

# 2015 West Virginia University and West Virginia State University Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

This report is the combined 2015 Annual Report of Accomplishments for three entities: the West Virginia University WVU Agriculture and Forestry Experiment Station (WVU-AFES) which is part of the Davis College of Agriculture, Natural Resources and Design; West Virginia University Extension (WVUES); and, the West Virginia State University (WVSU) Gus R. Douglass Land Grant Institute (WVSU-GRDI) which includes both Research and Extension programs. In past years each institution submitted a separate annual report, though we have submitted a joint plan of work for the last two years. This report is based on the joint plan of work for the period 2015 - 2019. While we already have some coordinated research and extension programming we plan to meet at least once a year in future years to increase our level of joint planning and cooperation. Two years ago we mutually agreed to organize our research and extension programming into ten program areas (listed below) that could encompass each institution's strategic goals. We will work in the future to increase coordination and reduce duplication of effort in each of the ten program areas.

The WVU-AFES supports approximately 44 FTE research faculty positions distributed across the 110 individual scientist positions. The Station also supports approximately 25 FTE technical positions, 35 clerical and farm/forest worker positions and 40 professional support positions (mostly graduate students). The Experiment Station operates seven farms and two forests which support faculty research. Four of the farms (Animal and Nutritional Sciences farms in Morgantown and Reedsville, Horticultural and Agronomy farms in Morgantown) and the University Forest are sufficiently close to the University campus to be used extensively to support academic programs in addition to research. Outlying farms include the Reymann Memorial Farm (beef, sheep, aquaculture, agronomic crops and bull testing station) and Kearneysville Tree Fruit Research Farm (primarily apples and peaches) in northeastern West Virginia; the Willow Bend Farm in the southeast (pasture raised and finished beef); and the Tygart Valley Forest (mostly oak regeneration and disease control research).

The West Virginia Agriculture and Forestry Experiment Station is part of the Davis College of Agriculture, Natural Resources and Design. While the West Virginia Cooperative Extension Service is a separate administrative unit and not part of the College, research and extension are integrated through joint appointments (nine of 110 faculty in the Davis College have partial extension appointments), through coordination of activities and planning at the deans, directors and associate-directors levels, through integrated research, extension and education projects and programs funded by Hatch, Smith-Lever and McIntire-Stennis formula funds and through competitive funding from NIFA and other sources.

The Davis College has three schools, the School of Agriculture and Food (Plant and Soil Sciences and Animal and Nutritional Sciences); the School of Design and Community Development (Design and Merchandizing, Landscape Architecture and Agricultural and Extension Education); and, the School of Natural Resources (Forestry and Natural Resources and the Agricultural and Resource Economics program. Four centers and one organizational unit exist within the College to help focus and direct our efforts on economic development, natural resources and the environment. They also contribute to our ability to leverage Hatch and McIntire-Stennis capacity funding by attracting external competitive grants

and other external sources of funding. The four centers are the Natural Resource Analysis Center (NRAC), the Institute for Water Security and Science (IWSS), the National Geospatial Development Center (NGDC) and the Appalachian Hardwood Center (AHC). The organizational unit is the West Virginia Cooperative Fish and Wildlife Unit.

The regular WVUES workforce of 465 county agents, state specialists, and staff is augmented by an additional 1,200 seasonal employees who help deliver our large, statewide summer learning programs. More than 18,000 well-trained volunteers also help design, deliver, evaluate, and improve Extension programs each year. Employees of numerous longtime program partners, such as Regional Education Service Agencies (RESA) of the West Virginia Department of Education, West Virginia Department of Agriculture, county school professionals, West Virginia Department of Health and Human Resources, and WVU Health Sciences, help in this regard as well. Many identify with WVU Extension through our educational programs. Some of the most recognized programs are 4-H, Dining with Diabetes, Extension Master Gardeners, Firefighter Training, Community Educational Outreach Service (CEOS), Family Nutrition Program, Energy Express, Soil Testing, Workplace Safety, Pesticide Recertification Training, Character Education, Beef Quality Assurance, Farm Management, Forest Stewardship, and Community Leadership Development. The University's strategic plan specifically mentions the work and contribution of the Extension Service, "Expand outreach efforts to connect the campuses to citizens and communities throughout the state. Provide resources and information to equip WVUES county agents, and other personnel engaged in outreach and care, for a broader role as ambassadors for the institution."

WVUES continues to play a major role in reaching these goals and objectives by implementing relevant programs linked to the National Institute of Food and Agriculture's five priority areas childhood obesity, global food security and hunger, climate change, food safety, and sustainable energy. Programs also are implemented in youth development, workforce and community development, and family finance and relationships.

**Agriculture and Natural Resources:** Agents and specialists work with farmers, landowners, and communities to support local agriculture and encourage wise use of natural resources. We are committed to helping small family farmers find ways to increase their profits. As the trusted local source for answers to home and garden questions, Extension is committed to ensuring a safe food supply and working with rural landowners to develop alternative enterprises. Included in this division are the planned program areas of global food security and hunger; sustainable energy; climate change, environmental quality and stewardship; production/sustainable forestry; and food safety. In 2015, WVUES agriculture and natural resource programs tallied 152,016 direct contacts.

**4-H Youth Development:** Positive youth development is achieved by weaving essential elements into 4-H programs that promote independence, generosity, and mastery of new skills. The three primary educational areas of emphasis are healthy lifestyles; science, technology, engineering, and math (STEM); and citizenship. Our literacy programs strengthen children's reading skills and promote the benefits of adults and children reading together. In 2015, 4-H youth development programs at WVUES tallied 203,322 direct contacts.

**Families and Health:** Extension faculty and paraprofessionals help families thrive by providing research-based knowledge, skills, and resources for healthier lifestyle choices. Nutrition and health education programs teach individuals and families ways to improve their diets and to engage in regular physical activity. Family programs include resource management, relationship education, parenting, and early childhood development. Faculty members work with adults to build leadership and interpersonal skills. In 2015, family and health programs tallied 166,182 direct contacts.

**Community Economic and Workforce Development:** WVUES promotes collaborative community projects and builds the capacities of local businesses, governments, and unions by delivering programs that build

local leadership capacity, expand and attract employment, improve retail opportunities, provide information and recommendations on downtown revitalization and tourism, and expand understanding of cultural and economic diversity. In 2015, WVUES community development programs tallied 85,089 direct contacts.

WVSU's Gus R. Douglass Land Grant Institute currently supports 36 FTE positions across research and extension. Research and extension efforts continue to expand and integrate programs. As the University builds infrastructure and capacity, and is able to secure additional funding sources, existing research and extension programs are further strengthened and new programming is being developed to better serve the needs of stakeholders.

Aligning WVSU research and extension programs within NIFA's priority areas has proven beneficial, by providing an opportunity to determine where programs complement each other; as well as, where there are opportunities to build greater collaboration and identify pathways for new integrated efforts. The Masters of Science in Biotechnology program, within the WVSU College of Natural Sciences and Mathematics, continues to benefit from the development and maturation of research programs. Split appointments of graduate research faculty within GRDI have permitted the increased participation of undergraduate and graduate students in agricultural and environmental research.

WVSU continues to undergo organizational restructuring due to changes in University administration, programming needs, and decreasing federal and state appropriations. Despite this organizational evolution, the mission of the Institute continues to be one of delivering educational and life-long learning opportunities by conducting research, teaching and outreach services to improve the well-being of West Virginia citizens (particularly those traditionally under-served). Federal support continues to be a key success factor for the Institute. As additional state appropriations and other resources continue to be attained, the University carries on efforts to strengthen and extend its research and extension programming capacity and programs.

Federal support continues to be a key success factor for the WVSU-GRDI. As additional state appropriations and other resources continue to be attained, the University carries on efforts to strengthen and extend its research and extension programming capacity and programs. The following report provides details of the programs supported by Evans-Allen, Section 1444 Program and McIntire-Stennis formula funds appropriated to 1890 Institutions and matching funds provided by the State of West Virginia.

As in the past, research programs of the WVU Agricultural and Forestry Experiment Station are coordinated with and supported by research programs at WVSU and by educational and outreach programs of both West Virginia State and West Virginia University Extension. Supporting research at West Virginia State includes; genetic mapping for pest and disease resistance, as well as value-added traits in melon, watermelon, squash, pumpkin, tomatoes and peppers, and field trials of many vegetables and cut flowers; diet formulation in aquaculture; improving operation of poultry waste digesters and develop novel techniques for soil remediation on reclaimed mine lands.

West Virginia University and West Virginia State University entered into a voluntary agreement in 1997 to create the West Virginia Association of Land Grant Institutions; a collaboration of the state's two land grant institutions committed to providing education that would help the citizens of West Virginia improve their lives and communities. In 2005, triggered by an USDA CSREES mandate, the two Universities developed a Comprehensive Plan for the State which superseded the former agreement. This plan assures appropriate coordination between the two institutions to avoid duplication of efforts, as it relates to their research and extension programming, and thus an efficient investment of human and financial resources within the State.

The combined extension efforts of both Universities are addressing the most common problems facing families and communities in West Virginia which includes, a decreasing and aging population; a

largely rural population with limited access to health and nutritional information and a consequent tendency towards poorly balanced, calorie dense diets; and an extreme need for environmentally friendly and sustainable economic development which will provide jobs to replace the many which have been lost in coal and timber harvesting industries.

- This combined five year Plan of Work has ten program areas:
- Global Food Security and Hunger: Production/Sustainable Agriculture
  - Climate Change and Environmental Quality
  - Sustainable Energy
  - Childhood Obesity, Nutrition, and Health
  - Food Safety
  - Community, Economic and Workforce Development
  - Production/Sustainable Forestry
  - Fundamental Plant and Animal Systems
  - Strengthening Families
  - Youth Development

Progress for 2015 in each of these goal areas is summarized in the Planned Programs section.

**Total Actual Amount of professional FTEs/SYs for this State**

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	173.0	24.5	41.0	13.0
Actual	160.0	25.0	44.0	12.5

**II. Merit Review Process**

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

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

**2. Brief Explanation**

Internal merit review

Internal merit review at WVUES was done in the following way:

1. Each Extension faculty member developed an individual plan and each program area team developed a plan of work. These plans are approved by the unit directors (agriculture and natural resources, 4-H youth development, families and health, and community economic workforce development). Faculty based their plans on objectives designed to meet the goals of WVU's planned programs.
2. Each unit director reviews the data collected through the reporting system. The evaluation specialist writes a summary of the data collected, as well as outcome reports which are used to report to

NIFA/USDA. This year, it became apparent that our reporting system was not meeting the needs of faculty. In 2016, we will begin collecting output and some outcome data through Digital Measures. Digital Measure is being adopted university-wide at WVU. We have examined the databases used by other Extension units and are using what we learned to adapt our system.

3. All Extension specialists and county agents are appointed as faculty at West Virginia University. As such, they undergo the same faculty reviews as other university faculty and are promoted under the same protocol. In December of each year, every Extension faculty member submits a faculty file which contains productivity charts and accomplishment narratives related to teaching, service, and research. Depending on the years of service and whether the person is applying for promotion, the files are evaluated by their peers in their unit, their program unit director, an Extension-wide committee, and the WVU Provost (for promotion years only).

4. Administrative reviews are done periodically. All administrators in WVU Extension were reviewed by Extension staff and faculty in 2013 and have been counseled with regard to evaluations.

5. In 2015, the administration of the WVU Extension Service conducted four "Listening Session" with faculty and staff. At these listening sessions, Steve Bonanno and other administrators informed faculty and staff about upcoming events and issues related to Extension. Faculty and staff were allowed to ask questions and express their opinions to administrators.

#### External merit review

1. In 2011, WVUES conducted a survey of 800 voters to better understand attitudes towards WVU and touch points between the university and the public. They were asked if they were aware of a number of WVU services including medical care, health care, Extension health education programs, Extension farming programs, 4-H extension program, Mine, fire and other safety programs, rural medical care programs, breast care screen, wellness initiatives including CARDIAC, Environmental protection programs, academic summer camps, Extension gardening, dental care, and Energy Express. Of the Extension programs, 67% had heard of Extension health program, 61% had heard of Extension farming programs, 58% had heard of 4-H Extension programs, 46% had heard of Extension gardening programs, and 40% had heard of Energy Express. Respondents who used a service, also rated whether they thought WVU was doing a good job. For most Extension program, 70% or better thought we were doing a good or excellent job. 4-H programs rank the highest among those who know someone who has used it and among those who say it has a positive performance.

2. Evaluations done by individual programmatic teams often serve as merit reviews for WVU Extension. Findings from the evaluation are used to improve current programming and help Extension educators plan new programming.

3. Programs at WVU Extension, as well as individual Extension educators, continue to win awards for their excellent programming. WVU Extension programs are recognized by regional and national organized as providers of quality educational opportunities. This year, WVU Extension professionals won the following awards:

- From the National Association of Extension 4-H Agents, Northeast Division
  - Excellence in Camping - Individual - Donald Reed
  - Excellence in 4-H Club Support - Individual Award - Becca Fint-Clark
  - World Citizenship in 4-H Development Award - Julie Tritz and Sherry Swint
  - Beyond Youth Award - a team of 10 agents
  - Denise Miller Innovator Award - Phillip See

- Excellence in Healthy Living Programming Award - a team of 4 agents
- Education Piece - Team Award - a team of 10 agents
- Personal Column - Andrea Mender
- Promotion Piece - Individual - Andrea Mender
- From the National Extension Association of Family and Consumer Sciences, National
  - Human Development/Family Relationships - team of 9 agents and specialists
  - Marketing Package Award (2<sup>nd</sup> Place)- a team of 14 agents and specialists
- From the National Extension Association of Family and Consumer Sciences, Eastern Division
  - Family Health and Wellness Award (2<sup>nd</sup> place) - a team of 8 agents
  - Human Development/Family Relationships (1<sup>st</sup> place)-- a team of 9 agents and specialists
  - Marketing Package Award (1<sup>st</sup> Place)- a team of 14 agents and specialists

### Scientific Merit and Peer Review at WVU-AFES

A scientific merit and peer review process is used for all Hatch, McIntire Stennis and Animal and Health and Disease Act research projects. Projects are reviewed internally by individuals with expertise in the fields of science addressed in each proposal are selected by the Division Director, Experiment Station Director or designee and asked to judge technical merit, likelihood of achieving stated objectives, and potential impacts for each proposed project. A minimum of three peer scientists (i.e., individuals qualified by their status in the same discipline, or a closely related field of science), are asked to read and provide written comments on the proposed activities. The terms of reference for the reviewers focus on questions of the quality of the proposed science, technical feasibility of the research, the validity of the scientific approach, and likelihood for completing the stated objectives. Additional comments may be requested on a project's relevance to the station's priorities, the degree of integration with extension (as appropriate), responsiveness to stakeholder needs, and the accuracy of any claims for multi-disciplinary and multi-state collaboration. Reviewers are asked to present their findings in writing, and records of the reviewers' comments are preserved for the life of the project, or for a period of three years in the event that a project is not initiated. Competitively awarded grants requiring peer review or contract research requiring grantor approval are exempt from this process. Programs of research are reviewed annually by the Station visiting committee and every five years through a College level strategic planning process.

## **III. Stakeholder Input**

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

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

### **Brief explanation.**

At special events where the public gathers, such as the WVU Day at the Legislature and the West Virginia State Fair, WVU Extension has made an effort to gather post-evaluative information on stakeholders' satisfaction and how they are able to use what they have learned in their everyday lives. We also gather evaluative information at most educational events all year round. This

information not only tells us if participants are satisfied, but also whether and how participants have benefited. The results of these evaluative efforts are generally positive, but critical comments are always used to inform program improvement. Faculty members are expected to report on program outcomes in their annual reports. In order to receive ratings of excellent, evaluations must measure changes in learning, action, and conditions.

Our WVU Extension website is viewed favorably. It is consistently updated with news and information about programs and issues of interest around the state. There is an opportunity for stakeholders to comment on Extension's programs available on the site. County offices have websites and some have Facebook pages where stakeholders can comment on activities and give suggestions.

Another indication of stakeholder participation is their willingness to give financially to Extension programming. WVUES has benefited from an increase in financial giving over the last year.

### WVU-AFES

Much stakeholder input is collected in conjunction with West Virginia University Extension (administratively distinct from the College of Agriculture, Natural Resources and Design) since we share a majority of stakeholders. We discontinued special meetings which had as their sole purpose the gathering of stakeholder input and instead, have more recently relied upon input gathered at meetings with other primary purposes (annual or regular meetings of West Virginia Farm Bureau, West Virginia Forestry Association, West Virginia Grasslands Steering Committee, State Aquaculture Forum, Organic Research Project annual meeting, the West Virginia Farmer's Market Association, etc.) We find the new procedure more efficient and to represent a larger and more diverse segment of our stakeholders. Input also originates from various advisory groups associated with specific interest areas within College Divisions (e.g., Organic Research Project Steering Committee within the Division of Plant and Soil Sciences; Appalachian Hardwood Council; Advisory Board in the Division of Forestry and Natural Resources, etc.) as well as from advisory groups established at the College/Station level (Davis College Visiting Committee).

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

### **1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

### **Brief explanation.**

Each of our counties have county advisory committees that meet regularly and advise county faculty on issues and needs of that county. In addition, unit directors and other administrators meet from time to time with these groups. During hiring of county agents, county advisory committees have direct input into the hiring process. Administrators also meet regularly with major stakeholder groups such as the WV Farm Bureau and Community Education Outreach Service (CEOS) constituencies.

Two new associate deans for WVUES began their work in 2015. One of the associate deans will focus on programming and research. Another, the associate dean for partnerships and initiatives, will lead our efforts to increase collaborations with state agencies and organizations. She will help bridge the gap with other WVU colleges and departments. She will also play a key role in WVU's Mountain State University initiative in Beckley. She will work with our agents and specialists to build and cultivate relationships on a local, county, state, and national level. In 2015, a new director for professional development was also appointed.

### WVU-AFES

The focus of the Service/Outreach agenda for the College is to continue to enhance our communication and working relationship with our Extension partners, commodity and industry groups, state agencies and community organizations that represent our College disciplines within the State of West Virginia. The impact of these efforts by the College will continue to enhance our relationship with our academic partners and stakeholders and make our programs more relevant to needs of the State and be consistent with Goal 5 of the West Virginia University's 2020 Strategic Plan- "to enhance the well-being and the quality of life of the people of West Virginia. We truly believe that our success as a land grant College/Institution will be measured by how well we serve the citizens of West Virginia, then the nation and the world. Based on the initial strategies identified in 2010 to improve our Service and Outreach agenda, we have had good success in implementing these strategies and have realized some strong positive impacts for an improved image of the College within the University and our Service and Outreach agenda within the State and region.

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

### **1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

### **Brief explanation.**

#### Meeting with traditional Stakeholder groups

Representatives of WVUES, most especially the Director, Steve Bonanno, meet with legislators and heads of stakeholder groups to learn how Extension can serve the state and meet the needs of stakeholders. We coordinate WVU Day at the Legislature each year.

Our Interim Development Director, works to not only raise funds, but also to understand what alumni and stakeholder groups want Extension to do to extend outreach throughout the State. Our new WVU President, Gordon Gee travels the State and toured Extension county offices. He has met with stakeholders of Extension as well as other outreach initiatives of the university. His feedback has helped Extension strengthen its programs.

### Survey of traditional Stakeholder groups

Most coordinators of Extension activities conduct surveys of participants in order to understand their needs with regard to Extension programming. Those surveys are studied by teams of agents and specialist in each program area to determine how to improve programming and/or create new programs. The Evaluation Specialist, Allison Nichols, works with those teams to create appropriate evaluation protocols.

### WVU-AFES

Surveys are distributed at annual meetings for numerous organizations having interest in College program areas (related to agriculture, forestry, landscape architecture, interior design, human nutrition, etc.) to provide input. Division Directors, College faculty and advisory groups are queried regularly and routinely to identify industries, groups or subject matter areas needing representation in the College input stream and for specific individuals to fill these roles.

### **3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities

#### **Brief explanation.**

##### In the Budget Process

WVUES administrators carefully consider the needs of stakeholders when making additions or subtractions to the budget. In the past, a priority has been placed upon expanding and enhancing the role of Extension at the county level. This continues to be a priority. Most recently, there have been threats to funding at the county level. WVUES administrators have worked hard to convince county leaders of the importance of Extension. Recently about 80 Extension faculty attended a Public Value and Evaluation conference in order to learn how to document our public value.

The administrative team members interact with several constituent groups on the state level and participate in professional associations, boards, etc. County-based faculty interact on the local, and sometimes state levels, as well. County Extension Service Committee, mandated by WV State Code, and applies ONLY to WVU Extension, specifies the committee's function to provide program advice.

##### Identified Emerging Issues and Redirected Extension Programs

The following are emerging issues in West Virginia:

1. Energy, particularly changing sources of energy. Shale gas is making new millionaires and decreasing the cost of energy but also decreasing the price of coal. Loss of coal jobs and severance taxes deepens the poverty in already distressed counties. There are many issues related to drilling

for shale gas and the environment. WVUES is providing educational programs to help landowners make decisions based on research.

2. Low workforce participation among eligible adults. Since our unemployment rate is reasonable compared to the nation as a whole that low workforce participation has different implications. One of those is a high rate of substance abuse.

3. High rates of obesity and chronic diseases that result from poor nutrition and lack of exercise.

WVU is addressing these issues in the following ways:

1. The growth and development of the Marcellus shale in West Virginia creates both opportunities and concerns. In 2015, the expertise and knowledge that the citizens of West Virginia need to make informed decisions about the oil and natural gas industry have been addressed through many educational programs.

2. Science, Technology, Engineering, and Math (STEM) programming has been developed and promoted within our 4-H and Youth Development program this year, which is one way we are addressing the employment rate. We hope to prepare well-trained workers in the STEM fields.

3. Our Community Education, and Workforce Development unit has increased its emphasis on tourism, an expanding industry in the state and has expanded the First Impressions program to include tourism. These new tourism businesses will open up jobs for our citizens.

4. We are placing an emphasis on our health living programs in both our family and health programs and 4-H programs. We will be adding an item to all evaluation forms to measure intentions to changes behaviors related to healthy living.

#### In the Action Plans and To Set Priorities

Each of the four Extension units have developed strategic plans. Most have considered the new National indicators in their planning. University and Extension administrators have been studying ways to make the Extension service more of an integral part of the University. Extension outcome data has been added to the University's strategic planning website.

#### In hiring:

In 2016, WVU will be hiring four new program unit director. These vacancies have occurred because some of the former unit directors were promoted to associate dean or other administrative positions. Careful consideration will be given in the hiring process to our state and university priorities as well as to the needs of all stakeholders.

#### WVU-AFES

The Davis College of Agriculture, Natural Resources and Design continues to value our work with the stakeholders and partnerships within our State and need their continued input to improve and make more relevant these relationships in the future and continue to enhance the wellbeing and quality of life of citizens in West Virginia in disciplines germane to our College. New facilities such as a new greenhouse completed in 2012 and a construction of a new 240,000 square foot Agriculture Sciences building proposed for completion in 2014/15 will enhance the quality of our teaching and research activities and partnership potential with external partners. The new building will have over 50 wet labs as well as a state of the art meat lab. These new facilities as well as scheduled

renovations of existing facilities will certainly improve morale of faculty, staff and students, enhance our image and afford enhanced opportunities for our service, outreach and engagement agenda. Input from our stakeholders is used to help inform long term strategic planning and budgeting. As we are faced with a State budget cut this and next year, as well as a cut in the operating budgets for our farms, we work with our stakeholders to help determine where spending can be reduced without impinging on mission-critical programs.

**Brief Explanation of what you learned from your Stakeholders**

1. We have learned that the Marcellus Shale natural gas industry develops in West Virginia, developers and citizens want more information and guidance about how to respond. They particularly want to know more about leasing and contracts.
2. We learned that we have a great opportunity to expand tourism in West Virginia. We have learned that we need to work together with West Virginia State University Extension to reach out to all populations in West Virginia.
3. We have learned that other agencies look to us for research-based programs on healthy living. For example, the state insurance program, PEIA, has offered two of our signature programs - Dining With Diabetes and Stress Less with Mindfulness - to their clients and have reimbursed WVUES when they attend.
4. We have learned that 4-H is considered an important contribution to positive youth development in our state. The PROSPER program has been adopted by two counties as one of the substance abuse prevention programs offered to 6th and 7th graders in their schools. WVU-AFES perspective:

1. Our constituents have urged us to conduct more applied research to help support their businesses and to help stimulate the State economy. This is part of our mission but is increasingly difficult to accomplish given decreasing State funding and the priorities of the federal research agencies which generally favor more basic research projects.
2. We have received positive feedback about two of our programs which are designed to produce graduates that are well trained for jobs that exist within the State. These are the Energy Land Management program and E Quad (Energy, Economics, Entrepreneurship and Environment).
3. The State budget and economy are feeling the effects of the decline in the coal industry and falling energy prices. We have been advised by our constituents to conduct research to help foster the forest products industry by creating value-added products that utilize the hardwood resources of the State. We have several research projects looking at developing novel bio-products, bio-materials and bioenergy products from underutilized hardwood species and from waste generated by the forestry industry.

**IV. Expenditure Summary**

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
4241218	1388168	3298649	1527342

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
	<b>Extension</b>		<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	4241218	1455606	2866846	1790061
<b>Actual Matching</b>	7927810	819963	6347148	1013061
<b>Actual All Other</b>	0	723807	4582055	1045585
<b>Total Actual Expended</b>	12169028	2999376	13796049	3848707

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b>				
<b>Carryover</b>	0	67438	2638819	262719

**V. Planned Program Table of Content**

<b>S. No.</b>	<b>PROGRAM NAME</b>
1	Global Food Security and Hunger
2	Climate Change and Environmental Quality
3	Sustainable Energy
4	Childhood Obesity, Nutrition and Health
5	Food Safety
6	Community, Economic, Workforce Development
7	Production/Sustainable Forestry
8	Fundamental Plant and Animal Systems
9	Strengthening Families
10	Youth Development

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

**Program # 1**

**1. Name of the Planned Program**

Global Food Security and Hunger

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	10%	2%	10%	0%
102	Soil, Plant, Water, Nutrient Relationships	10%	3%	10%	0%
111	Conservation and Efficient Use of Water	0%	10%	0%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	0%	30%
202	Plant Genetic Resources	0%	0%	5%	30%
205	Plant Management Systems	10%	5%	10%	11%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	5%	10%	0%
212	Pathogens and Nematodes Affecting Plants	0%	5%	10%	0%
216	Integrated Pest Management Systems	10%	10%	5%	0%
301	Reproductive Performance of Animals	0%	0%	10%	0%
302	Nutrient Utilization in Animals	0%	0%	15%	29%
307	Animal Management Systems	15%	0%	10%	0%
308	Improved Animal Products (Before Harvest)	10%	0%	0%	0%
313	Internal Parasites in Animals	0%	0%	5%	0%
403	Waste Disposal, Recycling, and Reuse	0%	10%	0%	0%
405	Drainage and Irrigation Systems and Facilities	0%	3%	0%	0%
503	Quality Maintenance in Storing and Marketing Food Products	10%	10%	0%	0%
604	Marketing and Distribution Practices	10%	2%	0%	0%
607	Consumer Economics	10%	5%	0%	0%
806	Youth Development	5%	30%	0%	0%
	<b>Total</b>	100%	100%	100%	100%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	17.0	2.0	9.5	8.0
<b>Actual Paid</b>	17.0	6.0	8.0	4.3
<b>Actual Volunteer</b>	1400.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
730000	161734	912436	696686
<b>1862 Matching</b>	<b>1890 Matching</b>	<b>1862 Matching</b>	<b>1890 Matching</b>
564100	91107	1343582	437687
<b>1862 All Other</b>	<b>1890 All Other</b>	<b>1862 All Other</b>	<b>1890 All Other</b>
0	80423	744176	448528

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

**1. Brief description of the Activity**

This program area involves applied research in plant and animal production systems. Projects are focused on increasing the productivity and sustainability of agriculture thereby contributing both to food security and alleviation of world hunger.

WVU-AFES

West Virginia agriculture is dominated by high intensity poultry production and low intensity pasture-fed ruminant production with a declining amount of acreage in tree-fruit production. Much of the land in West Virginia is characterized by steep slopes and high rates of erosion that are suitable to pasture but not to intensive row-crop production. Most intensive crop production, including some fruits and vegetables, is limited to those regions of the state that have relatively flat terrain and favorable soil and climate characteristics. To be competitive, West Virginia producers typically must either increase the value of what they produce or reduce transportation and production costs by relying on locally-marketed products by taking advantage of the State's proximity to major urban markets or by developing niche products. Some examples of successful enterprises include encouraging markets and consumer acceptance of pasture-raised and pasture-finished beef; cool water aquaculture; focusing on higher priced products such as those with ornamental or recreational use; increasing real or perceived product value in specialty or out-of-season markets such as lamb and organic products; and by diversifying product offerings. A number of projects at the Davis College involve long-term organic farming research involving plant systems, animal systems, recovery of proteins in fish processing, integrated plant and animal systems and non-chemical control of parasites in sheep.

Highlights for 2015 include:

- Study of the spatial distribution patterns of the brown marmorated stink bug in order to better formulate monitoring and pest control programs.
- Continued research on the mechanisms that regulate the development of protective immunity during

gastrointestinal nematode infection of sheep.

- Related research to develop integrated gastrointestinal nematode control methods for sheep that decrease reliance on chemical dewormers through the use of selective deworming, better forage management and grazing options and breed and animal selection for nematode resistance or resilience.
- Developing methods for using unmanned aerial vehicles to develop spatially-targeted integrated pest control systems.
- Creation of potentially marketable protein powders from underutilized resources by extracting the water soluble proteins from fish processing byproducts.

#### WVUES

The WVUES Global Food Security and Hunger planned program has the following goals: 1) increase food supply and quality by improving and promoting animal health, marketing, using pesticides, using risk mitigation, and controlling predation; 2) engage individuals in the promotion, support, and sustainability of horticulture, 3) expand marketing opportunities for value-added products and develop food systems that support local consumers and local business creation and expansion; 4) enhance the agricultural knowledge so that citizens make informed decisions related to the production of food, fiber and wildlife ecology; and 5) build volunteer capacity related to agriculture within communities. In 2015 there were 901 educational activities reported and 133,327 direct contacts in this program area. Of those direct contacts, 77,463 were with youth. Activities in the WVUES Global Food Security and Hunger planned program include those that address animal health, livestock production, animal product marketing, and grassland management, feeder cattle marketing, livestock improvement, grassland management, homeowner and commercial horticulture, volunteer Master Gardeners, integrated pest management, weed control management, small farms, fertilizer use and selection, soil sampling, composting, livestock judging, and other agriculture skills for youth. In 2015, as in prior years, WVUES conducted the West Virginia Small Farms Conference and hosts the Small Farms Website.

#### WVSU-GRDI

WVSU Agricultural and Environmental Research Station research efforts are focused on developing vegetable varieties suitable to small farm environments, developing improved feed for rainbow trout and reducing aquaculture pollution, and developing value added and disease resistant cultivars of melons, watermelons and peppers.

Adult programs efforts have concentrated on educational workshops and trainings on topics such as hydroponic/aeroponic production, irrigation, small fruit production, adaptive gardening, cold storage/post-harvest technology and aquaponics. With a focus on re-education of our veteran, socially disadvantaged and displaced worker populations, WVSUES has focused on agricultural education to best meet these needs in our state.

Highlights for 2015 include:

- Veteran and socially disadvantaged farmers across the state were provided hands on workshop instruction and illustrated and increase in knowledge.
- Small and urban farmers participated in educational program efforts to increase the diversity of their farms.
- Small and urban farmers increased their ability to provide fresh, safe produce to the emerging local foods market in WV.
- Successful retrosynthesis of a tomato acylsugar has led to compound pest resistance trials

## **2. Brief description of the target audience**

The target audience for this program area includes beef, dairy, and aquaculture producers, large and small

growers of horticultural products, processors, distributors, agricultural consultants, regulators, homeowners, shepherds, pesticide applicators, certified nutrient managers, fish feed manufacturers, federal agencies youth livestock exhibitors, volunteers, minority farmers, policy makers and other researchers, and Extension specialists and agents.

**3. How was eXtension used?**

Four educators answer questions that are referred via the national eXtension website Agents report using eXtension to look up information for county residents. These are usually plant or insect related.

We are about to implement mandatory training for all horse camp volunteers through the eXtension HALTER program through the Horse Quest Community of Practice.

One specialist is part of the Community, Local and Regional Foods COP; the Women in Agriculture COP and the Entrepreneurs and Their Communities COP. She serves as leader for the Webinar Group under the Community, Local and Regional Foods COP. She takes part in daily conversations about best practices which has proven to be a tremendous source of real-time information. Webinars and general network contacts have been invaluable tools.

One county educator works on webinars in horticulture.

One county educator is on the Extension Master Gardener Social Media Team

One county educator said that 25 of his Master Gardeners have completed at least one eXtension webinar for Continuing Education Credit.

One county educator actively uses 2 listservs.

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	59159	2788852	80826	211441

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	10	37	47

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	92

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	51

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	965

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	202

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	14

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

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

O. No.	OUTCOME NAME
1	Number of participants (youth and adults) who improve or increase skills in farm management
2	Number of participants who increase or improve skills in animal production and health.
3	Number of participants who increase or improve skills in weed or pest management.
4	Number of participants who increase or improve skills in aquaculture.
5	Number of participants who increase or improve a skill in nutrient management.
6	Number of producers indicating adoption of recommended or best practices.
7	Number of people certified or licensed to practice in the field.
8	Number of new groups or organizations that are established or enhanced.
9	Number of producers who utilize best practices with alternative agricultural enterprises to diversify their income portfolio.
10	Development of a new diet formulation for rainbow trout.
11	Development of value-added, disease resistant cultivars.
12	Increase in the number of producers and other members of the food supply chain.
13	Growth in state sales of beef- % increase.
14	Growth in state aquaculture industry- annual % increase in gross revenue.
15	Growth in state broiler, egg and turkey sales- annual % increase.
16	Spatially-Targeted Pest Management Using Geospatial and Aerospace Technologies
17	Number of youth who practice skills in horticulture and farm management.

18	Number of adults who gain knowledge and skills in alternative farming methods.
19	Number of participants who adopt in nutrient management skills.
20	Number of producers who use alternative agricultural enterprises to diversify their income portfolio.

**Outcome #1**

**1. Outcome Measures**

Number of participants (youth and adults) who improve or increase skills in farm management

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	91480

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

**Issue (Who cares and Why)**

West Virginia farmers need to assemble information from which they can make informed and timely decisions, find answers to specific management problems, and study public policy issues important to agriculture.

**What has been done**

In addition to phone calls and farm visits, WVUES educators conduct workshops related to farm management. Examples of workshops for adults include; "Annie?s Project," "Planning for Profitability: Record-Keeping, Financial Management," "Market Analysis and Risk," "Small-Scale Farming," "Backyard or Pastured Poultry Production," "Agribusiness," "Starting A Farm," "Bovine Emergency Response Plan," "Equine Management," "Agricultural Grant Writing," "Senior Coupon Training for Farmers Market," "Specialty Crop Production," and "Transition to Farming." Examples of workshops for youth include: "Ag in the Classroom," "Agriculture Careers Exploration Day," and "Farm Safety Day."

**Results**

- Adults in the grant-writing classes submitted 17 grants and 11 were funded.
- Adults in agritourism workshop intend to develop a strong marketing plan in the coming year.

- Adults in Annie's Project adopted at least two risk-management strategies to enhance farm viability and profitability.
- Adults increased skill in the business planning process for starting and sustaining a (small, urban) financially successful agribusinesses.
- Youth increased knowledge of agricultural products that are important in West Virginia.
- Youth increased knowledge of how a farm really works.
- Youth say that they want to pursue a career in agriculture.
- Youth learned about safety around equipment.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
607	Consumer Economics
806	Youth Development

#### Outcome #2

##### 1. Outcome Measures

Number of participants who increase or improve skills in animal production and health.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	2921

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

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

WVUES is dedicated to increasing the quality of the food supply by improving and promoting animal health.

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

WVUES offers workshops for livestock producers. Some of the topics include: "Effective Livestock Handling: Management of Facilities and Animal Handlers," "Reducing Losses When Feeding Hay to Beef Cattle," "Successful Heat Synchronization in Beef Cattle," "Bull Breeding Soundness Exams," "Adding Value to Your Calf Crop: Taking Advantage of Cooperative Marketing," "Beef Herd Management: Sire Selection," "Feed Efficiency: Importance, Measure, and Impacts"

"Heifer Development: Management Consideration and Cost Implications" and "Taking Advantage of Variation: Genetic Progress Through Effective Sire Selection."

**Results**

Producers increased knowledge of:

- 1.livestock handling procedures
- 2.facilities design
- 3.calf pool standards and grading standards
- 4.available marketing opportunities for value added sales
- 5.sire selection
- 6.cost management of the beef enterprise
- 7.replacement heifer management
- 8.genetic evaluation and selection tools and their application in animal breeding programs.

Producers selected bulls for their farms based on EPD's, performance data, visual evaluation, and price.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals

**Outcome #3**

**1. Outcome Measures**

Number of participants who increase or improve skills in weed or pest management.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	0

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

**Issue (Who cares and Why)**

WVUES seeks to increase implementation of IPM practices through educational programs for commercial orchardists, small farmers, homeowners, community gardeners, and members of the landscaping industry and to coordinate IPM practices in different commodities throughout the state, and to improve the documentation procedures related to the implementation of IPM practices overall.

**What has been done**

WVUES offers many workshops on weed and pest management to commercial and home gardeners. Topics this year have included: ?Organic vs. Conventional Insecticides,? ?Pasture Weed Control,? ?Pesticide Safety-Personal ?Protective Equipment,? ?Tips to Reduce Spray Drift,? ?The Impact of Neonictinoid Insecticides on Honeybees,? ?Use of Apogee for Fire Blight Control,? ?Pest Management for the Vegetable Garden,? ?Invasive Plant Control,? ?Weed Wipers,? and ?Master Gardeners Pesticide Safety.?

**Results**

Participants gained knowledge about:

- 1.organic insecticides
- 2.pasture management and weed control
- 3.personal pesticide safety and protective equipment
- 4.ways to reduce spray drift
- 5.correct ways to store chemicals
- 6.how insecticides affect honeybees and link to colony collapse disorder
- 7.pesticide labeling information
- 8.differences between insecticides, herbicides, and fungicides
- 9.symptoms of physiological and environmental disorders (nutrient deficiency, drought stress, scorch, girdling root system, winter injury, etc.)
- 10.use of Apogee, a plant growth regulator that reduces shoot blight development

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

**Outcome #4**

**1. Outcome Measures**

Number of participants who increase or improve skills in aquaculture.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Number of participants who increase or improve a skill in nutrient management.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1494

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

**Issue (Who cares and Why)**

Nutrient management is one of the most important facets of an agricultural operation, perhaps even more than the production taking place. With the notoriety of the Chesapeake Bay and the nutrient loading issues that have been found in this region, it has become even more important for nutrient management to be implement in all agricultural practices. Through the use of nutrient conservation practices and production opportunities through the use of hydroponic technology, the nutrient loading issues of the past can be reduced tremendously going forward.

**What has been done**

Educational workshops and demonstrations conducted by both WVUES and WVSUES have been developed to assist farmers learn nutrient management strategies, as well as to see them fully implemented through the demonstration sites. WVSUES has been particularly active in demonstrating the hydroponic growing methodology.

**Results**

As a result of the nutrient workshops and demonstration sites, farmers are learning to become more engaged with the nutrients and the nutrient management, As a result of the efforts of

WVSUES, 10 different farmers/organizations have begun using hydroponic technology for production purposes.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants

#### Outcome #6

##### 1. Outcome Measures

Number of producers indicating adoption of recommended or best practices.

##### 2. Associated Institution Types

- 1890 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	5

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

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

: As a change occurs in the realm of agricultural production, a focus on sustainable agricultural production has become more desirable. Based on this demand, Extension based agricultural program efforts out of WVSU have focused on workshop delivery and one on one technical assistance to farmers to illustrate best management practices in agriculture and natural resources to extend the knowledge of the University out to the greater community.

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

Technical assistance has been provided to local small farming operations on mushroom production, hydroponic/aeroponic production technology and small fruit production around the state. Presentations at conferences and at local meetings were given about program offerings.

###### **Results**

Five small farm enterprises have adopted recommended practices or best practices to enhance their production over the course of the past year due to technical assistance provided by WVSU

Extension Service. One farm has increased its overall small fruit production through incorporation of proper pruning techniques while also adopting new cultural practices on the side of mushroom log production. A second farm has worked with WVSU Extension Service to design and implement hydroponic production systems into their traditional organic production farming applications in order to diversify their operation.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
607	Consumer Economics

**Outcome #7**

**1. Outcome Measures**

Number of people certified or licensed to practice in the field.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	141

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

**Issue (Who cares and Why)**

Secure funding for the WV Pesticide Safety Education Program (PSEP) is needed in order to increase knowledge of IPM practices and provide educational support and training to pesticide applicators who seek re-certification.

**What has been done**

Two counties held workshops with pesticide applicators who wanted to accrue continuing education units for re-certification. WVUES created a pesticide recertification video which was used in the training. 141 participants received some training that counted toward re-certification.

**Results**

116 individuals in WV were re-certified in the WV Pesticide Safety Education Program.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

**Outcome #8**

**1. Outcome Measures**

Number of new groups or organizations that are established or enhanced.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	5

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

**Issue (Who cares and Why)**

The current agricultural climate in West Virginia is changing to include younger growers utilizing non-traditional methods to grow food to be used in the local markets. With many of the older farmers retiring it is important that younger growers step up to take their place, even if they do not necessarily use the same methods that have always been used. With this said, Extension programs have been designed to help teach these new growers non-traditional growing methods that can be used by a small landowner, or even in urban settings, to grow food for the local markets.

**What has been done**

Educational workshops and demonstration areas have been put into place by the Extension Service to help educate and give hands-on learning opportunities to small and socially-disadvantaged farmers. These sites have allowed new groups and organizations to spin off into a production agriculture enterprise utilizing non-traditional and very small-scale methods. These

groups focus on production in urban settings and socially and economically distressed areas of the state where having food on the table at all is difficult for many families.

**Results**

As a result of these programs, 5 different groups have begun growing food for the local markets with aspirations of growing larger and larger over time. These groups are all at different places in their production plan with some at full production and others just getting started, however they have all started to grow food for entrance into the market.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
604	Marketing and Distribution Practices
607	Consumer Economics

**Outcome #9**

**1. Outcome Measures**

Number of producers who utilize best practices with alternative agricultural enterprises to diversify their income portfolio.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1

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

**Issue (Who cares and Why)**

As new farming practices take hold in WV, farmers are starting to acknowledge the benefits of alternative cropping systems and the opportunities that come with niche market development. In the past, traditional agricultural practices were the norm and markets were fairly developed for crops produced. As a new face of agriculture has taken hold in WV, with an influx of farm to table concepts, growers have more opportunities to sell produce via local farmer's market venues as well as restaurants for the first time.

**What has been done**

Hands-on demonstration areas have been put into place by WVSUES for small and socially-disadvantaged farmers. These sites have allowed new groups and organizations to spin off into a

production agriculture enterprise utilizing non-traditional and very small-scale methods. WVSUES has worked closely with farmers to brainstorm ways to diversify their farming applications to meet the needs of the developing niche markets outlets.

**Results**

One farm has increased its overall small fruit production, with raspberries as their most lucrative crop. This increase in in production has allowed for the creation of value added products like pies and jams. They have also won numerous awards for their raspberry wines and cordials. This same farm has increased their production capabilities on the side of mushrooms and added hops production this year based on the success of our WVSU Extension based outreach efforts on this crop.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
604	Marketing and Distribution Practices
607	Consumer Economics

**Outcome #10**

**1. Outcome Measures**

Development of a new diet formulation for rainbow trout.

**2. Associated Institution Types**

- 1862 Research
- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

Fish feed manufacturer, fish breeders, and farmers. Dietary formula with improved nutrient utilization will lead to farmed rainbow reach market-size in less time with less nutrient input. Less nutrient input and higher nutrient retention have environmental implications by reducing pollution from aquaculture discharge. . High feed cost is problem and reducing the cost through optimal dietary composition will increase profitability to the farmers. If changes in dietary composition lead to improvement in nutrient utilization efficiencies, pollution from unused nutrients in effluent discharges from aquaculture production facility will be reduced.

### What has been done

A 3 x 4 factorial experiment was designed to evaluate the effects of environmental temperatures (10 C or 14 C or 18 C) practical-type diets (40% crude protein/10% fat fishmeal/plant protein (from soybean meal or soy protein concentrate designated as 40/10FM/PP) or 40% crude protein/20% fat fishmeal/plant protein (from soybean meal or soy protein concentrate designated as 40/20FM/PP) or (40% crude protein/10% fat plant protein-based (from soybean meal or soy protein concentrate designated as 40/10PP) or 40% crude protein/20% fat plant protein-based (from soybean meal or soy protein concentrate designated as 40/20PP).

### Results

Results from study 1 indicates that temperature and dietary composition separately and interactively had a significant effect on some aspects of growth performance characteristics, nutrient utilization and mitochondrial respiratory enzyme activities. Because there was no difference in weight gain when rainbow trout is reared at 14 °C to 18°C with either FM/PP or PP based diet, but rather an interactive effect, our findings have practical implications. Results from study 2 indicates that only dietary composition affected weight gain while temperature and dietary composition separately affected feed intake and feed efficiency with no interactive effects between diet and temperature. Fish fed 42/20FM/PP had the highest growth rate followed by those fed 42/20PP while fish fed 42/10PP had lowest growth. In term of feed efficiency, there was no difference between the fish fed 42/20FM/PP and 42/20PP, although the feed intake was numerically lower for fish 42/20PP. Because there was no difference in feed efficiency when rainbow trout is reared at 10 OC or 14 °C or 18 °C with either 42/20FM/PP or 42/20PP based diet, it is more economical to use only 42/20 plant protein-based diet. The biochemical and gene expression analyses are ongoing.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

## Outcome #11

### 1. Outcome Measures

Development of value-added, disease resistant cultivars.

### 2. Associated Institution Types

- 1862 Research
- 1890 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

{No Data Entered}

#### What has been done

{No Data Entered}

#### Results

{No Data Entered}

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

### Outcome #12

#### 1. Outcome Measures

Increase in the number of producers and other members of the food supply chain.

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2015	32

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The 2012 Census of Agriculture shows that women "control 7 percent of U.S. farmland but account for only 3 percent of sales." "Nationally women were 30 percent of farmers," and 969,672 U.S. women farmers operated 62.7 million acres of farmland. Women in agriculture need special help in developing networks and skills that are needed to build successful agriculture business.

#### What has been done

WVUES has implemented Part 1 of Annie's Project in WV. In this part of the course, women farmers are taught risk management for farm and ranch women which includes learning to implement a risk analysis survey, use computers for decision making, keeping farm records and creating enterprise budgets.

#### Results

- 32 WV farm women increase their knowledge of risk management strategies.
- 32 WV farm women stated that they intend to adopt at least one risk migration strategy that was taught during the six-week session.
- 3 participants attended the Women in Agriculture Conference.
- 1 participant sought additional help in budgeting for a beef finishing operation.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices
607	Consumer Economics

### Outcome #13

#### 1. Outcome Measures

Growth in state sales of beef- % increase.

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2015	22

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Beef cattle and sheep production are important sectors of the WV agricultural economy, given the relative abundance of high quality pasture land and the relative shortage of prime farmland for intensive agricultural product production.

#### What has been done

We have a long-term integrated pasture-based beef program that has examined ways to increase the production quantity and quality of pasture grass and to enhance the market opportunities for pasture raised beef, the primary method of raising beef cattle in West Virginia.

#### Results

Like last year, the beef industry has a strong year, buoyed by strong demand and relatively high prices. Gross income in the cattle industry grew by another 22 percent in the current reporting period.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices
607	Consumer Economics
806	Youth Development

**Outcome #14**

**1. Outcome Measures**

Growth in state aquaculture industry- annual % increase in gross revenue.

Not Reporting on this Outcome Measure

**Outcome #15**

**1. Outcome Measures**

Growth in state broiler, egg and turkey sales- annual % increase.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	13

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

**Issue (Who cares and Why)**

The poultry industry in WV (broilers, eggs and turkeys) is the single largest agricultural industry in the State. There is considerable pressure on this industry due to increasing costs of production, regional competition and pressures to reduce phosphorus pollution in the Potomac Watershed.

**What has been done**

West Virginia University's Davis College and WVU Extension have one of the most productive feed manufacture and animal nutrition research and extension programs in the United States as evidenced by extensive industry collaborations and publications and growth in the industry. Current work is taking a two pronged effort to improve poultry nutrition to increase growth rate while formulating rations that reduce phosphorous runoff into waterways.

**Results**

Our reputation in the poultry industry led to the donation of a state-of-the-art feed mill valued at half a million dollars to the Davis College Animal and Nutritional Sciences program. This investment will benefit all of our livestock programs but in particular should allow us to make even greater progress in pellet design and poultry feed ration formulations that increase growth and

reduce pollution. The 13 percent growth in sales in the industry for this reporting period is due in part to our research and extension programs that has allowed growth in the industry while at the same time preserving environmental quality.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices
607	Consumer Economics
806	Youth Development

#### Outcome #16

##### 1. Outcome Measures

Spatially-Targeted Pest Management Using Geospatial and Aerospace Technologies

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

<b>Year</b>	<b>Actual</b>
2015	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

United States agriculture and forestry faces a major threat by many pests (e.g. insects, weeds, and plant diseases) distributed over large geographic areas. Specifically, noxious invasive species have caused considerable economic loss and environmental damage to agriculture and forestry in the United States. The result of damage and loss caused by such pests is sometimes irreversible without accurate management of the threat in a timely manner.

#### What has been done

One project is designed to develop spatially targeted pest management systems using geospatial and/or aerospace technologies (unmanned aerial vehicles, or UAV's) for efficient detection of pests and for precise delivery of control measures against major pests in agriculture and forestry.

#### Results

Rotor UAV's were tested for delivery of biological control agents (mile-a-minute weevils) for control of mile-a-minute weeds. Small helicopters were not found to be stable enough for delivery of bug bombs, quad rotor UAV's were found to be much more effective. Aerial delivery was also found to not compromise the effectiveness of the biological control agent compared with standard application methods. This new technology could prove to be very effective for pest control in forestry and other applications where direct application methods are limited by rough terrain.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

### Outcome #17

#### 1. Outcome Measures

Number of youth who practice skills in horticulture and farm management.

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Action Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2015	3363

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

**Issue (Who cares and Why)**

Educational experiences increase the knowledge base of adults on urban and alternative horticultural and agricultural topics. Youth in both rural and urban areas of WV have shown interest in growing their own fruits and vegetables for consumption at home or at school.

**What has been done**

WVSU Extension Service has developed an urban youth garden program entitled SCRATCH to illustrate how the Junior Master Gardener Program can be used in conjunction with after school program efforts. The youth interactions occur at three afterschool sites weekly while production gardens are built and maintained by the program youth. The SCRATCH program sells at the Wild Ramp Market and the Winter Blues Farmers Market. PLANTERS has five pilot preschools in Putnam and Kanawha County with three afterschool programs.

**Results**

3363 SCRATCH/PLANTERS youth participants have increased their skills in building and maintaining gardens, harvesting crops, and selling produce in markets.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems
604	Marketing and Distribution Practices
607	Consumer Economics
806	Youth Development

**Outcome #18**

**1. Outcome Measures**

Number of adults who gain knowledge and skills in alternative farming methods.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	991

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

**Issue (Who cares and Why)**

As focus turns towards local foods and urban agricultural efforts, it has become even more important to provide information to socially disadvantages farmers on information of containers and raised bed gardens, mushrooms, hydroponics and fruit production. Educational opportunities increase the knowledge base of adults on urban and alternative horticultural and agricultural topics.

**What has been done**

Presentations for socially and economically disadvantaged adults were conducted by WVSUES on four different occasions around the state KISRA, Kimball, Mount Hope locations and the Urban Agricultural Conference. A total of 22 topics were covered in areas such as container gardening, mushroom production, irrigation, hydroponics, fruit production, etc. Workshops and demonstrations were held at KISRA, Kimball and Mount Hope locations and the the Urban Agricultural Conference.

**Results**

991 individuals from urban/low-resource areas gained knowledge in container gardening, irrigation, hydroponic productions and fruits and mushroom cultivations. The average knowledge gained by individuals was between 45 and 64 percent.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
205	Plant Management Systems
216	Integrated Pest Management Systems
604	Marketing and Distribution Practices

**Outcome #19**

**1. Outcome Measures**

Number of participants who adopt in nutrient management skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
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**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

WVUES spends time training local producers in forage and feed sampling and testing because it is possible to reduce the need for supplements while increasing milk or meat production and adding to income. Accurate testing provides the producer, the seller and the buyer with accurate, valuable information.

**What has been done**

WVUES specialists and agents work with individual producers to teach them forage sampling and forage testing techniques.

**Results**

- In one county, 15 operations submitted over 60 forage samples in 2015 and utilized the results to properly supplement livestock.
- In one county, 4 producers changed procedures in making bale haylage.
- In one county, 3 producers extended grazing 30 days because of pasture testing. This was a savings of over \$6,250.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

**Outcome #20**

**1. Outcome Measures**

Number of producers who use alternative agricultural enterprises to diversify their income portfolio.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	2

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Farms that diversify to include tourism support economic stability, contribute to environmental sustainability, and protect local food systems. Agritourism creates many new opportunities for farmers to add to their income without diverting from the intent of the farm.

#### What has been done

Two farmers participated in an intensive four-day-long workshop on holistic business-planning and risk-management program for agritourism operators and owners entitled "Growing Agritourism and Farm-based Education in WV" "Managing Risks for Improved Income Diversification." The "WV Agritourism Initiative" has reached audiences in WV and nationally through webinars, websites, newsletters, publications and national posters and presentations.

#### Results

Participants reported gaining competence in marketing analysis, assessing agritourism potential, the business-side of agritourism, farm safety and liability, emergency and event planning, hospitality management, and marketing. 100% of participants implemented at least two new strategies to start/expand their operations.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
607	Consumer Economics

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

#### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

#### Brief Explanation

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

Normal problems for small farmers related to production costs and market factors.

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

#### Evaluation Results

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
  - Referee journal articles and books
  - General audience papers and news reports
  - M.S. and PhD graduates
  - Trends in terms of competitive funding
  - And in terms of longer-term impact:
  - Citations in scientific journals
  - Patents
  - Successful technology transfer or start-ups based on research programs
  - Awards based on continuing impact and research excellence. Every five
- years there will be a full portfolio review including:
- Long term productivity
  - Relevance to our constituent groups and the State and Region
  - The allocation of research inputs among the programs
  - Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
  - Consideration of adding additional program areas given NIFA and State priorities
- This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

### WVSUES

The SCRATCH/PLANTERS has direct contact with 3363 kids over this past year. PLANTERS has five pilot preschools in Putnam and Kanawha County and programming in three afterschool programs in Cabell County. The SCRATCH program engages youth on a weekly basis and has three functional garden spaces that are worked by the youth. The SCRATCH youth program has expanded to selling at such markets and the Wild Ramp in Huntington and at events like The Winter Blues Farmers Market. Of the 991 adults that participated in the multiple presentations at the five different locations, 55% of the adults gained new knowledge of the different urban and alternative agricultural that could benefit the increasing food movement. As a result of the hydroponic production workshops and demonstration sites, 10 different farmers/organizations have begun using hydroponic technology for production purposes. Five small farm enterprises have adopted recommended practices or best practices to enhance their production over the course of the past year due to technical assistance provided by WVSU Extension Service. Additionally, 5 different groups have begun growing food for the local markets with aspirations of growing larger and larger over time. One farm has also increased its overall small fruit, mushroom and hops production in an attempt to diversify their portfolio to meet the needs for niche products in the local market. Through all of these outreach educational efforts, at least 4 new growers have entered the local foods market.

### WVUES

WVUES is implementing an Integrated Pest Management program that includes faculty at WVUES, WVSUES, and Penn State Extension. During the first grant period, 63 individuals responded to an evaluation survey designed to find out if they perceived that they had gained knowledge and/or skills related to integrated pest management (IPM).

A retrospective questionnaire was administered to participants that asked them to indicate their skill level at the end of a workshop, and then recall what it had been before they came to the workshop. A paired sample t-test of the data resulted in significant differences on all questions ( $p < .02$ ). The skills which showed the greatest reported change from skills mastered before coming to the workshop to skill master as a result of the workshop (the differences between the means were greater than .8000) were:

- Ability to develop a scouting/monitoring program for targeted pests (1.06522)
- Ability to understand underlying problem by identifying weeds (1.0000)
- Understanding of cultural practices in preventing and/or managing plant health (.86716)
- Understanding of issues related to balanced nutrition for the overall health of plants (.86077)
- Ability to identify mineral deficiency symptoms and ways to correct the problem (.85219)

The participants were asked what they thought they would most likely do in the weeks following the workshop.

The tasks that were cited most often were:

- Clean seeds before planting with Clorox bleach seed bath (7)
- Survey yard/garden for weeds early in the season (5)
- Use a hot water treatment of seeds (5)
- Identify some insects (4)
- Cut perennial weeds repeatedly/trim fields (2)
- Evaluate soil to rectify problem soils and to discourage weeds (2)
- 

Participants were also asked what else they would like to receive from the Extension educators. Some of the responses were related to tools and some were related to knowledge/skills.

With regard to tools, participants said that they wanted a website or an app on their phone that would give them illustrations/photos of WV weeds so that they can identify them easily. One participant said that a good ID booklet would be helpful. One participant said that he or she wanted access to a slicks-CD/flashdrive.

Participants also wanted more information on the following:

1. Edible vs. toxic weeds
2. Acidic plants
3. Nematodes or carrots
4. Pest ID
5. Controls for BMSB & SWD
6. Uses for weeds

Of those who responded, 51.8 percent said that they do not use pesticides, while 48.2% said that they do use pesticides. Most, however (87.5%) said that the workshop would influence how they would use pesticides in the future.

Questions related to satisfaction with the workshops were all positive. On a scale from 1 to 5, with 1 indicating not satisfied and 5 indicating very satisfied, all means were above 4.0.

### **Key Items of Evaluation**

#### WVU-AFES

Our constituents have urged us to conduct more applied agricultural research to help support their businesses and to help stimulate the State economy. This is part of our mission but is increasingly difficult to accomplish given decreasing State funding and the priorities of the federal research agencies which generally favor more basic research projects.

#### WVSUES

Evaluations focus on the increase of knowledge on the various topics that are being presented upon. Additional information being garnered includes presenter effectiveness, the likelihood of the participant implementing these topics and also comments on additional topics that should be made available going forward.

#### WVUES

We will be continuing the evaluation of the IPM grant in 2016. Participants will be contacted to see if they were able to put into practice the skills they learned and the skills they said that they would use in the growing season following the workshops.

Most of our programs in the Global Food Security and Hunger area have a program evaluation in place and many have accompanying logic models. We recently had a statewide evaluation conference where a number of teams worked out an evaluation plan.

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

**Program # 2**

**1. Name of the Planned Program**

Climate Change and Environmental Quality

Reporting on this Program

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

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	10%	15%	5%
102	Soil, Plant, Water, Nutrient Relationships	25%	15%	10%	25%
111	Conservation and Efficient Use of Water	0%	10%	0%	0%
112	Watershed Protection and Management	0%	0%	15%	0%
124	Urban Forestry	0%	10%	0%	0%
131	Alternative Uses of Land	25%	10%	0%	5%
132	Weather and Climate	0%	0%	10%	0%
133	Pollution Prevention and Mitigation	0%	5%	15%	15%
135	Aquatic and Terrestrial Wildlife	10%	0%	20%	0%
136	Conservation of Biological Diversity	20%	0%	0%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	10%	5%	20%
212	Pathogens and Nematodes Affecting Plants	0%	10%	0%	20%
403	Waste Disposal, Recycling, and Reuse	5%	10%	0%	10%
605	Natural Resource and Environmental Economics	10%	10%	10%	0%
	<b>Total</b>	100%	100%	100%	100%

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

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

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.0	0.0	9.0	3.0
<b>Actual Paid</b>	3.0	0.6	7.0	3.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
206000	161734	185849	596687
1862 Matching	1890 Matching	1862 Matching	1890 Matching
21028	91107	930175	337686
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	1046342	348528

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

**1. Brief description of the Activity**

Research and extension programs to assist in the preservation of soil, water, forest and wildlife resources are a high priority given the importance of natural resources and the environment to the economy and wellbeing of the citizens of West Virginia. These programs have become even more critical given the extra stresses and uncertainty imposed by a changing climate. The focus of our research and extension programming is on studying, protecting and restoring environmental quality while developing economically effective and environmentally sustainable management practices for agriculture, forestry, mining and rural communities and anticipating and adapting to climate change.

WVU-AFES

Primary environmental research areas involve mine land restoration, soil science, ecosystem resilience to climate change and other environmental stressors, water quality, watershed management, wetlands, and aquatic and terrestrial wildlife ecology.

Contamination of soil and water with acid mine drainage from abandoned surface and underground coal mines and natural gas fields and restoration of the landscape from surface mining are important issues in West Virginia. Disturbed soils, such as those resulting from agriculture, erosion, deforestation, road building, urbanization, and surface mining require specialized treatments to make them suitable for subsequent use and management. Research is being conducted to characterize the nature and scope of these problems and to develop cost effective remediation programs. Work is being conducted to evaluate properties of soil materials placed on the surface and determine their suitability for a variety of land uses such as agriculture, forestry, building site potential, recreation, and energy production. Relevant research projects include restoring surface mines to productive forestland or grassland (including switchgrass as a possible feedstock for biofuels), use of different types of soil amendments such as biochar and poultry litter on damaged soils to restore productivity, and restoring lost aquatic ecosystem functions on reclaimed mine sites and watersheds. Progress continues in assessing the ecological functions of restored and created wetlands.

Highlights for 2015 include:

- Remapping all the soils in every county of WV to better guide land-use decision making and environmental management.
- Work on development of genetic markers to guide decision making in management of threatened and endangered fish and wildlife species.

- Continuation of work on a pilot project designed to measure the effects of climate change on multi-trophic interactions among pollinators, their parasites and agricultural crops.

### WVUES

In 2015, the Climate Change Environmental Quality and Stewardship planned program at WVUES worked towards developing an agriculture system that maintains high productivity in the face of climate changes. WVUES educators help producers plan for and make decisions to adapt to changing environments and sustain economic vitality and take advantage of emerging economic opportunities offered by climate change mitigation technologies. Objectives addressed in this program area include: 1) decrease risk and loss to farming operations through use of risk mitigation tools and control of predation; 2) increase compliance with and knowledge of the WV Best Management Practices for controlling soil erosion and sedimentation; and 3) increase the capacity of local communities and landowners in nutrient management and sustainability. Activities in this program area fall under several categories related to the protection of natural resources including: composting and utilization, nutrient management, grassland management, and wildlife management. Topics include: agricultural and cover crop, calibration methods & demonstration, forage economics, forage sampling and testing, nutrient management, grassland management, risk mitigation, deer damage management, bats, Master Naturalist, and land judging. This year, there were 37 educational activities and 3,320 direct contacts reported in the climate change program area.

### WVSU-GRDI

The Experiment Station researchers conducted research; reported results in scientific manuscripts, technical and popular presentations; and trained graduate students. The researchers generated applied research that is useful to the profession and to producers within the State and conducted outreach activities in conjunction with Extension staff to disseminate the results of that applied research in a way that is understandable and useful to State farmers and agribusinesses. Research efforts are focused on small farmers adopting new varieties and growing techniques to adapt to changing environmental conditions, developing soil ratings for mitigation of runoff, and improving the use of biochar and other byproducts as soil amendments.

Educational programs and demonstration sites farmers were established to meet the needs of small and urban farmers who looking for ways to mitigate these climate change issues while maintaining a productive and profitable agricultural operation. Through Extension based programs, these farmers, especially socially-disadvantaged farmers, were given opportunities to learn the latest developments in climate change mitigation.

Highlights for 2015 include:

- A new successful method for total extractable elements from biochar was developed
- Small and urban farmers were able to increase their knowledge of climate change mitigation strategies that could be used on their individual farms.
- Small and urban farmers were able to develop a plan to implement these strategies and how to go about funding them through available grant funds, cost-shares or direct payment.
- Workshops and training participants indicated an increase in their knowledge level of topics such as irrigation practices, high tunnels, cover crops, etc.

## **2. Brief description of the target audience**

Target audiences include policy makers, planners, regulatory agencies and public interest and citizens groups, homeowners, land-owners, small-farm operators, volunteer organizations, various city, county and municipalities, state government, underserved and minority farmers/landowners, WVDA staff, USDA staff and other agricultural and natural resource focused agencies, undergraduate and graduate students, the bioenergy industry; private state and federal conservation and environmental quality groups and regulatory agencies, horizontal directional drilling professionals, private forestland owners, forestry professionals, researchers, and the general public.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	1468	1269	1216	1000

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	7	34	41

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

Year	Actual
2015	18

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	15

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	42

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	51

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	16

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

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

O. No.	OUTCOME NAME
1	Number of participants who increase their knowledge of management practices under climate variability and change.
2	Number of participants that adopt recommended adaptation and climate mitigation strategies for production agriculture and natural resources management.
3	Number of groups or organizations that change their procedures and/or policies regarding climate control.
4	Number of state landowners adopting reclamation and watershed protection practices in consultation with WVU and WV State Extension and Experiment Station Faculty.
5	Development of value-added products through pyrolysis process of biomass-to-energy conversion.
6	Creation of new knowledge in horizontal directional drilling mud co-product use and impact.
7	Conservation Genetics of Fish and Wildlife Populations
8	Number of participants who increase their knowledge of wildlife management practices under climate variability and change.
9	Creation of new knowledge of the mechanisms of plant response to change in environmental stress

## **Outcome #1**

### **1. Outcome Measures**

Number of participants who increase their knowledge of management practices under climate variability and change.

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

- 1862 Extension
- 1890 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	327

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

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

Farmers in West Virginia, both in rural and urban settings, have been forced to deal with unprecedented climatic issues throughout the past year. As a result of this, these farmers are looking for ways to mitigate these issues while maintaining a productive and profitable agricultural operation. Through Extension based programs, these farmers, especially socially-disadvantaged farmers, can learn the latest developments in climate change mitigation.

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

In 2015, educational workshops by WVUES and WVSUES educators were conducted and hands-on demonstration sites were developed throughout the state to give these farmers, particularly socially-disadvantaged farmers, the opportunity to learn how to implement these new practices in a practical manner on their farms. These initiatives include: Low Cost Fertilization a Soil Management System, Soil Testing for Improved Forage Production, Demonstration of Precision Agriculture using Guidance Systems for Sprayer applications and Lime Spreader Calibration, Cover Crops for Soil Health, and Soil Management.

#### **Results**

As a result of these educational programs and demonstration sites farmers were able to increase their knowledge of climate change mitigation strategies that could be used on their individual farms. They were able to develop a plan to implement these strategies and applied for available grant funds, cost-shares or direct payment. Participants increased skill in using: fertilizers, soil test lab results, new site specific tools to manage nutrients, equipment calibration when renting unfamiliar application equipment, poultry litter for forage production, and cycling of plant nutrients. An evaluation by WVSU educators indicated that 83% of participants increased in their knowledge level of topics such as irrigation practices, high tunnels, cover crops, etc.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
212	Pathogens and Nematodes Affecting Plants
605	Natural Resource and Environmental Economics

**Outcome #2**

**1. Outcome Measures**

Number of participants that adopt recommended adaptation and climate mitigation strategies for production agriculture and natural resources management.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	32

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

**Issue (Who cares and Why)**

A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome which is affecting northern long-eared bats. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect.

**What has been done**

The WVUES Wildlife specialist gave a workshop for members of the Forest Land Group on the northern long-eared myotis. The workshop covered potential listings and ways to protect bats and their habitats.

**Results**

32 land managers now include northern long-eared bat considerations in all management plans.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
----------------	-----------------------

135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

**Outcome #3**

**1. Outcome Measures**

Number of groups or organizations that change their procedures and/or policies regarding climate control.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Number of state landowners adopting reclamation and watershed protection practices in consultation with WVU and WV State Extension and Experiment Station Faculty.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Development of value-added products through pyrolysis process of biomass-to-energy conversion.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

Thermal conversion of biomass to energy provides a sustainable and renewable source of energy. Use of co-product biochar produced in the process as soil amendment could improve fertility of Appalachian basin soils. In addition, biochar may increase soil carbon sequestration, rendering the pyrolysis biomass-to-energy pathway carbon negative. Meaning, less carbon than

was initially removed from the atmosphere by assimilation into plant biomass is emitted back to the atmosphere. As such, the use of biochar as soil amendment could increase soil productivity while mitigating carbon emission and resulting climatic impact.

**What has been done**

Biochar of different feedstock digested and analyzed for elemental content as excess of heavy metals may adversely affect soil processes and plant growth. Existing total extractable methods evaluated and new procedure developed and evaluated. In addition, biochars were subjected to different wet chemistry assays to determine solubility, mobility, and availability of metals and nutrients.

**Results**

Successful method for total extractable elements from biochars was developed. Elemental content, and metals and nutrients chemical behavior in the different biochar was determined. Biochars from fast-pyrolysis seemed to result in low total and available metal content. This includes essential nutrients. Inasmuch as the results suggest that biochar application at agronomic rates will not result in elevated levels of toxic metals, essential element are of low levels as well, suggesting a limited nutrient influx from biochar to soil and plant system.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity

**Outcome #6**

**1. Outcome Measures**

Creation of new knowledge in horizontal directional drilling mud co-product use and impact.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

Increase in oil & gas exploration and production at the Marcellus and Utica shale require corresponding increase in pipeline infrastructure. Installation of pipeline under heavily used infrastructure or ecologically sensitive area require horizontal directional drilling. Local use of the spent mud as soil amendment is a potential alternative to offsite removal for dewatering and landfilling. Yet, the environmental and agronomic implications of its land use are not clear.

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

The collected mud samples (42) are analyzed for total content and for element solubility and bioavailability. The 10 experimental sites, composed of different soil types established during late 2014 and are monitored for soil physical, hydrological, and chemical properties, as well as moisture content, and plant growth. In addition, a short incubation study and pot experiments, using 17 different soil types, was conducted and plant growth and soil solution composition determined.

#### **Results**

Results from the first year of the field studies suggest no significant impact, positive or negative, on all measured parameters. This was independent of mud application rate (up to 79 Mg mud ha<sup>-1</sup>[ca. 35 short tons per acre]). Results from short incubation and pot studies, with mud application rate up to 702 Mg mud ha<sup>-1</sup>, showed increase in soil salinity and sodicity but did not affected plant growth (rye grass). Noteworthy, albeit the extremely high mud application rates used in the pot study, resulting soil salinity and sodicity where below threshold considered limiting productivity of salt-sensitive plants or detrimental to soil aggregate stability.

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

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

#### **Outcome #7**

##### **1. Outcome Measures**

Conservation Genetics of Fish and Wildlife Populations

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

- 1862 Research

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

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	0

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

**Issue (Who cares and Why)**

A number of fish and wildlife species are threatened or endangered. One characteristic of these imperiled species is often severely limited genetic diversity, something that increases the species' susceptibility to stresses from decreasing habitat, climate change or predation.

**What has been done**

Conservation genetics is the application of genetic principles to effectively manage endangered and threatened species. A study at the WVU Agricultural and Forestry Experiment Station seeks to develop a suite of genetic markers useful in the analysis of imperiled fish and wildlife species.

**Results**

The methods developed in this project have so far been applied to several populations of lake sturgeon. In particular, the researchers studies the effectiveness of artificial reef construction in encouraging spawning by lake sturgeon, and the effects of removal of barriers to fish movement, such as dams. Both were found to increase spawning frequency which in turn increases genetic diversity, improving the overall health and resilience of the fish population.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

**Outcome #8**

**1. Outcome Measures**

Number of participants who increase their knowledge of wildlife management practices under climate variability and change.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	218

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Climate change is altering the environment and is affecting wildlife management. Wildlife specialists, such as the one at WVUES, are having to address questions about more frequent contact with wildlife in environments where humans live and work.

#### What has been done

The WVUES wildlife specialist conducts workshops throughout WV to members of various groups including: the Farm Bureau, Master Gardeners, the Forest Land Group, ANR members, and school and youth groups. Topics this year included: Bats of WV, Backyard Wildlife Management, Northern Long-eared Myotis, Pigs and Coyotes, Deer Damage Management, and Coyote Ecology and Management.

#### Results

Participants gained knowledge of: bat ecology and management, backyard wildlife habitat management, managing bats in WV forests, feral swine distribution and management in West Virginia, coyote ecology and management, deer damage management, how to develop a deer management plan, and bat ecology and management.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

### Outcome #9

#### 1. Outcome Measures

Creation of new knowledge of the mechanisms of plant response to change in environmental stress

#### 2. Associated Institution Types

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

Currently, shifts in climate conditions and the increase of the atmospheric CO<sub>2</sub> concentration are critical components to be considered in agriculture. The climate predictions and scenarios available at the moment indicate that average surface temperatures will rise by 3 to 5 °C in the next 50 to 100 years, undoubtedly affecting global agricultural systems, affecting plant growth and yield and causing annual losses at the level of billions of dollars. Therefore, understanding abiotic stress responses of food crops is now thought to be one of the most important topics in plant sciences. Significant progress has been made in understanding the physiological, cellular and molecular mechanisms of plant responses to environmental stress.

Functional analyses have demonstrated that several plant small RNA play vital roles in plant resistance to abiotic as well as biotic stresses. The regulatory mechanisms of small RNA (sRNAs) in the regulation of specific genes involved in responses to stress caused by consecutive decrements of the field capacity and an increase in the atmospheric concentration of CO<sub>2</sub> on sweet potato (*Ipomoea batatas*) plants grown in a SPAR (Soil Plant and Atmosphere Research) system was studied in this project.

**What has been done**

We have identified families of conserved microRNAs present in both, tubers and leaves, of sweet potato (*Ipomoea batatas*) plants grown at different levels of CO<sub>2</sub> (380 and 760 ppm) and field capacity (40 and 100%, equivalent to 0.1024 m<sup>3</sup>m<sup>-3</sup> and 0.256 m<sup>3</sup>m<sup>-3</sup>, respectively) by applying a filtering strategy using high-throughput small RNA sequencing reads.

**Results**

In terms of production by number of storage roots formed, higher production was observed in plants growing at high CO<sub>2</sub>, especially when the plants were not under drought stress. Higher yields under elevated CO<sub>2</sub> have been reported before for several crops. In this study, small RNA sequencing was performed on sweet potato [*Ipomoea batatas* (L.) Lam. variety Beauregard plants under stress. MicroRNA regulation was studied in both tissues, storage roots and leaves collected 97 DAT. MicroRNA families, isoforms and variants were identified. Subsequently, expression of several microRNAs was experimentally tested. MicroRNAs studied in this experiment are involved in several important activities related to stress responses in sweet potato plants, mainly hormone signaling (miR159 and miR396).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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102	Soil, Plant, Water, Nutrient Relationships
132	Weather and Climate

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

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

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### **Brief Explanation**

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

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

### **Evaluation Results**

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
  - Referee journal articles and books
  - General audience papers and news reports
  - M.S. and PhD graduates
  - Trends in terms of competitive funding
  - And in terms of longer-term impact:
    - Citations in scientific journals
    - Patents
    - Successful technology transfer or start-ups based on research programs
    - Awards based on continuing impact and research excellence
- Every five years there will be a full portfolio review including:
- Long term productivity
  - Relevance to our constituent groups and the State and Region
  - The allocation of research inputs among the programs
  - Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
    - Consideration of adding additional program areas given NIFA and State priorities
- This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

### WVSUES

During the workshops, evaluations were administered to determine how many participants increased in knowledge. Due to the nature of many of these workshops being hands-on and outdoors in nature, many evaluations were more verbal and informal rather than tangible. Of the tangible evaluations, approximately 85% of the participants showed an increase in knowledge of the topics at hand.

### WVUES

After land managers complete wildlife management workshops, WVUES educators follow-up with the land managers to find out if they are able to implement plans. After training related to bat management in 2015, 32 land managers now include northern long-eared bat considerations in all management plans.

## **Key Items of Evaluation**

### WVU-AFES

We have been engaged for over 10 years in a joint project with the EPA and the WV Department of Natural Resources (DNR) to help restore the upper reaches of Shavers Fork to their pre-1920's condition as a prime brook trout fishery. Our collaboration has involved our fisheries biologists, our remote sensing experts, resource economists and geologists. The area has been devastated by logging and construction of impassable culverts. The project has been highly successful and has spawned development of a railroad so tourists can easily access the area and is helping the economy of the region. We met with the leadership of DNR this reporting period to evaluate our results and to plan for future joint efforts. This should lead to a continued effort on Shavers Fork and other damaged watersheds in the State.

### WVSUES

Evaluations focus on the increase of knowledge on the various topics that are being presented upon. Additional information being garnered includes presenter effectiveness, the likelihood of the participant implementing these topics and also comments on additional topics that should be made available going forward.

### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 3**

**1. Name of the Planned Program**

Sustainable Energy

Reporting on this Program

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

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	0%	0%	10%
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	0%	10%
123	Management and Sustainability of Forest Resources	0%	0%	0%	10%
131	Alternative Uses of Land	40%	0%	10%	5%
133	Pollution Prevention and Mitigation	0%	0%	10%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	0%	20%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	0%	10%
403	Waste Disposal, Recycling, and Reuse	50%	50%	20%	15%
511	New and Improved Non-Food Products and Processes	0%	50%	35%	20%
605	Natural Resource and Environmental Economics	0%	0%	15%	0%
610	Domestic Policy Analysis	0%	0%	10%	0%
806	Youth Development	10%	0%	0%	0%
	<b>Total</b>	100%	100%	100%	100%

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

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

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.0	0.0	2.5	2.0
<b>Actual Paid</b>	9.0	0.1	2.0	4.9
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
370000	161734	64566	496688
1862 Matching	1890 Matching	1862 Matching	1890 Matching
379547	91107	186360	237688
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	231876	248529

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

### 1. Brief description of the Activity

This activity involves research and extension programming on biofuel and bioenergy production. The program so far is focused on examining different biomass feedstocks for the production of biofuels (ethanol, biodiesel, syngas) and biomaterials, nondestructive methods for characterizing the physical and chemical properties of lingo-cellulosic biomass, and syngas production from co-firing coal and biomass. The feedstocks examined so far include algae, switchgrass and mixed grasses, and residual woody biomass from forestry operations.

#### WVU-AFES

Several related projects are researching production of biofuels and bioproducts from biomass. Woody biomass is being examined as the potential main feedstock for a wide array of bioenergy projects due to its widespread availability throughout the State and the fact that it can be used as either a combustion fuel or as a feedstock for the development of liquid fuels, while simultaneously creating environmental and economic benefits for the region. However, the development of these bioenergy projects will be incumbent on the ability to source feedstocks at sufficient quantities and competitive prices for economically feasible biofuel production.

Highlights for 2015:

- One continuing study is looking at the economic and technical feasibility of joint gasification of coal and biomass feedstocks, both of which are abundant in WV.
- Another project is looking at the use of biochar, a byproduct of the biomass gasification process, as an input in producing advanced materials, composites and sensors.

#### WVU-ES

The Sustainable Energy planned program at WVUES works toward energy independence to develop biomass use for biofuels by designing optimum forestry and crops for bioenergy production and improving water quality in the state. Educational topics include: reclamation of Marcellus well sites, chestnut for reforestation, switchgrass potential for minesoils, chestnut growth on surface mines, bioenergy crops on surface mines, flow effects on acidity, survival of chestnut trees, biomass for bioenergy, switchgrass biomass stewardship, biomass issues for forest management plans, and workshops on byproduct utilization for bioproducts/bioenergy collaborative research on blueberry waste. Other topics include Talkin' the Bakken: Oil Development in North Dakota and Impacts on Natural Resources, Natural Gas Pipelines: Atlantic Coast and Mountain Valley, WV Energy and Alternative Energy Consumption, Water Quality and

Conservation, Agriculture Plastics Recycling Program Presentation at the Region 8 Solid Waste Authority Annual Conference. Youth educational activities include the Putnam County Schools Water Resources Day Field Day and STEM Festival - Safe Ground Water: Edible Aquifer Demonstration. This year there were 12 educational programs in this planned program that reached 747 youth and 2098 adults.

WVSU-GRDI

WVSU Agricultural and Environmental Research Station research efforts are focused on improving thermophilic digestion of poultry waste, developing anaerobic microbial energy conversion, and increasing awareness of soil remediation technology among mining operators and agencies. We are expanding into studying the functional role of additional oil biosynthesis genes in Arabidopsis and translate the proven examples from the model plant to a dedicated bioenergy crop for the production of bioenergy.

- Laboratory scale anaerobic digesters are being used to study the properties of stability, flexibility and efficiency in poultry litter degradation.
- 60 lines of hybrid poplar were tested for response to biochar treatment.

**2. Brief description of the target audience**

The target audience for this program area includes the bio-fuels and materials industries, the electricity generating industry, foresters, digester manufacturers and users, poultry farmers, other agricultural waste producers, environmentally concerned citizens, undergraduate and graduate students, engineers and scientists who study bioreactors and anaerobic microbial processes, mine operators, mine reclamation contractors, land owners, farmers, related energy industry sector, environmental scientists and engineers, small and large scale commercial biotech and chemical companies and local coal power companies researchers, regulators, policy makers.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	2098	0	747	0

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

**Patent Applications Submitted**

Year: 2015  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

<b>2015</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	0	31	31

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	13

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	3

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	12

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	27

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

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<b>Year</b>	<b>Actual</b>
2015	3

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

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

O. No.	OUTCOME NAME
1	Number of participants who increase awareness of beneficial use of waste and byproducts to improve soil productivity and ecological services.
2	Number of stakeholders participating in production/harvesting/storage systems that increase or improve their skills.
3	Number of youth who gain science process skills in biofuels.
4	Number of participants who adopt BMPs for production/harvesting/storage systems.
5	Number of new processes for converting lignocellulose to usable sources of energy.
6	Increase in the percentage of renewable sources of biomass co-fired with coal (% increase per year).
7	Number of improvements to the operational parameters that have been used to control thermophilic poultry waste digesters.
8	Creation of new knowledge concerning how microbial diversity gives rise to anaerobic microbial energy conversion and anaerobic digestion.
9	number of genetic materials tested

**Outcome #1**

**1. Outcome Measures**

Number of participants who increase awareness of beneficial use of waste and byproducts to improve soil productivity and ecological services.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	18

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

**Issue (Who cares and Why)**

Implementing a recycling program offers several economic benefits. Recycling can 1) reduce solid waste collection, transportation, and disposal costs; 2) generate revenues from the sale of recyclable materials; 3) create jobs; and 4) provide eligibility for grants.

**What has been done**

An Extension Agent in one rural county implemented a program called: "Reduce, Reuse Recycle" How Roane County Recycling can help your business. There was an exchange between the members of Spencer Rotary Club and other community members about how citizens can help each other take care of the recycling needs.

**Results**

Participants learned how the recycling program works in Roane County. After this program was implemented, the amount of materials collected increased to 42 tons in one month. Because of these efforts, the Board was able to hire an additional employee to pick up recyclable items.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
403	Waste Disposal, Recycling, and Reuse

**Outcome #2**

**1. Outcome Measures**

Number of stakeholders participating in production/harvesting/storage systems that increase or improve their skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	110

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

**Issue (Who cares and Why)**

Interest in our soil and land resources continues to increase. Land use has become the centerpiece for many public issue debates and is one of the driving forces for the Farmland Preservation Program. With the increase in oil and gas exploration several acres are being disturbed and more understanding is needed by the landowners to protect their surface interests. Oftentimes, recommendations, and comments are made by people who have little or no understanding of proper land and soil management. The best way to begin to change the situation is to teach our youths.

**What has been done**

Extension Services throughout the United States conduct state land and homesite judging contests each year. A National Land and Homesite judging contest is conducted annually. State winners qualify to participate in the national event. Three contests were conducted in WV in 2015: North central Regional FFA; State FFA Contest; and State 4-H.

**Results**

110 youths in the Land and Homesite judging program in West Virginia gained knowledge and skills in soil properties, land management principles, decision making, reasoning, verbal communication skills, personal self-confidence, teamwork, and interpersonal skills.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
131	Alternative Uses of Land
806	Youth Development

**Outcome #3**

**1. Outcome Measures**

Number of youth who gain science process skills in biofuels.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Number of participants who adopt BMPs for production/harvesting/storage systems.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Number of new processes for converting lignocellulose to usable sources of energy.

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

Increase in the percentage of renewable sources of biomass co-fired with coal (% increase per year).

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

The economy of WV is heavily dependent on the coal and natural gas industries, both exhaustible fossil fuels. There is a need to diversify both the State economy and our portfolio of energy sources. Increasing the amount of renewable energy production will help diversify the State economy, reduce our dependence as a country on imports of fossil fuels, and lead to a more sustainable energy supply. One way to do this is combining coal with renewable sources of biomass to produce energy products.

**What has been done**

A long-term project has examined coal and biomass combined thermo-chemical co-gasification using experimental and modeling techniques. Several types of biomass were tested as possible feed stocks for coal/biomass gasification. Wood chips and hardwood pellets made from red oak and yellow poplar were included in the tests.

**Results**

Results showed that gross heating value, ash content and sulfur content significantly decreased when wood was mixed with coal. Volatile matter was less in the coal-biomass mixtures as compared to biomass alone. Lower amounts of tar impurities can be expected from its co-gasification. Higher char obtained by pyrolysis of the coal-biomass mixtures than biomass alone may lead to higher gas yield from gasification. On the other hand, due to lower ash content in the mixtures than coal alone, a reduction in problems like slagging and corrosion is likely to occur. Compared to using biomass and coal alone in gasification, a mixture of both is expected to give better results.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
511	New and Improved Non-Food Products and Processes
806	Youth Development

**Outcome #7**

**1. Outcome Measures**

Number of improvements to the operational parameters that have been used to control thermophilic poultry waste digesters.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Organic wastes are produced in enormous quantities from agricultural, municipal and industrial sources. These wastes can be converted into bioenergy (methane) through the process of anaerobic digestion. The use of anaerobic digestion has been growing in the United States but still lags far behind other regions. Anaerobic digestion is especially suited for animal farms and has been widely used for cattle production, but it is underutilized by the poultry industry which is important in West Virginia. The performance efficiency of anaerobic digesters is also known to vary for unknown reasons; diagnosis and engineering of the microbial system may improve reliability and performance. Anaerobic bioreactors may also be used for producing valuable platform chemicals for the chemical industry.

#### What has been done

Our research is aimed at developing bioenergy and bioproducts from waste biomass, and optimizing anaerobic digestion for diverse applications. We have been operating laboratory-scale digesters to study the properties of stability, flexibility and efficiency using poultry farm waste as substrate. An experiment was done to test whether glycerol as co-substrate could be used to increase the production of intermediate chain fatty acids in a thermophilic digester. We have also been working with a collaborator at Universidad Autonoma de Coahuila (Mexico) to study low efficiency lagoon digesters that are used on large cattle farms in central Mexico.

#### Results

We have collected performance data from a set of replicate laboratory-scale digesters to study the property of resilience toward environmental stress. In another experiment, we found that propionic acid as well as intermediate chain fatty acids (butyric) could be produced at higher levels when a thermophilic digester is stressed with glycerol. In collaboration with a Mexican colleague, a low-performance lagoon digester in Mexico was sampled over time to develop a profile of its metabolic output in relation to operational handling. In addition, a survey of methane emissions and bioenergy potential from livestock manures in Mexico was published with a colleague (Nagamani Balagurusamy) from Coahuila, Mexico.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

## **Outcome #8**

### **1. Outcome Measures**

Creation of new knowledge concerning how microbial diversity gives rise to anaerobic microbial energy conversion and anaerobic digestion.

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

- 1890 Research

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	0

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

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

Microorganisms are probably the single most important resource for biotechnology and will be key to the development of biomass-to-energy and biomass-to-bioproduct industries. Microbial diversity encompasses enormous varieties of metabolism, but harnessing these properties for the development of products is challenging. Mixed microbial consortia offer tremendous opportunities for converting complex organic wastes into useful products. However, our ability to engineer these consortia to produce desired products is still limited and requires research to understand the limitations and metabolic potential of microbial consortia. The bioenergy industry will benefit as well as other industries that seek to use their organic wastes as a value-added product.

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

Replicate digesters were operated to evaluate the relationship between microbial population diversity and steady state reactor metabolic pathways. Molecular (RNA-based) diversity sampling was done of replicate digesters in a long-term resilience experiment, and also for a modeling experiment that tested the kinetics of acetate oxidation.

#### **Results**

Microbial diversity shifted during a glycerol stress experiment performance declined in a poultry litter digester. Another experiment using molecular analysis showed that thermophilic digestion of poultry litter was dominated by hydrogenotrophic methanogens and that bacterial acetate oxidation was the primary pathway for this metabolite. The standard Anaerobic Digestion Model No. 1 (ADM1) was modified to include bacterial acetate oxidation in this type of thermophilic digester. Different methods for kinetic parameter estimation were used. This research was done with a collaborator (Teodoro Espinosa-Solares) from Universidad Autonoma Chapingo (Mexico).

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

**KA Code**    **Knowledge Area**  
403            Waste Disposal, Recycling, and Reuse

**Outcome #9**

**1. Outcome Measures**

number of genetic materials tested

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	60

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

**Issue (Who cares and Why)**

Ecosystem services and site productivity of reclaimed mine site is very poor. Selection of plant material and development of new management practices could improve site productivity and ecosystem services such as runoff and sediment control.

**What has been done**

Genetic trial assessing suitability of 60 lines of hybrid poplar and response to biochar treatment are monitored for growth parameters. Initial assessment of the different genetic line was conducted using an index value based on measured growth attributes (height, diameter, mass, survival, and health). Thirty-two of the best performing genetic lines were propagated and planted during late spring of 2015. Observation of second year performances of initial plot, and that of first year performances of the selected 32 lines was collected in the fall of 2015.

**Results**

Results from first year (60 lines cohort) showed significant differences in establishment and growth parameters among different clone lines and genomic groups. Yet, no soil treatment effect (biochar application ) was found. Seedlings establishment of the second cohort (32 lines) seemed to be more challenging than in the first site/cohort, amid similar weather conditions (i.e. wet summer) during establishment.

**4. Associated Knowledge Areas**

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

123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

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

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

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### **Brief Explanation**

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

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

### **Evaluation Results**

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
  - Referee journal articles and books
  - General audience papers and news reports
  - M.S. and PhD graduates
  - Trends in terms of competitive funding
  - And in terms of longer-term impact:
    - Citations in scientific journals
    - Patents
    - Successful technology transfer or start-ups based on research programs
    - Awards based on continuing impact and research excellence
- Every five years there will be a full portfolio review including:
- Long term productivity
  - Relevance to our constituent groups and the State and Region
  - The allocation of research inputs among the programs
  - Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
    - Consideration of adding additional program areas given NIFA and State priorities
- This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

### WVUES

One method of evaluation in this program area was to monitor the amount of recycled materials in a community over the course of a month. In Roane County, for instance, participants learned how the recycling program worked and were encouraged to recycle. After this program was implemented, the amount of materials collected increased to 42 tons in one month. Because of these efforts, the Board was able to hire an additional employee to pick up recyclable items.

### **Key Items of Evaluation**

#### WVU-AFES

The State budget and economy are feeling the effects of the decline in the coal industry and falling energy prices. We have been advised by our constituents to conduct research to help foster the forest products industry by creating value-added products that utilize the hardwood resources of the State. We have several research projects looking at developing novel bio-products, bio-materials and bioenergy products from underutilized hardwood species and from waste generated by the forestry industry.

#### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 4**

**1. Name of the Planned Program**

Childhood Obesity, Nutrition and Health

Reporting on this Program

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

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%	0%	15%	0%
502	New and Improved Food Products	0%	0%	15%	0%
701	Nutrient Composition of Food	0%	20%	0%	0%
702	Requirements and Function of Nutrients and Other Food Components	10%	0%	20%	0%
703	Nutrition Education and Behavior	30%	30%	30%	0%
724	Healthy Lifestyle	30%	20%	20%	0%
801	Individual and Family Resource Management	10%	0%	0%	0%
802	Human Development and Family Well-Being	10%	10%	0%	0%
806	Youth Development	10%	20%	0%	0%
	<b>Total</b>	100%	100%	100%	0%

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

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

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	17.0	4.0	3.5	0.0
<b>Actual Paid</b>	14.0	1.2	6.0	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
421000	161734	416204	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
736962	91107	1118712	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	1264346	0

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

### 1. Brief description of the Activity

West Virginia citizens have the second highest level of obesity in the Nation (35.7%, Center for Disease Control, 2014). West Virginia is also above the national averages for incidence of diabetes, high blood pressure, and cardiovascular disease, as well as for osteopenia and osteoporosis.

#### WVU-AFES

Station research in human nutrition and health is focused on determining the current and potential impacts of diet, nutritional education and dietary intervention on obesity and obesity related conditions (diabetes, elevated cholesterol and plasma lipids, heart attack, stroke and some cancers). The program also is testing the efficacy and safety of bioactive compounds in foods, including krill protein, and is developing omega-3 DHA enhanced diets and educational programs to support their adoption.

Highlights for 2015 include:

- Several projects continued involving the nutritional and health impacts of consumption of foods high in omega-3 fatty acids as well as the development of nutritional foods that are high in omega-3 fatty acids.
- Another study looked at the impacts of intra-muscular fat on insulin resistance and type II diabetes in humans using dairy cow models.

#### WVUES

In 2015, the childhood obesity planned program at West Virginia University Extension worked towards increasing the capacity of youth, adults, and families to make informed, science-based decisions which prevent chronic disease and maintain healthy weight status through physical activity and intake of nutrient-dense foods. There were 395 reported activities for 2015 in the Childhood Obesity and Healthy Lifestyle planned program. These activities can be grouped in the following categories:

Nutrition, Food Selection, and Preparation - The largest program in this category is the Family Nutrition Program for both low-income adults and youths. The program teaches food and nutrition by using the USDA's My Plate. Other activities in this category include nutrition classes, food preparation classes, and classes on food selection/shopping resources and techniques. Other programs in this category include: Cent\$ible Nutrition, Eating a Rainbow, Fabulous Five, Rethink Your Drink and cooking classes of all kinds. Specialists are working with childcare centers to promote good nutrition and physical activity for preschoolers.

Healthy Lifestyles Skills and Practice - The largest programs in this category include: Healthy Lifestyles for Afterschool, How to Train Your Brain, Laughter is Good Medicine, Taking Charge of Your Health, Maintain Don't Gain, Dental Health Rethink Your Drink, Adult Exercise Program, and Active for Life, a program for older adults. Youth programs in this category are Girls on the Run, 4-H Health Officers, and 4-H Health Ambassadors.

Chronic Diseases and Associated Risk Factors - Dining with Diabetes, a cooking school for persons with diabetes and their caregivers is still being implemented in many counties, even though grant funding has ceased. The public health insurance group in the state, PEIA, has selected Dining with Diabetes as one of the programs that participants can chose to enhance their health outcomes. PEIA reimburses WVUES for each one of their participants who attend. The annual Diabetes Symposium, a national professional conference was not held this year due to commitments to the NAEFCS conference in WV. Other initiatives address heart disease prevention such as Heart Health and Love Your Heart.

WVSU-GRDI

Programming in human nutrition and health is implemented and evaluated to educate participants on the steps necessary to improve diet and health practices that will improve overall health, including a reduction in childhood obesity and healthcare costs.

Highlights for 2015 include:

- Youth EFNEP programming in two local schools that improved the nutrition and health awareness and behaviors of middle school youth.

**2. Brief description of the target audience**

The target audience for this program area includes dietitians, nutritionists, health care professionals, policy makers, researchers, Extension educators, 4-H and other youth program developers, community leaders, low-income West Virginia adults and youth, West Virginians who have diabetes and their caregivers, and older adults and their caregivers.

**3. How was eXtension used?**

One Extension educators in this area said that "the eXtension search is my "go to" resource for recipes and information, mainly for my bi-monthly newspaper column, but I use it anytime I want to find reliable information. I would guess that I check that search about 2 times a week."

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	131195	1054435	23536	20607

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

**Patent Applications Submitted**

Year: 2015  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
Actual	2	13	15

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

Year	Actual
2015	33

**Output #2**

**Output Measure**

- Number of educational materials create or updated

Year	Actual
2015	45

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

Year	Actual
2015	1414

**Output #4**

**Output Measure**

- Number of professional/academic presentations

Year	Actual
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2015 69

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	10

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

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

O. No.	OUTCOME NAME
1	Number of youth who gained awareness and knowledge about eating more healthy foods.
2	Number of adults/families who gained awareness and knowledge about eating more healthy foods.
3	Number of youth who gained awareness and knowledge becoming more active.
4	Number of adults/families who gained awareness and knowledge about becoming more active
5	Number of participants that gained knowledge of how to access and produce healthy foods.
6	Number of youth who change a behavior or use a new skill related to nutrition and health such as choosing healthier foods and increasing physical exercise.
7	Number of adults/families who change a behavior or use a new skill related to nutrition and health such as choosing healthier foods and increasing physical.
8	Number of participants who train others to eat more healthy foods and/or become more active.
9	Number of delivery systems/access points that change their procedures and/or policies with regard to expanding or improving their offering healthy foods or healthy activities.
10	Number of participants who advance to higher knowledge and skill level in healthy lifestyle professional areas.
11	Development of Nutritionally-Enhanced Foods to Improve Health
12	Number of adults/families who change a behavior or use a new skill related to increasing physical activity.
13	Number of participants who gain confidence in their ability to improve their health status.

**Outcome #1**

**1. Outcome Measures**

Number of youth who gained awareness and knowledge about eating more healthy foods.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	20204

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

**Issue (Who cares and Why)**

The CDC (2010) cites the need for better youth health education to address problems related to childhood obesity in West Virginia. It is also a priority of the programs to educate the parents and caregivers of youth in order to assist them in making healthier decisions for our children.

**What has been done**

The Youth Family Nutrition programs in WV (both at WVUES and WVSUES) provided lessons on key issues in childhood obesity such as lack of knowledge, interest, and skill to incorporate health and nutrition practices in daily life activity. EFNEP participants learned about food safety, food preparation, healthy food selection, more economical ways to practice health and nutrition, and engaged in physical activities. Youth were encouraged to replicate the consumption of healthy foods and physical activity in their daily lives and share what they've learned with their families. More 1000 programs were delivered in 2015.

**Results**

Students have shown an increase in healthy eating and snacking. They are now more likely to incorporate fresh fruits and vegetables into their diets and meal planning with their families. Students have also shown they are making better choices in choosing drinks that accompany. They are choosing more milk, water and fruit juices instead of sodas. Snacking on items like potato chips and candy is now giving way to fruits and vegetables.

**4. Associated Knowledge Areas**

**KA Code    Knowledge Area**

701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

## **Outcome #2**

### **1. Outcome Measures**

Number of adults/families who gained awareness and knowledge about eating more healthy foods.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	1210

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

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

In West Virginia, adults need to learn skills to assist them in living healthy lifestyles. These skills lead to changes in behavior related to selecting and preparing healthy foods, shopping for the healthiest choices and best prices, choosing physical activities, and improving food safety behaviors.

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

The Family Nutrition Program (SNAPed and EFNEP) in at WVUES enrolled 1639 adults and children in its family program which include training workshops for adults at community centers, public school, churches, elderly service centers, adult education and job training centers, health fairs, and the like. Of those 1240 adults graduated from the program.

#### **Results**

-80% (957 of 1210) participants showed improvement in one or more food resource management practice (i.e. plan meals, compare prices, does not run out of food or uses grocery lists).

-85% (1021 of 1212) participants showed improvement in one or more nutrition practice (i.e. plans meals, makes healthy food choices, prepares food without adding salt, reads nutrition labels or has children eat breakfast).

-59% (646 of 1138) participants showed improvement in one or more food safety practice (i.e. thawing and storing foods correctly).

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

#### Outcome #3

##### 1. Outcome Measures

Number of youth who gained awareness and knowledge becoming more active.

##### 2. Associated Institution Types

- 1890 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

<b>Year</b>	<b>Actual</b>
2015	341

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

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

The CDC (2010) cites the need for better youth health education to address problems related to childhood obesity in West Virginia. It is also a priority of the programs to educate the parents and caregivers of youth in order to assist them in making healthier decisions for our children. Furthermore, the physical education program in schools has decreased in frequency and entertainment that encourages little mobility, which opens the door to more youth leading increased sedentary lifestyles.

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

The Youth EFNEP program aimed to improve awareness in these areas, reducing the rate of obesity amongst our youth. Middle school youth in the Cedar Grove and Charleston areas were

targeted for this program. Six lessons of school enrichment were implemented during the 6th grade health classes of two local middle schools. Lessons on food safety, food preparation, physical fitness, and nutritious eating were offered using the Choose Health: Food, Fun and Fitness curriculum. As youth participated in the program, they were provided examples of healthier breakfast, lunch, snack and dinner options as well as label reading and fitness activities.

**Results**

Our results show that student's spare time sedentary activities, such as video games and watching television, increased to larger episodes of physical activity. Along with this, we also see a greater awareness of how important exercise and physical activity is for the body and healthy development. Participants have also reported an increase in their consumption of healthier foods.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #4**

**1. Outcome Measures**

Number of adults/families who gained awareness and knowledge about becoming more active

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	285

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

**Issue (Who cares and Why)**

Although children and adolescents are generally more active than adults, many still do not meet the recommended guidelines for physical activity. According to the CDC, children and

adolescents should have 60 minutes (1 hour) or more of physical activity daily including aerobic, muscle-strengthening, and bone-strengthening activities. Among West Virginia's children aged 2 years to less than 5 years, 14.4% were overweight (85th to < 95th percentile BMI-for-Age), and 13.7% were obese (&#8805; 95th percentile BMI-for-Age).

**What has been done**

WVUES educators participate in two programs that promote healthy exercise: Healthy Choices and Girls on the Run. Girls on the Run meets twice a week in small teams of 8-20 girls. The program teaches life skills through fun, engaging lessons that celebrate the joy of movement.

**Results**

Students in the Healthy Lifestyles program learned about the various health benefits of making healthier decisions with regards to physical activity and beverages. Through movement activities, third ?fifth graders in The Girls on the Run Program learned to: recognize their power and responsibility to be intentional in their decision making; embrace their differences; express joy, optimism and gratitude through words, thoughts and actions; nurture their physical and emotional health; and stand up for themselves.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #5**

**1. Outcome Measures**

Number of participants that gained knowledge of how to access and produce healthy foods.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	73

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

**Issue (Who cares and Why)**

Summer is the hungriest time of the year for many youth because they cannot take advantage of the free and reduced lunch programs at school. The Summer Food Service Program (SFSP) ensures that low-income children continue to receive nutritious meals when school is not in session. USDA plans to serve more than 200 million free meals to children 18 years and under at approved SFSP sites.

**What has been done**

WVUES participates in the national Summer School Program in several venues including: 4-H camps, the Energy Express Program, and at community centers and schools. As part of that program, WVUES Extension agents train kitchen staff members on how to access and produce healthy foods for youth during the summer months.

**Results**

- Kitchen staff gained knowledge and skill related to the requirements of the Summer Food Program
- Kitchen staff gained knowledge and skill related to the SFSP Nutritional Guidelines

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management

**Outcome #6**

**1. Outcome Measures**

Number of youth who change a behavior or use a new skill related to nutrition and health such as choosing healthier foods and increasing physical exercise.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	20545

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Access to quality nutrition and health education programs is limited to many West Virginians due to the rural nature of the state, insufficient public transportation, lack of insurance reimbursement, and the limited availability of such programs. There is a need for better youth health education to address problems related to childhood obesity in West Virginia. The Family Nutrition Program (SNAP and EFNEP) has filled in the gap and has multiple stakeholders at the state and federal levels. It is also a priority of these programs to educate the parents and caregivers of youth in order to assist them in making healthier decisions for our children.

#### What has been done

In 2015, the WVUES Family Nutrition Program and WVSUES EFNP Program conducted over 900 classroom programs, 12 afterschool program, 55 camp-based programs, and 15 short-term, special interest programs. Thirty instructors are employed, serving 47 counties. Approximately 6,500 lessons were taught overall. The program teaches food and nutrition by using USDA's MyPyramid. Other activities in this category include nutrition classes, food preparation classes, and classes on food selection, shopping resources, and techniques.

#### Results

- 81.5% of children and youth improve their abilities to choose foods according to Federal Dietary Recommendations or gain knowledge.
- 40.5% of children and youth use safe food handling practices more often or gain knowledge.
- 33% of children and youth improve their physical activity practices or gain knowledge.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

#### Outcome #7

##### 1. Outcome Measures

Number of adults/families who change a behavior or use a new skill related to nutrition and health such as choosing healthier foods and increasing physical.

##### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	1210

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

In West Virginia, adults need to learn skills to assist them in living healthy lifestyles. These skills lead to changes in behavior related to selecting and preparing healthy foods, shopping for the healthiest choices and best prices, choosing physical activities, and improving food safety behaviors.

#### What has been done

The Family Nutrition Program (SNAPed and EFNEP) in West Virginia enrolled 1639 adults and children in its family program which include training workshops for adults at community centers, public school, churches, elderly service centers, adult education and job training centers, health fairs, and the like. Of those 1240 adults graduated from the program.

#### Results

-80% (957 of 1210) participants showed improvement in one or more food resource management practice (i.e. plan meals, compare prices, does not run out of food or uses grocery lists).

-85% (1021 of 1212) participants showed improvement in one or more nutrition practice (i.e. plans meals, makes healthy food choices, prepares food without adding salt, reads nutrition labels or has children eat breakfast).

-59% (646 of 1138) participants showed improvement in one or more food safety practice (i.e. thawing and storing foods correctly).

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

**Outcome #8**

**1. Outcome Measures**

Number of participants who train others to eat more healthy foods and/or become more active.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	155

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

**Issue (Who cares and Why)**

In communities where there are high areas of need, it is powerful for teenage youth to take a stand against the poor choices which they witness others making every day. They need opportunities to explore their own attitudes and beliefs about tobacco, alcohol and illegal drugs. Through training, they can be given a voice and confidence to speak out about poor choices and make a difference in their community.

**What has been done**

4-H Health Ambassadors is one of the leadership opportunities being offered to youth across the state of West Virginia. 4-H teens attend a day-long training where they receive instruction, a teaching kit and a connection with a community adult at home who helps them implement the program. Youth are trained by WVUES faculty to select, implement and advocate for health anti-substance abuse and nutrition curriculum in afterschool arenas using tools such as Up For the Challenge, Health Rocks!, the Eat and Move-O-Matic app, and other healthy living programs. Afterschool providers, 4-H programs and other out of school time

**Results**

Ambassadors reported being motivated to:

- be a better leader
- make themselves healthier
- try new things
- be part of changing a person's life for the better.

Ambassadors reported gaining confidence in

- finding out what they want to do with their lives
- becoming a leader
- being a part of changing others' lives
- working with youth

- speaking in public
- managing time and organizing schedules

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

#### Outcome #9

##### 1. Outcome Measures

Number of delivery systems/access points that change their procedures and/or policies with regard to expanding or improving their offering healthy foods or healthy activities.

Not Reporting on this Outcome Measure

#### Outcome #10

##### 1. Outcome Measures

Number of participants who advance to higher knowledge and skill level in healthy lifestyle professional areas.

Not Reporting on this Outcome Measure

#### Outcome #11

##### 1. Outcome Measures

Development of Nutritionally-Enhanced Foods to Improve Health

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

It is well known that omega-3 polyunsaturated fatty acids have positive health benefits. Clinical trials have shown that this group of fatty acids reduces cardiovascular disease, inflammatory disorders, autoimmune disorders, Crohn's disease, and certain cancers. The American Heart Association recommends that consumption of 2-3 fatty fish meals per week would yield an amount of omega-3 FA that would have beneficial health effects. Fish consumption data suggests that Americans are still not eating the recommended amounts and that children under age 15 are consuming less than half the amount that adults consume. Therefore, there is a need to develop foods high in omega-3 fatty acids more appealing to parents and children.

#### What has been done

A long-term research project concluded this year that involved developing nutritional foods that are high in omega-3 FA and would appeal to consumers and that would use underutilized waste products from the fish processing industry. The efficacy of protein separation from lipids, and insoluble such as skin, fins, scales and bones were investigated and compared. Protein and lipid recovery yields were calculated to determine the economic feasibility of the procedure by calculating the amount of material recovered out of the available protein or lipids present in the initial material. Mineral content of the recovered protein was analyzed and compared to the initial fish and Alaska Pollock surimi.

#### Results

Overall, the project demonstrated that effective protein recovery strategies were improved when  $\text{Ca}(\text{OH})_2$  was used as the processing base. The recovered protein fraction was enhanced with calcium and sodium was reduced. Protein gels made from calcium enhanced protein will be harder and naturally whiter. Moreover, sarcoplasmic protein recovered using simple solubilization processes from fish and by-products may be used as a nutritional supplement to enhance the protein content of food products or can be incorporated into functional food products such as protein gels containing lower amounts of sodium than currently available products.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
701	Nutrient Composition of Food

### Outcome #12

#### 1. Outcome Measures

Number of adults/families who change a behavior or use a new skill related to increasing physical activity.

#### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1418

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

**Issue (Who cares and Why)**

Physical activity offers a broad range of benefits, including the prevention of obesity, improved self-confidence, and an overall sense of well-being. The promotion of healthy lifestyles is particularly important in West Virginia. WVUES has joined with other public health professionals in taking a leadership role in promoting physical activity by providing opportunities for physical activity and encouraging citizens to take part in them.

**What has been done**

WVUES county educators conduct a number of program that teach the benefits of exercise and engage participants in activities that they can incorporate into their daily lives. Examples of these programs include: Active for Life, Adult Exercise Program, Let's Get Moving, Using Exercise to Manage Your Diabetes, Walk, Spin & Win, 100 Mile Walk, Family Fitness, and Stretches for Seniors.

**Results**

- Class members in programs like Active for Life and Adult Exercise Program who do exercises in class, improve cardiovascular health.
- Class members in programs like Active for Life and Adult Exercise Program who do exercises in class strengthen legs, hips, ankles, arms, stomach and back.
- Participants in Dining with Diabetes classes gain knowledge of how to better manage their diabetes through a comprehensive physical activity routine.
- Participants in all exercise classes learn how to start a comprehensive physical activity routine and set short and long term goals for becoming more active.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
724	Healthy Lifestyle

**Outcome #13**

**1. Outcome Measures**

Number of participants who gain confidence in their ability to improve their health status.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	133

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

**Issue (Who cares and Why)**

West Virginia citizens have the third highest level of obesity in the Nation (32.4%, Center for Disease Control, 2011). West Virginia is also above the national averages for incidence of diabetes, high blood pressure, and cardiovascular disease, as well as for osteopenia and osteoporosis.

**What has been done**

Even though formal funding for the Dining with Diabetes program in West Virginia has ceased, WVUES continues to offer 5-session programs at the local level. This year, classes were held in 10 counties with 133 participants.

**Results**

Results of the comparison of pre- and post-test scores showed a significant improvement in the statements "I feel confident that I can keep my diabetes under control." and "I know exactly what I need to do to take good care of my diabetes." The paired Wilcoxon Signed Ranks Test (nonparametric T-test) significance p-values for these two questions were 0.085 and 0.036 respectively. Both p-values were below the chosen significance level of 0.1 (0.085<0.1 and 0.036<0.1, respectively). This result implies that the knowledge individual participants gained from the Dining with Diabetes program enabled them to "feel confident that they can keep their diabetes under control," and feel that "they know exactly what they need to do to take good care of their diabetes."

**4. Associated Knowledge Areas**

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

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

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

- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### **Brief Explanation**

WVUES has had significant personnel changes in this area. An Interim unit director has been in the lead. She has continued her job as a county agent while taking on administrative duties. Personnel changes have also occurred in the Family Nutrition program, however, a full workforce is in place. Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets.

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

### **Evaluation Results**

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
- Referee journal articles and books
- General audience papers and news reports
- M.S. and PhD graduates
- Trends in terms of competitive funding
- And in terms of longer-term impact:
- Citations in scientific journals
- Patents
- Successful technology transfer or start-ups based on research programs
- Awards based on continuing impact and research excellence

Every five years there will be a full portfolio review including:

- Long term productivity
- Relevance to our constituent groups and the State and Region
- The allocation of research inputs among the programs
- Consideration of eliminating some research programs that are not productive or have

diminished relevance given NIFA and State priorities

- Consideration of adding additional program areas given NIFA and State priorities

This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

### WVSUES

Youth EFNEP uses a pre and post survey mandated by the National EFNEP staff at USDA. Results from the post survey show that 84% adopted and practiced 1 or more food selection behavior(s) consistent with Federal Dietary Guideline recommendations, and 59% adopt and practice 2 or more of the same; 67% of youth adopted or improved 1 or more habit(s) or behaviors related to physical activity. 97% of youth participants improved in one or more of the program's core areas including physical activity practices, food safety, food resource management, and diet quality practices.

### WVUES

The WVUES Family Nutrition Program -- Adults

- 80% (957 of 1210) participants showed improvement in one or more food resource management practice (i.e. plan meals, compare prices, does not run out of food or uses grocery lists).
- 85% (1021 of 1212) participants showed improvement in one or more nutrition practice (i.e. plans meals, makes healthy food choices, prepares food without adding salt, reads nutrition labels or has children eat breakfast).
- 59% (646 of 1138) participants showed improvement in one or more food safety practice (i.e. thawing and storing foods correctly).

The WVUES Family Nutrition Program -- Youth Program

- 81.5% of children and youth improve their abilities to choose foods according to Federal Dietary
- Recommendations or gain knowledge.
  - 40.5% of children and youth use safe food handling practices more often or gain knowledge.
  - 33% of children and youth improve their physical activity practices or gain knowledge.

### Dining with Diabetes

Results of the comparison of showed statistically significant improvement in the statements "I feel confident that I can keep my diabetes under control." and "I know exactly what I need to do to take good care of my diabetes." The paired Wilcoxon Signed Ranks Test (nonparametric T-test) significance p-values for these two statements were **0.016** and **0.000** respectively. Both p-values were below the chosen **significance level of 0.1 (0.016<0.1 and 0.000<0.1)**. This result implies that the knowledge individual participants gained from the Dining with Diabetes program enabled them to "feel confident that they can keep their diabetes under control," and feel that "they know exactly what they need to do to take good care of their diabetes." This was evidence of self-reported improvement in knowledge on diabetes care and control. From the same table, there was also statistically significant improvement in participant feelings of depressive symptoms. This is reflected in the p-value (**0.060<0.1**) for the statement "during the past month, I have had little interest or pleasure in doing things." Taken together, these improvements also reflected improvement in self-perception.

Results of **Pre-** and **Post-test** comparison of scores also showed statistically significant improvement in participant knowledge of diabetes care and control related to food nutrients and portion sizes. This is reflected in the p-values of (**0.025**; **0.046**; and **0.011**) for questions "Which of the following does NOT provide fuel for the body?" "Which form of dairy product has the highest source of calcium?" and "Which of the following does NOT provide carbohydrates to the body?" respectively. The importance of information on food nutrients (especially carbohydrates) and portion sizes to participants was also highlighted in participant comments that learning how to read labels, portion control, and to not only control sugar but also carbohydrates intake were key areas of improvement in knowledge about diabetes care and control gained from the DwD program. Many wrote that they had previously watched only sugar intake. Indeed asked what topic they would like to hear about at the follow-up session, most (46/85 = 54%) of participants chose "portion control/meal planning."

Results of **Pre-** and **Post-test** comparison of scores also showed statistically significant improvement in participant use of herbs or spices in place of salt, and consumption of three servings of dairy products, with p-values of **0.021** and **0.046** respectively. This shift in food consumption behavior was very important, for it is considered (by research on food sciences) healthy for those living with diabetes. Indeed this shift was reinforced by participant response to the question on what action participants had taken since taking the DwD program. Most (48/85 = 55%) indicated that they had made healthier food choices. The second most indicated choice was by (18/75=21%) that since taking the DwD program, they had seen a health care provider for diabetes or made an appointment.

### Key Items of Evaluation

This program has matured and is one of our most successful truly integrated efforts between the WVU Cooperative Extension Service and the WVU Agricultural and Forestry Experiment Station. We are involved in many programs throughout the State involving clinical research, extension and education in the areas of diabetes prevention and nutrition for those who have diabetes and prevention of obesity through exercise and nutritional planning. We have been meeting jointly with representatives from Novo-Nordisk to evaluate our current programs and to develop a diabetes action plan for the State. We are hoping this plan will come to fruition in the coming year.

#### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 5**

**1. Name of the Planned Program**

Food Safety

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	10%	0%	25%	0%
502	New and Improved Food Products	10%	0%	50%	0%
504	Home and Commercial Food Service	50%	0%	0%	0%
703	Nutrition Education and Behavior	10%	25%	25%	0%
724	Healthy Lifestyle	10%	25%	0%	0%
802	Human Development and Family Well-Being	0%	25%	0%	0%
806	Youth Development	10%	25%	0%	0%
	<b>Total</b>	100%	100%	100%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	21.0	1.2	0.5	0.0
<b>Actual Paid</b>	20.0	1.2	0.0	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
504218	161734	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1017304	91107	21814	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	5080	0

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

### 1. Brief description of the Activity

The Food Safety planned program in West Virginia worked toward reducing the incidence of food-borne illness by eliminating causes of microbial resistance to contaminants, educating consumers and food safety professionals, and developing safe food processing technologies.

#### WVUES

In 2015, educational programs at WVUES in food safety fell under three major areas: community food preparation, commercial food preparation, and beef quality assurance. In 2015, there were 113 educational activities.

**Community Food Preparation:** The major initiatives included food preservation and canning workshops/demonstrations, and Venison 101.

**Commercial Food Preparation:** The major initiatives include ServSafe® Manager Food Safety Training, a food business workshop, a food defense workshop, Venison 101, and HACCP training. This year, Extension Specialist, Litha Sivanandan, conducted research to identify and develop food products using the isoelectric processing, a WVU-patented technology, and to offer its application through research, outreach, and educational opportunities in business plan, risks and liabilities, process and product technology transfer, product and process development, product/process safety, and product marketing/commercialization. She offered workshops based on her research.

**Beef Quality Assurance:** The major initiatives included beef quality assurance certification, levels I and II; beef quality assurance for WVU farm worker; WVU-ES winter education series; the WV cattlemen's short course for producers; the West Virginia quality assurance feeder calf sale hands on vaccination training; calf pools and bull sales; and 4-H Beef Quality Assurance. The programs are a valuable tool to help producers keep up-to date on new technology to insure that proper training and techniques are utilized when administering vaccines or animal health products. The members of the WV feeder cattle marketing pools and consignors to the WV Bull evaluation programs are recertified every two years. Members of 4-H and other youth were instructed about the proper way to wash hands through such programs as Germ City and the Germ Stops Here.

#### WVSU-GRDI

Programming on safe food handling was implemented and evaluated throughout the EFNEP program using weekly lessons on temperature control, food storage and cross contamination.

- The Adult and Youth EFNEP surveys showed that participants are learning best practices on food safety where they are reporting more positive feedback on proper food preparation and storage.

WVU-AFES

The WVU-AFES recently added a joint faculty position with WVUES in the food safety area.

**2. Brief description of the target audience**

Target groups include WV citizens who can or preserve foods, commercial food processors, beef producers, WVU Extension agents, youth, and residents from low to moderate income level households.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	6619	9649	7721	1982

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

**Patent Applications Submitted**

Year: 2015  
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	1	0	1

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	33

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	45

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	226

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	9

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	1

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

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

O. No.	OUTCOME NAME
1	Number of participants who improve their knowledge of safe food handling practices.
2	Number of participants who increase or improve their skill in proper time and temperature controls in food preparation.
3	Number of participants who improve or increase skills in safe food handling practices such as preparing, cooking, and storing foods safely.
4	Number of participants who report using new food handling practices.
5	Number of youth who disseminate information about food safety to their families.
6	Number of youth who participate in Extension nutrition programs that receive one balanced, nutritionally correct meal per day that is prepared and held at safe.
7	Number of growers, producers, and food workers completing food safety certification.
8	Number of improved prevention, detection, control and intervention technologies adopted.
9	Number of projects characterizing social, economic, and/or cultural practices attributed to foodborne illness.

**Outcome #1**

**1. Outcome Measures**

Number of participants who improve their knowledge of safe food handling practices.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	980

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

**Issue (Who cares and Why)**

Since many West Virginia citizens hunt deer each year, there is a need to provide scientifically-based training on proper and safe- field dressing, processing, freezing, and drying methods of venison. It is also important to disseminate basic information on tested and approved procedures in canning of venison and other meats.

**What has been done**

Venison 101 Food Safety and Food Processing hands-on workshops were offered this year in collaboration with WVU Davis College of Agriculture, Natural Resources and Design (WVU DCANRD) and WV Department of Natural Resources (WV DNR). This program is in high demand. Videos on safe field dressing and venison processing, created by the WVUES Food Safety Specialist in 2011, are in high demand and are available on YouTube. New resource videos were sent to educators for expert suggestions

**Results**

Participants learned how to properly field dress, clean, cut, and cook deer meat; they were also instructed in the basics of herd health and canning. There was Increased knowledge on venison field dressing and processing through the newly developed videos.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior

## **Outcome #2**

### **1. Outcome Measures**

Number of participants who increase or improve their skill in proper time and temperature controls in food preparation.

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

- 1862 Extension
- 1890 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	3193

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

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

Using tested procedures and recipes will help to prevent serious food-borne illnesses while preserving the quality of the food.

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

WVUES and WVSUES educators conduct food preservation and food safety workshops. Participants learn to use the boiling water method for high acid foods and work with pressure canners for low acid foods. Dehydration and freezing is also covered. EFNEP participants were given lessons on food safety and how to prevent food borne illnesses through accurate food temperature readings and as well as hand washing.

#### **Results**

Participants increased their knowledge of safe preservation practices.

- Participants increased their skill in canning using the boiling water method for high acid foods by making jelly and jam.
- Participants increased their skill with canning using pressure canners for low acid foods by canning green beans and carrots.
- In one workshop, participants reported they felt prepared to teach a food drying class.
- Participants acquired knowledge about freezing in food preservation.
- 61% of the youth adopted and practiced 1 or more behavior(s) necessary to handle food safely.
- 66% of participants showed improvement in one or more food safety practices.

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

<b>KA Code</b>	<b>Knowledge Area</b>
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior

### **Outcome #3**

#### **1. Outcome Measures**

Number of participants who improve or increase skills in safe food handling practices such as preparing, cooking, and storing foods safely.

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

- 1890 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	355

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

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

Many youth and their families are not aware of proper food handling recommendations, the prevalence of cross contamination and how to prevent it. They are also unaware of the guidelines they should use to prevent food borne illnesses. Lack of knowledge in this area could lead to increased hospital visits and even death.

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

The youth and adult participants were introduced to different types of kitchen appliances, utensils, and equipment and given proper and safe instruction on how to use such kitchen items. During youth and adult EFNEP, participants were also given lessons on food safety and how to prevent food borne illnesses and the spread of germs through accurate food temperature readings and as well as hand washing.

##### **Results**

As a result of the information that was given, 61% of the youth adopted and practiced 1 or more behavior(s) necessary to handle food safely. 66% of participants showed improvement in one or more food safety practices. These outcomes will enable the participants to be more confident in safe food preparation for themselves and their families.

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

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

**Outcome #4**

**1. Outcome Measures**

Number of participants who report using new food handling practices.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Number of youth who disseminate information about food safety to their families.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1059

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

**Issue (Who cares and Why)**

Youth-adult learning situations help build strong communities. Adults have lower negative attitudes about youth and youth gain respect for the knowledge and skill of their elders. Barriers are overcome when youth and adults work together. In 4-H programs, adults and youth often work together. A good example of this is the youth beef quality assurance program in Extension where youth and adults learn together.

**What has been done**

WVUES agents conduct the Beef Quality Assurance Program. Youth and adult participants are trained together in food safety and animal welfare. The skills that participants learn include reading a feed tag, reading and understanding medication label, and calculating and recording withdrawal times for antibiotics. Students are also trained on proper curing techniques. They also examine ethics and quality assurance in preparation for their livestock exhibitions. In 2015, there

were 712 youth and 347 adults in attendance.

### Results

Youth and adults learned how to cure their hams and bacon following all state guidelines.

Youth and learned about proper food handling, preparation, trimming and storage techniques in order to meet WVDA requirements for WV hams and bacon.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior
806	Youth Development

## Outcome #6

### 1. Outcome Measures

Number of youth who participate in Extension nutrition programs that receive one balanced, nutritionally correct meal per day that is prepared and held at safe.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	2645

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Only 14 children in West Virginia receive summer meals for every 100 low-income students who received free or reduced price lunch according to a 2012-2013 WV school year report. In the summer months as low-income families struggle to provide food, the nutritional status of children declines and they return to school in the fall less healthy.

#### What has been done

WVUES conducts the Energy Express literacy program each year at over 75 sites. Elementary school children attend Energy Express all day for six weeks in the summer. 71% are eligible for free and reduced price meals, 17% of children have IEPs (Individual Educational Plans), and 13% are from racial/ethnic minority groups. Each day, children in the program are served two healthy

meals ? breakfast and lunch. Each meal is prepared by school cafeteria staff who prepare the meals safely, according to all government food and sanitary standards.

**Results**

92,928 meals served to children participating in the program

17,548 meals served to other community youth

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #7**

**1. Outcome Measures**

Number of growers, producers, and food workers completing food safety certification.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	104

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

**Issue (Who cares and Why)**

Preventing food borne illness and death remains a major public health challenge. Medical bills and loss of productivity add to the cost. The incidence of food borne illnesses could be greatly reduced with the adoption of established food safety practices in the production, transportation, storage, preparation and service of food.

**What has been done**

The Extension Food Safety specialist and county agents offered the ServSafe program to commercial food handlers. Seven workshops were held with 104 participants in attendance.

**Results**

72 food handlers were certified in the ServSafe program in 2015.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior

#### Outcome #8

##### 1. Outcome Measures

Number of improved prevention, detection, control and intervention technologies adopted.

Not Reporting on this Outcome Measure

#### Outcome #9

##### 1. Outcome Measures

Number of projects characterizing social, economic, and/or cultural practices attributed to foodborne illness.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

<b>Year</b>	<b>Actual</b>
2015	3

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

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

Un-harvested fruit and unsold harvest fruit pose major challenges in West Virginia, resulting in decreasing production and increasing agricultural waste. The prevalent practice of drying fruits and vegetables without any pre-treatments and without the inclusion of additional ingredients (such as concentrated juices) are making the final products unsafe for storing it along time.

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

Three research projects have been undertaken by the WVUES Food Safety Specialist and others

to study ways to dry fruits and vegetables safely with the ultimate goal of harvesting and preserving formerly unused fruits and vegetables in West Virginia. The result will be increases to the economy of West Virginia.

### Results

Three research articles have been submitted for publication. One was accepted in 2015.

1. Smith A, Kenney B, Jaczynski J, Sivanandan L. 2015. Dehydration of Fruits Using Osmotic Dehydration, Vacuum Impregnation, and Pulsed Vacuum Osmotic Dehydration- A Review. Journal of Agricultural Science and Applications. Accepted for publication.
2. Akharume, F, Singh K, Sivanandan L. 2015. Characteristics of Apple Juice and Sugar Infused Fresh and Frozen Blueberries. Food and Bioprocess Technology: An International Journal. Under Review.
3. Smith A, Kenney B, Jaczynski J, Sivanandan L. 2015. Optimization of Pulsed Vacuum Osmotic Dehydration of Blueberries. Journal of Agricultural Science and Applications. Manuscript Ready for Submission.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
504	Home and Commercial Food Service
703	Nutrition Education and Behavior

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

### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### Brief Explanation

WVUES has had significant personnel changes in this area. An Interim unit director has been in the lead. She has continued her job as a county agent while taking on administrative duties. Personnel changes have also occurred in the Family Nutrition program, however, a full workforce is in place. Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets.

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

### Evaluation Results

WVU Experiment Station research program evaluation will take place at two levels and on

two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
  - Referee journal articles and books
  - General audience papers and news reports
  - M.S. and PhD graduates
  - Trends in terms of competitive funding
  - And in terms of longer-term impact:
    - Citations in scientific journals
    - Patents
    - Successful technology transfer or start-ups based on research programs
    - Awards based on continuing impact and research excellence
- Every five years there will be a full portfolio review including:
- Long term productivity
  - Relevance to our constituent groups and the State and Region
  - The allocation of research inputs among the programs
  - Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
    - Consideration of adding additional program areas given NIFA and State priorities

This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

### WVUES

Participants increased their knowledge of safe preservation practices.

- Participants increased their skill in canning using the boiling water method for high acid foods by making jelly and jam.
- Participants increased their skill with canning using pressure canners for low acid foods by canning green beans and carrots.
- In one workshop, participants reported they felt prepared to teach a food drying class.
- Participants acquired knowledge about freezing in food preservation.
- 61% of the youth adopted and practiced 1 or more behavior(s) necessary to handle food safely.
- 66% of participants showed improvement in one or more food safety practices.

## **Key Items of Evaluation**

### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 6**

**1. Name of the Planned Program**

Community, Economic, Workforce Development

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	0%	5%	10%	0%
134	Outdoor Recreation	10%	20%	15%	0%
602	Business Management, Finance, and Taxation	5%	5%	10%	0%
604	Marketing and Distribution Practices	0%	5%	15%	0%
605	Natural Resource and Environmental Economics	0%	0%	10%	0%
608	Community Resource Planning and Development	40%	40%	20%	0%
723	Hazards to Human Health and Safety	20%	0%	10%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	10%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%	0%	5%	0%
805	Community Institutions, Health, and Social Services	10%	10%	0%	0%
903	Communication, Education, and Information Delivery	5%	5%	5%	0%
	<b>Total</b>	100%	100%	100%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	21.0	7.0	2.5	0.0
<b>Actual Paid</b>	19.0	6.0	9.0	0.0
<b>Actual Volunteer</b>	3000.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
680000	161734	540131	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
841522	91107	919885	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	317096	0

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

**1. Brief description of the Activity**

West Virginia is considered to be a lagging region in terms of economic development and growth, a characteristic shared by many states in the Appalachian Region. While the region has abundant natural resources, particularly coal, natural gas, forests, water and recreational opportunities, unemployment is typically higher than in the rest of the Nation. Accordingly, we have designated community, economic and workforce development and the quality of life in rural communities as one of our program areas.

WVU-AFES

A significant part of rural employment growth nationwide has occurred in non-traditional economic activities including those capitalizing on natural resources and climate. A number of possible economic opportunities are currently being investigated in West Virginia, including pasture finished beef, cool water aquaculture, local food production and marketing, wood utilization, organic production of vegetables and animal products, and ecotourism. In the last three years cutbacks in Agricultural Research Service (ARS) budgets and the closing of the ARS facility in Beaver, WV, have led to a reduction in the research resources devoted to the pasture finished beef projects. The elimination of congressionally directed spending has also led to reduced activity in the aquaculture and wood utilization areas. These cutbacks increase the relative importance of federal capacity funding and AFRI competitive funding to the success of our research and extension programs.

Highlights for 2015:

- A long-term study was completed that looked at the characteristics and performance of local food supply chains in the Appalachian Region.

WVUES

In 2015, the community and workforce development program area conducted 511 activities. The activities in this program area are varied, but fall under the following four categories.

Workforce Development - WVUES conducts workshops and training opportunities for workers in a variety of settings in West Virginia. Topics cover a broad range and include workshops and training opportunities related to workforce health and safety as well as training for a number of occupational requirements. WVUES contracts with OSHA to train workers. It should be noted that some workforce

development is reported under other planned programs, where appropriate. Examples include ServSafe certification, logger training, and childcare provider training.

Leadership Development - WVU Extension relies on volunteers to carry out programs in the community. Groups who train volunteers, Community Education Outreach Service organization (CEOS), the Master Gardener program (reported under Food Security and World Hunger), 4-H and Youth Development (reported in that section) and Energy Express (also reported under 4-H and Youth Development). Topics for volunteers include budgeting and planning for small organizations, public speaking, board responsibilities including serving as an officer, and communications.

Community Development - WVU Extension implements a number of initiatives which focus on the development of local governments and community organizations. These initiatives include The First Impressions Program, Government Planning and Public Policy, Tourism, Farmer's Markets, Walkability Studies and Making Sense of Natural Gas Pipelines and Right of Way Agreements. These programs attract participants who are interested in initiating downtown revitalization programs to improve their community's capacity to attract and retain new businesses and make communities more desirable places to live and work. The Community Leadership Academy has been planned and implemented by WVUES each year. In 2015, 180 participants have attended. Recently, the community development faculty at West Virginia University Extension and West Virginia State University (1890) have come together to plan joint projects with mutually agreed upon outcomes.

Labor Relations - Under the direction of the Labor Studies Institute at WVUES, faculty provide training for members of unions and other workers who negotiate for better working conditions.

WVSUES Agents work directly in the communities to help develop, search out fiscal support and implement innovative programs to develop a greater sense of pride within the communities they serve. Through these efforts opportunities for continued economic growth and diversity are created and sustainable community models developed.

Highlights for 2015:

- An organization was created, Destination Downtown Oak Hill, having been inspired by the community resource guide and developed a project called Sunrise Park Scenic Overlook.
- The Read Aloud program is being expanded in Summers County which encourages early childhood reading through placement of volunteers in the public school system who read to children.
- The City of Richwood has developed an inventory of over 100 properties, begun the legal process of contacting owners for remediation, received grants for the removal of dilapidated structures, and fulfilled the legal process resulting in key structures being removed from the community.

## **2. Brief description of the target audience**

The primary audience for our community and economic development activities is community managers; city, county, and state planners and policy makers; consultants and local development committees or groups, producers, processors and distributors, State citizens and community groups and educators.

Workforce programs target firefighters, EMS, law enforcement, first-responders, upper management in the fire services, airport personnel, the general population, people who seek to implement or assist in the implementation of individual or employer compliance with state, federal, and local safety and health legislation, employers/owners of businesses.

Other audiences include local businesses, community-based organizations, fair and festivals boards, potential business start-ups, and regional economic development authorities.

Specialty populations include volunteers, immigrants, migrant workers, youth, disabled community members, older adults, the unemployed and the under-employed workforce members (with focus on low-to-mod income).

**3. How was eXtension used?**

One of our specialists was the Northeast representative on the Land Use CoP Board. Another specialist is an active member of the Evaluation CoP.

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	88135	16370	1835	160500

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

Year: 2015  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	4	20	24

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

Year	Actual
2015	78

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	66

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	578

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	166

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	9

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

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

O. No.	OUTCOME NAME
1	Number of participants in workforce development programs who increase their knowledge and skills.
2	Number of government and civic leaders who improve or increase skills.
3	Number of volunteers who increase or improve skills.
4	Number of adults who gain knowledge and skill related to working with you.
5	Number of workers who use a new skill.
6	Number of people certified or licensed to practice in the field.
7	Number of new groups or organizations that are established or enhanced by obtaining new sources of revenue, new licenses, etc.
8	Number of adults who successfully train youth in topics related to STEM, healthy living, and citizenship.
9	Number of employers who comply with OSHA specified limits for exposure of workers to hazardous substances and conditions.
10	Number of government or civic groups that use a new skill or procedure.
11	Number of community specific plans developed and adopted in whole or in part to help enhance economic development and quality of life.
12	Number of business plans and successful start-ups in the State developed and implemented with assistance from the WVU and WV State University Extension and experimental stations.
13	Number of grants, financial awards or partnerships awarded or developed for use to support community, economic, workforce development initiatives.
14	Developing community based projects to expand the availability of local foods to food deserts and economically disadvantaged regions.
15	Number of organizations that were grown or enhanced through Extension participation.
16	Number of local economies that were enhanced through Extension efforts.

**Outcome #1**

**1. Outcome Measures**

Number of participants in workforce development programs who increase their knowledge and skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	5000

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

**Issue (Who cares and Why)**

West Virginia hosts a number of conferences and workshop to address the issue of leadership development. They include the Women's Concerns Conference; Faces of Leadership Conference in Berkeley Springs, the WV Leadership Academy, the CEOS Annual Conference, Energy Express site coordinator and volunteer training, and the Community Leadership Academy at WVU Extension. WVU Extension specialists and county faculty seek out ways to contribute educational leadership programs in each of these venues as well as at the local level.

**What has been done**

WVU Extension educators have conducted a number of training session on leadership development. Some topics include: Real Colors (communication skills); volunteer traits for success; leadership styles; steps for successful conference planning; strategic planning, facilitation skills; board development; non-verbal communication; implementing major countywide events; poverty simulations; the power of a personal pitch; team building; and Barga- a simulation on cultural clashes. We recorded over 5,000 contacts at leadership sessions.

**Results**

Participants demonstrated increased knowledge and skill about being an effective facilitator.

Participants enhanced their knowledge of non-verbal style and other styles of communication.

Participants increased knowledge of the roles and responsibilities of the collaborative members.

Participants increased knowledge of parliamentary procedures and duties.

Participants developed skills in conducting interviews.

Participants increased skills in cultural interaction and communication.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

#### Outcome #2

##### 1. Outcome Measures

Number of government and civic leaders who improve or increase skills.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	87

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

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

The First Impressions Program is a portable, easy to implement program for assessing community needs/barriers and assets. There is a need for systematic instruction on how to implement the program by community members and Extension faculty and staff.

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

The WVU Extension tourism team targeted three groups for training to conduct the First Impressions Program: Extension faculty in other states, Extension faculty in West Virginia, WVU students, and community leaders. Extension faculty in other states were invited to four webinars on how to develop and implement a Tourism First Impressions program. Graduate students were taught the principles and practice of rural tourism planning. WVU Extension faculty were taught how to conduct participatory action research and the importance of Interpretive Guide Training. Community leaders were taught the five core values for successful community tourism development.

###### **Results**

Michigan, Minnesota, Vermont, and New Hampshire, are planning to adapt and implement the First Impressions Tourism program in 2016.

Six graduate students planned a cultural tourism planning project in Tucker County, WV and

applied for funding to implement the project.  
Thirty community leaders gained knowledge of the five core values for successful community tourism development.  
Twenty-five WVU Extension educators gained skills needed to conduct the First Impressions Program in their counties.  
As a result of a presentation in Connecticut to 22 individuals, entitled "NERCRD "Regional Collaboration of Successful CRD Extension Programs Planning Grant," the town planner for Windsor Locks, CT is planning to have an assessment done in her community.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

**Outcome #3**

**1. Outcome Measures**

Number of volunteers who increase or improve skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	435

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

**Issue (Who cares and Why)**

As West Virginia's population continues to age, civic organizations consistently lose membership. In the past, these organizations and individuals have played a critical role in improving the quality of life in small rural communities. While many younger citizens may have some interest in volunteering in their community, without skills or direction it can be difficult to engage younger generations in successful projects.

**What has been done**

WVSU Extension has developed Destination: Beautification, a 90 page comprehensive educational resource to assist communities in revitalization. A product of a partnership between West Virginia State University, the New River Gorge Regional Development Authority, and the National Coal Heritage Area Authority, This guide has been used by agents to inspire

communities to develop a community vision and complete community improvement projects.

**Results**

Having been inspired by the community resource guide and with the assistance of a local WVSU extension agent a group of concerned community members in Oak Hill developed an organization they named Destination Downtown Oak Hill. This group, along with many volunteers, developed a project called Sunrise Park Scenic Overlook which provides a community greenspace on municipal property but also encourages motorists passing by on a major 4-lane route to pause on the City's Main Street to enjoy the scenic overlook and provide potential for spending at local merchants.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

**Outcome #4**

**1. Outcome Measures**

Number of adults who gain knowledge and skill related to working with you.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	8932

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

**Issue (Who cares and Why)**

The 4-H program at WVU Extension utilizes the time and talent of many adults who want to serve as club leaders, counselors, and organizers of youth events. Although all enthusiastic, not all adults who want to serve in these capacities have had formal leadership training. It is the job of specialists and county faculty to equip adults to work with youth.

**What has been done**

In 2015, WVU Extension has conducted 325 adult leadership training sessions. The topics covered included 4-H and youth policies including "Children on Campus;" "Essential Elements for Positive Youth Development;" integrating technology into youth programming; how to be an effective camp counselor; policies and procedures for afterschool programming, organizing sporting events, and teaching safety issues. WVSUES trained adults to read with children through their Read Aloud program and Snuggle and Read.

**Results**

Adults gained knowledge and skill related to their roles and responsibilities in the WVU 4-H program.

Youth gained positive relationships with caring adults through their interactions with trained, caring adults.

Parents sent their youth to 4-H activities with the assurance that adults working in the program were trained in positive youth development and were vetted through official background checks. 78 parents in the reading programs learned to read to their children.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development
723	Hazards to Human Health and Safety
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
903	Communication, Education, and Information Delivery

**Outcome #5**

**1. Outcome Measures**

Number of workers who use a new skill.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	15

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

**Issue (Who cares and Why)**

Construction managers plan, coordinate, budget, and supervise construction projects from start to finish. Employment of construction managers is projected to grow 5 percent from 2014 to 2024, about as fast as the average for all occupations. Construction managers will be needed as overall construction activity increases over the coming decade.

**What has been done**

WVU specialist designed and implemented a new course entitled, Construction Management Coordination I, II, & III. As the first construction management program in the state of West Virginia, it serves both a need and a demand for workers, employers, and unions.

**Results**

15 construction workers successfully completed the course.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

**Outcome #6**

**1. Outcome Measures**

Number of people certified or licensed to practice in the field.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	82

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

**Issue (Who cares and Why)**

Residential construction is very dangerous work. Fall from roofs, ladders and scaffolds are the leading cause of fatalities and serious injuries in this industry. When college students are tasked with building a solar residential home those risks are even greater due to the lack of true industry and work experience.

**What has been done**

WVU Safety & Health Extension agreed to develop and deliver hands-on training to prepare the WVU Solar decathlon team to safely construction the solar house. Over several months WVU S&HE faculty delivered 120 training hours to 82 students. The faculty also conducted 20 follow work site inspections and continued to make recommendations on how to safely complete the project.

**Results**

These activities resulted in all students receiving an OSHA 10 Hour certification and most importantly no students were injured during the construction of the solar house.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

**Outcome #7**

**1. Outcome Measures**

Number of new groups or organizations that are established or enhanced by obtaining new sources of revenue, new licenses, etc.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	32

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

**Issue (Who cares and Why)**

A major factor that impedes the creation and growth of new groups and organizations in the community is a lack of resources. While an organization may have a strong vision and the desire to accomplish it, a lack of resources can prevent progress. Without connection to resources and expertise community organizations are limited in their ability to carry out their missions.

**What has been done**

WVSU Extension staff are highly skilled at writing grants, identifying resources and creating partnerships. They provided professional assistance with grant procurement and management to 32 local governments.

**Results**

WVSU Extension has been successful in receipt of multiple grant submissions impacting 32 local governments and community organizations.

Due to the work of WVSU Extension the City of Richwood has developed an inventory of over 100 properties, begun the legal process of contacting owners for remediation, received grants for the removal of dilapidated structures, and fulfilled the legal process resulting in key structures being removed from the community.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
903	Communication, Education, and Information Delivery

**Outcome #8**

**1. Outcome Measures**

Number of adults who successfully train youth in topics related to STEM, healthy living, and citizenship.

Not Reporting on this Outcome Measure

**Outcome #9**

**1. Outcome Measures**

Number of employers who comply with OSHA specified limits for exposure of workers to hazardous substances and conditions.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	59494

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

**Issue (Who cares and Why)**

OSHA Education Centers help serve the public in meeting their goal in training the workforce in the recognition, avoidance and prevention of unsafe and unhealthful working conditions.

**What has been done**

In 2015, WVU Safety & Health Extension trained 59,494 individuals in occupational, public, rural and health care related safety and health topics.

**Results**

52% of participants said they will make changes in safety policies and procedures  
45% said that they will make changes in how the implement, use or require personal protective equipment (respirators, hearing protection, fall protection harness, etc.).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

**Outcome #10**

**1. Outcome Measures**

Number of government or civic groups that use a new skill or procedure.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	112

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

**Issue (Who cares and Why)**

Communities in West Virginia need to access their strengths and weaknesses in order to take advantage of opportunities for tourism development.

**What has been done**

A team was established in WV to develop a regional cultural tourism/asset-based economic development program modeled after the SW VA initiative. The team established relationships with state agencies and non-profit organizations to create a cultural-heritage tourism partnership and determine the feasibility of developing a heritage area program in West Virginia. Regional tourism assets were identified and asset mapping was initiated. Regional leadership teams

developed strategies and action plans.

### Results

Eight new partnerships related to tourism were established in West Virginia, involving 112 groups. These partnerships led to opportunities for cultural tourism teaching and research. A demand for green travel in WV was identified and a partnership was established with the Charleston CVB to pursue the development of a statewide green travel program in WV.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
903	Communication, Education, and Information Delivery

## Outcome #11

### 1. Outcome Measures

Number of community specific plans developed and adopted in whole or in part to help enhance economic development and quality of life.

### 2. Associated Institution Types

- 1862 Extension
- 1890 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2015	6

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

A key challenge in community development is how to engage broad community support, identify the underlying causes of issues and challenges together, learn from one another, and mobilize the community's capitals in a long-range and long-term problem solving approach. In many rural communities, local governments and civic leaders lack the skills to produce the kinds of professional documents necessary to achieve positive results when pursuing projects.

**What has been done**

The WVUES Community Development Planning Specialist works with local governments to develop strategic improvement plans. In 2015, he worked with three West Virginia communities: Parsons, Keyser, and Westover. WVSU Extension works with elected officials and organizations to provide professional support necessary to develop plans specific to that community or organization's need.

**Results**

Parsons now has a plan outline for redevelopment activities.  
Keyser has three projects underway: buy local, community information, and a website. Westover developed draft utility rules and updated their parking regulations.  
The Mount Hope's Mayor's office has developed a strategy for community re-development of over 50 acres of floodplain property that incorporates agriculture, conservation, recreation and education. It was unanimously received and adopted by the City Council.  
The town of Richwood has developed plans for a new public space where a burned out commercial structure once stood.  
The John Henry Museum in Tallcot is operating in a sustainable manner.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
131	Alternative Uses of Land
602	Business Management, Finance, and Taxation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

**Outcome #12**

**1. Outcome Measures**

Number of business plans and successful start-ups in the State developed and implemented with assistance from the WVU and WV State University Extension and experimental stations.

Not Reporting on this Outcome Measure

**Outcome #13**

**1. Outcome Measures**

Number of grants, financial awards or partnerships awarded or developed for use to support community, economic, workforce development initiatives.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	20

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

**Issue (Who cares and Why)**

With strained budgets from struggling local economies, many rural governments and organizations lack the kind of experienced grant-writing that is necessary to successfully fund public projects. In challenging economic times, partnerships also become more critical to developing resources and providing sustainability for projects and organizations.

**What has been done**

WVSUES and WVUES Extension agents pursue grants on behalf of communities. Through training, they connect organizations and projects with viable grants. The WVUES agent in Monroe County helped county leadership recruit sponsorships to develop the musical trail throughout the state. The digital trail contains sound clips of artists in each region as well as camp sites, hotels, restaurants, and other attraction.

**Results**

WVSU facilitated \$445,690 in funding for local projects through 20 grants or financial awards. The Town of Fayetteville received a 283,000 FLAP (Federal Lands Access Program) Grant to develop a four mile trail to connect the High School, Middle School, and Elementary School to the Town Park. Richwood was awarded an \$8,000 Flex-E-Grant grant awarded through the WV Development Office from an ARC (Appalachian Regional Commission) Program to develop Helios Park, a sustainable solar and native vegetation green space. \$1289 in donations was collected to support Mountain Music Trail efforts in Monroe county. 10 affiliate sponsorships were obtained to support the Mountain Music Trail efforts.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

**Outcome #14**

**1. Outcome Measures**

Developing community based projects to expand the availability of local foods to food deserts and economically disadvantaged regions.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

As discussed last year, one area that is experiencing growth nationwide involves local food supply chains (LFSC). The United States has seen considerable growth in farmer's markets, community supported agriculture, and the use of roadside markets. Fueling the growth in these contemporary supply chains are consumer demand for high quality, fresh food products, reduction in transportation costs, and the use of environmentally friendly production practices. The development of LFSC is increasingly being viewed as an "alternative" to "traditional" agribusiness supply chains. A major project concluded this year studying the role and performance of local food chains in the Appalachian region.

**What has been done**

The project critically examined the vertical and horizontal coordination, technology innovation, and competitive strategies utilized by LFSC to respond to changing consumer preferences and gain sustained competitive advantage and market share relative to traditional food channels. In addition, the project served to fund local projects utilizing resources from the NIFA grant, "Enhancing Food Security by Cultivating Resilient Food Systems and Communities: Place-based Foodshed Analysis from Research to Community Practice" to community organizations across the state who are finding innovative ways to enable low income individuals to participate in local food supply chains.

**Results**

Two of the projects have mobile produce markets that travel to rural areas and/or to senior housing, bringing locally grown food to those who may otherwise not have access to it. Two projects helped farmers develop and/or expand

food aggregation and distribution systems. Another project facilitated a community garden to move its facility, and the sixth project started a farmers market in a food desert in the coal fields region of West Virginia. The final project funded four farmers markets to pilot a "gleaning" project at their market that would connect the market to a local emergency food system provider. The goal is for farmers and consumers to donate food for local food pantry clients, reducing waste and improving access for low-income consumers to healthy, local food.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

#### Outcome #15

##### 1. Outcome Measures

Number of organizations that were grown or enhanced through Extension participation.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	1

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

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

The current Community Leadership Academy at WVU was created in 2013 by WVU Extension when the start-up Community Resource Leadership Academy absorbed the dormant Local Government Leadership Academy. This transformed a conference that was being organized around a particular issue into a training institute with a broader mission and a wider scope ? as well as a much larger potential audience.

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

The Community Leadership Academy offers education and training to public officials and other local leaders in West Virginia and beyond. In 2015, the conference theme was "Think Creatively Connect Resourcefully." The topic was covered through four different tracks.

**Results**

The academy has grown from 60 participants in 2012, to 125 in 2013 (the first year of CLA), to 170 in 2014 to 200 in 2015. Likewise, sponsorships have grown as well, more than doubling between 2013 and 2014 from \$8,000 to \$18,000. In 2015, sponsorships rose to \$27,500. What began as a small, topic-focused training session has become, through partnerships and programmatic expansion, a premiere activity for participants to identify and build on their community's assets to take advantage of the current development environment.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

**Outcome #16**

**1. Outcome Measures**

Number of local economies that were enhanced through Extension efforts.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1

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

**Issue (Who cares and Why)**

Agri-tourism increases the income of small rural communities and allows them to provide enhanced services to citizens. When tourists visit a rural location they spend money in local restaurants and hotels and supplement the income of local farm families.

**What has been done**

A WVU Extension county agent conducted two Sugar Bus Tours: Overview of Monroe County Agriculture and Eating Local.? At a luncheon for tourists, the agent discussed the demographics of Monroe County and the importance of the agricultural industry in the county. He also, spoke about the importance of eating local and purchasing local products. Participants learned about fruit production at a local commercial orchard and how wheat and corn were milled for food while visiting a local grist mill.

### Results

In just one county, visits by tourists added \$2,100.00 to local restaurants and \$3,200.00 to local farms and historical places for a total of \$5,200.00 in local income. These number, multiplied by similar activities in other counties, will result in significant funds added to the local economy.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

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

##### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

##### Brief Explanation

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

Many of the programs in the community and workforce program area are affected by government appropriations and policy changes because they are dependent on federal funds for operations.

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

##### Evaluation Results

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
- Referee journal articles and books
- General audience papers and news reports
- M.S. and PhD graduates
- Trends in terms of competitive funding

- And in terms of longer-term impact:
- Citations in scientific journals
- Patents
- Successful technology transfer or start-ups based on research programs
- Awards based on continuing impact and research excellence

Every five years there will be a full portfolio review including:

- Long term productivity
- Relevance to our constituent groups and the State and Region
- The allocation of research inputs among the programs
- Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
- Consideration of adding additional program areas given NIFA and State priorities

This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

#### WVUES

##### Community Leadership Academy

The student's findings indicated a positive impact made on past participants and their communities. However, the impact has been stronger on the individuals than their communities. Although participants stated that they had learned and developed skills at CLA, implementation was found to be a barrier. CLA has been effective in accomplishing its stated goals. Past participants are most interested in the topic of Citizen Engagement, although topics of interest are diverse. We found, and explained, four potential models for the networking session for CLA 2015. Of the four models, we recommended two.

Further impact were determined based on evaluation questions post the CLA in 2015. When participants were asked what activities in their community or organization have occurred from knowledge gained at the Community Leadership Academy, the following individuals representing separate communities responded:

- More Partners and initiatives gained through CLA
- Received Brownfields Grant
- Networking benefits
- Working on a comprehensive plan in county
- Implementing tourism business retention/expansion in county
- Working with local officials
- Built relationship with Senator Unger
- Better at meeting strategies

##### Occupational Safety Programs:

52% of participants said they will make changes in safety policies and procedures  
45% said that they will make changes in how the implement, use or require personal protective equipment (respirators, hearing protection, fall protection harness, etc.).

#### **Key Items of Evaluation**

##### WVU-AFES

1. Our constituents have urged us to conduct more applied agricultural research to help support their businesses and to help stimulate the State economy. This is part of our mission but is increasingly difficult to accomplish given decreasing State funding and the priorities of the federal research agencies which generally favor more basic research projects.
2. We have received positive feedback about two of our programs which are designed to produce graduates that are well trained for jobs that exist within the State. These are the Energy Land Management program and E Quad (Energy, Economics, Entrepreneurship and Environment).
3. The State budget and economy are feeling the effects of the decline in the coal industry and falling energy prices. We have been advised by our constituents to conduct research to help foster the forest products industry by creating value-added products that utilize the hardwood resources of the State. We have several research projects looking at developing novel bio-products, bio-materials and bioenergy products from underutilized hardwood species and from waste generated by the forestry industry.

#### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 7**

**1. Name of the Planned Program**

Production/Sustainable Forestry

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	50%	0%	60%	0%
124	Urban Forestry	5%	80%	5%	0%
125	Agroforestry	20%	15%	0%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	10%	0%
511	New and Improved Non-Food Products and Processes	5%	0%	25%	0%
604	Marketing and Distribution Practices	10%	0%	0%	0%
605	Natural Resource and Environmental Economics	10%	5%	0%	0%
	<b>Total</b>	100%	100%	100%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	10.0	0.0	7.0	0.0
<b>Actual Paid</b>	0.0	1.0	4.0	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
150000	161734	17330	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
31780	91107	427719	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	429339	0

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

### 1. Brief description of the Activity

The forest products industry is an important part of the WV State economy. While the State has abundant forest resources, sustainable management of those resources is essential to preserve the productivity and health of our forest ecosystems for future generations. Such sustainable management involves understanding of the markets for forest products, utilization of current low value hardwoods, development of new biomaterials and biofuels, control of fire and pests, and development of forest management practices that increase productivity while preserving the environment.

#### WVU-AFES

This program includes research to develop improved procedures for hardwood timber management and harvest, to increase the efficiency of wood utilization while developing new uses for hardwoods, and, increasingly, to devise new processes to efficiently utilize wood and timber resources in the production of renewable bio-energy and bio-products. Timber management research includes the development of models to predict yields, systems to protect forest resources from insect pests, acid precipitation, fire, disease, and invasive species; harvest management protocols for optimum regeneration and re-growth; methods to use harvest and processing wastes to efficiently produce bio-energy; feedstock and bio-product logistics; and, programs that respond to research needs and concerns of corporate and private owners and provide economic comparisons among alternative management and harvest methods.

Highlights for 2015 include:

- Research continued on developing high value biomaterials and bioproducts from underutilized Appalachian hardwood species through chemical conversion to produce biopolymers.
- Another project is looking to develop computerized management tools to help public and private forest managers develop optimal sustainable management practices that take into account risk, predicted market prices, carbon storage credits and yield in the face of continued climate change.
- Another project made progress in utilizing nanostructures derived from lignin in forest biomass to bind antimicrobial agents such as copper to produce food packaging materials that suppress foodborne pathogens and spoilage.

#### WVUES

In 2015, the Production/Sustainable Forestry planned program at WVUES sought to improve knowledge about the importance of the forest as a natural resource and increase participants' skill in protecting it. These skills are needed to improve woodlot conditions, expand forest and non-timber product production,

and to improve the business and management competencies of forest/wood industry businesses. Topics include: Forestry in WV, Tree ID, Firewood Processor, Timber!, Wildlife Response to Timber Management, and Illegal Logging. This year, there were 72 educational activities.

WVSU-GRDI

West Virginia State University Extension Service conducts educational workshops focusing on urban and community forestry. These hands-on workshops allow participants to become comfortable pruning their own trees at home, as well as municipal employees being comfortable with basic maintenance skills. Topics such as cultivated mushroom production, pecan production, and others are being analyzed to determine the productivity possibilities, as well as the economic possibilities that could arise

Highlights for 2015 include:

- Memorial Tree Project have been utilized from a community development perspective, as well as an urban forestry standpoint to bring aesthetics and community together.
- Workshops and training participants indicated an increase in their knowledge of cultivated mushroom production, pecan production, etc.

**2. Brief description of the target audience**

The target audience for this program includes professional foresters, the forest-product industry, small and large woodlot owners, extension specialists, consultants, regulators, policy makers, urban and suburban landowners.

**3. How was eXtension used?**

WVSU Extension Agent answered "Ask an Expert" questions an average of once a month.

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	2976	600	843	0

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

**Patent Applications Submitted**

Year: 2015  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

<b>2015</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	0	11	11

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	3

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	0

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	14

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	18

**Output #5**

**Output Measure**

- Number of graduate students earning degrees

<b>Year</b>	<b>Actual</b>
2015	14

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

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

O. No.	OUTCOME NAME
1	Number of program and workshop participants who gain knowledge or skills that will improve their forest operation management skills.
2	Number of new state wood products and materials developed
3	Number of WV forestry program participants using forestry by-products.
4	Number of program and workshop participants who gain knowledge or skills in urban forestry practices.
5	Development of New Bioproducts and Chemicals from Underutilized Hardwood Species and forest industry by-products in Appalachia

**Outcome #1**

**1. Outcome Measures**

Number of program and workshop participants who gain knowledge or skills that will improve their forest operation management skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	407

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

**Issue (Who cares and Why)**

Since WV has vast tracts of public and private forest lands, WVU Extension has an important role in training and consulting with private woodland owners to manage their property based on accepted principles of sustainable forestry. The ultimate goal is to preserve forest resources in West Virginia.

**What has been done**

WVUES specialists offered a series of workshop for landowners on forest operations management. They included Firewood Processors, a series called, TIMBER!, and workshops on wildlife response to timber management. Topics covered included the proper operation of firewood processors, the basics of logging, selling timber, timber rights, harvesting, economics of logging, and the benefits and impacts of timber management to wildlife.

**Results**

-Participants gained knowledge of: the proper operation of firewood processors, the basics of logging, selling timber, timber rights, harvesting, economics of logging, and the benefits and impacts of timber management to wildlife.

-Participants gained skills in implementing road layout. They were able to use theory about forest roads in order to minimize environmental impacts from forest operations.

-As a result of their training, participants were able to operate firewood processors for a number of cycles.

-As a result of their training, landowners now contact a forester before timbering their property.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
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123 Management and Sustainability of Forest Resources  
605 Natural Resource and Environmental Economics

**Outcome #2**

**1. Outcome Measures**

Number of new state wood products and materials developed

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Number of WV forestry program participants using forestry by-products.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Number of program and workshop participants who gain knowledge or skills in urban forestry practices.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	301

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

**Issue (Who cares and Why)**

Urban Forestry is the management of trees in an urban environment. WVUES and WVSUES work to help town and city planners, homeowners, commercial property owners manage their current urban trees and prevent loss due to disease and hazardous conditions.

**What has been done**

WVUES has implemented the Urban Tree Management Program.

**Results**

Reduction of hazardous trees & economic loss from tree failures.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
124	Urban Forestry
605	Natural Resource and Environmental Economics

**Outcome #5**

**1. Outcome Measures**

Development of New Bioproducts and Chemicals from Underutilized Hardwood Species and forest industry by-products in Appalachia

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	0

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

**Issue (Who cares and Why)**

West Virginia is the third most heavily forested state in USA; produces 2.41 million dry tons of wood residues, and approximately 0.9 million dry tons of agricultural residues per year. A fraction of the wood residues are used as pellet fuel, boiler fuel, mulch and raw material for wood-composite products, while a portion of agricultural residues are used in biofuel production. Currently, there is a significant amount of biomass being underutilized that has great potential for valuable chemical production, particularly from the two common West Virginian hardwood species, northern red oak and yellow-poplar.

**What has been done**

Biomass for renewable energy, fuels, and chemicals has experienced a notable increase interest during the past few years. Particularly, biomass can be converted to valuable chemical products by fractioning and extracting its main components (cellulose, hemicellulose and lignin) via some of the following treatments or its combination: organic solvents, water, ionic liquids; energetic treatments, ultrasound,

electrochemistry, etc. One example of high value materials from biomass (cellulose and/or hemicelluloses) are biofilms for the packaging and/or the pharmaceutical area.

### Results

One important result of this project, which concluded in this reporting period, is development of a workable process to fabricate a hybrid material composed of cellulose and copper nanoparticles with antimicrobial properties feasible to be used in films for the food industry. Although microbial growth rarely occurs on the polymers used for packaging materials, foodborne pathogens and spoilage microorganisms can still potentially grow in packaged food products; therefore, a film that is able to release the antimicrobial material in a controlled way could effectively reduce the risk of spread of foodborne pathogens through packaged products.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
511	New and Improved Non-Food Products and Processes

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

### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### Brief Explanation

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

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

### Evaluation Results

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact

- Professional presentations
- Referee journal articles and books
- General audience papers and news reports
- M.S. and PhD graduates
- Trends in terms of competitive funding

- And in terms of longer-term impact:
- Citations in scientific journals
- Patents
- Successful technology transfer or start-ups based on research programs
- Awards based on continuing impact and research excellence

Every five years there will be a full portfolio review including:

- Long term productivity
- Relevance to our constituent groups and the State and Region
- The allocation of research inputs among the programs
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- Consideration of adding additional program areas given NIFA and State priorities

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#### WVUES

Participants gained knowledge of: the proper operation of firewood processors, the basics of logging, selling timber, timber rights, harvesting, economics of logging, and the benefits and impacts of timber management to wildlife.

- Participants gained skills in implementing road layout. They were able to use theory about forest roads in order to minimize environmental impacts from forest operations.
- As a result of their training, participants were able to operate firewood processors for a number of cycles.
- As a result of their training, landowners now contact a forester before timbering their property.

### **Key Items of Evaluation**

#### WVU-AFES

The State budget and economy are feeling the effects of the decline in the coal industry and falling energy prices. We have been advised by our constituents to conduct research to help foster the forest products industry by creating value-added products that utilize the hardwood resources of the State. We have several research projects looking at developing novel bio-products, bio-materials and bioenergy products from underutilized hardwood species and from waste generated by the forestry industry.

#### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 8**

**1. Name of the Planned Program**

Fundamental Plant and Animal Systems

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	10%	0%
206	Basic Plant Biology	0%	0%	10%	0%
301	Reproductive Performance of Animals	0%	0%	20%	0%
302	Nutrient Utilization in Animals	0%	0%	20%	0%
304	Animal Genome	0%	0%	20%	0%
305	Animal Physiological Processes	0%	0%	20%	0%
	<b>Total</b>	0%	0%	100%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	6.0	0.0
<b>Actual Paid</b>	0.0	0.0	8.0	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	730330	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1398901	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	543800	0

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

**1. Brief description of the Activity**

Research involving fundamental plant and animal systems is designed to increase our basic scientific understanding of reproductive, nutritional and general physiological systems and processes.

WVU-AFES

Experiment station basic research involves animal and plant systems and use of animal models for biomedical research. On the animal side, problems addressed include embryonic mortality in sheep and cattle, infertility in dairy cows, performance limiting amino acids in animal rations, and health and disease resistance in poultry. For plants, the program emphasis includes determining the molecular interactions during nitrogen fixation symbiosis between legumes and rhizobial bacteria, characterization of arbuscular mycorrhizal fungi, determining functions of ubiquitin and other polypeptide tags, understanding basic mechanisms of flower senescence and cold shock adaptation, combating the impacts of phytophthora and Chestnut blight and defining and eliminating negative effects on grazing animals of ergot alkaloids produced by fungi that are symbiotic with pasture grasses. On the human health side, research involves using dairy cows as models to explore the linkages among nutrition, lipids, insulin resistance, metabolic disorder and diabetes.

Highlights for 2015 include:

- A long-term research project continued that seeks to understand the ergot alkaloid and loline alkaloid pathways and the biological activities of the products of those pathways such that the endophyte chemotypes can be manipulated to maximize bioprotective properties of forage and turf grasses while minimizing toxicity to livestock.
- AFRI-funded research continued on the effects of excess nutrient intake prior to calving on the incidence of postpartum metabolic disease.

**2. Brief description of the target audience**

The target audience for this area is composed animal and plant scientists, biochemists, professional practitioners, dieticians, regulators and agribusiness firms.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
Actual	0	17	0

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles  
Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Number of professional/academic presentations

Year	Actual
2015	3

**Output #3**

**Output Measure**

- Number of graduate students earning degrees

Year	Actual
2015	12

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

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

O. No.	OUTCOME NAME
1	Number of new cultivars ergot alkaloid deficient grasses at or near wild-type vigor developed.
2	Number of strategies using hypovirus as a biological control agent for Chestnut blight developed and employed.
3	Number of ovarian-specific genes affecting reproductive success identified.
4	Characterizing the mechanism responsible for insulin resistance in over-conditioned cows.

## **Outcome #1**

### **1. Outcome Measures**

Number of new cultivars ergot alkaloid deficient grasses at or near wild-type vigor developed.

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

- 1862 Research
- 1890 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	2

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

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

As reported last year, many agriculturally important forage and turf grasses, including tall fescue and perennial ryegrass, are infected with symbiotic fungi from the genus *Neotyphodium*. These fungi grow internally in the plants, which show no external symptoms. The fungi benefit the plant by providing tolerance to biological or environmental stress. In many cases, these fungi produce bioactive chemicals including ergot alkaloids and lolines. Loline alkaloids, in general, are effective against insects, but the relative activities of different lolines need to be assessed. Certain ergot alkaloids provide protection against insects; however, many ergot alkaloids also are harmful to grazing animals, resulting in poor weight gain, poor health, and reduced reproduction.

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

Again, as reported last year, Davis College researchers have identified many of the genes required to produce ergot alkaloids and lolines. The goals of this current project are to eliminate, replace, or add specific genes to symbiotic fungi to alter the spectrum of ergot alkaloids and lolines produced in a controlled manner. The modified fungi will be reintroduced into their grass hosts (grown in containment), and the chemical profiles will be analyzed. Plants containing the modified fungi will be studied to determine the effects of specific chemicals on insect pests and parasitic nematodes (soil-dwelling round worms). This approach may produce fungi that provide enhanced bioprotective properties to their grass hosts. The alterations in ergot alkaloids also may reduce toxicity to grazing animals.

#### **Results**

This year, the researchers engineered a mutant strain of tall fescue contains a natural mutation in the lysergic acid-activating gene. This mutant strain lacks all lysergic acid derivatives though it still produces one of the remaining ergot alkaloids. The researchers have started field plots (with all the required permits) of tall fescue containing the modified *E. coenophiala* e19 alongside tall

fescue containing the wild-type e19. Seeds, as well as some vegetative material from these plants will be used to determine the performance of this strain of tall fescue in terms of reduced ergot alkaloid production.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

#### Outcome #2

##### 1. Outcome Measures

Number of strategies using hypovirus as a biological control agent for Chestnut blight developed and employed.

Not Reporting on this Outcome Measure

#### Outcome #3

##### 1. Outcome Measures

Number of ovarian-specific genes affecting reproductive success identified.

Not Reporting on this Outcome Measure

#### Outcome #4

##### 1. Outcome Measures

Characterizing the mechanism responsible for insulin resistance in over-conditioned cows.

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	0

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

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

Excess nutrient intake prior to calving can place over-conditioned cows transitioning from gestation to lactation at increased risk of developing postpartum metabolic disease. Postpartum metabolic disease is associated with insulin resistance and increased adipose tissue lipolysis. Collectively, postpartum metabolic disease can have a damaging effect on milk yield and quality, and increase treatment costs and culling.

### **What has been done**

Researchers are attempting to delineate the mechanisms that cause insulin resistance in over-conditioned dairy cattle transitioning from gestation to lactation. To reach this goal, they will utilize contemporary mass spectrometry-based metabolomics to profile the bovine plasma metabolome for markers associated with greater insulin resistance in over-conditioned cattle. These markers will be compared to profiles observed in rodents with impaired insulin action caused by surplus nutrients.

### **Results**

The researchers so far have identified approximately 50 new biomarkers (mainly ceramides and fatty acylcarnitines) associated with the development of insulin resistance in postpartum dairy cows. On-going work is defining the relationship between these biomarkers and the mechanisms that mediate insulin resistance. This research has also spawned related research involving the relationship between intramuscular fat and insulin resistance in humans.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes

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

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

- Appropriations changes
- Competing Public priorities

### **Brief Explanation**

{No Data Entered}

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

### **Evaluation Results**

WVU Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will be evaluated using these general criteria plus additional criteria tailored to each specific program as detailed in the Plan of Work under Outputs and State defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate

#### impact

- Professional presentations
- Referee journal articles and books
- General audience papers and news reports
- M.S. and PhD graduates
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- Consideration of adding additional program areas given NIFA and State priorities

This portfolio review will be conducted internally by a committee appointed by the Dean and externally by a committee composed by a subset of our College Visiting Committee.

#### **Key Items of Evaluation**

##### WVU-AFES

This reporting period we continued implementing our strategic plan for our basic sciences programs. We utilized feedback from constituents (industry, academia and government) in formulating our plan. Our plan is to strengthen our research programs in molecular genetics, microbiology and biochemistry. We have continued to add faculty, adding two more in plant biochemistry, one in molecular genetics and one more in microbiology. We have established a solid working relationship with our Health Sciences program and are jointly developing a metabolomics core facility that will be housed in our College. This investment should make us more competitive for AFRI, NSF and NIH funding and indeed has already paid off in terms of new and continued funding from these agencies.

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

**Program # 9**

**1. Name of the Planned Program**

Strengthening Families

Reporting on this Program

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
724	Healthy Lifestyle	20%	20%	0%	0%
801	Individual and Family Resource Management	20%	20%	0%	0%
802	Human Development and Family Well-Being	60%	20%	0%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%	20%	0%	0%
806	Youth Development	0%	20%	0%	0%
	<b>Total</b>	100%	100%	0%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	27.0	4.0	0.0	0.0
<b>Actual Paid</b>	22.0	1.8	0.0	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
385000	161734	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1317515	91107	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	0	0

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

### 1. Brief description of the Activity

In 2015, the Strengthening Families planned program at WVUES worked towards improving the financial wellbeing of WV families, encouraging good mental health practices, and building strong primary adult and child/parent relationships in WV families. The goals of the program include: 1) increasing knowledge and skills related to financial decision-making, emotional health, and family relationships; 2) ensuring the success of those in train-the-trainer programs; 3) increasing collaborations between WVUES and community organizations in order to strengthen families; 4) increasing the number of participants who are certified to provide childcare and offer relationship, parenting or financial education.

#### WVUES

The major initiatives within the family finance area Smart Money and Money Habitudes. The major initiatives within the parenting area were: Parenting Piece by Piece and Strong Families Eat Together. The major initiatives within the adult relationship area were: The Five Love Languages, Relationship Smarts, and Marriage Preparation Training. The major initiative in the childcare area is the ACDS Childcare Provider Training. Finally, the major initiatives in the emotional health area were Stress Less with Mindfulness and RELAX. WVUES Extension faculty serve as liaisons and provide educational resources to the CEOS groups in West Virginia. Many faculty write and publish lesson plans for CEOS club meetings. There are approximately 4,000 members in West Virginia. This year there were 239 educational activities and 11,964 direct contacts recorded. There were 239 educational activities in the strengthening families' area in 2015.

#### WVSU-GRDI

Focus on improving overall health led to the implementation of programs that targeted underserved youth and families. Health and nutrition education classes are offered to a nontraditional audience on a weekly basis to help improve their physical health. A journal that guides recipients on proper communication with healthcare providers is provided in a workshop setting to adults, youth and military families.

Highlights for 2015 include:

- International workshop on health literacy providing resources on effective communication with healthcare providers.
- Funding received to develop and implement curriculum that provides guidance and resources for grandparents raising grandchildren.

- Partnerships with local hospitals and recovery centers were developed to provide health and nutrition education to underserved audiences such as pregnant women, individuals transitioning from prison and/or recovering from drug abuse.
- AFRI project continued on determining food supply chain for local stores to ensure that they are buying local/regional foods.
- CAPE project collected data from the early warning system and developed a community intervention based on that data.

**2. Brief description of the target audience**

The target recipients of family services will be individuals and families representing a wide range of diversity, throughout the state of West Virginia. Audiences include West Virginia parents, childcare providers in WV, older adults in WV, kin caregivers in WV, school teachers, WV citizens in significant personal relationships, volunteers, partners, Extension agents, legislators, and social service personnel.

**3. How was eXtension used?**

One faculty member is the lead for a learning community of practice under the Military Families Learning Network. It is the Caregiving Special Needs Concentration Area. In this capacity, she also serve as the PI for a \$73,000.00 grant from the Department of Defense (sub-award under Texas A&M).

One specialist is a member of the Financial group of eXtension.

One member goes to eXtension to check out the resources and information dealing with financial issues relevant to her assignment.

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

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	11977	1785757	1001	82

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

**Patent Applications Submitted**

Year: 2015  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	5	2	7

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

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	27

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	26

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	245

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	69

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

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

O. No.	OUTCOME NAME
1	Number of participants who increased their skills in family relationships including harmful behavior avoidance, beneficial parenting techniques, and communication.
2	Number of participants who improve or increase their skills in family financial management including, informed shopping, budgeting and establishing savings accounts.
3	Number of participants who increase or improve their skills in parenting.
4	Number of participants who change a behavior or use a new skill related to family management.
5	Number of individual participants and communities that participate in social networking activities through Extension programs.
6	Number of participants who train others.
7	Amount of money raised by participants to support the program.
8	Number of people certified or license to practice in the field.
9	Number of new groups or organizations related to family life or finance that are established or enhanced.
10	Number of economic improvements related to families.
11	Number of social improvements related to families.
12	Number of military families that participate in social networking activities through Extension programs.

## **Outcome #1**

### **1. Outcome Measures**

Number of participants who increased their skills in family relationships including harmful behavior avoidance, beneficial parenting techniques, and communication.

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

- 1890 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	130

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

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

As health issues continue to arise, people need to be able to monitor their family's health by maximizing time with their physicians and keeping effective records. According to the National Network of Libraries of Medicine (NNLM) (2012), low health literacy also has a negative economic effect on society. According to the report, "Low Health Literacy: Implications for National Health Policy" the cost of low health literacy to the U.S. economy is between \$106 billion and \$238 billion annually. Improving health communication reduces health care costs and increases the quality of health care.

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

The WVSUES Nutrition and Health Specialist trained adults, youth, and military families to use health literacy journals. Journals have also been distributed in several states as well as to professors and health care providers in Glasgow, Scotland.

#### **Results**

Families who attended the health literacy program were better equipped to track and maintain their family medical records. Caregivers were empowered to better advocate for their patients/loved ones.

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

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #2**

**1. Outcome Measures**

Number of participants who improve or increase their skills in family financial management including, informed shopping, budgeting and establishing savings accounts.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	121

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

**Issue (Who cares and Why)**

From 2009-2013, WV has a median household income of \$41,043 compared to a national median of \$53,046. With the average resident falling below the poverty level, money-saving techniques are essential. Furthermore, many residents are unaware of how to file their income taxes, even the simple returns. As a result, they are forced to find individuals who have the skills or pay for the service, which they often cannot afford.

**What has been done**

In 2015, WVSUES offered Financial Literacy workshops. They have been presented in five different counties (Kanawha, Lincoln, Logan, Putnam, and Cabell). Each workshop was approximately six weeks, once a week for two hours. One on one training was also offered to interested parties on how to prepare their own simple tax return.

**Results**

Participants increased their knowledge in financial literacy by completing lessons on budgeting and smart ways to save/spend income.

Participants were able to show that they are equipped to complete a simple tax return.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

### **Outcome #3**

#### **1. Outcome Measures**

Number of participants who increase or improve their skills in parenting.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2015	1731

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

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

Children learn how to become responsible, caring adults and citizens of their society from those who are most intensely involved with them. For that reason, parenting programs are a part of Extension work. WVUES has chosen to address three parenting issues: parenting by separated or divorced couples, helping families enhance family activities, and helping parents understand the developmental challenges their children face. Faced with the difficulty of getting people to attend parenting programs, WVUES seeks out new venues for its parenting programs.

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

WVU Extension implements a number of different parenting programs for adults in West Virginia. Some of those include Parenting Piece by Piece, Strong Families Eat Together, Love Languages of Our Children, Rules, Routines, and Limits, Developmental Play, and Learning Activities at Home. Some of the venues at which WVUES Extension teaches parents include Head Start, schools, local conferences, and planned events at Extension offices. In all, 50 parenting trainings were conducted.

##### **Results**

- In the Parenting Piece by Piece program, divorcing parents gained knowledge of co-parenting strategies.
- In the Strong Families Eat Together Program, parents gained an appreciation of the value of eating family meals together. In the post-survey, parents said that that they more likely to sit down together for a family meal and that they expected to turn off the TV during dinner.
- In the Developmental Play Program, parents learned the importance of unscripted, that it contributes to children's development. Parents learned about the need to limit children's screen time. Parents learned how to use every day found items to create developmental playtime.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

#### Outcome #4

##### 1. Outcome Measures

Number of participants who change a behavior or use a new skill related to family management.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	880

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

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

In general, children growing up in homes where there is a stable and healthy couple relationship show better academic performance, health behaviors, and reduced school misbehavior. Healthy stable couple relationships have also been linked to better physical and mental health for adults based on indicators such as improved health behaviors, longevity, lower rates of alcohol consumption, less depression, and fewer lost work days.

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

Since 2005, WVU Extension Service has been engaged in delivering research-based, skill-focused education in relationships. One of the programs is the 5 Love Languages program. Extension faculty developed built on an existing program by developing a PowerPoint presentation, several handouts, an evaluation form, a discussion guide for group leaders and a participant handout: ?Connecting with Others Using the Five Love Languages? <http://fh.ext.wvu.edu/publications/ceos-lessons>. The program has been implemented in 17 counties, with more than 2500 participants overall. There were 880 participants this year. A research study of the program resulted several positive impacts to participants

###### **Results**

Participants gained understanding of their love language and the language of their partner. Participants gain confidence in using the love language of their partner.

Participants who participated in the 5 LL program were more likely to say that they look at their partner's side of a disagreement, imagine how things look from their partner's perspective, try to look at things in their relationship from two sides, put themselves in their partner's.

#### 4. Associated Knowledge Areas

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

#### Outcome #5

##### 1. Outcome Measures

Number of individual participants and communities that participate in social networking activities through Extension programs.

##### 2. Associated Institution Types

- 1890 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	50

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

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

Social media use has increased drastically on a national and international level. Social interaction and professional communication are becoming a normal part of social media. If an individual is not equipped with the skills to create, maintain and navigate social media sites, they could fall behind socially and professionally.

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

The WVSUES Technology Today program has assisted the residents of four local housing development sites on how to properly use social media and professional job search websites. They have conducted one-on-one and group sessions on the topic where residents were provided hands on instruction.

###### **Results**

100% of participants created social network pages and learned how to maintain those pages. Professional social network sites were also created by more than 50% of residents in the housing complex, with hopes of using the site for job search and advertising their skills for future employers.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

#### Outcome #6

##### 1. Outcome Measures

Number of participants who train others.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2015	39

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

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

"Mindfulness" has been described as paying attention, on purpose, to the present moment, and with a non-judgmental attitude. (Kabat-Zinn, 2011). Mindfulness involves training in gently focused awareness. On their website (2012), the National Institutes of Health showed 283 studies investigating how mindfulness training can help youth and adults with chronic pain, hypertension, menopausal symptoms, insomnia, depression and anxiety, PTSD, and other physical and psychological difficulties.

###### What has been done

A WVUES specialist, who developed the "Stress Less with Mindfulness" program and 1 county-level agent trained 22 Extension agents from 3 states to deliver the five-session program. They also developed and disseminated a single session version to agents in WV. They created a partnership with Michigan State University to cross train educators in Stress Less with Mindfulness and their anger management curriculum, RELAX: Alternatives to Anger. The specialist developed and taught a 3 day workshop on Mindfulness Based Stress management at An Giang University, Viet Nam. The program has been sent out to 3 external reviewers.

###### Results

22 Extension educators in WV, Michigan, and Washington were certified to implement Stress Less with Mindfulness.

24 WVUES county faculty received program and evaluation resources to prepare them to offer the one-session version of the program.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being

**Outcome #7**

**1. Outcome Measures**

Amount of money raised by participants to support the program.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	25400

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

**Issue (Who cares and Why)**

The top statewide priority for these PEIA classes is stress management, citing WV Department of Health and Human Resources studies showing the high medical cost of stress/lost productivity within that agency. Although slow to start in 2013, the Stress Less program is spreading as agents find their personal comfort level with the material and PEIA Health Promotion Consultants recruit audiences.

**What has been done**

The partnership with the WV Public Employees Insurance Agency (PEIA) for WVU Extension to deliver engaged wellness classes to state employees and dependents covered by this insurance is beginning to link WVUES with worksite audiences. Under this arrangement, WVU Extension receives \$200 for each participant completing 4 of the 5 classes.

**Results**

Stress Less classes taught by all instructors have brought in \$25,400 (81.8% of the total invoiced to PEIA).

**4. Associated Knowledge Areas**

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

**Outcome #8**

**1. Outcome Measures**

Number of people certified or license to practice in the field.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	12

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

**Issue (Who cares and Why)**

In today's child care settings the training of childcare providers take varied forms, all of which include some form of on-the-job training. Often workers are placed under the direction of an experienced teacher but far too often child care providers are placed in centers without adequate training. The Apprenticeship for Child Development Specialist (ACDS) program has set out to remedy this problem.

**What has been done**

ACDA is sponsored by the U.S. Department of Labor and implemented in West Virginia through River Valley Child Development Center in Huntington. Two Extension county agents qualified to become instructors. They taught topics such as print awareness, meta-communication, bi-lingual learning, diversity, brain development, motor development, health, safety, nutrition and ethics.

**Results**

In the spring of 2015, 12 students completed the requirements for the course to graduate and were certified as childcare workers.

**4. Associated Knowledge Areas**

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

**Outcome #9**

**1. Outcome Measures**

Number of new groups or organizations related to family life or finance that are established or enhanced.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	1

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

**Issue (Who cares and Why)**

Each Extension region hosts the annual conference for the National Extension Association of Family and Consumer Science once every four years. All states in the region contribute financially to the endeavor, however, it generally falls upon the host state to coordinate the conference. In 2016, West Virginia took on this responsibility which constitutes a strong dedication to the work of the organization and the promotion of the values of family and consumer science Extension agents throughout the country.

**What has been done**

WVEAFCS hosted the 2016 National Extension Association of Family and Consumer Science Annual Conference in White Sulphur Springs, WV at the Greenbrier Resort. The planning committees worked on the conference for several years and included fundraising, marketing and promotion, opening ceremony, welcome event, leadership event, in-depth sessions, hospitality, tours, and wellness activities. Each planning committee prepared a report giving recommendations to the National organization and future planners of the conference. These are available on request.

**Results**

634 participants attended from most states and a number of countries.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
801	Individual and Family Resource Management

802	Human Development and Family Well-Being
806	Youth Development

**Outcome #10**

**1. Outcome Measures**

Number of economic improvements related to families.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	1

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

**Issue (Who cares and Why)**

The state of West Virginia proposed moving from a bi-annual pay system to a every-two week pay schedule. The auditor's office wanted to help state employees adjust to the new system which would increase the number of paychecks they received, but lower the amount of pay in each check by about 7 percent.

**What has been done**

The state of West Virginia designed a training module for state employees who would be affected by the new payroll system. They funded WVU Extension to implement the Smart Money training over a period of one year. 46 workshops were held. The educational goal was to help families of State employees budget their money efficiently

**Results**

2,747 state employees learned about the new payroll program and learned budgeting skills to prepare for the changes in the WV system, thus avoiding short loans to make ends meet. As a result, the State of West Virginia managed a successful transition into their new payroll system and as a result of that, the economic situation in the state remained stable.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

**Outcome #11**

**1. Outcome Measures**

Number of social improvements related to families.

Not Reporting on this Outcome Measure

**Outcome #12**

**1. Outcome Measures**

Number of military families that participate in social networking activities through Extension programs.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	340

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

**Issue (Who cares and Why)**

According to Department of Defense/USDA partnership website, "For more than 25 years, USDA, land-grant universities, the Extension Service, the Department of Defense (DoD), and military service components have partnered to support service members and their families. The mission of this partnership is to advance the health, well-being, and quality of life for military service members, families, and their communities through the coordination of research, education and extension programs.

**What has been done**

A WVUES specialist participates in The Military Families Learning Network, Care-Giving Lifespan Special Needs Concentration Area. This learning community of practice provides web-based training and resources for military social workers, wounded warrior caregivers and staff who serve military families with special medical needs. Participants learned new skills through the 4 webinars in which the WVUES specialist was highly involved as a developer or presenter. Her presentations include: Empowering Those We Help: Building Trust and Credibility; Rethinking! Creating New Strategies to Build Trust and Credibility; Relating! Caring and Culture; Recharging! Combating Compassion Fatigue!

### Results

In 2015 a total of 486 NASW CEU credits were awarded in the Care-Giving Lifespan Special Needs concentration area. 340 individuals participated in the session presented by the WVU specialist. More than 700 individuals participated in all sessions in 2015.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

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

##### External factors which affected outcomes

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

##### Brief Explanation

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

The Family Life specialist retired this year. A replacement will be found in the next year.

The State of West Virginia has used some of the materials that Extension has produced for their divorcing parents. Also the State insurance program -- PEIA -- has selected Extension's program called Stress Less With Mindfulness to offer to their clients as part of their coverage. Extension educators in this unit continue to work with government and social service agencies in the state.

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

##### Evaluation Results

###### WVUES

###### Five Love Language Program

Participants gained understanding of their love language and the language of their partner.

Participants gain confidence in using the love language of their partner.

Participants who participated in the 5 LL program were more likely to say that they look at their partner's side of a disagreement, imagine how things look from their partner's

perspective, try to look at things in their relationship from two sides, put themselves in their partner's.

#### Apprenticeship for Child Development Specialist (ACDS) program

##### Positive Findings

- Students report positive interaction with instructors
- Data supports student competency in major content areas across semesters
- Strong retention of knowledge over semesters
- Students report that ACDS has helped them to be better providers

##### Challenges

- Two content questions (1<sup>st</sup> & 4<sup>th</sup> semester) need to be revised
- Question concerning raises needs to be revised - although enough evidence to report there is inconsistency between DOL guidelines and workplace implementation of pay scales
  - With 43% of students age 35 and younger, the use of more technology may enhance the curriculum
  - 50% of students have some college or an advanced degree - curriculum needs to be reviewed for challenging this population
  - Should include ethnicity in the demographic portion in follow up studies

#### WVSUES

##### Technology Today Program

100% of participants created social network pages and learned how to maintain those pages. Professional social network sites were also created by more than 50% of residents in the housing complex, with hopes of using the site for job search and advertising their skills for future employers.

### **Key Items of Evaluation**

#### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

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

**Program # 10**

**1. Name of the Planned Program**

Youth Development

Reporting on this Program

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

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	20%	30%	0%	0%
806	Youth Development	80%	70%	0%	0%
	<b>Total</b>	100%	100%	0%	0%

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

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

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	60.0	4.0	0.0	0.0
<b>Actual Paid</b>	54.0	6.8	0.0	0.0
<b>Actual Volunteer</b>	11561.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
795000	161734	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3018052	91107	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	80423	0	0

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

**1. Brief description of the Activity**

In West Virginia, 4-H Youth Development professionals and programs at both West Virginia University Extension and West Virginia State University Extension provide educational, fun, and safe opportunities for young people to make friends, learn, and grow. Positive youth development is achieved by weaving essential elements into 4-H programs that promote independence, generosity, and mastery of new skills. The three primary educational areas of emphasis are healthy lifestyles; science, technology, engineering, and math (STEM); and citizenship. Our literacy programs strengthen children's reading skills and promote the benefits of adults and children reading together. Programs focused on STEM, citizenship and expressive arts are created and implemented to cultivate youth and increase their interest in STEM fields, improve self-efficacy, and equip them with knowledge to become responsible youth and adults.

### WVUES

The youth development program at WVUES addresses five programmatic areas: 1) citizenship and global education; 2) literacy education, 3) science, technology, engineering and math (STEM), 4) healthy lifestyles, and 5) adult leadership for youth. The goals of the program are: 1) develop youths into responsible leaders of their state, country, and world, 2) improve reading skills in youth and engage adults in teaching children to read, 3) create in youth an appreciation for STEM and equip them for a technologically advanced society, 4) increase the capacity of youth to maintain a healthy lifestyle.

Activities include clubs, county camps, statewide camps, conferences, and national and international experiences.

**Citizenship and Global Education** - Within the Citizenship and Global Education program, youth gain skills in leadership, 4-H workforce development, cultural and international communication, and civics. Some educational activities include: iRespect, Global Awareness, Build-A-Budget, Dress for Success, Charting, 4-H Officer Training, Youth Voice Teen Leadership, Teen Counsellor Training, and Career Connections. There were 348 activities in Citizenship and Global Education.

**Literacy Education** - Within the Literacy Education program area the largest program is Energy Express, a summer program that promotes school success of children living in low-income communities by providing summer learning experiences and an ethic of service among college students and community members. This category also includes the Reading Partner initiative.

**Science, Technology, Engineering and Math** - Within the STEM program area, educational activities included topics related to the environment, energy, forestry, agriculture, animals/agriculture, technology and engineering, the biological sciences, and the physical sciences. A feature program in this area is the STEM Ambassador program which trains college students with STEM majors in pedagogy skills related to their field, and then places them in a 4-H state camp during the summer where they teach STEM related subjects and mentor campers who are interested in STEM careers. There were 231 activities in this area in 2015.

**Healthy Lifestyles** - Many youth activities related to healthy living are reported in the Nutrition and Childhood Obesity section. The ones reported in this section are mainly those related to safety including ATV safety, shooting sports, risk prevention programs such as Health Rocks and PROSPER, and sport safety. There were 206 activities in this area in 2015.

**Adult Leadership Development for Youth Activities** - WVU Extension faculty members train adults to work with youth in West Virginia. These programs train club leaders, camp counselors and staff. Some educational activities include camp counsellor training, Energy Express mentor and site coordinator training, and volunteer leader training. There were 334 activities in this area in 2015.

### WVSU-GRDI

Youth program content is focused on science, agriculture, expressive arts, mentoring and citizenship. Summer camps are designed to increase youth's interest in pursuing degrees and careers in STEM fields. Junior Master Gardener programs improve knowledge on and increase interest in on agriculture.

Highlights for 2015 include:

- The Health Sciences & Technology Academy (HSTA) Summer Forensics Institute improved youth's interest in pursuing STEM and healthcare careers as well as a desire to pursue a college degree.
- Youth with mentors reported increased levels of self-efficacy.
- Youth in agriculture programs demonstrated increased knowledge on growing produce and retained knowledge on information regarding nature as it relates to animals and plants.

## 2. Brief description of the target audience

Children ranging from preschool to 8 years of age. Youths 9 to 21 years of age, primarily in 4-H programs. More than 85,000 youth are 4-H members and more than 6,000 adult volunteers work directly and indirectly with them. Volunteer and adult workers will be the focus of professional development and program sustainability.

## 3. How was eXtension used?

4-H and Youth Development agents found information and resources on food safety, science for youth, and child care.

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

#### 1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	24486	602	216848	8376

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

##### Patent Applications Submitted

Year: 2015  
Actual: 0

#### Patents listed

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

##### Number of Peer Reviewed Publications

2015	Extension	Research	Total
<b>Actual</b>	3	7	10

### V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Number of general press articles

<b>Year</b>	<b>Actual</b>
2015	130

**Output #2**

**Output Measure**

- Number of educational materials create or updated

<b>Year</b>	<b>Actual</b>
2015	78

**Output #3**

**Output Measure**

- Number of workshops and other educational presentations for clients

<b>Year</b>	<b>Actual</b>
2015	1189

**Output #4**

**Output Measure**

- Number of professional/academic presentations

<b>Year</b>	<b>Actual</b>
2015	106

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

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

O. No.	OUTCOME NAME
1	Number of youth participants who improve or increase skills in STEM subjects including agriculture and gardening skills.
2	Number of youth who report positive interests in science and/or an interest in pursuing a health, science, or technology-related career.
3	Number of youth participants who improve or increase leadership, communication, or citizenship skills.
4	Number of youth who increase their appreciation for cultural diversity and respect for other cultures.
5	Number of youth who improve or increase healthy living skills including consuming healthy foods and engaging in physical activity.
6	Number of youth who increase or improve their literacy skills.
7	Number of youth who increase knowledge and skills about risky behavior avoidance.
8	Number of youth who participate in service learning activities, community activities or issues.
9	Number of youth who express an interested in engaging in service learning activities, community activities and issues later in life.
10	Number of youth who engage in safety practices.
11	Number of youth participants who use a new skill that they learned in a 4-H activity.
12	Number of youth attending expressive arts programs who demonstrate mastery of their creative art.
13	Number of youth who improve their grade point average or other assessment score related to academic achievement.
14	Number of youth who gain an appreciation for their own heritage and who learn from the past.
15	Number of individuals who have received early childhood literacy kits to help them read to small children

**Outcome #1**

**1. Outcome Measures**

Number of youth participants who improve or increase skills in STEM subjects including agriculture and gardening skills.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	123339

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

**Issue (Who cares and Why)**

Waning interest in science, technology, engineering, and mathematics (STEM) disciplines is especially problematic in a state like West Virginia where only 17% of the predominantly rural population have a Bachelor's degrees or higher, the lowest rate of any state. Given the lack of parents and local employers with STEM degrees, West Virginia students have fewer role models in these fields, leading to limited knowledge of STEM career opportunities and the steps needed to pursue them. In addition, West Virginia students are ranked at the bottom of nearly every national metric for science and math preparedness (The Science and Engineering Readiness Index (SERI), National Assessment of Educational Progress.

**What has been done**

WVSUES and WVUES provide youth with hands-on learning experiences in the STEM fields. The WVSU youth agriculture programs, SCRATCH, 4-H PLANTERS and 4-H GROWTH aim to connect the community with research-based knowledge, emerging horticulture issues. WVUES agents also teach youth at the HSTA Summer Forensic Institute. WVUES has conducted more than 250 STEM activities in 2015. Topics include: Geocaching, GPS Technology, Natural Camouflage, Solar Prints, Marshmallow Catapult, and Air Rockets. Special day long and repeated activities include: 4-H National Youth Science Day, Lego League Team, 4-H Robotics Club, and Discover Engineering Day.

**Results**

Youth from across the state of WV gained knowledge and skills related to science, technology, and engineering subjects.

100% of HSTA participants displayed increased skill in the laboratory on topics including DNA Analysis, fingerprinting, and chromatography.

Youth and adults in the SCRATCH, 4-H PLANTERS, and 4-H GROWTH programs displayed an

increased interest in reading about agriculture.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #2**

**1. Outcome Measures**

Number of youth who report positive interests in science and/or an interest in pursuing a health, science, or technology-related career.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1872

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

**Issue (Who cares and Why)**

Waning interest in science, technology, engineering, and mathematics (STEM) disciplines is especially problematic in a state like West Virginia where only 17% of the predominantly rural population have a Bachelor's degrees or higher, the lowest rate of any state. Given the lack of parents and local employers with STEM degrees, West Virginia students have fewer role models in these fields, leading to limited knowledge of STEM career opportunities and the steps needed to pursue them. In addition, West Virginia students are ranked at the bottom of nearly every national metric for science and math preparedness (The Science and Engineering Readiness Index (SERI), National Assessment of Educational Progress (NAEP)).

**What has been done**

WVUES conducts the STEM Ambassador Program to provide state youth with opportunities to engage in hands-on science, technology, and engineering projects during the summer camping season. WVU undergraduate students pursuing STEM degrees, are trained in pedagogy and curricula before spending 4-6 weeks teaching in 4-H summer camps. Through the STEM Ambassador Program, 15 hours of STEM activities were conducted per week in each of 24 camp settings by college students majoring in a STEM field.

**Results**

Pre- and post-surveys were distributed to youth participating in summer residential or day camps with a STEM focus which asked: "Have you ever considered studying science after you graduate from High School?" and "Have you ever considered pursuing a career in a STEM related field?" The number of campers who said that they would study science after high school increased from 79 to 111. The number of campers who said that they would consider a career in science increased from 89 to 211. In both cases the number of no answers decreased considerably from 1204 to 814 on the first question and 1301 to 706 on the second question.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #3**

**1. Outcome Measures**

Number of youth participants who improve or increase leadership, communication, or citizenship skills.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	278

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

**Issue (Who cares and Why)**

In today's society, youth are in need of continuous experiences and opportunities that are developmentally appropriate for their age and stage in life. This is especially important for those youth ages 13-19 as they move towards self-discovery. Developing a strong sense of personal identity, responsibility, caring, compassion and tolerance are essential first steps for any individual to be fully engaged in any societal level.

**What has been done**

4-H Teen Leaders. State 4-H Teen Leader/Charting Weekend (TLW) is a state 4-H event where youth increase their leadership skills, advance their personal development and gain knowledge of 4-H Teen Leaders. Teens gain subject knowledge and skill in teamwork, leadership, accepting differences, communication and responsibility; confidence in using the skills learned and the ability to teach the topic to others.

**Results**

278 youth participated in 4-H Officer's Training Workshops and then went on to assume leadership roles in their 4-H community clubs. The officer roles included President, Vice-President, Secretary, Treasurer and various committee or function area chairs.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #4**

**1. Outcome Measures**

Number of youth who increase their appreciation for cultural diversity and respect for other cultures.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	399

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

**Issue (Who cares and Why)**

Global education has increased significantly, in importance and prominence, for youth and adults over the last decade. Not only are we learning about the world through new technology, we are also interacting with it. Being fully immersed in the 21st century has placed new importance on understanding diversity and cultures other than our own.

**What has been done**

WVU has a number of 4-H programs that enhance global education for Extension faculty, staff, and volunteers, and clientele including exchanges, workshops and special activities. Examples include "Global Awareness," and exchange student presentations for Africa, Central Asia, and China. Classes on diversity education are also offered.

**Results**

Participants have reported:

- Enhanced capability of Extension faculty and staff to prepare West Virginia citizens to succeed

and live responsibly in the global society.

- Increased understanding of the concerns, beliefs, and possible responses to citizen reactions to various international and domestic challenges related to global conflict; trade and competition; environmental and safety standards; and intolerance and discrimination in West Virginia, the U.S., and abroad.

- Being better-prepared to respond to the needs of communities, businesses, workforce, farmers, children, youth, and families affected by cultural diversity and global interdependence.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #5**

**1. Outcome Measures**

Number of youth who improve or increase healthy living skills including consuming healthy foods and engaging in physical activity.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	4500

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

**Issue (Who cares and Why)**

Overconsumption of sugar sweetened beverages (SSBs) is a national health concern. Studies have shown that high levels of consumption of added sugars from liquid sources predicts higher increase in blood glucose levels and insulin resistance compared to added sugars from solid sources. There is a clear link between SSBs and overweight and the development of type II diabetes, dental caries, and certain types of cancer. West Virginians tend to have higher rates of chronic health conditions and poor mental health, and have less disposable income, which affirms the urgency for West Virginians to reduce SSB consumption.

**What has been done**

Throughout spring of 2015, team members created a "Rethink Your Drink @ Camp Kit? for 4-H and other camp programs. A RYD 4-page Leader's Guide and 2-page Handout were developed

for adult audiences. A mascot, "Quench," was adopted for the campaign for appearances at events. A RYD "jingle" for use in radio and other media was created. 110 WVU Extension agents and Nutrition Outreach Instructors were trained in the curriculum. Fifteen other presentations were conducted. Approximately 4,500 youth were reached in camping efforts.

**Results**

On a post-camp survey:

- Two-thirds (65.3 %) of campers strongly agree/agree with the statement "I drink more water."
- An even greater percentage (81%) strongly agree or agree with the statement "I drink less sugar sweetened beverages."

- 104 campers said that they would either drink more water or would drink less sugary drinks.

The comments were spontaneous and open-ended, and not selected from a list.

- When comparing 4-H campers who were part of the RYD program with those who were not part of it, a higher percent (68%) of those who were part of RYD agreed or strongly agreed with the statement "I drink less sweetened beverages?" than did those who did not participate in the program (64.4%).

**4. Associated Knowledge Areas**

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

**Outcome #6**

**1. Outcome Measures**

Number of youth who increase or improve their literacy skills.

**2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	341

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

**Issue (Who cares and Why)**

Scientific literacy is "the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. Youth in WV need to be able to read and understand scientific literature in order to

succeed in a variety of occupations and to understand current events and issues.

**What has been done**

WVUES connects the community with research-based knowledge, emerging horticulture issues. In partnership with faculty members at West Virginia State University, WVUES uses gardening success as a tool for enhancing environmental and scientific literacy, building community and promoting human well-being. Programming includes after-school, in-school, and summer based enrichment opportunities. One program designed to increase scientific literacy is the GROWTH program.

**Results**

After completion of the GROWTH program, youth and adults have displayed an increased interest in reading and agriculture.

Students have demonstrated gains in knowledge on topics related to nutrition, gardening, and nature as well increased their interest in reading books related to these topics. Pre- and post-surveys have shown an increase in knowledge in the same areas.

**4. Associated Knowledge Areas**

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

**Outcome #7**

**1. Outcome Measures**

Number of youth who increase knowledge and skills about risky behavior avoidance.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	12080

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

**Issue (Who cares and Why)**

In WV, 19% of high school students smoke cigarettes, 14% use chewing tobacco, snuff, or dip (which is much higher than the national average), 19% drank alcohol for the first time before the age of 13, and 34% had at least one drink on at least one day during the previous 30 days. WV Extension educators are committed to help youth understand influences and health consequences of tobacco, drug, and alcohol use to make healthy choices.

**What has been done**

In West Virginia, a total of 12,080 youth completed 10 hours or more of training in Health Rocks! Of that total, 43.1% were boys and 56.9% were girls.

**Results**

After program participation:

?Eight out of ten youth participants reported knowing that people who smoke or do drugs can have serious physical health, cognitive, and relational consequences.

?Over 87% disapproved of engaging in risky behaviors related to substance use.

?Most participants reported intent to avoid underage tobacco use, and positive health-related behavior change.

?They expressed confidence that they would be able to say ?no? if other people, such as their friends or peers, offered them drugs.

?They would not choose drinking or smoking to deal with stress.

?Over 87% of youth participants were confident that they would be able to deal with stress by using stress management skills, such as talking about their problems with someone they trust.

**4. Associated Knowledge Areas**

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

**Outcome #8**

**1. Outcome Measures**

Number of youth who participate in service learning activities, community activities or issues.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	80

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

In a survey conducted with 4-H members who participated in forums and workshops on community service, 98% indicated that they planned to be active in community service throughout their lifetime. The role of 4-H is to expose youth to service and to train them to work with others on service activities.

#### What has been done

Eight teams of youth (ranging in size from 5 to 11) studied community needs and selected a project to address one of those needs. The youth interviewed community members, designed a service project and are currently in various phases of implementing the projects. For example, in Wayne County, the team selected a beautification project that would promote tourism. They created barn quilts and had them mounted in various locations throughout the county.

#### Results

Projects have received local, state and national recognition.

4-H members learned to design a service project

4-H members learned to work with community members to implement service projects

4-H members learned the value of community work to the well-being and economy of their communities.

### 4. Associated Knowledge Areas

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

#### Outcome #9

##### 1. Outcome Measures

Number of youth who express an interested in engaging in service learning activities, community activities and issues later in life.

Not Reporting on this Outcome Measure

#### Outcome #10

##### 1. Outcome Measures

Number of youth who engage in safety practices.

##### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	2017

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

**Issue (Who cares and Why)**

Helmets reduced the risk and severity of head and neck injuries without increasing risky behavior in youth participating in high risk sports or activities, researchers found. Youth participating in activities where there is a risk of head trauma should wear helmets to reduce incidence and severity of injuries, the researchers wrote online in The Journal of Trauma and Acute Care Surgery (2013).

**What has been done**

The importance of helmet use was covered with youth taking ATV Safety courses, Bike Safety courses and 4-H Horse projects. Youth are required to report on their helmet use when they complete their project. A total of 2,017 of these reports were completed in 2015.

**Results**

In the final reports 85% of the youth reported wearing a helmet every time they engaged in their project activity. 15% reported wearing a helmet ?most of the time? when they participated in their activities.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #11**

**1. Outcome Measures**

Number of youth participants who use a new skill that they learned in a 4-H activity.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	1195

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

**Issue (Who cares and Why)**

The National Institute of Food & Agriculture (NIFA, 2013), states that too many people experience financial crisis because of inadequate savings, too much debt, and poor planning. In the last decade the incidents of personal bankruptcy rose by 69%. Furthermore, more than half of Americans report living paycheck-to-paycheck. Financial programs for youth give young people the knowledge, skills, and motivation to build financial security.

**What has been done**

The Reality Store program materials came from the University of Kentucky Cooperative Extension and were updated to reflect West Virginia taxes, costs, and prices. The program uses simulation exercises to help students look ahead and determine how they will manage finances. Students are given a career and monthly salary, marital status, and number of children. Jobs range from those that require a high school education to those requiring a college degree. Students visit 19 stations (ex. transportation, housing, utilities, etc.) where they make financial decisions. The program was delivered at 8 schools, reaching 1195 students.

**Results**

Participants indicated on their evaluations that they increased their understanding of the following: the need to budget your money (77%); what it costs to maintain a household (80%); importance of wise financial choices (80%); what it costs to raise a child (77%); the education required to get a job (82%); how the type of job affects how much money you make (81%); making career choices (81%); the importance of staying in school (80%); the importance of education after high school (80%). Because of this program, schools in the county have asked for more follow-up.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #12**

**1. Outcome Measures**

Number of youth attending expressive arts programs who demonstrate mastery of their creative art.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	1000

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

**Issue (Who cares and Why)**

The expressive arts "visual arts, movement, drama, music and writing" offer countless ways to promote the academic, career and personal/social development of students, which are goals of a comprehensive youth development program. Although research in this area is new, the results of available studies are encouraging. For example, according to research conducted by Michael Mason and Susan Chuang in 2001, students participating in out of school arts programs showed increases in self-esteem, social skills and leadership.

**What has been done**

A number of creative activities including heritage crafts, writing and journaling, art, theater and music courses were taught at each of the three state 4-H camps. The Drawing Academy was also held last summer on the campus of WVU. This one-week specialty camp is held in cooperation with the WVU College of Creative Arts.

**Results**

69% (N=637) taking a creative course reported learning at least one new thing.  
23% (N=213) 4-H youths reported that they had reached mastery.

**4. Associated Knowledge Areas**

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

**Outcome #13**

**1. Outcome Measures**

Number of youth who improve their grade point average or other assessment score related to academic achievement.

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2015	1535

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

**Issue (Who cares and Why)**

During the summer months, children are most at risk for falling behind on reading levels -- a preventable loss known as the "summer slide." Summer reading programs are most effective when they are fun and when they occur in a safe, enriching environment focused on reading, writing, art and drama.

**What has been done**

Energy Express, a summer reading program, supports communities that identify the effects of the "summer slide" and nutritional loss as a priority. Local key stakeholders unite and build collaboratives to support the establishment and implementation of Energy Express sites. Through the efforts of WVUES faculty and staff, 74 communities successfully implemented the Energy Express Program in 2014. Approximately 2500 children participated at 71 community sites across the state with 2,075 attending at least 50% of the program days.

**Results**

Children showed significant increases in letter-word identification, reading fluency, passage comprehension and broad reading.

Seventy four percent of children either maintained (69.7%) or increased (4.3%), and the average child gained 2.8 months in broad reading achievement.

**4. Associated Knowledge Areas**

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

**Outcome #14**

**1. Outcome Measures**

Number of youth who gain an appreciation for their own heritage and who learn from the past.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	6445

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

**Issue (Who cares and Why)**

Many youth in West Virginia are unable to travel to WVU's Heritage area at WVU Jackson's Mill where they can experience demonstrations of life in Pre-Civil War Central Appalachia and learn what it was like to live in that time period, while relating it to modern day conveniences. These programs all follow the framework and logic model for the National 4-H Mission Mandate of Citizenship (Civic Education: History & Culture), and many of them also encompass parts of the other 4-H National Mission Mandates.

**What has been done**

WVUES conducted the History Hitting the Road program where staff and volunteers from the Heritage Area at WVU Jackson's Mill travel to schools, fairs/festivals, and other public events to conduct heritage programming. In 2015, History Hitting the Road provided direct programming to 225 youth at schools, 535 youth at West Virginia 4-H camps, 1660 youth at fairs/public events, and 4025 youth and adults at open fairs/public event. It included the following topics: butter making, toys & games, candle making, rope making, food preservation and delivery methods, animal skins and skulls identification and uses, and Appalachian jewelry making.

**Results**

6445 youth:

- ?increased their knowledge about life in Appalachia
- ?gained a greater understanding and appreciation for Appalachian history and heritage
- ?gained skills related to citizenship.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #15**

**1. Outcome Measures**

Number of individuals who have received early childhood literacy kits to help them read to small children

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2015	100

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

**Issue (Who cares and Why)**

Numerous studies have shown that literacy skills are key to educational attainment at all levels. Reading Partners was developed as a complete kit that service organizations or individuals could pick up and use with young people anywhere to help promote a love of reading and increase literacy skills.

**What has been done**

Reading Partners provides training in shared reading strategies that help to create a positive reading environment for a child to practice reading and comprehension skills. The goal of Reading Partners is to create a positive and safe reading environment that motivates children to want to read. Participants learn shared reading strategies, how children's literacy develops, how to select good books and how to encourage children to write about what they read.

**Results**

In 2015, 100 Reading Partners kits were distributed to school systems in southern WV to use with volunteers. Local Quota Club groups provided funds and volunteers to make this happen. The program is ongoing.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being

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

### External factors which affected outcomes

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

### Brief Explanation

Economic issues affect all units. The WVUES Director and other administrators have worked with county committees, some of whom are questioning Extension's place in their budgets. Cutbacks in university budgets affect funding of competing programs.

Changes in school schedules have made it a priority for Energy Express to try out new formats with shorter schedules. Government regulations regarding background checks and safety consideration always affect the risk management procedures of 4-H.

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

### Evaluation Results

#### WVUES

##### Energy Express

Children showed significant increases in letter-word identification, reading fluency, passage comprehension and broad reading.

Seventy four percent of children either maintained (69.7%) or increased (4.3%), and the average child gained 2.8 months in broad reading achievement.

##### ATV Safety

In the final reports 85% of the youth reported wearing a helmet every time they engaged in their project activity. 15% reported wearing a helmet "most of the time" when they participated in their activities.

##### Reality Store

Participants indicated on their evaluations that they increased their understanding of the following: the need to budget your money (77%); what it costs to maintain a household (80%); importance of wise financial choices (80%); what it costs to raise a child (77%); the education required to get a job (82%); how the type of job affects how much money you make (81%); making career choices (81%); the importance of staying in school (80%); the importance of education after high school (80%).

Because of this program, schools in the county have asked for more follow-up.

### STEM programs

Each GKVF STEM Ambassador was asked to input weekly impact data on a Drobox Excel file. The complete list of events, community partners, time frame, number of youth participants, age ranges, number of adult participants and/or volunteers, the activities presented, and success stories can be found in the supplementary data (R3). Totaling all six counties, 5,261 youth received direct STEM programming this summer at 81 total events over 149 days. This greatly exceeded our original estimates of 1,000 youth and 30 events in the original program goals. It is estimated that more than 700 hours of hands-on STEM activities were offered to youth in the GKVF service area as a result of this program. This significantly added to the overall impact data for the 2015 combined STEM Ambassador Program shown in Table 2.

### STEM Ambassadors

The STEM Ambassadors received both pre and post training surveys at the beginning and end of the summer. Ambassadors rated their abilities, preparedness, and teaching characteristics using a Likert-type scale with the following rating system: strongly disagree (1), disagree (2), unsure (3), agree (4), or strongly agree (5). Table 3 below shows the mean rating for each pre and post question as well as the percent change from the 15 ambassadors. The high percent change in the pre/post responses of these statements demonstrates that their pedagogical training was successful and the support given to the ambassadors during the program contributed to their growth as STEM educators.

#### **Question**

**Pre Avg.**

**Post Avg.**

**% Change**

I understand the 4-H mission.

3.39

3.83

11.6%

I am prepared to teach STEM programming in 4-H settings.

3.00

4.00

25.0%

I understand how to educate young people through experiential and inquiry-based learning strategies.

3.33

3.75

11.1%

I understand how to adapt my STEM lessons to fit a variety of needs and educational levels.

3.29

3.75

12.4%

I am prepared to serve as a representative of WVU Extension.

3.62

3.92

7.6%

I understand my role as a STEM Ambassador and the expectations associated with the position.

3.55

3.92

9.4%	I am aware of the diverse backgrounds and needs of the young people that I will encounter in 4-H programs this summer.
3.60	
3.83	
6.1%	I am able to identify the Essential Elements of Positive Youth Development.
2.94	
3.63	
18.9%	I'm able to use pedagogy strategies to keep youth interest and engagement while teaching
3.08	
3.55	
13.2%	I am able to provide NXT/EV3 training for young people.
2.50	
3.82	
34.5%	I am able to provide FabLab training for young people.
2.50	
4.00	
37.5%	I am able to provide WeDo Robotics training for young people.
2.57	
3.92	
34.3%	I am able to provide Simple Circuits training for young people.
2.40	
3.82	
37.1%	I am able to teach the Bubble-ology training for young people.
2.61	
4.00	
34.7%	I am able to teach the Geocaching to young people.
2.94	
3.70	
20.5%	I am able to teach the Nanoscience training for young people.
2.46	
3.83	
35.8%	I am able to teach Astronomy lessons to young people.
2.79	
3.83	
27.3%	I am able to teach young people about careers in STEM.
3.47	
3.92	
11.4%	

**Table 3:** Results to pre/post training surveys provided to ambassadors at the beginning

## **Key Items of Evaluation**

### WVUES

Almost all programs in this area are evaluated at some level. Most are evaluated with regard to participant satisfaction. Many are evaluated with regard to knowledge gained. Fewer are evaluated on the basis of participant behavior change. Almost all major programs have logic models that guide their evaluation strategies.

## VI. National Outcomes and Indicators

### 1. NIFA Selected Outcomes and Indicators

<b>Childhood Obesity (Outcome 1, Indicator 1.c)</b>	
16466	Number of children and youth who reported eating more of healthy foods.
<b>Climate Change (Outcome 1, Indicator 4)</b>	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
<b>Global Food Security and Hunger (Outcome 1, Indicator 4.a)</b>	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
<b>Global Food Security and Hunger (Outcome 2, Indicator 1)</b>	
0	Number of new or improved innovations developed for food enterprises.
<b>Food Safety (Outcome 1, Indicator 1)</b>	
0	Number of viable technologies developed or modified for the detection and
<b>Sustainable Energy (Outcome 3, Indicator 2)</b>	
0	Number of farmers who adopted a dedicated bioenergy crop
<b>Sustainable Energy (Outcome 3, Indicator 4)</b>	
0	Tons of feedstocks delivered.