2017 Virginia State University and Virginia Polytechnic Inst. & State University Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

Virginia Cooperative Extension (VCE), a partnership between Virginia Polytechnic Institute and State University (VT) and Virginia State University (VSU), 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, VAES and VSUARS are dynamic organizations which stimulate 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.

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 focused and 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. The mission of VAES is to perform basic and applied research on agricultural, environmental, and natural and community resource issues related to the future needs of Virginia, the region, the nation, and the world. Research is designed to provide knowledge that will enhance the quality of individual and family life and the social and economic vigor of Virginia. Researchers utilize the best techniques of qualitative and quantitative research to form the knowledge base for instruction of and application to the broader mission of the land-grant university. The mission of VAES is to perform basic and applied research on agricultural, environmental, and natural and community resource issues related to the future needs of Virginia, the region, the nation, and the world. Research is designed to provide knowledge that will enhance the quality of individual and family life and the social and economic vigor of Virginia. Researchers utilize the best techniques of qualitative and quantitative research to form the knowledge base for instruction of and application to the broader mission of the land-grant university.

The Virginia Agricultural Experiment Station is committed to developing and implementing agricultural research that addresses society's needs and expectations. The College is focused on addressing the needs of production agriculture, improving human and animal health and nutrition, enhancing the quality of the environment, reducing the effects of major infectious diseases, developing value-added products from biological resources, 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 eleven 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: VAES, VSUARS, and VCE address a broad range of problems and issues facing citizens of Virginia through focused research and educational programming. The foundation for Research and Extension programs are built on the identification and prioritization of strategic issues through situation analyses, which are accomplished through the examination of trends and emerging issues identified by local advisory groups in Unit offices (Extension Leadership Councils), Agricultural Research and Extension Center (AREC) Advisory groups, and individual Extension specialists. Each year Unit offices are asked to review their latest local situation analysis for necessary updates. Unit situation analyses are the background and rationale for deciding which problems and issues will be addressed and reported on by VAES, VSUARS, and VCE.

VCE uses a program planning and reporting process that is based on the objectives identified in the 2011-2016 VCE Strategic Plan. Program Teams made up of agents, specialists, are aligned with Strategic Plan objectives and other objectives have been established as new opportunities have developed. Each Program Team coordinates programming across the state to meet the needs identified by their aligned Strategic plan objectives. This includes situation analysis, program planning, program development, evaluation, and reporting.

REPORTING: 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 reports focused on faculty goals, outputs, outcomes, and other data for each planned program for teaching, research, and Extension at an individual, unit, college, and organizational level. Updates to eFARS and contact reporting each year continue to better align planning and reporting with the 7 planned programs presented in this report. All research faculty are required to propose peer-reviewed Experiment Station projects submitted to USDA/NIFA, and entered into REEport. Researchers prepare annual progress and termination reports reviewed by the VAES director before being submitted to REEport.

PLANNED PROGRAMS for 2017-2021: 1) Agriculture Profitability and Sustainability; 2) Biotechnology, Biomaterials and Energy; 3) Climate Change, Natural Resources and Environment; 4) Community Viability; 5) Food, Nutrition, and Health; 6) Strengthening Virginia Families; 7) Youth Development.

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	377.3	28.0	329.1	15.5
2018	360.6	30.0	339.0	18.5
2019	365.5	30.5	346.0	20.5

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

Year	Extension		Research	
	1862	1890	1862	1890
2020	374.0	31.5	356.2	20.5
2021	382.4	34.0	361.5	20.5

II. Merit Review Process

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

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

2. Brief Explanation

VAES RESEARCH REVIEW

Research under the Hatch, McIntire-Stennis, and Animal Health and Disease Acts is conducted in the College of Agriculture and Life Sciences, College of Natural Resources, and Virginia-Maryland Regional College of Veterinary Medicine that constitute the Virginia Agricultural Experiment Station (VAES). Researchers are required to submit a research proposal through their departmental head, conforming to the format determined by the USDA. An internal administrative review confirms that the work proposed will utiliize appropriate statistical methods and that the PI has obtained any needed approvals through the institutional review boards. In the College of Agriculture and Life Sciences, the proposal is subsequently peer reviewed by a minimum of three internal or external PhD level scientists. An additional panel review may be mandated. Proposal selection criteria include: 1) research relevance to the goals of the department and college; 2) needs of the people the research would serve; 3) priorities established by task forces, work groups, or commodity research committees; 4) objectives and procedures are clearly stated; 5) proposed duration is realistic; 6) appropriate or desirable cooperators; 7) impacts for Virginia (and elsewhere) or anticipated economic importance and 8) project leader competence.

The project leader submits the revised proposal to the department/unit head, and VAES Director or Associate Director**,** with a letter delineating the changes made from reviewer's recommendations and/or rebuttal for any recommendations not accepted. The project leader enters CRIS Forms AD-416 and AD-417 on the CRIS website-http://cwf.uvm.edu/dris/ and sends a copy of the proposal electronically to the VAES office.

ARS Research Review

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 when developing a proposal.

Review of Full Evans-Allen Proposal - A full proposal is submitted by applicant(s) to the Director of Research for review. The Director then makes a determination on how the proposal is

reviewed. It could be sent to external anonymous experts in the respective fields. The Director of Research's Office facilitates this process. 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.
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

The review process for Extension covers all programs conducted by VCE through eleven program teams (PT). The PTs, made up of Extension specialists and agents, and experiment station researchers, review programs at least annually to maintain, modify, create, and report on programs to meet needs identified through external and internal stakeholder input.

VCE addresses a broad range of issues facing the Commonwealth through focused educational programming. This is accomplished and reported through VCE's eleven Program Teams and State Program Leaders who serve as partners for each Team. A web-based planning and reporting system, organized by our seven Planned Programs, documents program outputs and outcomes. Problems and issues identified through situation analysis are communicated throughout VCE and educational program plans are developed by the interdisciplinary PTs. Program proposals identify programming outputs, outcomes, and an evaluation plan to be conducted by the PTs. The program proposals are reviewed by VCE programming leadership.

III. Evaluation of Multis & Joint Activities

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

The Virginia Agricultural Experiment Station (VAES) conducts research relevant to the needs and priorities of the citizens of the Commonwealth and the nation. Research projects are established based on the input of advisory committees at eleven Agricultural Research and Extension Centers (ARECs) across the state. In addition, the twelve academic departments within the College of Agriculture and Life Sciences each maintain stakeholder groups and the College of Agriculture and Life Sciences has an advisory group of producers, commodity groups, and agribusiness leaders that provide important feedback to VAES. In turn, VAES provides research-based input for the VCE programming process through faculty research, Extension specialists, and administratively through AREC directors and statewide Extension program leaders.

Virginia Cooperative Extension connects with the grassroots of the state through partnerships with Extension Leadership Councils (ELCs). At the local level, this partnership represents the diversity of each county, city, and town. Representation includes VCE program representatives from 4-H/Youth Development, Family and Consumer Sciences, Agriculture and Natural Resources and Community Viability, community leaders, and other organized community partners. Extension staff and Leadership Council members work as equal partners to determine needs, establish program priorities, plan and implement educational programs, identity 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 connections are made 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 (or designees) of FCS and 4-H leadership councils, the VCE Director (VT), the VCE Administrator (VSU), designated VCE staff from both VT and VSU, the 1862 director of the agricultural experiment stations, and the 1890 director of research. The VCELC provides a formal mechanism for VSU and VT to receive stakeholder input for Extension and research programs.

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

The stakeholder input process used by research and Extension includes opportunities to collect relevant issues and problems from under-served and under-represented populations. Campus-based faculty are sensitive to these populations and specifically include input from a broad representation of stakeholder groups to enhance their ability to include under-served and under-represented audiences and their needs. Field faculty are being challenged to increase and document efforts to address the needs of under-served and under-represented populations. In some cases, programs are specifically designed to address the needs of under-served and under-represented audiences. For example, parenting and bankruptcy education programs specifically target under-served and under-represented populations. Faculty are sensitive to this work and develop projects and programs incorporating input and needs from under-served and under-represented audiences. In addition, all Extension agents are required to record how they plan to serve underserved and underrepresented audiences in their personal action plans for each major program at the beginning of each program year. Finally, research and extension work at VSU is specifically targeted at reaching underserved and low-resource audiences.

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

Program Teams develop specific outcomes they expect faculty will address over a period of five years. These outcomes range from short-term (knowledge, attitude, skills and aspiration changes), to medium-term (practice or behavior changes), to long-term (broader impacts and situation change for individuals, communities, and systems). For each planned program, these outcomes will be monitored, evaluated, and documented each year through an evaluation plan. Program Teams are expected to meet at least twice a year to discuss their Plan of Work, including expected outcomes and impacts. Many of the teams meet throughout the year to plan, develop curriculum, create evaluation instruments, and discuss reporting. The VCE intranet contains documents, PowerPoints, and other tools to assist teams with this work. http://www.ext.vt.edu/vce/reports/

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

Virginia's integrated research and Extension planned programs have a historic and strong connection that increases the effectiveness and scope of both efforts. The results of the research agenda provide the basis for relevant and effective Extension programs. The outcomes of Extension programs inform the research agenda. This integrated approach embodies the Land Grant philosophy and results in improved effectiveness and efficiency of research and Extension educational programs for the benefit of the citizens of Virginia. The researcher explicates knowledge discovery and development and then connects with the Extension faculty through knowledge dissemination to change learning, behavior, and conditions.

IV. Stakeholder Input

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

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

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, at-large members appointed by the director of VCE, leaders representing Virginia's diverse population, businesses, agencies, organizations, VCE District Directors, 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 College 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 of Virginia.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use 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 eleven Agricultural Research and Extension Centers (ARECs) distributed across the state along with input from selected departmental advisory committees**.** 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 grassroots 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 entities that 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, the VCE Director (VT), the VCE Administrator (VSU), designated VCE staff from VT and VSU, the 1862 director of the agricultural experiment stations, the 1890 director of research, and the director of governmental relations at VT. Extension provides a formal mechanism for VSU and VT to receive stakeholder input for Extension and research programs.

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

A variety of methods will be used to collect stakeholder input and can include issues forums, focus groups, community surveys, key informant interviews, and listening sessions.

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 stakeholder groups is considered in identifying current and emerging issues, setting priorities for programs, developing implementation plans, and staff professional development offerings. This ultimately influences the budgeting process.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Agriculture Profitability and Sustainability

2. Brief summary about Planned Program

For over 100 years, Virginia Cooperative Extension (VCE) and the Virginia Agricultural Experiment Station (VAES) have conducted research and educational outreach focusing on a range of programs addressing ag production, human health, environmental, and economic issues through a wide variety of science based technologies. Citizens demand safe, pest and disease free homes, schools, recreational areas, and a safe and affordable food supply and a wholesome environment with minimal risks. Virginia agriculture is the number one industry with over $54B of economic impact on the commonweath.

Agriculture in Virginia has long been dominated by animal based industries (70% of market value) which rely on agronomic crops and forages to such an extent that Virginia is a grain deficit state, and imports large quantities of plant products from other areas. Agronomic and horticultural crops each account for 15% and 15% of market value, and together have a market value of $858 million. In recent years, dramatic population increases in northern and eastern Virginia have resulted in substantial growth in the turf, ornamental, and landscape industries, with managed turf areas alone estimated at over 1.7 million acres. Urbanization and population growth has resulted in loss of prime farmland, dramatic increases in land values, and a growing number of lifestyle farmers, gardeners, and others interested in home horticulture. Environmental pressures may soon force dramatic changes in the animal industry, with consequences on associated plant industries of the state. Many rural areas of the state are facing economic stagnation or decline, but have substantial areas of land suitable for plant or plant-animal production systems. In short, all areas of the state have significant opportunities and challenges to develop new or improved plant based systems that are competitive, profitable, and environmentally friendly.

Crop and livestock production can be optimized if the agricultural components are studied and managed as a system rather than as discrete operations. Treating production operations holistically offers greater management flexibility, provides more environmentally and economically sound options, and creates safer and healthier conditions for workers and farm animals. Integrated, sustainable approaches, such as organic farming, precision agriculture, integrated pest management, nutrient management, and other soil and water conservation-oriented best management practices, will be incorporated into agronomic and vegetable crop and livestock production systems appropriate for both large and small producers.

Animal production impacts every region of the state, and makes a significant contribution to the economy of Virginia. Additionally, the value added by related processing and service industries and the economic impact of the businesses that support the various animal enterprises is considerable. As a result, research and VCE efforts to improve quantity, quality, profitability, and sustainability of animal production systems have played a significant role in Virginia agriculture for more than a century.

VAES researchers utilize biotechnological methods in disease diagnosis and monitoring, metabolic engineering for bioenergy, plant breeding and multiple other initiatives. Genomics and proteinomics provide the tools to identify the molecular basis of plant disease resistance, develop improved bioenergy crops, explore mechanisms involved in disease vectoring and to explore numerous plant, animal and human health issues.

The well-being of Virginians is dependent on both their individual and family economic status. In addition, the impacts of changing markets and environmental issues affect not only their business but also their family well-being. Virginia agriculture and small business are undergoing dramatic change as business integration accelerates, traditional markets disappear, and trade, commodity, and environmental policies provide both new constraints on, and opportunities for business profits. Many small farmers are exploring high value, local, or niche markets for their products, while large farmers are leveraging assets, adopting technology, and exploring alternative end use markets. Cooperatives and other institutions are playing an increasing role in management decision making. Agricultural producers are attempting to capture a larger share of the consumer food dollar by forming marketing cooperatives, while vertically integrated business arrangements have become ever more widespread in livestock and grain production

Citizens demand safe, pest and disease free homes, schools, recreational areas, and a safe and affordable food supply and a wholesome environment with minimal risks. Infestations of insects, diseases, weeds, and nematodes result in significant crop and commodity losses every year. Growers, foresters, nurserymen, homeowners, and commercial applicators apply large amounts of pesticides to control these pests. Management practices used for pests of structures, schools, and other public settings also constitute a major health concern. VCE's pest management program strives to address this wide variety of pest problems with programs that reduce commodity losses to pests and the reliance on chemical pest controls.

Protection of livestock, poultry, and plants must include preventative measures to decrease the risk of non-invasive and invasive risks and tracking measures for implementation in the event of a threat. Biosecurity measures related to food and food sources are based on threats to food production practices, food supply, and food marketing. VCE is positioned to fill these educational needs and is the primary educator through the efforts of its agents and specialists.

To provide plants and plant products for a productive economy and high quality of life, research efforts must focus on improving, evaluating, and tailoring plants for specific uses, finding new ways to use them, and develop production and processing technologies that minimize environmental impacts while increasing producer competitiveness and profitability. Three areas are targeted in this program: 1) improvement of plants through plant breeding, genetics, and genomics, 2) new and improved uses of plants and plant products (bio-based products), and 3) production, processing, and marketing practices which increase profitability, ensure quality, and are environmentally friendly.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%	0%	10%	0%
111	Conservation and Efficient Use of Water	8%	0%	0%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	1%	0%	10%	5%
202	Plant Genetic Resources	3%	0%	10%	15%
204	Plant Product Quality and Utility (Preharvest)	10%	0%	0%	20%
205	Plant Management Systems	16%	20%	10%	10%
206	Basic Plant Biology	0%	0%	5%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	0%	5%	0%
212	Diseases and Nematodes Affecting Plants	0%	0%	5%	0%
215	Biological Control of Pests Affecting Plants	1%	0%	0%	5%
216	Integrated Pest Management Systems	13%	0%	13%	0%
301	Reproductive Performance of Animals	4%	0%	5%	15%
302	Nutrient Utilization in Animals	3%	0%	5%	15%
307	Animal Management Systems	7%	10%	5%	15%
311	Animal Diseases	5%	10%	2%	0%
315	Animal Welfare/Well-Being and Protection	8%	0%	0%	0%
601	Economics of Agricultural Production and Farm Management	5%	50%	5%	0%
604	Marketing and Distribution Practices	0%	10%	0%	0%
606	International Trade and Development Economics	1%	0%	10%	0%
	Total	100%	100%	100%	100%

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

1. Situation and priorities

Virginia's producers are facing increases in land values, costs of production, and environmental regulation. Diseases threaten to reduce productivity and high value end uses. Undesirable plant components such as alkaloids, tannins, and indigestible carbohydrates are reducing animal performance and limiting usefulness of plants for human consumption. Soils receiving manure from concentrated animal feeding operations are accumulating excess phosphorus levels, and could threaten soil and water quality.

U.S. dependence on foreign oil and rising prices are stimulating interest in biomass production for synthesis of biofuels. Opportunities to use plants as a vehicle for manufacture of enzymes, pharmaceuticals, and other essential products require more secure production systems, more efficient extraction, fermentation, and processing methods.

While the most efficient producers can currently compete in the global commodity market, profitability must continue to increase. In some cases, this will involve increases in productivity through plant breeding and genomics, and through using better adapted varieties. Plants with specific high quality traits or components will be developed for new markets. New or underutilized plants with market potential will be evaluated and production systems developed. In other cases, more profitable alternatives such as ornamental and horticultural crops, organic production systems, bio-based products must be explored.

The viability of both large and small producers of crop and livestock food, fiber, and energy products is limited by economic and environmental factors. Such constraints can be alleviated through research and educational programs that address production efficiency, environmental controls, and business management. Increasing the production efficiency can increase profit to producers and decrease costs to consumers. Reducing environmental (soil, water, and air) degradation will benefit producers and society and improved business management will increase profitability and, thus, viability of producers. Integrated research and educational programs for both educators and producers on the technical (including nutrient management and soil testing, integrated pest management, tillage, cover cropping and other soil conservation practices, crop rotations, selection of appropriate plant cultivars, and other crop management practices) and business (including budgets, marketing, etc.) aspects of organic and sustainable production systems, precision agriculture, and environmental best management practices will enable farmers to produce food, fiber, and energy profitably while minimizing environmental degradation and optimizing consumer health. Personnel employed by the VCE and the VAES possess the expertise and experience to conduct research and research-based education programs to achieve these goals.

There is substantial pressure on animal industries to provide consumers with safe, high quality products at competitive prices. Furthermore, farm level producers are challenged to produce products of a quality which meet the needs of the marketplace while adding value to the enterprise. Increasing cost efficiencies in animal agriculture nationally have forced successful producers to intensify management to reduce per-unit costs or to adopt low input, extensive production systems. Animals must be produced and maintained in a manner which provides for the well-being of the animal, minimizes environmental effects, and makes wise use of limited resources. Environmental issues are an increasing concern.

Feeds comprise a major cost of livestock, poultry and aquaculture production. The development of feeds is a drawn out process of trials, measuring the suitability of feeds using measures such as growth and feed efficiency. New technical developments will allow measurement of animal response to feeds at the morphological, physiological, and gene expression levels, thereby greatly enhancing the development of feeds promoting the survival, growth, and well-being of food animals of agricultural and aquaculture importance. Gene discovery is one of the most important objectives in genomics research in agricultural biotechnology. The recent availability of enormous DNA sequence information coupled with the latest developments in engineering applications to biological instrumentation (lasers, robotics), have created a golden opportunity to address limitations of both high throughput screening and gene discovery programs.

Improved financial security of individuals, families, agricultural, and small businesses is critical for the long-term economic health of Virginia. Individuals and families, who have set financial goals and understand the importance of planning for future events ease the burden on government assistance. Understanding business, financial, and risk management are the underlying principles for obtaining long-term financial security for individual entrepreneurs. Profitable and successful farms and small businesses are the cornerstone of robust families and the communities in which they live.

Infestations of insects, diseases, weeds, and nematodes result in significant crop and commodity losses every year. Pesticide misuse can have a significant impact on successful pest control, public safety, and the environment. Pest management and pesticide safety education are essential and viable solutions to addressing these issues.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Implementing efficient, economically-feasible, and environmentally sound integrated crop and/or livestock systems requires on-going research. Established and developing knowledge of production systems that include management of pests (weeds, insects, disease), soils (cover cropping, tillage, organic matter management, nutrient management), crops (selection of appropriate species and cultivars, planting timing, row spacing, and geometries, crop rotations, etc.), livestock (dietary management, grazing rotations, fencing, etc.), and business practices (purchase/use of external inputs, marketing of outputs, value-added products, cost-return ratios, etc.) must be extended in a timely and effective manner. Many organizations (e.g., Virginia Association for Biological Farming, Virginia commodity boards, Chesapeake Bay Foundation) and local (Soil and Water conservation districts), state (Virginia Departments of: Agriculture and Consumer Services, Conservation and Recreation, Environmental Quality, and Health), and federal agencies (Natural Resource Conservation Service) are providers of education, cost-share funding, marketing assistance, or permits and inspections of potentially environmentally-impacting practices.

VCE and VAES provide multidisciplinary expertise to address research and education needs employing an integrated approach. On-going established collaborations between VCE/VAES and other research and Extension faculty throughout the mid-Atlantic region enable Virginia to draw upon expertise for cooperation where gaps exist. VCE and VAES personnel work directly with farmers and staff from various organizations and agencies to impart knowledge and implement change among agricultural producers through a multiplier effect. Funding to implement these research and educational programs comes from state organizations (e.g., commodity boards), state agencies (e.g., Water Quality Improvement Funds and other conservation-promoting cost share funds), federal agencies (e.g., USDA), local and regional governments (e.g., sanitation districts), and regional organizations (e.g., Chesapeake Bay Foundation, National Fish and Wildlife Foundation).

We assume funding will remain constant or increase. The VCE program assumes availability of expertise in key scientific areas of animal physiology and nutrition, reproduction and genetics, animal health, environmental issues, food quality, and animal management systems. Such expertise is essential to apply best practices to animal production issues in these areas. Adequate resources to expand the body of knowledge pertinent to the needs of Virginia animal production is assumed. Such resources include existing state owned research herds and flocks, research laboratories, an ample supply of highly trained,

motivated, visionary researchers and associated staff. Further, it is assumed that economic circumstances will be favorable enough to motivate clientele to change and implement new procedures. Virginia animal production systems have survived the competitive agricultural climate for the entire history of the country. It is expected today's producers will continue to adopt best practices well tested scientifically and explained fully and clearly by trusted and well informed Extension personnel.

Lack of management skills and knowledge of basic economic and financial management and analysis skills, are obstacles to individual and family economic well-being. Farmers and small business owners are struggling to remain profitable. A stated priority is to research issues and opportunities available to these business people and then train and assist them to gain skills to adapt to these critical issues. The combination of research and Extension activities will enable Virginia's farms, small businesses, individuals and families to have financial security.

IPM research and extension programs will emphasize soybean, cotton, peanut, potato, forages, turf, apples, grapes, ornamentals, vegetables and insects at schools. To improve electronic delivery, the Virginia IPM web page will be completely revised to become a one-stop shopping site for pests of agriculture, community and natural areas. It will include new pages on soybean rust surveillance and management, urban IPM, and links to the Plant Diagnostic Clinic, Virginia Tech Pesticide Programs, biological control references, and the new email-delivered Virginia Ag Pest Advisory which provides weekly updates on pests of cotton, peanut, soybean, wheat, and vegetables.

It is assumed that world-wide production of essential food, feed grains, and forages will continue to increase at moderate rates to meet world demand. Recent fluctuations in oil prices have stimulated renewed interest in biofuel crops, improved grain prices, and shifted production in favor of corn and small grains for ethanol. It remains to be seen if these prices will be sustained long term, and what the effects will be on farm profitability, food costs, and degradation of essential environmental services. To ensure long term sustainability, efforts are focused on significant increases in productivity, quality, and price. Population growth and environmental degradation will continue for the life of this plan, and agricultural and associated non-agricultural land uses will play a vital role in mitigating these problems. Agriculture will remain a major contributor to the state's economy and food security, and will support open space, deliver scenic beauty for tourism, and provide essential and desirable ecosystem services. These drivers will continue to force reductions in land area devoted to production, and will require remaining productive lands towards growth of higher value plants and plant products. Commercial plant producers desire to be profitable, efficient and good stewards of the environment. Plant producers with no profit motive, such as homeowners and local government agencies, can be motivated to change behavior and attitudes toward good gardening/production practices with economically viable alternatives and well-designed educational programs. With the basic science, people, and tools in place to begin the discovery process, new developments and effective educational programs are critical for medium and long term success.

2. Ultimate goal(s) of this Program

Profitability of large and small farms in Virginia will increase and the quality of soil, water, and air associated with crop and livestock systems will improve. The goal is that farm profitability will increase by 4% annually. Agricultural best practices should reduce sediment and nutrient levels in the watershed by 5%. Improved cropping practices and fertilization practices will increase the efficiency of use of applied nutrients by 5%.

To improve the financial and economic well-being of Virginians and Virginia farm and business managers through targeted research and educational programs. VAES researchers, both on campus and stationed at off campus centers will conduct laboratory and field research aimed at producing the needed knowledge to allow the economical and environmentally appropriate control of important insect and microbial pests.VCE and its stakeholders will sustain their partnerships to support a viable and active education program to reduce enforcement costs, maintain viable pest management options to protect

agriculture, specialty areas, public health, and the environment, and to protect the public and occupational health and the environment from the misuse of pesticides. The pest management program will have positive impact on cost benefit ratios, human health, and the environment.

Continued improvement of existing animal production systems and/or development of new animal production systems will be continued that produce ample supplies of high quality products in an environmentally and socially responsible manner while supporting quality lifestyles. By doing so, animal agriculture in Virginia will remain competitive, profitable, and sustainable while producing products and services that meet consumer expectations.

To discover, develop, and disseminate knowledge promoting the sustainability of living natural resources and agricultural systems, particularly as impacted by bioinformatics, genomics and biotechnological approaches. To expand understanding of the applications and implications of genetics, genomics, and biotechnology. By focusing on plant improvement, genetic modification, and discovery of new uses for underutilized plant resources coupled with new or improved environmentally friendly ways of producing, handling, processing and refining, the program will deliver higher value plant and plant products and educational programs to plant producers that meet or exceed end-user requirements, protect environmental quality, and ensure agricultural profitability and a safe, secure food supply.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	130.3	16.0	219.7	10.5
2018	122.5	16.0	226.3	13.5
2019	127.7	16.5	231.0	14.5
2020	130.7	17.0	237.8	14.5
2021	133.6	18.0	241.3	14.5

V(F). Planned Program (Activity)

1. Activity for the Program

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (eXtension)	● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension ● Other 1 (VCE Pubs)

3. Description of targeted audience

Commercial producers, 4-H youth, Master Gardeners, state and federal agency personnel, Extension educators, consumers, supermarket chain store buyers, animal owners, youth, allied industry personnel, consumers, policy-makers, academic colleagues, research scientists, government officials, high school teachers, general public, individuals, families, owners and managers of farms, and small businesses; local, state, and federal personnel, private sector service suppliers, advocacy and consumer protection groups and association, health/medical personnel.

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of publications created.
- Number of Extension presentations delivered.
- Number of peer-reviewed journal articles published.
- The amount of competitive grant funding received.

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase in the adoption of IPM practices
2	Adoption of value added marketing practices through the VQA weaned and preconditioned program improve profits
3	Direct marketing education improves long term sustainability
4	Aquaculture producers improve profitability through enhanced management
5	Farm operators use Market Maker to enhance direct marketing
6	Farms initiate transition plan resulting long-term agriculture sustainability
7	Beginning farmers implement whole farm planning goals
8	Farms develop agritourism enterprises
9	Methods for improving water systems and aquaculture practices enhances fish management systems
10	Controlling invasive pests through biological controls and management strategies
11	Improving grazing and grasses management for agriculture sustainability and value
12	Plant breeding and genomic characterization for value-added variety development and agriculture sustainability
13	Integrated management of plant-pathogenic nematodes and diseases through sustainable crop production practices
14	Increase number of producers that are improving animal performance through forage system management strategies
15	Specialty crop producers implement sustainable crop production practices
16	Limited-resource small ruminant producers improve their profitability through adopting best management practices
17	Community gardens and urban ag enterprises improve urban food availability
18	Limited resource farmers improve their sustainability and profitability through diversifying into alternative farm enterprises and entering new markets.
19	Limited resource farmers improve their profitability through adoption of best management production or agribusiness practices

Outcome # 1

1. Outcome Target

Increase in the adoption of IPM practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 205 - Plant Management Systems

4. Associated Institute Type(s)

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

Outcome # 2

1. Outcome Target

Adoption of value added marketing practices through the VQA weaned and preconditioned program improve profits

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 301 - Reproductive Performance of Animals
- 315 - Animal Welfare/Well-Being and Protection
- 604 - Marketing and Distribution Practices
- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Direct marketing education improves long term sustainability

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

Aquaculture producers improve profitability through enhanced management

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 5

1. Outcome Target

Farm operators use Market Maker to enhance direct marketing

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

Outcome # 6

1. Outcome Target

Farms initiate transition plan resulting long-term agriculture sustainability

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

Beginning farmers implement whole farm planning goals

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

Farms develop agritourism enterprises

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

Methods for improving water systems and aquaculture practices enhances fish management systems

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 311 - Animal Diseases
- 302 - Nutrient Utilization in Animals

4. Associated Institute Type(s)

- 1862 Research

Outcome # 10

1. Outcome Target

Controlling invasive pests through biological controls and management strategies

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 215 - Biological Control of Pests Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

Improving grazing and grasses management for agriculture sustainability and value

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 601 - Economics of Agricultural Production and Farm Management
- 205 - Plant Management Systems
- 204 - Plant Product Quality and Utility (Preharvest)

4. Associated Institute Type(s)

- 1862 Research

Outcome # 12

1. Outcome Target

Plant breeding and genomic characterization for value-added variety development and agriculture sustainability

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 601 - Economics of Agricultural Production and Farm Management
- 202 - Plant Genetic Resources

4. Associated Institute Type(s)

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

Outcome # 13

1. Outcome Target

Integrated management of plant-pathogenic nematodes and diseases through sustainable crop production practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 212 - Diseases and Nematodes Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Research

Outcome # 14

1. Outcome Target

Increase number of producers that are improving animal performance through forage system management strategies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 302 - Nutrient Utilization in Animals
- 205 - Plant Management Systems
- 307 - Animal Management Systems

4. Associated Institute Type(s)

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

Outcome # 15

1. Outcome Target

Specialty crop producers implement sustainable crop production practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems

4. Associated Institute Type(s)

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

Outcome # 16

1. Outcome Target

Limited-resource small ruminant producers improve their profitability through adopting best management practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 17

1. Outcome Target

Community gardens and urban ag enterprises improve urban food availability

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 18

1. Outcome Target

Limited resource farmers improve their sustainability and profitability through diversifying into alternative farm enterprises and entering new markets.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 307 - Animal Management Systems
- 205 - Plant Management Systems
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 19

1. Outcome Target

Limited resource farmers improve their profitability through adoption of best management production or agribusiness practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 307 - Animal Management Systems
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The gross income derived from farming could be affected by natural disasters, changes in the economy, government regulations and public policy changes. Disasters damage infrastructure and facilities while economic and governance changes influence profitability of production systems. The number of acres of land subject to nutrient management plans/best management practices/conservation plans affected by government regulations and changes in the economy. If greater emphasis is placed on water and environmental quality then even more widespread implementation of these practices will be encouraged. These factors may have immediate impact as they significantly influence items such as production economics, industry infrastructure, marketing systems, and consumer demand. Good economic conditions encourage consumption of value added products. In Virginia, increasing land values in traditional animal production areas around cities and growing towns are a significant challenge. The recent increase in ethanol production and anticipated future growth of this alternative fuel source will likely have major impacts on livestock production practices in Virginia. Scope of such impacts is unknown, but anticipated direction has influenced this planned program.

A recent challenge has been the change in demographics in Virginia. There is an increased demand to offer education resources in Spanish. Employers have a desire to employ non-English speaking workers. The prohibitive, besides the lack of resources to change the training materials and examinations, is that most materials use in Virginia (and most states) are written in English only. Changes in global food production capacity, energy costs, and epidemic diseases could have unpredictable effects. All external factors affecting personal discretionary spending will affect the implementation of environmentally sound BMP's. Natural disasters may affect producers directly but also will affect ag producers, homeowner and commercial landscaping. The general economy, public policy and governmental regulations impact production and sales of horticultural products. Appropriations and competing programmatic challenges affect the dedication of personnel and programs to the described programs. Population changes affect supply and demand for horticultural products.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Participants in conferences, workshops and field days will evaluate the planned educational programs. Case studies will be conducted among selected vegetable growers, livestock farmers, and grain farmers who have established progress to measure their production success and their economic success. The data collected from Agriculture Statistics will provide information about numbers. Evaluation studies will include analysis of research output, programmatic progress and appropriate outreach.

The annual number of educators and farmers trained in best management practices will be collected and tabulated. The annual amount of land subject to nutrient management and other best management practices will be collected from the Virginia Department of Conservation and Recreation and tabulated.

Data collection methods will vary by local program and variation and innovation in methods used to determine program impact are encouraged. Program successes will be evaluated using clientele surveys, input from key stakeholder groups, and monitoring hotlines and web sites.

Program evaluations are conducted for knowledge based programs before and after the program. Behavior or attitude-based programs are evaluated post program on intentions or on follow-up surveys to evaluate implementation. Case studies are used to evaluate implementation of programs.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Biotechnology, Biomaterials, and Energy

2. Brief summary about Planned Program

Our efforts in Biotechnology, Biomaterials, and Energy seeks to conduct research and extension programming that educates and explores issues related to energy efficiency and renewable energy systems. This program includes laboratory research, development of pilot scale projects in the field, educating clientele on the merits of particular energy practices, aspects of project analysis,, and engaging the private sector to spur the commercialization and economic development of innovative and efficient energy systems.

Advances in molecular genetics continually transforms our understanding of life sciences and, consequently, the methods utilized to produce food and fiber and to treat illness. Many pre-college curricula now incorporate concepts in genetics, genomics, and biotechnology. Individuals must make biotechnology-related decisions on a regular basis, from what foods to eat to what heath care to utilize. As biological molecules, cells, and organisms become easier to manipulate and produce, individuals will increasingly need to choose whether and how they use these "products" of life science. Thus, the public needs opportunities, resources, and skills to consider the applications and implications of biotechnologies and scientists need continued and expanded mechanisms for communicating current research to non-technical audiences.

VAES researchers utilize biotechnological methods in disease diagnosis and monitoring, metabolic engineering for bioenergy, plant breeding and multiple other initiatives. Genomics and proteinomics provide the tools to identfy the molecular basis of plant disease resistance, develop improved bioenergy crops, explore mechanisms involved in disease vectoring and to explore numerous plant, animal and human health issues.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	20%	0%	15%	0%
124	Urban Forestry	5%	0%	0%	0%
132	Weather and Climate	5%	0%	0%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	20%	50%
202	Plant Genetic Resources	2%	0%	10%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%	0%	5%	50%
206	Basic Plant Biology	5%	0%	5%	0%
402	Engineering Systems and Equipment	10%	0%	20%	0%
403	Waste Disposal, Recycling, and Reuse	11%	0%	0%	0%
511	New and Improved Non-Food Products and Processes	15%	0%	20%	0%
601	Economics of Agricultural Production and Farm Management	10%	0%	5%	0%
605	Natural Resource and Environmental Economics	7%	0%	0%	0%
	Total	100%	0%	100%	100%

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

1. Situation and priorities

Due to rising energy prices, climate change, and 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. In response to these issues, the federal government recently signed into law the Renewable Fuels, Consumer Protection, and Energy Efficiency Act of 2007. This Act seeks to move the United States toward greater energy independence and security and promote the production of renewable fuels. Additionally, the Commonwealth announced in the 2007 Virginia Energy Plan a nonbinding goal of reducing statewide carbon dioxide emissions 30% by the year 2025. These policies are indicative of a broader interest to sustainably increase our energy independence while mitigating climate change. Virginians are particularly interested in evaluating the use of residual biomass as an integral component to future renewable energy production. Agricultural operations in Virginia are facing substantial structural changes and challenges due to rapid urbanization, intensified competition, and increased environmental regulation.

Finding a novel way to utilize the byproducts created from agriculture and other sources has the potential to convert waste streams into revenue streams. This potential can be realized through developing new value-added products such as biofuels, bioenergy, biopolymers, compost, functional foods, and pharmaceuticals.

For generations American farmers have led the world in producing food, feed and fiber. Now, for a variety of reasons, farmers are also being asked to produce fuel for our nation. Faculty from Virginia Tech and Virginia Cooperative Extension explore opportunities to enhance sustainable energy. A critical component to this systems based approach to bioenergy development is to better understand feedstock production from the farmers' perspective. The reliable sourcing of a continuous supply of feedstock to feed a biorefinery is also a key concern, not just the adjacency to rail lines or adequate water supplies.

Conversely, farms are not without ongoing economic challenges and seek innovative ways to remain viable and maintain the competitive advantage. New technologies, products, and markets are being developed to create new sources of revenue critical to fortifying the existing multi-million dollar farming industry. Virginia farmers spent nearly $210 million dollars in energy related production expenses. For decades, farmers have realized higher yields per acre because of increased crop production efficiency resulting in economic benefits for the farmer, the agricultural community, and world population. Today, it is equally critical for farmers to increase production while minimizing energy inputs. Implementing energy efficiency technologies will reduce costs and increase farm profitability. For example, a 10% increase in energy efficiency, without affecting crop yield, would have produced nearly $21 million in additional revenue to Virginia farmers.

Feeds comprise a major cost of livestock, poultry and aquaculture production. The development of feeds is a drawn out process of trials, measuring the suitability of feeds using measures such as growth and feed efficiency. New technical developments will allow measurement of animal response to feeds at the morphological, physiological, and gene expression levels, thereby greatly enhancing the development of feeds promoting the survival, growth, and well-being of food animals of agricultural and aquacultural importance. Many of the genes that play important roles in growth and reproduction in livestock and poultry species are unknown. The recent sequencing of the chicken, pig, and cattle genomes provides the raw data for the identification of many of these genes using genomics and bioinformatics approaches. By knowing the function of these genes, basic physiological mechanisms can be better understood, which will lead to improved production of food animals. Developments in molecular genetics, population genetic and phylogenetic inference, and conservation theory support definition of evolutionarily significant units, providing a basis for rational and defensible decision making for management of imperiled species. Forest plantations will prove more productive when tree genomes and ecological conditions are managed to promote efficient tree growth. High throughput screening is essential in biotechnology applications to crop improvement. Gene discovery is one of the most important objectives in genomics research in agricultural biotechnology. The recent availability of enormous DNA sequence information coupled with the latest developments in engineering applications to biological instrumentation (lasers, robotics), have created a golden opportunity to address limitations of both high throughput screening and gene discovery programs. This opportunity has further come to light with the development of DNA chip or DNA microarray technology. This state of the art technology is a powerful and revolutionary analytical method enabling us to study global gene expression of tens of thousands of genes simultaneously rather than the one gene at a time approach. Learning about biotechnology will give high school students the opportunity to better understand and critically evaluate the issues that are arising as a result of these new agricultural, medical, and environmental technologies. Equally important is the preparation of a future workforce. As of 2003, there were 1,473 biotechnology companies creating agricultural, medical, environmental, and computational products in the U.S., employing 198,000 people (Biotechnology Industry Organization, 2005). The industry reached a market capitalization of $311 billion by spring of 2005. In addition, biotechnology is one of the most research intensive industries in the world, spending $17.9 billion on research and development in 2003. The demands of our changing economy and workplace require a workforce with a deeper understanding of biotechnology and scientific research.

2. Scope of the Program

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

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

1. Assumptions made for the Program

To move toward a more sustainable energy system will require more research and extension programming. Research must focus on increasing energy use efficiency, design of energy efficient systems/units/utilities, improved feedstock cultivation, efficient harvesting and storage of biomass, network analysis to optimize logistics and minimize delivery costs, development of genetically enhanced and engineered plant materials, exploration of the consequences of specific policy initiatives, and other aspects critical to the development, design, and deployment of sustainable energy systems. Extension efforts must focus on the development of programming and materials to inform the public of the new research efforts based on facts discovered and also inform the researchers of the needs of the public to direct their investigations. Extension work should also direct more efforts on energy conservation education. The Land Grant system is uniquely positioned to facilitate the high level of iterative communication between Research and Extension that is required to develop sustainable energy systems, such as: biomass used for biofuels, design of optimum forestry practices and crops for bioenergy production, and the production of value-added bio-based industrial products and materials.

We assume funding will remain constant or increase. Bioinformatics, genomics, and biotechnology approaches can be implemented broadly across disciplines such as plants, animals, microbes, the environment, and human health. Important to the future application of these approaches and knowledge is a basic understanding of the technologies, benefits, and risks. High school students in Virginia and across the country will continue to take a year-long biology course. End-of-course testing will continue to include assessments of student knowledge about genetics and scientific inquiry.

2. Ultimate goal(s) of this Program

This program will work to promote energy efficient systems, renewable energy production, and evaluate policy effectiveness to promoting sustainable domestic energy generation to increase the economic competitiveness and long-term sustainability of Virginia production systems. Our goals are also to discover, develop, and disseminate knowledge promoting the sustainability of living natural resources and agricultural systems, particularly as impacted by bioinformatics, genomics and biotechnological approaches. We work to expand understanding of the applications and implications of genetics, genomics, and biotechnology.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890

2017	3.5	0.0	9.9	1.0
2018	3.2	0.0	10.2	1.0
2019	3.3	0.0	10.4	1.0
2020	3.4	0.0	10.7	1.0
2021	3.5	0.0	10.9	1.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

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

Extension

Direct Methods	Indirect Methods

● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (UTube)

3. Description of targeted 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)
- Research scientists, government officials, high school teachers, general public

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of educational meetings, workshops, conferences, training sessions, demonstrations and field days
- Number offact sheets, publications, newsletters, and other print resources
- Number of peer reviewed journal articles.
- The amount of competitive grant funding received.

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase farm profitability due to more energy efficient practices
2	Increase adoption of sustainable energy conversion technologies
3	Increase understanding of raw material conversion and modern business management practices.
4	Researchers develop novel germplasm with higher biomass potentials, suitable for large scale and sustainable biomass production in Virginia
5	Develop microbial systems for the production of bio-fuel, more effective therapeutics and vaccines for TB, and for facilitating better nutrient utilization in ruminants.

Outcome # 1

1. Outcome Target

Increase farm profitability due to more energy efficient practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

Increase adoption of sustainable energy conversion technologies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

- 511 - New and Improved Non-Food Products and Processes
- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Researchers develop novel germplasm with higher biomass potentials, suitable for large scale and sustainable biomass production in Virginia

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Develop microbial systems for the production of bio-fuel, more effective therapeutics and vaccines for TB, and for facilitating better nutrient utilization in ruminants.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation results are indicated within each impact statement for each state defined outcome.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Community Viability

2. Brief summary about Planned Program

Virginia small business are undergoing dramatic change as business integration accelerates, traditional markets disappear, and trade, commodity, and environmental policies provide both new constraints on, and opportunities for business profits. Virginia businesses find themselves forced to manage new sources of business risk, and find that known risks are more volatile than ever before. For small businesses, rapidly changing consumer demands, high costs of labor and health care, and increased imports of lower costs goods all contribute increased business risk and a cost price squeeze, resulting in reduced profitability. Small businesses are looking for products and services to fill niches that both meet consumers' needs and provide for a profitable business plan.

Communities and community development organizations are seeking programs and approaches that strengthen local economies, enhance overall community resilience, and build capacity.

Equipping local leaders, aspiring leaders, and engaged community members with the skills and tools needed to effectively lead their communities affords the opportunity for communities to build on local strengths. VCE recognizes that strengthening the leadership and civic capacity of communities requires preparing more citizens to serve in leadership roles, engaging citizens in public issues education, and strengthening civic engagement skills and knowledge while increasing opportunities for civic involvement.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	5%	0%	10%	0%
603	Market Economics	5%	0%	10%	0%
605	Natural Resource and Environmental Economics	15%	0%	15%	0%
607	Consumer Economics	5%	0%	15%	0%
608	Community Resource Planning and Development	65%	100%	20%	0%
610	Domestic Policy Analysis	2%	0%	5%	0%
801	Individual and Family Resource Management	3%	0%	15%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%	0%	10%	0%
	Total	100%	100%	100%	0%

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

1. Situation and priorities

There are many pressing social, economic, and environmental needs and issues facing communities. Participants identified concerns 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 Improved financial capability of agricultural and small businesses is critical for the long-term economic health of Virginia. Understanding business, financial, and risk management are the underlying principles for obtaining long-term financial security for individual entrepreneurs. Profitable and successful small businesses are the cornerstone of robust families and the communities in which they live.

Moreover, communities prosper from assistance in developing and strengthening local economies through entrepreneurship and small business development. This includes developing and delivering educational programming to improve capacity among community members to engage in community planning, decision-making, and community leadership for strengthening local and regional economies.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Communities also require information and resources on alternative economic development opportunities and strategies. A priority is to provide communities with assistance in building stronger, more resilient economies.

Equipping local leaders, aspiring leaders, and engaged community members with the skills and tools needed to effectively lead their communities affords the opportunity for communities to build on local strengths. VCE recognizes that strengthening the leadership and civic capacity of communities requires preparing more citizens to serve in leadership roles, engaging citizens in public issues education, and strengthening civic engagement skills and knowledge while increasing opportunities for civic involvement.

All children and families, and communities can grow and develop to realize their full potential. These groups are confronted with a multitude of issues that affect their well-being such as child and school-aged care, at-risk youth behaviors, strained family relationships, aging populations, poverty, and community leadership. Concerns about how Virginia's communities are functioning, adjusting, and adapting to these issues have economic impacts for the Commonwealth and are backed by VCE's community situation analysis results. Further, Extension programs have shown positive influences on the quality of community life. It is VCE's, VT's, and VSU's responsibility to continue to apply research, educate, and provide outreach services to insure best practices that create strong communities.

2. Ultimate goal(s) of this Program

The ultimate goal of the Community Viability Planned Program is to develop community resiliency and capacity to respond to locally based issues through:

1. Assisting communities in developing and strengthening local economies through entrepreneurship and small business development.
2. Developing and delivering educational programming to improve capacity among community members to engage in community planning, decision-making, and community leadership.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	38.4	1.0	0.0	0.0
2018	34.3	1.0	0.0	0.0
2019	35.8	1.0	0.0	0.0
2020	36.6	1.5	0.0	0.0
2021	37.4	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

To address the Community Viability planned program, we will:

1. Conduct workshops in leadership development, facilitation, conflict management, community planning, community resource development, and alternative economic development.
2. Deliver services in facilitation strategic planning, public listening sessions, land use discussions for community viability/community resource development issues
3. Develop print and electronic resources in community viability/community resource development
4. Provide and distributed available resources, including eXtension, in land use, community planning, leadership, facilitation, and alternative economic development
5. Provide professional development training in facilitation, land use and leadership
6. Partner with local, regional and state agencies, organizations, faith-based groups, etc.
7. Facilitate meetings of task forces, coalitions, committees, addressing community viability/community resource development issues
8. Conduct research on leadership development

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

1. Individuals
2. Families
3. Owners and managers of farms and small businesses
4. Local, state, and federal personnel and policy makers
5. Community leaders and organizations
6. Private sector service suppliers

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of communities and local governments partnering with Virginia Cooperative Extension faculty to seek and develop alternative economic development opportunities or address public policy and community planning goals.
- Number of trainings, educational workshops, and on-line education sessions held in planned program are for targeted audiences.
- Number of fact sheets, publications, newspaper articles, and curricula on community viability
- Number of participants who report new leadership roles and opportunities undertaken
- Number of plans adopted or implemented in business or community planning
- Number of civic engagement events held
- Number of programs offered regarding local foods and community food systems

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Alternative Economic Development/Community Planning - 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	Facilitation Skills Training - Increase the percentage of trained volunteers and citizens participating in facilitation skills training that indicate improved knowledge and skills as a result of participation.
3	Leadership Development Education - Increase the percentage of adult citizens participating in leadership development education programs that indicate improved knowledge and skills as a result of participation.
4	Community Food Systems: 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
5	Youth Civic Engagement: Increased attendance or participation in civic engagement
6	Leadership Development: Extension efforts result in increased participation by adults in community leadership roles
7	Disaster Preparedness: Increased preparedness of agricultural operations, individuals, families, businesses, and communities for natural disaster or other emergency
8	Volunteers: Extension volunteers express increased capacity
9	Water Quality: Achieving water quality goals in the Chesapeake Bay and other water estuaries by nutrient trading and resource management

Outcome # 1

1. Outcome Target

Alternative Economic Development/Community Planning - 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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

Community Food Systems: 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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

4. Associated Institute Type(s)

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

Outcome # 5

1. Outcome Target

Youth Civic Engagement: Increased attendance or participation in civic engagement

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

Leadership Development: Extension efforts result in increased participation by adults in community leadership roles

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Disaster Preparedness: Increased preparedness of agricultural operations, individuals, families, businesses, and communities for natural disaster or other emergency

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Volunteers: Extension volunteers express increased capacity

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

Water Quality: Achieving water quality goals in the Chesapeake Bay and other water estuaries by nutrient trading and resource management

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

All items listed above directly affect communities and all forms of businesses (i.e., droughts, floods, and changes in government policy can lead to dramatic shifts in the structure of an industry) and reduce family assets and lost wages due to business closings. These changes may be short-lived (flood) or may cause structural changes to a community and the livelihood of its citizens. They may also hinder citizens from engaging in volunteer and leadership roles due to shrinking personal financial resources and time.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Educational programs will be formally evaluated with a post program questionnaire. As funds permit additional formal evaluations will be conducted to demonstrate the degree of adoption of behavior change.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food, Nutrition, and Health

2. Brief summary about Planned Program

Food is a basic necessity for life, but also for economic productivity and prosperity. And yet, many Virginians struggle to have access to an adequate supply of healthy food to lead an active productive life. Because of economic constraints, many Virginia households must choose between buying foods or paying for other basic household needs and bills like rent, electricity or medical. Virginia's food insecurity rate at 11.8% is below the national average, but 912,790 individuals are still considered food insecure.
The current physical activity levels of Virginia youth may need to increase to promote optimal health. Also, the health status of Virginia youth is impacted by the school food environment. In 2013 physical education was not a requirement for all students with 47.7% of Virginia high school students not attending physical education classes on one or more days out of an average school week and 86.7% of students did not attend physical education classes on all five days of an average week when they were in school. Additionally, Virginia is one of 30 US states or territories that do not currently require a health assessment or screening in schools though the Institute of Medicine recommends annual BMI screenings in schools (TAH & RWJF, 2014).

3. Program existence : New (One year or less)

4. Program duration : Short-Term (One year or less)

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

6. Expending other than formula funds or state-matching funds : No

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	2%	0%	0%	0%
305	Animal Physiological Processes	0%	0%	10%	0%
501	New and Improved Food Processing Technologies	3%	0%	10%	0%
502	New and Improved Food Products	5%	0%	7%	0%
604	Marketing and Distribution Practices	5%	0%	5%	0%
701	Nutrient Composition of Food	0%	15%	3%	0%
702	Requirements and Function of Nutrients and Other Food Components	5%	15%	7%	100%
703	Nutrition Education and Behavior	36%	50%	3%	0%
704	Nutrition and Hunger in the Population	2%	20%	0%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	15%	0%
721	Insects and Other Pests Affecting Humans	2%	0%	20%	0%
723	Hazards to Human Health and Safety	10%	0%	15%	0%
724	Healthy Lifestyle	30%	0%	5%	0%
	Total	100%	100%	100%	100%

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

1. Situation and priorities

The prevalence of obesity in Virginia in 2013 remained virtually unchanged at 27.2%. Indicators affecting this are diet quality, the consumption of fruits and vegetables, and physical activity levels to promote optimal health. According to the High School Youth Risk Behavior Survey (2013), 55.7% of Virginia High School students were not physically active for at least 60 minutes per day on five or more days per week. The health status of Virginians is also effected when considering food security and food borne illness. There were a total of 1,425 cases of food borne illness in Virginia in 2012 (CDC, 2012) and over 500,000 (512,752) Virginia youth eligible for free or reduced lunch. As of June 2014, 437,101 households or 908,370 individuals were on SNAP for a total of $107,132,866 in benefits issued.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research

- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

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

1. Assumptions made for the Program

A food system is defined as the production, processing, distribution, sales, purchasing, preparation, consumption, and waste disposal pathways of food. Within each of these sectors and pathways, there are opportunities for job creation, business incubation and expansion, health promotion, improved access to healthy, nutritious food, enhanced environmental stewardship and economic success.
Virginia's overall food system directly impacts the survival and viability of farms and farmland, the economic development of rural and urban communities, the resilience of ecological resources, and critical health issues.
Food is a basic necessity for life, but also for economic productivity and prosperity. And yet, many Virginians struggle to have access to an adequate supply of healthy food to lead an active productive life. Because of economic constraints, many Virginia households must choose between buying foods or paying for other basic household needs and bills like rent, electricity or medical. Virginia's food insecurity rate at 11.8% is below the national average, but 912,790 individuals are still considered food insecure

2. Ultimate goal(s) of this Program

• Remove barriers that impede the development and expansion of the production, processing, distribution and marketing capacity of locally-grown Virginia foods.
• Set measurable goals and track procurement purchases and costs of locally-grown Virginia food and farm products for all state agencies, schools, universities, and other institutions.
• Quality food should be affordable and accessible to everyone in Virginia.
• Addressing community food security, hunger, justice and public health issues.
• Establish a Virginia food system report card to facilitate assessment and collection of baseline data for monitoring hunger, health, and advancements of Virginia's food system.
• Improve competencies of Virginia youth in knowledge, reasoning, creativity, personal, social, vocational, citizenship, health, and physical. Improve the health of Virginians through access to adequate, safe, and nutritious food.
• Provide research and guidance for sustaining a safe and wholesome food supply to meet nutrition needs and reduce the risk of illness and disease.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	18.6	4.0	39.6	3.0
2018	17.3	4.0	40.8	3.0
2019	18.0	5.0	41.6	4.0

2020	18.5	5.0	42.8	4.0
2021	18.9	5.0	43.5	4.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Improve access and availability to local, safe, affordable, and nutritious foods and beverages and physical activities
• Promote markets, profitability, environmental stewardship, and health among Virginia producers
• Offer educational programming to support outcomes 1 and 2 and reduce chronic disease
• Pilot-test the northern Virginia Food and Fitness Initiative at the northern Virginia 4-H center for scaling up to other 4-H centers
• Promote healthy, safe, active (decrease sedentary), "green" products, and local sourcing at VCE meetings
• Conduct research experiments and disseminate results to target audiences

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● Demonstrations ● Other 1 (camps)	● Newsletters ● TV Media Programs ● eXtension web sites ● Other 1 (social media)

3. Description of targeted audience

• Children and Youth (e.g. 4-H, FFA, science museums)
• Educators (e.g. K-12, community and 4-year colleges, VCE agents)
• Managers (e.g. school food service, laboratory/technical, farm, farmers' markets, 4-H center staff, retail food)
• General public
• Farmers and agriculture production organizations
• Food processors, ingredient suppliers, packaging suppliers
• Scientists in regulatory agencies (e.g. Department of Health, VDACS, FDA, USDA, CDC)
• Healthcare practitioners (e.g. dietitians, nurses, doctors)
• Pharmaceutical and health care industries (e.g. supplement manufacturers, medical food manufacturers, pharmacists)

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of sessions offered for producers intended to increase their knowledge about best practices on the farm
- Number of 4-H youth, families and communities increasing their knowledge of basic principles outlined in the Dietary Guidelines for Americans 2015
- Number of professional development sessions to VCE staff on safe food handling, healthy eating, reducing sedentary activity, and local sourcing of foods
- Number of youth and families participating in sessions on the causes and effects of chronic diseases, including obesity and sedentary lifestyles.

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased adoption of behaviors in nutrition and physical activity to improve health and decrease chronic disease
2	Increase in number of Virginia consumers who practice safe preservation of foods at home
3	Increase in the number of Virginia produce growers who implement on-farm risk reduction practices
4	Improve food products to enhance nutrition and quality.
5	Increase in knowledge regarding how fermentation influences microbial communities and nutrients and health value of food and beverages
6	Water availability, source, and composition influences choice and behavior for hydration practices.
7	Aquaculture production and processing to yield improved production efficiency, nutrition, and economics.
8	Biological functionality of food components for combating chronic disease
9	Number of limited resource individuals, families adopting healthy lifestyle behaviors to prevent chronic disease

Outcome # 1

1. Outcome Target

Increased adoption of behaviors in nutrition and physical activity to improve health and decrease chronic disease

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Increase in number of Virginia consumers who practice safe preservation of foods at home

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increase in the number of Virginia produce growers who implement on-farm risk reduction practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

Improve food products to enhance nutrition and quality.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Increase in knowledge regarding how fermentation influences microbial communities and nutrients and health value of food and beverages

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Water availability, source, and composition influences choice and behavior for hydration practices.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 701 - Nutrient Composition of Food

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

Aquaculture production and processing to yield improved production efficiency, nutrition, and economics.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 701 - Nutrient Composition of Food

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

Outcome # 8

1. Outcome Target

Biological functionality of food components for combating chronic disease

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Research

Outcome # 9

1. Outcome Target

Number of limited resource individuals, families adopting healthy lifestyle behaviors to prevent chronic disease

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Government Regulations

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

• Utilize a mixed methods approach to assess impact of Food and Fitness Initiative on nutrition and physical activity
• Evaluate adoption of integrated practices by Agents through online surveys

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Natural Resources, Environment, and Climate Change

2. Brief summary about Planned Program

This Planned Program aims to improve the management of the state's soil and water resources, 15.4 million acres of forest land, 680,000 acres of freshwater lakes, and 5,000 miles of shoreline while positively impacting climate change. Effective programming efforts will have strong impacts on land management efforts, which ultimately will directly affect forest stewardship, agricultural practices and climate change. Demonstrating the importance of effective forest, water or soil management will increase the storage of carbon and decrease the use of petrochemicals that directly impact our environment. The bulk of Virginia's natural resources are in private ownership. Therefore, in the absence of strict regulations, VCE is reliant upon financial incentives and education/technical assistance to help private owners make wise decisions on the management and use of natural resources. For example, though the state has ownership rights to the state's fish and wildlife populations, the habitat is owned and managed mostly by private individuals. Without the proper knowledge, private landowners may not make the best decisions on managing wildlife habitat. VCE is the only state agency charged solely with providing educational services to owners of Virginia's natural resources. While other agencies also provide some education, they are regulatory agencies and do not often gain the trust of the landowner which Extension provides. Additionally, personnel with other agencies are excellent partners in education, but often lack the training and resources to be strong educators. VCE can also assist state regulatory agencies develop technically-sound regulations and best management practices for protecting soil and water resources. For example, personnel from of the Virginia Department of Transportation require training in the environmentally sound management of the sizeable acreage under their control. Wastewater, water, and solid waste utilities must make sound environmental and economic decisions on the treatment and utilization of solid and liquid wastes that they process and generate. Finally, Virginia relies heavily on its rich natural resource base for both economic and recreational benefits. Virginia's soil, water, forest, and wildlife resources support manufacturing and recreational industries valued at over $25 billion annually. Educational opportunities impact these industries by providing tools for effective decision making that impact good land management decisions, efficient processing activities and reduced energy consumption. VAES will play a vital role by providing the knowledge base necessary for the development of appropriate Natural Resource policies and to provide Virginia's commercial and private landowners information needed to properly manage their holdings in an economically and environmentally sustainable manner.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%	0%	30%	0%
111	Conservation and Efficient Use of Water	5%	0%	5%	0%
112	Watershed Protection and Management	15%	15%	20%	0%
123	Management and Sustainability of Forest Resources	20%	30%	15%	0%
124	Urban Forestry	5%	15%	5%	0%
125	Agroforestry	0%	15%	0%	0%
131	Alternative Uses of Land	15%	15%	0%	0%
133	Pollution Prevention and Mitigation	5%	0%	0%	100%
135	Aquatic and Terrestrial Wildlife	8%	0%	10%	0%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	2%	0%	5%	0%
403	Waste Disposal, Recycling, and Reuse	10%	0%	0%	0%
605	Natural Resource and Environmental Economics	5%	10%	10%	0%
	Total	100%	100%	100%	100%

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

1. Situation and priorities

Natural Resources, Environment, and Climate Change is a very broad Planned Program, with many inherent issues. For example, Virginia's forests provide a host of multiple benefits, some monetary like the sale of stumpage, and some intrinsic, such as clean water, carbon storage, and an aesthetic environment. Yet, there are problems in the forest. Insects, disease, and fire all take their toll. Additionally, forests are being invaded by a host of exotic plant species, like the tree-of-heaven, Japanese honeysuckle, oriental bittersweet, and autumn-olive. Virginia also loses over 25,000 acres of forest/agricultural land for development every year. Forest landowners need the latest research to best manage their lands and understand the importance of keeping land in forests. Extension programs provide just that. In many cases landowners need basic information and assistance to prepare management plans, and locating sources of governmental financial assistance. Many farmers and forest owners are concerned about protecting their lands in the long term, and want unbiased information about conservation easements and other protection tools. Many activities on the land contribute to nonpoint source pollution of the state's waters, and Extension can assist with educational programs for a wide variety of issues and audiences. For example: Land managers, waste applicators, land reclamation professionals, and farmers need assistance with nutrient management plans to guide them in fertilizer applications, and in waste application treatments and utilization. All of these efforts have a strong impact on climate change and our environment. In far southwest Virginia landowners and coal mine operators need assistance in correctly

applying reclamation practices to insure both prudent bond release and a favorable environment after the reclamation process is completed. Public utilities are tasked with processing solid and liquid wastes and must understand proper land management practices to prevent impairment of soil and water resources, and state regulatory personnel require technical guidance to develop sound environmental regulation. Educational efforts in biomass growth utilization for energy offer new markets for our farmers and landowners, while reducing fossil fuel consumption that impacts climate change.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Many assumptions are implicit in this planned program. For example, most of the natural resources in Virginia are privately owned, and this will probably continue. While Virginia has some environmental regulations, it is not known as a heavily regulated state. Governmental financial incentives and education/technical assistance guide farmers and landowners in land management decisions. Extension is in the strongest position to provide this education. It is assumed that through education, farmers and landowners will make prudent decisions, and adopt new technologies. It is also assumed that internet use in the home will increase in the future, as more of our educational materials are web based. Furthermore, it is assumed that publicly owned utility operators and state regulatory agencies will make wise decisions that affect the public through increased educational efforts.

2. Ultimate goal(s) of this Program

To impact climate change through educational and research efforts that directly foster greater forest stewardship, environmentally sound land management activities and improved water quality. To provide for improved environmental quality, while also providing for economic vitality of families and communities.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	39.3	2.0	59.9	1.0
2018	38.8	2.0	61.7	1.0
2019	40.5	2.0	63.0	1.0
2020	41.4	2.0	64.9	1.0

2021	42.3	2.0	65.8	1.0

V(F). Planned Program (Activity)

1. Activity for the Program

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, web sites, discussion boards.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (web-based applications) ● Other 2 (satellite delivery)	● Public Service Announcement ● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs offered.
- Number of educational materials and curriculas developed
- Identifiable impacts reported by agents/specialists
- Number of counties where drinking water clinics are held.
- Number of participants in drinking water clinics.
- Number of drinking water samples tested.
- Number of extension agents, volunteers and agency collaborators trained through the Virginia Master Well Owner Network.
- Number of programs for landowners which address the impacts of BMP implementation on water quality.
- Number of SHARP Logger Programs which address the impacts of BMP implementation on water quality.
- Number of workshops for small woodlot owners which emphasize the importance of small lots, non-timber forest products, and resources available to help owners of small lots.

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Private water supply users who participate in drinking water clinics more effectively manage their systems
2	Private forest landowners demonstrate application of tools to improve forest health and sustainability
3	Researchers are calibrating the performance of a common watershed model for estimating water quality to allow the prediction of water quality at the watershed scale.
4	Research climate change adaptation techniques for crop producers that will result in recommendations for the use of land management as a climate change adaptation strategy in the US and abroad.
5	Increase in the amount of cropland (acres) managed with conservation tillage production techniques
6	Increase in the amount of cropland (acres) subject to improved nutrient management technologies
7	Increase the number of residential landscapes who have adopted best management practices
8	Increase by municipalities and private industries in adoption of composting as a waste treatment technique
9	Adoption and implementation of renewable energy production of farms and local municipalities and businesses
10	Youth increase agricultural literacy
11	Management practices of forest, land, and water for conservation and protection of native and endangered aquatic fishes and land animals

Outcome # 1

1. Outcome Target

Private water supply users who participate in drinking water clinics more effectively manage their systems

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 111 - Conservation and Efficient Use of Water
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Private forest landowners demonstrate application of tools to improve forest health and sustainability

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

Researchers are calibrating the performance of a common watershed model for estimating water quality to allow the prediction of water quality at the watershed scale.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Research climate change adaptation techniques for crop producers that will result in recommendations for the use of land management as a climate change adaptation strategy in the US and abroad.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Increase in the amount of cropland (acres) managed with conservation tillage production techniques

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

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

Outcome # 6

1. Outcome Target

Increase in the amount of cropland (acres) subject to improved nutrient management technologies

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research
- 1890 Extension

Outcome # 7

1. Outcome Target

Increase the number of residential landscapes who have adopted best management practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Increase by municipalities and private industries in adoption of composting as a waste treatment technique

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 133 - Pollution Prevention and Mitigation
- 131 - Alternative Uses of Land

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

Adoption and implementation of renewable energy production of farms and local municipalities and businesses

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

Youth increase agricultural literacy

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 11

1. Outcome Target

Management practices of forest, land, and water for conservation and protection of native and endangered aquatic fishes and land animals

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

- Populations changes (immigration, new cultural groupings, etc.)

Description

Many external factors affect both the outcomes and the ability to support **the research and** educational programs behind the outcomes. Natural disasters can not only siphon off funds, but create new issues related to climate change, natural resources and the environment. For example, hurricane blowdown can flood the market with low cost wood, and create fuel buildup and insect and disease problems. Floods and droughts have unique problems, and both greatly affect natural resources issues. Certainly, funding for **Research and** Extension programs, particularly state funds, control the ability to develop and deliver **new knowledge and** programs. Finally, new laws and regulations may both create new issues and opportunities, and also cause other issues to fade away. In most cases new regulations result in a need for **more research and additional** education for those affected by the regulations.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation of a broad array of programs, such as those represented by the Climate Change and Natural Resource planned program, require a multitude of varying procedures. In general, Extension educators are responsible for determining their evaluation procedure that best fits their program, time, and fiscal resources. For example, the Virginia Sharpe Loggers Program undertook a complete evaluation covering the years of the program. An extensive survey of program participants is was conducted and adjustments were made from the results to further meet the audience needs. One adjustment was the development of on-line training for loggers for recertification. The Landowner education impact team and the evaluation instructme

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Strengthening Virginia Families

2. Brief summary about Planned Program

Strengthening families means addressing personal issues, stress, and struggles. Families stressed over finding jobs and managing a tough economy leads to struggles with relationships and disconnects between parents and children and poor health. To integrate this information into all extension educational outreach programs, a series of mini modules have been developed that will be embedded into other programs that address financial well-being, nutrition, health, economic enterprise, farm transition and estate planning. Topics include stress, coping and managing relationships while under economic stress. Virginia's per capita income rose steadily early in the decade, but since the recession has struggled to rise from a 2009 low. In 2013, Virginia ranked 10th among the states with an average per capita personal income of $48,733. According to the United States Courts there were 23,972 non-business bankruptcies filed in Virginia last year. These filings included Chapters 7, 11, and 13. In addition, there were 243 foreclosure cases filed in Virginia's courts during 2014. Poverty imposes far-reaching hardships, not only on the poor and their community, but also on the surrounding communities. Virginia has a relatively low poverty rate and it was again ranked 9th in the nation in 2013. However, it has been affected by recent trends, with more than 1 in 10 residents now living below federal poverty thresholds.

3. Program existence : New (One year or less)

4. Program duration : Medium Term (One to five years)

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	0%	5%	0%	0%
607	Consumer Economics	0%	10%	0%	0%
724	Healthy Lifestyle	0%	30%	0%	0%
801	Individual and Family Resource Management	60%	25%	0%	0%
802	Human Development and Family Well-Being	30%	30%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	10%	0%	0%	0%
	Total	100%	100%	0%	0%

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

1. Situation and priorities

All children and families can grow and develop to realize their full potential. They are confronted with a multitude of issues that affect their well-being such as child and school-aged care, at-risk youth behaviors, strained family relationships, aging populations and poverty. Concerns about how Virginia's youth and families are functioning, adjusting, and adapting to these issues have economic impacts for the Commonwealth and are backed by VCE's community situation analysis results. Further, Extension programs for youth, adults, and families have shown positive influences on the quality of family and community life. It is VCE's, VT's, and VSU's responsibility to continue to apply research, educate, and provide outreach services to insure best practices that create healthy families.

2. Scope of the Program

- In-State Extension
- Multistate Extension

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

1. Assumptions made for the Program

People have a desire and have made a commitment to improve their lives; people need a knowledge base, appropriate tools, adequate resources, support, and ongoing evaluation and feedback to improve their lives and their family functioning; and people need connection with others, opportunities to practice new skills and positive interactions with role models and mentors in a nurturing environment. Educational programs must be under girded by a solid research base. Finally, through engaging volunteers and program stakeholders, programs can serve as catalysts for change.

2. Ultimate goal(s) of this Program

The ultimate goal of this planned program is to improve youth and family functioning through the use of collaborative, integrative, educational programming and research in the areas of parenting, child development, child care, individual and family financial management and youth financial education. To achieve the goal, VCE will apply a multidisciplinary tactic using trained professionals and volunteers to ensure a holistic approach to strengthening families to create lasting changes and improve self-sufficiency. Through science-based family and human development educational programming, parents and caregivers will increase knowledge and skills related to employing effective, positive, and safe practices. Moreover, educational programming in financial management will raise awareness, knowledge, and skills regarding financial strategies to improve financial stability of families and individuals. The result of applying science-based educational tools in the programming will improve financial decision-making among youth and adults.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890

2017	46.5	2.0	0.0	0.0
2018	44.2	3.0	0.0	0.0
2019	46.0	3.0	0.0	0.0
2020	47.1	3.0	0.0	0.0
2021	48.2	3.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

To address the Strengthening Virginia Families planned program, we will:

1. Conduct workshops in human development, parenting education, child care provider training, housing, and individual and family resource management
2. Deliver services in individual and family resource management
3. Develop print and electronic resources in human development, housing, and individual and family resource management
4. Provide and distributed available resources, including eXtension, in human development, housing, and individual and family resource management
5. Provide professional and volunteer development training in child care, parenting, and individual and family financial management
6. Provide counseling in financial management
7. Partner with local, regional and state agencies, organizations, faith-based groups, etc.
8. Facilitate meetings of task forces, coalitions, committees, addressing human development and financial management issues

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● Web sites other than eXtension
● One-on-One Intervention	● Other 1 (e-mail, phone, newspaper)
● Other 1 (web-based training)	● Other 2 (materials and resources)

3. Description of targeted audience

Families, youth, individuals, older adults, adult home caregivers, child care providers and early childhood educators, providers of after-school care, community organizations, home owners and government officials, donors, K-12 educators, and volunteers.

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number of child care providers attending trainings.
- Number of parents or caregivers participating in parenting education sessions.
- Number of educational sessions offered to promote efficient small business practices

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Parenting Education - Increase the percentage of parenting education participants that indicate increased knowledge of effective parenting practices.
2	Financial Education: Increase in the number of participants who utilize spending and savings plans
3	Youth Financial Education - 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.
4	Stress Reduction: Increase the number of participants receiving stress reduction information.
5	Child care providers will increase their knowledge and use of practices that lead to school readiness in preschool children.
6	Dollars saved by limited resource individuals and families after attending Family Financial Management programs
7	Number of childcare providers adopting best practices in early childhood development or acquiring/maintaining business certification
8	Entrepreneurship: Increase the capacity of entrepreneurs to identify, develop, and sustain business enterprises.

Outcome # 1

1. Outcome Target

Parenting Education - Increase the percentage of parenting education participants that indicate increased knowledge of effective parenting practices.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

Financial Education: Increase in the number of participants who utilize spending and savings plans

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

Youth Financial Education - 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.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

Stress Reduction: Increase the number of participants receiving stress reduction information.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Child care providers will increase their knowledge and use of practices that lead to school readiness in preschool children.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

Dollars saved by limited resource individuals and families after attending Family Financial Management programs

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 7

1. Outcome Target

Number of childcare providers adopting best practices in early childhood development or acquiring/maintaining business certification

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 8

1. Outcome Target

Entrepreneurship: Increase the capacity of entrepreneurs to identify, develop, and sustain business enterprises.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

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. Budget cuts at the state and local levels and potentially related decreases in staffing may also impact the ability to offer as many programs/workshops.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation of programs, such as those represented by Family and Consumer Sciences require a multitude of varying procedures. To the extent possible, uniform evaluation surveys for financial management, parenting education programs, early childhood professional development trainings and other relevant programs will be utilized.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth Development

2. Brief summary about Planned Program

4-H is the youth development education program of Virginia Cooperative Extension. 4-H is rich with learning experiences where young people partner with caring adults and volunteers in a fellowship unlike any other program available to youth today. Through 4-H, young people are encouraged to participate in a variety of activities that emphasize 4-H's "learning by doing" philosophy of youth development.

Standing for head, heart, hands, and health, 4-H uses more than a century of experience in youth development programming to build strong, confident leaders. Young people in the 4-H community learn leadership, citizenship, and a vast array of life skills that benefit them for the rest of their lives. Through school-based, after-school, and community clubs as well as camp settings, 4-H members pledge to build a better community, country, and world.

4-H participants are youth, ages 5 to 19, taking part in programs provided as the result of actions planned and initiated by Extension personnel in cooperation with volunteers. With a direct connection to research at Virginia's land-grant universities, Virginia Tech and Virginia State University, 4-H is the first experience many young people have with higher education. 4-H is characterized as being community-centered, volunteer-led, Extension-staff supervised, research-based, home- and family-oriented, publicly and privately funded, and responsive to change.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

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

1. Situation and priorities

All children can grow and develop to realize their full potential. Youth and adults are confronted with a multitude of issues that affect their well-being such as child and school-aged care, at-risk youth behaviors, leadership, childhood obesity, character education, and academic enrichment. Concerns about how Virginia's youth are functioning, adjusting, and adapting to these issues have economic impacts for the Commonwealth and are backed by VCE's community situation analysis results. Further, 4-H programs for children and youth have shown positive influences on the quality of community life. It is VCE's, VT's,

and VSU's responsibility to continue to apply research, educate, and provide outreach services to insure best practices that create positive youth development.

2. Scope of the Program

- In-State Extension
- Multistate Extension

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

1. Assumptions made for the Program

Youth have a desire to learn life skills through experiential learning; youth need a knowledge base, appropriate tools, adequate resources, support, and ongoing evaluation and feedback to improve their lives; and youth need connection with others, opportunities to practice new skills and positive interactions with role models and mentors in a nurturing environment to contribute to positive youth development. Educational programs must be under girded by a solid research base. Finally, through engaging volunteers and program stakeholders, programs can serve as catalysts for change.

2. Ultimate goal(s) of this Program

To develop youth and adults working with those youth to realize their full potential "becoming effective, contributing citizens through participation in research-based, informal, hands-on educational experiences."

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2017	100.7	3.0	0.0	0.0
2018	100.3	3.0	0.0	0.0
2019	94.2	3.0	0.0	0.0
2020	96.3	3.0	0.0	0.0
2021	98.5	4.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 4-H trainings, home school education, online education and distance learning, and specialized trainings and workshops to qualify instructors and to educate trainers.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● Other 1 (Camping, ed. program & events) ● Other 2 (service learning projects)	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (E-mail, phone, newspaper) ● Other 2 (Materials and resources)

3. Description of targeted audience

Youth between the ages of 5-19

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Total number of educational presentations for VCE's targeted audiences with a focus on positive youth development.
- Total number of peer reviewed publications focused on positive youth development.
- Total number of 4-H youth participants enrolled in all delivery modes.
- Number of youth engaged in Science, Engineering, and Technology
- Number of youth engaged in Citizenship.
- Number of youth engaged in Healthy Lifestyles.
- Total number of adults volunteers.
- Total number of non-peer reviewed publications focused on positive youth development.
- Total number of youth volunteers.

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

V(I). State Defined Outcome

O. No	Outcome Name
1	4-H Camping - Percentage 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 - Percentage of youth participating as volunteers and through community service that demonstrate teamwork skills and community commitment.
3	4-H Foods, Nutrition and Health - Percentage of 4-H youth participating in foods, nutrition, and health programs that increase knowledge, attitudes, skills, and aspirations to promote optimal physical, social, and emotional health habits.
4	4-H Science, Engineering and Technology - Percentage of 4-H youth that demonstrate increased knowledge, skills, aspirations, and attitudes in STEM programming.
5	4-H Adult Leaders - Percentage of adult 4-H volunteers participating in leadership and volunteer development who indicate increased knowledge and skill development in implementing 4-H programming.
6	Number of limited resource youth trained in STEAM content related to environmental education and agriculture.
7	Percentage of youth who make positive choices.
8	Percentage of youth who effectively communicate.

Outcome # 1

1. Outcome Target

4-H Camping - Percentage 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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

4-H Citizenship - Percentage of youth participating as volunteers and through community service that demonstrate teamwork skills and community commitment.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

4-H Foods, Nutrition and Health - Percentage of 4-H youth participating in foods, nutrition, and health programs that increase knowledge, attitudes, skills, and aspirations to promote optimal physical, social, and emotional health habits.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

4-H Science, Engineering and Technology - Percentage of 4-H youth that demonstrate increased knowledge, skills, aspirations, and attitudes in STEM programming.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

4-H Adult Leaders - Percentage of adult 4-H volunteers participating in leadership and volunteer development who indicate increased knowledge and skill development in implementing 4-H programming.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Number of limited resource youth trained in STEAM content related to environmental education and agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

Percentage of youth who make positive choices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Percentage of youth who effectively communicate.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Decreased economic stability and family dynamics can hinder the ability of youth to participate in educational programming efforts. Budget cuts could potentially impact staffing and the ability to offer as many programs/workshops. Increased pressures of standardized testing could hinder partnerships with public schools. Language barriers, curtural differences, urban/rural interface, and competition with other youth educational and/or recreational programs may hinder our ability to recruit youth and adult volunteers.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

A variety of evaluation methodologies will be incorporated into the 4-H program planning process. The 4-H youth development program team will provide leadership in developing and conducting appropriate evaluations. Virginia 4-H will incorporate common measures in their evaluation plan.