THE GUS R. DOUGLASS
LAND-GRANT INSTITUTE
West Virginia State University
AGRICULTURAL, CONSUMER, ENVIRONMENTAL, & OUTREACH PROGRAMS

West Virginia State University

Annual Report of Accomplishments and Results

(FY 2006)

For Plan of Work FY 2005-2006

1890 Cooperative Research & Cooperative Extension

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DEAN AND DIRECTOR

Gus R. Douglass Land-Grant Institute
for Agricultural, Consumer, Environmental, and Outreach Programs

Annual Report of Accomplishments and Results
- FY 2006 -

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SECTION I. INTRODUCTION

Report Summary & Structure

The present document provides a report of the annual accomplishments and results achieved during the Federal Fiscal Year 2006 (FY 06) for West Virginia State University's research and extension programs conducted by the Agricultural and Environmental Research Station (AERS), and the West Virginia State University Extension (WVSUE) Units, respectively. The report is divided in three main sections: (I) Introduction, (II) Report on 1890 Research Programs, and (III) Report on 1890 Extension Programs. Each of the two reports has been structured by main goals and key program (themes) components. Invested resources, including personnel and financial allocations for each of the five national initiatives and key themes, is summarized in *Tables 1 and 2*, for both Research and Extension reports, at the beginning of each section.

Institutional Updates

West Virginia State University (WVSU) became fully reinstated as an 1890 Land-Grant Institution in November of 2001. However, the University began the reactivation of its research and extension programs in FY 2000. The Department of Land-Grant Programs was officially established on March 17, 2000 and charged with the mission of administering land-grant related research and extension programs. In order to better accommodate the growth of this unit and to better serve the University's constituents, the Department was elevated to a Division of Agricultural, Consumer, Environmental, and Outreach Programs (or Division of ACEOP) in 2003; and on March 15, 2006, the Division became **"The Gus R. Douglass Land-Grant Institute"**. The mission of the Institute remains that of delivering the institution's land-grant mission related to the dissemination of research, teaching, and extension services to the state's citizens.

Federal support has been one of the key success factors of the Institute. Formula funding for FY 2006 was maintained at slightly over $1 M for extension and research, respectively. More recently, state appropriated dollars, to meet the matching of its formula funding, have been infused in furthering the advancement of the University's Land-Grant Programs. In fact, the State Legislature appropriated in FY 2006 state dollars to meet the 90% match, and secured a line item within the institution's budget to meet the match in the years thereafter. As state appropriations and other federal and non-federal resources are attained, the University has now begun extending its presence, in relation to research and extension programming, to additional counties in the state.

Merit Review

The merit review process used to conduct land-grant related research projects follows the recommended steps in the research CSREES administrative manual. All new and existing research projects are subjected to the following criteria: (*1*) Submitted

proposals are complete per the guidelines in the Administrative Manual, *Appendix F*, (*2*) Proposals are relevant to society's food and agricultural needs, (*3*) The research proposals are scientifically sound, (*4*) Cooperative opportunities are encouraged whenever possible, (*5*) Project leaders are given ample opportunity to interact with reviewers in efforts to strengthen proposals, and (*6*) Documentation of compliance with these goals is kept on file and available to CSREES upon request.

Identified research stakeholders serve as advisors to evaluate the merit of research proposals. Each year, during the months of March and April, all programs are subjected to a review process. The process includes an internal and external evaluation. An oral presentation at the Annual Research Symposium is a key component of the overall annual evaluation and it is required for land-grant sponsored researchers. Stakeholders identified by the procedures outlined below are invited to the Symposium. The internal evaluation consists of an Office and/or Departmental appraisal by the executive staff. Additionally, all participants in land-grant sponsored research critically assess the research of fellow colleagues for developmental purposes. A research advisory panel conducts the external program evaluations. The research advisory panel consists of local scientists with a wide variety of backgrounds, business leaders and other appropriate stakeholders. The evaluations from these panels are utilized to help rank and allocate funds to specific land-grant programs. Evaluation assessing research productivity versus resources spent is included in the ranking of continuing projects to facilitate funding decisions for the next budget year.

Faculty Appointment Policy

The University's Gus R. Douglass Institute and the Academic Affairs Unit have in place an appointment system that allows existing faculty to participate in land-grant research funded activities. This appointment system also allows land-grant staff members to participate in the University's teaching activities. The system operates on a mechanism designed to exchange appointment time between the two Units. Furthermore, the University is currently considering to give those qualified staff members at the Institute (according to established criteria) faculty status. The Dean and Director has also developed along with the faculty status criteria, a plan which confers the Institute's qualified staff members tenure or continuing contracts similar to the ones used within the Academic Unit. When in place, it is expected that this faculty appointment system within the Institute bridges the land-grant programs with the academic activities, and facilitates the interaction and flow of faculty between both units.

Stakeholder Input and Environmental Scanning

West Virginia State University Extension continues expanding its presence in the State of West Virginia. The Institution's strategy of expansion, as it relates to the delivery of its land-grant programs, is based on an environmental scan and needs assessment. Assessing the needs and strengths of stakeholders (individuals and communities) allows our staff to identify high impact programs which are responsive to these critical needs. Extension Program Leaders and Specialists design programs that are

responsive to these needs and Extension Agents and Associates deliver these educational programs which address the challenges faced by our target stakeholders.

Information about stakeholders gathered via town hall meetings have proven essential to identify our community stakeholders needs. Each year, extension personnel hold a series of community forums and town hall meetings in our servicing areas. Feedback from stakeholders has shown the need for programs that address high unemployment, illiteracy among adults, teen pregnancy, inadequate nutrition, lack of activities for children and youth after school and the digital divide. Programmatic efforts in FY 2006 were directed toward these issues. Partnerships with community-based organizations have also been useful to retrieve information pertinent to the needs of our stakeholders. Additionally, West Virginia State University conducts biennial meetings with its advisory council to provide direct input into program development. The participants on this advisory body are representative of the five Extension program areas and many of the members are programmatic partners or participants

In relation to 1890 Research Programs, stakeholders are identified by several means: (*1*) Principal investigators of proposals must identify relevant WV stakeholders, (*2*) The research office staff canvas both WV industry officials and WV government agency representatives relevant to the proposal and select at least one of each to participate in the merit review of the proposed project, (*3*) The research office staff solicits public comment on proposed projects through media advertisements and open meetings, and (*4*) Finally, the Associate Director of Research constructs an advisory panel tailored to each proposal. The Associate Director of Research chairs the advisory panels, provides administrative support, including proposal evaluation instruments, and ensures that WVSU regulations regarding scientific validity and USDA regulations on merit review are followed.

Evaluation of Multi and Joint Activities

The University participates in multi state activities in both research and extension programs. The lead institution in multi or joint activities is responsible for evaluations. The leading institution's internal and USDA-approved policies and procedures are followed in the evaluation of multi or joint activities.

Collaborative Programs: 1862 & 1890 Institutions

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. More recently (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 in the areas of research and extension programming, and thus an efficient investment of human and financial resources within the State.

SECTION II
WVSU Agricultural & Environmental Research Station - AERS
(1890 Research Programs)

Table 1: WVSU AERS Programs: Summary of Resource Allocation by Goal and Program

1890 RESEARCH PROGRAMS (AERS)

ANNUAL ALLOCATION OF RESOURCES *(FY 2006)*							
NATIONAL GOAL / INSTITUTIONAL PROGRAM		FUNDING SOURCE					
Goal	*Program Area*	*Federal Formula*	*Federal Other*	*State Match**	*Other*	*TOTAL*	*SY's*
GOAL I							
Program 1.1	Agricultural Biotechnology	70,000	49,516	42,000	14,584	176,100	1.0
Program 1.2	Alternative Agriculture	105,685	23,940	52,843	813	183,281	1.0
Program 1.3	Aquaculture	160,000	0	96,000	0	256,000	1.5
Program 1.4	Plant Genomics	185,000	154,526	111,000	78,904	529,430	2.50
	Total	**520,685**	**227,982**	**301,843**	**94,301**	**1,144,811**	***6.00***
GOAL II							
Program 2.1	Food Quality and Safety	0	0	0	0	*0*	0
	Total	**0**	**0**	**0**	**0**	***0***	***0.00***
GOAL III							
Program 3.1	Human Health and Nutrition	0	0	0	0	*0*	0
	Total	**0**	**0**	**0**	**0**	***0***	***0.00***
GOAL IV							
Program 4.1	Natural Resource Management	79,254	26,401	47,552	0	153,207	1.00
Program 4.2	Environmental Microbiology	475,370	673,524	256,518	0	1,405,412	5.50
	Total	**554,624**	**699,925**	**304,070**	**0**	**1,558,619**	***6.50***
GOAL V							
Program 5.1	Regional Economic Forecasting	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	***0.00***
	GRAND TOTAL	***$ 1,075,309***	***$ 927,907***	***$ 605,913***	***$ 94,301***	***$ 2,703,430***	***12.50***

***** *State match appropriations spent between October 1, 2005 thru June 30, 2006*

WVSU AERS (1890 Research) Overview

West Virginia State University has worked diligently to establish land-grant related research programs that are responsive to the critical needs prevailing in the state. The University continues to implement and advance reputable programs within the scientific community. However, the University is still in great need to develop infrastructure and research capacity. With the assistance of additional funding such as facilities and capacity building programs, state and private funding, the institution is positioning itself as an important research player in the state. The funding received for fiscal year 2006 was devoted to advance the institution's 1890 research programs and to build research capacity. Qualified scientists have been developing research programs that are congruent with the institutional plan of work and strategic plans. *Table 1* provides a

summary of the level of effort for the 1890 research programs as it relates to the allocation of resources by goal and program. The following sections present with greater detail the accomplishments for each goal and programs established in the institution's plan of work for fiscal year 2006, and an account of program impacts by goal and program area.

Goal 1: To achieve an agricultural production system that is highly competitive in the global economy

Executive Summary:

(A) Several research projects are addressing issues to improve the competitiveness of WV agriculture. Part of the WVSU biotechnology research efforts has been devoted to determine the fundamental biochemistry of proteins that have agronomic importance. Understanding the structure and functional relationships of key proteins in crop plants will result in the identification of biochemical targets that modify crop growth and development – establishing the basis for improved agricultural products. WVSU aquaculture research has diversified into several projects including formulating aquaculture feeds from digested poultry litter and assessments of the effects of diet on both cold and warm water fishes. A project involving plant genomics was initiated in 2003. It focuses on developing new greenhouse tomato varieties for the southern US growers. The application of DNA marker technology for genetic improvement of pepper and watermelon is essential for genetic mapping and for gene manipulation. A gene mapping project focuses on building extensive genomic resources for these crops and identifying germplasm with disease and pest resistant genes.

(B) These projects have not fully completed their research goals as they are continuing. Moreover, local growers and producers are aware of our research efforts on their behalf. Grower and/or producer feedback and needs continue to guide future planning, as it relates to research efforts. These activities are refining and focusing our efforts and should bring improvements resulting in more competitive WV agriculture.

(C) All of the established research programs (projects) are showing benefits to clientele and stakeholders. Furthermore state producers are now aware of WVSU's research activities and they recognize the potential to improve their agricultural activities

(D) Some of the short-term outcomes have been documented, however due to the newness of these programs other long-term outcomes are still being effected.

(E) Resource Allocation:

Total Invested:	$1,144,811
Formula Funds:	$ 520,685
Scientific Years:	6.00

Research Program 1.1: Agricultural Biotechnology

Project 1: Agricultural Biotechnology

Description: The program involves fundamental research in biochemistry of proteins of agronomic interest. The initial studies will focus on Rubisco (the carbon dioxide fixing enzyme in photosynthesis). Novel information on structure function relationships of Rubisco could be used to increase the yield of numerous crops. The initial project includes cloning, expressing isolating and characterizing Rubisco, understanding the dynamics of protein substrate specificity and catalysis, identifying the critical protein sequence on activity and creating and characterizing a novel Rubisco. Studies will be expanded to determine if Tryptophan monooxygenase (TMO) from Agrobacterium tumefaciens (responsible for crown gall disease in plants) is amenable to investigations already developed with rubisco.

a) **Results**. Laboratory infrastructure is limited to the point that assays on Rubisco have not been feasible. Therefore, investigations were initiated on another protein-Tryptophan monooxygenase from Agrobacterium tumefaciens. It is a plant pathogenic organism responsible for crown gall disease that affects many crops especially woody ornamentals and grapes. The authentic bacterium has been obtained from Dr. Peter Christie (University of Texas- Houston) and it has been prepared for cloning.
b) **Successes Resulting in Change** (Outcomes): No outcomes to report at this time.
c) **Stakeholder Benefits** (Impacts): No impacts at this time.
d) Assessment of Accomplishments: This project is progressing and should be continued.
e) Source of Expenditures & Impact Scope:
Funding Source- Evans-Allen (Section 1445); State Match; Dow Chem. Co.
Scope of Impact- State-specific, 1890 Research

Research Program 1.2: Alternative Agriculture

Project 1: Alternative Crop Production

Description: Alternative agriculture products and practices, such as organic farming and exotic plant and animal production, are becoming an important component in North American agriculture. Due to the expansion and domination of large agribusiness corporations, small farms are unable to remain competitive in both traditional crop production and marketing. However, alternative approaches to growing traditional crops and the production of new or exotic species not currently grown on a large-scale commercial basis in the USA can provide a greater return on small farms investment compared to traditional products and practices. In areas such as southern West Virginia, with economic instability due to the transition from an industrial and forestry based economy to a service and technology based economy, income from small farms could provide an important source of income for landowners in these regions. An

alternative to conventional crops and practices will help develop new and niche markets for plants and animals in high demand but limited supply. Other potential areas of alternative production include organic farming, ornamental and herb production, and hydroponic plant production.

a.) **Results**:
Liedl, B. E., J. Bombardiere and J. M. Chatfield. 2006. The fertilizer potential of liquid and solid effluent from thermophilic anaerobic digestion of poultry waste. *Water Science and Technology*, 53 (8) 69-79.

Subcontract from a USDA-OREI project entitled "The Organic Seed Partnership" with Cornell will fund organic variety trials with WV farmers for the next two years.

b.) **Successes Resulting in Change** (Outcomes):

1) WV farmers are involved with organic variety trials as part of the "Organic Seed Partnership"
2) Maryland Department of Agriculture and the Chesapeake Bay Foundation attended a special meeting with WVSU staff. Results from fertilizer experiments using digested poultry manure. These groups are considering waste management options for poultry farmers in Maryland and nutrient management implications.

Stakeholder Benefits (Impacts): A digester engineering firm has used the results of this research to forecast the economic value of the liquid and solid effluent from proposed commercial digesters.

c.) **Assessment of Accomplishments**: The projects are progressing and should be continued.

d.) **Source of Expenditures & Impact Scope:**
Funding Source-

1. Evans-Allen (section 1445) 2003-2005
2. Bioplex Phases 4 & 5 2004-2005
3. USDA OREI-OSP subcontract from Cornell 2004-2007

Scope of Impact- State, Regional, National, International

Research Program 1.3: Aquaculture

***Project 1**: Aquaculture: Utilization of Protein from Thermophilic Anaerobic Digestion of Poultry Wastes in Fish Diets*

Description: Effluents from thermophilic anaerobic digestion include significant amounts of microbial protein that can be used as a potential feedstock. Since the cost of feed represents one of the highest costs for the aquaculture industry, efforts to improve feed efficiency are necessary for continued economic growth. Furthermore, feeds with proper nutritional characteristics will ultimately be more environmentally friendly. The objective of this project is to determine if microbial protein, recovered from

the digester may be feasibly used as a supplement in fish feeds. The experimental goals were to determine the feasibility of utilizing recovered protein from treated poultry wastes as dietary supplement of rainbow trout and to establish acceptable and optimum dietary levels of recovered protein from treated poultry wastes as dietary supplement of rainbow trout and channel catfish.

a) **Results**: Feeding trials for the evaluation of protein from the anaerobic digestion of poultry litter are in progress. A novel screen separation technology has been developed to purify digester proteins from liquid fractions and high fiber fractions. These proteins are being collected for feed formulation trials. The purification system for water supplied to experimental aquaria has been reengineered to deliver higher quality water thus extending the treatment duration of experiments.
b) **Successes Resulting in Change** (Outcomes): This work has generated broad interest in the aquaculture research circles. At various professional meetings, several scientists have requested information to attempt related experiments in their aquaculture production systems. A stakeholder (Mid-Atlantic Technology Research and Innovation Center) specializing in biotechnology development has agreed to evaluate more economic ways to concentrate and purify microbial protein from anaerobic bioreactors.

   Stakeholder Benefits (Impacts): No impacts to report at this time.
c) **Assessment of Accomplishments**: The project is successfully progressing and will be continued.
d) **Source of Expenditures & Impact Scope**:
   Funding Source-USDA/ CSREES Federal Administration Research Grant, Evans-Allen (Section 1445)
   Scope of Impact**-** State-specific, 1890 Research

***Project 2**: Aquaculture Waste Control and optimizing Nutrient Utilization through Diet Composition and Feeding Strategies*

Description: WVSU is developing aquaculture related research that addresses fish feed efficiency while minimizing pollution thereby effectively controlling waste associated with aquaculture production. The objectives of this program are to (1) determine the effects of feeding practices on waste load in trout culture systems and determine the effects of dietary supplementation of various zeolites on growth, feed efficiency and health of rainbow trout, (2) identify and develop cheaper alternative protein sources and/or improving the efficiency of nutrient utilization. The efficient utilization of feed for growth and meat production is key to economic aquaculture. Feed efficiency (FE, weight gain to feed) or feed conversion ratio (FCR, feed to weight gain) is a composite measure that combine feed intake with growth rate to estimate effectiveness by which feed is converted into saleable meat product. Thus, FE or FCR is a major determinant of the production efficiency. Investigations of the mitochondrial biochemistry behind this phenomenon are in progress. Two feeding trials are currently underway to generate preliminary data on the relationship between mitochondrial function and feed efficiency in channel catfish.

a) Results:

Publications:

1 Three manuscripts are in preparation and they are as follows:

Eya, J.C. 2007. Effects of Zeolites (BENTONITE) on the Performance of Juvenile Rainbow Trout.

Eya, J.C., A. Parsons, I. Haile and P. Jagidi. 2007. The impact of feeding strategy, dietary phosphorus and varying protein/fat contents on juvenile rainbow trout growth performance and waste output.

Eya, J.C., A. Parsons, I. Haile and P. Jagidi. 2007. Comparison of the Effects of Various Kinds of Zeolites on Growth, Body Composition, and Waste Output in Juvenile Rainbow Trout *Oncorhynchus mykiss*.

b) Successes Resulting in Change (Outcomes): Partnerships were established between scientists at WVSU, and the USDA Agricultural Research Service. Drs. Chhorn Lim and Ahmed Darwish, USDA Agricultural Research Service, are collaborating with WVSU on a project that was submitted for extramural funding. Dr. Lim is a renowned fish nutritionist who has worked at the USDA Aquatic Animal Health Research Unit for several years investigating the role of nutrient/disease interaction. Dr. Darwish is a fish pathologist and research microbiologist at Stuttgart National Aquaculture Research Center and has worked on the histopathology and pathogenesis of some fish diseases. This project will create a partnership between the USDA cooperators, Drs. Lim and Darwish, and the WVSU team that should strengthen and enhance the programs at both institutions.

c) Stakeholder Benefits (Impacts): No impacts to report at this time.

d) Assessment of Accomplishments: The project is progressing and should be continued.

e) Source of Expenditures & Impact Scope:

Funding Source- Evans-Allen (Section 1445)

Scope of Impact- State-specific, Integrated 1890 Research & Extension, 1890 & 1862 Collaboration

Research Program 1.4: "Plant Genomics"

Project 1: *Plant Genomics Evaluation, Enhancement and Breeding of Greenhouse Tomatoes*

Description:

The greenhouse tomato industry in North America accounted for 37% of fresh tomato sales compared to 10% in 1999. In addition, greenhouse production area has grown by almost 600% from the early 1990s to 2003. This rapid growth in demand has lead to declining prices, which challenges US growers to be profitable. Greenhouse production of tomatoes (*Solanum lycopersicum* L., formerly *Lycopersicon esculentum* Mill.) is best with varieties bred for greenhouses. Field varieties are used in some locations, but their

determinate plant growth habit makes them difficult to preserve over an extended growing season and they require higher light and lower humidity than greenhouse varieties. In addition, the controlled environment conditions of greenhouse production generate higher yields from varieties bred for the greenhouse than the field varieties.
To be competitive, greenhouse tomato producers need to offer a better quality produce at lower production costs. However, production costs increase and profits drop with every pesticide spray that is applied. Consumers also complain about the lack of acceptable sensory qualities in greenhouse tomatoes. An alternative would be to transfer sources of resistance or regions of the genome associated with organoleptic traits already identified in field tomato germplasm into greenhouse lines. In addition, most greenhouse tomato varieties used are bred for the European environment, which selects plants with a lower light requirement and a more moderate temperature than is found in North America. As such the current greenhouse varieties are not as adapted to our environmental conditions. In production, good management practices and variety choice can limit most insect and diseases problems, except white fly and late blight. White flies are difficult to eliminate with chemical or biological methods. However, germplasm with a broad-spectrum insect resistance is being developed at Cornell University that would allow development of varieties with resistance to the majority of pests in the tomato crop, including white fly. The other increasingly significant problem in tomato production is late blight caused by *Phytophthora infestans*. Useful sources of resistance have been identified and transferring of the resistance from two sources to cultivated tomato has been accomplished. Field-testing of the late blight resistant material has been done and current work is developing molecular markers to assist in selection for the resistance genes in breeding programs. Recent advances in molecular biology have identified genomic regions responsible for several insect and disease resistant traits and some of the organoleptic traits. These are being transferred to field and processing tomatoes but could also be moved into greenhouse germplasm. Our first step will be to identify promising lines that could be used in developing new greenhouse varieties that are adapted to North America and have superior insect, disease and organoleptic traits.

a) Results: The feasibility of using DNA markers to follow selected breeding traits in cultivated tomato lines is in progress. Collaboration with Drs. Joanne Labate and Angela Baldo of the USDA ARS Plant Germplasm Resource Unit (PGRU) at Geneva, NY was established to evaluate the use of their CAPS markers on our tomato lines. Another joint effort with Dr. David Francis of Ohio State University, OARDC, Wooster, OH will determine the possibility of using his makers that have been successfully applied to cultivated tomato germplasm. Tomato fruit data collected from the 2005-2006 breeding program has been analyzed and compared to 2004-2005 data. In short, for fruit characters studied to date, greenhouse lines produce the earliest and most reliable amount of large or extra large fruit. However field lines produce the fruit that are the heaviest or have the highest sugar content. Thus, growers require lines developed specifically for greenhouse production, but with some of the traits of lines developed for field production (high weight and sugar content). Crosses were accomplished in spring 2006 and seed harvested. An inventory of seed produced from crosses and open pollination has been inventoried and placed in a computer data management system.

The seeds for 2006-2007 breeding plan were planted the first week of September and transplanted in December. Over 250 plants are present representing current greenhouse cultivars, heirloom varieties, determinate field cultivars and breeding germplasm from NCSU and Cornell University. In addition, four crosses between late blight resistant material and heirloom varieties are also being evaluated. Tissue was harvested off of the new varieties or germplasm planted in the fall of 2006 and placed in -80 storage for future DNA extraction. Collaboration with Ed Cobb at Cornell University is assessing particular tomato hybrids for a better tasting tomato with some firmness and a good plant type. The tomato fruit will be evaluated for both taste and flavor.

b) Successes Resulting in Change (Outcomes): This work is in the process of developing to the extent it can be translated to extension or outreach programs. However, public presentation of the research and establishment of collaborations with WV farmers or growers and other researchers has made institutional endeavors better known to WV farmers/growers and the scientific community.

c) Stakeholder Benefits (Impacts):

1) Evaluated new greenhouse cultivars for local growers.
2) Field varieties do not perform as well in greenhouse production, thus it is imperative to transfer desired traits from field lines into greenhouse lines to benefit growers.
3) Laboratory space allows the project to move into the areas of genomics, testing of plant pathogens and quantification of various compounds of interest.
4) Greenhouse environmental control system and insect/disease scouting allow better plant growth for research and can be used as a model to growers, especially since we use environmentally friendly chemicals (almost organic conditions).

Collaboration with other institutions connects us and our stakeholders to other research programs, potential collaborations and new technology. No impacts to report at this time.

d) Assessment of Accomplishments: The project is progressing and should be continued.

e) Source of Expenditures & Impact Scope:

Funding Source- Evans-Allen (Section 1445)
Scope of Impact- State, Regional and National

Project 2: *Development and Characterization of Molecular Markers for Genetic Improvement of Pepper, Watermelon, Other Cucurbits and Cotton*

Description: The application of DNA marker technology for genetic improvement of pepper, watermelon other cucurbits and cotton is essential for genetic mapping and for manipulating the genes that control the agriculturally important traits. This research focuses on building extensive genomic resources for these crops and identifying diverse

germplasm with pest/disease resistance and nutraceutical genes. The various genetic markers and genetic maps under development will be applied to identify favorable parental lines for future use in breeding programs The goal is to improve the agronomic performance of peppers and watermelons, melons and cotton.

a) Results:

Peppers. Sixty DNA markers were used to estimate the genetic (molecular) diversity among cultivated pepper species namely *Capsicum annuum*, *Capsicum bacatum*, *Capsicum pubescence*, *Capsicum frutescence* and *Capsicum chinense*. Sixty-two pepper lines representing all five species and various geographical locations were evaluated (using AFLP and SSR DNA technologies). The selected DNA markers could be used to accurately define species and predict evolutionary relationships. Use of these markers is being refined by applying them in the analysis of pepper species hybrids. Genetic crosses with selected pepper parents have been performed and the hybrids have been evaluated for numerous performance traits. DNA from hybrids is under analysis to identify more precise DNA markers (QTLs) for quality, yield and disease resistance.

Watermelons. The genetic diversity in cultivated watermelon (*Citrullus lanatus* var. *lanatus*) is not very high, therefore thirty-one watermelon Plant Introductions collected from diverse geographical locations and representing major groups of *Citrullus* species were selected to understand the molecular diversity using DNA technologies (AFLP and Simple Sequence Repeat (SSR) polymorphisms). Previously developed DNA markers were used to detect polymorphism within the DNA of various species and sub species of *Citrullus.* Genetic crosses with selected watermelon parents have been performed and the hybrids have been evaluated for numerous performance traits. DNA from hybrids is under analysis to identify more precise DNA markers for various fruit traits, abundance of female flowers and disease resistance.

Melons. The genetic diversity of 46 Ukrainian melon accessions was assessed using amplified fragment length polymorphisms (AFLP) developed from 20 primer combinations resolved on LICOR genotyper. All these cultivars were thoroughly characterized for their yield differences, sex expression, fruit characters and disease resistance. The AFLP genotyping work was done at Alcorn State University and the gel images were analyzed at WVSU. A total number of 800 polymorphisms were resulted from 20 primer combinations

Cotton. DNA (molecular) markers are being developed for *Gossypium barbadense* and a cotton RIL (recombinant inbred lines) population derived from a cross between *Gossypium barbadense* and *Gossypium hirsutum*. Once evaluated they will be used to construct genetic maps determine saturation levels in the genome and used by breeders to isolate the important disease resistant and quality traits.

Presentations

1. Jooha Jeong, Srinivas Asturi, Gopinath Vajja, Padma Nimmakayala. Use of DNA Markers for Molecular Analysis in *Capsicum annuam L*. Association of Research Directors 14th Biennial Research Symposium. April 1-5 2006, Atlanta, Georgia.
2. Reddy UK, Tomason YR, Zlenko I, Bashet A, Bates G, Levy A and Nimmakayala P. 2006. Diversity in Ukrainian Melon Germplasm. International conference of

proceedings of the Theoretical and Applied Activities of young Agricultural scientists – April 11-12, 2006, held at Dnepropetrovsk, Ukraine.

b.) Successes Resulting in Change (Outcomes): The DNA (molecular) markers developed in this project will be useful for making genetic maps and also saturating the existing genetic maps to isolate the important disease resistant and quality traits. Several research groups are interested in using these molecular markers in their ongoing research programs. Not many groups are working on development of these kinds of markers (SSRs).

c) Stakeholder Benefits (Impacts): No impacts to report at this time.

d) Assessment of Accomplishments: The project is progressing and should be continued.

e) Source of Expenditures & Impact Scope: Funding Source- Evans-Allen, USDA/CSREES
National and International level genomics research

Goal 4: To achieve greater harmony between agriculture and the environment….

Executive Summary: West Virginia's natural resources are extremely important to the state's economy. To that fact, research efforts underway at WVSU are exploring efficient and economical methods to lessen and remediate the impact of extractive and agricultural industries. The development of novel methods of heavy metal remediation in streams and rivers will provide more efficient and cost effective alternatives for extractive industries. With the reduction of carbon dioxide being a key critical environmental issue, new carbon sequestration studies are focused on the capture and conversion of carbon dioxide into a fuel or feedstock. Increasing production of agricultural waste associated with farming activities impacts, health, economic and environmental welfare. The "Bioplex" project is comprised of several research projects involving the utilization of agricultural waste and thermophilic anaerobic digestion. Innovations and developments resulting from these studies will result in both more efficient and commercially viable digesters.

(A) These projects have produced oral or poster presentations and publications at local, national and international scientific or government venues.
(B) The agricultural waste remediation project has developed a website with information about the projects specific research findings and an overview of current AD technology and economic impacts.
(C) Resource Allocation:

Total Invested:	$ 564,624
Formula Funds:	$ 1,558, 619
Scientific Years:	6.50

Research Program 4.1: Natural Resource Management

Project 1: Development and Photophysical Investigation of a Heterogeneous Carbon Dioxide Reduction Photocatalyst

Description: Reduction of carbon dioxide is a critical environmental issue. A key component to this research is carbon sequestration and recycling. This project addresses the capturing of carbon dioxide. However, it takes it a step further in the attempt to minimize environmental and geological impact. Not only does this project capture carbon dioxide, it will utilize solar energy to convert it into a useful fuel or a chemical feedstock. Instead of disposing of carbon dioxide waste into a geological landfill, carbon dioxide will be recycled using a free and natural energy source.

a) **Results**: Currently work involves the synthesis and purification of the ruthenium and iridium monometallic starting materials.
   1. An oral presentation was given at the 2005 Annual WVSU Research Symposium, Institute, WV.
b) **Successes Resulting in Change** (Outcomes): This work has been recognized by WV government officials interested in economic development opportunities that may come out of this research program.

c) **Stakeholder Benefits** (Impacts): No impacts to report at this time.
d) A**ssessment of Accomplishments**: This research project is progressing well and will be continued.

e) **Source of Expenditures & Impact Scope**:
   Funding Source- Evans-Allen (Section 1445), Dept of Energy Grant
   Scope of Impact- State-specific, 1890 Research

Project 2*:* Aqueous Metal-Ion Complexation

Description: Metal-ion presence or contamination in water sources is a world-wide problem whose solution has received considerable attention. A common method of removal of the metals from water involves the complexation of the metal ions with soluble ligands such as EDTA, a homogenous method. The metal-ligand complex then has to be removed from the water. The goal of this research is to develop water-soluble ligands that are supported by an insoluble inorganic support, such as alumina or silica. The major advantages sought here include, the use of high concentrations of ligands thus significantly increasing the capacity for metal complexation, and the ease of disposal of the supported ligand-metal complex from water.

a.) Results: Water-soluble phosphine synthesis is under development resulting in the synthesis of the novel compound 1,2 bis(bis(hydroxymethyl)phosphino)-methane. The research focus has now shifted to functionalizing activated silica gel with nitrogen- or oxygen-donor ligands due to problems characterizing the

potential phosphine ligands. In both water-soluble phosphine syntheses performed, a white precipitate and a pale yellow to clear supernatant were separated. Product characterization using 31P NMR is progressing.

Presentations.

1. Johnson, Gerald, Jegnaw Essatu and Ernie Sekabunga. 2006. The Synthesis Of Water-Soluble Hydroxymethylphosphines For The Complexation Of Metal Ion Pollutants In The Aqueous Environment.. The Association of Research Directors 14th Biennial Research Symposium, Atlanta, GA, April 1-5, 2006.

b.) Successes Resulting in Change (Outcomes): This work has been recognized by WV government officials interested in economic development opportunities that may come out of this research program

c.) Stakeholder Benefits (Impacts): No impacts to report at this time.

d.) Assessment of Accomplishments: This research project is progressing well and will be continued.

e.) Source of Expenditures & Impact Scope:
Funding Source- Evans-Allen (Section 1445)
Scope of Impact- State-specific, 1890 Research

Research Program 4.2: Environmental Microbiology

Project 1: **Bioplex Program:** Application of Microbiology & Related Techniques on Waste Management and Environmental Remediation

Description: Increasing production of agricultural waste associated with farming activities impacts health, economic and environmental welfare. In 2003, there were 87.2 million broilers (chickens) produced in West Virginia, with a value of over $121 million (357,500,000 lbs. @ $0.34). Over 125,000 tons of litter was associated with this production. Nationally, 44 billion pounds of broilers were produced with over 15.4 million tons (lbs. meat x 0.7/2000) of associated litter and manure. The management of this manure is a serious issue. This animal waste is a rich source of nutrients and unfortunately, human pathogens. Thus, to minimize deleterious impacts to both the health of farms, associated communities and the environmental quality of watersheds, livestock farmers need economically viable alternatives to current manure management practices. The Bioplex program at West Virginia State University involves several projects that are developing novel biological ways to utilize livestock wastes and convert them into assets for the farmer. Innovations and developments resulting from these studies will result in both more efficient and commercially viable digesters and novel commercial applications. This research program has regional significance due to the intense poultry production of NE West Virginia and surrounding regions of Maryland, Virginia and Delaware. Thus outreach solutions implemented on WV farms could readily spread to surrounding states. Broilers (chickens) are the #1 livestock product in WV. This represents 1% of national production.

The Bioplex program objectives are to: **1)** Study the pilot plant digester's capacity to be controlled using biochemical parameters known to be effective. We will develop and test software that uses feedback from online measurements of feed volume, pH, biogas production, and methane percentage to control feed loading and mixing for optimal digester performance. Another experiment will evaluate the biogas production of effluent discharged from the thermophilic pilot plant at different hydraulic retention times. **2)** The reduction in pathogens during digestion will be studied, with emphasis on bacterial pathogens, Cryptosporidium, Giardia and Ascaris. We propose to set up experiments in a manner that we can evaluate pathogen kill over time and demonstrate that the material remaining after known incubation times (equivalent to digester resident time) is not viable or infective. An independent assessment of this experiment will be provided by Waterborne Inc., New Orleans, LA. **3)** More effective digester control will result from an understanding of the relationship between biochemical control parameters and the resident microbial populations. This research is aimed at further understanding the microbial degradation processes that occur in thermophilic anaerobic bioreactors during the decomposition of agricultural waste. The objective is to link microbial community structure and metabolism to bioreactor design. The project consists of two phases. The goal of phase one is a molecular analysis of the microbial community structure of a thermophilic methanogenic pilot plant. Phase two will examine microbial community dynamics and comparative reactor performance of three model reactors that differ in design. **4)** The organic materials resulting from thermophilic anaerobic digestion are known to have biological value. Several years data on the accumulation and depletion of various crop nutrients has allowed us to propose recommended practices for the use of digested, poultry-litter solids and liquids as replacements for commercial fertilizers. Also, we propose to test a surface coal mine reforestation strategy using digested poultry litter solids and liquids. We plan to compare our test strategy to current re-vegetation practices with respect to soil chemistry, microbiology and tree establishment characteristics. **5)** The commercialization of anaerobic digester technology and outreach of this information will continue by defining the economics of recycling the carbon and nutrients in a specific agricultural region. The value of energy and green power, fertilizers, crop markets, and pollution credits are defined by locality. A ranked list of potential regional digester sites based on the distribution of livestock producers and the associated wastes is being developed. A scoping exercise is determining factors that should go into this economic model. White papers will be developed to facilitate decisions on when and what type of digester technology is appropriate for the management of livestock residuals in a given situation.

a) **Results**:

1) Four pilot plant experiments were conducted. Four feed frequencies were compared; 1, 2, 6, and 12 feed events per day. Biogas production was greatest at frequencies 2 and 6. The second experiment compared different temperature control strategies. The treatments included deadbands of 0.2, 0.6, and 1 F. Biogas production was greatest at the 1 F deadband. The third experiment tested digester stability during organic loading shocks. Acetic acid was added to the system in two doses, 5 and 15 gallons. Data from these experiments is currently being analyzed. The final experiment compared different gas blower mixing durations on digester performance. The treatments were 3 minutes,

15 minutes, and no mixing. Data is currently being analyzed. **2)** Experiments characterized the viability of both Giardia muris and Cryptosporidium parvum in both thermophilic (55 degrees C) and mesophilic (37 degrees C) digester environments. Dye exclusion assays indicate plus 99% loss of viability for Giardia lamblia at thermophilic temperatures. This work indicates that for Cryptosporidium parvum, the thermophilic temperature and the anaerobic process are critical in inactivation of the organism. The research supports that thermophilic process is superior to mesophilic. **3)** The diversity of the anaerobic digester community has been analyzed using the standard metric of 16S rDNA gene sequence similarity. The majority of bacterial 16S rDNA sequences obtained from the pilot plant digester represent new species and new higher taxonomic groups. The antibiotic resistant bacteria and genes in poultry litter and digester effluent was examined. The tetracycline resistance gene tetM was found in about 30% of the poultry litter and digester isolates. Although tetracycline resistant isolates were found in the digester effluent, the digester reduced their diversity. **4)** Field trials continued to test digester effluent as fertilizer. Potato weight and tuber number was statistically greater for plots treated with the 2x liquid. The 2x effluent treatment produced 3 times the number of extra-large tomatoes compared to other treatments. The fertilizer treatments for broccoli showed statistical differences between all treatments, with 2x liquid treated plants having the highest yield. Cucumbers were grown hydroponically to evaluate the effects of liquid effluent versus a commercial regime. Average weight and number produced was statistically significant between the two fertilizer regimes; commercial being superior. **5)** Three end-use effluent experiments were concluded. The first tested digested poultry litter solids as a filter for heavy metals. Results indicate the digested solids are less effective than raw poultry litter for carbon filtration of metals. The second tested the effects of digested liquid on hay and corn field soil nematode populations. There is very little evidence that the treatments had a significant effect on soil nematodes, either plant parasites or free-living species. Digested solids were tested as a substrate for mushroom cultivation. Preliminary tests with digested solids indicated the solids are appropriate for some varieties of mushrooms.

Posters, Publications and Presentations:

1. Bombardiere, J., T. Espinosa-Solares, M. Domaschko, F. Robles-Martinez, M. Chatfield. Influence of temperature on methane production from poultry litter in a pilot plant biodigester. 7th IWA Specialty Conference on Small Water and Wastewater Systems Mexico City, Mexico, March 2006, oral presentation.
2. Bombardiere, J., T. Espinosa-Solares, M. Chatfield, M. Domaschko, M. Easter, D. A. Stafford, S. Castillo-Angeles, N. Castellanos-Hernandez. 2005. Influence of hydraulic retention time on the performance of a pilot plant thermophilic anaerobic bioreactor. 4th International Symposium on Anaerobic Digestion of Solid Waste, Copenhagen, Denmark, poster presentation.
3. Bombardiere, J., T Espinosa-Solares, M. Domaschko, and M. Chatfield. Performance of a Thermophilic Anaerobic Digester at Different Feed Loading Frequencies. 28th Symposium on Biotechnology for Fuels and Chemicals, Nashville, Tennessee, April 2006, poster presentation.

4. Espinosa-Solares, T., J. Bombardiere, M. Chatfield, M. Domaschko, M. Easter, D. A. Stafford, S. Castillo-Angeles, N. Castellanos-Hernandez. 2005. Macroscopic mass and energy balance of a pilot plant anaerobic bioreactor operated under thermophilic conditions. Bioresource Technology, publication.
5. Isikhuemhen Omoanghe S., Olena Shulga and Mark Chatfield. 2006. Preliminary Studies on the Use of Solid Waste from Anaerobic Digestion of Poultry Litter in Mushroom Cultivation. Association of Research Directors, Inc. 14th Biennial Research Symposium, Atlanta, GA, April 2006, poster presentation.
6. Liedl, B. E., J. Bombardiere and J. M. Chatfield. 2006. The fertilizer potential of liquid and solid effluent from thermophilic anaerobic digestion of poultry waste. In press: Water Science and Technology, paper.
7. Liedl, B. E., J. Bombardiere, A. Stowers, K. Mazzaferro, and J. M. Chatfield. 2005 Liquid Effluent from Thermophilic anaerobic digestion of poultry litter as a potential fertilizer. American Society of Horticultural Science Annual Meetings, Las Vegas, NV, oral presentation.
8. Ruhnke, T. R., V. Carrasco and J. McCormick Removal of protozoan and helminth pathogens using Thermophilic Anaerobic Digestion. Association of Research Directors, Inc. 14th Biennial Research Symposium, Atlanta, GA, April 2006, oral presentation.
9. Wilfong, K., C. Taylor, K. Mazzaferro and B. E. Liedl. 2006. Hydroponic cucumber production using liquid effluent from poultry waste bioremediation as a nutrient source. Association of Research Directors, Inc. 14th Biennial Research Symposium, Atlanta, GA, April 2006, poster presentation

b) **Successes Resulting in Change** (Outcomes): The Bioplex Project has demonstrated the performance and stability of anaerobic digesters fed poultry litter, the value of digested liquids and solids for soil amendments and hydroponic crop production, the level of pathogen destruction obtained during digestion, and the fate of hormones through the digestion process. Presentations and site tours have been conducted to departments of agriculture in three states considering anaerobic digestion of poultry litter

c) **Stakeholder Benefits** (Impacts): Increasing energy prices coupled with stricter regulations on manure use and management have made anaerobic digestion of animal manures a competitive waste management option. Methane gas production from anaerobic digestion of animal manures is still not sufficient to justify construction of capital intensive regional digesters, even when natural gas prices are at $12 per 1000 cubic feet. The effluent streams must add value to the operation either by helping solve nutrient management, pathogen, odor challenges or producing marketable end products. The Mid-Atlantic region of the US produced 1.2 billion broiler chickens in 2003, resulting in 105 million tons of litter. Broiler chickens are the #1 livestock product in WV. This represents 1% of national production. Repeated application of litter onto agricultural lands has resulted in high soil phosphorus, loss of ammonia nitrogen to the atmosphere, and increasing levels of P and N in the watersheds. The Bioplex Project has demonstrated the performance and stability of anaerobic digesters fed poultry litter, the value of digested effluents

for soil amendments and hydroponic crop production, the level of pathogen destruction obtained during digestion, and the fate of hormones through the digestion process. Presentations and site tours have been conducted to departments of agriculture in three states considering anaerobic digestion of poultry litter. Poultry litter digesters are being constructed on farms in Louisiana and Ontario, Canada in part because of information and site tours provided by the West Virginia State University Bioplex Project.

d) **Assessment of Accomplishments**: The WVSU Associate Director of 1890 Research (Dr. Chatfield) is responsible for assessments. Dr. Chatfield is also research director for this project. He feels it is progressing and should be continued.

e) **Source of Expenditures & Impact Scope**:
Funding Source- Evans-Allen (Section 1445), USDA/CSREES
Scope of Impact- State-specific, 1890 Research

Project 2: *Environmental Microbiology*

Description: Anaerobic digester technology for waste management is becoming a more attractive option for adding value to animal manure and improving nutrient management of associated nitrogen and phosphorus. The function of digesters requires the cooperation of complex consortia of bacteria. The quantitative detection of key populations is needed in order to develop predictive models for digester control. In addition, the heavy use of antibiotics on poultry is a well known problem that may contribute to the spread of antibiotic resistant human pathogens. Development of reliable real-time PCR techniques to identify and quantify bacterial populations and identification of antibiotic resistant microbes in poultry litter is the focus of microbiology research at WVSU.

a.) Results:

Molecular methods (real-time PCR) were developed for the detection of specific bacteria present in a thermophilic digester and quantitation of specific bacterial populations in the digester microbial community. Unique phylotype populations that were found to be abundant in the WVSU pilot plant digester. The populations represent previously under-scribed organisms in the phylum Firmicutes. Several unique populations including one related to the syntroph Pelotomaculum were quantitatively detected using these novel techniques. These techniques are currently being applied in related research that seeks to quantify the population abundance of the major groups of bacteria in CSTR and biofilm digesters. This study was expanded to include the application of T-RFLP technology to digester microbial ecology. Another technique (T-RFLP) was compared to the PCR technology. It can be used for measuring the abundance of populations of bacteria in mixed samples. Although this method is semi-quantitative and less sensitive than real-time PCR, it permits the simultaneous discrimination of multiple bacterial gene targets. A bacteria universal primer set was

applied to digester DNA samples previously collected from a hydraulic retention time experiment. Population profiles showed that the abundance of some phylotypes varied during the two months of time covered by the samples.

Publications.

1. Smith A., H. Lappin-Scott, S. Burton, D.H. Huber. 2006. Extensive diversity of Clostridiales revealed in a thermophilic anaerobic digester. American Society for Microbiology 106th General Meeting, May, Orlando, Fl; abstract and poster.
2. Smith A., H. Lappin-Scott, S. Burton, D.H. Huber. 2006. Molecular analysis of biofilm communities in a thermophilic anaerobic digester. International Society for Microbial Ecology Meeting, August, Vienna, Austria; abstract and poster.

b.) **Successes Resulting in Change** (Outcomes): This research has advanced our ability to monitor the specific presence of key bacterial populations that are required for proper digester operation. The research is also developing methods for detecting tetracycline resistance genes found on poultry farms.

c.) **Stakeholder Benefits** (Impacts): No impacts to report at this time.

d.) **Assessment of Accomplishments**: The projects are progressing and should be continued.

e.) **Source of Expenditures & Impact Scope:**

Funding Source-

1. Evans-Allen (section 1445) 2003-2006
2. Bioplex Phases 5 & 6 2005-2006
3. USDA CSREES Research Capacity Grant 2004-2007

Scope of Impact- State, Regional, National, International

SECTION III
West Virginia State University Extension
(1890 Extension Programs)

Table 2: WVSU Extension: Resource Allocation Summary *by Goal and Program*

WVSU EXTENSION PROGRAMS

ANNUAL ALLOCATION OF RESOURCES *(FY 2006)*								
NATIONAL GOAL / INSTITUTIONAL PROGRAM		FUNDING SOURCE						
Goal	*Program Area*	*Federal Formula*	*Federal Other*	*State Match **	*State Other*	*Other*	*TOTAL*	*FTE*
GOAL I								
Program 1.1	Alternative Agriculture Extension and Education	30,000	0	15,000	0	0	*45,000*	1.00
Program 1.2	The Expansion of Horticultural and Forestry Activities in West Virginia	37,781	11,250	14,413	10,000	34,400	*107,844*	1.25
Program 1.3	Production Agriculture Education	25,000	0	10,000	0	0	*35,000*	0.25
Program 1.4	Youth Agriculture Education	35,000	0	21,000	0	320	*56,320*	0.5
	Total	**127,781**	**11,250**	**60,413**	**10,000**	**34,720**	***244,164***	***3.00***
GOAL II								
Program 2.1	Food Safety	35,000	0	9,100	0	0	*44,100*	1.00
Program 2.2	Food Security	15,000	0	4,500	0	0	*19,500*	0.25
	Total	**50,000**	**0**	**13,600**	**0**	**0**	***63,600***	***1.25***
GOAL III								
Program 3.1	Nutrition Education and Wellness System	152,761	11,047	91,656	22,877	2,500	*280,841*	2.5
	Total	**152,761**	**11,047**	**91,656**	**22,877**	**2,500**	***280,841***	***2.50***
GOAL IV								
Program 4.1	Environmental Conservation Education	15,000	15,000	7,500	0	0	*37,500*	0.25
	Total	**15,000**	**15,000**	**7,500**	**0**	**0**	***37,500***	***0.25***
GOAL V								
Program 5.1	Youth Development	172,599	0	103,559		83,767	*359,925*	5.50
Program 5.2	Community and Economic Development	151,330	0	90,798	82,500	100,000	*424,628*	4.50
Program 5.3	Minority Business Affairs	41,365	65,582	12,410	0	130,824	*250,181*	2.00
Program 5.4	Technology and Literacy Education Programs	85,050	31,233	51,030	0		*167,313*	2.00
Program 5.5	Rural Business Services	121,365	100,000	72,819			*294,184*	1.00
Program 5.6	Family Education	152,900	0	91,740	20,000	17,830	*282,470*	3.00
	Total	**724,609**	**196,815**	**422,356**	**102,500**	**332,421**	***1,778,701***	***18.00***
	GRAND TOTAL	***$ 1,070,150***	***$ 234,112***	***$ 595,526***	***$ 135,377***	***$ 369,641***	***$ 2,404,806***	***25.00***

***** *State match appropriations spent between October 1, 2005 thru June 30, 2006*

WVSU Extension Overview

Extension and outreach programs are currently offered on a consistent basis in approximately 15 counties within West Virginia. These programs were specifically designed to meet the needs of our target audiences and communities, categorized as underserved and underrepresented. Community environmental scans and stakeholder sources assist our staff in designing new programs and redesigning existing ones to more effectively serve the needs of our target audiences (clients). In 5 years of service, many of these programs have already had a profound impact on those individuals and communities we serve. As state and other federal and non-federal sources of funding

are secured, opportunities for the institution to expand its extension and outreach programs to other communities will be assessed. The following section presents a description of all the activities undertaken and the impacts they had on the communities and stakeholders served in FY 2005. Table 2 summarizes the funding invested in each goal and program of the institution's plan of work for fiscal year 2005.

GOAL 1. An agricultural system that is highly competitive in the global economy

Executive Summary: West Virginia has the highest percentage of family operated farms in the country. Individuals and their families operate 96.4% of all farms in the state. In addition, more than 400 agri-businesses contribute an estimated $100 million in revenue to the state of West Virginia on an annual basis. Small farm operations face constant pressure to increase the quality of their product and make their operations more profitable. Since July 2003, WVSU has addressed these needs by placing an Agriculture and Natural Resources Extension Agent in a county office. Also, residential horticulture and pest control are increasing areas of interest throughout West Virginia and across the country. The increased awareness of horticulture and pest control has prompted WVSU to respond in July 2004 by placing an Extension Agent for Agriculture and Natural Resources with a multi-county assignment in the development of community and youth gardening efforts.

Total Invested

Total Funds:	$ 244,164
Formula Funds:	$ 127,781
FTE:	**3.00**

Extension Program 1.1: Alternative Agriculture and Extension Education

Roane County Calf Pool

a) Description: The United States Department of Agriculture Economic Research Service (USDA/ERS) showed that one of West Virginia's top livestock products annually is beef cattle. To address the needs of this constituency for greater return on their investment, West Virginia State University has partnered with the citizens of Roane County and operated the Roane County Calf Pool for the last three years in cooperation with local agriculture interests and the West Virginia University Extension Service.

b) Outputs: The Extension Agent helped to coordinate Roane County's Calf Pool program. This local effort creates an opportunity to increase the market value of cattle sold in the pool. Thirteen local producers took part in this year's effort and marketed 235 cattle at above average market prices.

c) Outcomes: The pool produced $147,909.70 in revenue for local producers.

d) **Impact:** Increasing market value of an animal will result in more profit for producers in the local agriculture industry.

e) **Funding Source:** Federal and State
Scope of Impact: County and State-specific

Extension Program 1.2: The Expansion of Residential Horticulture Activities in West Virginia

Pesticide Applicator Re-Certifications

a) **Description:** Residential horticulture and pest management issues continue to be the most desired service provided by West Virginia State University Agriculture and Natural Resources Agents. From questions as simple as handling residential lady bug infestations to more complicated natural invasive plant and pest management, Agriculture and Natural Resource Extension Agents play a prime role in the delivery of research-based knowledge to the citizens of their counties. Primary delivery methods include fact sheet distribution, newspaper articles, and appearances on local radio. They are also responsible for the development of the research involved in delivering information and solutions. The extension agent can be an identifier of horticulture problems and then develop research to find applicable answers. Roane County alone has two registered nurseries and numerous unregistered nurseries. It also has four nursery dealerships within the county.

b) **Outputs:** The Extension Agent visited many Roane County residents' homes/farms for observations, interpretations, diagnostics, and explanations on plant diseases, insect problems, irregular plant growth, and livestock health. The Extension Agent averaged twenty-five calls or information requests per week on local agricultural issues. Roane County newspaper articles provided diversified agricultural information to more than 5,900 people per printing. These articles were submitted every three weeks. The Extension Agent also presented the Pesticide Recertification Class for three Roane County residents. Three Roane County residents are more knowledgeable on pasture management, beef cattle parasite control, weed identification and eradication, West Nile disease prevention, and record-keeping.

c) **Outcomes:** Three Pesticide Recertification participants passed the test and received their continuation. The test covered topics of pesticide application techniques, safety, respirator awareness, and general pesticide use.

d) **Impacts:** The Pesticide Recertification classes provide essential information on the proper use of restricted pesticides and herbicides. Without these classes people could possibly contaminate the water supply or kill all types of forages in pasture grounds causing livestock to be confined inside and the producer to buy hay for animals.

e) **Funding Source-** Federal and State allocations
Scope of Impact- State and county specific

Grafting Workshop

a) **Description:** This program was discontinued in 2006**.**

Extension Program 1.2: The Expansion of Horticultural and Forestry Activities in West Virginia

4A Pesticide Certification

a) Description: Within forestry and horticulture professions, training on proper pesticide handling and application is mandated by state government. The West Virginia Department of Agriculture, Pesticide Division serves the population by offering numerous free trainings on such topics, but its location at the Guthrie Agricultural Center has made it inconvenient at times to accommodate large trainings. In cooperation with the Department of Agriculture, West Virginia State University (WVSU) Extension has provided a location for various trainings acting as the host to an event. Not only does this cooperation benefit the Pesticide Division, but it also has proved to be beneficial to the University as well. WVSU Physical Facilities grounds maintenance employees and students involved in the agricultural research at Bioplex have all been trained by the Department of Agriculture Pesticide Division on proper pesticide application and handling.

b) Outputs: A 4A Recertification Training, which involves regulations on lawn care and turf grass management, was hosted by the Department of Agriculture in conjunction with WVSU on February 14, 2006. Typically, this training is offered only in the northern region of the state, making it difficult for participants in the southern region of the state to attend. The training recertified 64 people in 4A Protection Standards in a more convenient, centrally located area. Ten members of West Virginia State University's Physical Facilities grounds maintenance employees and student laborers were included.

c) Outcomes: Pesticide training increases knowledge of proper handling and application of a chemical and decreases the potential for improper use or injury due to negligence. The WVSU Physical Facilities ground maintenance employees and student laborers gained certification and increased awareness of proper practices that they can utilize not only for the proper maintenance of our beautiful campus, but also as a means of professional development.

d) Impact: The cooperation between the Department of Agriculture and West Virginia State University has increased the number of individuals trained on proper pesticide management. This has also increased the participation of businesses in the southern regions of the state and allowed them to remain in compliance with the laws that restrict pesticide application in the lawn care and turf grass management fields.

e) Funding Source: Federal and State allocations
Scope of Impact: County

Urban Forestry

(a) Description: Urban forestry is a specialized branch of forestry that includes planning, designing, establishing, maintaining, regulating, treating, conserving, and protecting woody vegetation in urbanized areas. Because of its similarities to horticulture, landscape architecture, and park management, our staff works in

concert with professionals in these fields as well as with the West Virginia Division of Forestry, city planners, and various community organizations to develop the program. In the immediate service area, 80% of the residents live in urban and/or suburban areas. Statewide, this figure is 62%. In these urban areas, healthy trees enhance the environment by promoting clean air and water, increasing property values, reducing erosion and storm water runoff, providing wildlife habitat, moderating temperature, and offering year-round enjoyment. The Urban Forestry Extension Program is an educational outreach network that focuses on areas such as tree care and maintenance, ecology, and economics through the education of citizen groups, children, professionals, municipalities and agencies.

(b) **Outputs:** Coordinated development of the West Virginia State University (WVSU) urban forestry extension programs with existing programs run by the Urban Forestry unit of WVDF staff and the State Office of the Division of Forestry has helped to further the program along in its development. Using grant monies from Renewable Resources Extension Act (RREA), the Agriculture and Natural Resource (ANR) Specialist donated over $3,000 worth of trees for planting in West Virginia. The ANR specialist also coordinated the development a printing of a booklet on choosing and planting trees for the community and has made the printing cost a line item budget for future RREA grants. The specialist attended a grant-writing seminar to supplement RREA funding as demand increases.

(c) **Outcomes:** The cooperation that has been developed between WVSU and the Division of Forestry has allowed for an increase in the dissemination of information about urban forestry and forestry in general to the public. By providing support to the efforts of the Urban Forestry Division, programs have been able to continue when state funding was at a minimum. This cooperation has not only benefited the Division of Forestry, but it has also increased the knowledge and performance of the staff of WVSU. Numerous teachers and volunteers have benefited from this cooperation by acquiring the needed training and supplies to teach our youth about proper management of trees in our landscape. The booklet has been disseminated not only at various functions/trainings attended by both the WVDF and WVSU. Additionally, trees were planted in all 55 counties across the state of West Virginia for Arbor Day project. which bought a greater awareness of WVSU Extension commitment to one of the states most valuable renewable resources.

(d) **Impacts:** As a result of this interaction, teachers and volunteers have been introduced to an environmental curriculum that they may utilize in their own classrooms or volunteering efforts. The WVSU Extension and Physical Facility/staff have also increased their knowledge of forestry practices which enables them to better serve the public or the WVSU campus on a variety of forestry related issues. Long-standing programs, which have in the past been supported by the Division of Forestry, were able to continue even when budget cuts took place due to the support of RREA funding through the office of Agriculture and Natural Resources at West Virginia State University. This cooperation has also opened the door for further coordination of programs and projects which can only result in the expansion of knowledge of forestry issues throughout the service areas.

(e) **Funding Source:** Federal and State allocations
Scope of Impact: State and County specific

Community Gardens

a) Description: In continuing to provide educational outreach to underserved communities, West Virginia State University identified the need for community garden programs. Through several programs already existing in conjunction with Charleston Housing, one being a community garden at Orchard Manor, the WVSU Extension Agents became aware of interest in gardening within yet another housing development. In July of 2005, WVSU Extension Agents took the lead to coordinate another Community Garden program, along with Charleston Housing, located at Carroll Terrace. As the program flourished and gained recognition, the participants in the community garden program took pride in all of their accomplishments.

b) Outputs: Participants in the community garden located at Carroll Terrace were provided a very structured garden atmosphere to learn in as well as enjoy. WVSU Agents coordinated the construction of the community garden from beginning to end, bringing on 19 corporate sponsors such as Lowe's Home Improvement Warehouse and the American Heart Association, to aid in the cause. Once the participants were allocated garden space they were allowed to choose which crops they would enjoy growing from a list of available plants. WVSU Agents instructed the participants on topics such as proper plant spacing and disease/pest management through hands on interaction with the gardener's. Harvest records were kept by the garden participants and 49 people took part in the Carroll Terrace Community Garden experience.

c) Outcomes: The Community Garden Program at Carroll succeeded in bringing the community together within the various surrounding Charleston Housing developments, as well as the surrounding community. Residents from Lee and Lippert Terrace traveled to share in the garden experience. The community garden also allowed the participants to interact with high ranking officials within many local businesses, such as West Virginia American Water and the Capitol Conservation District, working together to install the irrigation system to provide water to the beds and plant the English herb garden based on a landscape design plan. The Community Garden Project culminated with a Garden Hose Cutting Ceremony held on June 16, 2006. Among those present at this event were Agriculture Commissioner Gus Douglass, Mayor Danny Jones, and West Virginia State University's President Hazo Carter. Commissioner Douglass held the honor of cutting the garden hose to christen the garden. Numerous dignitaries were on hand for the event, as well as local television and print media representatives. By the end of the first growing season, daily harvest records determined that the garden produced 2,311 tomatoes, 584 peppers and 40 squash. The overwhelming response to the Community Garden at Carroll Terrace has prompted numerous requests for gardens in surrounding areas. The garden has also been featured in various newspaper articles and is in competition with other programs for award recognition.

d) Impact: The participants at Carroll Terrace harvested nearly $3,000 worth of vegetables and were instructed on their inclusion in dietary consumption where 100% of participants indicated they would use them. The inclusion of vegetables

in the residents' diets answers a primary concern of food security for limited resource participants. Residents are anxiously waiting for next spring and will be well prepared for the upcoming season as a winter program is developed to further educate the residents about gardening basics and healthy eating. The community garden program has also brought in monthly programming from outside entities, including the American Heart Association, to the residents of the Charleston Housing developments. These partnerships efforts garnered a 100% increase in the participation in some healthy lifestyle initiatives for the participants.

e) **Funding Source:** Federal and State allocations, Charleston Housing, Private Industry

Scope of Impact: State and County Specific

Extension Program 1.3: Production Agriculture Education

Progressive Farmers Meetings

a) **Description**: Information from The United States Department of Agriculture Economic Research Service (USDA/ERS) indicates that West Virginia is the number one state in the country for percentage of family farms, followed by Alabama and Oklahoma. Individuals/families operate 96.4 percent of the Mountain State's farms. To address the needs of this constituency, WVSU Extension has partnered with the citizens of Roane County and placed a full-time Extension Agent in the field of Agricultural and Natural Resources. Roane County is located in central West Virginia with a population of 15,362 residents. Roane County is filled with 538 farms covering a total of 99,078 acres of farmland. West Virginia State University has made a commitment to ensure optimal agriculture education programs within Roane County.

b) **Outputs:** To provide Roane County agricultural producers information, the Extension Agent has formed a Progressive Farmer group. Seven meetings have been scheduled and four Young Farmer meetings have been held. Completed meetings included speakers from various agencies and organizations like the Department of Agriculture Division of Pesticide Regulatory Services, the Roane County Farm Bureau, the Division of Natural Resources Conservation Service in Roane County, and the Smuggling Interdiction and Trade Compliance Operations Office. Discussion topics included a variety of topics like pesticide safety and certification; how to join the Farm Bureau; the Conservation Security Program; and the international threat of Avian Influenza in poultry. The four remaining meetings will include speakers from Premier Feeds, West Virginia University Extension, the Natural Resource Conservation Service, the Farm Service Agency, the Little Kanawha Conservation District, and the West Virginia State Veterinarian's Office. The Extension Agent is responsible for coordinating the meetings and inviting speakers to the Young Farmer Meetings. Forty-four producers and 19 members attended the two December meetings. In January, 34 members attended the two meetings.

c) **Outcomes:** Participants were asked how useful the information provided was and asked to grade it on a 5-point Likert-type scale with 5 being very useful and 1 being

not useful. On December 6, 2005, 68% of participants answered the survey and gave an average score of 4.46. On December 15, 2005, 36% of the people in attendance answered the survey and gave an average score of 4.88. On January 12, 2006, 100% of the people in attendance answered the survey and gave an average score of 4.83. On January 19, 2006, 58% of the people in attendance answered the survey and gave an average score of 4.82.

d) **Impact:** Through attending the Progressive Farmer Meetings, Roane County producers are becoming better informed on up-to-date agricultural information and programs.

e) **Funding Source:** Federal and State
Scope of Impact: County and State-specific

Extension Program 1.4: Youth Agriculture Education

Youth Livestock Program

a) **Description*:*** Due to changing office staffing patterns, the WVSU Agriculture Natural Resources agent in Roane County discontinued association with this program. **No activity occurred in relation to this program in FY 2006.**

Extension Program 1.5: Junior Master Gardener

a) **Description:** Agriculture plays a major role in the daily lives of residents of West Virginia. In order to educate youth in agricultural topics, WVSU Extension has continued working with schools in Putnam and Kanawha counties to provide Junior Master Gardener training. The curriculum that accompanies this program covers topic areas such as plants, soil, water, insects, environment, and ecology. In many cases these subjects are required to be covered in the classroom during the science instructional time. By working with the teachers at the various grade levels, the Junior Master Gardener program can be incorporated into the classroom as a supplemental resource to the already established science lesson plans.

b) **Outputs:** All of the JMG groups were continued from last year at Buffalo Elementary to educate the kindergarten, 3rd and 5th grade students about horticulture and the environment. During the same time, interaction with the students at Piedmont Elementary in Kanawha County continued. As the 2006-2007 school year began, two additional groups were created in Putnam County and another in Kanawha. The 5th grade for the 2006-2007 school year at Buffalo Elementary, in Putnam County, divided into two separate groups due to the creation of a 4th/5th split teaching position. The 3rd grade also chose to participate again, but divided into two separate groups. The kindergarten classes chose to be more involved this year as well, creating 6 different groups within one school. Due to this increased participation, the groups were placed on a weekly rotation in order to best accommodate everyone's needs. As the past JMG students moved on to GW Middle in Putnam County, request came in to create a JMG Exploratory time

at that school in conjunction with a JMG trained teacher. The Exploratory time was held three times a week and changes with every nine weeks. The agent interacted with these students on a once a week basis and the rest of the time was covered by the teacher at the school. Piedmont Elementary, in Kanawha County continued its involvement with the JMG Program in the after school setting, still comprised of the 3rd to 5th grade students on an every other week basis. An additional after school program was picked up in Kanawha County with Montrose Elementary including youth in 4th and 5th grades. This program was developed for a once a month meeting. In all, 301 youth were involved in the program. The first Junior Master Gardener based camp was developed during the first quarter of the year in conjunction with Crum Elementary in Wayne County. The camp revolved around three main JMG curricula: Literature in the Garden, Wildlife Gardener and the Level one Teachers guide. Planning phase for this six week long camp began in March and the camp was conducted in June with 40 students from Crum Elementary. The youth experienced JMG activities and suggested readings on a daily basis.

c) Outcomes: In all, 245 youth were involved in the program. The students at Buffalo Elementary maintained and incorporated new elements into their established wildlife habitat. Of these, **** were first year program participants who increase their knowledge of the agricultural communities impact on various aspects of our society.

d) Impact: 100% of students who participated in the Junior Master Gardener Program demonstrated the importance of being good stewards to our land and increased their understanding of the scientific process. Not only were the youth exposed to garden-based activities, but also they learned how to conduct experiments and assess a result. Through the curriculum's experiential pedagogy, the students were able to better comprehend topics that they otherwise may have found unintelligible. Teaching our youth at a young age how to utilize critical thinking and deductive reasoning better prepares them for the world outside of the classroom and 100% of the students were able to express a greater understanding of the strategic thinking processes.

e) Funding Source: Federal and State allocations
Scope of Impact: State and County Specific

Junior Master Gardener Daycare Pilot Program

a) Description: West Virginia State University acknowledges that exposure to agricultural topic areas needs to start as early as possible. Through the newly developed Junior Master Gardener Daycare Pilot Program, youth as young as 2 years old are experiencing activities in topic areas such as plants, soil, water, insects, environment and ecology. Children, in their early stages of development, are like little sponges that pick up every little drop of information. WVSU feels that it is important to incorporate this age group into our youth programming and develop a curriculum gauged at daycare level agricultural education.

b) Outputs: Two Junior Master Gardener Daycare Pilot Programs were established, one in Kanawha County and the second in Putnam County. The Kanawha County Pilot was held at the Discovery Learning Center in South

Charleston where children from the ages of 2 years to 5 years old have been participating in activities gauged at increasing their awareness of the environment. The Putnam County Pilot was held at the Teays Valley Child Development Center. The same age group was targeted at the Putnam County site. Both of the programs have been registered as Junior Master Gardener groups with the National Junior Master Gardener Headquarters at Texas A&M University. A total of 87 youth have been impacted by this new daycare initiative.

c) Outcomes: By targeting this age group, WVSU feels that it is being innovative in its approach to agricultural education. The youth are responding well to the program and are able to illustrate what they have learned by the end of the activity. Whether it is the placement of models of the lifecycle of a butterfly in the correct order, or the repetition of the word "metamorphosis" by 3 year olds, the youth are learning these basic concepts. Parents are recognizing the efforts and questioning the daycare providers about the programming. Enthusiasm has also spread to the various daycare teachers involved in the program. Teachers have become exposed to innovative activities as they present to the youth on a daily basis.

d) Impact: Students who are participating in the Junior Master Gardener (JMG) Daycare Pilot Program have knowledge of scientific and agricultural topics normally taught at more advanced ages. Through the daycare experience, children are being taught things that they need to know in preparation for kindergarten. Introducing concepts to children at this age enables them to become familiar with a concept. This, in turn, may increase their ability to comprehend the topic when it is taught to them in the school system. 100% of the students participating showed increased awareness of and involvement in agriculture. Additionally, 100% expressed increased knowledge of innovative teaching methods incorporating agricultural aspects into regular classroom instruction.

e) Funding Source: Federal and State allocations
Scope of Impact: State and County Specific

Agriculture in the Classroom

a) Description: Agriculture in the Classroom is a program coordinated by the United States Department of Agriculture with a goal "to help students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies." Funding for this program was received by West Virginia State University (WVSU) for the first time in 2005. By combining efforts with other State supported agencies such as West Virginia's Department of Environmental Protection, West Virginia's Division of Forestry, and the West Virginia Department of Natural Resources, WVSU has been able to educate numerous teachers and volunteers on programs consistent with the goals of the Ag in the Classroom initiative.

b) Outputs: The development of the WVSU Ag in the Classroom program has helped to broaden the reach of the program. A two-day training on four environmentally based curricula was sponsored by WVSU and held on the University's campus. The WV Department of Environmental Protection provided training on Project Wet, the WV Division of Forestry on Project Learning Tree, the Department of Natural

Resources on Project Wild and WVSU Extension on Junior Master Gardener. Twenty participants took part in this two day training session.

c) Outcomes: The cooperation that has been developed with the various state agencies was made possible by the Ag in the Classroom funding. This collaboration allowed for an increase in the dissemination of information about agriculturally based youth curriculums available to the public. By providing a location for these different state agencies to hold their trainings, the Ag in the Classroom funding made it possible for these programs to gain exposure. The participants of the training sessions have increased in their awareness of agriculturally based youth curricula, as well as in their knowledge of WVSU Extension programs. Participants received the needed training and supplies to teach youth about environmental issues.

d) Impacts: As a result of this interaction, teachers and volunteers have been introduced to an environmental curriculum that they may utilize in their own classrooms or volunteer efforts. The participants received the necessary resources to incorporate the various curricula into their classroom, as well as made contacts with the trainers at the different state agencies. This partnership has opened the door for further coordination of programs and projects that may result in the expansion of knowledge of agriculturally based youth curricula throughout the service areas.

e) Funding Source: Federal and State allocations
Scope of Impact: State and County specific

Goal 2: To provide a safe and secure food and fiber system

Executive Summary:

Good nutrition is important throughout the year, yet children receiving free and reduced cost lunches during the school year may experience food insecurity during long summer breaks away from school. In some school districts in Kanawha County, West Virginia, more than 90% of elementary-aged children receive free or reduced cost lunches. These children often reside in low income housing areas where every child meets the eligibility requirements for free school lunch. Children living in poverty, while not necessarily underweight, are more likely to consume diets of poor nutritional value and more likely to be overweight and, at the same time, malnourished. In August 2004, the Dietary Guidelines Scientific Advisory Committee reported that more than half of all U.S. children, regardless of household income, fail to consume enough calcium, vitamin E, fiber, magnesium, and potassium. Lunches that meet the United States Department of Agriculture (USDA) guidelines provide most, if not all, of these nutrients.

Total Invested

Total Funds:	$ 95,839
Formula Funds:	$ 80,000
FTE:	**1.25**

Extension Program 2.1: Food Safety

Summer Food Service Program (SFSP)

a) **Description:** The Summer Food Service Program (SFSP) is administered by the WV Department of Education, Office of Child Nutrition. The WVSU Nutrition and Health Education Unit develops the menus used for the program and then contracts with AVI, the university's food service contractor, for the preparation and packaging of the meals. The Nutrition and Health Education Unit hires part-time summer staff for monitoring of the program and delivery of the meals. The SFSP is also monitored by the county health department, the Office of Child Nutrition and the WV Department of Agriculture. These agencies uphold federal and state food safety and nutrition standards.

b) **Outputs:** The Nutrition and Health Education Program Unit provided lunches to nineteen sites and one 4-H camp in the summer of 2006. A total of 16,068 meals were provided to eligible children.

c) **Outcomes:** 100% of the children participating in the program received a well-balanced, nutritious lunch each day during the 10-week program.

d) **Impact:** Children participating in the program received at least one-third of the nutrients essential for growth and well-being. Good health is consistently linked with good nutrition.

e) **Funding Source:** Smith-Lever Section 1444
Scope of Impact: State Specific

Extension Program 2.2: Food Security

Agriculture Readiness and Preparedness

a) **Description:** Due to the increase awareness of global risk in Agro-security, farmers, growers, producers and Extension personnel are usually the first to notice unusual trends within the agricultural realm. Therefore it is imperative that they know what signs to look for in case a possible agricultural related attack.

b) **Outputs:** WVSU hosted classes on Agro-security readiness delivered by Louisiana State University at the Charleston Area Medical Center. The Agriculture and Natural Resources Specialist has also attended seminars on Chemical and Biological readiness and preparedness hosted by Charleston Area Medical Centers. Collaboration on a partnership with the Red Cross has begun that will allow for program delivery of vital information to the public during emergencies and/or disasters statewide.

c) **Outcomes** Staff and other participants have acquired a basic knowledge of possible agricultural, biological, and chemical tactics that may threaten the safety of local producers in statewide. Also various forms of networking have enabled WVSU Extension programming efforts to become better aligned with Gus R. Douglass' counter-terrorism focus.

d) **Impacts:** Through various educational efforts, WVSU has expanded the knowledge of individuals in West Virginia concerning agro-security issues. This effort will provide Extension and outreach professionals with a practical knowledge

of their role in the community as it relates to protecting our food resources from possible attack.

e) **Funding Source:** Federal and State allocations
Scope of Impact: State and County

Goal 3: To promote a healthy, well-nourished population through research and education

Executive Summary:

West Virginia is consistently ranked among the top three heaviest states. According to the Department of Health and Human Services' Centers for Disease Control and Prevention (DCD), 64 percent of West Virginia adults are obese or overweight; 29 percent of West Virginia high-school students are overweight or at risk of becoming overweight; and 28 percent of low-income West Virginia children between the ages of two and five are overweight or at risk of becoming overweight. Obesity is one of the most serious risk factors for a variety of chronic diseases, such as heart disease, diabetes, and hypertension. Poor nutrition and lack of physical activity are risk factors for obesity. Moreover, people living in rural areas have a higher risk of heart disease, diabetes, and cancer. West Virginia is the second most rural state in the United States, with nearly 65 percent of its population living in communities with fewer than 2,500 people and 45 of its 55 counties designated as "non-metropolitan" by the Census Bureau.

West Virginia State University Extension's Nutrition and Health Education Unit offers programs that improve the quality of life for West Virginians through improved nutrition practices and health education. Office initiatives from October 2005 to September 30 2006 were health literacy for senior citizens, diabetes education, and the Bake ~n~ Shake summer camp for youth.

Total Invested

Total Funds	$ 63,600
Formula Funds	$ 50,000
FTE:	**2.50**

Extension Program 3.1: Nutrition and Health Education Programs

Statement of Issues

Diet and nutrition are important factors in the promotion and maintenance of good health throughout the entire lifespan. Their role as determinants of chronic diseases, such as cardiovascular disease, diabetes, certain cancers, stroke, osteoporosis, and obesity is well established. Therefore, programs focusing on nutrition and wellness occupy a critical position in preventive measures. In West Virginia, one of the most

debilitating medical conditions is obesity, which contributes to numerous other co-morbid conditions. While overweight and obesity can be a result of consuming excess calories, the quality of the diet is also very important. The most recent research on dietary behaviors in West Virginia indicates that respondents in the "obese" category ate the least servings of fruits and vegetables. Moreover, the 2003 West Virginia Youth Risk Behavior Survey (YRBS) found that nearly 80 percent of adolescents ate less than five servings of fruit and vegetables and drank less than three glasses of milk per day. Milk consumption is being displaced by the ever-increasing consumption of soft drinks.

Diabetes Education

a) Description: Staff of the Nutrition and Health Education Unit taught meal planning and food preparation skills for individuals living with diabetes. Participants were enrolled through senior citizens center, newspaper advertisements, and churches. The program is offered in three weekly, two-hour sessions. The educational module is delivered by a registered and license dietitian. The cooking component is taught by a Master's level extension agent. A three-month follow up session was also provided at each site in order to reinforce the educational concepts.

b) Outputs: One three-week class (six hours total) was administered in Kanawha County. A total of 20 people attended the series.

c) Outcomes: One-hundred percent of the participants completed the educational program. All demonstrated an increase in knowledge regarding healthier dietary behaviors. Three months after the class, 10 participants returned for the follow-up session. The majority reported feeling empowerment and in better control of their diabetes.

d) Impacts: Achieving better blood glucose control is the ultimate aim for those suffering from diabetes. The aptitude necessary to manage the disease involves understanding meal planning, food preparation, label reading, etc. Participants receive targeted nutrition counseling and education to gain the everyday skills needed to manage diabetes successfully.

e) Funding Source: Smith-Lever Section 1444 Funds, State of West Virginia
Scope of Impact: State Specific

Health Literacy Project – Can You Repeat That, Please?

a) Description: In 2003 the Office of Nutrition and Health Education, in collaboration with a number of other entities, developed a health literacy program which was first targeted to the senior population. In 2004 a teaching curriculum and personal health history journal were designed to educate and empower program participants to be more involved in their health care decisions. The journal provides a tool for individuals to record relevant health history, insurance information, medication usage, medical test results and other pertinent information. Taking the journal to medical appointments helps to promote the patient's ability to provide more accurate information to health care providers.

b) Outputs: The Health Literacy Program was presented to senior citizens at 22 Senior Citizen Centers in three counties in West Virginia, and at a statewide conference held at Jackson's Mill in Weston, WV. Through partnerships with the

state's Bureau of Senior Services, the Rural Health Education Partnership and others, WVSU Extension has been able to offer the program and the health journal to participants without cost.

c) **Outcomes:** Surveys completed at the end of each training session indicated that 80% of the participants planned to utilize the personal health history journals that they received during the training. All participants also indicated that they planned to implement what they had learned during the training to prepare them for their doctor's visits. 99% of participants stated that they wouldn't change anything about the program. The follow-up evaluation is currently being conducted at all sites where the training was held one year ago.

d) **Impacts:** The health literacy project empowers participants to take a more active role in the management of their overall well being as well as management of any physical challenge they may be experiencing by asking questions, considering alternative treatments, and improving self-efficacy.

e) **Funding Source:** Smith-Lever Section 1444 Funds, State of West Virginia
West Virginia Bureau of Senior Services
Scope of Impact: State Specific, Kanawha, Wyoming, and Roane Counties, statewide conference at Jackson's Mill (Lewis County)

Bake ~n~ Shake Camp (formerly known as the Junior Chef School Project)

a) **Description:** In 2005 the Office of Nutrition and Health Education, in collaboration with a number of other entities, developed a Junior Chef School program that targeted middle school-age students. The teaching curriculum was developed to be used during the pilot program in June, 2005. The objectives of the WVSU Junior Chef School program were to increase the number of participants who eat breakfast each day, increase the number of fruits and vegetable consumed each day to five servings, increase the number of participants who consume the recommended amount of calcium each day and to improve label reading skills. In the summer of 2006, the objectives of the program changed only to include ones for exercise.

b) **Outputs:** This program was presented to 20 participants, ages 11-13, at one Kanawha County High School.

c) **Outcomes:** As a result of participating in the program, 100% of youth wash their hands before eating and preparing food, 60% sometimes read food labels, 90% eat breakfast every day, 55% always choose healthy snacks when given a choice, 70% eat vegetables every day, 70% eat fruits or drink real fruit juice every day, 60% always try new foods, 100% are physically active every day, 55% sometimes think about which foods are good for them when choosing to eat, and 70% drink milk and eat cheese at least two times a day.

d) **Impacts:** The Bake ~n~ Shake program empowered participants to begin making healthier food choices. The students were able to select foods, as well as learn basic food preparation skills to prepare foods for themselves.

e) **Funding Source:** Smith-Lever Section 1444 Funds, EFNEP Funds
Scope of Impact: State Specific, Kanawha County Middle Schools

Expanded Food and Nutrition Education Program (EFNEP)

a) **Description:** The Expanded Food and Nutrition Education Program (EFNEP) was designed to assist limited resource audiences on how to improve their dietary practices and become more effective managers of available resources. EFNEP includes programming to reach two primary audiences: adult and youth. EFNEP is delivered in a series of lessons by paraprofessionals and volunteers, many of whom are indigenous to the target population. EFNEP's hands-on, learn-by-doing approach allows the participants to acquire the practical skills necessary to make positive changes in behaviors. In 2006, 1890 institutions were granted federal funds in order to implement EFNEP for the first time. WVSUE was awarded approximately $11,000, which was not sufficient to establish a unified and sustainable program. WVSUE collaborated with its 1862 counterpart (WVUES) to bring adult EFNEP to Roane County, an area that had not received any previous nutrition and health programs. In addition, part of the money was used to provide a one-week nutrition and fitness summer camp for middle-school youth.

b) **Outputs:** Eight new program families were enrolled in Adult EFNEP in Roane County. One hundred percent of the families were enrolled in one or more food assistance programs. Eighty-eight percent of participants completed the series of classes. The one person who did not complete the program took a job. All eight participants (seven female, one male), or 100%, were Caucasian.

c) **Outcomes:** After program participation, 86% planned meals in advance most of the time, 71% always compared prices at the grocery store, 57% seldom ran out of food, 100% stopped the practice of allowing food to sit at room temperature, 43% chose healthy foods most of the time, 57% stopped adding salt to foods, 43% read food labels, and 100% always ate breakfast.

d) **Impacts:** The EFNEP program empowered participants to begin making healthier food choices. The participants were able to select foods, as well as learn basic food safety skills.

e) **Funding Source:** Smith-Lever Section 1444 Funds, EFNEP Funds
Scope of Impact: State Specific, Roane County

Goal 4: To achieve greater harmony between agriculture and the environment

Executive Summary:
West Virginia offers natural resources that are often utilized by landowners every day. These natural resources are however limited and without proper management they can be become exhausted or extinct. Producers need to be educated and made aware of specific conservation practices (e.g. soil sampling and crop rotation systems) aimed to increasing land efficiency and conservation. Water quality and its availability are also very important factors to consider when designing paddocks in pasture and the application of pesticides. Clean water supply is essential to agriculture and human life. Thus, protecting and preserving natural resources within West Virginia is an obligation of every landowner in West Virginia. WVSU can contribute to this effort via education.

Total Invested:

Total Funds	$ 37,500
Formula Funds	$ 15,000
FTE:	**0.25**

Extension Program 4.1: Environmental Conservation

Japanese Knotweed Research

a) Description: Non-native invasive weeds continue to be a program for homeowners and farmers. Many times as an invasive weed encroaches upon land, native species are destroyed and their value is lost. One high-profile invasive weed gathering much attention in West Virginia currently is Japanese Knotweed. It is invading pasture after pasture, replacing native grasses, and has little to no nutritional value to livestock.

b) Outputs: The Extension Agent has collaborated with West Virginia University (WVU) on a Japanese Knotweed control project. The Extension Agent will be responsible for monitoring and analyzing the project test plots. Eleven different mixtures of herbicides were applied to determine the optimal control of Japanese Knotweed. The Extension Agent has successfully completed all the evaluations.

c) Outcomes: An effective control for Japanese Knotweed as a noxious plant will be determined and a safe/effective plan for the eradication of Japanese Knotweed can be implemented by land-owners state-wide.

d) Impacts: West Virginia State University has completed the project. There were three plots that showed a 99% control rate and one other plot that had an 85% control rate, the other plots control rates were too low to view as a significant control recommendation.

e) Funding Source: Federal and State allocations
Scope of Impact: State and county specific

SARE

a) Description: Sustainable Agriculture Research and Education (SARE) actively supports training and research in farming and marketing techniques that speak to the long-term viability of agriculture by supporting research and education that helps build the future economic viability of agriculture in the United States. At WVSU SARE funding has been utilized to study sustainable agriculture and provide training opportunities for local agriculture producers.

b) Outputs: The SARE coordinator and the USDA 1890 liaison have attended regional and national conferences. The Northeastern SARE coordinator has visited WVSU and met with the SARE Principle Investigator, USDA Liaison, and several members of the GR Douglass Institute's staff. An advisory committee has been assembled and met to discuss community issues related to Sustainable Agriculture and how WVSU Extension may best use its resources to address appropriate solutions. Additionally, a compost demonstration site has been established on campus available for education of local residents, arborists, public employees, commercial vendors and other interested parties.

c) **Outcomes** Because the SARE PI advisory committee consists of professionals from all agricultural impacted areas across the state, requests have begun to come to the office of Agricultural and Natural Resources for tours of demonstration sites and possible collaboration with local farmers on sustainability issues.

d) **Impacts:** West Virginia State University's Extension is becoming noticeable on the local, state and federal level. Ongoing use of the compost demonstration site is allowing for outreach in agriculturally based training and development with more 30 individuals learning and applying new knowledge from the use of this complex. This in turn affords the general public a chance to see some of the research not only being conducted here on campus, but also at other locations in central and southern West Virginia.

e) **Funding Source:** Federal and State allocations
Scope of Impact: State and County specific

Goal 5: To enhance the economic opportunities and quality of life among families and individuals

Executive Summary:

With almost 18% of its population living below the poverty line, West Virginia ranks as the second poorest state in the nation, with a poverty rate almost 150% of the national average. This extreme poverty results from a significant downshift in coal mining, manufacturing and non-durable goods production. The economic characteristics of much of the state, according to the Appalachian Regional Commission (a federal-state partnership for the development of the Appalachian region), reflects this downshift. In their 2004 report, 19 of the state's 55 counties were ranked as being distressed, the lowest economic category, and none were ranked at their highest level. Additionally, of the counties being served by the Extension Service, several fall within two other federal categorizations for extreme plight: Enterprise Communities and Champion Communities. Typically, Enterprise Communities by their nature are the poorest, most economically blighted in the country. McDowell County has been designated as an Enterprise Community, while Fayette and Nicholas counties are part of the five-county Central Appalachia Enterprise Community. Summers, Greenbrier, and Monroe are part of the Tri-county Champion Community and Wyoming County received the designation independently. The region received these federal blight designations because many of the communities within these counties lack capital and declining tax base, have aging populations with high disability levels, as well as suffer from high unemployment and low availability of new jobs. These economic conditions have affected the fiber of the whole community, where many communities have largely abandoned down-towns, housing stock that is old and in need or rehabilitation, and a workforce that is in need of redevelopment and new opportunities for employment. These challenges present an opportunity for the delivery of educational programs and services that assist individuals, families and entire communities with development and redevelopment assistance.

Resource Allocation: Total Invested

Total Funds:	$ 1,778,701
Formula Funds	$ 724,609
FTE:	**18**

Extension Program 5.1: 4-H Youth Development

Health Sciences and Technology Academy Forensics Summer Institute

a) **Description:** The Health Sciences and Technology Academy Program provides academic enrichment focused on science and math for each grade from 9th through 12th as well as laboratory experiences where students work with scientists and/or clinical practitioners. The students work on projects emphasizing science in ways to develop their knowledge and skills in collecting, analyzing and interpreting crime data. The students are shown a number of ways to collect crime data, from crime scene observation to suspect and witness interviews, to actual evidence processing.

The tenth-grade students who attend the Forensics Summer Institute at WVSU are greeted on Sunday Night with a crime scene from which they are expected to collect data and observe the visual aspects of the scene. Throughout the week, the students interview potential suspects and witnesses in order gather evidence to utilize with other evidence to solve the crime; learn how to process evidence at a crime scene through a myriad of forensic science methods – DNA processing, fingerprint collection and identification, and thin layer chromatography, just to name a few; and meet in groups with their teacher/advisor to determine who committed the crime. On the final day of the institute, the student groups present their findings to science faculty, teachers, Land Grant personnel, and fellow students.

b) **Outputs:** The 2006 Forensics Summer Institute served 92 youth from twenty-five counties throughout West Virginia. Seventeen West Virginia counties were represented. In addition, seven West Virginia teachers learned about techniques for teaching Forensic Science.

c) **Outcomes:** 100% of teachers indicated that the information learned would benefit them to some degree in the classroom. 70% of teachers perceived that the Summer Institute had an impact on whether or not students would select science or health-related careers. Approximately 90% of students indicated that the Summer Institute would have an impact on whether or not they would select a science or health-related career, with 40% indicating that the summer institute had a “high” or “very high” impact on that decision. Nearly 70% of students indicated that they had learned either “a lot” or “quite a bit” about the seven Forensic areas of focus (DNA, Blood Spatter, Handwriting Analysis, Chromatography, Fingerprint Analysis, Drug Identification, and Evidence Processing).

d) **Impacts*:*** The majority of 714 HSTA students from the first four cohort groups are still in college. 23% of the 714 students have gone on to graduate or professional school. 49% of those in graduate or professional programs are enrolled in health science areas. Ten of the HSTA scholars are currently in medical school.

e) **Funding Source:** Smith-Lever Section 1444; Howard Hughes Medical Institute; Stanley & Virginia Hostler; National Institutes of Health Science Education Partnership Award; Benedum Foundation; Centers for Disease Control; Robert Wood Johnson Foundation; State of West Virginia; and West Virginia University Health Sciences Center

Scope of Impact – State specific, Kanawha, Cabell, McDowell, Raleigh, Braxton, Mingo , Mercer, Tucker, Preston, Logan, Boone, Ohio, Calhoun, Taylor, Greenbrier, Monongalia, Preston, Berkeley, Marion, Jefferson, Roane, Marshall, Fayette, and Barbour Counties

Hip-Hop Boot Camp

a) **Description:** The Hip-Hop Boot Camp is a non-traditional 4-H summer camp that attracts youth interested in the music industry. During the one-week, residential camp, the teens participated in track sessions that teach production, song and rap writing, turntables, dance, photography, filmmaking, and graffiti art. The track sessions provided every participant with a minimum of 12 hours of instruction in the Arts and additional activities provided six hours of physical activity, eight hours of small group mentoring, and three hours of entrepreneurial instruction and activities.

b) **Outputs:** During the summer of 2006, the Hip-Hop Boot Camp served 64 youth in grades 7-12. The camp also employed the talents of 18 adult counselors.

c) **Outcomes**: Of the 42 youth who attended camp in 2006, 31 were returning campers, which is a nearly 75% return rate from 2005. The camp also attracted youth from six counties in West Virginia, as well as four youth from Ohio. The track sessions, which are the classroom times, were the most popular part of the camp. In the final evaluation, the most requested change for 2006 was an increase in classroom time and every camper reported learning during their track time, with 61% reporting that they learned a lot. Also, 71% of the teens reported that the majority of the skills they learned will assist them in the future. In addition to the instruction in the Arts, each camper also received six hours of exercise and nutrition instruction, which resulted in 64% reporting that they learned more about exercise and nutrition.

d) **Impact:** The camp continues to show incredible growth potential. On the final camp survey, 98% of the participants reported a desire to attend the 2006 camp. Additionally, 100% of the campers would recommend the camp to their friends.

e) **Funding Source -** Smith-Lever Section 1444; The Greater Kanawha Valley Foundation; 304Live.com; West Virginia Human Rights Commission

Scope of Impact – Multi-state - Participants and staff came from Fayette, Kanawha, Raleigh, Cabell, Mercer, and Wood Counties in West Virginia, as well as Franklin County, Ohio and Wake County, North Carolina.

Extension Program 5.2: Community and Economic Development

Economic Development Authority Partnerships

a) **Description**: The economy of the service region is working to re-align from a reliance on the extraction industries into new economies that are anchored by

tourism and technology ventures. The adoption of these new industries has created an important need for localized community and economic development assistance for southern West Virginia, both in terms of workforce development as well as small business development and community revitalization. In addition, WVSU Extension began a partnership with a local Main Street agency that is unique in the nation.

b) **Output**: Assess community and economic development needs within the service region to assist in providing communities with access to needed community and economic development program efforts that have a measurable impact on development needs of the service region.

c) **Outcome:** WVSU placed an additional community and economic development agent in the service counties. An agent is now housed in Fayette, Wyoming / McDowell, Nicholas and Kanawha Counties, each focused on CED issues. The agents are working with partners on strategic initiatives such as the development of a Science, Nature and Environmental Education complex to serve southern West Virginia; the delivery of small business development / training programs that were attended by over 600 participants; and the facilitation of community strategic planning efforts that resulted in the development of a long-range economic development plan for two blighted communities and an urban corridor revitalization effort.

d) **Impact:** Extension Agents assisted eight community projects that generated over $400,000 in state and federal grants for local redevelopment; also staff provided entrepreneurial assistance to small business owners receiving county economic development loan funds totaling over $1 million dollars for use in augmenting their businesses; and the university facilitated a strategic planning initiative for the development of the West Virginia Industry of Culture business cluster program supported by the Governor of West Virginia. In addition, during its first year of programming the West Side Main Street initiative sponsored seven community events including a public forum: “It’s so Easy Living Green”, a “FestivALL” Ice Cream Social and Community Sing, an Arts & Crafts Fair; a “Trick or Treat for Trash” Street Clean-Up; and a Sidewalk and Bake Sale. As a result of these community-building events, an interest in the revitalization is growing as evidenced by the approximately 720 hours of volunteer time donated to the projects and the increased participation rate to approximately 50% by the local businesses. Other impacts from this past year include working with various partners to attain designation of a portion of Washington Street as a National Historical District; get the Florida Streetscape underway; coordinate design assistance projects for two businesses; co-sponsorship of 2 SBA workshops attended by over 60 prospective or existing business persons as well as sponsorship of 6 additional trainings attended by a total of 90 persons.

e) **Funding Source:** 4-C Economic Development Authority, Wyoming county Economic Development Authority, Fayette County Commission, Federal and State Allocations

Scope of Impact: County Specific

Workforce Education and Career Awareness Website www.WECAN4U.net

a) **Description:** In September 2000, a collaborative multi-state agreement was effected with the Alabama Cooperative Extension System – Alabama A&M University, in order to establish a national website promoting workforce development, financial literacy, employment, and training opportunities. The site was developed and posted on the World Wide Web in July 2001, in order to bridge the digital divide via the utilization of information technology. In addition, the website received national recognition from the 1890 Association of Extension Administrators when it received the 2003 Innovative Program in Technology Award. Furthermore, the USDA awarded a $10,000.00 grant to the program in November 2003. The monies are intended to provide further support for site development, search engine registration, promotion, and inclusion of other states within the website schema. WVSU concluded participation in this website in September 2006.

b) **Outputs:** The website generated over 2000 hits in the annum.

c) **Outcomes:** Site feedback included participant increases in knowledge of Internet sites regarding training and educational opportunities, Workforce Investment Act information, and employment prospects.

d) **Impact:** Established in 2001, wecan4u.net continues to serve as a gateway for workforce development information for utilization from individuals throughout the world. As site maintenance costs less than $20.00 per month, the site serves as a cost efficient illustration of how a multi-state initiative can serve thousands of individuals for less than one dollar per person.

e) **Funding Source** – Smith-Lever (Section 1444)
Scope of Impact – Multi-state, national, and international

Extension Program 5.3: Minority Business Affairs

a) **Description:** Over the past 10 years, minority-owned businesses have grown at double the rate of all other firms nationwide, making up 12% of the nation's businesses, and now have a purchasing power equal to 20% of the US disposable income. While this national trend has been very positive, West Virginia has unfortunately not mirrored the rest of the nation in minority business development or purchasing power. Even in Kanawha County, which has the largest number of minority residents in the state, minority-owned businesses comprise only 1% of the total businesses and this percentage is even less in the other counties.

b) **Output:** With support form a HUD grant awarded in the amount of $550,000, WVSU has purchased a facility to house an economic development center. This Center has the mission of providing education and training for low income residents of Kanawha County as well as providing an entrepreneurial development/ business incubator that specifically targets low-income minority business development.

c) **Outcome:** The Center has been established, with three additional grants totaling approximately $450,000 secured to support the programming efforts. Partnerships have also been developed with Workforce WV who have re-located staff to the facility and the WV Department of Health and Human Resources who have had

their staff participate in training and program development at the center. Local faith based groups are delivering home-ownership and parenting classes; and the small business development program "Opening Soon" has been launched with 10 minority businesses involved in the twelve-week training program.

d) **Impact:** The Center is now fully established and more than 1200 community members have participated in workforce development training, homeownership / credit restoration initiatives, small business development assistance and other programming offered at the Center. Additionally, two minority businesses are housed in the business incubator.

e) **Funding Source***:* Housing and Urban Development Grant, Federal and State Allocations
Scope of Impact: County Specific

Extension Program 5.4: Technology and Literacy Education

a) **Description**: Several programs and initiatives are underway that provide educational training that helps address the skills necessary to achieve individual economic self-sufficiency. These skills include general educational development such as literacy training and GED preparation, goal setting and leadership development, entrepreneurial training, employment skills including job training, job search, and placement assistance, labor retention skills, financial literacy, and computer utilization. The first of the initiatives is the Community Learning Centers / Neighborhood Networks Program in which Extension presently oversees or provides support for fourteen sites within Charleston that offer an array of technology literacy and life skills development programs. Four of the sites are located in community or faith-based sites, where WVSU Extension continues to provide Internet access and limited training support. Ten of the sites are located in Charleston Housing, the local public housing authority which provides family and senior living to approximately 2000 low-income residents. These sites include South Park Village, Carroll Terrace, Lippert Terrace, Lee Terrace, Jarrett Terrace, Littlepage Terrace, Oakhurst Village, Hillcrest Village, Washington Manor and Orchard Manor. The Neighborhood Networks grant program of HUD funded these sites programmatically. Through Charleston Housing, WVSU Extension manages the $200,000 program.

b) **Output:** More than 250 individual literacy and technology program topics were delivered to approximately 400 residents. These include topics such as: Computer Basics, Talking to your Doctor; Workforce Development, Literacy, Life Management Skills, E-Mail, Site Seer's Club, Business Card Development, Basket Weaving and Technology. One full-time grant funded staff member works with the WVSU Extension Agent to provide regular weekly hours at each site. The program coordinator works with the newly established Community Service Program where volunteers provided a total of 2500 hours of open lab and garden maintenance support. .

c) **Outcome:** Twelve community centers with computer labs were fully operational and making technology accessible to more than 2000 low-income residents.

d) **Impact**: Learning Centers were fully maintained in twelve limited resource communities that provided low-income residents with important access to technology formerly not available to them. Low-income students used this access for homework, computer literacy, and e-mailing. Adult residents used the site for online banking (particularly among the elderly), resume writing and job searches. This access to technology permitted these participants to have the educational resources not within their means otherwise, and allows them to remain competitive with individuals already with access and familiarity with technology. Additionally, Community service hours were also on the rise with 859 hours as residents on "Zero Income" fulfilled their 8-hour per month obligation to attend educational classes. If the participants had not fulfilled these requirements through the program, they may have been in jeopardy of losing public assistance dollars for which they are eligible. The loss of these funds, and potentially the loss of housing access, would have greatly reduced self-sufficiency.

e) **Funding Source:** Housing and Urban Development Grant, Higher Education Policy Commission Grant, Federal and State Allocations
Scope of Impact: State Specific

Extension Program 5.5: Rural Business Services

(a) **Description:** This program was initially developed in November 2003 with a $136,000 grant from the USDA and operates under the mission of the Rural Business Cooperative Service. Two subsequent grants have allowed for program continuation. The program strives to provide outreach to small rural communities through the delivery of programs that will develop future entrepreneurs and businesses in economically distressed areas. The program specifically targets eleven counties in southern West Virginia (Fayette, Greenbrier, Mercer, McDowell, Monroe, Nicholas, Pocahontas, Raleigh, Summers, Webster and Wyoming). An additional focus on the counties of McDowell, Summers, Webster and Wyoming was provided because of their designation as "distressed" based upon their poverty statistics, loss of population, average income and average unemployment.

(b) **Output:** Working in partnership with the USDA's state program for Rural Business Services, and a host of other state and private partners such as the Small Business Development Center of the Workforce Investment Board region 1, several key directions for this program were identified. These include:

1) low-cost training, which is being co-sponsored frequently with the state and local SBDC;
2) regional collaboration / facilitation;
3) community fair and festival development;
4) specialty foods development and tourism related small business development.

c) **Outcome**: Sponsorship of a regional Women's Conference that was attended by over 90 prospective or existing business women from southern West Virginia; annual sponsorship of a state-wide conference for the Specialty Foods cooperative that provided individualized business development assistance for approximately 40

small businesses; sponsorship of ten specialty foods businesses at the international specialty foods trade show; two community development strategic planning processes were funded; and the development of a new farmers market was funded..

d) **Impact:** The new farmers market generated over $4,000 in new income for the local participating farmers; the Recipe Challenge launched one new food entrepreneur and identified twenty-six potential producers; and two communities developed a comprehensive strategic plan which resulted in a funded grant application of $350,000 which will leverage over $1 million to implement the plan;

e) **Funding Source**: USDA Rural Business Services Grant, Federal and State Allocations
Scope of Impact: 11 counties in Southern West Virginia

Extension Program 5.6: Adult and Family Education

Pregnancy Prevention

a) **Description:** The program area of Adult and Family Education addresses adolescent pregnancy using the "Baby Think It Over®" program. With this program, computerized infant simulators are utilized to demonstrate the responsibilities associated with parenting. Teen participants are assigned a simulator that cries and needs life-like care (e.g. bottle feeding, diaper changing, burping, rocking, etc.) The goal of this program is to increase awareness among teens of the time, effort, responsibility, and skills required to raise an infant. It also encourages teens to wait to become parents until they are older and able to adequately provide financial and emotional care for children.

b) **Outputs:** This program was provided to 69 students this past year in Kanawha County; some of whom were already parents.

c) **Outcomes:** At least 90% of the students surveyed after the simulation stated they realized they were not ready to be parents at their current age. Pre-and post-test data indicate that 100% of the Baby Think It Over participants demonstrated an increased knowledge of the responsibilities of parenting. Comments of participating students indicate the successful impact this simulation had on their views of teenage parenthood.

d) **Impact:** As the goal of this program was to offset adolescent pregnancies in the area, many of the participants indicated that they did not want the responsibilities at such an early age, thereby decreasing their initial tendencies to participate in behaviors that could lead to unwanted pregnancies.

e) **Funding Source:** Smith-Lever Section 1444 Funds
Scope of Impact: State Specific

Transitional Living Program

a) options for increasing land efficiency by using **Description:** According to The Associated Press, only 54 percent of students that entered four-year colleges in 1997 had a degree six years later. The percentages of successful completion

are a great deal lower when you examine at-risk young adults. To address this national issue West Virginia State University Extension, with funding from HUD and HBCU, developed the H.O.U.S.E. (Helping Our Undergraduates Succeed in Education) program. The West Virginia State University H.O.U.S.E. program is the only program of its kind in the nation. The H.O.U.S.E. program is composed of two initiatives. The first component assists six at-risk 17-24 year olds with transition into college life; by providing for them with a residence in a small family home setting for their first four semesters. The second component assists three female victims of domestic violence or homelessness, who wish to succeed by graduating from college. There are three apartments on campus reserved for these students and they may reside in their apartment until they obtain their degree. Residents of the H.O.U.S.E. program are referred from local and state agencies as well as departments within the university. The H.O.U.S.E. program accepts residents from throughout the state as well as the nation. The goal of the HOUSE program is to see at least 80 percent of all residents obtain college degrees. This will allow them to be productive, employed, and contributing members of society. The benefits of the H.O.U.S.E. program to West Virginia State University have been immeasurable.

b) **Outputs:** Six residents participated in 20 independent life skills lessons addressing assessed deficiencies in the areas of independent living. A total of nearly 2,000 contact hours have been spent with these residents that include case management services, volunteer activities, meetings, crisis management, and 24-hour support from resident assistants.

c) **Outcomes:** 100% of both HOUSE and Phase II students who completed at least one successful semester in the program continue to take classes on the campus, work towards their degree and consider themselves forever connected to HOUSE. At least three students have been dean's list participants. Students who are often marginalized have been empowered to make positive, sustainable changes in their lives directly due to the support of this program.

d) **Impact:** The HOUSE and Phase II programs provide both group and individually tailored case management services to clients in a residential setting. These services result in the at-risk population having an opportunity to obtain a higher education, a residence of their own, and greater potential for future long-term employment, as a result of the skills they learn while in the transitional living program. Referral agencies, residents, social service providers, and youth in foster care continue to actively support this program and its ongoing development.

e) **Funding Source**: Smith-Lever Section 1444 Funds, State Funds, Self-Generated Program Funds

Scope of Impact: National

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