V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
304	Animal Genome			10%	10%
307	Animal Management Systems			10%	15%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals			10%	0%
501	New and Improved Food Processing Technologies			20%	20%
503	Quality Maintenance in Storing and Marketing Food Products			10%	10%
504	Home and Commercial Food Service			5%	5%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			10%	15%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			20%	20%
723	Hazards to Human Health and Safety			5%	5%
	Total			100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	14.0	8.0
Actual Paid Professional	0.0	0.0	14.0	8.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	750000	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	750000	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Alabama A&M University

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	341087
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	341087
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	311281
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	311281
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

Research under this program area included studies to reduce the incidence of food-borne illness and provide a safer food supply; eliminating causes of microbial contamination and antimicrobial resistance; educating consumer and food safety professionals; developing food processing technologies to improve food safety; development of technologies for tracing the sources of food production; development of technologies for rapid analysis and identification of food including seafood; development of technologies for rapid detection of biological and chemical contamination such as antibiotics, pesticides, and other contaminants.

Major effort is directed at development of feasible intervention strategies to reduce or eliminate Salmonella and Campylobacter on broiler carcasses at various processing steps. Additional work is targeting Listeria monocytogenes. UV treatment of further processed poultry products is being investigated. Efforts on detection methods were made. Novel feed additives to reduce salmonella colonization in broilers and breeders are being researched. E. coli isolates from broilers are being characterized.

In 2011, Databases were established to secure agriculture and food in the face of bioterrorism. Such efforts focus on infectious agents of human diseases, but also include infectious diseases of animals and plants, including those of aquatic animals.

Singeing of beef carcasses, similar to what is performed for hog carcasses, was conducted to reduce bacterial load for the evaluation of singeing as a potential method for small processors to meet the regulations of Hazard Analysis and Critical Control Point (HACCP) in a cost-effective fashion.

Testing concentrations and contact time of peracetic acid for the purpose of meeting the new USDA performance standards was conducted with poultry meat products.

Microbial profile in poultry litter, specifically in regards to Salmonella and Clostridium perfringens accumulation was investigated.

Research was conducted to to gain knowledge about the behavior of Listeria monocytogenes strains when exposed to UV radiation.

RNA sensors were developed to allow for detection of infectious RNAs at the source for the immediate protection of humans, domestic animals and crops. This nucleic acid-based technology, when perfected and commercialized, is expected to have a significant social impact in food agriculture, medical, national security and research industries.

Research results are shared with extension personnel for further dissemination, particularly to county agents, consumers, and community leaders. Additional dissemination of results are through direct contact (such as survey participants and community gatherings), through publications (experiment station bulletins, on-line reports, press releases, as well as scientific journal articles), and may include non-traditional efforts, such as working through community.

Through a competitive granting process, the Auburn University Food Systems Initiative received a $6.5 million, five-year grant to create training programs through a Virtual Food Systems Training Consortium (VFSTC). Working closely with the FDA, AUFSI has already started creating several training course.

2. Brief description of the target audience

Researchers, educators, producers, food processors, super markets, consumers, and the general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	30000	300000	20500	55000

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	15	43	58

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications

Year	Actual
2011	58

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Decreased incidence of cases of food poisoning (AL state stats, % deaths from Salmonella and other intestinal infections in 2004 = 1.6%). Program success will be indicated by a decline or no change in this incidence.
2	New technology(-ies) developed to monitor microbial contaminants. (Medium term outcome)
3	New professionals in workforce with training in food safety and security. (Long-term)

Outcome #1

1. Outcome Measures

Decreased incidence of cases of food poisoning (AL state stats, % deaths from Salmonella and other intestinal infections in 2004 = 1.6%). Program success will be indicated by a decline or no change in this incidence.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

New technology(-ies) developed to monitor microbial contaminants. (Medium term outcome)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food safety detection technologies need to be developed to provide rapid, sensitive, and accurate detection of any infectious agents on food products.

What has been done
RNA-based sensors were developed that provide high sensitivity and accuracy.

Results
A new class of sensors utilizing cRNA, a synthetic RNA complementary to a segment of the bacterial or viral RNA target, was developed. Two single-stranded DNA molecules, one acting as a receptor and the other as an enhancer, mediate cRNA detection. When these DNA strands are conjugated to gold nanoparticles to form DNA-AuNPs, colorimetric detection is achieved. When fluorophore-binding RNA networks function as an enhancer, fluorescence is monitored to detect cRNAs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service
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
723	Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

New professionals in workforce with training in food safety and security. (Long-term)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Properly trained labor force is required in the area of food safety as dealing with issues of food safety requires high levels of knowledge, skills, and technologies.

What has been done
Students, both undergraduates and graduates, were involved in food safety research that allowed them to be trained to meet the future needs.
Through a competitive granting process, the Auburn University Food Systems Initiative received a $6.5 million, five-year grant to create training programs through a Virtual Food Systems Training Consortium (VFSTC). Working closely with the FDA, AUFSI has already started creating several training course.

Results

15 students were trained in the area of food safety and detection, preparing them for food safety jobs.
A course on microbiology will include a stand-alone module on Listeria, the bacteria implicated in a deadly outbreak of foodborne illness traced back to cantaloupes. The course will also include a module on Vibrio vulnificus, a deadly bacterium that infects oysters raised in the warm waters of the Gulf. Also in production is a course on Oral Communications, aimed at inspectors who have to communicate bad news to plant managers and officials who have to talk about outbreaks of foodborne illness. In addition, a stand-alone Specialty Eggs module will educate both consumers and inspectors about the new kinds of eggs on the market and serve as an introduction to a course on egg safety.
A number of other FDA courses are in the works, and the VFSTC will also serve as an umbrella to create other training programs utilizing state-of-the-art technology for distance learning. To provide FDA training, AUFSI is required to become an ?authorized provider? through the International Association for Continuing Education and Training (IACET). When the process is complete early next calendar year, AUFSI will be able to provide Continuing Education units for a variety of training programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome
307	Animal Management Systems
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
501	New and Improved Food Processing Technologies
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723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The major issue in research is the lack of research funding.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Food safety is a priority program at Auburn University. Starting with AU Food Safety Initiative a couple years ago, Auburn has developed this initiative into a broader initiative of AU Food Systems Initiative. Under this initiative, researchers are working on research, training, and extension. Good results have been achieved in the initial phase of this program. Dr. Pat Curtis was appointed as the first Director for the AU Food Systems Initiative, with the intention to further develop this program with the goal for the establishment of a Food Systems Institute at Auburn.

Key Items of Evaluation

Auburn University Food Systems Initiative was established in 2011 with the focus of food safety research, training, technology development and outreach. This Initiative has made major progress with its obtaining of $6.5 million grant from FDA. Various virtual training modules are being developed with the goal of becoming a training hub in southern US for food safety.