

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Commercial and Consumer Horticulture

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
124	Urban Forestry	8%		10%	
202	Plant Genetic Resources	10%		10%	
204	Plant Product Quality and Utility (Preharvest)	15%		15%	
205	Plant Management Systems	36%		40%	
502	New and Improved Food Products	18%		20%	
901	Program and Project Design, and Statistics	3%		5%	
903	Communication, Education, and Information Delivery	10%		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	12.0	0.0	3.0	0.0
Actual Paid	23.0	0.0	2.1	0.0
Actual Volunteer	25.6	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
228000	0	104912	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
228000	0	104912	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2637600	0	519975	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Conduct research to evaluate cultivars of traditional and nontraditional horticultural crops and ornamental plants. •Conduct research into crop cultural systems, particularly the feasibility of horticultural crops in rotation with agronomic crops. •Management of website for grape production for eXtension. •Conduct research to develop "seed to market" production systems for high-value alternative horticultural crops like cilantro and herbs. •Conduct research to develop sustainable and/or organic production systems for commercial horticultural crops. •Provide demonstrations and education and disseminate information to support Oklahoma's commercial horticulture industry, with emphasis on electronic resources. •Survey Oklahoma Consumers (Gardeners) to assess the needs and wants of the gardening public. •Upgrade the web-based delivery. •Review and revise annually or as needed Fact sheets and other publications. •Educational programs focused on Consumer Best Management Practices (BMP) for the conservation of energy, water resources, water pollution prevention, Integrated Pest Management (IPM), and urban landscape wildlife conservation. •Educational programs are conducted based on public interest and County Educator requests. •Participate and support eXtension Consumer Horticulture/Master Gardener Community of Practice. •Conduct Master Gardener/Junior Master Gardener Training. •Conduct pesticide training and education. •Assist in Youth at Risk and Obesity/School Gardens.

2. Brief description of the target audience

Horticultural crop producers, commodity groups, food processors, landscape professionals, input suppliers such as seed and chemical companies, peer scientists, extension specialists and county professionals, horticultural dealers and merchants, greenhouses, Master Gardeners, home owners, communities, and youth.

3. How was eXtension used?

In 2014 approximately 28 responses were provided by state specialists to users of eXtension through the Ask an Expert feature of the Gardens, Lawns & Landscape Community of Practice eXtension web site.

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	77400	29700000	4155	4000

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	36	19	55

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- New Master Gardeners trained

Year	Actual
2014	245

Output #2

Output Measure

- Manuscripts submitted for consideration of publication in peer-reviewed journals

Year	Actual
2014	19

Output #3

Output Measure

- Number of Extension publications completed - fact sheets, newsletters, trial reports, web-based materials

Year	Actual
2014	63

Output #4

Output Measure

- Number of statewide "Oklahoma Gardening" shows produced

Year	Actual
2014	37

Output #5

Output Measure

- Number of Funded Grant Proposals

Year	Actual
2014	15

Output #6

Output Measure

- Number of potential fresh market growers of horticulture crops trained

Year	Actual
2014	85

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of horticultural crop producers newly certified as organic
2	Number of volunteer hours provided to community horticulture programs statewide
3	Number of home gardeners experiencing increased awareness and knowledge about environmental issues and IPM principles
4	Pecan Suture Split Research
5	Sensor-Based Fertilization Control in Ornamentals

Outcome #1

1. Outcome Measures

Number of horticultural crop producers newly certified as organic

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Organic produce is an important niche market for fresh market fruit and vegetable producers within the state. A segment of consumers are interested in having more certified organic produce available for purchase. As a result there is demand for more certified organic farmers who can fill this market demand.

What has been done

As a Land Grant institution Oklahoma State University has committed both people and resources to develop a research and outreach programs to provide research based information for organic farmers. In addition, this effort is in collaboration with the Oklahoma Department of Agriculture Food and Forestry's (ODAFF) Organic Certification program to provide both information and certification to increase the number of organic farmers available to fill this developing market.

Results

During the past 12 months ten newly certified organic producers have been added to the ODAFF certified list. Contact: Dr. Lynn Brandenberger at: lynn.brandenberger@okstate.edu

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
502	New and Improved Food Products

Outcome #2

1. Outcome Measures

Number of volunteer hours provided to community horticulture programs statewide

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	80384

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rapid urban growth in many areas of the United States coupled with increased interest in the environment and home gardening have prompted an ever-increasing number of garden and landscape inquiries. Along with this interest, comes a multitude of gardening questions needing individual explanation and too few Extension staff members to answer each question. Many of these questions are seasonal in nature and are relatively easy to answer assuming that one has horticulture training.

What has been done

Oklahoma Master Gardeners are trained, supervised and recruited to: 1) improve overall efficiency in providing one-on-one service to the non-commercial horticulture clientele in the county, 2) provide group learning and teaching activities for non-commercial clientele, 3) allow agents to develop proactive Extension programs, and 4) form a group of Extension volunteers to support additional consumer horticulture efforts.

Trainees participate in a 10 - 13 week course receiving between 40 - 56 hours of course work on subjects including: basic plant science, vegetables, fruits, nuts, ornamentals, lawns, diagnosing pest problems, soils, and other related topics. Upon completion of the training period, satisfactorily passing an exam on materials and topics covered, and donating between 40 - 56 hours of volunteer time to the Horticulture program, the trainees are certified and awarded the title of Oklahoma Master Gardener.

Examples of Master Gardener Volunteer activities include: staffing plant clinics to answer phone and walk-in questions, manning educational exhibits, maintaining demonstration gardens, community beautification projects, serving as 4-H hort leaders and judges, speaking at club/civic meetings, teaching horticulture activities at nursing homes, etc., assisting in horticulture mailings,

newsletters, etc., and appearing on TV and radio.

Results

The service from the Master Gardener volunteer program has proven to be a highly popular means of extending the knowledge of the Oklahoma State University Cooperative Extension Service to the residents of Oklahoma. The Oklahoma Master Gardener Program now has 28 counties participating in the program as of January 2015. The following data was provided by 20 of the 28 counties. Approximately 255 new Master Gardeners were trained during the 2014 training season. Close to 1,209 active Master Gardeners volunteered their time, contributing approximately 80,384 volunteer hours resulting in over 6,417,767 educational interventions with Oklahomans and as many as 2,510+ educational and community programs and activities being conducted in their communities in 2014. This translates to over \$1,678,418.00 in service that was donated by volunteers (wage rate of \$20.88/hour was used, which includes a 12% estimate of fringe benefits. This hourly rate is the assigned wage for non-management, non-agricultural workers in 2013 for the state of Oklahoma as published by The Independent Sector, an organization that "serves as a national forum to encourage giving, volunteering and not-for-profit initiative," http://www.independentsector.org/programs/research/volunteer_time.html). Reports are gathered yearly at the beginning of the following year.

In addition to the many hours donated, approximately 1,200 pounds of produce was donated to local food pantries/kitchens, shelters, and other organizations throughout Oklahoma by the Master Gardeners.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
205	Plant Management Systems
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

Number of home gardeners experiencing increased awareness and knowledge about environmental issues and IPM principles

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	5554

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Public concern for the environment continues to increase. Traditional landscape management practices have involved extensive use of pesticides, fertilizers, and other materials that could harm the environment if not used properly. Integrated Pest Management (IPM) uses biological principles, cultural practices, and some chemicals to control pest populations with minimal environmental impact.

What has been done

Over 2,510 gardening programs and IPM workshops, educational programs/seminars and Oklahoma Gardening segments are used to educate the public of IPM practices and other related gardening topics. A train-the-trainer workshop on IPM was conducted with 57 participants representing 22 counties and one commercial business (garden center employees).

Results

Participants evaluated the program using a pre and a post-test to capture Knowledge, Attitudes and Skills changes of the participants with a (Likert Scale: 1=Very High, 5 = Very low). On average, participants increased their Understanding of IPM (Before 2.85, After 4.13), and had a positive attitude change towards using IPM (3.13 Before, 3.69 After). They also increased their confidence about using and applying and teaching IPM principles (Skills Change) to their clientele (2.42 Before, 3.64 After).

Homeowners are better educated and can make choices in maintaining the landscape that are more environmentally friendly. Participants of the IPM workshop have conducted numerous presentations to other MG volunteer groups as well as the public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
205	Plant Management Systems
903	Communication, Education, and Information Delivery

Outcome #4

1. Outcome Measures

Pecan Suture Split Research

2. Associated Institution Types

- 1862 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)

Certain thin-shelled pecan cultivars tend to split at the shell suture when harvested early in the season. When harvested later in the season suture splits are infrequent. Early season harvest is desirable because pecan demand and prices are highest at the start of the season.

What has been done

OSU researchers demonstrated that suture split was related to high kernel moisture nuts being exposed to high solar radiation when shaken from the tree in preparation for harvest. Up to 10% of the harvested nuts had split sutures, a condition substantially reducing nut value. If high moisture nuts were harvested on cloudy days or shaken in the evening and harvested the next morning split sutures were reduced to less than 2%.

Results

Based on current pecan prices this modification in harvest procedures represents a savings of about \$100 to \$220/acre for cultivars subject to suture split. Contact: Dr. Mike Smith at: mike.smith@okstate.edu

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #5

1. Outcome Measures

Sensor-Based Fertilization Control in Ornamentals

2. Associated Institution Types

- 1862 Extension
- 1862 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)

According to a 2007 United States Department of Agriculture specialty crop census, the floriculture industry in Oklahoma is valued at approximately \$14 million. Economic margins are often extremely tight for growers, so they are constantly looking for efficient ways or new technology to improve productivity, enhance competitiveness, and increase sustainability with efficient fertilizer use.

What has been done

Over the last three years, GreenSeeker, SPAD, and atLEAF optical sensors have been evaluated as a nondestructive, rapid method for predicting plant nitrogen status in 12 different ornamental crops. Three journal articles, an OSU fact sheet, and an iphone app have resulted from the research.

Results

The OSU fact sheet alone has been viewed over 600 times since being published online a year ago. OSU researchers found that sensor-based fertilization control can greatly improve fertilizer applications and thus nutrient run-off, cutting the initial fertilizer application or subsequent applications by 20%. It is estimated that just in Oklahoma, this could save ornamental growers \$100,000 per year in fertilizer costs. The scope of impact is multi-state national. Contact: Dr. Bruce Dunn at: bruce.dunn@okstate.edu

4. Associated Knowledge Areas

KA Code	Knowledge Area
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205 Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2014, the IPM team developed and delivered an **Advanced IPM Workshop for Master Gardeners**. 54 Master Gardeners received 12 hours of training that included information on Scouting, Diagnosing problems, Cultural, Biological, Mechanical and Chemical Controls. Participants evaluated the program using a pre and a post-test to capture Knowledge, Attitudes and Skills changes of the participants with a (Likert Scale: 1=Very High, 5 = Very low). On average, **participants increased their Understanding of IPM** (Before 2.85, After 4.13), and had a **positive attitude change towards using IPM** (3.13 Before, 3.69 After). They also increased their **confidence about using and applying and teaching IPM principles (Skills Change) to their clientele** (2.42 Before, 3.64 After).

Key Items of Evaluation