V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources		2%		0%
102	Soil, Plant, Water, Nutrient Relationships		3%		0%
111	Conservation and Efficient Use of Water		10%		0%
131	Alternative Uses of Land		10%		0%
201	Plant Genome, Genetics, and Genetic Mechanisms		0%		30%
202	Plant Genetic Resources		0%		26%
204	Plant Product Quality and Utility (Preharvest)		5%		2%
205	Plant Management Systems		5%		11%
206	Basic Plant Biology		10%		2%
302	Nutrient Utilization in Animals		0%		29%
403	Waste Disposal, Recycling, and Reuse		10%		0%
405	Drainage and Irrigation Systems and Facilities		3%		0%
721	Insects and Other Pests Affecting Humans		2%		0%
806	Youth Development		25%		0%
902	Administration of Projects and Programs		10%		0%
903	Communication, Education, and Information Delivery		5%		0%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	2.5	0.0	7.8

Actual Paid	0.0	3.5	0.0	6.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	179431	0	992828
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	134921	0	878354
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

WVSU Extension personnel will assist in the development of alternative agricultural endeavors to assist farmers increasing their revenues. Additionally, there is an emerging interest in the development of green spaces in our urban centers and municipalities. WVSU will work with these entities to maximize utilization of best practices in the field of cultivation, selection, and maintenance. WVSU Extension will continue to target small-scale producers with education to increase knowledge levels in alternative enterprises that may expand profits for small farm operators. Home landscape beautification and vegetable gardening are at the center of this heightened resurgence of interest in horticulture.

Commercial growers in the areas of greenhouse and nursery management, cut flower production, and fruit and vegetable production are also seeking marketing and production related advice in order to satisfy growing consumer demands. Some of the projects that are the most often asked about are the identification and/or eradication of plants and pests, the growing cycles of plants, plant maintenance, and alternative gardening techniques. WVSU will offer youth from pre-k to age 18, a variety of opportunities to be exposed to plant and animal education. Program emphasis will focus on the Junior Master Gardener program.

A Research and Extension integrated goal will be to identify funds to create an Extension position to better support the research efforts in this area.

2. Brief description of the target audience

- Fish feed manufacturers, federal agencies (ARS) involved in rainbow trout breeding, fish farmers
- Horticulturalists, plant breeders, farmers/growers, small-farm operators, minority farmers and

landowners, underserved rural communities , state and federal agencies, and students.
• Homeowners, consumers, volunteer organizations, various segments of the youth population, and other agricultural and natural resource focused entities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3300	7250	2492	2221

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	1	17	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

● Identify breed of rainbow trout that has genetic potential for improved nutrient utilization

Year	Actual
2014	0

Output #2

Output Measure

- Train undergraduate and graduate students in biotechnology, plant genomics and agricultural related fields
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Identification of DNA markers, fruit related genes, association panels, and value-added progenies

Year	Actual
2014	0

Output #4

Output Measure

- Develop vegetable varieties for small farm production

Year	Actual
2014	0

Output #5

Output Measure

- Both urban/rural clientele will receive information on research-based horticultural management.

Year	Actual
2014	336

Output #6

Output Measure

- Adult volunteers and youth will receive training in horticulture and agriculture through JMG and other training opportunities.

Year	Actual
2014	3152

Output #7

Output Measure

- Workshops targeted at alternative agriculture endeavors will be held in targeted counties.

Year	Actual

2014	31

Output #8

Output Measure

- WVSU Extension Service staff will generate media articles and stories related to alternative agriculture.

Year	Actual
2014	6

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	New diet formulation for rainbow trout
2	Development of improved feed for rainbow trout will lead to reduction in aquaculture pollution
3	Development of value-added, disease resistant cultivars
4	Development of vegetable varieties suitable to small farm environment.
5	Volunteers will exhibit increased knowledge of providing age-appropriate horticulture and agriculture programs to youth.
6	Extension clientele will implement best practices in agriculture and natural resources based on research-based knowledge.
7	Farmers/growers will utilize best practices with alternative agricultural enterprises to diversify their income portfolio.
8	Through the Agritourism initiative participants will create new or develop existing enterprises to increase their sustainability.

Outcome #1

1. Outcome Measures

New diet formulation for rainbow trout

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
High feed cost in aquaculture is a major problem, and reducing the cost through optimal dietary composition will increase profitability to the farmers. If changes in dietary composition lead to improvement in nutrient utilization efficiencies, pollution from unused nutrients in effluent discharges from aquaculture production facility will be reduced.

What has been done
A 2 x 3 factorial experiment was conducted to determine effect of trout families (designated as low FE and high FE) and diets (45/10 or 45/20 or 45/30 percent crude protein/fat) on the growth performance characteristics, mitochondrial respiratory enzymatic activities and gene expression in the liver, muscle and intestine. Analyses of growth performance characteristics have been completed and analyses of mitochondrial respiratory enzymatic activities and gene expression in the liver, muscle and intestine are ongoing for diets containing 45/10, 45/20, and 45/30 percent crude protein/fat.

Results
Dietary composition and fish family did not significantly affect weight gain, feed efficiency, condition factor, and specific growth rate. The rainbow trout family significantly affected hepatosomatic index while dietary composition significantly affected viscerosomatic index, visceral fat content, and respiratory control ratio using succinate and pyruvate as substrates. There was significant interactive effect between diet and family for respiratory control ratio using succinate as a substrate.

4. Associated Knowledge Areas

KA Code	Knowledge Area

302 Nutrient Utilization in Animals

Outcome #2

1. Outcome Measures

Development of improved feed for rainbow trout will lead to reduction in aquaculture pollution

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rainbow trout with improved nutrient utilization will reach market-size in less time with less nutrient input. Less nutrient input and higher nutrient retention have environmental implications by reducing pollution from aquaculture discharge.

What has been done
A 2 x 3 factorial experiment was conducted to determine effect of trout families (designated as low FE and high FE) and diets (45/10 or 45/20 or 45/30 percent crude protein/fat) on the growth performance characteristics, mitochondrial respiratory enzymatic activities, and gene expression in the liver, muscle and intestine. Analyses of growth performance characteristics have been completed and analyses of mitochondrial respiratory enzymatic activities and gene expression in the liver, muscle and intestine are ongoing for diets containing 45/10, 45/20, and 45/30 percent crude protein/fat.

Results
Dietary composition and fish family did not significantly affect weight gain, feed efficiency, condition factor, and specific growth rate. The rainbow trout family significantly affected hepatosomatic index, while dietary composition significantly affected viscerosomatic index, visceral fat content, and respiratory control ratio using succinate and pyruvate as substrates. There was significant interactive effect between diet and family for respiratory control ratio using succinate as a substrate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #3

1. Outcome Measures

Development of value-added, disease resistant cultivars

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Because of narrow genetic diversity, cultivars in watermelon, melon and pumpkin have been vulnerable for various diseases and pests. This research will facilitate developing nutraceutically-enriched cultivars, and help plant breeders to slect important parental material for breeding valuable cultivars.

What has been done
We performed genome analysis to classify diversity groups for widening genetic diversity among the cultivars. Nutraceutical compounds are quantified and genes responsible for various compounds are identified, using the following techniques and objectives: high resolution genetic maps are with 10,000 SNPs for melon, watermelon and pumpkin, QTLs and linked markers for various traits have been identified, domestication process is elucidated for watermelon and pepper, genetic passport information is generated for melon, pumpkin, watermelon and peppers, value added vegetable cultivars are identified, advanced breeding lines have been evaluated in farmers? field, and whole genome sequence is completed for watermelon and pumpkin.

Results
Genomewide association mapping was performed to identify genes and markers for various cultivars. In addition, valuable genomic information is developed pertaining to chromosome wide nucleotide diversity, recombination hot spots, selection sweeps, the genes that are important for cultivar domestication, genes linked to various fruit and nutraceutical traits and insect resistance. Graduate students and undergraduate students associated with the research activities of this program have been exposed to various filed and lab techniques like selfing, crossing, molecular

marker development and marker analysis etc.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Development of vegetable varieties suitable to small farm environment.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Protected culture production of tomatoes has more than doubled in the last five year in West Virginia, while at the same time the number and size of vegetable farms has been static. Production in a greenhouse or high tunnel generates higher yields than field production when using varieties bred for these environmental conditions. Unfortunately, most of the varieties bred in the US are for field production and no public tomato breeder is focused on protected culture tomato varieties. We are focusing on selecting lines with superior organoleptic and pest resistance traits for developing varieties for this market. Trials will also be done to verify the insect resistant trait, acylsugar production, which will not interfere with the existing biological control agents used in IPM before using marker-assisted selection.

What has been done
Current focus is on identifying verified molecular markers that can be used to transfer and maintain the necessary genotypes, and determining a synthesis method for acylsugars to use in

trialing with beneficial insects. Standard tomato varieties, advanced breeding lines, and germplasm have been grown in a hydroponic system within a greenhouse. These lines have been selected for superior plant and fruit traits as well as having seed and leaf tissue collected for marker analysis. Markers for three diseases (late blight, tobacco mosaic virus, and Verticillium wilt) were identified from the literature or developing labs. We have incorporated the QIAxcel Advanced system, used to determine DNA fragment sizes, into our verification methods along with gel electrophoresis and sequencing techniques. A plan for retrosynthesis of an acylsugar (triesterified monosaccharide, 2-hydroxy-6-(hydroxymethyl) tetrahydro-2H-pyran-3,4,5-triyl triundecanoate) was undertaken and modified to produce the compound for trialing on beneficial insects used in IPM.

Results

Verifying published marker sizes continues to be problematic as some markers are not in the gene of interest, sizes for the amplicon or restricted products do not agree with published reports and others do not amplify. Seventeen markers have been used (five late blight, five tobacco mosaic virus, three Verticillium wilt and one each for Asc1, Bs4, Hero and self-pruning). In the past estimating the size of amplicons and restricted products has been difficult but the addition of new equipment and software we are able to reliably call band sizes within 3-5 bp. We still find that the published sizes of amplicons and restricted products do not agree with our results, but believe that this is due to the method that was used to ?call? the size. Use of software to virtually identify the sizes has generally agreed with our results. Sequencing of amplicons has also been undertaken to verifiy that the fragment obtained is the same as that found virtually. Work with the Tm-2 markers can illustrate our results. Amplification of the five markers with the three known genotypes of Tm-2 produced amplicons expected from published literature. Digested products were found for three of the five Tm-2 markers. Amplicons from one marker that did not digest had sequence data that lacked the published restriction site, which agreed with the published genome. Further it was found that this marker does not amplify within or near the Tm-2 gene but over 32 Mbp away. A second marker, which did digest, was also found in this region. Another undigested amplicon marker also did not align to the published location but was found over 6 Mbp away. Sequences of two remaining Tm-2 markers aligned with the reference genome and known sequences of Tm-2 and produced restriction sizes as predicted. A five step method for the retrosynthesis of an acylsugar (triesterified monosaccharide, 2-hydroxy-6-(hydroxymethyl) tetrahydro-2H-pyran-3,4,5-triyl triundecanoate) successfully created the compound. Work is currently underway to verify the final product, synthesize other acylsugar moieties and produce sufficient quantities necessary for trials on beneficial insects.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources

Outcome #5

1. Outcome Measures

Volunteers will exhibit increased knowledge of providing age-appropriate horticulture and agriculture programs to youth.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	674

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As focus turns towards local foods and urban agricultural efforts, it has become even more important to provide information to adults on how to engage youth on these topics. Youth in both rural and urban areas of WV have shown interest in growing their own fruits and vegetables for consumption at home or at school. Providing trainings to increase the knowledge base of adults on horticultural and agricultural topics geared toward the preschool, elementary to middle school age groups has provided the ability to transfer this information from one generation to the next. Through the National Junior Master Gardener Program, West Virginia State University serves as the State Coordinator of the West Virginia based program conducting presentations and trainings on the program to meet these needs within the state. WV State University Extension Service has also developed an urban youth garden program entitled SCRATCH to serve as a pilot program and illustrate how the Junior Master Gardener Program can be used in conjunction with after school program efforts. The preschool based JMG pilot program PLANTERS was also initiated this year.

What has been done
Presentations were conducted on eleven different occasions around the state and out of state to increase the awareness of the Junior Master Gardener Program. Four Junior Master Gardener Trainings were conducted at 4 hours each and trained the participants on the program through conducting hands-on activities from the curriculum. In order to increase program exposure, a Junior Master Gardener Program Interactive Display was set up at thirteen events within the state where youth are able to come through and interact in the exhibit and get a feel for the programmatic efforts. It is also a way for parents and teachers to become engaged in the program concept. Through the pilot Junior Master Gardener based SCRATCH Program, youth interactions occur at three afterschool sites weekly while production gardens are built and maintained by the

program youth. These sites serve as a demonstration of what can be created in an urban setting. An additional youth based art garden was created to serve as a demonstration for garden creation. The preschool JMG based pilot program PLANTERS was established this year and interacts in 4 preschools within the state adapting the JMG curriculum to this age level.

Results

Presentations were attended by 285 adults interested in youth gardening opportunities, while an additional 60 participants attended scheduled half day trainings to increase their knowledge of program delivery and activities. Over 1700 youth and countless parents engaged with the JMG Interactive displays set up on thirteen occasions around the state to increase awareness of the program offerings. Fourteen volunteers assisted with these efforts. A demonstration youth art garden was built in conjunction with a community partner. This garden indirectly impacts 100 youth at the School of Harmony. The Scratch Project engages youth on a weekly basis and has three functional garden spaces that are worked by the youth. Over the course of the year the youth met 103 times totaling direct contact with 1042 kids. The program is also using evaluation measures such as a Fruit and Vegetable ID and Preference Questionnaire to determine a change in behavior of the youth. These results have proved that even our youngest participants are starting to increase their baseline levels of knowledge. In one year 247 volunteers gave their time to the project, mainly students from Marshall University in conjunction with the SCRATCH Project site interactions as well as garden builds. The PLANTERS program works with youth from 4 local preschools on a weekly basis and in its first year met with 1450 youth over the course of 56 interactions. In one year 68 volunteers gave their time to the project during the activities as well as for the garden builds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
206	Basic Plant Biology
403	Waste Disposal, Recycling, and Reuse
721	Insects and Other Pests Affecting Humans
806	Youth Development
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

Outcome #6

1. Outcome Measures

Extension clientele will implement best practices in agriculture and natural resources based on research-based knowledge.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	662

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As a change occurs in the realm of agricultural production, a focus on sustainable agricultural production has become more desirable. Based on this demand, Extension based agricultural program efforts out of WVSU have focused on implementing workshops to illustrate best management practices in agriculture and natural resources to extend the knowledge of the University out to the greater community. Workshops, garden builds, and presentations have been delivered on numerous topics to help ensure that the general public is well educated on these topics.

What has been done
Workshops were delivered on the topics of mushroom production, hydroponic/aeroponic production, raised bed production, community and adaptive garden creation, hops and small fruit production around the state. Community, youth and adaptive gardens were built in collaboration with program partners to provide an outlet for healthy food production. Work days were conducted of garden sites for hands on experiences. Presentations at conferences and at local meetings were given about program offerings. Articles were written as well as poster presentations displayed at conferences.

Results
Sixteen workshops were delivered on the topics of raised bed production and community and adaptive garden creation. A raised bed workshop was offered during our Urban Ag Conference to 103 participants and was the most sought after class on the schedule. Community and adaptive gardens were assisted in five communities around the state involving over 120 participants. Work days at local garden sites and were offered and attended by over 50 people increasing the visibility of our program outreach efforts. Presentations on our community garden program efforts were delivered on fifteen occasions to audiences totaling 389 people.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships

111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
721	Insects and Other Pests Affecting Humans
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

Outcome #7

1. Outcome Measures

Farmers/growers will utilize best practices with alternative agricultural enterprises to diversify their income portfolio.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
206	Basic Plant Biology
302	Nutrient Utilization in Animals
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
721	Insects and Other Pests Affecting Humans
806	Youth Development
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

Outcome #8

1. Outcome Measures

Through the Agritourism initiative participants will create new or develop existing enterprises to increase their sustainability.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	301

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As tourism in WV has an increasing push toward the natural beauty of the state, it is only natural that our agricultural production sector takes advantage of this as well to move more towards the agritourism side of the industry. Through the development of niche markets, unique production methodology as well as unique marketing strategies the potential for expansion is incalculable.

What has been done

Workshops were delivered on the topics of specialty crop production of oyster, chicken of the woods and shitake mushroom and hydroponic/aeroponic production technologies. Grants were written to expand on the education on specialty mushroom production around the state through development of urban and rural demonstration sites, with new projects proposed for reuse of preexisting structures that provide the appropriate climate for mushroom production. Additional grants were funded to conduct applied research on the potential for hops production in the state as a viable agritourism industry in conjunction with local brewery operations as well as to develop pecan groves back in areas of the state where the trees once stood. Meetings were conducted to discuss the potential for production expansion on to abandoned mine lands sites as well as with industry professional to illustrate the potential for growth of the agritourism industry in the state.

Results

Fifteen workshops were delivered on the topics of mushroom production, hydroponic/aeroponic production, hops and small fruit production to participants around the state. Mushroom production workshops focusing cultivation of shitake, chicken of the woods and button varieties were offered on 8 occasions for 151 participants. Hydroponic production (vertical aeroponic technology) methods were presented twice throughout the year to 34 participants and a demonstration production range is under development utilizing solar power to run the systems on an abandoned mine site. A hops production trial was funded this year involving 40 growers around the state who have been engaged in discussions on several occasions along with plant material and advice. As part of our small fruits program, 4 workshops were provided to 76 participants and a small fruit garden established in McDowell County. Several other workshops we on the schedule but were delayed until the beginning of this year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Weather continued to affect the outcomes of our program efforts due to the nature of horticulture and gardening. Workshops and training all were delayed or cancelled

throughout the year due to weather. Changes in site locations and scheduling issues also came in to play. Program budget cuts and delays affected many projects. Finally, changes in staff and personnel has been one of the biggest hurdles in the past year, working to fulfill the same work load requirements with less staff in place.
All research programs have been impacted by the delay in receiving federal funds and a decrease in State matching.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Of the 60 participants of the half day JMG Trainings, 100% illustrated at increase in knowledge about the program and their ability to deliver the activities to youth. For the SCRATCH Project in general, fruits are easier for children to recognize than vegetables, and they prefer fruits to vegetables. Many items are ones that children recognize but cannot name. When children are unable to name the item, they are less likely to have ever tasted the item and less likely to report liking it. These results may pave the way for a fruits and vegetables identification and preference test that others can use. Preliminary data was presented at the Midwestern Psychological Association meeting in May, 2014 as a poster.

Key Items of Evaluation

Of the **60** participants of the half day JMG Trainings, 100% illustrated at increase in knowledge about the program and their ability to deliver the activities to youth. The mushroom production workshop evaluations illustrated of the **151** participants there was an average of **85%** increase of knowledge about the topic. The Community and Adaptive gardening presentations targeted several topics but overall evaluations illustrated of the **359** participants there was an average of **85%** increase of knowledge about the various topics covered, including raised bed construction. Hydroponic and aeroponic production workshops were attended by **34** participants and also indicated a **100%** increase in knowledge on the topic. The 4 Small Fruits workshops attended by **76** participants saw an average of an **88%** increase of knowledge gained. The Carroll Terrace Community Garden celebrated its 10th growing season in 2014 and consistently produces over 2000lbs of produce that goes back to the 40 participants at the low income garden site, allowing them to not choose between eating or purchasing their medications. At the Adaptive Garden at the Five Loaves and Two Fishes Food Bank in McDowell County, over 250lbs of produce was grown in the second season going directly back for distribution and feeding the hungry in the area.