect dietary and physical activity status. For example, the Healthy-Hungry Free Kids Act has resulted in substantial changes to foods offered

at schools participating in the USDA school breakfast and lunch programs, along with funding for farm-

to-school programs. While these changes did not influence impacts or outcomesfrom 2012, they demonstrate the potential for external policy factors influencing children's behaviors and stakeholders' interest in programs offered by Extension.

Several populations, particularly Hispanic and African American individuals, have higher rates of

obesity. With population shifts within Virginia, it is possible to see changes in childhood obesity prevalence rates.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

All major programs relating to children and youth are evaluated to determine program effectiveness, although outcomes may not be available from all locations statewide.

This past year, a study was completed with youth EFNEP to test the cost-effectiveness of the program, utilizing Healthy Weights for Healthy Kids. The results found that over 90% of youth participating in the program improved behaviors in at least one area. The data are still being analyzed and interpreted and will be reported in 2013. Correspondingly, a study was conducted and published in the Journal of Nutrition Education Behavior that estimated the average cost effectiveness of EFNEP Outcomes. Virginia was found to offer cost-effectiveness programs in relation to other states.

A study was completed this past year as part of the Extension-based Fit Kids Menu Initiative, to offer healthier options and nutrition labeling on children's menus at restaurants. The results found that menu labeling that contained information on the 'nutrition bargain price' was considered to be most effective and significant in changes purchases among families with children. The results were published in the journal, Appetite.

Key Items of Evaluation

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V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change and Natural Resources

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%	10%	10%	0%
102	Soil, Plant, Water, Nutrient Relationships	10%	10%	10%	0%
104	Protect Soil from Harmful Effects of Natural Elements	10%	10%	10%	0%
111	Conservation and Efficient Use of Water	5%	5%	5%	0%
112	Watershed Protection and Management	10%	10%	10%	0%
123	Management and Sustainability of Forest Resources	15%	15%	15%	0%
124	Urban Forestry	5%	5%	5%	0%
131	Alternative Uses of Land	10%	10%	10%	0%
133	Pollution Prevention and Mitigation	5%	5%	5%	0%
135	Aquatic and Terrestrial Wildlife	10%	10%	10%	0%
403	Waste Disposal, Recycling, and Reuse	5%	5%	5%	0%
605	Natural Resource and Environmental Economics	5%	5%	5%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research		
Tear: 2012	1862	1890	1862	1890	
Plan	19.6	0.8	18.9	0.0	
Actual Paid Professional	21.2	1.5	24.2	0.0	
Actual Volunteer	1103.0	0.0	0.0	0.0	

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

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Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
441404	148360	441724	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
624529	180561	993357	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1853506	70578	5471887	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Primary outputs from this program include the following: developing and delivering educational programs such as short courses, workshops, field days and tours, seminars, conducting applied research and link with extension, develop and maintain demonstration areas, developing collaborative partnerships with government officials, state agencies, non-governmental organizations, developing and disseminating educational materials such as extension bulletins, journal articles, conference proceedings, webinars, trade journal articles, DVD's, and developing and maintaining web based educational materials such as short courses, webinars, web sites, and discussion boards.

2. Brief description of the target audience

Farmers, forest owners, loggers, Christmas tree growers, youth, homeowners, mill owners and workers, private consultants and companies, local governmental officials, private landowners, waste water treatment operators, state and federal agencies, nongovernmental organizations, professional associations and societies, and community groups.

3. How was eXtension used?

The program has three Extension efforts.

- 1. Forest Farming eXtension Community of Practice This project uses eXtension to create a national virtual community to synthesize and deliver synchronous and asynchronous forest farming educational programs, encourage and inform forest farming initiatives, compile comprehensive forest farming data, incorporate cutting-edge technology, and equitably address social and biophysical variability. eXtension's optimization metrics capture the community's characteristics, resources, behaviors, and activities.
- 2. Wood Products Community of Practice- Web site: http://www.extension.org/wood_products Description: The goal of the Wood Products CoP is to disseminate knowledge on the design, production, management, marketing, and environmental impact of wood products to small and large wood products manufacturers
- 3. Geospacial: Map@syst Map@Systis a community of practice devoted to the outreach and education for geospatial technologies and their application to today's world. The Map@syst community provides information on using geospatial technologies and how geospatial technologies are making a difference in peoples' lives. may@syst is responsible for the Geospatial Technology resource area within eXtension.

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V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	482420	105348	49064	547

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	17	71	88

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of educational programs offered.

Year	Actual	
2012	425	

Output #2

Output Measure

• Number of educational materials and curriculas developed

Year	Actual
2012	63

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Output #3

Output Measure

• Number of applied research projects.

Year	Actual
2012	169

Output #4

Output Measure

• Acres of land exposed to educational programming efforts.

Year	Actual
2012	530000

Output #5

Output Measure

• Identifiable impacts reported by agents/specialists

Year	Actual
2012	174

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased number of people adopting at least one new or improved land management practices.
2	Improved natural resource industries that contribute to community viability.
3	Number of participants learning about the quality of their private water supply and about private water system maintenance by participating in a county-based Virginia Household Drinking Water Program water testing clinic.
4	Increase in the number of individuals who gain knowledge as certified nutrient management planners in turf and landscape systems.
5	Increase in the number of acres covered by nutrient management plans in turf and landscape systems due to participation in Extension educational programs.
6	Increase in the tons of compost produced from organic wastes typically land-applied (manure, biosolids) or land-filled (yardwaste, biosolids, industrial sludge) as a result of increased knowledge and skills.
7	Increase in the number of people directly impacted by new or improved land management practices
8	Increased public awareness of climate change, biodiversity, and ecosystem services.
9	Increased number of stakeholders involved in community natural resource management and decision-making.
10	Increase program participants understanding of raw material conversion and modern business management practices.
11	The general public, landowners, and loggers use the forest in alternative and traditional ways to increase value and profit.
12	Increase in the number of acres directly impacted by new or improved land management practices.
13	Number of projects assembling transcriptomes for vertebrates and invertebrates from the Southern Appalachian Mountains

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Outcome #1

1. Outcome Measures

Increased number of people adopting at least one new or improved land management practices.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	439	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forests are Virginia?s primary land cover. Because 68% of the Commonwealth?s forests are privately owned, private forest landowners (PFLs) are an important link to meet the Commonwealth?s goal that ?Virginia?s natural resources will be enhanced.? Regionally, ?private forestland stewardship? is a priority issue in the Northern District Forestry and Natural Resources Situation Analysis. Extension?s Northern District holds 3.5 million acres of these woodlands. Traditionally, PFLs have been difficult to reach because of their sheer numbers and short ownership tenure. As land continues to be sold and divided into smaller pieces, forestland ownership is turning over. On average, a given piece of woodland will have a new owner every seven years or less. As a result, there is a continual need to educate new landowners and acquaint them with professional assistance availability. Research into landowner decision making highlights the importance of planning, professional assistance and peer influence to increase stewardship while meeting society?s demands.

What has been done

A variety of educational offerings provide forest landowners with learning and networking opportunities. Annual Landowners? Woods & Wildlife Conferences and Forestry and Wildlife Bus Tours showcase good management practices and connect landowners with local natural resource professionals. Peer-to-peer learning is facilitated through the Piedmont Landowners Association (PLA), a volunteer lead association that offers monthly educational and networking opportunities. Additional outreach targets forest landowners through online and printed media such as the Online Woodland Options Course.

Results

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An average of 500 landowners, representing approximately 20,000 forested acres, participates in at least one educational offering each year. Participants of management related programs indicated an increase in knowledge and an intention to put practices into place. Follow-up evaluations reveal various implementations such as, completed management plans, controlled invasive plants, improved wildlife habitat and conducted successful timber sales. Approximately 30% of program participants contact a natural resource professional following educational events. One landowner, following recommendations from class, increased the value of his timbersale 150% from \$20,000 to \$50,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
124	Urban Forestry
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Improved natural resource industries that contribute to community viability.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	66

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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Virginia currently has 5 wood fired electricity generating facilities under construction. These facilities will be operational before the end of 2013. Combined, they will have a generation capacity of approximately 300 MegaWatts (MW) and will have the capacity to utilize approximately 3 million tons of wood per year to generate electricity. Much of this new supply of wood for energy will come from logging residues such as limbs, tops, and previously unmerchantable trees left behind after logging operations were completed. Loggers, foresters, and procurement staff for these new wood to energy facilities are working to determine how these facilities will impact their existing operations, and where the new supply will come from. With much of the woody biomass feedstock expected to come from existing logging operations, many loggers across the state are trying to determine if biomass harvesting will be practical and beneficial for their operations.

What has been done

The SHARP Logger Program worked with industry partners who will be procuring much of the new biomass supply needed for operating these renewable energy facilities. The SHARP logger program developed a continuing education workshop which was offered at 3 locations across VA (New Castle, Chatham, and Franklin). The workshop began with a classroom training and afterwards participants traveled to a field site to see multiple whole tree chippers operating on logging jobs with conditions similar to what they would find if they added a whole tree chipper to their own operation to produce biomass "fuel chips".

Results

A total of 380 participants were able to learn more about biomass harvesting, and gain additional information to help them decide whether or not biomass harvesting will be a good fit for their business operations. Participants were able to view the latest equipment available for biomass harvesting and see it in operation to help determine which equipment they would like to purchase if they decide to harvest biomass. The workshops served as a networking opportunity for loggers to meet with procurement personnel who will be purchasing biomass and to meet with equipment dealers who can provide the equipment needed for biomass harvesting. Participants were provided information which could help them to make a more informed decision about whether or not they want to invest in the equipment needed to produce biomass for these new market in Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
605	Natural Resource and Environmental Economics

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Outcome #3

1. Outcome Measures

Number of participants learning about the quality of their private water supply and about private water system maintenance by participating in a county-based Virginia Household Drinking Water Program water testing clinic.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nearly one quarter (22%) of Virginia?s population (1.7 million people) relies on private water supply systems, such as wells, springs and cisterns, for their household water supply. In the US, public water supplies are regulated under the Safe Drinking Water Act by the Environmental Protection Agency, which mandates regular testing and water treatment. Homeowners who use private water supplies are completely responsible for routine testing, system maintenance and addressing any water quality problems, should they exist. Lack of knowledge about private water supply management and water quality issues may lead to system neglect and a lack of regular water testing, which can have serious implications for water quality, longevity of the water supply system, and, ultimately, the health of the families who rely on these systems.

What has been done

Cooperative Extension (VCE) county agents, volunteers, and agency collaborators in private water supply testing, maintenance, treatment, and protection. VAMWON trained VCE agents organize and conduct county-based VAHWQP drinking water clinics with support from on-campus faculty. Trained VAMWON volunteers and agency collaborators provide direct outreach to private water system users and support VCE trained VAMWON agents. Private water supply users can participate in one of the 16-22 county-based VAHWQP drinking water clinics held per year. Clinic participants collect and submit household water samples that are analyzed for 12 chemical parameters, total coliform bacteria, and E. coli. Three weeks later, test results, an explanation of those results, and possible water treatment options are discussed with clinic participants at an interpretation meeting. This interpretation meeting is a critical value-added component unique to VAHWQP drinking water clinics.

Results

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A website, www.wellwater.bse.vt.edu, which contains program information, upcoming events, and other resources, receives 800 unique visitors per month. Eleven peer-reviewed Virginia Cooperative Extension household water quality publications were published, with seven more will be completed in 2013. Since December 2008, 50 drinking water clinics, each involving two educational meetings were conducted by VAMWON trained VCE educators in 68 of Virginia?s 95 counties, with 2777 samples from systems serving an estimated 6400 individuals being analyzed. Twelve VAMWON workshops were held producing 75 VAMWON-trained volunteers, 54 extension agents, and 17 agency collaborators representing 59 Virginia counties and four cities. The VAHWQP/VAMWON project coordinator, with the assistance of industry experts (well drillers, scientists, and water treatment specialists) fielded more than 1500 detailed private water supply questions (via email or phone) since 2008. Also, more than 7250 educational contacts were generated by the coordinator and volunteers. In-kind donations and sponsorships totaled \$14,590 during the project period, and a partnership was initiated with Southeast Rural Community Assistance Project (www.sercap.org), an organization providing financial assistance to in-need private water supply users.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #4

1. Outcome Measures

Increase in the number of individuals who gain knowledge as certified nutrient management planners in turf and landscape systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All large animal feeding operations in Virginia, biosolids applicators and many farms that receive cost share money, are required to have nutrient management plans. Nutrient management plans

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are designed to assist landowners and operators in the management of land application of fertilizers, biosolids, animal manures, and other nutrient sources for agronomic benefits, and for the protection of the Commonwealth?s ground and surface waters. By state law, all of these nutrient management plans must be written by certified nutrient management planners. Individuals who might become certified to write nutrient management plans include representatives of private (e.g. fertilizer dealers, agricultural consultants, biosolids applicators) and public (e.g., Virginia Department of Conservation and Recreation, Natural Resource and Conservation Service) sector organizations and agencies.

What has been done

Twice a year we conduct a two day science-based training on soils and crop production that the planners undergo before taking the nutrient management exam.

Results

This year we trained a total of 42 new nutrient management planners. We also provided continuing education credits to 135 certified planners. These planners and those certified in previous years wrote over 300,000 acres of nutrient management plans for permitted farms in 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #5

1. Outcome Measures

Increase in the number of acres covered by nutrient management plans in turf and landscape systems due to participation in Extension educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	300000

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nutrient Management Planner training and certification programs administered by the Virginia Department of Conservation and Recreation (DCR). This program, initiated in 2009, was developed through a collaborative effort between DCR, Virginia Cooperative Extension, and Virginia Tech. The parties also collaborated in the development of a state/regional training manual to support the certification process in 2010. This award-winning (recognized by both the American Society of Agronomy and the American Society of Agriculture and Biological Engineers) 13-chapter manual is published through Virginia Cooperative Extension. Personnel from Virginia Cooperative Extension, Virginia Tech, and DCR collaborated on spring and fall training sessions in 2012.

What has been done

Personnel from Virginia Cooperative Extension, Virginia Tech, and DCR collaborated on 2-day training sessions in both the spring and fall of 2012. The audience included green industry professionals, extension agents, and Master Gardeners desiring to become certified plan writers in 2012.

Results

An additional 35 people became certified plan writers in Turf and Landscape Nutrient Management in 2012, raising the total of T&L certified planners to 102 statewide. Through the efforts of these plan writers, Virginia?s Chesapeake Bay watershed currently has 39,400 acres under urban nutrient management, with targets of 390,000 Acres by 2017 and 650,000 Acres by 2025.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Increase in the tons of compost produced from organic wastes typically land-applied (manure, biosolids) or land-filled (yardwaste, biosolids, industrial sludge) as a result of increased knowledge and skills.

2. Associated Institution Types

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- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Municipal, agricultural, and industrial organic wastes can be sources of excess nutrients, anthropogenic toxic

compounds, and animal and plant pathogens, whose direct application to land may impair soil health and water quality. Composting is a process that biologically converts raw organic wastes into stabilized organic matter with the potential to eliminate pathogens and breakdown organic toxicants to less harmful compounds while generating a value-added soil amendment.

What has been done

We conducted educational programs to train waste by-product managers to properly compost, how to assess compost quality, and how to use the finished compost product in the mid Atlantic region, especially in urban and disturbed soils.

Results

There has been an increased amount of waste composted and finished product being used to amend soils in the mid Atlantic region. Composters have been provided education that has enabled them to become certified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #7

1. Outcome Measures

Increase in the number of people directly impacted by new or improved land management practices

2. Associated Institution Types

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- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1426

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Of Virginia's 25 million acre land base, 15.8 million acres, or 63%, is forested. These forested areas generate over \$25 billion annually for the commonwealth's economy, and an additional \$5.1 billion in environmental benefits (e.g., clean air and water, wildlife habitat, carbon sequestration). The majority of these lands, 10.1 million acres, are privately owned family forests. In order to sustain and enhance these economic and ecological benefits, it is imperative that private family forest landowners know how to implement sustainable forestry practices to keep their forests healthy and productive.

What has been done

Public classes were offered in GPS, GIS, Forest Landowner education, invasive specie control, wildlife habitat, logging safety and managing municipal forests.

Results

88 new Forest Stewardship Plans representing 12,300 acres. 82% of participants expressed that knowledge gained would enable them to make better decisions about natural resources management and use. One realtor expressed that knowing the types of trees and timber markets will help them better know what they are selling and how to point their clients on to natural resources professionals for management advice and services.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry

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131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #8

1. Outcome Measures

Increased public awareness of climate change, biodiversity, and ecosystem services.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia is a rapidly urbanizing state with the vast majority of its citizens living in urban areas. Growth of these urban areas brings social and economic opportunities for the state, but also exacts environmental costs as land cover is changed and human activities are concentrated on the landscape. As a result, cities are faced with issues of stormwater runoff, air pollution, and urban heat island effects. Urban forests and greenspaces are well documented in reducing these negative impacts of urbanization and improving the quality of life for citizens. However, there are numerous challenges to fully realizing these benefits. In Virginia, urban forests are challenged by the loss of tree canopy cover and the introduction of exotic, invasive tree pests. Without healthy, abundant urban forests, our cities fail to realize their potential as desirable, sustainable places for people to work and live.

What has been done

Our faculty and extension staff have worked diligently to create research, educational programs, and technology products to raise awareness of Virginia's urban forests and the threats to their sustainability. In 2012, a four-year investigation of municipal street trees in 23 localities was completed. A website was created to share the research findings and connect citizens with resources to help them with street trees in their communities. A series of workshops were also held at three locations around the state to create a dialogue on the issues and opportunities

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surrounding street trees. Also in 2012 came the creation of a new web resource called the urban tree canopy mapper. Based on a multi-year project to measure tree canopy cover in 22 Virginia localities, the mapper is an intuitive web tool that allows users to view and query canopy cover data over a broad geographic scale.

Results

Investigations into Virginia's street trees and tree canopy cover have created unprecedented data about the abundance and composition of Virginia's urban forests. These data raise awareness and understanding of urban forests and also provide resource managers with information to improve planning and decision-making. Over 100 citizens and resource professionals attended our street tree workshops. They reported increased understanding of the benefits provided by street trees and the importance of species diversity for minimizing threats from forest pests. To date, several municipal foresters from around the state have contacted us with praise for the tree canopy mapper and described a range of applications, from education of local leaders to identification of new tree planting locations in their communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land

Outcome #9

1. Outcome Measures

Increased number of stakeholders involved in community natural resource management and decision-making.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 2000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forestry is the second largest industry in Virginia, with total economic outputs of over \$23 billion annually. Most of the commercial timberland in Virginia is owned by non-industrial private landowners (10.1 million acres or 63%). This landowner population is aging and an unprecedented exchange of forestland is set to occur in the Commonwealth. Continued proper management of these lands will be essential to the future of the forest industry in Virginia; however, many of the new landowners will lack forest management experience.

What has been done

Real estate professionals are typically the first point of contact for many rural land buyers. To capitalize on this, the Virginia Forest Landowner Education Program (VFLEP) developed Real Forestry for Real Estate (RFRE) continuing education classes, which have been offered to real estate professionals throughout Virginia. The goals of RFRE are to increase the awareness of real professionals about the importance of the product they are selling (forest land), and to introduce them to sources of assistance for their clients. Since August 2011, 16 RFRE classes have been offered in Virginia with 454 participants. Fifteen-hundred New Landowner Packets have been distributed to the participants.

Results

Participants increased their level of knowledge by at least one point for all the topics presented in RFRE, with the largest knowledge increases in topics concerning fragmentation, diseases, exotic invasives and sources of assistance.

The real impact, new landowners implementing sustainable forestry practices, remains to be measured. Thus far, several landowners have requested more information from the Virignia Forest Landowner Education Program as a result of receiving the New Landowner Packets. All of these individuals will be surveyed at the end of 2013 to determine what, if any, practices they implemented on their land

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife

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Outcome #10

1. Outcome Measures

Increase program participants understanding of raw material conversion and modern business management practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2400

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The forest industry contributes over \$25 billion annually to Virginia?s economy. Wood product companies rank first in manufacturing jobs and second in payroll, yet employees and owners in the forest industry cite increasingly narrower profit margins. Efficiency in daily business operations such as mapping and area calculations can improve profit margins. Business decisions such as borrowing money can also negatively or positively impact profitability. A competitive and profitable forest industry is a vital tool for comprehensive forest management resulting in a more sustainable natural resource and economy for all Virginians.

What has been done

Twenty-one hands-on workshops have been delivered to SHARP loggers to teach them how to use hand-held Global Positioning Systems (GPS) throughout Virginia to 361 participants. In partnership with the Virginia Department of Forestry, a cost-sharing agreement has been instituted to reduce the cost of GPS purchase for current SHARP loggers who have completed a GPS training.

Results

GPS participants reported a significant (Average of 2.6 point increase on a 5 point scale) knowledge gain with 95% indicating that this would improve their efficiency. Eighty percent plan to integrate these skills into their current practices, which is expected to increase accuracy and efficiency to boost profitability. To date, 21 GPS units have been purchased by trained SHARP loggers through the cost-share program. These natural resource professionals directly impact approximately 57,000 acres of forestland annually.

4. Associated Knowledge Areas

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KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse

Outcome #11

1. Outcome Measures

The general public, landowners, and loggers use the forest in alternative and traditional ways to increase value and profit.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2550

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia currently has 5 wood fired electricity generating facilities under construction. These facilities will be operational before the end of 2013. Combined, they will have a generation capacity of approximately 300 MegaWatts (MW) and will have the capacity to utilize approximately 3 million tons of wood per year to generate electricity. Much of this new supply of wood for energy will come from logging residues such as limbs, tops, and previously unmerchantable trees left behind after logging operations were completed. Loggers, foresters, and procurement staff for these new wood to energy facilities are working to determine how these facilities will impact their existing operations, and where the new supply will come from. With much of the woody biomass feedstock expected to come from existing logging operations, many loggers across the state are trying to determine if biomass harvesting will be practical and beneficial for their operations.

What has been done

The classroom training provided a brief overview of woody biomass for energy, highlighted the new wood energy facilities coming to Virginia, and included presentations from local procurement personnel who provided more specific details about their local operations and feedstock requirements. The indoor presentation included research results from a survey of loggers currently harvesting biomass in the Southern Piedmont of Virginia. Results included operational

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and chipper characteristics as well as owners' attitudes towards biomass harvesting for logging businesses currently harvesting biomass.

At the field demo sites 4-5 different manufacturers had an opportunity to describe the equipment they had available for chipping logging residues, then each manufacturer had the opportunity to demonstrate their equipment and chip approximately 10-25 tons of fuel chips.

Results

A total of 380 participants were able to learn more about biomass harvesting, and gain additional information to help them decide whether or not biomass harvesting will be a good fit for their business operations. Participants were able to view the latest equipment available for biomass harvesting and see it in operation to help determine which equipment they would like to purchase if they decide to harvest biomass. The workshops served as a networking opportunity for loggers to meet with procurement personnel who will be purchasing biomass and to meet with equipment dealers who can provide the equipment needed for biomass harvesting. Participants were provided information which could help them to make a more informed decision about whether or not they want to invest in the equipment needed to produce biomass for these new market in Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

Outcome #12

1. Outcome Measures

Increase in the number of acres directly impacted by new or improved land management practices.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	530000

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers in Central Virginia historically have relied on a limited selection of row crops for profitable production. With new market opportunities and an increasing local foods movement, more opportunities for new crops are being opened.

What has been done

Educational programs and farm visits emphasized methods available to reduce the cost of production and also emphasized other crops offering attractive marketing and profit opportunities. Research based information was provided to producers regarding new crop and/or production opportunities. A canola fieldday was held and multiple individual discussions of a soybean variety comparison and a chickpea/pidgeon pea planting were utilized.

Results

Grain sorghum was planted on approximately 200 acres of cropland in Central Virginia by new producers. Spring oats were planted on approximately 150 acres of recently cleared woodland. No-tillage production of wheat and rye was adopted on many farms throughout Central Virginia. One Appomattox producer reported a diesel fuel savings of over \$2000 related to adoption of no-tillage wheat production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse

Outcome #13

1. Outcome Measures

Number of projects assembling transcriptomes for vertebrates and invertebrates from the Southern Appalachian Mountains

2. Associated Institution Types

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• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In spite of federal and state environmental laws, over 40 percent of our assessed surface waters still do not meet the water quality standards that have been set for them. These impaired waters include approximately 300,000 miles of rivers and shorelines and approximately 5 million acres of lakes. The pollutants involved are mostly sediments, excess nutrients, toxic contaminants, and harmful microorganisms that often originate from our use of land for agriculture, silviculture, and suburban development. An overwhelming majority of the U. S. population

What has been done

One of the problems in conducting valid bioassessment with macroinvertebrates in streams is the lack of understanding of what community structure should exist in natural, undisturbed streams. Pristine, undisturbed streams hardly exist today, but some of the most healthy streams occur within National Parks. For this reason, I have a contract with the National Park Service to analyze samples from streams within Shenandoah National Park in Virginia. This information will provide a powerful comparative baseline to determine changes being brought about in watersheds that are subjected to various human activities.

Results

The research in 2012 was primarily devoted to acquiring new field data on the aquatic insects and related invertebrates in the streams within Shenandoah National Park. Laboratory processing and statistical analyses of these data will take place in 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

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V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Numerous external factors affect both the ooutcomes and the ability to support educational programs behind the outcomes. Virginia forestry has been greatly impacted by the economic downturn and changing climate conditions. Natural disasters such as fire, flood, hurricanes and drought siphon of state and federal funds that help support our programs. New laws and regulations create new opportunities and issues for adjusting programing efforts. One such example is the growth of the bioenergy market in Virginia. This will change how we manage our forest landscape and we are offering new programs to meet this need.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Watershed Protection and Mangement - Homeowners had their lawns soil tested and measured by Master Gardener Volunteers. 281 urban nutrient management plans were written. In 2012 a total of 66.5 acres (or 1,586,610 square feet) of residential turf in Prince William County, the cities of Manassas and Manassas Park were brought under a nutrient management plan which promotes best practices. Master Gardeners volunteered over 759 hours of their time to assist with this project. To date since 1990 when the program was initially started, MG's/staff have assisted in writing over 3,259 nutrient management plans for over 29 million square feet of turf or 671.82 acres within local watersheds.

Management and Sustainabilty of Forest Resources - An average of 500 landowners, representing approximately 20,000 forested acres, participates in at least one educational offering each year. Participants of management related programs indicated an increase in knowledge and an intention to put practices into place. Follow-up evaluations reveal various implementations such as, completed management plans, controlled invasive plants, improved wildlife habitat and conducted successful timber sales. Approximately 30% of program participants contact a natural resource professional following educational events. One landowner, following recommendations from class, increased the value of his timbersale 150% from \$20,000 to \$50,000.

Pollution Prevention and Mitagation - The Virginia Household Water Quality Program (VAHWQP) -

n evaluation completed by 208 (24%) of clinic participants found:

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22% will seek additional testing

30% will determine source of water problem

27% will pump out septic tank

24% will perform maintenance on well

8% will reduce herbicide or fertilizer use around well or spring

29% will shock-chlorinate

12% will acquire water treatment equipment

18% will improve functioning of existing treatment equipment

14% plan to use bottled water

89% will test water annually or every few years from now on

83% plan to share information learned. On average each respondent will share with 3 other (650 individuals)

Key Items of Evaluation

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V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Family Finance and Community Viability

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	10%	10%	10%	0%
603	Market Economics	5%	5%	10%	0%
605	Natural Resource and Environmental Economics	5%	5%	15%	0%
607	Consumer Economics	20%	20%	15%	0%
608	Community Resource Planning and Development	20%	0%	15%	0%
610	Domestic Policy Analysis	5%	0%	5%	0%
801	Individual and Family Resource Management	30%	60%	20%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%	0%	10%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
Tear: 2012	1862	1890	1862	1890
Plan	9.9	1.0	3.0	0.0
Actual Paid Professional	1.7	1.0	0.0	0.0
Actual Volunteer	2083.0	0.0	0.0	0.0

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

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Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
34665	160078	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
49047	87430	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
145563	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and educational programs will be conducted to support the needs of Virginians and Virginia small business managers. Research in personal finance issues and evaluation of programming will be conducted to improve financial literacy. Financial literacy curriculum will be developed using proven delivery methods. Research will be conducted to develop knowledge of market systems. Research-based information will be disseminated via media and informational meetings. Decision aids, workshops, detailed curriculum, and distance educational methods will be used to support change in the overall behavior of learners. Research will be conducted on community resiliency and enterprise development. Research-based information on these topics and on alternative economic development will be disseminated and used to create targeted educational programming and resources.

2. Brief description of the target audience

Individuals, families, owners and managers of farms, and small businesses; local, state, and federal personnel and policy makers; community leaders and organizations; and private sector service suppliers are the targeted audiences.

3. How was eXtension used?

The Family Resource Management Specialist was the co-chair of the eXtension Financial Security for All Community of Practice. We refer to eXtension in our classes and publications were applicable and many of the county educators as well as the specialist participate in answering Ask-the-Expert questions. There is an Ask-the-Expect link on our publications page.

The Community Viability program holds a seat on the Land Use and Community Planning Community of Practice national leadership team, as the Southern Regional Representative. eXtension is referenced as a source for information in our classes and publications (where applicable) and Ask-the-Expert functionality is supported on our web pages. There is also an Ask-the-Expect link on our publications page.

V(E). Planned Program (Outputs)

1. Standard output measures

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2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	16391	18512	8629	100

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	11	19	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of education programs planned in public policy education

Year	Actual
2012	11

Output #2

Output Measure

 Number of individuals and families completing basic financial management strategies such as budgeting, setting financial goals, establishing a saving/investing program, and implementing practices to reduce the chance for identity theft after receiving instruction.

Year	Actual
2012	5774

Output #3

Output Measure

 Number of communities and local governments partnering with Virginia Cooperative Extension faculty to seek and develop alternative economic development opportunities or address public

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policy and community planning goals.

Year	Actual
2012	57

Output #4

Output Measure

 Number of youth educational programs conducted on completing basic financial management strategies such as budgeting, setting financial goals, establishing a saving/investing program after receiving financial instruction.

Year	Actual
2012	7933

Output #5

Output Measure

• Number of program participants improving their housing environment through new ownership, avoiding foreclosure or purchasing and maintaining a home.

Year	Actual
2012	285

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of individuals completing basic financial management strategies including budgeting, setting financial goals, establishing a saving/investing program.
2	Increase the number of trained volunteers and citizens participating in Extension entrepreneurship workshops indicating increased entrepreneurial knowledge and skills applied to evaluation and planning of new enterprises (such as small businesses, microbusinesses, home-based businesses and agri-tourism).
3	Increase the number of communities and local governments partnering with Virginia Cooperative Extension faculty that seek and develop alternative economic development opportunities, and community planning goals.
4	Increase the number of individuals improving their housing environment by adopting techniques allowing them to purchase a home or to avoid foreclosure.
5	Increase the number of youth learning the basic financial management strategies such as budgeting, setting financial goals, establishing a saving/investing program after receiving financial instruction.
6	Increase the number of local food entrepreneurs who make direct connections with local food distribution outlets such as grocery stores, colleges, universities, hospitals, schools, nursing homes etc.

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Outcome #1

1. Outcome Measures

Increase the number of individuals completing basic financial management strategies including budgeting, setting financial goals, establishing a saving/investing program.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	5774	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Financial capability, as defined by the Financial Literacy and Education Commission, "is an individual's capacity, based on knowledge, skills, and access, to manage financial resources effectively. To develop this capacity, individuals must have appropriate access to and understanding of financial products, services, and concepts. Financial capability empowers individuals to make informed choices, avoid pitfalls, know where to go for help, and take other actions to improve their present and long-term financial well-being." The well-being of Virginians depends on individual and family financial capacity. Evidence shows that education on financial topics is an important issue in Virginia. In 2011, the number of non-business bankruptcy filings was 33,076. Virginia ranks 26th in bankruptcy filings nationwide. As of November 2012, 1 in every 1,345 households in Virginia received a foreclosure filing with Fairfax County and Virginia Beach City having the highest rates. One in every 9 Virginians lives at or below the poverty level. VCE FCS financial education programs contribute to Virginia?s families building financial capacity by making better financial choices, being better able to handle financial emergencies and thus reduce the need for these individuals and families to apply for public assistance.

What has been done

Twelve Extension educators reported evaluation results from financial education programming to adult audiences. Audiences included women, low and moderate income individuals and families, incarcerated individuals, recent immigrants, and homeowners facing foreclosure. Individuals and families also received one-on-one financial mentoring. Virginia Cooperative Extension collaborates with the Virginia Employment commission, correctional facilities, the Department of Social Services, Habitat for Humanity, Virginia Department of Housing, Department of Human Services, Veterans Administration, local churches, public housing developments, colleges and universities, local governments, banks and credit unions, and many other local organizations.

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Results

In 2012, county educators and their volunteers reached 5,774 participants with financial literacy information on one or more of the following financial management skills: writing goals, writing a spending plan, comparing actual spending to their spending plan, having an emergency fund, saving to meet their goals, protecting against identity theft, reducing debt, and getting and understanding their credit report.

Trained financial volunteers (1,049) assisted with financial education programs and contributed 7,707 hours of their time at a savings in salaries of \$174,178.20 at a rate of \$22.60 per hour.

Program results show that 85% of money management class participants said they would write financial goals after completing the course compared to only 36% who did so before taking classes. 88% said they would have a written spending and savings plan compared to just 27% who did so before. 96% said they would maintain a record keeping system to assist them with paying bills on time compared to only 68% who did so before the classes. 80% said they would pay themselves first for savings whereas only 28% did so before involvement in our programs. 86% said they would put money into an emergency fund compared to 32% who did so before the money management classes. 86% said they would review credit reports annually compared to just 26% who did so before. 80% said they would have a plan for paying down debt compared to only 34% who did so before.

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics
607	Consumer Economics
801	Individual and Family Resource Management
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #2

1. Outcome Measures

Increase the number of trained volunteers and citizens participating in Extension entrepreneurship workshops indicating increased entrepreneurial knowledge and skills applied to evaluation and planning of new enterprises (such as small businesses, micro-businesses, home-based businesses and agri-tourism).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

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3b. Quantitative Outcome

Year	Actual
2012	189

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rural communities are finding small business start-ups to be an ever more important part of the local economy. Entrepreneurial skill development, coordinated resource provision, and technical assistance on financing and business plan development have been demonstrated to significantly improve start-up success rates.

What has been done

VCE continues to provide niche enterprise assistance in such areas as agri-tourism and foodbased businesses. In addition, VCE provides rural entreprenuership workshops and planning assistance to local leaders and governments.

Results

In 2012, 189 entrepreneurs, resource providers, or local small business advocates received skill-based or resource support training resulting in enhanced entreprenurial ecosystems and increased knowledge base for entreprenuers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Increase the number of communities and local governments partnering with Virginia Cooperative Extension faculty that seek and develop alternative economic development opportunities, and community planning goals.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

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3b. Quantitative Outcome

Year	Actual
2012	57

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Local governments seek resources to assist with sustainable planning and alternative economic development efforts.

What has been done

VCE has developed programs to train local planning officials and also to provide assistance to regional leaders on economic development strategies.

Results

In 2012, over 57 localities participated in VCE programming resulting in increased awareness of planning best practices and alternative economic development strategies. Moreover, VCE has helped two multi-county target regions, consisting of 12 localities, in conducting and completing regional asset maps and cluster analysis resulting in formation of one new regional economic development organization and two new regional economic development plans. Thirty-one new stakeholder groups and organizations became engaged in coordinated regional planning efforts as a result of the VCE-led process. County planning officials have also reported increased awareness of planning and zoning laws and policies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #4

1. Outcome Measures

Increase the number of individuals improving their housing environment by adopting techniques allowing them to purchase a home or to avoid foreclosure.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

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3b. Quantitative Outcome

Year	Actual
2012	285

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The well-being of Virginians depends on individual and family economic well-being including dealing with potential bankruptcy, credit debt, foreclosures, and mounting responsibilities for retirement/aging. In 2011 in Virginia, the number of non-business bankruptcy filings 33,076. The November 2012 foreclosure rate in VA was 1 in every 1,345 households in Virginia received a foreclosure filing, with Fairfax County and Virginia Beach city having the highest rates. Families need education on sound financial practices.

What has been done

Extension agents, volunteers, and the state specialist offered Foreclosure Prevention Counseling. In addition, volunteer staff in Prince William country and county agents in a few other counties offered classes to first time homebuyers. Healthy Homes classes were also offered.

Results

Fifty-eight of the people receiving foreclosure counseling were able to stay in their homes. There are no statistics available about how many people actually purchased a home. Financial capability, as defined by the Financial Literacy and Education Commission, "is an individual's capacity, based on knowledge, skills, and access, to manage financial resources effectively. To develop this capacity, individuals must have appropriate access to and understanding of financial products, services, and concepts. Financial capability empowers individuals to make informed choices, avoid pitfalls, know where to go for help, and take other actions to improve their present and long-term financial well-being." All of the education and counseling efforts helped improve the financial capacity of the Virginians that participated. In order to offer these sessions, in addition to paid staff, 203 volunteers put in 791 hours for a salary savings of \$17,876.60 at the rate of \$22.60 per hour.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #5

1. Outcome Measures

Increase the number of youth learning the basic financial management strategies such as budgeting, setting financial goals, establishing a saving/investing program after receiving financial instruction.

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2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual 2012 7933

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the Jump \$tart Coalition which conducts a bi-annual survey of financial knowledge among high school students, financial literacy among teens has fallen to its lowest level with a score of 48 percent. American college graduates are slightly more financially literate with a score on the same exam of 65 percent. Only 25 percent of young adults are graduating from college. This means that 75 percent of adults are likely to lack skills to make educated financial decisions. Virginia schools understand the importance of financial education among students and are requiring students entering ninth grade in fall 2011 to take one unit of credit in economics and personal finance to graduate with a standard or advanced studies diploma.

What has been done

VCE uses several approaches and programs to educate youth and increase the financial capacity of Virginia's youth. The program's goal is to educate students about sound money management skills and the financial planning process and to help them begin to develop positive behaviors that are necessary to attain financial maturity and achieve a secure future. VCE offered Reality Store simulations, Kids Marketplace simulations, NEFE High School Financial Planning programs, Real Money Real World and Camp Millionaire. Each of these programs offers hands-on learning in an environment that correlates to Standards of Learning and educational mandates.

Results

Extension Educators reached 7,522 youth through financial education programming. Agents reported 526 volunteers contributed 2,671 hours equating to \$60,364.60 value of volunteer time. The actual numbers are likely much higher as several agents did not provide volunteer data. Reality Store evaluations provided the following results: 92% of youth felt the program increased their awareness of making smart financial decisions and 61% felt there was a clear relationship between their performance in school, participation in community activities and their future occupation. Follow-up data with these same participants yielded the following results with one student saying ?I watch how much money I spend and how much things costs?: 74% said the program increased their knowledge of budgeting money and 71% of participants said the program taught them the value of completing higher education. The following results are from students completing Kids Marketplace evaluations: 82% learned to choose what they need with their

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money, 71% learned how to give up one thing to choose another and 74% indicated the program gave them new ideas on how to handle money in the future. A participant provided the following comment: ?It gave me a chance to think about what I was going to do with my money and life.? Finally, results from the Camp Millionaire three month follow-up evaluation include: 67% of participants had written financial goals and a spending plan and 56% had opened a savings account.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #6

1. Outcome Measures

Increase the number of local food entrepreneurs who make direct connections with local food distribution outlets such as grocery stores, colleges, universities, hospitals, schools, nursing homes etc.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	240

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Local food-based businesses and farm enterprises continue to seek new markets and explore new ways to grow their consumer base and strengthen local food systems. Demonstrated benefits include improved public health and economic outcomes.

What has been done

VCE has implemented state and regional local food plans, training and workshops.

Results

In 2012, over 240 local food businesses participated in VCE programming, including networking and relationship-building with purchasers such as local institutions. Moreover, VCE has led development of state-wide Farm to Table Plan consisting of a number of specific policy objectives aimed to support local food entrepreneurs and facilitate local purchasing from colleges, hospitals,

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schools and other institutions. Two regions have completed regional plans. VCE has institutionalized an annual Farm-to-Table conference. Participants reported new or strengthened producer-buyer relationships as a result of the event as well as increased knowledge of marketing and selling strategies.

4. Associated Knowledge Areas

KA Code Knowledge Area

608 Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Loss of county educators; Loss of Extension Specialist)

Brief Explanation

The continuing issues with the economy have kept VCE from increasing the number of Extension Agents that program in Family Finance and Community Viability. As agents leave, there are often vacancies for a number of months. In addition, during 2012 this program area experienced the unexpected loss of the Extension Specialist. The position is still vacant so it is having an effect on the amount of work that can be accomplished.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

During 2012 an evaluation system was implemented to capture evaluation data that shows the effect of our Family Finance and Community Viability programs in the Commonwealth of Virginia. Some highlights:

Financial management programs for youth showed 92% increased their awareness of making smart financial decisions, 74% said the program increased their knowledge of budgeting money, and 71% of participants said the program taught them the value of completing high education.

Funding was obtained for Americorps VISTA members to work with the Master Financial Education Volunteer program. Seven members contributed 6498 hours of service, recruited 269 volunteers, and raised a total of \$14,472 for our programming.

FCS agents offered the "Steps to Financial Success" class for bankruptcy filers. Ninety-five percent of those completing evaluations indicated they would make at least one behavior change as a result of attending the class.

FCS agents trained 73 new Master Financial Education Volunteers, contributing more than 200 hours and working with 2,000 individuals in 2012.

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Key Items of Evaluation

For adult financial literacy programs results show that 85% of money management class participants said they would write financial goals after completing the course compared to only 36% who did so before taking classes. 88% said they would have a written spending and savings plan compared to just 27% who did so before. 96% said they would maintain a record keeping system to assist them with paying bills on time compared to only 68% who did so before the classes. 80% said they would pay themselves first for savings whereas only 28% did so before involvement in our programs. 86% said they would put money into an emergency fund compared to 32% who did so before the money management classes. 86% said they would review credit reports annually compared to just 26% who did so before. 80% said they would have a plan for paying down debt compared to only 34% who did so before.

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V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Families and Communities

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	40%	30%	100%	0%
802	Human Development and Family Well- Being	60%	70%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

V 2042	Exter	nsion	Research		
Year: 2012	1862	1890	1862	1890	
Plan	17.0	1.0	0.0	0.0	
Actual Paid Professional	11.2	1.0	12.8	0.0	
Actual Volunteer	902.0	0.0	0.0	0.0	

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

Exte	ension	Research		
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
233412	181488	233582	0	
1862 Matching	1890 Matching	1862 Matching	1890 Matching	
330248	62249	525283	0	
1862 All Other	1890 All Other	1862 All Other	1890 All Other	
980126	0	2893511	0	

V(D). Planned Program (Activity)

1. Brief description of the Activity

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Activities include entrepreneurial education, asset-based economic development, leadership, civic engagement, child care provider education, parent education, online education and distance learning, and specialized trainings and workshops to qualify instructors and to educate trainers.

2. Brief description of the target audience

Parents, grandparents, adult home caregivers, child care providers and early childhood educators, providers of after-school care, community organizations, community partners, community leaders and government officials, donors, K-12 educators, and volunteers.

3. How was eXtension used?

In 2012 eXtension resources were utilized in the following programs. The resources available through these sources were used to both enhance community-based education and aliviate time spent on requests for assistance that were of a basic, and purely informational, nature. In addition the eXtension CoP framework was used to develop and host webinars, FAQ, and other published materials to increase the reach and audience of each program listed:

- Community Planning and Zoning
- 1. **Parenting**
- 2.
- Child Care 3.
- **Family Caregiving** 4.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	21699	28303	7602	233

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

Year: 2012 0 Actual:

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012 Extension Research Total

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Actual	8	9	17
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

 Number of trainings, educational workshops, and on-line education sessions for VCE's targeted audiences.

Year	Actual	
2012	771	

Output #2

Output Measure

 Number of fact sheets, publications, newspaper articles, and curricula on families and communities.

Year	Actual
2012	318

Output #3

Output Measure

• Number of citizens receiving entrepreneurial education.

Year	Actual
2012	47

Output #4

Output Measure

• Number of adults engaged in community-based leadership development education.

Year	Actual
2012	69

Output #5

Output Measure

• Number of communities partnering with Virginia Cooperative Extension faculty to address emerging issues (i.e. land use, agritourism, local foods, bioenergy, youth gangs, and others).

Year	Actual
2012	6

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Output #6

Output Measure

• Number of workshops, activities, or programs offered to address emerging issues.

Year	Actual
2012	18

Output #7

Output Measure

• Number of adults engaged in facilitation skills training.

Year	Actual
2012	88

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Parenting Education - Increase the percentage of parenting education participants that indicate increased knowledge of effective parenting practices, such as nurturing and guiding children, understanding basic child development, reducing family conflict and managing stress, and knowing how to access available community resources to meet family needs.
2	Parenting Education - Increase the percentage of parenting education participants that adopt developmentally appropriate, effective parenting practices, such as nurturing and guiding children, and actively seeking to manage stress and reduce family conflicts.
3	Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that indicate increased knowledge of core competency areas, such as basic child development, appropriate child observation and assessment, effective interaction strategies, and effective learning environments.
4	Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that improve their early childhood learning environment by making practice changes, such as implementing developmentally-appropriate learning practices, interaction practices and observation assessment strategies.
5	Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that improve program management practices, such as effective relationships with enrolled families, record keeping, facilities management, budgeting, and emergency preparedness.
6	Facilitation Skills Training - Increase the percentage of trained volunteers and citizens participating in facilitation skills training that indicate increased knowledge and skills as a result of participation.
7	Leadership Development Education - Increase the percentage of adult citizens participating in leadership development education programs that indicate increased knowledge and skills as a result of participation.
8	Economic and Community Planning- Increase self-reported preparedness of communities on issues of economic and community planning

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Outcome #1

1. Outcome Measures

Parenting Education - Increase the percentage of parenting education participants that indicate increased knowledge of effective parenting practices, such as nurturing and guiding children, understanding basic child development, reducing family conflict and managing stress, and knowing how to access available community resources to meet family needs.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	98

3c. Qualitative Outcome or Impact Statement

reducing family conflict and managing stress

Issue (Who cares and Why)

In 2011, 31 children died from physical neglect, 23 children died as victims of physical abuse and nine children died due to medical neglect, shaking injuries, and lack of supervision. Research shows that parents who lack understanding of their children's developmental stages, who hold unreasonable expectations for their child's abilities, or who are unaware of effective discipline strategies, may be abusive or neglectful. Concerns about how Virginia families are functioning have economic impacts for the individual family unit and the Commonwealth.

What has been done

VCE agents partnered with the local Departments of Social Services and other agencies. Educational programming focused on effective parenting techniques, communication and positive discipline in parenting workshops for various audiences including DSS referred or court ordered parents, Head Start parents, parents of teens involved with the juvenile justice system, parents of newborns, incarcerated parents, grandparents and other relatives raising children, stay at home parents, homeless parents and parents in transitional housing, and others.

Results

More than 1074 parents completed VCE parent education programs in 2012. The result of pre and post tests revealed:

98 percent of parents completed pre and post surveys indicated the had increased their knowledge of effective parenting practices in at least one of the following areas: nurturing and guiding children's behavior understanding basic child development

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knowing how to access available community resources to meet family needs In one county where 410 parents attended parenting education classes, there were no DSS referred clients that had a new founded case of abuse or neglect. Moreover, no DSS referred families had their children placed in foster care upon completion of the parenting classes. Beyond the cost savings to the county, these results indicate that parents learned more effective and less violent parenting and nurturing skills, allowing for strengthened families.

4. Associated Knowledge Areas

KA Code Knowledge Area802 Human Development and Family Well-Being

Outcome #2

1. Outcome Measures

Parenting Education - Increase the percentage of parenting education participants that adopt developmentally appropriate, effective parenting practices, such as nurturing and guiding children, and actively seeking to manage stress and reduce family conflicts.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In 2011, 31 children died from physical neglect, 23 children died as victims of physical abuse and nine children died due to medical neglect, shaking injuries, and lack of supervision. Research shows that parents who lack understanding of their children's developmental stages, who hold unreasonable expectations for their child's abilities, or who are unaware of effective discipline strategies, may be abusive or neglectful. Concerns about how Virginia families are functioning have economic impacts for the individual family unit and the Commonwealth.

What has been done

VCE agents partnered with the local Departments of Social Services and other agencies. Educational programming focused on effective parenting techniques, communication and positive discipline in parenting workshops for various audiences including DSS referred or court ordered parents, Head Start parents, parents of teens involved with the juvenile justice system, parents of

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newborns, incarcerated parents, grandparents and other relatives raising children, stay at home parents, homeless parents and parents in transitional housing, and others.

Results

More than 1074 parents completed VCE parent education programs in 2012. In one county where 410 parents attended parenting education classes, there were no DSS referred clients that had a new founded case of abuse or neglect. Moreover, no DSS referred families had their children placed in foster care upon completion of the parenting classes. These results indicate that parents are using more effective and less violent parenting skills. Moreover, results from the Juvenile Justice parenting program revealed that there was only a 5% recidivism rate among those youth at 12-24 months after completion.

Other program results indicated that:

?97% of parents report using the skills learned in class

?97% report improved communication in the home

4. Associated Knowledge Areas

KA Code Knowledge Area

802 Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that indicate increased knowledge of core competency areas, such as basic child development, appropriate child observation and assessment, effective interaction strategies, and effective learning environments.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There are an estimated 599,000 children under the age of 6 in Virginia. Of these, approximately 62% are routinely cared for by someone other than their parents. Current statistics indicate that one in five Virginia children enter Kindergarten without the basic skills needed to succeed. Yet research shows that the first five years of life are crucial to children?s development and that every

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dollar invested in high quality childcare returns 7 to 8 dollars to society.

What has been done

To enhance the quality of early childhood care and education, Family and Consumer Sciences Agents Virginia conducted childcare provider trainings in partnership with other agencies/organizations. There were 751 participants representing family day homes, childcare facilities, public school pre-K, Head Start and other groups attended these events to learn about effective guidelines for successful early childhood programs.

Results

As a result of attending Extension educational programs, participants reported the following knowledge gains:

99%- gained new and inexpensive quality improvement ideas to use in the classroom

100%- learned ways to incorporate storytelling in the classroom

99%- learned new physical activities to incorporate in the classroom

97%- plan to use new physical activities learned in my program

92%- learned new healthy snack ideas

95%- plan to use healthy snack options learned with children

93%- learned ideas to incorporate gardening with youth in my program

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that improve their early childhood learning environment by making practice changes, such as implementing developmentally-appropriate learning practices, interaction practices and observation assessment strategies.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	75

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Of these, approximately 62% are routinely cared for by someone other than their parents. Current statistics indicate that one in five Virginia children enter Kindergarten without the basic skills needed to succeed. Yet research shows that the first five years of life are crucial to children?s development and that every dollar invested in high quality childcare returns 7 to 8 dollars to society.

What has been done

To enhance the quality of early childhood education in Virginia localities, FCS agents partnered with other organizations to conduct childcare provider trainings. Participants represented family day homes, childcare facilities, Head Start, and other groups. To enhance the quality of early childhood care and education, Family and Consumer Sciences Agents Virginia conducted childcare provider trainings in partnership with other agencies/organizations. There were 751 participants representing family day homes, childcare facilities, public school pre-K, Head Start and other groups attended these events to learn about effective guidelines for successful early childhood program operations.

Results

A six month follow-up evaluation was conducted. Results indicated that after attending these training sessions, participants reported the following knowledge gains:

75 percent have started using more activities to help children learn to read.

93 percent of providers have made changes to help children get along with others.

100 percent of providers learned healthy food choices and new activities to increase physical activity.

98 percent could now recognize the signs of abuse and new the procedures to report it.

4. Associated Knowledge Areas

KA Code Knowledge Area

802 Human Development and Family Well-Being

Outcome #5

1. Outcome Measures

Child Care Provider/Early Childhood Training - Increase the percentage of early childhood professional development participants that improve program management practices, such as effective relationships with enrolled families, record keeping, facilities management, budgeting, and emergency preparedness.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

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3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Of these, approximately 62% are routinely cared for by someone other than their parents. Current statistics indicate that one in five Virginia children enter Kindergarten without the basic skills needed to succeed. Yet research shows that the first five years of life are crucial to children?s development and that every dollar invested in high quality childcare returns 7 to 8 dollars to society.

What has been done

To enhance the quality of early childhood education in Virginia localities, FCS agents partnered with other organizations to conduct childcare provider trainings. Participants represented family day homes, childcare facilities, Head Start, and other groups. To enhance the quality of early childhood care and education, Family and Consumer Sciences Agents Virginia conducted childcare provider trainings in partnership with other agencies/organizations. There were 751 participants representing family day homes, childcare facilities, public school pre-K, Head Start and other groups attended these events to learn about effective guidelines for successful early childhood program operations.

Results

Respondents reported that as a result of attending Extension Childcare Trainings:

- -90 percent had implemented 3 to 5 new activities to encourage early language development
- -94 percent had developed an Emergency Response Plan according to FEMA guidelines and shared it with the parents of their children
- -80 percent had used recipes, cooking and foods to increase children's understanding of nutrition
- -85 percent had reduced the risk of allergens and asthma triggers 85%

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

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Outcome #6

1. Outcome Measures

Facilitation Skills Training - Increase the percentage of trained volunteers and citizens participating in facilitation skills training that indicate increased knowledge and skills as a result of participation.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia Cooperative Extension agents and community leaders have indicated a lack of knowledge and experience in effectively managing and facilitating meetings and community discussions as reported by local Extension offices and Extension Leadership Councils. The 2009/2010 strategic planning listening sessions indicated community leaders needed assistance in creating change through individual and community leadership development, facilitation, and conflict resolution skills development.

What has been done

Specialists researched and selected a curriculum for enhancing facilitation skills developed by the University of Maine. Strengthening Your Facilitation Skills (SYFS) addresses VCE focus area, Cultivating Community Resiliency and Capacity, and provides a strategy to achieve Goal 2: Develop and deliver educational programming to improve capacity among community members to engage in community planning, decision-making, and community leadership.

Results

During 2012, 56 community leaders participated in trainings in Petersburg, Lynchburg and the city of Richmond. In addition, 32 agents were taught the curriculum and 21 were trained as master trainers. Evaluation results from the community and agent trainings indicated that the participants gained new skills as a result of their participation. Overall, 97 percent (59/61) of participants reported that the training helped them better understand the process of facilitation. Moreover, 97 percent (59 of 61) of participants reported that they intend to adopt practices learned in the training series. Pre and post surveys also indicted that the participants increased their ability to create and sustain an environment of participation, to guide the group to useful outcomes, and to plan appropriate group processes as a result of participating in the training.

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4. Associated Knowledge Areas

KA Code Knowledge Area

608 Community Resource Planning and Development

Outcome #7

1. Outcome Measures

Leadership Development Education - Increase the percentage of adult citizens participating in leadership development education programs that indicate increased knowledge and skills as a result of participation.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Southern Rural Development Initiative executive director was adamant that communities cannot wait for exceptional leaders to appear but must ?help ordinary people become leaders.? During the strategic planning 2009/2010 VCE listening sessions, concerns were identified related to the quality of life within communities, namely workforce, economic and leadership development; public service infrastructure; urban sprawl; and the ability to respond to emerging critical issues within local communities. Community groups asked how local residents can be empowered to create and drive positive change.

What has been done

Virginia Cooperative Extension?s leadership development curriculum, Innovative Leadership: Building Community Connections, is a key training tool for developing the leadership skills of community residents. The program is an 18-hour, 6 training module curriculum enabling individuals to build their leadership skills; increase their awareness of community issues; network with other leaders; and become more engaged in community, civic, and governmental activities.

Results

In 2012, 5 trainers taught adult leadership classes in 3 counties/cities with 69 of the residents completing the training. Roanoke offer Innovative Leadership for the first time in 2012 and taught 45 residents in two classes. In May 2012, Extension hosted its second state-wide leadership

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conference featuring the book SWITCH with the authors? sister facilitating the 5 hour training. One hundred percent of those responding to the evaluation indicated the conference was helpful or somewhat helpful, and 91% indicated the session increased their knowledge and/or skills regarding leadership.

4. Associated Knowledge Areas

KA Code Knowledge Area608 Community Resource Planning and Development

Outcome #8

1. Outcome Measures

Economic and Community Planning- Increase self-reported preparedness of communities on issues of economic and community planning

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Citizens, including local officials, are charged with developing local comprehensive land use plans, and making land use permitting determinations at the local governmental level. Their effectiveness and awareness of best planning practices has profound impacts on the ability of Virginia's communities to meet the tripartite goals of economic development, environmental stewardship, and social capacity development. Providing education on public policy and economic development strategies can increase the preparedness of communities to meet these challenges.

What has been done

In 2012, a \$248,842 grant was awarded to VCE to train data collectors for on-farm energy audits, and a Virginia firm focusing specifically on the energy usage of agricultural enterprises was launched. Over 300 planning officials gained knowledge on the best practices in community planning, effective governance, and emerging opportunities in agriculture. Another example of VCE's effort was to facilitate the development program in Bedford County.

Results

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As a result of these activities, VCE continues to assist communities by helping them define their development goals and prepare community leaders to implement their vision. For example, VCE was influential in identifying \$1.2 million in annual energy related on-farm savings. Twenty-one (21) farms implemented the cost saving projects identified in the audits and fourteen (14) farms applied for USDA REAP energy conservation grants and 11 of these were successful.

4. Associated Knowledge Areas

KA Code Knowledge Area

608 Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

All items listed above directly affect agriculture, families, communities, and all forms of businesses, i.e., droughts, floods, poor economy, and changes in government policy can lead to dramatic shifts in the structure of an industry, and hinder the ability of families to participate in educational programming efforts. For example, several severe weather events in the summer of 2012 resulted in time away from programming to focus on emergency response tasks for some agents, as directed by local governmental partners. Uncertainty in state and local level budgeting may have negatively impacted staffing and may also impact the ability to offer as many programs/workshops.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Before Preschool Program/Al's Pals is offered in two counties. Al's Pals: Kids Making Healthy Choices is a nationally recognized, resilience-based early childhood curriculum that develops social, emotional and behavioral skills in children 3 to 8 years old. To measure the effectiveness of the Before Preschool Program/Al's Pals, teacher observation and the Before Preschool Pre-Post Survey-Local Evaluation Component was used. Twenty-six children who completed the program in May 2012 were evaluated. The following desired outcomes were measured: A decreased use of aggressive behaviors was measured by teacher responses to questions related to physical aggression and bullying or intimidating other children. Twenty-one of the 26 children completing the program showed aggressive behaviors. Over half (12 of the 21) decreased their use of aggressive behaviors. An increase in the ability to demonstrate self-control was measured. Twenty-four of the 26 children (92%) showed an increase in their ability to demonstrate self-control. All 26

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children increased their knowledge of the dangers of weapons, drugs and alcohol. 20 of the 26 children (77%) developed positive friendship skills by decreasing problems making friends and decreasing bothering and annoying other children. All of the 26 children demonstrated an ability to resolve problems in peaceful ways by practicing brainstorming skills.

Results of another parenting education program serving 410 families showed documented impacts. Participants reported the following: 97% using the skills; 97% improved communication in the home; 99% more effective communication in the home; 96% of participants in the When Families Get Angry program reported that the conflict resolution methods have been helpful Results are also gathered annually on families who completed the parent education program at least 12 months earlier. As of July 1, 2012, there were no repeat incidents of child abuse or neglect for those DSS referred parents who completed the program between July 1, 2010 and June 30, 2011. In addition, no children of the parents who completed the parent education program during that time frame, were placed in foster care. And specifically for families with a teen involved in the juvenile justice system, the recidivism rate was only 5% at 12-24 months after completing the program.

Evaluation results from the Strengthening Your Facilitation Skills trainings indicated that the participants gained new skills as a result of their participation. Overall, 97 percent (59/61) of participants reported that the training helped them better understand the process of facilitation. Moreover, 97 percent (59 of 61) of participants reported that they intend to adopt practices learned in the training series.

Key Items of Evaluation

The Before Preschool Program/Al's Pals is offered in two counties. Al's Pals: Kids Making Healthy Choices is a nationally recognized, resilience-based early childhood curriculum that develops social, emotional and behavioral skills in children 3 to 8 years old. To measure the effectiveness of the Before Preschool Program/Al's Pals, teacher observation and the Before Preschool Pre-Post Survey-Local Evaluation Component was used. Twenty-six children who completed the program in May 2012 were evaluated. The following desired outcomes were measured: A decreased use of aggressive behaviors was measured by teacher responses to questions related to physical aggression and bullying or intimidating other children. Twenty-one of the 26 children completing the program showed aggressive behaviors. Over half (12 of the 21) decreased their use of aggressive behaviors. An increase in the ability to demonstrate self-control was measured. Twenty-four of the 26 children (92%) showed an increase in their ability to demonstrate self-control. All 26 children increased their knowledge of the dangers of weapons, drugs and alcohol. 20 of the 26 children (77%) developed positive friendship skills by decreasing problems making friends and decreasing bothering and annoying other children. All of the 26 children demonstrated an ability to resolve problems in peaceful ways by practicing brainstorming skills.

Results of another parenting education program serving 410 families showed documented impacts. Results are gathered annually on families who completed the parent education program at least 12 months earlier. As of July 1, 2012, there were no repeat incidents of child abuse or neglect for those DSS referred parents who completed the program between July 1, 2010 and June 30, 2011. In addition, no children of the parents who completed the parent education program during that time frame, were placed in foster care. And specifically for families with a teen involved in the juvenile justice system, the recidivism rate was only 5% at 12-24 months after completing the program.

Two graduates of the Innovative Leadership: Building Community Connections

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program decided to run and ultimately get elected to seats on the local school board.

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V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food, Nutrition, and Health

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	20%	5%	35%	100%
703	Nutrition Education and Behavior	40%	60%	35%	0%
724	Healthy Lifestyle	40%	35%	30%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Exten		Rese	earch
rear: 2012	1862	1890	1862	1890
Plan	9.0	1.0	7.6	1.0
Actual Paid Professional	7.8	1.5	8.9	2.0
Actual Volunteer	814.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
161771	245722	161888	313723
1862 Matching	1890 Matching	1862 Matching	1890 Matching
228885	85020	364058	321883
1862 All Other	1890 All Other	1862 All Other	1890 All Other
679295	0	3437835	117196

V(D). Planned Program (Activity)

1. Brief description of the Activity

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Conduct educational classes, workshops, meetings, and trainings, develop products, curriculum, resources, facilitate coalitions and/or task forces, conduct assessments and community surveys, partner with community agencies and institutions to facilitate programs and community development, create/revise social systems and public policies, conduct research studies, disseminate program and research results through papers, reports, and media, develop and implement marketing strategies using various outlets to promote program participation, disseminate research-based information to consumers using a variety of media and technology resources, cooperate with media and other community agencies to seek effective means of reaching new and non-traditional audiences, and respond to consumer inquiries.

2. Brief description of the target audience

Young adults (ages 18 to 59), older adults (age 60 and older), caregivers of older adults, adults with type 2 diabetes, parents and caregivers of individuals with type 2 diabetes, senior center and meal site staff and volunteers, and Extension educators.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	20561	23393	10202	284

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	4	97	101

V(F). State Defined Outputs

Output Target

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Output #1

Output Measure

• Number of adults participating in diabetes educational programs.

Year	Actual
2012	80

Output #2

Output Measure

 Number of adults participating in at least one session on adult nutrition, fitness, worksite wellness, or health.

Year	Actual
2012	2573

Output #3

Output Measure

 Number of research projects completed or in progress on adult obesity and related chronic disease.

Year	Actual
2012	17

Output #4

Output Measure

• Number of research papers published on adult obesity and related chronic disease.

Year	Actual
2012	97

Output #5

Output Measure

• Number of Master Food/Health volunteers trained to extend the work of an Extension educator.

Year	Actual
2012	89

Output #6

Output Measure

 Number of individuals, including children, exposed to Extension-based social marketing campaigns

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Year Actual 2012 22400000

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase in the number of individuals with diabetes who have improved their Hemoglobin A1c level, meal planning behaviors or physical activity behaviors, three months after participating in a Diabetes Education programs offered in collaboration with a local health care provider.
2	Increase in number of adults that make lifestyle changes which improve their dietary quality and/or physical activity level after participation in VCE programs.
3	Number of discoveries from completed obesity related research projects which focus on examining adult obesity from its root causes to its association with chronic disease.

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Outcome #1

1. Outcome Measures

Increase in the number of individuals with diabetes who have improved their Hemoglobin A1c level, meal planning behaviors or physical activity behaviors, three months after participating in a Diabetes Education programs offered in collaboration with a local health care provider.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nearly 500,000 Virginians have been diagnosed with diabetes and another 250,000 have diabetes and don?t know it. Diabetes is the 6th leading cause of death in Virginia and adds to deaths from heart disease and stroke. Diabetes complications exert a high cost in money, loss of productivity, and quality of life. In Virginia diabetes leads to 11,700 hospitalizations each year adding nearly \$173 million to our health care bill. The burden of diabetes is disproportionate to African Americans, the elderly, the limited income, and the medically underserved.

What has been done

Family and Consumer Sciences agents partnered with the VT Center for Public Health Practice and Research, the VT Dept of Psychology, the Virginia Diabetes Council, and other health professionals to offer Balanced Living with Diabetes (BLD). BLD provides practical education to help people with type 2 diabetes and their families learn about self-care, food choices to control carbohydrate intake, and life style patterns that prevent or slow the complications of their disease. BLD includes 4 weekly classes and a reunion class 3 months and 6 months following for reassessment. Funding was received from the National Institutes of Health and the Svoboda Endowment. Programs target African Americans, and where possible, are offered in faith-based settings. A total of 15 programs were offered in 5 general locations: Chesterfield, Danville, Emporia, Richmond, and Petersburg. This program is on-going and about half of the locations have not completed their final assessments.

Results

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In 2012 293 Virginians participated in BLD; 93% were African American and 79% self-reported type 2 diabetes. Nearly 1/3 had incomes below \$10,000 and nearly 2/3 were below \$30,000.

BLD emphasizes a meal planning method to control carbohydrate intake. At baseline attendees reported on average using a meal planning method 2 to 3 days per week; this increased to 4 to 5 days per week on reassessment. Several participants who never used a meal planning method at the onset increased to 7 days a week.

Hemoglobin A1c indicates average blood sugar levels over the 3 months prior and evaluates diabetes management. The American Diabetes Association recommends an A1c of less than 7.0% in type 2 diabetes. At baseline 65 persons had A1c measures above 7.0%, and mean A1c fell by 1.5% by the 3-month reunion. Individual changes included a drop from 10.1% to 6.5% and 12.8% to 8.6%. A decrease in A1c of 1.0% lowers the risk of diabetes complications such as blindness or renal failure by 40%. Preventing one renal failure saves \$72,000 a year in dialysis costs. BLD provides practical meal time advice consistent with cultural and ethnic preferences that impacts the entire family.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Increase in number of adults that make lifestyle changes which improve their dietary quality and/or physical activity level after participation in VCE programs.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2316

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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According to the Virginia Division of Chronic Disease and Control Indicators of 2010 report, two-thirds (62%) of Virginia adults are at an unhealthy weight (i.e., overweight or obese),50% of Virginians do not get enough physical activity, and 74% of Virginians do not meet the daily requirements for eating five or more servings of fruits and vegetables. Thirty percent of children and adolescents are overweight and 64% of adults are overweight or obese in the US. Families of low-socioeconomic status suffer disproportionately from poor health. Overweight and obesity are major health and economic issues, costing Americans over \$147 billion each year. Likewise, an obese person has medical costs that are \$1429 more than his or her normal weight counterpart. Good nutrition and physical activity are central in preventing chronic diseases, such as obesity and diabetes, and saving healthcare costs.

What has been done

Virginia Extension Educators offer education on a wide variety of food, nutrition, health, and chronic disease topics for individuals to reduce the number of visits to doctors and other healthcare providers, fewer costly laboratory tests, and lower numbers of hospital visits for uninsured individuals. Programs include Cooking Matters, a cooking-based program to increase whole grains, fruits and vegetables, and lean proteins, Fit Extension, a physical activity program, and farmers market promotion efforts, to engage low-income audiences with locally grown produce.

Results

In 2012, for Cooking Matters alone, 10 Extension units were awarded \$3000 to conduct 44 programs. Four hundred ninety five youth and adults participated in 2011-2012. Fifty-two percent of participants received at least one form of assistance such as SNAP, free/reduced school meals, food pantry, WIC. Average household size was 3.74 people. Average number of children was 1.71. Adults with children in the home were 78%. The average adult graduate reported an 85% change in how often he/she used the Nutrition Facts label to make food choices, 98% of children learned at least one new thing about cooking and eating healthy; 83% practiced preparing recipes at home with their parents, 92% reported that cooking skills were improved, 40% were eating more fruits and vegetables. Eighty percent of adult participants increased their understanding of how to create a household budget. The average cost of 2652 participant takehome grocery bags was \$25.00 per bag (an average of \$66,000 value). Eighty-four volunteers averaged teaching 1.25 courses each and 23% taught two or more courses. Additional collaboration with local agencies and program sustainability were established. One unit received \$5000 Shopping Matter Grant to teach 120 participants shopping and budget skills. To date, 149 graduated from that program.

4. Associated Knowledge Areas

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

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Outcome #3

1. Outcome Measures

Number of discoveries from completed obesity related research projects which focus on examining adult obesity from its root causes to its association with chronic disease.

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Recent data indicate 17% of children and adolescents are obese and more than 30% of adults. Excess body fat increases the risk of hypertension, cardiovascular disease, and diabetes, major contributors to health care costs, loss of productivity, early mortality, and diminished quality of life. Obesity-related illnesses place a significant burden on the economy and obesity is believed to account for as much as 9 percent of total health care expenditures and a minimum of \$26.8 billion in medical spending.

What has been done

The etiology of obesity extends beyond energy imbalance to include genomic, molecular, cellular, and organ components that interact with individual preferences, family and community, work life, economics, and public policy. Virginia Tech scientists are striving to examine obesity from bench to behavior through inter-disciplinary and translational science and applications that will result in positive public health impacts.

Results

In 2012, 97 peer-reviewed articles (in childhood obesity and food, nutrition, and health) were published or in press. Current research studies aim to explore a multitude of factors and interventions related to obesity, health, and well-being, including: a surveillance assessment of health status and the built environment in a health disparate region; hypothalamic control of body chamber to set food prices; the effect of resistance training as an approach to prevent diabetes from developing among older, overweight individuals with pre-diabetes; the identification and characterization of phytochemicals from food sources or medicinal herbs that provide beneficial effects on cardio-vascular disease, diabetes, and cancer; the effect of DHA supplements on

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muscle damage and inflammation; the impact of lifestyle and pharmacological therapies, both alone and in combination, to alter the course of the cardiovascular and metabolic consequences that occur with aging and obesity; gene therapy; and the initiation of a community-based participatory research framework for a health disparate region.

A group of scientists also collaboratively developed proposals to establish the Fralin Translational Obesity Research Center and a Tanslational Obesity Research Interdisciplinary Graduate Education Program that would provide resources and direction for researchers and training opportunities for students interested in translational obesity research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The economy (i.e. employment opportunities, etc.) can directly influence food purchases and food security of adults and families and furthermore weightstatus. Public policy changes, such as the Affordable Healthcare Act, may impact a multitude offactors related to food, nutrition, health, and healthcare access in 2011 and beyond. Severalpopulations, particularly Hispanic and African American individuals, have higher rates of obesity. With population shifts within Virginia, it is possible to see changes in obesity prevalence rates.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Numerous research studies are being conducted to identify contributors and strategies to address obesity, cardiovascular disease, cancer, and overall health, from bench to behavior and acrss the socio-ecological framework. Several innovative studies were completed during 2012. For example, one study investigated resistance training as a strategy to reduce risk of diabetes among older, overweight, prediabetic adults. To date, 150 individuals have been enrolled in a 15-month intervention trial. The expected research

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results will have significant impact on the field of "exercise as medicine." Another study tested combinations of incentive packages that vary incentive magnitude, form, timing, contingency conditions and program locations to encourage participation in weight loss programs, using choice modeling.

Within the extension system in Virginia, ongoing evaluation studies are conducted to demonstrate the effectiveness of two of thehallmark USDA nutrition education programs, EFNEP and SNAP-Ed. Participants completing the EFNEP and SNAP-Ed series of six lessons improved nutrition and food behavior. As a result of well trained staff, the following impacts were documented:

- 83% of adult EFNEP participants who completed a series of at least 6 lessons showed improvement in nutrition practices.
- 86% of adult SNAP-Ed participants who completed a series of at least 6 lessons showed improvement

86% of adult EFNEP participants who completed a series of at least 6 lessons demonstrated acceptable food safety practices.

Key Items of Evaluation

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V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%	0%	10%	15%
502	New and Improved Food Products	0%	0%	10%	15%
702	Requirements and Function of Nutrients and Other Food Components	0%	0%	10%	10%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	0%	20%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	90%	100%	50%	60%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Exter	nsion	Research		
rear: 2012	1862	1890	1862	1890	
Plan	7.3	0.5	9.5	2.0	
Actual Paid Professional	13.3	0.5	15.2	0.0	
Actual Volunteer	184.0	0.0	0.0	0.0	

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

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Exte	ension	Research		
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
277322	99077	277523	196705	
1862 Matching	1890 Matching	1862 Matching	1890 Matching	
392374	79839	624099	201821	
1862 All Other	1890 All Other	1862 All Other	1890 All Other	
1164506	0	2005404	13405	

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct educational classes, workshops, meetings, and trainings, develop products, curriculum, resources, facilitate coalitions and/or task forces, conduct assessments and community surveys, partner with community agencies and institutions to facilitate programs and community development, create/revise social systems and public policies, conduct research studies, disseminate program and research results through papers, reports, and media, develop and implement marketing strategies using various outlets to promote program participation, disseminate research-based information to consumers using a variety of media and technology resources, cooperate with media and other community agencies to seek effective means of reaching new and non-traditional audiences, and respond to consumer inquiries.

2. Brief description of the target audience

Retail and food service employees, retail and food service management, temporary food vendors, child care providers, young adults (ages 25-59), older adults (ages 60 and older), Extension educators, commercial food processors, value-added food producers and very small and small produce growers.

3. How was eXtension used?

Content by specialists has been uploaded into eXtension. Additionally, agents and specialists are listed as experts for the "Ask an Expert" link. Therefore agents and specialists have answered questions that have come through eXtension from Virginia.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	14863	12998	1860	11

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

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Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	23	13	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

 Number of food service managers, supervisors and food handling personnel from restaurants, cafeterias, daycare and other food service facilities completing food safety training offered by extension educators in Virginia

Year	Actual
2012	782

Output #2

Output Measure

 Number of home-based food business workshops conducted for food product formulation, facility planning, food processing and safety, product evaluation, food packaging and labeling, and record keeping.

Year	Actual
2012	5

Output #3

Output Measure

 Number of short-courses provided on food safety practices including HACCP training, Good Agricultural Practices and recall workshops to industry personnel, consumer organizations, Extension Agents and to local, state, and federal health inspectors

Year	Actual
2012	10

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Output #4

Output Measure

• Number of research projects completed or in progress in the area of food safety.

Year	Actual
2012	6

Output #5

Output Measure

 Food Safety - Number of home based business entrepreneurs that have products evaluated for their safety by the 'Food Processor Technical Assistance Program' to prevent foodborne illness across the commonwealth.

Year	Actual	
2012	29	

Output #6

Output Measure

 Number of consumers completing home food preservation training offered by extension educators in Virginia

Year	Actual
2012	777

Output #7

Output Measure

 Number of temporary food vendors or other small occasional food handlers completing food safety training offered by extension educators in Virginia

Year	Actual
2012	517

Output #8

Output Measure

 Number of Virginia fresh produce growers and farm market managers knowledgeable in using food safety principles and practices (taught through Enhancing the safety of locally grown produce?).

Year	Actual
2012	62

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase in the number of food handlers (managers, supervisors, and food handling personnel from restaurants, public school and hospital cafeterias, daycare centers, nursing homes, university food service, correctional centers, civic/community groups and volunteers) who increase knowledge and skills in safe food handling practices.
2	Increase in number of home-based business entrepreneurs that increase awareness and knowledge in producing safe high acid and acidified food products.
3	Increase in number of discoveries from completed food related research projects which focus on enhancing the safety of the Nation's food supply and the development of value added foods.
4	Food Preservation - Increase in the number of consumers that increase their knowledge on how to safely preserve foods at home.
5	Increase in number of small direct market Virginia fresh produce growers and farmers market managers knowledgeable in using food safety principles and practices (taught through "Enhancing the safety of locally grown produce)
6	Increase in number of Virginia fresh produce growers knowledgable or certified in Good Agricultural Practices (GAPs).
7	Creation of a new workshop on preventive controls offered to Virginia food industry
8	Salmonella Rebound Study Recommends Uninterrupted Cold-chain for Produce Safety

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Outcome #1

1. Outcome Measures

Increase in the number of food handlers (managers, supervisors, and food handling personnel from restaurants, public school and hospital cafeterias, daycare centers, nursing homes, university food service, correctional centers, civic/community groups and volunteers) who increase knowledge and skills in safe food handling practices.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1299

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Centers for Disease Control and Prevention estimate that each year 1 in 6 Americans get sick, 128,000 are hospitalized and 3,000 die from foodborne illness. The overall cost to the public is high, with the estimated economic cost of foodborne illness approximately \$77.7 billion dollars per year, or approximately \$1626 per foodborne illness case.

Between 2007 and 2009, the state of Virginia averaged 21 foodborne outbreaks per year resulting in an average of 400 confirmed cases (sick individuals) per year. For each confirmed case there are an estimated 20-38 unconfirmed cases. Between 8,000 and 15,200 Virginians suffered from foodborne illness each of those years. The estimated economic loss from foodborne illness in Virginia during those years may be between 13 and 25 million dollars per year.

The top factors which contribute to foodborne illness are: inadequate cooking, improper holding temperatures, contaminated equipment, poor personal hygiene and food from unsafe sources. Safe food handling and preparation by food handlers can dramatically reduce illness and health costs.

What has been done

In 2012 VCE conducted food handler trainings across the state including:

?36 manager food safety certification courses (16 hour nationally recognized certification program) were provided to 379 individuals from the food service industry, schools, senior and day care centers across the state.

?32 employee food safety certification courses (6 to 10 hour trainings) were provided to 403 individuals were food handlers preparing foods in non-supervisory roles

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? 24 general safe food handling and preparation courses were provided to 517 individuals. These included consumers preparing foods in their homes, individuals from non-profit organizations such as church, civic groups and public service organizations preparing food occasionally for the public.

Eleven Extension agents provided these programs in over 30 counties across the state. Over 448 restaurants, schools, day care centers, churches, civic groups, public service organizations and other locations sent individuals to VCE to complete food safety training.

Results

Of those completing the manager?s certification course, 89% became certified. All food handler trainings were evaluated to determine the knowledge and behavior changes of participants. Of those who completed pre and post evaluations, 88% increased their knowledge of food safety practices.

103 participants responded to a follow-up survey, for a response rate of 8%. Of respondents, 97% adopted at least one new food safety behavior including.

?90% improved time and temperature practices

?62% made changes to prevent food contamination

?76% made changes to personal hygiene practices

In addition, respondents shared food safety information with 431 additional food handlers.

It is conservatively estimated that if one case of foodborne illness is prevented per food handler completing proper food safety training and application through VCE, this translates into a potential annual savings of approximately \$2.1 million dollars for the state of Virginia. This savings is calculated from the estimated economic burden of foodborne illness. This range of economic costs ensures a broad, accurate measure of the potential impacts.

4. Associated Knowledge Areas

KA Code Knowledge Area

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

Outcome #2

1. Outcome Measures

Increase in number of home-based business entrepreneurs that increase awareness and knowledge in producing safe high acid and acidified food products.

2. Associated Institution Types

• 1862 Extension

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3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	54

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food processors in Virginia are in need of guidance on formulation and regulation of their products in order to produce safe and wholesome food products that are in compliance with local and federal regulations. The importance of a good source for education and input is especially important in recent years as many Virginians are seeking to start their own food businesses as a source of supplemental income in hard economic times. Processors of acidified foods such as barbeque sauces and salsas are required by federal regulation to have their processes approved by a competent processing authority and to pass an FDA mandated course specific for acidified and low-acid canned food processors.

What has been done

The Food Innovations Program was developed to meet the demand for education and guidance for food processors in Virginia. The program has been designed to focus on 1) education material and opportunities for food processors, 2) analysis of food products and providing recommendation for formulation and processing based on the analysis, 3) providing official documents to food processors to file with the FDA when necessary, 4) providing feedback on product labeling and providing assistance in developing nutrition facts panels, 5) consulting with individuals or companies who need technical food processing assistance, and 6) providing food safety and food processing training courses to food processors, consumers, extension agents, and government agents in need.

The Food Innovations Program has implemented a website for easy access to education materials with unrestricted access. Materials have been developed and published to cover 5 areas of need, including Addressing Business Needs, The Science of Food Quality and Food Safety, Food Regulations and Compliance, Food Labeling, and Miscellaneous Food Info. There are currently 18 hand-outs related to these topics available on both the VCE publications web page, and the Food Innovations Program website.

Results

Since opening the food testing laboratory for service in September 2012, the Food Innovations Program has assisted 14 food entrepreneurs with their food enterprise. Nutrition labels have been created for 11 different products. A total of 29 products have been analyzed and accessed for safety. Of the 29 products, 16 were classified as acidified foods, and 13 products were found to be exempt from acidified food regulations. Of the 16 acidified foods submitted for process approval, 12 of the processes needed to be altered to provide a science-based adequate process for a safe acidified food product.

The Food Innovations Program has supplied a number of opportunities for support for food entrepreneurs. I have had a total of 370 phone contacts, 689 email contacts, and approximately 350 in-person contacts.

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4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Increase in number of discoveries from completed food related research projects which focus on enhancing the safety of the Nation's food supply and the development of value added foods.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	7	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Foodborne illnesses are a major problem in the United States. According to CDC, each year about 1 in 6 Americans (or 48 million people) gets sick, and 3,000 die of foodborne illness (FBI).

What has been done

The following research projects were conducted by faculty at Virginia Tech and Virginia State University:

?Investigation into the effects of irrigation fertilization and plant growth on Salmonella contamination of tomatoes in the field

?The antimicrobial activity of two plant essential oil compounds (trans-cinnamaldehyde and eugenol) were evaluated alone and in combination with trans-2-hexenal (a naturally-occurring apple flavorant) to determine their ability to inactivate Salmonella Typhimurium and Listeria monocytogenes in commercial apple juice.

?Antimicrobial activity of AITC in both its liquid and vapor phase against strains of Salmonella enterica serovar Michigan and Listeria monocytogenes on the surface of whole full-slip cultivars of cantaloupe (Cucumis melo L. var. reticulatus): ?Athena? and ?Hales Best Jumbo? over a treatment period of 24 h at room temperature.

?Cross contamination originating on the deli slicer or meat chub was tracked through a retail deli using an fluorescing abiotic surrogate, GloGermTM, to visually represent how pathogens may spread to different components of the slicer.

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?Determine appropriate methods and parameters for bacterial inoculation and thermal treatment of wheat flour.

Results

Virginia Tech researchers made strides to enhance the safety of the food supply. Some of the key discoveries and impacts include:

?No contaminated tomato fruits with Salmonella were detected in this field study.

?Treatments with 0.05% of trans-cinnamaldehyde, eugenol and trans-2-hexenal resulted in a 5 log CFU/ml reduction in bacterial numbers within one day of storage at both 4°C and 25°C. ?Treatment with 5 μ l liquid AITC on the rind of ?Athena? cantaloupe resulted in a 3 log CFU/10 g reduction in S. Michigan.

?Key areas of the deli slicer were identified as niche environments for Listeria including: hard-to-reach areas around the slicer blade, the grooves on the front of the slicer blade, cracks in the plastic handle, and areas underneath the blade.

?The minimum heat treatments required for a 5-log reduction in microbial populations (~ 109CFU/g to ~ 104CFU/g) were 5 minutes at 70°C and 30 minutes at 70°C for E. coli O157:H7 and S. Agona, respectively.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
702	Requirements and Function of Nutrients and Other Food Components
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Food Preservation - Increase in the number of consumers that increase their knowledge on how to safely preserve foods at home.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year Act	tua	al
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2012 777

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The number of consumers preserving foods at home continues to increase, as more consumers emphasize greater control over what they eat and where their food comes from. Failure to adequately preserve foods in the home can result in foodborne illness. Foodborne botulism is a severe form of food poisoning. Most of these cases are associated with improperly processed home-canned food. Just one case of botulism can cost \$1,343,592 related to medical services, deaths, lost work, and disability. In order to prevent illness, it is essential that consumers follow validated recipes when preserving foods at home. Historically Extension educators have been recognized as a credible resource for home food preservers.

What has been done

To help ensure safe home food preservation methods Virginia Cooperative Extension agent(s) provided food preservation trainings and support across the state in 2012. Fifteen extension educators provided home food preservation support in over 30 counties.

Education offered across the state included:

?54 Food preservation classes were offered across the state with over 777 participants. Types of classes offered included:

?14 general information classes on how to can

?25 high acid (jams, jellies, pickles, fruits, etc..) canning classes demonstrating hands on canning using a boiling water bath canner

?19 low acid (vegetables, meats, fish, etc?) canning classes demonstrating hands on canning using a pressure canner

?269 dial gauge inspections for accuracy.

?305 one-on-one individualized home preservers support via phone/e-mail

Results

Home food preservers completing education through VCE programs were evaluated to determine their knowledge gain in safe home food preservation techniques and how the training impacted their future behaviors.

94% of participants increased their knowledge in the following areas

?276 individuals learned how to can low acid foods using a pressure canner

?340 individuals learned how to can high acid foods using a boiling water bath canner

?422 individuals learned the importance of pH in determining the acidity of foods

?89 individuals learned how to make jams/jellies and other fruit spreads

?103 individuals learned how to make pickles, relishes and other fermented vegetables

?123 individuals learned how to dehydrate foods

?192 learned how to freeze foods

346 participants were surveyed on what they intended to change as a result of the training. 100% intended to change behaviors including:

?60% intend to can low acid foods using a pressure canner

?100% intend to use safe food preservation techniques

?36% intend to freeze more foods

?15% intend to dehydrate more foods

If a gauge is determined to be inaccurate after testing, the Extension Educator recommends replacement of the gauge and re-testing of the new gauge to ensure accuracy. Of those tested,

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132 were inaccurate and recommended for replacement. It is assumed that if one case of botulism can be prevented through replacement of an inaccurate dial gauge, the potential annual savings to the State of Virginia (or County(ies)) can be \$177.4 million dollar.

4. Associated Knowledge Areas

KA Code Knowledge Area

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

Outcome #5

1. Outcome Measures

Increase in number of small direct market Virginia fresh produce growers and farmers market managers knowledgeable in using food safety principles and practices (taught through "Enhancing the safety of locally grown produce)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	62	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As produce consumption has increased, so have foodborne disease outbreaks associated with fresh produce. Local and/or organic small to medium farms that sell directly to consumers often do not have the resources to develop Good Agricultural Practices (GAP) plans to address food safety. Additionally, these groups have less access to food safety education and training, indicating a need for food safety training to ensure the use of ?best practices? on small farms and in markets to reduce liability and enhance safety of locally grown produce.

Between 2007 and 2009, the state of Virginia averaged 21 foodborne outbreaks per year resulting in an average of 400 confirmed cases (sick individuals) per year. For each confirmed case there are an estimated 20-38 unconfirmed cases therefore approximately 8,000 to 15,200 Virginians suffered from foodborne illness in each of those years. The overall cost to the public is high. The estimated economic cost of foodborne illness is approximately \$77.7 billion dollars per year, or \$1626 per foodborne illness case. The estimated economic loss from foodborne illness in Virginia during those years may be between 13 and 25 million dollars per year.

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What has been done

The USDA funded project ?Enhancing the Safety of Locally Grown Produce Through Research and Extension, a multi-state research and Extension Project? under the direction of Virginia Tech addresses this issue. Curriculum packages were developed and 25 Extension Agents in Virginia were trained to deliver and evaluate the ?Enhancing the Safety of Locally Grown Produce? curriculum.

In six (6) counties, ?Enhancing the Safety of Locally Grown Produce? was offered through Extension agents. In 2012, fifty-six (56) produce growers and six (6) farmers? market managers were trained.

Results

Small direct market farmers and farmers? market managers were evaluated to determine the knowledge and intended behavior changes of participants. Of those who completed evaluations, 98% increased their knowledge of food safety practices.

The following percentage of small direct market farmers reported intending to make the following improvements on their farm as a result of the workshop:

?36% Provide more training for workers

?12% Improve water used for irrigation

?27% Improve hand washing and toilet facilities for workers

?53% Improve cleaning and sanitizing methods on the farm or packing house

?50% Make improvements in cleanliness and conditions used for transport to point of sale

?50% Monitor storage temperatures

The following percentage of farmers? market managers reported intending to make the following improvements on their farm as a result of the workshop:

?67% Enhance training / certification requirements for vendors

?50% Ask questions of vendors about how produce is grown / handled before arriving at market.

?25% Improve hand washing and toilet facilities

?0% Switch to containers that can be cleaned and sanitized

?33% Make improvements to cleaning and sanitizing methods at the market

?17% Monitor storage or holding temperatures

It is conservatively estimated that if one case of foodborne illness is prevented per risk reducing behavior incorporated by farmers and market managers, it translates into a potential annual savings of approximately \$226,014 for the state of Virginia.

4. Associated Knowledge Areas

KA Code Knowledge Area

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

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Outcome #6

1. Outcome Measures

Increase in number of Virginia fresh produce growers knowledgable or certified in Good Agricultural Practices (GAPs).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	550

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food safety in the fresh fruit and vegetable industry continues to be at the forefront of the American consumer. With the passage of the Food Safety Modernization Act of 2010, growers have become even more aware of the importance and emphasis being placed on food safety. What was first offered to growers as a voluntary compliance to requirements as requested by buyers will now become a mandatory requirement within the next year mandated by the US Food and Drug Administration. These implications will mean that growers and producers of fruits and vegetables will be doing business in a new and different way. By virtue of voluntary participation, many Virginia growers find themselves ahead of the upcoming mandates. A program developed and administered by Virginia Cooperative Extension agents to help train growers and agribusiness industries affiliated with the state?s fresh produce industry has allowed these growers to be successful in preparing their farms for third party food safety audits. At the same time, the programming materials and methods of delivery have been used repeatedly and refined so that future participants will be able to benefit and share in the successes of those first growers and educators who pioneered the training system. By offering farm based food safety education and preparation to farms of all sizes and growers of all backgrounds. Virginia?s farm based food safety program has gained notoriety from the entire Southeastern United States.

What has been done

The first GAP-GHP audit checklist issued by USDA had no information as to what was expected of a grower in order to satisfy the list of audit requirements. A distinct need for help and training materials was evident. When requests from growers to help with achieving their certifications began to be received, the first training materials were developed by agents based solely on the checklist along with practices- both good and bad- observed being practiced on various farms. As information became more available, a need for a method to organize the farm plan into a manageable document was evident. A food safety plan of action manual was developed to

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include all the items required for the farm audit.

The Virginia farm based food safety initiative continues to develop. Items that have been initiated and continue to be effective are:

- 1. Training sessions for growers and producers.
- 2. Train-the-trainer sessions for agents.
- 3. One-on-one farm visits to conduct mock audits.
- 4. Farm to farm visits by growers
- 5. Scheduled farm audits.
- 6.Cost share grants to offset audit expenses.
- 7. Virginia Fresh Produce Safety Team to oversee food safety efforts
- 8. Coordinated documentation
- 9. Website, standard operating procedure examples, and electronic worksheets
- 10. Publications related to fresh produce food safety

Results

Over 550 individuals representing in excess of 250 farms and agribusinesses in Virginia and surrounding states have participated in training sessions and workshops sponsored and taught by VCE agents. Of the Virginia farms trained, approximately 15% have requested and passed third party audits- a 100% pass rate of those farms requesting!

From 2008 to 2012, the number of Virginia farms who were listed on the USDA database as having passed a USDA third party audit increased from 6 farms to 64 farms- a 10x increase. Of this number, 53 farms (82.8%) had participated in programs sponsored through VCE.

Growers have had a lot to say about their experiences and successes with the food safety trainings:

?Awesome! We were able to be here at the Maple Hill Farm that just went through GAP. That was priceless! Also extension team work is fabulous with support! Very impressed.? A participant in the GO GAP program held in Albemarle County, VA.

?If it had not been for agents helping with GAP he would have reduced acreage from 140 to less than 20.? David Mann, Mann Farms, Ft. Blackmore, VA.

?Your visit to our farm to help us prepare for GAP audit will make a difference in this year?s bottom line of over \$300,000.? Robert Dodd, Dodd?s Acres, Mechanicsville, VA.

?Our orchard has sold out of apples this year. Now I have to call and turn down a new order of 4000 bushels of GAP certified apples that I don?t have.? Ricky Berrier, Berrier Orchards, Cana, VA.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from
7 1 1	Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
/ 12	Naturally Occurring Toxins

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Outcome #7

1. Outcome Measures

Creation of a new workshop on preventive controls offered to Virginia food industry

2. Associated Institution Types

1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	10	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 2011 Food Safety Modernization Act requires a number of sweeping changes to food safety management for firms who produce or manufacture FDA-regulated products. This represents the majority of foods in the U.S. Two very significant regulations required by FSMA are related to fresh produce food safety and preventive controls for food manufacturing. This workshop was developed to address the latter.

What has been done

We developed a new workshop on preventive controls for food safety and offered it to the Virginia food industry. The workshop included the following topics: Overview of the Food Safety Modernization Act, Food Laws, Regulations, and Regulatory Agencies, Preventive Controls, HACCP-based approaches, Pertinent Foodborne Hazards, and Guidance on Preparing for Future FSMA-related Regulations. The workshop consisted of 16 hours of instruction and was offered in Richmond.

Results

Ten Virginia food companies were trained in preventive controls for food safety. For each of these companies, this was their first training on FSMA and related requirements. These companies are now a core of processors who are aware of needed changes and are assisting us in engaging the food industry in Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from
7 1 1	Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and

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Naturally Occurring Toxins

Outcome #8

1. Outcome Measures

Salmonella Rebound Study Recommends Uninterrupted Cold-chain for Produce Safety

2. Associated Institution Types

1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Produce contaminted with foodborne pathognes has caused numerous foodborne disease outbreaks in the U.S. Since field contamitation is not entirely preventable, postharvest washing of raw produce has been recognized as a significant treatment that can reduce contamination loads on prodouce. Currently, industry washes produce prior to packing to ensure product cleanliness and maketability. Cold storage subsequent to washing, although applied to protect freshness, is not considered a food safety mandate throughout distribution. Since foodborne pathogens have the capability to survive and/or multiple on produce, it is necessary to understand the rebound potential of Salmonella population and its prevention on washed produce.

What has been done

Scientists at Virginia State University studied how spray washing on rollers or revolving brushes influences Salmonella rebound on jalapeño peppers and roma tomatoes. The study discovered significant rebound of Salmonella populations on both washed and non-washed fruit surfaces in humid storage. Furthermore the study demonstrated that storage at ≤10 oC (or ≤50 oF) are adequate for preventing the rebound, whereas leaving washed produce at ≥21 oC (or ≥70 oF) in humid storage or ripening may erase the decontamination impact from prior washing. The finding highlights the benefit of unbroken cold-chain systems from the farm to the dinner table in produce safety practices, especially under moist storage conditions.

Results

The study report was published in a peer reviewed journal (Foodborne Pathogens and Disease, 2012, Volume 9, Page 361-366; Article title: Salmonella Population Rebound and Its Prevention on Spray Washed and Non-washed Jalapeño Peppers and Roma Tomatoes in Humid Storage) to support industry-wide risk assessment and control. The report was used by leading produce magazines ?The Packer? and ?Fresh Cut? to generate timely communications for their industry

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subscribers and Internet postings for all stakeholders at http://www.thepacker.com/fruit-vegetable-news/Study-shows-safety-benefits-of-washing-cold-storage-147016525.html and http://freshcut.com/enews/2012/5_MAY_2012/WEB_FC_MAY_2012.html, respectively. Other news groups, including The Grower, Vegetable Grower News, and Food Production Daily, also publicized the study. Two graduate students and eight dietetic interns participated in this laboratory study at VSU to help combat foodborne illness caused by Salmonella.

4. Associated Knowledge Areas

KA Code Knowledge Area

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

In anticipation of the newlies announced FSMA regulations related to fresh produce food safety and preventive controls, several new outcomes were added. Specialists and researchers across Virginia quickly created new traiing opportunities to help keep Virginia companies and producers abreast of new changes and current in best practices.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

To answer the question of whether each of these programs was effective, evaluation of programs was done to determine knowledge gain, intent to change behavior and in some cases interview to determine impact of programs. To determine knowledge gain and intent to change behavior, pre-post tests or post/then/pre evaluation tools were used. in some cases, follow up 6-9 month surveys were sent out to determine changes that have been implemented since the training.

Using an economic model, we have also been able to extrapolate the number of dollars saved in illness, hospitalization, lost wages etc... as a result of preventing foodborne illness.

Key Items of Evaluation

• Of the food handlers that have been trained through Extension, over 97% adopted new practices into thier food handling. These new practices include improving behaviors related to the greatest risk factors associated with foodborne illness (time/temperature control.

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personal hygeine and cross contamination).

- 132 pressure canner dial gauges were tested to be inaccurate and Extension recommneded that those gauges be replace to ensure safe canning and prevention of botulism. If one case of botulism was prevented through dial gauge replacement ove 177 million dollars could have been saved from the state of VA.
- Of the Virginia farms trained in GAPs, approximately 15% decided that it was beneficial for them to pass the third party audit required to become certified- with Extensions help, we have a 100% pass rate of those farms requesting!

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V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Global Food Security and Hunger - Agricultural Systems

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%	10%	10%	0%
111	Conservation and Efficient Use of Water	10%	10%	10%	0%
112	Watershed Protection and Management	10%	10%	10%	0%
131	Alternative Uses of Land	10%	10%	10%	0%
205	Plant Management Systems	10%	10%	10%	0%
307	Animal Management Systems	10%	10%	10%	0%
402	Engineering Systems and Equipment	10%	10%	10%	0%
403	Waste Disposal, Recycling, and Reuse	10%	10%	10%	0%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	0%
605	Natural Resource and Environmental Economics	10%	10%	10%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Voor: 2042	Extension		Research		
Year: 2012	1862	1890	1862	1890	
Plan	21.9	5.0	18.4	0.0	
Actual Paid Professional	22.8	3.5	26.0	0.0	
Actual Volunteer	376.0	0.0	0.0	0.0	

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

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Extension		Research		
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
473758	212446	474101		0
1862 Matching	1890 Matching	1862 Matching	1890 Matching	
670306	318782	1066169		0
1862 All Other	1890 All Other	1862 All Other	1890 All Other	
1989365	298907	2406485		0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research experiments that educate and solve applied problems, establish partnerships to identify needs and develop solutions, conduct workshops, both traditional procedures and hands-on, and meetings to provide training for farmers and educators, organize and conduct state and regional conferences, establish on-farm demonstrations, develop enterprise budgets, develop products, curriculum, and resources for use by educators and directly by producers, and conduct assessments as needed to evaluate progress

2. Brief description of the target audience

Commercial producers, 4-H youth, Master Gardeners, state and federal agency personnel, Extension educators, policy makers, consumers and supermarket chain store buyers.

3. How was eXtension used?

Specialists and agents participated in multiple communities of practice, including Corn and Soybean.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	95597	92281	28452	1820

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

Year: 2012 Actual: 0

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Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	31	40	71

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of agriculture systems educator training workshops.

Year	Actual
2012	9

Output #2

Output Measure

• Number of agriculture systems field research experiments

Year	Actual
2012	45

Output #3

Output Measure

• Number of agriculture systems on-farm demonstrations

Year	Actual
2012	45

Output #4

Output Measure

• Number of agriculture systems producer training workshops

Year	Actual
2012	203

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Output #5

Output Measure

• Number of existing and future nutrient management planners and educators trained

Year	Actual
2012	147

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent increase in gross income from agriculture attributable to extension efforts.
2	Increase in farms and acres subject to organic management due to extension programming efforts which will increase overall profitability of organic agriculture (total annual sales).
3	Increase in the amount of agricultural land under best management practices due to extension programming efforts.
4	Increase in the number of individuals improving water quality and reducing erosion through participation in an advanced grazing system program.
5	Increase in the number of nutrient management plans, resulting in more efficient utilization of nutrients, and in the number of plan writers trained by Extension.
6	Increase the profitability (total annual sales) of small, part-time and limited resource farmers through sustainable production of specialty agriculture crops and livestock products.

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Outcome #1

1. Outcome Measures

Percent increase in gross income from agriculture attributable to extension efforts.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improved financial security of individuals, families, and agricultural businesses is critical for the long-term economic health of Virginia. Profitable and successful farms and small businesses are the cornerstone of robust families and the communities in which they live. Crop and livestock producers need to balance farm and feed resources to maximize profits.

What has been done

Agents and specialists conducted on-farm demonstrations, field days, and workshops that demonstrated profitable practices to producers. Crop variety and management evaluations, profitable dairy production strategies meetings, beef production programs, and many other specialty crop and animal production meetings and demonstrations were held.

Results

Agricultural profitability increased slightly in Virginia last year, due to slightly higher commodity prices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

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205	Plant Management Systems
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Increase in farms and acres subject to organic management due to extension programming efforts which will increase overall profitability of organic agriculture (total annual sales).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	450000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Organically raised products often garner a premium from consumers, enhancing producer's profitability.

What has been done

Meetings, demonstrations, and a large conference, the Virginia Biological Farming Conference were used to educate and teach the process of organic production.

Results

Farmers, USDA agriculture professionals, representatives from non-government organizations and youth attended the conference and meetings. Virginia producers reported organic sales equal to about one percent of all U.S. organic sales.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil Plant Water Nutrient Relationships

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112 Watershed Protection and Management

205 Plant Management Systems

Outcome #3

1. Outcome Measures

Increase in the amount of agricultural land under best management practices due to extension programming efforts.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	600000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Approximately 25 percent of Virginia's land area is used for some kind of agricultural activity and these activities can be the source of nutrients and sediment pollution. Best management practices (BMPs) reduce these losses and improve water and ecosystem quality.

What has been done

Virginia's five priority agricultural conservation practices have been, and will continue to be, a focus for additional reductions. These include:

- * Nutrient Management Planning
- * Cover Crops
- * Conservation Tillage
- * Riparian Buffers
- * Livestock Exclusion

Results

To date more than 600,000 acres of agricultural land is managed using BMPs that support many positive ecosystem services and protect water quality in the Chesapeake Bay. Agricultural clients statewide depend on VCE to provide information about benefits and implementation of these BMPs.

4. Associated Knowledge Areas

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KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

Increase in the number of individuals improving water quality and reducing erosion through participation in an advanced grazing system program.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	300	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Grazing animals make up a large portion of Virginia's agricultural income and their management affects millions of acres. Water quality can be negatively impacted by poor grazing practices and overgrazing.

What has been done

Conferences, short courses, regional meetings and other trainings have been conducted to demonstrate the economic and environmental advantages of advanced grazing systems.

Results

Additional fencing and advanced grazing techniques have been implemented.

4. Associated Knowledge Areas

KA Code Knowledge Area

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102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
205	Plant Management Systems
307	Animal Management Systems

Outcome #5

1. Outcome Measures

Increase in the number of nutrient management plans, resulting in more efficient utilization of nutrients, and in the number of plan writers trained by Extension.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	300000	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All large animal feeding operations in Virginia, biosolids applicators and many farms that receive cost share money, are required to have nutrient management plans.

What has been done

Twice a year we conduct a two day science-based training on soils and crop production that the planners undergo before taking the nutrient management exam. We also do the Phosphorus Index component of the three day session organized by the Department of Conservation and Recreation.

Results

This year we trained a total of 35 new nutrient management planners. These planners and those certified in previous years wrote over 300,000 acres of nutrient management plans for permitted farms this year.

4. Associated Knowledge Areas

KA Code	Knowledge Area		
102	Soil, Plant, Water, Nutrient Relationships		

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112	Watershed Protection and Management
205	Plant Management Systems
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

Increase the profitability (total annual sales) of small, part-time and limited resource farmers through sustainable production of specialty agriculture crops and livestock products.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improved financial security of individuals, families, and agricultural businesses is critical for the long-term economic health of Virginia. Profitable and successful farms and small businesses are the cornerstone of robust families and the communities in which they live. Producers need to balance farm resources and purchased inputs to maximize profits. Many small farmers in Virginia are growing niche market crops. They are selling these crops at farmers markets to maximize net revenue per acre compared to growing commodity crops (e.g. corn, wheat, soybeans) whose prices are determined on world markets. Since niche market crops are grown on limited acres in the nation, it is extremely difficult to find enterprise budgets for these crops.

What has been done

Enterprise budgets for niche market crops such as blue berries, black berries, straw berries, raspberries, water melons, cantaloupes, okra, baby lima beans, cut flowers fresh market tomatoes and sweet corn, and bell peppers, black turtle beans, goat production and brown eggs were aggregated and budgets were sent to Agriculture Management Agents in the Small Farm Outreach Program at VSU

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Results

Producers gained knowledge to determine breakeven costs for niche market crops grown on their small farms. Then the producers were able to set sales prices that were greater than their costs of production and determine net profit for each crop grown. Consequently, producers will be able to determine the optimal acreage of crops to be grown that would maximize profitability their farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Weather extremes affect all facets of production agriculture. The extent of of this impact depends of the severity of the weather events. The overall slow economic growth may reduce opportunites for lending and investment in agriculture. Higher input costs for crops and livestock may reduce opportunities for profits.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

(No Data Entered)

Key Items of Evaluation

{No Data Entered}

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V(A). Planned Program (Summary)

Program #8

1. Name of the Planned Program

Global Food Security and Hunger - Animal and Animal Products

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	15%	15%	15%	15%
302	Nutrient Utilization in Animals	15%	15%	15%	15%
303	Genetic Improvement of Animals	10%	10%	10%	10%
305	Animal Physiological Processes	10%	10%	10%	10%
307	Animal Management Systems	20%	20%	20%	20%
308	Improved Animal Products (Before Harvest)	10%	10%	10%	10%
311	Animal Diseases	10%	10%	10%	10%
315	Animal Welfare/Well-Being and Protection	10%	10%	10%	10%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Exter	nsion	Rese	earch
rear: 2012	1862	1890	1862	1890
Plan	26.9	1.8	28.8	4.0
Actual Paid Professional	25.6	3.5	29.2	0.0
Actual Volunteer	822.0	0.0	0.0	0.0

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

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Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
34665	207518	531918	781313
1862 Matching	1890 Matching	1862 Matching	1890 Matching
752050	302851	1196190	801635
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2231970	0	5872968	13956

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research experiments, conduct workshops, meetings, trainings, develop publications, curriculum, resources, provide consultation, leadership, facilitation, partner with industry, and conduct needs assessment and impact.

2. Brief description of the target audience

The target audience includes animal owners, youth, Extension educators, allied industry personnel, consumers, policy-makers, and academic colleagues.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	58933	89821	25961	4670

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

Year: 2012 Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

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	2012	Extension	Research	Total
Ī	Actual	15	81	96

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

 Number of animals and animal products educational meetings, workshops, conferences, training sessions, and field days

Year	Actual
2012	1082

Output #2

Output Measure

 Number of animals and animal products fact sheets, publications, newsletters, and other print resources

Year	Actual
2012	706

Output #3

Output Measure

• Number of animal and animal products web sites, applications, and modules

Year	Actual
2012	184

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent increase in beef cattle marketed through value-added programs
2	Number of additional beef producers trained and certified for quality assurance/best management practices
3	Number of dairy herds improving milk quality by culturing quarter milk samples and implementing mastitis control procedures.
4	Number of swine producers receiving continuing education credit for best management practices
5	Number of youth adopting best practices related to animal agriculture through youth animal projects and events
6	Number of program participants acquiring knowledge on best management practices related to equine.
7	Percent increase in freshwater shrimp production by Virginia farmers utilizing best management practices
8	Percent increase in sales of pond raised fish due to adoption of best management practices.
9	Increased fish production via recirculating aquaculture system (RAS) and pond production techniques through innovative research and dissemination and application of results through VCE programming to producers.
10	Number of individuals who gain knowledge to improve small ruminant production.
11	Number of commercial poultry growers adopting biosecurity practices to lower the risk of disease transmission
12	Acclerated lambing of hair sheep
13	Survey of management and deworming practices on mid-Atlantic alpaca farms

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Outcome #1

1. Outcome Measures

Percent increase in beef cattle marketed through value-added programs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adding value to Virginia's beef cattle operations is critical to sustainability of Virginia agriculture and rural communities. Adopting improved health, management, and marketing practices for Virginia feeder cattle adds value to the Commonwealth's second largest agricultural commodity.

What has been done

Extension Specialists partnered with the Virginia Cattlemen's Association to develop and implement this program which encourages the use of scientifically based cattle health and management procedures for feeder cattle.

The VQA program is a cooperative effort among VCE, the Virginia Cattlemen's Association, VDACS, VMRCVM, and producer organizations. Producers that handle their cattle in this manner are eligible to market their calves through the VQA certified feeder cattle program.

Results

In 2012, a total 9,380 calves were marketed through the VQA program. Producers received a premium of \$74 per calf resulting in \$694,120 of additional income for Virginia beef producers. Since 1997, producers have marketed over 127,000 head of feeder cattle resulting in \$4.9 million in value-added income.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

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Outcome #2

1. Outcome Measures

Number of additional beef producers trained and certified for quality assurance/best management practices

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	780

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

US consumers are very concerned about the saety and wholesomeness of the food they eat. If beef is to be safe so as to be competitive with other food choices producers must make choices at the farm level based on scientific knowledge and a commitment to produce a quality product.

What has been done

The Virginia Beef Quality Assurance Program educates and certifies beef producers in best management practices that improve the safety and quality of beef. \$16,800 was secured to carry out the training efforts from the Virginia Beef Industry Council. Agents throughout Virginia have conducted training and demonstrations and

have invited producers to make a commitment to conducting their operations in such a manner that quality beef is produced.

Results

The total number of certified producers in Virginia stands at over 4000 which makes Virginia one of the national leaders in BQA activities. During 2010 there were 780 producers either certified or re-certified. These producers came from 50 counties and two surrounding states. We estimate that the certified producers represent over half of the cattle produced in Virginia. Added value of cattle produced on BQA certified farms is estimated to be \$1.5 to \$2.0 million annually.

4. Associated Knowledge Areas

KA Code Knowledge Area

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307 Animal Management Systems

308 Improved Animal Products (Before Harvest)

Outcome #3

1. Outcome Measures

Number of dairy herds improving milk quality by culturing quarter milk samples and implementing mastitis control procedures.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	47

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Clinical mastitis in dairy cows is often treated with an intramammary antibiotic preparation. However, some

types of mastitis do not respond well to antibiotic therapy and for other types of mastitis, antibiotic therapy is

not recommended. Therefore, many producers will send milk samples to a local laboratory for culture prior to

treatment initiation. However, results are typically not received for 2-3 days, at which point the producer will have

already initiated treatment. In response, researched have examined the use of on-farm culture systems whereby

dairy producers can collect milk samples, culture the samples on-site and treat the cow 24 hours later according

to these results (culture-based). The research suggests no ill-effects to the cow when treatment initiation starts

24 hours after the onset of clinical signs and the use of antibiotics can be cut in half. However, dairy producers

must receive training before implementing such a program on-farm and no formal training had been previously

available in VA.

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What has been done

In response to this need, I developed a two-day workshop whereby dairy producers would aseptically collect milk

samples from clinical mastitis samples on their farm. These samples were frozen until the time of the workshop

but under normal circumstances they would be cultured immediately. On the first day of this workshop, the

producers learned about the culture system, the medias involved, the importance of culture, how to culture and

then streaked out their own milk samples onto plates provided. These plates were then incubated overnight

as they would on-farm. The following day (day two of the workshop), the producers met and we discussed and

interpreted the results and then also discussed potential treatment options, based on recommendations from Dr.

John Currin from the veterinary school.

Results

This workshop was held twice in 2012, reaching a total of 11 producers. The evaluations from the workshops

suggested the workshops should be held again, all 11 said they would recommend it to their peers and all 11

said they gained significant knowledge regarding milk culturing. After a follow-up 3 months later, 10 of the 11 had

implemented this on-farm. One producer volunteered that they had cut their antibiotic use in half, also saving 50%

of treatment costs by implementing this program. They estimated this savings to be over \$2000 annually.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #4

1. Outcome Measures

Number of swine producers receiving continuing education credit for best management practices

2. Associated Institution Types

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- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	186

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pork producers who raise or sell market hogs to packers with process verified systems must be trained as certified Pork Quality Assured Plus (PQA-Plus) producers and producer-transporters must be Transport Quality Assurance (TQA) certified. The Extension Swine faculty lead programs to allow producers to be trained and certified directly, and train-the-trainer programs to expand delivery of the programs. In addition the need for technical and educational niche market and small farm pork production is growing.

What has been done

Educational seminars were developed and delivered at multiple locations throughout the state to provide certification programs for PQA-Plus and TQA certification and individual sessions were held for new trainer certification. In addition to the traditional commercial pork production conference, a special conference directed at niche market pork producers was developed and delivered.

Results

Twenty nine producers received certification or recertification in PQA-Plus and TQA training; and a new PQA-Plus trainer was certified to deliver certification training in a commercial pork production company. In addition to the annual pork production conference that reached 121 persons addressing critical issues related to swine health, bio-security and environmental protection, a special pork conference was held that reached 35 new clientele. These producers learned new information that will support production of safe, wholesome pork products for non-traditional market channels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

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Outcome #5

1. Outcome Measures

Number of youth adopting best practices related to animal agriculture through youth animal projects and events

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	32134

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Livestock projects (beef, sheep, swine, dairy, equine, and poultry) and educational events provide a vehicle for educating youth about the importance of animal agriculture to society and are instrumental in developing life skills in youth. Participation in youth livestock projects serves as a foundation for stimulating career choices in agriculture, and provides a vehicle for the dissemination of knowledge to the public.

What has been done

Training of youth occurs locally by Extension agents, volunteer 4-H leaders, and agriculture educators. State contests are coordinated by campus-based Extension specialist faculty with assistance from Extension agents, volunteers, and agriculture educators. Comprehensive competitions are held at the state level for youth age 9-19. In these events, youth are asked to evaluate animal quality, identify items, rank groups of items, perform calculations, and justify their decisions to others and to demonstrate their handling skills with their livestock projects. In 2012, the first stockmen?s camp was held. Seventy youth and adults participated. A high percentage of attendees strongly agreed that their knowledge of the livestock industry, as measured by several different factors by a post-attendance survey, was improved by attending the camp.

Results

Youth participation in animal projects and embryology totaled 27,855 in 2012. 4,279 youth participated in state-level livestock and equine contests. The ability to observe and evaluate, ability to make decisions, and communication skills were enhanced by the students' participation in these events. The State 4H Horse Judging Team finished in the top five teams at all contests. They were second at Arabian Nationals (with high individual) and second at Eastern Nationals. The state 4H Skillathon team won the national contest at the NAILE. The state 4-H Livestock Judging team finished eighth at the national contest and the 2011 team represented the United

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States at the Royal Highland Show in Scotland and placed 2nd in Beef and 3rd in Sheep. Youth livestock members showed and sold over 3880 project animals at the various show and sale events held throughout the state and received sales proceeds in excess of \$1.7 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #6

1. Outcome Measures

Number of program participants acquiring knowledge on best management practices related to equine.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia?s horse industry has an estimated \$1.2 billion impact on the state?s economy, and horses are the 8th largest agricultural commodity in the Commonwealth. Also, Virginia horse owners spend \$926 million annually and support over 16,000 full-time jobs in the areas of racing, showing, recreation, breeding and other industry activities.

What has been done

Across the state, over a dozen one-day programs and separate presentations addressing topics of pasture management were delivered at various Virginia Cooperative Extension, Agricultural Research and Extension Center, and horse industry events. Additionally, on-site visits were conducted to discuss specific problems and issues of concern to farm owners. Speakers from academic institutions, veterinary practice, and horse industry professionals covered such topics

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as hay and forages, large animal mortality composting, health, nutrition and economics.

Results

Over 1000 Virginia youth and adults attended the various programs and presentations. In several cases, extension agents later conducted on-site farm visits with participants who took a more active interest in adopting best management practices at their operation. Finally, over 100 first responders, veterinarians, and horse owners were educated on emergency preparedness and disaster planning.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Percent increase in freshwater shrimp production by Virginia farmers utilizing best management practices

2. Associated Institution Types

• 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A sustainable alternative agriculture enterprise is needed to stimulate rural economic conditions in Southside Virginia.

What has been done

Best management guidelines were distributed to interested farmers. Site checks were conducted for new producers. Assistance was provided to freshwater shrimp nurseries in Virginia. Four regional workshops, educational displays including the Virginia State Fair and two field days were held to promote best management practices for shrimp farming. Assistance was provided during the labor intensive juvenile stocking period. Shrimp farm tours were conducted, Best Aquaculture Practices Education was provided to members of the Virginia AquaFarmers Network. Value-added alternatives to day-of-harvest sales were explored. Enhanced fertilization pond

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production demonstration was conducted at Virginia State University's Randolph Farm. Media promoted shrimp farming. Extension continued to provide support to two shrimp grant proposals. Furthermore, baseline value-added post-harvest processing techniques were developed and evaluated with a processor in Hampton, Virginia. Web based marketing of frozen shrimp has been initiated.

Results

Freshwater shrimp pond production continues to expand and has been shown to be a viable alternative agriculture operation stimulating rural economies throughout the Commonwealth. Target production for 2012 was: 500,000 juveniles stocked; >20,000 lbs produced; value = \$200,000. Actual results for 2012 were 450,000 juveniles produced at two nurseries and distributed (value \$45,000) primarily to growers in the tobacco growing counties of Southside VA; 12,500 lbs harvested; approximately 70% sold at an average price of \$10.00/lb for a total value of \$93,750; remainder frozen and processed before IQF and future sale during months until next harvest. Gross revenue from sales of frozen shrimp is estimated at \$37,500. Expansion may be impacted by economic conditions. Some growth is expected next year as operations expand and new producers start pond construction. New market promotions were conducted with shrimp boils and wine/shrimp festivals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #8

1. Outcome Measures

Percent increase in sales of pond raised fish due to adoption of best management practices.

2. Associated Institution Types

• 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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Adopting best management practices (BMP) for fish production will increase production level, protect aquatic environments and reduce losses due to poor water quality and diseases. BMPs are being developed to avoid adulterated products with antibiotic and pesticide residues. HACCP training by VAN is critical to achieve a safe consumer product. Virginia AquaFarmers Network (VAN) wants BMPs and HACCP as part of their overall production strategy to make their organization successful.

What has been done

A list of preliminary BMPs for Cage production was given to VAN for their review and possible acceptance. Two workshops and a two-day Aquaculture Forum: Growing Fish in Cages were given in 2012 that covered BMPs for cage production and handling post harvest product. Three workshops that showed pond owner?s how to improved water quality were conducted at the County Level. These workshops also covered feed management, water quality and fish health. Technical Assistance was provided to develop HACCP plans for processing fish and to test fish for presents of anithiotics.

Results

VAN and other fish farmers have taken HACCP training. VAN is now selling in Farmers Markets (Charlottesville and Williamsburg). This has resulted in a 25% increase in Catfish sales as well as trout and freshwater prawns. As the result of the Aquaculture Forum, 20% of the attendees plan to adopt cage aquaculture. Two workshops are planned for 2013 to increase farmer's awareness of BMPs especially water quality and food safety. Using antibiotic free fish will be useful marketing tool to increase sales in markets (Charlottesville and Williamsburg) that are concerned with adulterated products. This should increase sales by another 5% - 10%. VAN wants BMPs as part of their overall production strategy to make their organization successful. Farmers have increased stocking by more than 20% to meet previous year demand. Twenty percent of pond owners attending pond workshops would take actions to improve water quality for fish population.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #9

1. Outcome Measures

Increased fish production via recirculating aquaculture system (RAS) and pond production techniques through innovative research and dissemination and application of results through VCE programming to producers.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

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Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	167

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Aquaculture is, and has been the fastest growing sector of agriculture in the US for the past decade. Aquaculture has the potential to reduce our current 10 billion dollar national seafood trade deficit, enhance domestic seafood quality and safety, and can do so concurrently with revitalizing America?s rural agriculture sectors and coastal fishing communities.

What has been done

In Virginia, Extension faculty from VT and VSU have worked cooperatively to expand Virginia?s aquaculture production sector. This has been accomplished through numerous technical, marketing, value-added, Good Aquaculture Practice and subject-specific extension workshops, as well as field and technical onsite support at the producer level and faculty participation in producer grant submissions. Furthermore, industry requested research towards enhanced freshwater and marine shrimp and catfish production, identifying emerging marine species such as Cobia, Pompano, and Black Sea Bass, along with nutritional, biological and environmental optimization requirements, and production system optimization was conducted by VSU and VT Extension faculty and research facilities.

Results

In 2011, Virginia's finfish and crustacean production sectors increased by over \$300,000. These increases included expanded pond and RAS production of marine and freshwater shrimp, marine finfish such as Spot, Black Sea Bass, Cobia, Pompano and Flounder, and freshwater finfish including Hybrid Striped Bass and Tilapia. These expansion efforts continued into 2012, with major emphasis upon serving new aquaculture producer start-ups. Production numbers for 2012 are expected to add another \$200,000 on top of the \$300,000 from 2011, for a 2-year increase of over \$500,000 dollars in new revenues to producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area	
307	Animal Management Systems	
311	Animal Diseases	

Outcome #10

1. Outcome Measures

Number of individuals who gain knowledge to improve small ruminant production.

2. Associated Institution Types

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- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Small ruminants (sheep and goats) are a relevant component of rural economies in Virginia, with over 5,000 farms (>10%) having small ruminants as a part of their livestock enterprise.

What has been done

Many small ruminant farmers have livestock enterprises as a secondary income, or are new to the business. Therefore, there is a strong need for fundamental education which provides basic skills related to animal management, marketing, and business principles.

Results

In 2012, Virginia Cooperative Extension reached over 800 small ruminant producers through various educational workshops, field days, and activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #11

1. Outcome Measures

Number of commercial poultry growers adopting biosecurity practices to lower the risk of disease transmission

2. Associated Institution Types

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- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In Virginia, poultry and egg production contributed approximately \$1 billion to the economy in 2011, accounting for approximately 34% of all farm commodities. With the continuing threat of disease outbreak in the poultry industry, including widely recognized and publicized Avian Influenza (AI), the importance of biosecurity measures to prevent and limit disease spread are critical.

What has been done

A Biosecurity Audit Program was developed and is reviewed quarterly by the Virginia Poultry Disease Task Force with representatives from academia, industry, and regulatory agencies. As part of this program, commercial poultry producers in Virginia participate in biannual audits of their biosecurity practices. The external Biosecurity Audit team assesses all segments of live production for the commercial broiler, turkey, and egg producers in Virginia to identify biosecurity risks and opportunities for improvements in the control of disease outbreak or spread.

Results

In 2012, seven biosecurity audits were conducted of commercial poultry producers in Virginia. Middle management communicated that as a result of audit reports provided to each company, other company personnel and growers were educated on the identified biosecurity risks, corrective measures were taken by company personnel and growers, and awareness of biosecurity practices was increased. Audits performed this year also provided evidence that additional biosecurity practices and guidelines have been implemented in individual companies in response to suggestions and educational material provided. Since the audits were initiated, the average audit scores (percentage of maximum score achieved) of those companies participating every year have improved from 85% in 2004 to 97% in 2012.

4. Associated Knowledge Areas

KA Code Knowledge Area 311 Animal Diseases

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Outcome #12

1. Outcome Measures

Acclerated lambing of hair sheep

2. Associated Institution Types

• 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There has been a dramatic increase in the nontraditional lamb market, which now represents 48% of the 2.5 million lambs slaughtered annually. Hair sheep are well-suited to supply the ethnic, specialty, and niche markets for lamb now becoming more dominant. While the number of sheep declined by 0.5 million over the past 5 years, the number of farms increased by app. 10,000 during this period. This shift towards more small scale and low-input operations favors easy-care characteristics found in hair sheep. Seasonal breeding of sheep in temperate environments limits production. Increasing the frequency of lambing and shifting towards year-round production, utilizes facilities and labor more effectively, and takes advantage of favorable markets, which in turn will make lamb production more efficient and cost effective.

What has been done

Flocks of the Katahdin, Barbados Blackbelly and St. Croix hair sheep were established on Virginia State University?s Randolph Farm to evaluate the comparative performance of the breeds in forage-based production systems. The sheep were mated in 8-months intervals, rather than annually to evaluate their suitability for accelerated mating system in a mid-Atlantic environment. Ewes were exposed to rams of like breed in single-sire mating groups in November, July and March. Mating periods were selected to avoid breeding ewes during periods of deep seasonal anestrus (April through June). Ewes lambed unassisted on pasture, and lambs were weaned at 2 months of age. Data were collected over two production cycles (4 years).

Results

Pregnancy and lambing rates were higher for all breeds following November mating (>90%) during the peak of seasonal breeding, but also exceeded 80% in the other two mating periods (July and March). Pre-natal losses were limited (0-2%) except in Katahdin in the first July mating

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period (12%). The accelerated mating system produced an annual lamb crop of 2.36-2.77 lambs/ewe lambing depended on breed, with a production efficiency of 62-63% (weight of litter weaned as percentage ewe body weight). This represents an increase of 28-38% in annual lamb crop, and 20-22% increase in production efficiency compared to a once annual November mating. Production efficiency also increased from 43.1 to 47.0% from the first to the second two year cycle, suggesting no negative long-term effects of accelerated mating on ewe productivity. Data suggest that hair sheep are well-suited for accelerated mating under mid-Atlantic conditions, and can form the basis for a system of year-round production of lamb. The results indicate that selected hair sheep breed can be managed in an accelerated mating system that uses facilities and resources more efficiently, enhances production, and allows for year-round production of lamb to supply lucrative seasonal markets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals

Outcome #13

1. Outcome Measures

Survey of management and deworming practices on mid-Atlantic alpaca farms

2. Associated Institution Types

• 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The alpaca industry in the U.S. has exponentially grown, and Virginia currently has about 500 breeders with 7500 registered alpacas. However, there is limited research-based information on appropriate management practices applicable to the environmental conditions of the mid-Atlantic region. Gastrointestinal parasites are a major concern for small ruminant producers in this region, and anthelmintic resistance is widespread on sheep and goat farms in Virginia and Southeastern United States. Information is needed on current deworming practices and the incidence of anthelmintic resistance on alpaca farms to help device appropriate management practices for alpaca breeders.

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What has been done

On-farm surveying/testing was conducted to document management and deworming practices on Virginia alpaca farms, and determine evidence of anthelmintic resistance in the herds. Twenty-four on-farm surveys were completed in late spring and summer of 2010 and 2011. The survey identified herd demographics, general herd health management, and current deworming practices. Fecal samples were collected from a minimum of 8 and maximum of 39 alpacas on each farm. Farm visits were timed with scheduled deworming on each farm and fecal egg count reduction tests were conducted when 8 or more alpacas on a farm had strongylid eggs counts exceeding 10 eggs/g to determine the presence of dewormer resistance in strongylid parasites.

Results

Fifty-eight percent of breeders considered parasitism of moderate concern (14/24), while 5/24 considered it a severe problem, 2/24 thought is was of low importance and 3/24 were not sure about the impact. Breeders judged the impact of parasitism on their own farm as follows: less severe 29% (7/24), the same 50% (12/24), or more severe 21% (5/24); while judging their own knowledge in this area as: very good 25% (6/24), adequate 67% (16/24), or rudimentary 8% (2/24). All farms had done some form of fecal testing before. Seventy-five percent of farm of farms routinely dewormed their herd, while 25% used on-demand worming. Most dewormers had been in use since inception of the operation, and the routine deworming interval ranged from 4 to 6 weeks. Dewormer schedules were described as pre-set on 25% (6/24) and as needed on another 25% (6/24) farms, while 50% (12/24) used a combination of both. Fecal egg counts (6/17), visual assessment of animals (1/17) and a combination of the two (10/17 were used to determine as-needed use. Fecal egg count reduction tests were conducted at 16 locations that satisfied minimum sampling requirements. In all cases reduction of initial egg counts were less than 90%, and indicated widespread resistance in strongylid parasites to a number of anthelmintics, especially marcocyclic lactones, in mid-Atlantic alpaca herds. Together with indications of alpacas dying from haemonchosus, there is a need to re-evaluate deworming practices for alpacas.

4. Associated Knowledge Areas

KA Code Knowledge Area 311 Animal Diseases

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)
- Other (land values near urban areas)

Brief Explanation

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Specific external factors have impacted the state defined outcomes, in particular those related to the livestock sector. A combination of high input costs and other economic factors have resulted in a decrease in cattle numbers similar to other regions of the country. Outcomes measures based on quantification statistics are impacted by number of cattle and number of producers raising cattle accordingly.

Additionally, increased focus on issues surrounding the environment and regulartory items with the Chesapeake Bay Watershed have shifted local programming in some instances away from outcomes measured in Animal/Animal Products to those more appropriately measured in Ag Sytems and/or Climate Change/Natural Resources.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

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V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Global Food Security and Hunger - Biotechnology and Genomics

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	0%	0%	10%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	30%	90%
202	Plant Genetic Resources	0%	0%	20%	10%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	15%	0%
212	Pathogens and Nematodes Affecting Plants	0%	0%	10%	0%
304	Animal Genome	0%	0%	15%	0%
	Total	0%	0%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Exter	nsion	Research		
1ear: 2012	1862	1890	1862	1890	
Plan	0.9	0.0	6.0	1.0	
Actual Paid Professional	0.0	0.0	6.3	0.0	
Actual Volunteer	7.0	0.0	0.0	0.0	

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

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Exte	ension	Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	144338	102245
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	205333	104904
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	3835772	83115

V(D). Planned Program (Activity)

1. Brief description of the Activity

Processes of research studies, dissemination of research results, papers and citations, commercialization of techniques and products, conduct research experiments, conduct workshops, meetings, develop products, resources, work with media and establish and sustain partnerships.

2. Brief description of the target audience

Research scientists, government officials, high school teachers, general public

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

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2012	Extension	Research	Total
Actual	0	9	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of biotechnology and genomics research projects in program areas

Year	Actual
2012	7

Output #2

Output Measure

• Number of peer reviewed biotechnology and genomics research papers published

Year	Actual
2012	8

Output #3

Output Measure

• Number of biotechnology and genomics presentations

Year	Actual
2012	11

Output #4

Output Measure

Number of non-peer-reviewed biotechnology and genomics publications
 Not reporting on this Output for this Annual Report

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of projects addressing genetic improvement of aquaculture stocks
2	Number of projects to reduce impact of biotic and abiotic factors on food security
3	Number of projects to improve quality of food crop plants through genetic and metabolomic research
4	Projects manipulating genomes of insects vectoring diseases.
5	Virginia Tech ? China Scholar Exchange: Bioregulatory and Scientific Aspect of Agricultural Biotechnology
6	Integrating Whole-Genome Association Mapping and Landscape Genomics to Understand Climatic Adaptation in Populus
7	Integrating research, education, and extension for enhancing southern pine climate change mitigation and adaptation
8	Field performance of transgenic American chestnut clones
9	Characterization of genes and molecular networks controlling woody biomass accumulation.
10	Regulation of shoot-system development in poplar

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Outcome #1

1. Outcome Measures

Number of projects addressing genetic improvement of aquaculture stocks

2. Associated Institution Types

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Response to stress may affect the aquaculture performance of wild-type, transgenic, and triploid Atlantic salmon, and may inform aquaculture practices needed to produce them under conditions maintaining their welfare. Additionally, response to ecologically relevant stressors may affect individual fitness under conditions in the wild, in turn affecting assessment of ecological and genetic risk should fish with any of these genotypes escape into the wild.

What has been done

We determined the response of juvenile wild-type, GH-transgenic, and triploid Atlantic salmon to stressors representative of wild or aquaculture environments? low food availability, low dissolved oxygen, and handling? following chosen metrics of primary and secondary stress response variables upon stress and through 24 hours. Groups of one-year old wild-type, GH-transgenic, and triploid Atlantic salmon were subjected to no stress (control), one-week fasting, or low dissolved oxygen (1.5-2.0 ppm) in triplicated tanks. Blood samples were taken from anaesthetized fish, and nine markers of primary and secondary stress response were quantified. In addition, these stress-response markers were monitored over a time-course of 0, 1, 3, 6, and 24 hours after handling and air exposure stress.

Results

For fish subject to no stress, parameters measured immediately afterwards did not differ among genotypes, except that blood pH was higher and pO2 and potassium levels lower in wild-type than in triploid or transgenic salmon. After one week of fasting, transgenic fish exhibited higher levels of sodium and chloride than other genotypes, suggesting osmoregulatory difficulty. Upon anoxic challenge, transgenic fish exhibited higher hematocrit, pCO2, glucose and sodium levels than other genotypes. In the time-course study, levels of stress-response indicators tended to peak at higher levels in GH-transgenic than in triploid than in wild-type salmon, and to not return to baseline levels through 24 hours. Results of the experiments collectively demonstrated that

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wild-type fish maintained homeostasis more effectively than transgenic or triploid fish, exhibiting smaller changes in all measured stress-response parameters. Poor stress response may affect aquaculture performance of transgenic or triploid Atlantic salmon and hence the aquaculture practices needed for their production and maintenance of welfare, and also may reduce their fitness in the wild.

4. Associated Knowledge Areas

KA Code Knowledge Area 304 Animal Genome

Outcome #2

1. Outcome Measures

Number of projects to reduce impact of biotic and abiotic factors on food security

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why) {No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code Knowledge Area202 Plant Genetic Resources

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Outcome #3

1. Outcome Measures

Number of projects to improve quality of food crop plants through genetic and metabolomic research

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #4

1. Outcome Measures

Projects manipulating genomes of insects vectoring diseases.

2. Associated Institution Types

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• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code Knowledge Area201 Plant Genome, Genetics, and Genetic Mechanisms

Outcome #5

1. Outcome Measures

Virginia Tech ? China Scholar Exchange: Bioregulatory and Scientific Aspect of Agricultural Biotechnology

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The United States and the People?s Republic of China are the leaders in agricultural biotechnology. Heightened coordination and harmonization among our biotechnology research and oversight communities would be a boon to both countries and their citizens.

What has been done

With support from the U.S. Department of Agriculture Foreign Agricultural Service, we are conducting a comprehensive exchange program focusing on scientific, regulatory, trade, policy and commercial practices of agricultural biotechnology. The primary goal of this exchange is to provide American and Chinese scientists and policy makers with the skills and knowledge to better understand their respective biotechnology research and regulatory systems. Additional objectives include the establishment of a long-term collaboration between American scientists, trade experts, U. S. Federal agencies, and their Chinese counterparts.

Results

Two counterpart Chinese scientists have been identified and detailed plans for their visit to the United States and the activities that they will undertake are being prepared. The visit will occur in late May through June 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #6

1. Outcome Measures

Integrating Whole-Genome Association Mapping and Landscape Genomics to Understand Climatic Adaptation in Populus

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forest tree populations are exquisitely adapted to their local environments at present, but climate change is substantially altering adaptive landscapes. Climate change is expected to lead to widespread maladaptation of tree populations to their seasonal temperature regimes. Adapting management strategies to account for these changes depends crucially on an understanding of the genomic architecture of adaptive traits.

What has been done

We are using sequence capture technology to retrieve exons and upstream regulatory sequences for all expressed genes in Populus trichocarpa (black cottonwood). Captured sequences are being sequenced in a large black cottonwood mapping population that spans most of the species range, and associations wsought with three phenotypic traits, namely, timing of budset, timing of budflush, and cold hardiness. Associations will also be sought with climate variables that represent the principle selective constraint related to these traits. We will validate positive associations in a separate cohort of poplar clones, and using data provided by collaborators, determine the extent of overlap in adaptive loci in both Populus tremuloides (trembling aspen) and Populus deltoides (eastern cottonwood). This work will provide by far the most comprehensive picture to date of the genomic basis for local adaptation to climate in a tree species. In addition to answering long standing questions in evolutionary ecology about the genomic architecture of adaptation, this work will provide a link to practical breeding applications that can exploit naturally occurring ecologically-relevant genetic variation for tree improvement in a changing climate.

Results

Since the project began in February 2011, we have completed the following rooted and planted two four-fold replicated common gardens from a range-wide collection of 822 P. trichocarpa genotypes: one at our Reynold?s Homestead Research Center in southwest Virginia and one at Campbell River, British Columbia, Canada. These plants have been measured the Reynold?s population for fall cold hardiness, leaf shape, and photosynthetic rate, with further phenotyping ongoing. We also designed and tested exome capture using the Agilent SureSelect platform, the results of which were recently published in BMC Genomics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #7

1. Outcome Measures

Integrating research, education, and extension for enhancing southern pine climate change mitigation and adaptation

2. Associated Institution Types

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- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Loblolly pine the preeminent softwood timber species in the United States. While wood production from pine plantations has tripled in the past 50 years, their continuing productivity is threatened by climate change.

What has been done

This USDA NIFA Climate Change Coordinated Agriculture project is aimed at developing management strategies to mitigate and adapt loblolly pine forestry practices to climate change. Specifically, the portion of the project for which the Holliday lab was funded is to develop genomic tools to predict climate-related phenotypes based on the underlying genomic data for the trees.

Results

Along with our collaborators, we have tested several methods for genome complexity reduction aimed at finding the best compromise between cost and genomic coverage. We found that a combination of sequence capture and genotyping-by-sequencing methods will allow us to achieve the project goals, and are currently using these methods to map adaptive genes in large pine families planted across many sites in the southeast.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #8

1. Outcome Measures

Field performance of transgenic American chestnut clones

2. Associated Institution Types

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• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Substantial efforts have been undertaken to develop American chestnut (Castanea dentata) germplasm resistant to the fungal pathogen Cryphonectria parasitica through transgenics and introgression of resistance alleles from Chinese chestnut (Castanea mollissima). These efforts have been undertaken with the goal of eventual deployment in forest ecosystems.

What has been done

We are establishing mixed plantings of transgenic, hybrid, and native chestnut clones at two field sites and evaluating these for essential physiological characteristics, including viability, growth, adaptability, and blight and root-rot resistance.

Results

The project only began at the end of 2012, hence there are no results to report as yet.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #9

1. Outcome Measures

Characterization of genes and molecular networks controlling woody biomass accumulation.

2. Associated Institution Types

1862 Research

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3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In addition to being the raw material for the traditional forest products industry, wood is increasingly being used for the production of biopower, biofuels and high-value bioproducts. Sustainable increases in the yield of woody biomass and improvement of wood quality traits for more efficient conversion to end products are needed to meet the national goal of displacing 30% or more of the U.S. petroleum consumption by 2030. Relatively little is known about the molecular mechanisms regulating wood formation, which limits our ability to make marked improvements in wood yield and quality through breeding or biotechnology.

What has been done

Poplars (genus Populus) have long been grown for pulp, paper and solid wood products and are an emerging dedicated biomass crop. In addition, poplar is a model woody plant experimental system with extensive genomics resources. We are using genome-wide studies and functional characterization of poplar genes to understand the mechanisms regulating wood formation.

Results

Genome-wide expression studies in poplar have identified candidate genes important for wood formation. Over 400 of these genes have been cloned and continuing work is identify protein-protein interactions associated with wood development. This work has identified novel protein-protein networks and select genes are being functionally characterized in transgenic poplar. Results from this project can guide design of new strategies for molecular breeding or bioengineering of woody biomass crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #10

1. Outcome Measures

Regulation of shoot-system development in poplar

2. Associated Institution Types

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• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

To meet the growing need for plantation-grown wood or biomass, it is important to maximize rates of biological productivity. Shoot phenology interacts with crown morphology to have a major role in determining whole-tree photosynthesis and biomass yield. Moreover, the timing of seasonal growth and dormancy transitions are of major importance to the local adaptation of native tree populations and climate change is disrupting this adaptation and threatening forest health.

What has been done

Poplars (genus Populus) are both an important biomass crop and an ecologically important tree in temperate and boreal forests of the northern hemisphere. Identifying genes and mechanisms controlling crown architecture and associating molecular variation in these genes with phenotypes will facilitate new, more efficient approaches to breeding trees with greater biomass production/

Results

We identified a poplar gene that regulates tree branching and metabolite production in response to nitrogen availability that is a potential target for molecular breeding or bioengineering to optimize biomass production under specific environmental conditions (e.g., lower fertilization). The field trials of native species, hybrids and transgenic are providing insights into the functions of these genes under natural conditions and their importance in native environments.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

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V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

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V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Global Food Security and Hunger - Agricultural Management, Marketing and Policy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	20%	60%	10%	0%
602	Business Management, Finance, and Taxation	10%	0%	10%	0%
604	Marketing and Distribution Practices	20%	20%	10%	0%
605	Natural Resource and Environmental Economics	20%	20%	30%	0%
606	International Trade and Development	20%	0%	30%	0%
610	Domestic Policy Analysis	10%	0%	10%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
Tear: 2012	1862	1890	1862	1890
Plan	7.0	0.8	7.5	0.0
Actual Paid Professional	9.3	1.0	10.7	0.0
Actual Volunteer	279.0	0.0	0.0	0.0

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

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Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
194125	113862	194266	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
274662	175381	436869	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
815154	0	6589184	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and educational programs will be conducted to support the needs of Virginians and Virginia farm and small business managers. Research in personal finance issues and evaluation of programming will be conducted to improve financial literacy. Research will be conducted to develop knowledge of production and market systems. Research-based information will be disseminated via media and informational meetings. Decision aids, workshops, detailed curriculum, and distance educational methods will be used to support change in the overall behavior of learners.

2. Brief description of the target audience

Individuals, families, owners and managers of farms, and small businesses; local, state, and federal personnel and policy-makers; and private sector service suppliers are the targeted audiences.

3. How was eXtension used?

Majority of specialists are part of a COP providing support in the ask an expert section.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	15031	25959	2801	181

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

Year: 2012 Actual: 0

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Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	13	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of farmers creating succession/transition plans for their farm business

Year	Actual
2012	235

Output #2

Output Measure

 Number of education programs conducted in farm and agribusiness management and risk management

Year	Actual
2012	2200

Output #3

Output Measure

• Number of education programs conducted in marketing and direct marketing

Year	Actual
2012	750

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of land owners who implement transition plans.
2	Increase the number of program participants (farmers, agricultural business managers and leaders, food processors, government agencies, and agribusiness firms) making more informed business and economic decisions.

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Outcome #1

1. Outcome Measures

Increase the number of land owners who implement transition plans.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Many African American farms are sold when the older generations dies because the farm is inherited by family members who live on and off the farm. In some cases, family members want to cash in their share of the farm ownership. Usually, the remaining family members can't afford to buy out their siblings' interest. Consequently, the farm is sold in order to pay off these family members.

What has been done

During 2012 Farm Transition program was held in January and three programs were held in September in areas served by VSU agriculture agents. In addition a presentation was conducted at the VSU Small Farms Conference in November.

Results

Participants completed an evaluation at the end of the January and July workshops. The evaluation summary showed the need for farm transition planning for African American farmers. The results of the survey: Assembled a Financial Management Team(i.e. attorney, accountant, financial planner); Developed an inventory of farm and non-farm assets (i.e. your resource inventory); Write a will; Prepared an advanced medical directive; Made plans for long term health care; and

Created power of attorney

4. Associated Knowledge Areas

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

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605 Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Increase the number of program participants (farmers, agricultural business managers and leaders, food processors, government agencies, and agribusiness firms) making more informed business and economic decisions.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers, community leaders, consumers, and government officials are all interested in supporting food systems, engaging the farming community, and creating economic opportunities to provide quality foods locally.

What has been done

Local Extension leaders has been asked and taken the responsibility of organizing and leading these initiatives. These include: New farmers markets, local produce auctions, Farm-to-Fork events, Locavore food directories, Farmer-Landowner meet and greet, GAP training for farmers selling locally, developing a local animal harvest facility, and Farm-to-school linkages.

Results

Outcomes: Publications distributed locally and statewide highlighting local food systems; Increased knowledge and implementation of GAP standards for local foods; Local food sales via farmers markets and direct sales; Schools children meeting local farmers and consumer their produce; Local officials understanding the importance of farms to healthy and sustainable communities.

4. Associated Knowledge Areas

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

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605 Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

Natural Disasters (drought, weather extremes, etc.)

Brief Explanation

Regions of the state experiance droughts and increased finacial stree.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

National Agricultural Statistics Service data shows that the number of farms owned and operated by African American farmers in Virginia decreased from 11,621 in 1964 to 1,680 in 2007. For the same period, farmlands owned by these farmers decreased from 699,554 acres to 182,713 acres. Reasons for farm/land loss have been attributed to many reasons such as family disputes, lack of interest from younger generations, failure to pay taxes, urban sprawl, foreclosures and lack of knowledge in estate planning strategies. To address the issue of land/farm loss, Virginia Cooperative Extension (Virginia Tech and Virginia State University) developed a Farm/Land Loss Prevention and Transition Program with an overall goal of providing information and technical assistance to enable them to take an active role in increasing the long-term survival of this target audience.

The Farm/Land Loss Prevention and Transition Programs were held at African American churches located in southeast Virginia, which has the state's largest concentration of African American farmers. Pastors promoted the programs by announcements in church bulletins and during Sunday services.

Virginia Cooperative Extension (VCE) agents Peter Callan and Michael Lachance and attorney Andrew Branan developed a six hour training module that was conducted on a single day to meet the time constrains of this community. Topics included: family communication, net worth and creation of a balance sheet, howfamily members and their advisors preserve human, intellectual and financial capital for subsequent generations, family governance, wills, power of attorney, advanced medical directives and overview of estate planning tools. Family members' goals, analysis of resources and operating environment, economic viability of the farm and financial management abilities of the younger generation are among the crucial areas that need to be addressed in developing a farm transition plan. Communication within the family is the most important factor in developing a farm transition plan and was emphasized in all modules.

Key Items of Evaluation

It has been difficult to gather information regarding the impacts of the farm transition programs there were held at African American churches. Pastors of churches which

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sponsored the farm transition programs have indicated that there is a great need for farm transition planning within the African American community. The pastors feel that many families are reluctant to discuss farm transition planning with their pastors and close family friends because the farms are owned by numerous heirs scattered throughout the country.

Follow-up surveys indicated that some of the program participants have "tweaked" their estate plans by developing an inventory of farm and non-farm assets (e.g. resource inventory) and made plans for long term health care. However discussions with the pastors have indicated that they feel that there are few families who have made plans to transfer the farms to the next generation. Thus they feel that there is a great need for educating African American families on strategies to transfer land ownership to the next generation and avoid selling the family farm. The follow-up surveys have indicated that there is a dire need for families to have individual consultations with attorneys to resolve legal issues on their farms.

Due to limited resources, many families are not able afford the legal services needed to explore and pursue legal options that will enable them to transfer ownership of their farms to the younger family members who are interested in operating the farm. The VCE/VSU Farm Transition Program has been funded by a grant from the Virginia Department of Agriculture and Consumer Services. Since public funding cannot be used to pay for individual legal consultations and creation of legal documents (wills, LLCs, trusts etc.), a source of funding needs to be acquired to support the legal services needed to transfer their farms to the next generation. By having access the free legal services, limited resource families will be able to maintain ownership of their family farms by transferring the farms to the next generation in their families.

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V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Global Food Security and Hunger - Family Nutrition Program

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
704	Nutrition and Hunger in the Population	100%	100%	100%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Exter	nsion	Rese	earch
1 ear. 2012	1862	1890	1862	1890
Plan	10.0	2.0	10.7	0.0
Actual Paid Professional	5.2	1.0	6.0	0.0
Actual Volunteer	5754.0	47.0	0.0	0.0

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

Exte	ension	Res	earch
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
277322	0	108696	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
153680	0	244439	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
456098	86177	1346485	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Nutrition education will be taught to the target audience of impoverished Virginians with a comprehensive methodology. Participants completing the comprehensive programs will be assessed to determine that behavior change has been attained. Food security will also be assessed at completion of

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the comprehensive program.

2. Brief description of the target audience

The audience is comprised of people who are SNAP and WIC participants as well as those who are eligible to participate in those programs. The youth participants attend schools that have a high percentage of students participating in the Free and Reduced Lunch program (>50% Free and Reduced lunch). People who have income more than 185% of the federal poverty guidelines are not enrolled as program participants. Frequently, participants have dropped out of school, have minimal job skills, and have multiple health conditions resulting from issues related to obesity, malnutrition, and lack of exercise. Frequently, these issues are directly related to economic constraints due to poverty.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	157020	99	601761	0

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	1	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of sites where programming was delivered.

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Year Actual 2012 5326

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of adult participants who report that they ran out of food less often after participating in the Family Nutrition Program.
2	The Family Nutrition Program assists with combatting Floyd County's food desert
3	Eat Smart, Move More! Social Marketing Campaign
4	Expanded Food and Nutrition Education Program (EFNEP) Promotes Positive Health Behavior Change
5	The Supplemental Nutrition Assistance Program-Education (SNAP-Ed) Addresses Obesity and Overweight through Nutrition Education
6	The Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Education Program (SNAP-Ed) Reduces Health Care Costs in Virginia
7	Participants completing the EFNEP and SNAP-Ed series of six lessons improved nutrition and food behavior.
8	Diverse Families Receive Nutrition Education through Community Collaborators and Faith-Based Volunteers
9	Virginia Cooperative Extension Cooking Matters and Shopping Matters

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Outcome #1

1. Outcome Measures

Increase the number of adult participants who report that they ran out of food less often after participating in the Family Nutrition Program.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3651

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food insecurity has multiple complications resulting in health issues related to obesity, malnutrition, as well as developmental and mental health problems among children raised in food insecure households.

What has been done

FNP uses a core lesson series that includes the following menu planning, preparing meals at home, food buying, food safety and storage. Messages included in these lessons are buying locally grown foods and encouraging gardening and appropriate food preservation as well as raising awareness of community resources to meet food security needs.

Results

Of the participants in EFNEP and SNAP-Ed educational programs:

40% of families less often ran out of food after completing the SNAP-Ed nutrition education program.

54% of family less often ran out of food after completing the EFNEP nutrition education program.

4. Associated Knowledge Areas

KA Code Knowledge Area704 Nutrition and Hunger in the Population

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Outcome #2

1. Outcome Measures

The Family Nutrition Program assists with combatting Floyd County's food desert

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the USDA, most of Floyd County is a located in a food desert, where at least 20% of the people have income at or below the federal poverty levels for family size, or where median family income for the tract is at or below 80% of the surrounding area's median family income. The Food Security Project of the Family Nutrition Program is focused on combatting food deserts to ensure our participants have access to healthy food choices, as people living in food deserts are often forced to shop at convenience stores that don't sell fruits and vegetables, low fat dairy, and other healthy options.

What has been done

The Food Security Project assisted Sustain Floyd, a partner non-profit group that runs the farmers market in Floyd County, with planning for the mobile market logistics such as sites, schedule, and advertising. The FSP also assisted with outreach to local food pantries and religious groups to ensure local limited resource families were aware of the market. Finally, the FSP provided programming to the market by holding a low-cost meal food demonstration.

Results

The mobile market was piloted in 2 locations (2 elementary school parking lots) twice a week for 6 weeks. \$1,500 worth of local food was sold, benefitting 2 underserved neighborhoods and 4 local producers. The pilot was considered a success by Sustain Floyd, and they will be continuing the mobile market next year with continued support from the Food Security Project.

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

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Outcome #3

1. Outcome Measures

Eat Smart, Move More! Social Marketing Campaign

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10491

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The National Health and Nutrition Examination Survey (NHANES) of 2007-2008, concluded that 17% of

children and adolescents, ages 2-19 years, are obese. The prevalence and severity of childhood overweight has increased dramatically in the past three decades and is recognized as a serious public health concern that requires urgent action. Seventy-five percent of potential soldiers are declined acceptance into the United States military, and weight status is the number one reason why they are unable to join. An overweight or obese child accrues approximately 72 dollars more in medical costs each year than a healthy weight child. Energy intake, physical activity, sedentary behavior, and environmental factors all contribute to childhood obesity, thus should be the focus of any childhood obesity intervention aimed at modifying risky behaviors.

What has been done

A social marketing campaign promoting "Eat Smart, Move More!" message related to food choices and physical activity was conducted in Virginia by the Family Nutrition Program. Children frequently have athletes who are their role models. The campaign consisted of billboards throughout Virginia where there is a high incidence of poverty, posters on buses traveling through high poverty areas, and posters distributed throughout Virginia in schools where there is a high level of poverty, and a web presence childhood obesity intervention aimed at modifying risky behaviors.

Results

Over 22,400,000 people viewed the social marketing campaign through billboards, posters, and bus signage throughout the state of Virginia. A sample of youth were surveyed. The sample included 10,491 youth. The youth overwhelmingly demonstrated very positive attitudes and intent to change dietary behavior.

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76% of youth were likely to follow the suggestions for eating smart and moving more. 85% of youth believed that they could be an athlete by eating smart and moving move.

4. Associated Knowledge Areas

KA Code Knowledge Area

Nutrition and Hunger in the Population

Outcome #4

1. Outcome Measures

Expanded Food and Nutrition Education Program (EFNEP) Promotes Positive Health Behavior Change

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year Actual 2012 28006

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The rate of obesity in the United States is higher than ever before and 17% of American children bear the burden. The highest rates of obesity incidence are in low income populations, even though recent reports indicate it is affecting all levels of income equally. The combination of poor or comprised health status (hypertension, stroke, diabetes, cancer) and low income has significant emotional, physical, and spiritual implications. The U.S. Census, collected in 2009, reports that the number of Americans living in poverty is the highest it has been in 51 years (since 1958). It is critical that educational programs work with health promotion and disease prevention initiatives to reverse this trend.

What has been done

In 2011-2012, The Virginia Cooperative Extension?s EFNEP enrolled 26,603 low income youth and 1,010 low income adults whose incomes were equal to or less than 185% of Federal poverty guidelines. Through an eight nutrition lesson series, participants learned to select, buy, prepare, and store foods to meet the nutritional needs of their families, while operating within sound budget and gaining organizational skills.

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Results

Pre and post program measures reported that participating adults in EFNEP changed:

85% showed improvement in food resource management practices

87% showed improvement in one or more nutrition practices

82% demonstrated acceptable food safety practices at completion of the program.

Youth participating in EFNEP reported:

78% of youth now eat a variety of foods,

88% increased knowledge of essentials of human nutrition

81% increased their ability to select low-cost, nutritious foods

84% improved practices in food preparation and safety.

Resulting in a \$770.65 estimated health care cost savings in EFNEP per participant.

4. Associated Knowledge Areas

KA Code Knowledge Area

Nutrition and Hunger in the Population

Outcome #5

1. Outcome Measures

The Supplemental Nutrition Assistance Program-Education (SNAP-Ed) Addresses Obesity and Overweight through Nutrition Education

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	108896

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Overweight and obesity are major health and economic issues, costing Americans about \$147 billion each year, based on 2008 dollars. Likewise, an obese person has annual medical costs that are \$1,429 more than his or her normal weight counterpart (CDC, 2010). Almost 34% of adults and 17% of children and adolescents ages 2-19 are obese (CDC, 2010). Accordingly, the latest Behavior Risk Factor Surveillance System (BRFSS), 26% of all Virginians are obese. Families of low-socioeconomic status suffer disproportionately from poor health.

What has been done

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Virginia Cooperative Extension?s (VCE) SNAP-Ed reached 108,896 low income participants with 302,115 contacts whose income was equal to or below 150% of Federal poverty guidelines. Participants learned to select, buy, prepare and store foods to meet the nutritional needs of their families, while operating within sound budget constraints, and developing organizational skills.

Results

It can be assumed that chronic diseases are either being prevented and or delayed due to prepost

program measures of adults participating in SNAP-Ed.

Data reported that 7,563 adults changed their behaviors in:

80% reported improvement in one or more food resource management practices,

86% reported improvement in one or more nutrition practices,

81% demonstrated acceptable food safety practices.

Adults who graduate from the comprehensive series complete a pre and post test to assess knowledge and behavior change. Key findings were as follows:

Adult Comprehensive (Direct) Behavior Indicators

Indicators: % of clients demonstrating improvement:

Consume lower fat milk 34 Consume greater variety of foods46 Decrease sodium consumption 41 Enhance food security 40 Increase healthy food choices 42 Increase family meal time 34 Increase comparing prices 41 Increase using grocery lists 45 Increase in reading labels 55

Increase in breakfast consumption37 Volunteers contributed over 23.5 FTEs to the Family Nutrition Program.

25,305 youth enrolled in the six or more hour nutrition programs resulting in:

79% increased their consumption of a variety of foods,

85% increased their knowledge of essentials of human nutrition,

75% increased their ability to select low cost, nutritious foods.

79% improved their practices in food preparation and safety.

Resulting in an estimated \$9,192,110.74 in estimated direct benefit to Virginia in obesity prevention over the upcoming five years.

4. Associated Knowledge Areas

KA Code Knowledge Area

Nutrition and Hunger in the Population

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Outcome #6

1. Outcome Measures

The Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Education Program (SNAP-Ed) Reduces Health Care Costs in Virginia

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	8654

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Chronic diseases are the leading cause of morbidity and mortality in the United States. A sedentary lifestyle and a poor diet are linked to being overweight and obese and increases chances of developing chronic diseases like heart disease, stroke, cancer, and diabetes. Fortunately, these same diseases respond best to positive changes in health behaviors. The CDC reports, of deaths occurring in Virginia during 2005, 25% were linked to heart disease and 24% were associated with cancer. A reported 1,642 Virginians died from diabetes in 2005. Chronic diseases result from unhealthy lifestyles and have become a financial burden to the state and federal government. The estimated medical cost associated with obesity is \$147 billion annually. Likewise, an obese person has annual medical costs that are \$1,429 more than his or her normal weight counterpart.

What has been done

EFNEP and SNAP-Ed teaches families, youth, and seniors skills necessary to promote healthy lifestyles, eat more meals at home, prepare healthy and tasty meals for their families, increase fruit and vegetable consumption, control portion sizes, move more every day, move more and watch less television, and replace sugary beverages with healthy options.

Results

Participants completing the EFNEP and SNAP-Ed series of six lessons improved nutrition and food behavior.

Post-lesson data gathered through behavior change questionnaires in EFNEP have shown: 63% used food labels more often to make food choices

97.5% of participants improved their diet

50% increased their fruit consumption

54.1% increased consumption of calcium rich foods.

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In SNAP-Ed, post-test data reported:

55% used food labels more often to make food choices

86% of participants improved their diets.

4. Associated Knowledge Areas

KA Code Knowledge Area

Nutrition and Hunger in the Population

Outcome #7

1. Outcome Measures

Participants completing the EFNEP and SNAP-Ed series of six lessons improved nutrition and food behavior.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	8573

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food Research and Action Center (FRAC) report 18.6% of Americans reported food hardship in 2011. Food hardship is defined as not having enough money to buy food that the family needed in the last 12 months. Map the Gap, a research initiative of Feeding America, Inc., reports 12.4% (992,490 people) of Virginians being food insecure in 2010. When a household is in a period of food insecurity, they are likely to make food budget adjustments, reduce food intake, and change the types of food served. They consume less fruit, vegetables, and dairy, but eat more starchy foods. Research supports a relationship between being overweight and obese and food insecurity. There are also developmental and mental health problems among children raised in food insecure households. In 2012, the total national SNAP expenditure was 78.2 billion dollars. This was an increase of 46% from 2009. According to FRAC, Virginia received 1,403,720,773 dollars in federal funding to provide SNAP benefits in FY2012. In spite of these food assistance resources, research report that food assistance is still not enough to prevent people from being hungry. About 55% of households living at 130% of the federal poverty level who receive SNAP benefits for 12 months are still food insecure by the end of each month. This is evidence that assistance must be paired with education to improve the prevalence of food insecure households and people.

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What has been done

FNP uses a core lesson series that includes the following menu planning, preparing meals at home, food buying, food safety and storage. Messages included in these lessons are buying locally grown foods and encouraging gardening and appropriate food preservation as well as raising awareness of community resources to meet food security needs.

Results

Of the participants in EFNEP and SNAP-Ed educational programs:

40% of families less often ran out of food after completing the SNAP-Ed nutrition education program.

54% of family less often ran out of food after completing the EFNEP nutrition education program.

4. Associated Knowledge Areas

KA Code Knowledge Area704 Nutrition and Hunger in the Population

Outcome #8

1. Outcome Measures

Diverse Families Receive Nutrition Education through Community Collaborators and Faith-Based Volunteers

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year Actual 2012 20038

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Obesity and overweight continue to be health concerns for children, youth and adults in Virginia. According to Center for Disease Control (CDC) 2007 Behavioral Risk Factor Surveillance System (BRFSS) prevalence data, 61.9 percent of adult Virginians and 20% of youth are overweight or obese. It is further reported that racial/ethnic differences in obesity have also increased over time. Furthermore, family income was inversely associated with obesity prevalence among white females of all ages and white males aged 2-19 years. Reaching families of low socioeconomic background with nutrition information is challenging. These individuals struggle to provide the necessities of life, often working at multiple low-wage jobs. Other barriers to traditional group

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participation include lack of transportation/childcare or distrust of facilitators from different racial or ethnic groups.

What has been done

The Virginia Supplemental Nutrition Education Program (SNAP-Ed) Volunteer Initiative supports seven Nutrition Outreach Instructors (NOIs) who form statewide collaborations with schools, private and public agencies, and faith communities who serve limited income families. The NOIs train volunteers that include teachers, school nurses, librarians, and faith- based volunteers to deliver experiential activity-based nutrition education to diverse, limited- resource youth and parents. In addition to education in the classroom, these volunteers are able to reach adults and children through programs such as home visits, faith-based early education programs, and free medical clinics.

Results

During 2011-2012, 944 community volunteers reached 19,795 youth and 243 adults with comprehensive nutrition education. Nutrition education topics included benefits of increasing fruits and vegetables, decreasing fats and sugar sweetened beverages, safe food handling, and benefits of increasing physical activity. Results from state wide youth exit evaluations indicated the following:

79% increased their consumption of a variety of foods,

85% increased their knowledge of essentials of human nutrition,

75% increased their ability to select low cost, nutritious foods,

79% improved their practices in food preparation and safety.

In addition to comprehensive lessons, community volunteers reached 828,810 individuals with short-term nutrition education through venues such as community health fairs, parent newsletters, DSS waiting rooms, grocery stores, and television cooking programs. In total, the volunteers donated 20, 466 hours equaling an estimated economic contribution of \$245,592.

4. Associated Knowledge Areas

KA Code Knowledge Area

Nutrition and Hunger in the Population

Outcome #9

1. Outcome Measures

Virginia Cooperative Extension Cooking Matters and Shopping Matters

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

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3b. Quantitative Outcome

Year Actual 2012 495

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the Virginia Division of Chronic Disease and Control Indicators of 2010 two-thirds (62%) of Virginia adults are at an unhealthy weight (i.e., overweight or obese). 50% of Virginians do not get enough physical activity. Three-fourths (74%) of Virginians do not meet the daily requirements for eating five or more servings of fruits and vegetables. Thirty percent of children and adolescents are overweight and 64% of adults are overweight or obese in the US. Families of low-socioeconomic status suffer disproportionately from poor health.

Overweight and obesity are major health and economic issues, costing Americans over \$147 billion each year. Likewise, an obese person has medical costs that are \$1429 more than his or her normal weight counterpart (Centers for Disease Control and Prevention, 2010).

What has been done

Virginia Cooperative Extension?s (VCE) Family Nutrition Program, Family Consumer Science Agents, 4-H

Agents and chef volunteers collaborated with Share Our Strength to deliver interdisciplinary programs to address nutritional needs of limited income communities and/or family systems whose income was up to 150% of federal poverty guidelines. Participants were taught to select, buy, prepare, and store foods to meet the nutritional needs of their families, while operating within sound budget, and develop organizational skills. Courses are offered exclusively to low-income families; most participants are enrolled in food assistance programs including SNAP (food stamps) and free or reduced-price school meals. Families were provided take-home groceries after each class to supplement the family food budget. In addition, VCE has the capacity to provide financial management, family and youth development skills.

Results

In 2012, 10 units were awarded \$3000 to conduct 44 courses. Four hundred ninety five (495) youth and adults participated in 2011-2012. Fifty-two percent of participants receive at least one form of assistance such as SNAP, free/reduced school meals, food pantry, WIC. Average household size was 3.74 people. Average number of children was 1.71. Adults with children in the home were 78%. The average adult graduate reported an 85% change in how often he/she uses the Nutrition Facts label to make food choices, 98% of children learned at least one new thing about cooking and eating healthy; 83% practiced preparing recipes at home with their parents, 92% reported that cooking skills were improved, 40% are eating more fruits and vegetables. Child Care Providers reported that they incorporated more fruits and vegetables in meals for children in their care. Eighty percent of adult participants understand how to create a household budget. The average cost of 2652 participant take-home grocery bags was \$25.00 per bag (an average of \$66,000 value). Eighty-four volunteers averaged teaching 1.25 courses each and 23% taught two or more courses. Additional collaboration with local agencies and program sustainability were established. One unit received \$5000 Shopping Matter Grant to teach 120 participants shopping and budget skills. To date, 149 graduated from the program.

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4. Associated Knowledge Areas

KA Code Knowledge Area

704 Nutrition and Hunger in the Population

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Government Regulations

Brief Explanation

In FY2012 we had a slight reduction in SNAP-Ed funding. It amounted to \$300,000. It did not change the outcomes of our programming efforts with this reduction.

With the economy so precariously balanced we have not found it more difficult to locate our target population since more people today are in need of free food resources. Over 600 Memorandum of Agreements were signed across the state with agencies, non-profits, and school systems. These agreements gave the Family Nutrition Program (FNP) the ability to partner with agencies/organizations that were also reaching the FNP target population. The numbers enrolled into SNAP-Ed and EFNEP were increased in FY2012. However, in EFNEP the youth enrollment increased while the adult enrollment decreased. The SNAP-Ed enrollment increased in the adult and youth population.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In EFNEP:

1,091 adults and 26,915 youth were enrolled in comprehensive nutrition programs that were comprised of 6-10 lessons. 85% of participants showed improvement in food resource management practices; 87% of participants showed improvement in nutrition practices; 82% of participants at the completion of the program demonstrated acceptable food safety practices; and, 54% of EFNEP participants less often ran out of food before the end of the month after participating in the nutrition education.

2,019 volunteers contributed 17,472 hours to the program.

In SNAP-Ed:

62,372 adults and 59,856 youth were enrolled in multiple interventions that were comprised of short and comprehensive lessons. 105,782 people participated in the months nutrition newsletter series and 177,704 community event participants received a short nutrition intervention.

In the comprehensive adult program: 80% of participants showed improvement in food resource management practices; 86% of participants showed improvement in nutrition practices; and, 81% of participants at the completion of the program demonstrated acceptable food safety practices. 3,512 volunteers contributed 58,173 hours to the program. 40% of the participants in the comprehensive nutrition education programs less often run out of food after completing the program.

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Key Items of Evaluation

Food security levels have increased due to the nutrition education.

40% of SNAP-Ed participants less often run out of food by the end of the month upon completion of the classes.

54% of EFNEP participants less often run out of food by the end of the month upon completion of the classes.

Nutrient levels improved upon completing the program. It can be assumed that with nutrient improvements that health care costs will decrease.

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V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Global Food Security and Hunger - Local Food Systems

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	10%	10%	10%	0%
604	Marketing and Distribution Practices	10%	10%	10%	0%
703	Nutrition Education and Behavior	10%	10%	10%	0%
704	Nutrition and Hunger in the Population	70%	70%	70%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

V 0040	Extension		Research	
Year: 2012	1862	1890	1862	1890
Plan	7.3	2.0	7.8	0.0
Actual Paid Professional	9.9	0.5	11.3	0.0
Actual Volunteer	867.0	0.0	0.0	0.0

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

Extension		Research		
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen	
205680	118791	205829		0
1862 Matching	1890 Matching	1862 Matching	1890 Matching	
291011	201229	462873		0
1862 All Other	1890 All Other	1862 All Other	1890 All Other	
863675	3430	2549728		0

V(D). Planned Program (Activity)

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1. Brief description of the Activity

- Conduct consumer education workshops and training on food budgeting, the cost effectiveness of local and regional foods, healthy eating and cooking skills
 - · Conduct educational programs on crop and livestock production specific to local marketing channels
- Conduct research on the economic and environmental impacts of local or regional food system to communities
 - Conduct research on local or regional food system impact on the dietary and health of consumers
- Encourage collaboration and partnerships to improve food availability, food access, and consumption of fresh, nutritious local foods
- Provide educational programming on whole farm planning, marketing, food safety, and other educational needs to improve supply and availability of local foods.
 - Develop and conduct a Virginia food system assessment and farm-to-table plan
 - Organize and conduct, local regional and state conferences

2. Brief description of the target audience

The program's target audience is all residents of Virginia and those most susceptible to food insecurity and hunger, but with specific emphasis on producers, consumers and local food system stakeholders that can improve food availability and affordable access.

Consumers

Producers
Educators pre-K - 12
Governmental officials
Extension educators
Food-based business owners
Farm-related business owners
Environmental professionals
Health and nutrition professionals
Retail and institutional food service
Distributors
Community advocates

3. How was eXtension used?

eXtension was used in this program to answer questions and help people network with others working in the area of local foods and food security.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	33914	61473	10131	0

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	3	3	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of programs offered regarding community food systems.

Year	Actual
2012	181

Output #2

Output Measure

 Number of non-peer reviewed publications and outreach materials such as journal articles, extension publications, presentations at professional meetings, newsletters, newspaper articles, websites, guides and reports.

Year	Actual
2012	78

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of local communities partnering with Virginia Cooperative Extension faculty to strengthen the connection between local agriculture producers and growers with local food-related businesses and purchasing institutions.
2	Number of community gardening programs implemented to address food insecurity/hunger issues.
3	Meeting the Educational Needs of Amish and Mennonite Communities and Strengthening the Region's Food System and Farm Economy.
4	Ending Hunger Now: Extension Master Gardeners Partner with Foodbank of Southeastern Virginia to Fight Hunger
5	Healthy Food for the Common Wealth and Common Good: Consumers, Low-income Populations, and Farmers Benefit From a Farmers Market in Spotsylvania
6	Combatting Obesity in Children and Adults through Community Gardening
7	Cleaning up the Chesapeake Bay: One Home Landscape at a Time
8	Farmers Markets as the New Public Square and Hub for Community-based Economic Development

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Outcome #1

1. Outcome Measures

Increase the number of local communities partnering with Virginia Cooperative Extension faculty to strengthen the connection between local agriculture producers and growers with local food-related businesses and purchasing institutions.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	63

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia?s overall food system directly impacts the economic development of rural and urban communities; the care, restoration and resilience of ecological resources; and critical health issues. Virginia is recognized as an emerging leader in the Nation?s local food movement. This recognition provides an opportunity for communities to better connect producers with local food-related businesses and purchasing institutions in their area.

What has been done

New business enterprises and community initiatives have been incubated and expanded across the Commonwealth. These businesses and initiatives include farmers markets, food hubs, cooperatives, produce auctions, online farmers markets and Community Supported Agriculture (CSAs), urban and community gardens, food policy councils and working groups, Buy Fresh Buy Local chapters, crop mobs and gleaning clubs, farm-to-school, university, hospital and institutional procurement programs. Virginia Cooperative Extension has partnered with communities across the state to strengthen and enhance these initiatives.

Results

Virginia Cooperative Extension, through local food programming and a broader farm-to-table initiative, has worked with 63 communities to encourage more direct connections with producers, consumers and institutions. To make it easier for schools, universities, hospitals and other large volume buyers of food to purchase and procure locally-grown Virginia food, Extension has worked on aggregation and cooperative models that can help producers and communities address this issue. In 2012, Extension worked to help form the Southside Produce Auction, and strengthen

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models such as the Shenandoah Valley Beef Cooperative, Local Food Hub, Sustain Floyd, Friendly City Food Cooperative. Additionally, Extension worked with more than 80 school districts on farm-to-school programs and more than 11 universities on local food procurement efforts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #2

1. Outcome Measures

Number of community gardening programs implemented to address food insecurity/hunger issues.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	18	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nationally, 32 million people live in low income families, and 21%, almost 16 million, live in poor families, according to the National Center for Children in Poverty. Poverty has a significant impact on children. Poor nutrition in infancy can lead to poor brain development, academic difficulties in school, and long-term effects on the trajectory of a person's employment and career. Infants that experience hunger and poor nutrition are more likely to be obese and have a lower life expectancy. It is crucial that children receive proper diet, nutrition and exercise in their developing years. Community gardening can be positive experience, lead to more exercise and consumption of more fruits and vegetables.

What has been done

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Virginia Cooperative Extension has worked across disciplines to provide community gardening training and coordination of gardening efforts across the state. Community garden participants applied for the use of garden plots, agreed to participate in educational programs, and maintained their gardens. Garden handbooks were developed and distributed to garden families who attended a required garden orientation. Workshops were offered for gardening families and residents to prepare them for a productive gardening year, introduce them to new vegetables to expand their food palette, how to prepare and preserve food.

Results

As Virginia Cooperative Extension worked with diverse communities across the state such as Henrico County, and the cities of Portsmouth, Danville, and Arlington, some immediate outcomes of these efforts in these communities include: 1)Greater consumption of vegetables among gardeners and participating families, 2) greater levels of physical activity, and 3) a greater frequency of participating gardeners and families eating and preparing a balanced diet with more vegetables and whole foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #3

1. Outcome Measures

Meeting the Educational Needs of Amish and Mennonite Communities and Strengthening the Region's Food System and Farm Economy.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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Food is a great connector and the food system that makes food available and accessible from farm-to-table is an important component of community economic development and indicator of social well-being within a community and region. Yet, food and the food system is often overlooked as a connector and undervalued as a means and strategy for building health, wealth, connection and capacity where food is produced and most needed. U.S. families and households spend over \$1.2 trillion on food each year. In 2008, food purchases were the third largest household expenditure after housing and transportation. Households in Virginia alone spend more than \$19 billion each year on food purchases, close to \$12 billion for foods eaten at home. Another \$6 - 7 billion is purchased by tourists coming to Virginia.

What has been done

"With this framework and context, Virginia Cooperative Extension has specifically focused programming on local and regional food system development and Virginia Farm to Table initiatives to help Virginia farmers and communities capture and retain a larger portion of available food dollars, while also addressing other social, economic and environmental challenges facing communities such as food insecurity, obesity, watershed cleanup, and loss of small and mid-sized farms.

The aggregation of farmers and farm products to facilitate logistics and distribution of food continues to be critical for developing local and regional food systems, particularly to make it easier for schools, universities, hospitals and other large volume buyers of food to purchase and procure locally-grown Virginia food. "

Results

Produce auctions, along with food hubs, are a means for aggregating farmers and farm products. Produce auctions are common in Amish and Mennonite communities, and have been successful in diversifying farm economies. In 2012,its seventh year of operation, the Shenandoah Valley Produce Auction had more than \$1.8 million dollars of sales, and continues to have many direct, indirect and associated impacts locally and regionally. In 2011 and 2012, Virginia Cooperative Extension worked closely with Amish farmers and other produce growers in Southside Virginia to facilitate the development of another wholesale produce auction in Charlotte County, Virginia. Extension served as a liaison to 25 to 30 Amish producers in Charlotte Court House and worked closely with the Shenandoah Valley Produce Auction (SVPA) to arrange meetings for sharing the background and history of SVPA and the lessons learned as an educational exchange. A community-wide meeting was held in January 2012, where members of the Shenandoah Valley Produce Auction and other resource people shared insights and encouraged the growers and broader community in their efforts to develop the Southside Produce Auction (SPA). In its initial year, over 60 growers representing 13 different counties in Southside Virginia participated in the auction and had over \$270,000 of product sales in 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

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Outcome #4

1. Outcome Measures

Ending Hunger Now: Extension Master Gardeners Partner with Foodbank of Southeastern Virginia to Fight Hunger

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia's poverty rate has not decreased substantially over the last 30 years. More than 10% of Virginians (768,000, including 260,000 children) currently live below the poverty level. Poverty affects urban and rural residents, with highly concentrated in inner cities and along the state's southern and southwest borders, with growing clusters in our suburban areas. Beyond income, a more complete understanding of economic deprivation or quality of life is reflected by access to health care, labor market opportunities and hunger. During the month of October, 2012, an all time high of 933,462 individuals received assistance to purchase groceries in Virginia through the Supplemental Nutrition Assistance Program (SNAP). SNAP-Ed was recently cut to pay for the extension of current dairy programs by over 25% (\$110 million), threatening the commonwealth's ability to educate its residents concerning nutrition.

What has been done

Under the guidance of Agriculture and Natural Resources Horticulture Extension Agents in the Chesapeake, Norfolk, Virginia Beach and Portsmouth units, Extension Master Gardener volunteers addressed the food shortage through a multi-faceted approach to end hunger: direct donation of fresh garden produce; canned goods and monetary contributions to the Foodbank of Southeastern Virginia; creation of demonstration gardens to teach people how to grow their own food; participation in the Plant a Row for the Hungry Program and healthy food preparation information to area residents. Donations of food and money were collected at Master Gardener events, and produce was grown and regularly donated to the Foodbank. Demonstration gardens were cultivated in each city, where volunteers solicited and received donations for seeds and other essential supplies.

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Results

In 2012, food donations exceeded 12,000 pounds. This contribution to the foodbank helped provide nutritious canned, boxed, fresh frozen and prepared food to over 414,000 individuals, allowing for the assembly of nutritious meals for less than \$.32. Each dollar contributed allowed the foodbank to assemble and distribute up to \$6.00 worth of food and groceries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #5

1. Outcome Measures

Healthy Food for the Common Wealth and Common Good: Consumers, Low-income Populations, and Farmers Benefit From a Farmers Market in Spotsylvania

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture is Virginia?s largest industry with an annual economic impact of \$55 billion. And yet, Virginia farmers are struggling with economic profitability, uncertainty and viability. At the same time, individuals and Virginia communities are experiencing increased incidences of obesity, diabetes, diet-related diseases and in some instances, food insecurity. Expanding good, local fresh healthy food opportunities throughout the local food system can improve local agricultural economic vitality and strengthen community health and well-being. Economic data and projections that Virginia Cooperative Extension (VCE) developed in 2007 show that if each household in Virginia were to spend \$10 per week for a year on local Virginia products, a

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significant economic impact would be generated. At a state level, this spending pattern would generate over \$1.65 billion dollars in direct economic impact.

What has been done

A farmers market was started in Spotsylvania County in 1999 to connect local farmers and consumers. This market started with a handful of vendors in 1999. This farmers market is a Virginia Grown market and allows producers of agricultural products, baked goods, jams and jellies and similar products produced within a 100 mile radius of the market. The market secured grants to help attract Supplemental Nutrition Assistance Program (SNAP) recipients to the market by being able to offer a \$10.00 matching bonus for \$10.00 of SNAP funds used at the market, thus doubling part of their SNAP purchasing power at the market. The SNAP and bonus purchases are supported by market tokens which carried specific values and could only be used at the market. In 2012 a mid-week market was opened.

Results

In 2012, the Spotsylvania Farmers Market opened a Wednesday afternoon market. This provided two market days for local farmers, bakers and others. Forty-seven farmers and vendors had market stalls at the Saturday market and 15 farmers and vendors had stalls at mid-week market. Consumers were able to purchase local products and farmers were able to enhance their gross incomes through retail sales. The Saturday and Wednesday markets averaged 2,700 and 500 shoppers per week during peak vegetable season respectively.

In 2012, 884 SNAP recipient transactions were processed at the market for a total value of \$21,843. There were 273 first time SNAP purchasers at the market in 2012. SNAP shoppers have been introduced to a wide variety of fruits and vegetables and 37% reported purchasing many new or different kinds of fruits and vegetables and an additional 53% report purchasing some new or different kinds of vegetables and fruits.

A customer survey indicated that 59% of the customers shop at the market 3 or more times a month and that 31% of the customers shop 1 or 2 times a month. The consumption of fresh fruits and vegetables is important to a healthy diet and 31% and 40% of the customers from the two sample groups reported purchasing all or most, respectively, of these items at the market. As a result of shopping at the farmers market 66% and 28% of the shoppers from the two survey groups indicated that they have increased greatly or increased some the amounts of fresh fruits and vegetables purchased.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

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Outcome #6

1. Outcome Measures

Combatting Obesity in Children and Adults through Community Gardening

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Center for Disease Control and Prevention data indicates that in Virginia, 26% of adults are obese. Excess weight increases the risk of developing conditions such as diabetes, heart disease, osteoarthritis, and some cancers, while reducing life span. The U.S. spent an estimated \$190 billion on obesity-related illnesses in 2005. The total cost of diabetes for people in Virginia was estimated at \$4.4 billion in 2006. This estimate includes medical costs in excess of \$2.8 billion attributed to diabetes, and lost productivity valued at \$1.6 billion (American Diabetes Association, 2008; 2011).

In addition, obesity now affects 17% of all children and adolescents in the United States.

Between 1980 and 2008, the percentage of overweight or obese children in the United States tripled. In 2008 alone, more than one third of U.S. children and adolescents were overweight or obese. Statistics show that children and adolescents who are obese have a 70% to 80% chance of becoming overweight or obese adults.

Risk factors contributing to obesity include: lack of physical activity; unhealthy diet; sedentary lifestyle and environmental factors. According to Dr. Kevin Davy, professor of Family Medicine in the Virginia Tech Carilion School of Medicine, the complexity of obesity expands beyond the simple etiology of energy imbalance to include genomic, molecular, cellular, and organic components that interact with individual preferences, family and community contexts, work life,

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economics, and the local, state, and national policy landscape.

VCE's Strategic Plan (2011-2016) has established a need for the development of comprehensive local food systems, and recommends response to increased public interest in local foods, home food production and community gardening.

"

What has been done

To address the obesity epidemic, the Centers for Disease Control and Prevention have developed strategies to promote healthy eating and physical activity, which include:

- 1. Enhanced school-based physical education to improve student?s flexibility, muscular endurance, physical activity-related knowledge and overall physical fitness.
- 2. Community-scale urban design and land-use policies that support physical activity.
- 3. Creation of or enhanced access to places for physical activity combined with informational outreach activities.
- 4. Initiation or expansion of community supported agriculture programs in all settings.
- 5. Support and promotion of community and home gardens.

The Horticulture Extension Agent, and Master Gardeners, in collaboration with Norfolk City, Norfolk Environmental Commission and Bon Secours Health System, has integrated services in response. A Regional Master Gardener Training Seminar was specifically organized to address planning, management and benefits of community gardens and a Community Gardens Task Force was initiated to facilitate community partnerships, bring people and resources together, and support long-term viability of community garden programs.

"

Results

Immediate and emerging outcomes of these efforts include: the establishment of 4 new community gardens in 2012; identification and pooling of existing resources; reaching targeted audiences; imparting knowledge that will encourage/facilitate physical activity and consumption of superior, locally grown and affordable produce.

The long-term outcomes and benefits will be aesthetic improvements; the potential for increased property values near newly established gardens; and social benefits such as stronger community fabric and reduction in crime, and environmental benefits where community gardens serve as models for stewardship of natural areas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior

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Nutrition and Hunger in the Population

Outcome #7

1. Outcome Measures

Cleaning up the Chesapeake Bay: One Home Landscape at a Time

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Homeowners, green industry professionals and the Chesapeake Bay sustain significant financial and quality losses due to incorrect selection, planting and maintenance of landscape materials.

As one example, the EPA states that ?Homeowners tend an estimated 40 million acres of turf? and lawns rank as the fifth largest crop in the country, on the basis of area, after corn, soybeans, wheat and hay.? The report goes on to say that, ?The fertilizer amounts applied to lawns are roughly equivalent to the application rates for row crops and lawns produce significant amounts of nutrient-rich stormwater runoff which can potentially cause eutrophication in streams, lakes and estuaries.

Uninformed homeowners frequently use excessive and inappropriate amounts of lawn and garden chemicals & fertilizers. These practices not only cost homeowners and professionals time and money, but are harmful to the Chesapeake Bay, whose health is directly tied to our own health and well-being.

"

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What has been done

Through the Master Gardener Volunteer Program, the agent and volunteer coordinator recruits, trains and manages a volunteer staff of 125 active volunteers. These volunteers serve the general public & landscape professionals by educating them about the proper selection, planting and maintenance of landscape materials.

Master Gardener Volunteers are recruited from the general public, county and city employees and the green industry. These volunteers are given rigorous instruction initially via a 50 hour Master Gardener course that the agent plans & conducts with the help of guest instructors from Virginia Cooperative Extension and local communities.

Results

The Master Gardeners conducted programs based on the Landscape Best Management Practices (BMPs) developed by the Northern District Horticulture Agents. Centered on landscape BMPs, the 125 Master Gardeners contributed 7,899 contributed hours & contacted 7,360 clients while serving the horticultural needs in the Albemarle community. The financial impact of the volunteer?s work, at \$21.36/hour, was valued at \$168,723. The clients exercise management control and the ability to make fertilizer recommendations for more than 2,400 acres in Albemarle County.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
604	Marketing and Distribution Practices
704	Nutrition and Hunger in the Population

Outcome #8

1. Outcome Measures

Farmers Markets as the New Public Square and Hub for Community-based Economic Development

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Virginia experienced a 13% increase in the number of farms selling direct to consumers from 2002 to 2007. The value of these direct-to-consumer sales increased 72% over the same time period, from \$16.8 million to 28.9 million. Today, Virginia has over 200 farmers markets and 135 Community Supported Agriculture (CSAs) operations and the number continues to grow. For many people, farmers markets are the starting point for more direct farm to table connections.

What has been done

Farmers markets are now considered the new public square of civil society and hubs for community-based economic activity. Virginia Cooperative Extension is an educational resource for markets and communities to strengthen these public squares and economic hubs. As an example, Chesapeake VCE helped to reorganize and manage a Chesapeake Farmers Market which has been operated continuously for the past twelve years. Chesapeake VCE helped to establish rules which require vendors to be producers of what they offer to sell. Additionally, Extension has provided training on marketing, food handling, and the promotion and acceptance of Supplemental Nutrition Assistance Program (SNAP) benefits.

Results

The patronage of the Chesapeake Farmers Market has increased each year since 2000 and brought more farmers to the market. A survey conducted by Chesapeake VCE revealed 78% of people surveyed at the market made frequent visits; 48% patronized the market at least once a week spending at least \$20 per visit. Because this market has been so successful, the City constructed a permanent Farmers' Market pavilion in 2012, which will be an economic engine and gathering place for the community and region. Harrisonburg Farmers Market, in its fourth year under a permanent structure has experience three to four-fold increase in sales and reached nearly \$1.5 million in sales in 2012. Additionally, farming vendors had a combined sales of over \$640,000, and the market has we have a healthy SNAP program with a matching grant to offer a double-value incentive program toward SNAP benefits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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On overall goal of this planned program is to address food security and hunger at the local level. An important aspect of this goal is fostering community resilience and capacity to address these issues. The current economic situation and possible weather extremes may be a challenge for rural and urban communities over the next 5 years. Our planned program team will focus on building understanding and awareness of how foundational and necessary a strong local and regional food system is from a social, economic, and environmental perspective.

The economic and political situation continues to be tenuous, and this situation could affect funding for some programs and personnel. Additionally, the economic and political situation could also exacerbate food insecurity issues if employment opportunities do not increase statewide and localities continue to face dwindling financial resources.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Local food systems work continues to be an evolving and dynamic movement and process. A comprehensive analysis of the social, economic, and environmental impact of these systems on food security to understand the collective needs and results would be beneficial.

Key Items of Evaluation

A comprehensive analysis of the social, economic, and environmental impact of these systems on food security to understand the collective needs and results would be beneficial..

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V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Global Food Security and Hunger - Pest Management

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	5%	0%	0%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	20%	0%	30%	20%
212	Pathogens and Nematodes Affecting Plants	20%	0%	30%	0%
213	Weeds Affecting Plants	10%	0%	10%	20%
216	Integrated Pest Management Systems	20%	0%	20%	60%
403	Waste Disposal, Recycling, and Reuse	5%	0%	0%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%	0%	0%	0%
723	Hazards to Human Health and Safety	5%	0%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	10%	100%	10%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Vac:: 2042	Exter	nsion	Rese	earch
Year: 2012	1862	1890	1862	1890
Plan	26.2	0.8	28.0	1.5
Actual Paid Professional	33.0	0.5	37.7	0.0
Actual Volunteer	604.0	0.0	0.0	0.0

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

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2012 Virginia Polytechnic Inst. & State University and Virginia State University Combined Research and Extension Annual Report of Accomplishments and Results

Exte	ension	Res	earch
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
686371	0	686869	227092
1862 Matching	1890 Matching	1862 Matching	1890 Matching
971126	0	1544645	232999
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2882153	12346	7494993	143709

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Virginia IPM and Pesticide Safety Education Program was extended by Virginia Tech faculty and VCE ANR agents across the Commonwealth with the help of 604 volunteers who contributed 8,060 hours. Additional funding procured included 150 competitive grants (\$3,905,637), 74 non-competitive grants (\$1,372,992), contracts (\$655,520), donations (\$14,876), in-kind donations (\$195,827), fellowships (\$21,034), and continuing education fees (\$120,279). A total of 1,468 workshops, short courses, media pieces, field days, demonstrations, seminars, presentations, and in-service training programs were presented to homeowners, Master Gardeners, public school officials, food preparation staff, pesticide dealers/distributors/handlers, growers, foresters, plant nursery, landscape, and golf course managers including 26,706 'Extended Learners'. A total of 473 Extension publications/written materials were developed, including fact sheets, peer-reviewed documents, manuals, guides, and newspaper and trade journal articles. An additional 95 web sites or other multimedia offerings were placed online. The Master Gardeners Program in Arlington County responded to the need to meet Chesapeake Bay water pollution standards and reclaim public land from invasive plant species by offering a 2-day Sustainable Landscape Symposium (70 participants), and there were an additional 30,442 clientele contacts. The Gypsy Moth Slow The Spread Program performed dozens of database, GIS, and decision support functions, trapping data processing and quality control, report generation, and map generation. The Fruit Insect IPM Program conducted several full day fruit schools and updated The Spray Bulletin for Commercial Tree Fruit Growers and guides for Commercial Vineyards, Small Fruits and Home Fruit. The Virginia Corn Earworm Advisory promoted locally operated black light traps for detecting insect activity, field scouting and field demonstrations. A Watermelon Beet Armyworm Management Program was initiated on 225 acres of commercial seedless melons. The Ambrosia Beetle Management Program promoted pest monitoring and trapping in 9 counties and cities. The Virginia Plant Disease Clinic received 1,553 samples and diagnosed 1,704 plant problems. The Virginia Potato Disease Advisory provided weekly advisories and fungicide use recommendations. The Virginia Cucurbit Disease Advisory provided disease forecasts for Cucurbit downy mildew, the most devastating disease of cucurbits in Virginia. The Weed Identification in Ornamental Landscapes and Crops Program trained over 700 individuals in the identification of common and troublesome weed species. The VT Billbug IPM Program for Orchardgrass provided timely degree-day (DD) updates to predict spring egg-laying by adults. The Reduced Fungicide Use in Soybean Program used on farm demonstrations to evaluate the economics of fungicide use. The Surveillance and Management of Brown Marmorated Stink Bug and Kudzu Bug in Soybean Program made 569 soybean field visits to 65 counties. The Northern Shenandoah Valley Tree Fruit IPM Program conducted 9 in-depth meetings that were attended by 504 clientele. The IPM in Public Schools Program was extended to 3 new school districts.

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Pesticide safety education was extended through 105 local Extension units to over 20,000 certified pesticide applicators. This enabled these producers and pest managers to maintain state certification in 27 different applicator categories. Over 250 workshops were sponsored to train commercial and private applicators for certification/recertification. Pesticide safety education and IPM information was shared with over 686,961 unique visitors (4,706,954 hits) through the Virginia Tech Pesticide Programs websites. Over 300 employers enrolled over 1,500 employees in three online Extension pesticide safety education courses to help them qualify for certification in 7 different categories. Three in-service education (train-the-trainer) workshops were hosted for 139 trainers (Extension agents, specialists, pesticide investigators, and vocational agriculture teachers).

2. Brief description of the target audience

Consumers, landowners, homeowners, producers, producer groups, pesticide applicators seeking certification under federal and state laws, pesticide regulators, boards, commissions, and enforcement officials, local government, councils, and community groups, universities, colleges, K-12, youth aged 13-18, schools, advocacy and consumer protection groups and associations, pesticide safety educators, pest management specialists, and related experts, authors, journalists, other media specialists, institutional, industrial, and vector control groups and individuals, health/medical, environmental, and emergency response personnel and organizations, farm workers, migrants, and day-laborer groups and individuals, researchers, scientists, pesticide toxicologists, extension educators and related experts.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	67159	98344	4828	40

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	116	0

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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of non-peer reviewed outreach citations incorporating information on the most effective IPM strategies and systems for use on selected commodities and/or at selected sites

Year	Actual
2012	10

Output #2

Output Measure

• Number of private applicators trained for certification

Year	Actual
2012	2055

Output #3

Output Measure

• Number of commercial applicators trained for certification

Year	Actual
2012	2612

Output #4

Output Measure

• Number of private applicators trained for recertification

Year	Actual
2012	2955

Output #5

Output Measure

• Number of commercial applicators trained for recertification

Year	Actual
2012	1791

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Output #6

Output Measure

• Number of non-certified applicators trained

Year	Actual
2012	51750

Output #7

Output Measure

• Number of stakeholders enrolled in the IPM Stakeholder Network

Year	Actual
2012	80

Output #8

Output Measure

• Number of trainers and regulatory officials trained

Year	Actual
2012	139

Output #9

Output Measure

• Educational media website hits communicated through the Pesticide Safety Education website

Year	Actual
2012	4706954

Output #10

Output Measure

• Number of non-peer reviewed research citations incorporating information on the most effective IPM strategies and systems for use on selected commodities and/or at selected sites.

Year	Actual
2012	126

Output #11

Output Measure

• Number of presentations on IPM related topics.

Year	Actual
i cui	Actual

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2012 1468

Output #12

Output Measure

• Number of volunteer hours dedicated to pest management programming

Year	Actual	
2012	8060	

Output #13

Output Measure

• Number of extended learners with four or more hours of contact related to pest management

Year	Actual
2012	26706

Output #14

Output Measure

 Amount of revenue generated in dollars for pest management Extension and research programming

Year	Actual
2012	6286165

Output #15

Output Measure

 IPM publications for clientele including extension publications, manuals and guides, multi-media pieces, websites, newspaper and trade journal articles, and papers provided at production meetings and field days.

Year	Actual
2012	312

Output #16

Output Measure

• Number of samples evaluated by current and improved plant diagnostic methods

Year	Actual
2012	3553

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals gaining knowledge of IPM through training course completion and/or examination
2	Number of applicators who gain knowledge in pesticide safety through certification training and pass the state certification exam(s).
3	Number of applicators who gain additional knowledge in pesticide safety through recertification training and sufficient credit to maintain their certification
4	Number of applicators, farmworkers, and the general public who gain knowledge in general pesticide safety who are not seeking certification as pesticide applicators
5	Number of trainers who gain knowledge in pesticide safety and pesticide curriculum and program training in established train-the-trainer workshops
6	Through educational programming and collaborative efforts, support the collection and proper disposal of unwanted pesticides in Virginia localities.
7	Number of localities participating in a pesticide container recycling program.
8	Number of participants gaining knowledge about invasive NIS
9	Increase the number of stakeholders collaborating with pest management strategic planning activities which support the communication of the pest management needs of Virginia and regional agricultural interests to pesticide regulatory policymakers.
10	Increase in the number of facilities that are impacted in a positive way by IPM program activities.
11	Number of Virginia soybean growers aware of Asian soybean rust risk to their crop.
12	Number of Virginia soybean growers who apply fungicide based on Asian soybean rust detection activities.
13	Number of applicators who indicated that they understand that they need to comply with state and federal regulations as a result of VCE training.
14	Number of applicators who read pesticide labels and wear personal protective equipment as a result of VCE training.
15	Number of applicators who changed their use of application equipment or calibration to reduce spray drift as a result of VCE training.
16	More than 20% of commercial producers indicate that plant disease diagnosis and recommendations results in reduced pesticide use in their operations.
17	Pest monitoring programs result in cost and time savings and increased crop protection for an increasing number of acres

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Outcome #1

1. Outcome Measures

Number of individuals gaining knowledge of IPM through training course completion and/or examination

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	60000	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Federal and state pesticide laws and regulations require applicators to follow the pesticide label directions. Pesticide safety education incorporates integrated pest management (IPM) methods into training programs to encourage reduced risk and reduced use of pesticides. Pesticide safety education is mandatory for workers and handlers who must comply with federal worker protection standards. Without pesticide safety and IPM education there is an increased risk of human exposure and environmental from pesticide misuse.

What has been done

In 2012, Virginia Cooperative Extension agent, specialists, and volunteered conducted programs in pesticide safety and IPM throughout Virginia. The program(s) assisted agricultural producers, non-certified workers and handlers, and homeowners to comply with pesticide laws and regulations, to protect the environment, and safeguard human health through the safe and efficient use of pesticides and alternative pest control tactics.

Results

During 2012, over 60,000 pesticide applicators were trained in Virginia through the work of VCE agents, specialists, and volunteer Master Gardeners. These individuals were given the opportunity to gain knowledge of IPM through training courses, workshops, demonstrations, and examinations.

4. Associated Knowledge Areas

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KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Number of applicators who gain knowledge in pesticide safety through certification training and pass the state certification exam(s).

2. Associated Institution Types

1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	4667

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The federal and state pesticide laws and regulations require pesticide applicators to be certified to use restricted use pesticides. In addition, Virginia law requires all commercial applicators to be certified to use any pesticide. Without pesticide safety and integrated pest management (IPM) education to enable these individuals to do so, many would suffer economic hardships and violate the law. A lack of knowledge in pesticide safety and IPM practices threatens human health and the environment.

What has been done

In 2012, Virginia Cooperative Extension agents and specialists conducted certification preparation programs in pesticide safety and IPM throughout Virginia. These programs assisted agricultural producers and commercial pesticide applicators to comply with the law and protect the environment and human health through the safe and efficient use of pesticides and adoption of alternative pest control tactics.

Results

During 2012, 2,055 private pesticide applicators (farmers) gained knowledge in pesticide safety and IPM through certification training and passed the state certification exam(s). During 2012, 2,612 commercial applicators gained knowledge in pesticide safety and IPM through certification training and passed the state certification exam(s).

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4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #3

1. Outcome Measures

Number of applicators who gain additional knowledge in pesticide safety through re-certification training and sufficient credit to maintain their certification

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	4746

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The federal and state pesticide laws and regulations require pesticide applicators to be certified to use restricted use pesticides. In addition, Virginia law requires all commercial applicators to be certified to use any pesticide. It is mandatory that these applicators renew their pesticide licenses through continuing education every two years. Without pesticide safety and integrated pest management (IPM) education to enable these individuals to do so, many would suffer economic hardships and violate the law. A lack of knowledge in pesticide safety and IPM practices threatens human health and the environment.

What has been done

In 2012, Virginia Cooperative Extension agents and specialists conducted programs in pesticide safety and IPM throughout Virginia. The program(s) assisted agricultural producers and licensed pesticide applicators to comply with the law and protect the environment and human health through the safe and efficient use of pesticides and alternative pest control tactics.

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Results

During 2012, 2,955 private and 1,791 commercial applicators gained additional knowledge in pesticide safety and IPM through re-certification training. This enabled these applicators to maintain their licenses in order to comply with the law and sustain their businesses and employment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #4

1. Outcome Measures

Number of applicators, farmworkers, and the general public who gain knowledge in general pesticide safety who are not seeking certification as pesticide applicators

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	51750

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Federal and state pesticide laws and regulations require applicators to follow the pesticide label directions. Pesticide safety education incorporates integrated pest management (IPM) methods into training programs to encourage reduced risk and reduced use of pesticides. Pesticide safety education is mandatory for workers and handlers who must comply with federal worker protection standards. Without pesticide safety and IPM education there is an increased risk of human exposure and environmental from pesticide misuse.

What has been done

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In 2012, Virginia Cooperative Extension agents, specialists, and volunteered conducted programs in pesticide safety and IPM throughout Virginia. The program(s) assisted agricultural producers, non-certified workers and handlers, and homeowners to comply with pesticide laws and regulations, to protect the environment, and safeguard human health through the safe and efficient use of pesticides and alternative pest control tactics.

Results

During 2012, 51,750 non-certified pesticide applicators (those not seeking certification) were trained in Virginia through the work of VCE agents, specialists, and volunteer Master Gardeners.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #5

1. Outcome Measures

Number of trainers who gain knowledge in pesticide safety and pesticide curriculum and program training in established train-the-trainer workshops

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	139

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Train-the-trainer programs establish the expertise and organization of any pesticide safety education program. It is critical that train-the-trainer education is held annually to maintain a trainer network and transfer technology and methods to trainers.

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What has been done

Virginia Tech has hosted two train-the-trainer workshops in 2012.

Results

The Virginia Pesticide Safety Educators Workshop was held in October 2012. with 115 agents, specialists, pesticide investigators, and program staff attending. A second train-the-trainer workshop was hosted for 24 vocational agriculture teachers. These 139 trainers returned to their localities to educate applicators and students statewide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #6

1. Outcome Measures

Through educational programming and collaborative efforts, support the collection and proper disposal of unwanted pesticides in Virginia localities.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The disposal of canceled, banned or unwanted agricultural and commercial pesticides poses a significant challenge to agricultural producers and other pesticide users. Pesticide wastes are a public health and financial threat. Many waste products end up in local waste systems. Since 1990, the Virginia Department of Agriculture and Consumer Services, and Virginia Cooperative Extension have worked together to collect and destroy 1,189,014 pounds of pesticide wastes.

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What has been done

An inexpensive and efficient solution to disposing of waste products eliminates a potential threat to health and the environment and saves money. To identify and collect pesticide wastes in 2012, Virginia Cooperative Extension agents, in partnership with the Virginia Department of Agriculture and Consumer Services, conducted a pesticide waste disposal program in 23 localities throughout Southside Virginia. The program(s) helped agricultural producers, licensed pesticide dealers and pest control firms, golf courses, and homeowners properly dispose of unwanted pesticides.

Results

As a result of this collaborative pesticide waste disposal program, 42,000 pounds of unwanted pesticides were collected and properly disposed from farms, licensed pesticide dealers and pest control companies, golf courses, and homeowners in 23 Southside Virginia localities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
403	Waste Disposal, Recycling, and Reuse

Outcome #7

1. Outcome Measures

Number of localities participating in a pesticide container recycling program.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The disposal of pesticide containers poses a significant challenge to agricultural producers and other pesticide users. Improperly rinsed containers are a public health and financial threat. Many containers end up in local waste systems. Since 1993, the Virginia Department of Agriculture and Consumer Services, the Virginia Pesticide Control Board and Virginia Cooperative Extension have worked together to collect and recycle 1,274,350 pounds of plastic pesticide containers.

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What has been done

An inexpensive and efficient solution to disposing of containers eliminates a potential threat to health and the environment and saves money. To identify, collect and recycle pesticide containers in 2012, Agriculture and Natural Resource Extension agents for Virginia Cooperative Extension, in partnership with the Virginia Department of Agriculture and Consumer Services assisted pesticide container recycling programs at 29 collection sites in 17 Virginia localities. The program(s) helped agricultural producers, licensed pesticide dealers and pest control firms, golf courses, and homeowners properly recycle waste pesticide containers.

Results

As a result of this collaborative pesticide container recycling program, 88,000 pounds of properly rinsed containers were collected and properly recycled from farms, licensed pesticide dealers and pest control companies, golf courses, and homeowners in 17 localities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
403	Waste Disposal, Recycling, and Reuse

Outcome #8

1. Outcome Measures

Number of participants gaining knowledge about invasive NIS

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The nascent bioenergy industry is growing at a tremendous pace as they identify new crops, improve existing crops, and target specific growing regions. Virginia will play an important role in this industry as we adopt new crops to replace the dwindling tobacco fields. However, as the industry develops there is a growing concern that the crops we use could escape the cultivated environment and become harmful invasive species.

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What has been done

One research effort is to evaluate the threat posed by a multitude of crops throughout the Southeast, and identify mitigating strategies to reduce the threat. The concern over the invasive potential of bioenergy crops has been expressed by state and federal officials, environmental organizations, academics, and the bioenergy industry. Thus, this research program aims to present an unbiased evaluation of the invasion risk. We are conducting field, greenhouse, laboratory, and modeling studies to meet our goals.

Results

We have identified a novel mechanism by which the common understory invader Microstegium vimineum disperses seed: ephemeral overland flow that we tracked with fluorescent powder and UV imagery.

We have surveyed 18 naturalized populations of the invasive Miscanthus sinensis across the eastern US, finding that this species has a broad environmental niche, and can likely expand broadly outside its existing extent.

An Extension publication was authored outlining Best Management Practices along the bioenergy supply chain to reduce invasiveness.

Results are being disseminated via peer-reviewed publications, presentations, and extension documents.

4. Associated Knowledge Areas

KA Code	Knowledge Area	
112	Watershed Protection and Management	
213	Weeds Affecting Plants	
216	Integrated Pest Management Systems	

Outcome #9

1. Outcome Measures

Increase the number of stakeholders collaborating with pest management strategic planning activities which support the communication of the pest management needs of Virginia and regional agricultural interests to pesticide regulatory policymakers.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Increase in the number of facilities that are impacted in a positive way by IPM program activities.

2. Associated Institution Types

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- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #11

1. Outcome Measures

Number of Virginia soybean growers aware of Asian soybean rust risk to their crop.

Not Reporting on this Outcome Measure

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Outcome #12

1. Outcome Measures

Number of Virginia soybean growers who apply fungicide based on Asian soybean rust detection activities.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of applicators who indicated that they understand that they need to comply with state and federal regulations as a result of VCE training.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	9319	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Federal and state pesticide laws and regulations require applicators to follow the pesticide label directions. Pesticide safety education incorporates integrated pest management (IPM) methods into training programs to encourage reduced risk and reduced use of pesticides. Pesticide safety education is mandatory for workers and handlers who must comply with federal worker protection standards. Without pesticide safety and IPM education there is an increased risk of human exposure and environmental from pesticide misuse. It is very important that applicators understand the laws they have to comply with and this is best accomplished through training.

What has been done

Evaluation surveys were inserted into over 180 private and commercial pesticide applicator training meetings to determine if applicators understood how to comply with state and federal pesticide regulations.

Results

Survey data from 15 localities representing about 50 different sessions, indicated that 99% of 454 applicators understood how to comply with state and federal pesticide regulations as a result of VCE training. Extrapolated to the entire audience of certified applicators trained this year that

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would mean that 9,319 applicators understood how to comply with the law as a result of training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
723	Hazards to Human Health and Safety

Outcome #14

1. Outcome Measures

Number of applicators who read pesticide labels and wear personal protective equipment as a result of VCE training.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	9351	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

One of the most important practices by pesticide applicators is to read and comprehend pesticide label directions. One critical part of these directions is to understand what personal protective equipment (PPE) is required to be used for application in order to avoid exposure to pesticides. More applicators are cited for violation of label directions and improper use of PPE than any other violations in VIrginia.

What has been done

Label comprehension and proper use of PPE are key parts of Virginia Cooperative Extension (VCE) Pesticide Safety Education programs. Evaluation surveys were inserted into over 180

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private and commercial pesticide applicator training meetings to determine if applicators were reading label directions and used PPE.

Results

Survey data from 15 localities representing about 50 different sessions, indicated that 99.3% of 456 applicators read labels and used the required personal protective equipment (PPE) as a result of VCE training. Extrapolated to the entire audience of certified applicators trained this year that would mean that 9,351 applicators read pesticide labels and used the required PPE required as a result of VCE training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
723	Hazards to Human Health and Safety

Outcome #15

1. Outcome Measures

Number of applicators who changed their use of application equipment or calibration to reduce spray drift as a result of VCE training.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	9036

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Precision application technology is a modern convenience and a valuable tool to protect the environment, improve efficiency and efficacy, and protect pesticide applicators from exposure to pesticides. It is very important that applicators learn how to adopt and use this technology

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properly.

What has been done

Precision technology information is included in every Virginia Cooperative Extension (VCE) educational program in pesticide safety education and IPM. Evaluation surveys were inserted into over 180 private and commercial pesticide applicator training meetings to determine if applicators learned more about this technology as a result of attending VCE training programs.

Results

Survey data from 15 localities representing about 50 different sessions, indicated that 96% of 454 applicators learned more about proper use of application equipment (calibration, drift minimization, and new technology) as a result of VCE training. Extrapolated to the entire audience of certified applicators trained this year that would mean that 9,036 applicators learned more about application technology as a result of training.

4. Associated Knowledge Areas

KA Code	Knowledge Area	
112	Watershed Protection and Management	
216	Integrated Pest Management Systems	
403	Waste Disposal, Recycling, and Reuse	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	
723	Hazards to Human Health and Safety	

Outcome #16

1. Outcome Measures

More than 20% of commercial producers indicate that plant disease diagnosis and recommendations results in reduced pesticide use in their operations.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1849

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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Non-commercial growers, commercial crop producers and lawn/landscape professionals require accurate diagnosis of their crops? disease and abiotic problems (e.g., chemical injury, environmental stress, cultural problems) in order to implement appropriate IPM tactics. The Virginia Tech Plant Disease Clinic (PDC) is a service lab to Virginia Cooperative Extension (VCE) agents, providing diagnosis of plant disease and abiotic problems for Virginia clientele.

What has been done

In 2012, the PDC received 1,553 samples and diagnosed 1704 plant problems. Additionally, 103 phone and 106 email inquiries were answered and 87 digital diagnoses were made. To evaluate impacts of the PDC diagnostic services, electronic surveys were sent post-season 2012 to PDC clients who included email addresses on diagnostic forms.

Results

Response rates from the three clientele surveys (three grower groups) were 31% non-commercial growers, 24% landscape/lawn professionals and 30% commercial growers. Some highlights of the survey results include: commercial growers (81%/19%), non-commercial growers (66%/20%), and landscape/lawn professionals (71%/29%) strongly agreed/agreed with the statement, ?I value the services provided by the Plant Disease Clinic;? 90% of commercial growers, 59% of non-commercial growers and 57% of landscape/lawn professionals reported that PDC services increased their knowledge of pest/disease and abiotic problems; 43% percent of landscape/lawn professional, 29% of commercial grower and 18% of non-commercial grower respondents reported reduced pesticide usage through use of the PDC diagnostic services; Increased profitability and crop quality, respectively, were reported by 62% and 67% of commercial growers through use of PDC services; 71% of commercial grower respondents agreed that use of PDC diagnostic services allowed them to develop a more strategic IPM approach in their operation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #17

1. Outcome Measures

Pest monitoring programs result in cost and time savings and increased crop protection for an increasing number of acres

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Insect, weed and plant disease pests affect the lives and livelihoods on most growers and public sector clientele in Virginia. Both agricultural and urban settings are under constant pressure from many pests and the situation is made more complex by the constant invasion of new pest species from outside the US borders. Many current management strategies rely on the use of pesticides which are expensive and pose risks, both known and unknown. Knowledge of when and where a pest will occur is a powerful tool and first step in developing an effective management strategy. Pest monitoring programs can alert clientele to high risk areas or times of the season so control measures can be more precisely selected and targeted.

What has been done

Virginia Tech?s IPM Program encompasses many pest surveillance programs that are as varied as the pests being monitored, from field scouting to using weather-based models to predict incidence and spread. Examples are the Gypsy Moth Slow The Spread Program, the Virginia Corn Earworm Advisory, the Watermelon Beet Armyworm Management Program, the Ambrosia Beetle Management Program, the Virginia Potato Disease Advisory, the Virginia Cucurbit Disease Advisory, the VT Billbug IPM Orchardgrass Program, and the Surveillance and Management of Brown Marmorated Stink Bug and Kudzu Bug in Soybean Program.

Results

The gypsy moth Slow The Spread program resulted in an 80% reduction in spread from the historical rate in central/western Virginia and accounted for estimated benefits of between \$34 and \$264 million per year. As a result of the Virginia Corn Earworm Advisory, growers in Southampton County, one of Virginia?s largest agricultural counties, treated only problem fields and unwarranted sprays were prevented on nearly 80,000 acres of row crops. Growers in Prince George County treated only 2500 of their 11,000 acres. With an average treatment cost of \$12 per acre, this program saved growers in Southampton and Prince George Counties \$960,000 and \$102,000, respectively, and substantially reduced insecticide use on much of Virginia?s farm lands. Then Watermelon Beet Armyworm Management Program resulted in more timely insecticide sprays to infested fields, and reduced expensive unnecessary treatments resulting in an estimated \$50,000 in increased revenues for local melon growers. None of the 11 nurseries that used the Ambrosia Beetle Management Program sustained any losses from ambrosia beetles. On average 6 fungicide applications were spared through the implementation of the Virginia Potato Disease Advisory. Reduced fungicide applications constituted a savings of \$360,000 in unnecessary inputs for Eastern Shore of Virginia potato producers. Using the Virginia Cucurbit Disease Advisory, Virginia cucurbit producers saved \$100,000 on unnecessary fungicide applications. The Surveillance and Management of Brown Marmorated Stink Bug and Kudzu Bug in Soybean program limited insecticide treatments to field edges, only, on 1,885 soybean acres representing a 60-80% reduction in insecticide use.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

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V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Asian Soybean Rust has not been a problem the past several years, thus work has not resumed on this pest.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Response rates from the three Virginia Plant Disease Clinic (PDC) clientele surveys (three grower groups) were 31% noncommercial growers, 24% landscape/lawn professionals and 30% commercial growers. Survey highlights include: commercial growers (81%/19%), non-commercial growers (66%/20%), and landscape/lawn professionals (71%/29%) strongly agreed/agreed with the statement, "I value the services provided by the Plant Disease Clinic;" 90% of commercial growers, 59% of noncommercial growers and 57% of landscape/lawn professionals reported that PDC services increased their knowledge of pest/disease and abiotic problems; 43% percent of landscape/lawn professional, 29% of commercial grower and 18% of noncommercial grower respondents reported reduced pesticide usage through use of the PDC diagnostic services; Increased profitability and crop quality, respectively, were reported by 62% and 67% of commercial growers through use of PDC services; 71% of commercial grower respondents agreed that

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use of PDC diagnostic services allowed them to develop a more strategic IPM approach in their operation. With the VT Billbug IPM Orchardgrass (OG) Program post-season clientele survey, results showed that of those who responded, 100% selected either strongly agree or agree to all questions. Of 5,300 total arcre, the estimate of total OG acreage positively impacted by program updates in 2012 was 3,650 acres (68.9%). The number of acres on which the paired-feeding hole sampling method will be used in 2013 is 3,200 acres (60.4%). With the IPM and Invasive Pests in Tree Fruit Production post program survey, reviews of spray records indicated that 84% of the fruit growers in Planning District 9 effectively managed their crops and followed current pesticide labeling requirements for tree fruit crops. Current crop protection technology was applied on 84% orchards as a result of the IPM scouting program. Spray records indicated insecticide applications were based on the IPM scouting. One grower indicated a saving of \$18,000 by following extension recommendations. With the Northern Shenandoah Valley Tree Fruit IPM Program survey, 33 tree fruit growers offered evaluations at the Effective Fruit Spraying workshop that provided the following impacts: 45% of responders reported that they gained knowledge and skills that would allow them to reduce pesticide use by at least 11%; 67% of responders strongly agreed the sprayer demonstrations were an effective way to understand the difference amongst sprayer technologies and manufacturers; 100% of responders agreed that the workshop gave them a better understanding of factors that contribute to the effective spraying of fruit crops; 100% of responders agreed that they will be able to implement what they learned when they return to work. Fifty growers offered evaluations at the Winchester Area Fruit School provided the following statements: 11% of responders were first time attendees to the Winchester Area Fruit School:

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94% of responders felt the educational program was good or excellent with 21 responders stating specifically that the information presented was useful, good, and up-to-date for tree fruit management. Response rates from VCE Pesticide Safety Education Programs surveys that were reported by agents indicated that 96.1 to 99.3% of those surveyed responded positively to Extension training by improving their knowledge of information on legal compliance, label comprehension, use of personal protective equipment, and adoption of precision application methods and technology.

Key Items of Evaluation

Not all programs are currently evaluated but a new IPM Impact Assessment project is uderway that should allow for more annual evaluations of more programs.

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V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Global Food Security and Hunger - Plants and Plant Products

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	25%	50%	15%	30%
201	Plant Genome, Genetics, and Genetic Mechanisms	5%	0%	15%	0%
202	Plant Genetic Resources	0%	0%	10%	10%
205	Plant Management Systems	25%	25%	15%	20%
216	Integrated Pest Management Systems	20%	25%	15%	20%
403	Waste Disposal, Recycling, and Reuse	5%	0%	10%	20%
601	Economics of Agricultural Production and Farm Management	10%	0%	10%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%	0%	10%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
Tear. 2012	1862	1890	1862	1890
Plan	28.6	0.8	30.6	4.0
Actual Paid Professional	34.4	2.0	39.3	0.0
Actual Volunteer	3508.0	0.0	0.0	0.0

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

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Exte	ension	Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
716414	163145	572596	881743
1862 Matching	1890 Matching	1862 Matching	1890 Matching
808300	303693	1612255	904677
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3008308	141330	6058951	458773

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research experiments on genetic improvement and manipulation of plants, bioprocessing, production systems, and BMP effectiveness. Contribute presentations and scholarly publications to regional, national, and international scientific organizations. Engage with clientele to adapt research products to the production environment. Conduct multi-county and in-depth educational programs and short courses on new plants and plant products, their management, food safety issues, and associated BMPs. Collaborate with other state specialists to develop regional publications in these areas. Maintain demonstration plots of cultural practices, techniques and germplasm adaptability of selected crops. Publish (listserv, web, and mailing) newsletters to provide practical information on pest management, cultural practices, and other research-based aspects of plant management.

2. Brief description of the target audience

The target audience includes Extension educators, commercial producers, policy makers, small businesses, pesticide applicators, homeowners and other plant and food product consumers. Youth, their parents and limited income consumers are targeted through 4-H horticulture programs and community gardening efforts.

3. How was eXtension used?

Numerous eXtension querries were answered.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	198109	321599	43284	2821

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

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Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	48	22	70

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of plants and plant products educational presentations conducted

Year	Actual
2012	1314

Output #2

Output Measure

• Number of plants and plant products volunteers

Year	Actual
2012	3508

Output #3

Output Measure

• Number of plants and plant products research citations

Year	Actual
2012	79

Output #4

Output Measure

• Number of plants and plant products extension/outreach citations

Year	Actual
2012	722

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of commercial producers educated about new plants, cultivated varieties, production techniques or BMPs
2	Increase the number of commercial producers adopting new plants, cultivated varieties, production techniques, or BMPs
3	Increase the number of noncommercial gardeners/producers educated about new techniques or BMPs
4	Increase the number of noncommercial gardeners adopting new techniques or BMPs
5	Number of new cultivated varieties released
6	Increased number of acres dedicated to vegetable and berry specialty crops to enhance agricultural profitability.
7	Increase in the number of commercial producers educated about the reuse, recycling and utilization alternatives for agricultural plastics.
8	Increase the yield, input efficiency (fertilizer, fungicides, insecticides, herbicides, irrigation, etc.), and profit for Virginia vegetable farmers.
9	Determining plant genetic aspects to improve agricultural system profitability.

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Outcome #1

1. Outcome Measures

Increase the number of commercial producers educated about new plants, cultivated varieties, production techniques or BMPs

2. Associated Institution Types

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

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	195

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Homeowners, green industry professionals and the Chesapeake Bay sustain significant financial and quality losses due to incorrect selection, planting and maintenance of landscape materials.

As one example, the EPA states that ?Homeowners tend an estimated 40 million acres of turf? and lawns rank as the fifth largest crop in the country, on the basis of area, after corn, soybeans, wheat and hay.? The report goes on to say that, ?The fertilizer amounts applied to lawns are roughly equivalent to the application rates for row crops and lawns produce significant amounts of nutrient-rich stormwater runoff which can potentially cause eutrophication in streams, lakes and estuaries.?

Uninformed people frequently use excessive and inappropriate amounts of lawn and garden chemicals & fertilizers. These practices not only cost homeowners and professionals time and money, but are harmful to the Chesapeake Bay, whose health is directly tied to our own health and well-being

What has been done

Through the Master Gardener Volunteer Program, the agent and volunteer coordinator recruits, trains and manages a volunteer staff of 125 active volunteers. These volunteers serve the

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general public & landscape professionals by educating them about the proper selection, planting and maintenance of landscape materials.

Master Gardener Volunteers are recruited from the general public, county and city employees and the green industry. These volunteers are given rigorous instruction initially via a 50 hour Master Gardener course that the agent plans & conducts with the help of guest instructors from Virginia Cooperative Extension and local communities.

Results

The Master Gardeners conducted programs based on the Landscape Best Management Practices (BMPs) developed by the Northern District Horticulture Agents. Centered on landscape BMPs, the 125 Master Gardeners contributed 7,899 contributed hours & contacted 7,360 clients while serving the horticultural needs in the Albemarle community. The financial impact of the volunteer?s work, at \$21.36/hour, was valued at \$168,723.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

Increase the number of commercial producers adopting new plants, cultivated varieties, production techniques, or BMPs

2. Associated Institution Types

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

3a. Outcome Type:

Change in Action Outcome Measure

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3b. Quantitative Outcome

Year	Actual	
2012	33	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Eastern Shore of Virginia traditionally has been a major supplier of fresh and process vegetables to key markets located in the northeast. Due to changing market needs, availability of hand labor and other economic factors this area has transitioned to crops which can be mechanically harvested which has placed additional emphasis on larger commercial producers for the production of these specialty crops. Economic conditions, primarily transportation cost, have resulted in an increased interest by produce entities to locate producers in closer proximity to existing eastern markets. This has created the opportunity for smaller operations to participate in a new specialty program which may be an attractive addition to their operations and potentially increase profitability for these producers.

What has been done

In 2012 we were contacted by Sabra Foods in regard to the potential of commercially producing Chickpeas for their Colonial Heights, Virginia processing plant. We were able to obtain the necessary seed and planted approximately 5 acres of this crop. Dr. Henry Wilson was able to conduct herbicide evaluations in this location and disease control chemicals were also evaluated in conjunction with trials conducted at the ESAREC by Drs. Steve Rideout and Josh Freeman.

Results

We were extremely pleased with the potential for production of this crop based on our observations. Due to limited labeled weed control chemicals and the extreme disease pressure observed, much additional research will be needed prior to the introduction of this crop to Eastern Shore producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

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Outcome #3

1. Outcome Measures

Increase the number of noncommercial gardeners/producers educated about new techniques or BMPs

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	1244	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

For 33 years, Extension Master Gardeners have assisted state and county faculty in providing current, relevant, research-based, and timely responses to Virginia?s homeowners who need assistance with their home landscapes. As personnel resources diminish, we rely more heavily on our volunteers to help deliver quality programming and services to our constituents. The work of Extension Master Gardeners is important in multiplying the efforts of our paid faculty as they impart best practices to homeowners wishing to manage their landscapes in sustainable and environmentally friendly ways.

What has been done

In 2012, nearly 850 additional Extension Master Gardeners were trained and certified. Extension agents, specialists and veteran Master Gardeners all worked to provide quality training to this new cohort of volunteers. Once training was completed, opportunities to volunteer and employ their new training were provided to the new MG interns.

Results

Nearly 850 new Master Gardeners joined forces with more than 4,000 currently active Master Gardeners. In 2012, there were more than 5,000 volunteers total working on behalf of local extension offices providing service and educational programming to more than 433,000 constituents. In the course of working with Virginia?s citizens, Extension Master Gardeners reported in excess of 305,000 volunteer hours. The volunteer time was equivalent to 153 full-time equivalents. This means that collectively, Virginia Cooperative Extension had an additional 152 full-time staff disseminating best practices. The economic value of the reported volunteer time is more than \$6.9 million (based on an hourly rate for Virginia of \$22.60 from the independent sector: http://www.independentsector.org/programs/research/volunteer_time.html). This is a

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tremendous in-kind contribution and return on investment to the Commonwealth of Virginia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #4

1. Outcome Measures

Increase the number of noncommercial gardeners adopting new techniques or BMPs

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over 1,000 Master Gardener (MG) volunteers provide research-based horticulture and environmental educational programs through Virginia Cooperative Extension (VCE) in the 19 county Northern District (ND). According to a 2007 University of Minnesota MG study of potential public benefits, the identified top three were improving the natural environment, reduction of the spread of hazardous plants, insects and disease, and an increase in the effectiveness of community public service organizations. In Prince William County, Public Works?

Watershed Management Branch and the VCE-Prince William?s Environment and Natural Resources program determined the most important environmental issue is protecting water quality. Educational programs administered through the local Virginia Cooperative Extension office help the locality maintain their VPDES permit.

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What has been done

n 2011, Prince William County MG volunteers and staff educated 1136 residents through 44 classes held free to the public. Some of the class topics included the Basics of Gardening Series, the Sustainable Vegetable Gardening Series, Rain Gardens, Teaching Garden Tours, six Saturday in the Garden programs, and five classes on lawn care.

Results

As a result of these programs, 91% of attendees returning surveys reported the intent to adopt recommended water quality practices provided in the lectures on post surveys. Surveys sent out to the same attendees three months after these programs indicate that 84% of environmental education participants had adopted the recommended best management practices provided in the lecture they attended.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #5

1. Outcome Measures

Number of new cultivated varieties released

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Diseases of wheat and barley frequently result in yield losses ranging from 10 to 20% in susceptible cultivars, for which two or more fungicide applications would be required to achieve optimal control. In the case of Fusarium head blight, commonly known as scab, optimal disease control can only be achieved using a combination of host resistance and fungicides as neither alone provide complete control of the disease or mycotoxins in the grain.

What has been done

Our program continues to conduct research focused on identification, mapping, and incorporation of durable resistance to pathogens endemic in the eastern U.S. into barley and wheat cultivars to ensure sustainable and profitable production. Resistance to diseases (powdery mildew, leaf rust, stripe rust, net blotch, scab, and others) has been identified, validated, and mapped in Virginia Tech barley and wheat cultivars and germplasm. In 2012, results from such research were published in seven journal articles and presented at three national meetings.

Results

If resistant cultivars were not available, Virginia producers alone would apply fungicides over an area of 200,000 acres at a cost of \$2.4 million. Lack of disease-resistant cultivars also would jeopardize the quantity, quality, safety of the food supply, and create uncertain risks in the marketplace. Development and commercialization of disease resistant cultivars has increased production in Virginia by 2 million to 4 million bushels, resulting in an increase in revenue of as much as \$7 million annually.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Increased number of acres dedicated to vegetable and berry specialty crops to enhance agricultural profitability.

2. Associated Institution Types

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

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3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	450

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumer interest in buying locally grown foods and produce is providing new opportunities for small-farmers located near the larger population centers in Virginia. In addition, an increased number of grocery stores are interested in purchasing locally grown produce. Farmers and other entrepreneurs with small but suitable acreages are contacting VDACS and VCE regarding support for business development and production and marketing details.

Numerous organizations throughout the United States, including Virginia, are encouraging citizens and communities to buy locally grown produce to strengthen local economies, as well as promoting the health benefits of eating produce grown locally. This movement is providing opportunities for new small farm and diversified farm operations to enhance their profitability through production of more or new fresh market produce. Producing local crops out of season will increase marketability and if properly managed increased profitability of the operation.

What has been done

We developed educational materials to assist new and existing producers to establish or expand greenhouse vegetable or berry operations that are economically sound business ventures. In addition to production information, the materials included topics on profitability: a focus on marketing information and resources as well as how to develop and implement a marketing plan; and resources on business planning and assessing costs, income and profitability.

The materials were assembled by the individual cooperators and compiled into an extensive notebook which was distributed to participants of one of five workshops conducted around Virginia. We had about 162 participants, including 30 VCE agents along with 132 other citizens, primarily ones considering greenhouse production as a new enterprise along with about 20 established producers. Locations for the workshops included Virginia Beach, Manassas, Harrisonburg, Blackstone, and Wytheville. At each location, the local VCE agent(s) facilitated the program.

After the program, all of these resources were posted on a new website developed by Sarah Gugercin of the Virginia Tech Horticulture Department, http://www.hort.vt.edu/ghvegetables/. In addition to the workshop notebook, VCE agents received access to the actual PowerPoint presentations through this web site to permit them to conduct small group or one-on-one trainings to assist future producers.

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Results

Workshop evaluations were completed by 117 of the 162 participants (72% of the total). 91% of the respondents rated the handout materials as ?excellent? and ?highlight of the day.? Therefore, we met our primary goal. Many participants valued the training on business and marketing plans and how to effectively construct them. The production information was valued and many requested additional topics and more in-depth training.

We assessed the value of the workshop in the decision-making process. Only 67% responded, but the comments indicated that we had influenced the decision-making process (% total respondents): 17% plan to start construction this year; 21% are starting to PLAN the business this year; 4% decided this is NOT the right business for them and 9% were still undecided. Comments under this question included:

?I plan to develop a business plan to get a better idea about whether or not to start the business.

?I found that I have many decisions to make before embarking on this business.

?Made me realize it was more labor intense than I had considered.

?This program was an eye opener for some of the difficulties that one would face with greenhouse operations and marketing.

?It helped me realize aspects of growing that I had not previously considered.

?I am a novice, so all information was very helpful. There were many things I had not considered.

Agents will follow-up to assist new operations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Increase in the number of commercial producers educated about the reuse, recycling and utilization alternatives for agricultural plastics.

Not Reporting on this Outcome Measure

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Outcome #8

1. Outcome Measures

Increase the yield, input efficiency (fertilizer, fungicides, insecticides, herbicides, irrigation, etc.), and profit for Virginia vegetable farmers.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Cabbage, broccoli, and collards are important cruciferous vegetables produced commercially in Virginia. Harlequin bug has increased as a major pest of these crops. The piercing-sucking feeding of adults and nymphs creates white blotches on leaves, making vegetables sold as greens unmarketable, and under heavy pest pressure, can kill plants or entire fields of cabbage or broccoli. Although many broad-spectrum insecticides such as organophosphates, carbamates, and pyrethroids provide effective control, these insecticides are also detrimental to important natural enemies in the crucifer crop agroecosystem. Vegetable growers in Virginia who produce cole crops (collards, kale, cabbage, broccoli, etc?) will benefit from the knowledge gained on methods to effectively control harlequin bug, which has become a pest of increasing concern in the state.

What has been done

Laboratory toxicity bioassays and field trials were conducted to evaluate the effectiveness of soil-applied neonicotinoid insecticides for controlling harlequin bug. These insecticides have less impact on nontarget organisms than currently-used insecticides. Trap cropping, which draws the pest away from the cash trop was also examined as a control strategy for harlequin bug. Demonstration plots of mustard were established at 7 commercial farms growing cole crops and were monitored for harlequin bug.

Results

The neonicotinoid insecticides imidacloprid, thiamethoxam, dinotefuran, and clothianidin are toxic to harlequin bug nymphs; LC50 = 0.57, 0.52, 0.39, and 0.39 ppm, respectively. Soil drenches (transplant drenches) of the four neonicotinoids were shown to provide effective control of harlequin bug up to 14 days after application. These insecticides offer a less disruptive insecticidal control option for growers that should not destroy natural enemies of the lepidopteran pests. The neonicotinoid insecticides will also control aphids and flea beetles.

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Each of the 4 neonicotinoids provided significant control of harlequin bug for at least 14 days after drench application. Mustard (Brassica juncea ?Southern Curled Giant?) was found to be consistently more attractive than collard (B. oleracea ?Champion?) in choice tests and considered a candidate for a trap crop species.

Collard plots with mustard border rows had less harlequin bug damage (5-20% leaves damaged) than collard plots without a trap crop (55-85% leaves damaged). This was due to a clear preference for mustard over collard at the field level. There was no difference in control between mustard trap crops with and without systemic insecticide, but heaviest insect pressure occurred when insecticide residual efficacy was low. Several farmers surveyed were enthusiastic about adopting trap cropping in the future. Trap cropping offers organic vegetable growers with an effective control option for harlequin bug.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #9

1. Outcome Measures

Determining plant genetic aspects to improve agricultural system profitability.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The goal is to enhance the nutrition of indigenous populations that depend upon potato as a staple by improving phytonutrient accumulation in Andean potato varieties. This will be accomplished by using a combination of genomic approaches and rhizosphere management.

Micronutrient content in potato is critical to human health and nutrition where potato is a dietary

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staple for more than two billion small land holders and consumers in Africa, Asia, and Latin America. Iron, zinc and iodine deficiency in mothers contributes to retarded fetal growth. Estimates are that at least 50% of children and women of reproductive age and about 25 to 30% of men are iron deficient in developing countries. Poor cognitive development has been found in children with chronic anemia. An estimated 45% of children in Ecuador, Peru, and Bolivia who have adequate food supply in their potato-based diet suffer from chronic zinc deficiency, leading to poor cartilage and bone growth, greater risk of respiratory infections and weak immune systems. Substantial improvements in nutrition for those who depend upon potato can be made by deploying improved native varieties that derive from application of knowledge of the genetic and biotic mechanisms that control movement of iron and zinc from the soil into the edible tubers of a potato plant.

What has been done

Our recent efforts to contribute to the sequencing of the potato genome now offer great possibilities to enhance the nutrition of potato varieties and to understand the interactions between genes within a plant and the population of the root-associated microbial community (rhizosphere microbiome). The incipient genomic resources for potato have hardly been tapped. Nutrient acquisition by plants is a function of a plant?s genotype and its interaction with: 1) the surrounding soil nutrient pool, and the 2) rhizosphere microbiome. So far, genes that control iron, zinc and Vitamin C accumulation in plants have been described in several plant species. We have identified variation for key genes involved in micronutrient accumulation in Andean potato populations. We expect that the activity of these genes in the plant can be manipulated by rhizosphere management. Our approach using genomic resources in combination with rhizosphere management to improve phytonutrient acquisition in a tuber crop is unique for improving the diet of indigenous populations without the requirement of substantially changing the composition of the diet or administering nutritional supplements to remote populated areas. Studies of the effect of the microbiome on crop productivity are just beginning to emerge, with recent reports that plant specific microorganisms are a great benefit to plant health and productivity.

Results

The research will help to determine the relative role of 1. plant genotype, 2. soil nutrient pools, 3. soil microorganisms, and 4) interactions among the three drivers to assess their impact on phytonutrients available to consumers.

In an initial study, we will grow two Andean potato varieties (a high and a low micronutrient accumulator in tubers) at a field station in Peru in two soil types (one silty rich and one nutrient poor sand), at two different nutrient levels in six replicates. The plants will be sampled for tuber production, Fe and Zn accumulation in tubers, and allelic composition at candidate genes; in addition, the soil microbiome will be profiled at two developmental time periods. RNA will be isolated from stolons during early tuberization and mature tubers. RNA from roots will be extracted from the same varieties grown on both micronutrient rich and depleted media in tissue culture. This study will provide a baseline for the major effectors of micronutrient acquisition in potato tubers.

Upon successful completion of phase I, we will have reduced the pool of target genes in potato and associated root zone microorganisms to those which appear to have the greatest influence on micronutrient accumulation. We expect to confirm the key role of the microbial community and more specifically determine the key taxa and functions involved in nutrient uptake.

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4. Associated Knowledge Areas

KA Code Knowledge Area

102 Soil, Plant, Water, Nutrient Relationships

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The derecho of June 2012 had a significant neagtive effect on agriculture throughout the state. Thus, anticiapted crop yields and input efficiencies were less than expected.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Most educational programs conducted surveys to determine the effectiveness of the information transmittal. Results of these surverys indicated that program attendees were very satisfied with the programs and that they were likely to adopt the program content.

Key Items of Evaluation

Over 1600 Extentsion education-related events were conducted to transfer information to farmers, non-commerical producers/gardeners, and other agricultural professionals. Many of these events reported very successful outcomes.

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V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	10%	10%	10%	0%
124	Urban Forestry	10%	10%	10%	0%
132	Weather and Climate	10%	10%	10%	0%
206	Basic Plant Biology	10%	10%	10%	20%
402	Engineering Systems and Equipment	10%	10%	10%	20%
403	Waste Disposal, Recycling, and Reuse	10%	10%	10%	0%
511	New and Improved Non-Food Products and Processes	10%	10%	10%	60%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	0%
605	Natural Resource and Environmental Economics	10%	10%	10%	0%
610	Domestic Policy Analysis	10%	10%	10%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
fear: 2012	1862	1890	1862	1890
Plan	1.7	0.0	1.6	1.0
Actual Paid Professional	1.6	0.0	1.8	0.0
Actual Volunteer	13.0	0.0	0.0	0.0

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

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Exte	ension	Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
32354	0	32378	23131
1862 Matching	1890 Matching	1862 Matching	1890 Matching
45777	0	72812	23733
1862 All Other	1890 All Other	1862 All Other	1890 All Other
135859	0	401081	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Sustainable Energy program includes laboratory research, development of pilot scale projects in the field, educating clientele on the merits of particular energy practices and conversion technologies, and engaging the private sector to spur the commercialization and economic development of innovative and efficient energy systems. Specific examples of activity areas of this program are listed below:

- * Develop biomass use for biofuels
- * Designing optimum forestry and crops for bioenergy production.
- * Produce value-added bio-based industrial products.
- * Logistics/material handling
- * Processing and management of end use waste products and byproducts
- * Analysis of the global impacts of new generation biofuels
- * Demonstration and commercialization of technologies that increase US energy independence
- * Development of programs to train students and current county educators (in-service) to meet the new sustainable energy challenges.
 - * Energy conservation
 - * Alternative energy
 - * Understanding agricultural energy use and opportunities for conservation
 - * Smart and sustainable energy systems for communities
 - * Understanding the cost differences of energy usage
 - * Public outreach and engagement around energy public policy development
- * Youth development programs to teach energy conservation, alternative energy sources, electricity and recycling.
 - Clean energy project analysis via RETScreen

2. Brief description of the target audience

- Farmers
- Citizens
- · Agency personnel
- Economic developers
- · Regional planners
- Commercial Producers
- Land Owners
- 4-H Youth

- K-12 Youth
- · State and Federal Agency Personnel
- Extension Educators
- · Policy Makers
- Consumers
- · Ag Related Businesses
- Energy Service Companies (ESCOs)

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	683	325	205	0

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

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	16	27	43

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Number of Train the Trainer and In-service Energy Workshops

Year	Actual
2012	10

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Output #2

Output Measure

• Number of On-farm Demonstrations

Year	Actual
2012	0

Output #3

Output Measure

• Bioenergy Featured Case Studies

Year	Actual
2012	0

Output #4

Output Measure

• Number of educational meetings, workshops, conferences, training sessions, and field days

Year	Actual
2012	46

Output #5

Output Measure

• Number of fact sheets, publications, newsletters, and other print resources

Year	Actual
2012	43

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase farm profitability due to more energy efficient practices
2	Increase the number of individuals using energy more sustainably
3	Increase the number of sustainable energy products
4	Percent increase in the optimization of logistics management for sustainable energy systems
5	Increase number of enterprise budgets related to sustainable energy development
6	Characterization of Genes that Regulate Wood Formation and Biomass Accumulation.
7	Energy sensing in plants.
8	Genome-scale model-guided alterations of the cellulose pathway in plants.
9	Virgina Bioenergy Systems
10	A Systems Biology Approach to Cellular Regulation of Seed Filling
11	Balancing bioenergy benefits with the risk of invasiveness.
12	Developing New Tools for Exploring Bioenergy Project Opportunities in the Commonwealth of Virginia: GIS-based Assessments of Bioresidues, Dedicated Energy Crops, Existing Boilers, and Policy Drivers
13	The Bioenergy Engineering Education Program (BEEP), Department of Biological Systems Engineering, Virginia Tech
14	Biological CO2 fixation for the production of formic acid powered by sugars
15	Redox control of anaerobic metabolism - implications in biofuel production and infectious disease control

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Outcome #1

1. Outcome Measures

Increase farm profitability due to more energy efficient practices

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Dairy and poultry operations, greenhouse facilities, and flue-cured tobacco farms in Southside and Southwest Virginia are significant consumers of energy. Rising fuel and electricity expenses increase the cost of production and reduce already tight operating margins. Fluctuations in energy costs make budgeting more difficult. Inquiries to Virginia Cooperative Extension regarding farm energy audits and energy conservation cost-share programs illustrated the immediate demand by agricultural producers for resources and programs to address energy efficiency issues.

What has been done

The Virginia Tobacco Indemnification and Revitalization Commission awarded Virginia Cooperative Extension a \$248,842 grant to develop a pilot farm energy efficiency program. An energy firm was selected to train data collectors for energy audits, and a Virginia firm focusing specifically on the energy usage of agricultural enterprises was launched. The program addresses VCE focus area ?enhancing the value of Virginia's agriculture," and provides a strategy to achieve Goal 1: increase the profitability and sustainability of Virginia's commercial food, fiber, animal, recreation, and green industry.

Results

As a result of the pilot farm energy efficiency program, farm energy audits identified potential annual energy savings including: 1,258,086 (kWh) in electrical usage, 603,315 (gallons) propane fuel, and 19,336 (gallons) fuel oil. Farm audits projected annual savings of \$1.2 million with installation costs to be approximately \$4.9 million. Approximately 76% of the recommended energy conservation measures have a payback period shorter than five years. Twenty-one (21) farms implemented the cost saving projects identified in the audits. Fourteen (14) farms applied for USDA REAP energy conservation grants and 11 of these were successful. The farm energy audit program has focused the attention of agricultural producers on the cost of energy that they

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use, energy conservation options, and opportunities to cost-share projects to reduce farm energy consumption.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Increase the number of individuals using energy more sustainably

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Increase the number of sustainable energy products

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percent increase in the optimization of logistics management for sustainable energy systems

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Increase number of enterprise budgets related to sustainable energy development

Not Reporting on this Outcome Measure

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Outcome #6

1. Outcome Measures

Characterization of Genes that Regulate Wood Formation and Biomass Accumulation.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

"The U.S. forest products industry employs over 1 million people and produces thousands of paper, fiberboard, lumber and engineered wood products with an estimated value, in 2004, of \$243 billion in U.S. sales (DOE, Industrial Technologies Program, Fiscal Year 2004 Report). Xylem is the wood-forming tissue in plants and hence is the raw material for the forest products industry. It is the structure, arrangement and relative proportions of the xylem cell types, that determines the physical properties of woods and hence their suitability for specific applications. Remarkably little is known about the genetic mechanisms that regulate wood formation.

What has been done

My laboratory uses Arabidopsis and poplar to study wood formation. Arabidopsis is a good choice for such studies because its genome has been fully sequenced and several unique resources have been developed for facilitating rapid characterization of genetic mechanisms. By exploiting these resources, we recently identified all of the Arabidopsis genes expressed in xylem and we are now in the process of determining the function of selected regulatory genes. Additionally, we are translating our findings with Arabidopsis to poplar, a model for forest products research that was the subject of a recently completed genome sequencing effort. For the poplar work, we are supported by a feedstocks genomics grant from the DOE to study poplar protein-protein interactions relevant to wood formation.

Results

We are characterizing Arabidopsis and poplar genes controlling a variety of activities that contribute to wood formation and overall biomass accumulation, including a gene that negatively regulates lignocellulose production and programmed cell death in xylem, genes that are putative components of a signaling pathway that regulates cell cell fate in the xylem, and genes involved

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in novel protein-protein interaction networks relevant to wood formation. We have cloned over 400 genes associated with wood formation in poplar. These are being used to identify protein-protein interactions important to wood formation http://xylome.vbi.vt.edu/. Results from these investigations can be incorporated into bioengineering and breeding strategies for manipulating economically important aspects of the structure of wood.

4. Associated Knowledge Areas

KA Code Knowledge Area 206 Basic Plant Biology

Outcome #7

1. Outcome Measures

Energy sensing in plants.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A better understanding of how energy is sensed by living organisms will help us better utilize organisms like plants to meet our increasing energy demands.

What has been done

"To analyze molecular controls of energy-sensing in plants the Gillaspy laboratory continues to investigate a network of protein factors involved in nutrient and energy sensing. The protein network was delineated starting with a group

of plant genes that are used in the response to drought and cold. One of these genes was used in an assay that

can detect interacting gene products. This assay identified a gene that encodes an energy/nutrient/stress sensor

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we call SnRK1. There are two SnRK1 genes in plants, so we have been examining the regulation of these two

different genes and the impact of altering their expression in plants. "

Results

The work on this project has shown that this energy sensor can alter plant lifespan and biomass when greater amounts of it are produced in plants. The work characterized how genes for this sensor are expressed in a model plant throughout development, and where they each located within the cell. In addition, the work delineated a new separate gene that controls the stability of the energy sensor. Together, the sensor and its controller represent one way to potentially alter plant fitness, lifespan and/or biomass. The impact of our work is that it has delineated important genes for sensing energy levels. These important processes may be a valid target for genetic engineering to increase plant fitness and/or biomass.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology

Outcome #8

1. Outcome Measures

Genome-scale model-guided alterations of the cellulose pathway in plants.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increasing the amount of plant celluose and biomass could positively impact our ability to produce bioenergy. It is difficult to predict which genes should be altered to increase production of cellulose or other desired plant compounds.

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What has been done

A genome-scale model for the model plant Arabidopsis is being modified and used to make predictions of gens useful for genetic engineering of this pathway.

Results

Computational approaches have allowed for gene predictions to be made. Transgenic plants have been constructed and are being used to test the model and predictions. Information from these plants will be used to refine the model. If successful, the methods developed in this project can be applied to other plants and pathways to produce useful compounds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology

Outcome #9

1. Outcome Measures

Virgina Bioenergy Systems

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The bioenergy industry in Virginia is nascent, being only about 5 years old. Energy systems - particularly using herbaceous crops - are slowly gaining traction in Virginia, but agents (and producers) need more information and better understanding of how these systems will be put in place, how they will work, and how they are likely to affect existing producers and agricultural and forest systems. There are many thousands of acres in Virginia that currently receive little or no management, and these acres represent lost opportunities for Virginia land owners who could be getting rental (or better) returns if their land were put into energy crops.

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What has been done

I have begun putting together a set of in-service training sessions to make agents aware of the scope of the energy efforts and what this may mean to the producers in their region.

Results

"Our first field day was held in December and attended by about 10 agents/specialists, including: Cynthia Gregg, Bob Jones, Kelly Liddington, Haley McCann, Scott Reiter, Todd Scott, Laura Siegle, David Smith, Lindy Tucker, and Martha Walker. A retired faculty member and two graduate students also attended.

We had sponsorship from the industry for the day's activities and the agents and industry alike appreciated the session. Following the event the sponsor sent the following email:

""a big thank you for arranging the tour. As we told you @ the Processing Facility --this was one of the best ---if not the best meeting we have had over the past 4-5 years in terms of interest, question and enthusiasm about our project. We look forward to working with you and the Agents in the future as we continue to develop this industry.""

Although we are on the cusp of this activity, there is high likelihood that these efforts - and the interactions they lead to - will have broad impact in Virginia."

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management

Outcome #10

1. Outcome Measures

A Systems Biology Approach to Cellular Regulation of Seed Filling

2. Associated Institution Types

• 1862 Research

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3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plants as ?green factories? offer a solution to growing food and energy needs. From an agronomic perspective, seeds are the lowest cost/highest volume biological producers of protein and oils, which are valuable sources of food and chemicals. Approximately 19B lbs of vegetable oil are currently produced annually in the U.S., which represents 70% of total fats and oil produced. Over 700M gallons of biodiesel was produced from soybean alone in 2009. The production of biodiesel keeps increasing each year and in 2009, it was 350 fold higher than in 2000. To obtain high oil content in seeds, rational metabolic engineering strategies are needed based on the knowledge of the corresponding regulatory mechanisms. Systems biology approaches such as metabolic flux analysis (MFA) allow better understanding of metabolic regulation by globally investigating cellular interactions in seed composition. At VT, this interdisciplinary research falls within 3 key College of Agriculture and Life Sciences initiatives: Agricultural and Environmental Sustainability, Biodesign and Bioprocessing, and the Green Industry.

What has been done

In 2012, Collakova?s ?Seed Metabolic Regulation? lab was fully functional, producing results using the extramural funding for basic research regarding the regulation of the oil and protein formation in Arabidopsis and legume seeds, such that the resulting knowledge will be used in engineering oil-based products in soybean and peanuts. To elucidate regulatory mechanism underlying seed filling, we focused on transcriptomic and metabolomic aspects to identify major genetic and metabolic regulators. NSF-MCB-1052145 funds (\$880,000) were used for work in Arabidopsis, while internal Bioprocess and Bioengineering (BBRC) seed funds (\$102,803) were used for the sub-projects relevant to soybean work.

Results

Arabidopsis seeds accumulate up to 40% of each oil and protein in their seeds, while soybean seeds contain 20% of oil and 40% protein. Building blocks (metabolites such as fatty and amino acids) of oil and protein, respectively, can be made by different metabolic pathways and we can determine how these metabolites are formed by assessing changes in metabolite levels and quantifying flow of carbon in metabolic network in developing seeds. The soybean projects generated detailed transcriptomic and metabolomic data that are currently being mined for meaningful biological information. The NSF project involving exploration of regulation of Arabidopsis thaliana seed metabolism was launched in spring 2011. We are taking advantage of combining experimental and computational approaches to identify regulators of seed metabolism. We are nearly done screening about 200 Arabidopsis seed transcription factor mutants potentially affected in seed composition. The ongoing phenotypic screens have identified 15 potential

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mutants with significantly altered seed protein levels that will be further investigated. The computational approach has yielded a preliminary gene-interaction network, from which we can identify potential regulators of seed metabolism and composition. The flux modeling results of the testing of an Arabidopsis flux balance model that will be adapted for Arabidopsis and soybean seeds were published in Plant Science.

4. Associated Knowledge Areas

KA Code Knowledge Area 206 Basic Plant Biology

Outcome #11

1. Outcome Measures

Balancing bioenergy benefits with the risk of invasiveness.

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The nascent bioenergy industry is growing at a tremendous pace as they identify new crops, improve existing crops, and target specific growing regions. Virginia will play an important role in this industry as we adopt new crops to replace the dwindling tobacco fields. However, as the industry develops there is a growing concern that the crops we use could escape the cultivated environment and become harmful invasive species.

What has been done

"One component of my research program is to evaluate the threat posed by a multitude of crops throughout the Southeast, and identify mitigating strategies to reduce the threat. The concern over the invasive potential of bioenergy crops

has been expressed by state and federal officials, environmental organizations, academics, and the bioenergy industry. Thus, my research program aims to present an unbiased evaluation of the invasion risk. We are conducting field, greenhouse, laboratory, and modeling studies to meet our

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goals. "

Results

Results are being disseminated via peer-reviewed publications, presentations, and extension documents.

4. Associated Knowledge Areas

KA Code	Knowledge Area	
206	Basic Plant Biology	
610	Domestic Policy Analysis	

Outcome #12

1. Outcome Measures

Developing New Tools for Exploring Bioenergy Project Opportunities in the Commonwealth of Virginia: GIS-based Assessments of Bioresidues, Dedicated Energy Crops, Existing Boilers, and Policy Drivers

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In 2011, Virginia was selected as the ?Top State for Business? by CNBC, indicating efficient infrastructure, talented workforce, lower costs of doing business, among other factors. To remain competitive Virginia businesses must explore all options to minimize production costs and to increase the marketability and value of their products and services. Energy prices are often volatile and energy-intensive industries are often exposed to energy price fluctuations. Furthermore, many consumers are placing a greater emphasis on the ?greenness? or sustainability of certain products. Often fuel switching, from a fossil fuel to biomass, represents one opportunity to reduce energy costs while enhancing the overall sustainability, and often marketability, of the production process. To maintain this competitive advantage and spur economic growth how can Virginia institutions, agencies, and businesses identify opportunities to lower their operating costs?"

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What has been done

"In 2011 the Virginia Tech team began the initial assessment work for Virginia locations. The first step was to assess facilities with permitted boilers throughout Virginia. The Virginia Department of Labor and Industry (DLI) performs inspections of industrial boilers used in many large and small establishments, including hospitals, small offices, and large factories. Work focused on accessing, organizing, standardizing, and assessing boiler record information maintained by the DLI. The data was then be used to identify specific facilities that could be well suited for conversion to a biomass fired boiler. The metrics of the assessment consist of many factors, some of which are current fuel type, boiler size, boiler age, facility location, and any organizational policies promoting the use of renewable fuels. The second step was to identify Virginia businesses with Corporate Social Responsibility goals related to energy and greenhouse gasses. The third step was to begin the biomass resource assessments for the identified facilities. The feedstock assessment includes biomass sources appropriate for the given energy conversion technology, and typically includes sources of residual biomass, dedicated energy crops, and certain forest material.

Results

To date, 25,300 boiler records have been geocoded and entered into a Geographic Information System, and

7,874 Virginia business locations have been identified to have CSR goals related to energy and greenhouse gases. Biomass assessment reports are near completion for eight facilities (Three locations for biofuel developer OptaFuel, three locations for the New River Highlands Resource Conservation District, one location at Ferrum College, and one location for Barnes Biofuel).

While work is still underway, initial feedback has been very positive, with one business client indicating??From what you have shared, I expect that your output will be excellent support for our planning?.By all indications, you are definitely on the right track, and we could not be more appreciative.? A summary of the project was presented at the US Department of Energy's "Biomass 2012" conference."

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

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Outcome #13

1. Outcome Measures

The Bioenergy Engineering Education Program (BEEP), Department of Biological Systems Engineering, Virginia Tech

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	0	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Whether due to worries of rising energy prices, climate change, or energy security issues, many citizens are concerned that our nation has become too dependent on foreign sources of petroleum and are troubled by the impacts that this dependence has created. The federal government signed into law the Renewable Fuels, Consumer Protection, and Energy Efficiency Act of 2007 which seeks greater energy independence and security and promote the production of renewable fuels. Additionally, the commonwealth announced in the 2010 Virginia Energy Plan a target of making Virginia the energy capital of the east coast by increasing in-state production of energy by 20 percent over the next 10 years. These policies are indicative of a broader interest to sustainably increase our energy independence while spurring economic growth. The 2007 Energy Act received considerable attention in April 2012 when gasoline was well over \$3.93/gallon and livestock/poultry industries were challenged by high feed prices. Policy makers, farmers, and citizens of Virginia are facing new economic development opportunities and making difficult decisions related to bioenergy project and policy development. However, it is often difficult for the citizenry to fully understand the complex terminology, and energy conversion processes, related to bioenergy. As a result, decision making and opinion forming often occurs with incomplete, misunderstood, or inaccurate information."

What has been done

Virginia Tech's Department of Biological Systems Engineering developed the Bioenergy Engineering Education Program (BEEP). The primary goal of this extension program is to increase participant's knowledge and awareness of the basics of bioenergy. Specifically, the program seeks to inform participants on the many different forms of bioenergy, discuss the feedstocks typically used for the generation of bioenergy, and explain how the bioenergy conversion technologies actually work."

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Results

Over the course of 2012, the materials from the BEEP program were presented to different and diverse audiences through presentations, workshops and field tours. Last year the BEEP program focused primarily on biomass utilization, poultry litter-to-energy technologies, and energy project analysis. These sessions were targeted to community leaders, entrepreneurs, farmers, K-12, and interested citizens alike. The common thread was to give participants basic information on bioenergy and to enable them to make informed decisions on the opportunities created through these bioenergy technologies. As a direct result of these educational efforts, several Virginia farmers are exploring manure to energy pilot projects for their farm in order to enhance their competitive advantage via the generation of renewable electrical and thermal energy and reduced bedding and fertilizer expenses. This represents the potential adoption of innovative bioenergy technology to help sustain Virginia farms, often while also addressing nutrient management concerns, which are vital component of Virginia?s rural heritage and economy.

Collaborators: BEEP is a collaborative extension program executed with the cooperation of: Dr. Jactone Arogo Ogejo and John Ignosh."

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
132	Weather and Climate
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

Outcome #14

1. Outcome Measures

Biological CO2 fixation for the production of formic acid powered by sugars

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

"Efficient utilization of carbon dioxide (CO2) has become an important global issue due to the continuous rise in atmospheric CO2 concentrations, the growth in the consumption of fossil energy, and the depletion of fissile fuel resources. The cost-effective catalytic reduction of CO2 has inspired many sustainable energy and ?clean tech? applications.

formic acid can be produced from a variety of approaches. The annual production of FA is approximately 720,000 tonnes (Wolfel et al. 2011). On industrial scales, formic acid is mostly produced through carbonylation of methanol plus carbon monoxide. Both methanol and carbon monoxide are produced from fossil fuels, such as methane, coal, and crude oil. Also, this production process requires high-pressure reactors, consumes a large amount of water, and generates ammonia sulfate as a byproduct. "

What has been done

"The goal of this project (Phase I) is to validate the technological feasibility of enzymatic conversion of CO2 and starch to formic acid by putting 13 enzymes together under modest reaction conditions (e.g., ~30-40oC and ~1 atm). To accelerated CO2 reduction rate, we will construct the synthetic enzyme complexes including formate dehydrogenase and NADH-generating enzymes [e.g., glucose-6-phosphate dehydrogenase (G6PDH), and 6-phosphogluconate dehydrogenase (6PGDH)], which enzyme complexes are believed to accelerate reaction rate greatly due to substrate channeling among proximate cascade enzymes and circumvent unfavorable equilibrium. Also, we will attempt to engineer the cofactor preference of FDH from a costly and labile NAD to a low-cost and stable biomimetic cofactor by rational protein design.

In the Phase II project, we will (i) utilize less costly cellulosic materials as an energy input for CO2 fixation, (ii) replace NAD by using a low-cost biomimetic cofactor and engineer three redox enzymes (i.e., FDH, G6PDH and 6PGDH) that can work well with the biomimic, (iii) further enhance all enzyme stability with total turn-over number (TTN) values of more than 108 mol per mol enzyme and (iv) decrease their enzyme production costs to \$100 per kg protein. With these four advances, biological CO2 fixation for FA production will be economically competitive.

Results

"The production of FA from high-concentration CO2 released by power stations and renewable sugars would bring numerous benefits: (i) utilize CO2 for the production of a value-added chemical, which is produced from fossil fuels, (ii) decrease net CO2 emissions, (iii) create high-paying biomanufacturing jobs and promote rural economy, (iv) utilize abundant domestic renewable resources, (v) enhance national energy security, and (vi) enhance technology export in the future.

The combination of unique features of the USA (e.g., sufficient arable and marginal lands with modest temperatures and ample rainfall in most areas) and cell-free systems developed here could help the USA re-gain No.1 manufacturing leadership based on its renewable biomass resource and decrease net CO2 emissions. The production of renewable building block chemicals, such as formic acid or its derived biofuels (e.g., butanol) (Li et al. 2012), would be a

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key component of future sustainable biomanufacturing industry. "

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
206	Basic Plant Biology
511	New and Improved Non-Food Products and Processes
610	Domestic Policy Analysis

Outcome #15

1. Outcome Measures

Redox control of anaerobic metabolism - implications in biofuel production and infectious disease control

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There are many beneficial uses of microbes. For example, they are used in the production of antibiotics, vitamins, and fuels such as ethanol and methane (main component of natural gas), and in sewage treatment. Numerous microbes that inhabit human body help us to remain healthy. Yet we know about only a fraction of their metabolic capabilities. Consequently, we are not in a best position to utilize their potentials to our benefit and to combat the harmful actions of a few of them on our health and environment. The research in my laboratory is focused on following such poorly or incompletely understood areas of microbial metabolism. 1. The full capabilities of microbial hemes, which are iron-containing compound: A type of heme provides oxygen transport capabilities to our red blood cells. 2. The mechanisms that anaerobic microorganisms employ to face changes in the supply of low potential electrons: This is relevant in the biofuel production processes and microbial metabolism in our gut that determines whether we would be lean or obese. 3. The role of coenzyme F420 in the pathogenesis of Mycobacterium tuberculosis (Mtb), the causative agent of tuberculosis, and Mycobacterium avium (Mav), which causes disease in immunocompromised individuals, such as elderly and AIDS and cystic fibrosis patients. Mtb and Mav possess F420, a deazaflavin coenzyme. This is bit surprising, as F420 is

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rare in bacteria that grow under air. Mycobacterium species grow under air.

What has been done

- "1.The laboratory has recently discovered a group of potentially heme-containing proteins (DsrLPs) in a group of microorganisms called methanogenic archaea. Comuptaional analysis has identified these as sulfite reductases. But these proteins do not exhibit this predicted function, and therefore, could serve as platform for the discovery of new roles of heme proteins.
- 2.Our Computational studies have led to the hypothesis that anaerobic microorganisms modulate their metabolism in response to changes in the supply of low potential electrons by use of a thioredoxin system. We are testing this hypothesis via a proteomics approach.
- 3.Our preliminary studies indicated that the mycobacteria could employ F420 in deriving energy and cell building blocks and for evading human immune system while lying dormant within human body or causing overt disease. We are testing this hypothesis via genetics analysis and biochemistry studies."

Results

"The following are our current results.

- 1. he DsrLPs seem to have unusual electron transfer roles and these could exist in organisms belonging to all domains of life
- 2. Thioredoxin system could control both energy metabolism and cell synthesis in strictly anaerobic methanogenic archaea
- 3. Our preliminary results support the above-described hypothesis about the role of F420 in mycobacteria. The hypothesis is under further testing in a NIH funded project.

We have developed collaboration with a vaccine manufacturer to take some of our basic science findings from item 3 to applications (vaccine development).

4. Associated Knowledge Areas

KA Code Knowledge Area

New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

• Competing Public priorities

Brief Explanation

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No external factors affected the Sustainable Energy planned program outcomes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The program is progressing and many more opportunities exist.

Key Items of Evaluation

The program is progressing and many more opportunities exist. The program is comprehensive building from a base of energy efficieny then with grwoing tools, techniques and collaborators to facilitate understanding, and the appropriate adoption of, sustainable energy technologies.

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V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Youth Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research		
1 ear. 2012	1862	1890	1862	1890	
Plan	84.2	2.0	0.0	0.0	
Actual Paid Professional	105.1	1.5	0.0	0.0	
Actual Volunteer	14650.0	0.0	0.0	0.0	

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2186219	234712	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3093216	157572	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
9180191	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Activities include leadership, civic engagement, 4-H camping programs (overnight and day), 4-H after-school programs, 4-H in-school programs, 4-H school enrichment programs, 4-H clubs (community and military), 4-H special interest programs, 4-H Cloverbud groups, district 4-H trainings, local

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4-H trainings, home school education, online education and distance learning, and specialized trainings and workshops to qualify instructors and to educate trainers.

2. Brief description of the target audience

Youth between the ages of 5-19

3. How was eXtension used?

All Virginia 4-H Youth Development Specialists are listed as an expert in their respective specialty areas within eXtension. Thus, they regularly receive and answer questions from all across the United States on their specialty areas.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts	Indirect Contacts	Direct Contacts	Indirect Contacts
	Adults	Adults	Youth	Youth
Actual	154709	168180	685442	331190

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

Year: 2012 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	2012	Extension	Research	Total
ĺ	Actual	20	0	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

 Number of trainings, educational workshops, and on-line education sessions for VCE's targeted audiences

Year Actual

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2012 15970

Output #2

Output Measure

• Number of fact sheets, publications and curricula on youth development.

Year	Actual
2012	2472

Output #3

Output Measure

• Number of members enrolled in-school, after-school, community clubs, special interest activities, 4-H military programs, and camps.

Year	Actual
2012	212931

Output #4

Output Measure

• Number of youth engaged in leadership development education.

Year	Actual
2012	31088

Output #5

Output Measure

• Number of clubs where youth are involved in structured after school programming.

Year	Actual
2012	53

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V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	4-H Camping - Increase the number of 4-H youth, or parents of youth that report a positive change in responsibility and social development as a result of participation in a 4-H camp.
2	4-H Citizenship - Increase the number of 4-H youth participating as volunteers and through community service that demonstrate teamwork skills and community commitment.
3	4-H Animal Science - Increase the number of 4-H youth and adults participating in animal science programming that demonstrate increased knowledge of raising animals in a responsible, ethical, and economically viable manner.
4	4-H Communication and Expressive Arts - Increase the number of 4-H youth participating in communication and expressive arts programming that demonstrate increased self-efficacy in public speaking, presentations, visual arts, and performing arts.
5	4-H Foods, Nutrition and Health - Increase the number of 4-H youth participating in foods, nutrition, and health programs that demonstrate healthy living choices.
6	4-H Natural Resources and Environmental Education - Increase the number of 4-H youth participating in natural resources and environmental education programs that demonstrate environmentally responsible behavior.
7	4-H Plants, Soils and Entomology - Increase the number of 4-H youth participating in plant, soils, and entomology programming that learn the interconnectedness of organisms and their environment.
8	4-H Science, Engineering and Technology - Increase the number of 4-H youth that demonstrate sustained learning in science and technology programming.
9	4-H Careers and Consumer Education - Increase the number of 4-H youth that increase their awareness of potential career pathways through service learning programs and/or through the 4-H college fair.
10	4-H Careers and Consumer Education - Increase the number of 4-H youth that indicate increased knowledge/skills related to economic education and/or entrepreneurship.
11	4-H Leadership and Personal Development - Increase the number of 4-H youth that demonstrate leadership knowledge by participating in a leadership position on the club, county, state, or national level.
12	4-H Character Counts! - Increase the number of 4-H youth or parents of youth that indicate a positive change in behavior as a result of participating in 4-H Character Counts! programming.
13	4-H Adult Leaders - Increase the percent of adult 4-H volunteers participating in leadership and volunteer development trainings that indicate increased knowledge and skills in implementing 4-H programming as a result of participation.

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Outcome #1

1. Outcome Measures

4-H Camping - Increase the number of 4-H youth, or parents of youth that report a positive change in responsibility and social development as a result of participation in a 4-H camp.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	2012	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Positive youth development focuses on building skills that youth need to be successful, contributing members of society. The Community Network for Youth Development identifies development of independence skills as an important step in youth learning to be productive, connected and to navigate the world. In an increasingly structured and supervised environment, youth need opportunities to practice independence skills including decision-making, problem solving and planning.

What has been done

Independence is fostered through attending short term residential camping programs. Youth attending 4-H Junior camp develop independence by practicing decision making through daily programming activities, choosing schedules and making personal living choices. Problem-solving skills are enhanced through camp classes, living in a group environment and participating in group activities. Planning skills are addressed as youth work with teen and adult volunteers to develop activities, prepare team challenges and plan their day.

Results

Post camp surveys indicated that campers 9-13 report increasing their independence as a result of attending 4-H camp. 98% of youth surveyed reported increases in independence skills.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

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Outcome #2

1. Outcome Measures

4-H Citizenship - Increase the number of 4-H youth participating as volunteers and through community service that demonstrate teamwork skills and community commitment.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	57191	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

One way to meet the needs of the different demographics in Virginia is through the volunteer service of the 4-H clubs. Through community service, 4-H members and leaders are strengthening ties with each other as well as meeting new people and opening new doors of opportunity. Having the opportunity to learn more about our communities and the issues facing them is also important. Through local and state activities, youth are able to gain an appreciation for the diversity that makes our communities so unique.

What has been done

Members of one club coordinated an effort to provide low-income families with free clothing and basic toiletries. Events like 4-H Day at the Capitol and Citizenship-Washington Focus provide members with the opportunity to get a closer look at our state and federal governments. As part of Teen and Adult Leader Training for camp, a workshop was developed to highlight the importance and the benefit of a diverse community. This helped teen leaders to be tolerant and appreciate diversity at camp and beyond.

Results

More than 15 clothing drives were held, distributing thousands of dollars? worth of clothing to low-income families. Many of these clients were Spanish-speaking and could only communicate through their children. This gave 4-H members the opportunity to talk about 4-H while providing a much-needed service. 480 youth participated in 4-H Day at the Capitol, gaining a knowledge of our state government and learning about Virginia?s history. Five 4-Hers represented Virginia at Citizenship-Washington Focus. They participated in government service projects and were able to build teamwork and leadership skills. 278 teen leaders were taught a diversity course at Teen Adult Leader Training for summer camp, recognizing diversity as different unique abilities that make up a thriving community.

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4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #3

1. Outcome Measures

4-H Animal Science - Increase the number of 4-H youth and adults participating in animal science programming that demonstrate increased knowledge of raising animals in a responsible, ethical, and economically viable manner.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	33423	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture provides the basic necessities of food clothing and shelter. Although, less than two percent of our nation's population is directly involved in agriculture production, a healthy agriculture system is vital to everyone's daily life. The USDA "Know your Farmer, Know your Food" initiative focuses on the understanding of where our food comes from and how it gets to our plate.

What has been done

4-H delivers agriculture education programs through a variety of methods. Through club work youth gain knowledge of technical subject matter, an understanding of agricultural issues, and become informed consumers. School enrichment programs are dedicated to growing knowledge of agriculture, the environment, natural resources and local food systems. Youth who participate in agriculture competitions like Stockman's and Judging gain a broad prospective of the agriculture industry and the career opportunities in the field.

Results

33,423 4-H youth are enrolled in Animal Science project work. 351 youth participated in agriculture knowledge contests (Hippology, Horse Judging, Livestock Judging, Stockman?s and Poultry Judging). 117 third grade students gained a greater appreciation for local agriculture and natural resources through in school lessons and field days. The farm to school program, which brings products from local farms to the school lunch room helps reinforce the concepts taught in

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classroom. Using agriculture theme books, 4-H members reached over 600 students and parents at a Primary School reading night.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #4

1. Outcome Measures

4-H Communication and Expressive Arts - Increase the number of 4-H youth participating in communication and expressive arts programming that demonstrate increased self-efficacy in public speaking, presentations, visual arts, and performing arts.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual	
2012	15420	

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The ability to express one's self in verbal and written form is a fundamental skill in youth development. Youth need to develop communication skills that are important for academic and professional success. Communication skills are ranked FIRST among a job candidate?s ?must have? skills and qualities, according to a 2010 survey conducted by the National Association of Colleges and Employers. Furthermore ?Communication? is one of the life skills listed on 4-H's Targeting Life Skills wheel.

What has been done

4-H offers a number of creative ways for youth to learn and strengthen their communication skills. A partnership with fourth grade teachers provides students an opportunity to create and deliver a ?How to? presentation all while achieving the SOL standard, 4.2. Youth are invited to participate in the 4-H Oral Communication contest which include areas such as presentations, public speaking, extemporaneous speaking, and radio spots. Share the Fun allows youth to use performance as a medium to build communication skills and self-esteem.

Results

Verbal Communication: 1458 youth participated in the 4-H Oral Communication Contest. Of the 4th grade students who were surveyed, 81% reported that they can organize the parts of a

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presentation and deliver a 2-3 minute presentation. 76% reported that they have confidence to speak in front of a group.

Communication through Performance: 2400 youth participated in the Share the Fun talent contest.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #5

1. Outcome Measures

4-H Foods, Nutrition and Health - Increase the number of 4-H youth participating in foods, nutrition, and health programs that demonstrate healthy living choices.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual 2012 94640

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Healthy living has been at the core of 4-H and remains a foundation of our pledge. Although 4-H believes that healthy living habits of young people begin in the context of their families and communities, Virginia 4-H strives to equip youth with healthy living knowledge and skills that will prepare them physically, emotionally and socially to meet the challenges of the 21st century.

What has been done

To meet the needs of Virginia?s youth, the Virginia 4-H Healthy Living program addresses national issues including nutrition and physical fitness, substance abuse, safety, and social and emotional wellness. These issues are addressed through our Healthy Weights for Healthy Kids, Food Friends, Mighty Moves, and our social marketing campaign, Eat Smart Move More.

Results

Through grant funds provided by the WellPoint Foundation in support of our Healthy Weights for Healthy Kids, Food Friends and Mighty Moves programming efforts, we have provided training, teaching kits and support of 4-H and FCS agents resulting in the engagement of 3,364 youth in 2012 alone. Of these, 82% made positive changes in their food choices and increased their

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physical activity. In total, through our healthy living programming efforts and curriculum offerings, Virginia 4-H had 94,640 or 49% of its youth membership enrolled in healthy lifestyle education, up 16% from 2011.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #6

1. Outcome Measures

4-H Natural Resources and Environmental Education - Increase the number of 4-H youth participating in natural resources and environmental education programs that demonstrate environmentally responsible behavior.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	19316

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As technology becomes more integrated into everyday life, youth are becoming less active outdoors and spending more time with video games, computers, and cell phones. These youth are thus less knowledgeable of natural resources related information and how it affects their personal lives and the lives of those around them. The term ?nature-deficit disorder? was coined by author Richard Louv in his book ?Last Child in the Woods? to describe what happens to young people who become disconnected from their natural world.

What has been done

The 4-H Natural Resources Weekend offered 38 hands-on workshops primarily conducted in outdoor settings that address topics related to natural resources such as wildlife and fisheries, forestry, soils, water quality, and outdoor recreation. Participants had the opportunity to be active outdoors while learning research-based facts about the environment. This two-day event involved 22 instructors

who educated over 100 youth and adults about natural resources.

Results

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As a result of participation in the State 4-H Natural Resources Weekend, Survey respondents indicated 108 new skills or knowledge learned from participation in the weekend event such as the how to identify trees in winter, how falcons hunt, some insects are edible, how animals communicate, how to trap animals, and how to manage different trees. Participants described 4-H Natural Resources Weekend as "amazing, but too short"; "it was awesome"; "it teaches you the importance of nature and how you can help preserve it." Seventy-seven percent of evaluation respondents indicated that the Natural Resources Weekend changed the way they think about natural resources.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #7

1. Outcome Measures

4-H Plants, Soils and Entomology - Increase the number of 4-H youth participating in plant, soils, and entomology programming that learn the interconnectedness of organisms and their environment.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	12235

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Gardening projects can provide youth with skills that would help them lead healthier and more economically sustainable lifestyles as adults. In addition, through gardening and environmental horticulture education, youth can increase their knowledge about many science topics such as plant growth and reproduction, soils, insects, and water resources. As American students still fall short of other industrialized nations in science achievement, gardening programs can help enrich student learning in several areas of science studies.

What has been done

Hahn Horticulture Garden, Montgomery County 4-H and Montgomery County Master Gardeners offered the second county Junior Master Gardener (JMG) Certification Program in 2012. The goal for these collaborating groups is to provide this program each year for students in grades 3 through 5.

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Results

Participants completed 88 activities & 8 service projects across several gardening topics such as plant growth & development, soils & water & environmental horticulture. 14 youth enrolled in the class & 9 received JMG certification. At the conclusion of the program, parents were surveyed regarding their satisfaction if the program enhanced their child's affinity or appreciation for gardening and environmental sciences. All who responded stated that their child enjoyed the program. One parent said "My daughter's understanding of gardening and the environmental sciences was deepened and I'm thrilled that her love of science grew and is still evident at home and at school. The development of her own love and committment to gardening grew and sharing that with friends in the group setting was fun for her."

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

4-H Science, Engineering and Technology - Increase the number of 4-H youth that demonstrate sustained learning in science and technology programming.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	80981

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Kids? Tech University is an outreach program for 9-12 year old children and their guardians, focused on the STEM disciplines: Science, Technology, Engineering, and Mathematics. It is designed to address an increasingly serious problem we face as a nation: not enough students choose STEM careers to ensure that we have an adequately trained workforce for the challenges of the 21st century. The primary goal of the KTU program is to introduce children and their parents to the STEM disciplines and their applications.

What has been done

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KTU provides an authentic university experience, complete with interactive sessions by scientists, hands-on activities, on-line projects, and teacher training sessions. Although students are actively engaged in learning STEM content, they are not tested on their knowledge or retention of that content. The the stated goal of KTU is to foster and promote engagement with the STEM fields, and to introduce students to the careers, research, and the applicability of the STEM fields.

Results

Open-ended questions to both parents and children provided supporting evidence that children integrated concepts learned into science fair projects and homework. An unexpected outcome voiced by a parent:?My daughter Rachel, thoroughly enjoyed Saturday?s activities. On the drive home, she was explaining to me all about animal?s stripes and spots and why they occurred in the patterns that they did. I was actually amazed at all the information she retained from the lecture and also at her ability to convey that information to me. I watched the lecture myself, so we were able to discuss it together. She also informed me that she liked mathematics more now and that math is related to a lot of things in life. I don?t think she realized this fact until Saturday. All I can say is wow and thank you!!?

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #9

1. Outcome Measures

4-H Careers and Consumer Education - Increase the number of 4-H youth that increase their awareness of potential career pathways through service learning programs and/or through the 4-H college fair.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

4-H Careers and Consumer Education - Increase the number of 4-H youth that indicate increased knowledge/skills related to economic education and/or entrepreneurship.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 354

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Career and entrepreneurship education is needed especially to those that are labeled disadvantaged and under-served youth this is an important step towards guiding them in becoming an independent, self-efficient, and contributing member of society is a world of challenges. As this global job climate faces profound uncertainties, more youth are getting in trouble more and is not involved in any positive programs to enhance their job and social skills.

What has been done

The Career and Entrepreneurship Club combats behavioral and educational issues and inspires and motivate youth in the right direction. This program starts with the basics of what a career or job is, what steps are needed to get, find, and keep employment, how to properly complete job applications, how to dress successfully for job interviews, how to develop public speaking and presentation skills needed when trying to find employment, and how to maintain employment after receiving a job.

Results

145 students have participated in the Career and Entrepreneurship program in the highlighted county. Youth received 4-H participation certificates after completing the program in May 2012. Also several youth have completed their G.E.D. program and have entered the Armed Forces and training programs as a source of employment.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #11

1. Outcome Measures

4-H Leadership and Personal Development - Increase the number of 4-H youth that demonstrate leadership knowledge by participating in a leadership position on the club, county, state, or national level

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 31088

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Research shows that youth who serve as leaders learn and practice decision making, conflict management, responsibility, and other life skills. 4-H teens serve as leaders for other youth at unit, district, and state 4-H events. However, many of these teens lack the leadership skills necessary to lead others and may not provide a positive environment for youth development.

What has been done

provided leadership training for teens 13-19 years of age
Virginia 4-H provided leadership training for teens 13-19 years of age
through officer training, camp counselor training, 7 Habits of Highly Effective Teens, State 4-H
Cabinet, 4-H Teen Board and/or leadership projects to build leadership skills. As a result, 31088
youth participated in leadership and personal development projects.

Results

Of thoes teens surveyed, 95% of teens reported positive attitude change in responsibility, decision making, conflict management, or problem solving. 95% of teens reported gaining knowledge of the importance of accepting differences of others. Additionally, 89% of teens indicated improvement in critical thinking and teamwork as a result of participation in leadership training. Furthermore 95% of parents observed an increased willingness of teens accepting leadership roles and improved leadership skills in parliamentary procedure, responsibility, and teamwork as a result of participation in leadership training.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #12

1. Outcome Measures

4-H Character Counts! - Increase the number of 4-H youth or parents of youth that indicate a positive change in behavior as a result of participating in 4-H Character Counts! programming.

2. Associated Institution Types

• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year Actual

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2012 14340

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 2012 Report Card on the Ethics of American Youth, suggests that a robust recovery is underway. The survey of 23,000 high school students, conducted by the Josephson Institute of Ethics every two years, reveals that for the first time in a decade students are cheating, lying and stealing less than in previous years. Even though this is a small ray of hope, it is pertinent that we continue implementation and delivery of a character education program for fostering youth?s overall sense of well-being and positive development.

What has been done

The Virginia 4-H Character Counts! program helps youth sort right from wrong and encourages them to use universally accepted values to strengthen their character. The national program, developed by the Josephson Institute of Ethics, teaches trustworthiness, respect, responsibility, fairness, caring and citizenship as the six pillars of character. Age appropriate games, role playing, discussion, reflections, and real world examples make these character values understandable.

Results

The Virginia 4-H Character Counts! program reached 14,340 youth ages 5-19, through after-school programs, day and overnight camping, 4-H clubs, and special interest programs. Through these efforts each child received a minimum of six hours of Character Counts! programming. In addition, two statewide Character Counts! trainings were conducted in which 38 professionals were trained. Evaluation results indicated that out of a scale of one to five, one being little/none and five being complete, 94% of participants ranked their understanding of the six pillars as a four or higher. Eighty-seven percent ranked their preparedness of implementing Character Counts! as a four or higher and 100% of participants ranked the trainers as either informative and effective or very informative and effective.

4. Associated Knowledge Areas

KA Code Knowledge Area 806 Youth Development

Outcome #13

1. Outcome Measures

4-H Adult Leaders - Increase the percent of adult 4-H volunteers participating in leadership and volunteer development trainings that indicate increased knowledge and skills in implementing 4-H programming as a result of participation.

2. Associated Institution Types

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• 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	12935

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The bi-annual conferences held by the Virginia Association of Adult 4-H Volunteer Leaders fulfills many tasks. It is a recruitment tool to attract potential volunteers. It serves as a place to continue the training of current volunteers and agents and it is a time to reconnect to the purpose of volunteering with 4-H. Importantly, it increases the morale and enthusiasm of the volunteers and agents that participate.

What has been done

A committee of agents and volunteers from the hosting Southwest District met and organized a two day fall conference for 4-H volunteers from across the state of Virginia. Sixteen workshops and three guest speakers were scheduled for volunteers and agents to attend. Scholarships were made available through Monsanto sponsorship to enable and encourage volunteer and agent participation. The theme was centered around "The Volunteer Effect", a play off of the popular "Hokie Effect".

Results

At the conference seventy-seven attendees from across Virginia increased their knowledge and skills by attending the workshops (16 workshops offered) and listening to guest speakers. Through workshops such as ?4-H Accounts? and ?4-H All Stars?, volunteer and agent participants increased their knowledge of program basics. Workshops such as Weaving, 4-H Science Videos, Teen Opportunities, Mocktails, Officer Duties, Geo-Treasures, DNA Extraction, Junior Master Gardener Program, IFYE Program, Shooting Education Overveiw, and Using iPads gave volunteers information about new programs.

4. Associated Knowledge Areas

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V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

External factors that affected outcomes in 2012 include:

Economy - As a reflection of the national economic downturn, Virginia families have lost jobs, home and have been diplaced emotionally affected.

Appropriations Changes - Fourtunately, we have been able to hire some new 4-H agents over the last year however, they are still in the process of being trained and still learning the system.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

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