V(A). Planned Program (Summary)

Program # 5

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
501	New and Improved Food Processing Technologies	0%		20%	
502	New and Improved Food Products	10%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	15%		10%	
607	Consumer Economics	15%		0%	
701	Nutrient Composition of Food	10%		10%	
702	Requirements and Function of Nutrients and Other Food Components	5%		15%	
703	Nutrition Education and Behavior	10%		5%	
704	Nutrition and Hunger in the Population	5%		15%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%		15%	
	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	18.0	0.0	5.9	0.0
Actual Paid	10.5	0.0	4.1	0.0
Actual Volunteer	2.7	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**
590387	0	654908	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
590387	0	798730	0
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

This Planned Program advances broad global food security goals and includes both basic and applied research, and associated outreach and Extension programs. Research foci include microbial studies, packaging, food taste tests, new production techniques, and consumer preferences and behavior. Laboratories, pilot plants, farms, and multiple sites are available throughout state to permit data gathering and to continue longer-term experiments. All functional laboratories and sites are improved over time as program need warrants. Extension has the capacity to advance knowledge acquisition, promote adoption strategies, and help build human capital to promote global food security and reduce hunger worldwide. OARDC and OSU Extension faculty and staff engage in outreach, engagement, and consultation, with both internal and external stakeholders, across Ohio and nationally.

2. Brief description of the target audience

Targeted audiences for global food security research and Extension include, but are not limited to:

- Specific individuals or groups who have expressed a need for food-related information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that partner with food scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by stakeholders;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. persons who engage in home canning of food;
- Other scientists and scientific groups;
- Political entities;
- Other Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business and industrial groups.

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	47637	48225	14744	525

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

Patent Applications Submitted

Year: 2014

Actual: 1

Patents listed

Cheese Foods and Related Materials and Methods

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	21	44	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of participants attending educational programs of one teaching hour or more.

Year	Actual
2014	47637

Output #2

Output Measure

- Total number of workshops offered to producers and agri-business leaders (OSUE)

Year	Actual
2014	361

Output #3

Output Measure

- total number of participants in events related to 'Global Food Security and Hunger' (OSUE)
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- total number of volunteers participating in the planning and implementation of this event (committee members, teachers / trainers, unpaid staff, etc) (OSUE)

Year	Actual
2014	1409

Output #5

Output Measure

- number of community gardens associated with local and community food systems programming and demonstrations (OSUE)

Year	Actual
2014	14

Output #6

Output Measure

- number of participants in community gardening efforts associated with local and community food systems programming and demonstrations (OSUE)

Year	Actual
2014	10626

Output #7

Output Measure

- number of volunteer hours associated with community gardens and local community food systems programming

Year	Actual
2014	2278

Output #8

Output Measure

- percentage of total program participants that are considered to be under-represented (OSUE)

Year	Actual
2014	23

Output #9

Output Measure

- percentage of total program participants that are considered to be under-served (OSUE)

Year	Actual
2014	10

Output #10

Output Measure

- number of participants in educational events for Farm Bill insurance programs (OSUE)

Year	Actual
2014	5363

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Advance processing techniques, e.g. electrostatic coating, to achieve the desired traits requested by industrial partners, that are manifested in consumer demand studies, or that are novel technologies that may meet latent needs.
2	Participate in the creation of a standardized model and protocols for studying functional foods for the purpose of providing consumers with more informed functional choices that are currently available
3	Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed consumer choice, including the bioavailability of the desire substance in the food, than they presently have.
4	Reduce health risk by releasing at least one major study every five years.
5	Processing technology research will improve and optimize equipment and processing of food in such manner as meet consumer demand as or before that demand emerges.
6	Reduce through research and development the negative processing impacts on physio-chemical or molecular properties of food within varying parameters to make foods more acceptable and higher quality commensurate with demand.
7	Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.
8	Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established) (OSUE)
9	Establishment of a number of local/regional food systems
10	number of schools purchasing Ohio produced food as part of the Ohio Farm to School program (OSUE)
11	improvement in economic and social conditions, as indicated by the number of dollars in direct farm sales (OSUE)
12	number of producers becoming certified following 'Fertilizer Applicator Certification' training (OSUE)
13	number of participants in plant and animal systems management programs that implement new activities on their farm (OSUE)

Outcome #1

1. **Outcome Measures**

   Advance processing techniques, e.g. electrostatic coating, to achieve the desired traits requested by industrial partners, that are manifested in consumer demand studies, or that are novel technologies that may meet latent needs.

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Participate in the creation of a standardized model and protocols for studying functional foods for the purpose of providing consumers with more informed functional choices that are currently available

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed consumer choice, including the bioavailability of the desire substance in the food, than they presently have.

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Reduce health risk by releasing at least one major study every five years.

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Processing technology research will improve and optimize equipment and processing of food in such manner as meet consumer demand as or before that demand emerges.

   Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Reduce through research and development the negative processing impacts on physio-chemical or molecular properties of food within varying parameters to make foods more acceptable and higher quality commensurate with demand.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.

2. Associated Institution Types

- 1862 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)
In areas of the world where poverty and malnutrition are palpable, efforts to address food insecurity are matters of life and death. However, In addition to helping food producers in those nations boost production today, it's just as vital to strengthen their institutional capabilities to address the challenge for generations to come.

So say the leaders of Ohio State University's Innovative Agricultural Research Initiative, or iAGRI. Now about halfway through its $25.5 million, six-year grant, the project in the East African nation of Tanzania is becoming a prototype for strengthening the capacity of agricultural universities to improve African food security for the long term.

What has been done
Through the Innovative Agricultural Research Initiative (iAGRI), led by Ohio State University's Office of International Programs in Agriculture, a total of 128 Tanzanian graduate students are receiving advanced agricultural training at universities in the United States, Africa and India to

build a new generation of Tanzanian agricultural scholars, and as part of an extensive effort to provide long-term food security in the East African nation.

The initiative is part of the U.S. government's primary global hunger and food security program, Feed the Future, and is supported by the U.S. Agency for International Development.

In addition to the research that graduate students are conducting, iAGRI is sponsoring major projects in which scientists in Tanzania, from both Sokoine University and the Ministry of Agriculture, collaborate with faculty from one of the six U.S. partner universities. Projects focus on food security needs identified at the project's outset and include research on crops, water, gender issues, climate change, nutrition and agricultural policy.

Results
The project has 128 graduate students (108 master's degree and 20 doctoral students) enrolled in the program, and has already significantly impacted the lives of Tanzanian agricultural students. More than half of the program's participants have spent a year on a full scholarship at Ohio State or one of the initiative's five partner universities in the U.S. The other half have studied at Sokoine University of Agriculture in Tanzania, Punjab Agricultural University in India, or at other participating universities in East and Southern Africa.

Advanced academic training is vital to address the long-term food security needs of the country. For instance, more than half the faculty in Sokoine University's soil science department are at retirement age, and the iAGRI project is providing the training necessary for junior faculty to replace them.

At Sokoine University, only 19 percent of the faculty and 27 percent of the undergraduate student body are women. But in Tanzania, it's women who primarily are responsible for not only food preparation, but providing farm labor as well. With more than 80 percent of the Tanzanian agricultural sector comprised of women, iAGRI actively recruits female participants, seeking to promote women in the growth of the agricultural industry in the country. The iAGRI program has formulated a gender development plan and a gender policy implementation committee in its dedication to this task.

In iAGRI, "there is a real focus on educating women to be change-makers in the agricultural sector in Tanzania," says Privta Chiwindo, a doctoral student at The Ohio State University. "In my country, they say that if you help a woman, you help the entire country."

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

Outcome #8

1. Outcome Measures

Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established) (OSUE)

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Establishment of a number of local/regional food systems

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fresh fruits and vegetables are an important part of any diet. Many urban areas are lacking access to a steady source of fresh produce. Aside from providing a steady source of fresh produce, community gardens have the additional benefits of spurring economic development and a sense of community well-being.

What has been done
OSU Extension combined its expertise in urban agriculture production and cultivation techniques, with the resources of city and county governments, non-governmental organizations, and community groups to establish 10 new community gardens in cities across Ohio.

Results
10 Ohio communities are now seasonally enjoying fresh produce. Community awareness of food gardens around the new garden sites has increased. Food availability in the 10 communities has increased, and set the stage for further growth of this program in coming years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
704	Nutrition and Hunger in the Population

Outcome #10

1. Outcome Measures

number of schools purchasing Ohio produced food as part of the Ohio Farm to School program (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1007

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The basic mission of 'Farm to School' is to increase the supply of fresh, local, nutritious foods in schools around the state. With that mission comes much broader goals that involve developing more informed food decision-making among students, supporting and connecting with local farmers, developing community ties, and reinvesting in local economies. 'Farm to School' initiatives are gaining momentum in light of two recent phenomena - rising obesity, in particular among youth, and the declining family farm.

What has been done
OSU Extension provides leadership for the statewide 'Farm to School' program. 'Farm to School' provides youth, pre-K through college, with access to nutritious meals, while supporting local farmers and communities. This program provides children with fresh, local foods, and helps them understand where their food comes from and how food choices affect their health, environment and community. The Ohio Farm to School program is part of a national network and involves many local, state and regional partners, advisors and projects. OSUE and their partners provide guidance and help make connections that result in healthy young people, healthy economies, and healthy communities.

Results

The 'Farm to School' initiative in Ohio has grown to 1,007 schools participating. This number is up from 2013, when there were 833 participating schools. This represents a 21% increase in participation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
703	Nutrition Education and Behavior
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #11

1. Outcome Measures

improvement in economic and social conditions, as indicated by the number of dollars in direct farm sales (OSUE)

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

number of producers becoming certified following 'Fertilizer Applicator Certification' training (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	2800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
This training is being conducted in accordance with Ohio Senate Bill 150. This program has a target audience of all producers who apply fertilizer to 50 or more acres. The ultimate goal of the program is to reduce the amount of phosphorus and other nutrient runoff in groundwater and freshwater bodies, thus reducing harmful algal blooms in water bodies across Ohio. Legislators,

farmers, and all citizens of Ohio have a vested interest in water quality.

What has been done
In conjunction with the Ohio Department of Agriculture, Extension specialists and county educators have developed a curriculum for fertilizer certification, which includes information about selecting appropriate fertilizers, rates of application, correct timing of application, and correct placement of application. In 2014, this curriculum was taught in 15 educational programs. This is the initial series of meetings on this topic, and will continue for several years to come. All certifications will be valid for 3 years, at which point the applicator will need to be recertified by OSUE.

Results
Nearly 80 programs have been conducted with over 2800 applicators becoming certified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #13

1. Outcome Measures

number of participants in plant and animal systems management programs that implement new activities on their farm (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	2486

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adapting to changes in prices, management activities, and regulations are essential for any small business to remain viable. The importance is even greater for farms, as they need to ensure a secure and sustainable food supply, which in turn benefits consumers (general public). Regular participation in educational sessions helps farmers to obtain the knowledge that will allow them to

implement the newest technology and methods to maximize their production safely and efficiently.

What has been done
New management techniques and procedures for plant and animal systems are taught to producers through a number of direct educational programs, including the Farm Science Review, Conservation Tillage Conference, agronomy field days, and other events. Some of the topics introduced include: soil and water quality, nutrient management, no-till systems, cover crops, managing apiaries, manure management, sessions on a variety of livestock species, and veterinary-related topics. Indirectly, these new techniques are also taught through OSU Extension-produced newsletters, fact sheets and other publications, radio broadcasts, and other electronic media.

Results
361 direct educational programs were conducted for 18,553 individuals. Of those participants in educational programming, 13.4% (2,486 people) plan on adopting or conducting a new management activity on their farm as a result of information received at an educational OSUE event.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
701	Nutrient Composition of Food
704	Nutrition and Hunger in the Population
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Public Policy changes

Brief Explanation

The passage of Senate Bill 150 has and will continue to affect the way farmers apply fertilizer. To ensure farmers are in compliance with the law, OSUE has diverted some programming resources to develop new course offerings in the area of fertilizer management, customized to addressing the parameters and requirements of Senate Bill 150.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

As indicated in the 'brief description of activity' section of this planned program, OSU Extension has the capacity to advance knowledge acquisition, promote adoption strategies,

and help build human capital to promote global food security and reduce hunger. Extension has hosted a variety of large-scale events, targeting producers and consumers, which address food quality, and increasing yields.

The Conservation Tillage Conference (CTC) is an annual 2-day educational program with over 60 speakers in concurrent sessions. Sessions typically address topics such as: production of corn and soybeans, cover crops, nutrient management, soil and water quality, and no-till systems.

Farm Science Review (FSR) is another annual event hosted by Ohio State University Extension on 80 acres at the Molly Caren Agricultural Center near London, Ohio. An additional 600 acres of land are dedicated to field demonstrations, such as corn and soybean combines, tillage, nutrient and lime applications, and drainage installations. Each year, FSR attracts roughly 140,000 visitors from all over the United States and Canada, who come for three days to view 4,000 product lines from 600 commercial exhibitors, as well as learn the latest in agricultural production. Educational programs are provided by Ohio State University and Purdue University specialists.

The CTC and FSR are both large-scale events, but Extension thinks smaller-scale as well. Whether helping communities develop gardens which can provide hundreds of pounds of fresh produce to areas that formerly did not have the means or access to such nutritious options, or by recruiting more schools and school districts to join in the Farm to School movement, Extension is attempting to provide Ohio citizens with access to high quality food, grown locally and sustainably. OSU Extension reached 47,637 individuals last year through a variety of educational programs.

As detailed in the outputs and outcomes section of this planned program, Extension has helped to grow Ohio's capacity for better production methods has linked Ohio citizens to the resources necessary to partner with local farms, grow their own produce, and make sustainable choices.

Key Items of Evaluation