V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Food Safety - Overcoming Implementation Barriers to Food Traceability

☑ 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
204	Plant Product Quality and Utility (Preharvest)			10%	
401	Structures, Facilities, and General Purpose Farm Supplies			10%	
404	Instrumentation and Control Systems			10%	
501	New and Improved Food Processing Technologies			10%	
503	Quality Maintenance in Storing and Marketing Food Products			10%	
512	Quality Maintenance in Storing and Marketing Non-Food Products			10%	
601	Economics of Agricultural Production and Farm Management			10%	
604	Marketing and Distribution Practices			10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			10%	
902	Administration of Projects and Programs			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	0.0	0.0	9.5	0.0
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	0	217780	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1193442	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	3832855	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The implementation of the Food Safety and Modernization Act (FSMA) will have a major impact on agriculture, especially small farmsthroughout the U.S. It requires new harvest and post-harvest handling practices and record keeping that minimizethe risk of food-borne disease hazards. Small farms are artisanal in nature, have1-5 employees and lackthe capital (human and financial) to adopt such a systemon their own. A critical need exists for development of a cost effective and simple-to-implement Food Traceability System(FTS) for small producers and processors. This project will model several small scale food production systems: berries, tree nuts, seafood and meats in order to identify and report both common andunique barriers to FTS implementation. The team will evaluate current technology in the context of how it's able to be implemented and recommend solutions for FTS implementation for small scale systems. The solutions we suggest to overcome barriers to FTS implementation will enable small scale systems to fully integrate a FTS systemthat will allow themto be proactive and prevent or minimize microbial outbreaks by integrating food safety and harvesting practices.

2. Brief description of the target audience

Small farm producers
Organic producers
Policy makers (state and federal)
Decision makers (state and federal)
Food processors
Fodd marketers
Researchers
Consumer Stakeholders
Federal Regulatory Agencies
State Regulatory Agencies

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	220	300	0	0

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

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Identtfy current trace3ability practices by small producers and processors,

Year	Actual
2013	0

Output #2

Output Measure

- Identification of Critical Tracking Events (CTEs) and Key Data Elements (KDEs)

Year	Actual
2013	0

Output #3

Output Measure

- Evaluate current FTS technologies

Year	Actual
2013	0

Output #4

Output Measure

- Identification of benefits and costs to implementing FTS

Year	Actual
2013	0

Output #5

Output Measure

- Training for stakeholders

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Identify Current traceability practices by small producers and processors
2	Identification of Critical Tracking Events (CTEs) and Key Data Elements (KDEs)
3	Identification of benefits and costs to implementing FTS
4	Training for Stakehoders

Outcome #1

1. Outcome Measures

Identify Current traceability practices by small producers and processors

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The implementation of the Food Safety and Modernization Act (FSMA) will have a major impact on agriculture, especially small farms throughout the U.S. It requires new harvest and post-harvest handling practices and record keeping that minimize the risk of food-borne disease hazards. Large farms have the human capital and financial resources to incorporate existing programs such as the Produce Traceability Initiative (PTI), but small farms are artisanal in nature, have 1-5 employees and lack the capital (human and financial) to adopt such a system on their own. Not having small farms up to speed will leave the whole food safety system vulnerable, resulting in an unreliable and ineffective food safety system. A critical need exists for development of a cost effective and simple-to-implement Food Traceability System (FTS) for small producers and processors. However, in order to develop an effective FTS, in-depth knowledge about the barriers (economic, logistical) faced by small scale systems must be obtained.

What has been done
We formed a multi-disciplinary research and outreach team, recruited collaborative stakeholders, and identified critical industry needs and barriers in traceability system through a three-day specialty crop traceability conference in Aurora, Oregon. A total of sixty-five stakeholder representatives participated in this three-day conference, including NW hazelnut and berry growers, processors, retailers, industry trade organizations, and technology solution providers. Over 89% of industry participants considered product tracing to be very important to their business.

Results
The workshop and other communications with producers Identified several needs including effective product tracing tools and information platforms for data capturing and information

sharing among trading partners. The barriers to adoption included cost, privacy concerns, resistance to change, lack of benefits or incentives, technical support and training. In addition to work with stakeholders, the group also identified outside industry and academic expertise and formed the advisory panel for technical oversight and guidance on the project.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
401	Structures, Facilities, and General Purpose Farm Supplies
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
512	Quality Maintenance in Storing and Marketing Non-Food Products
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
902	Administration of Projects and Programs

Outcome #2

1. Outcome Measures

Identification of Critical Tracking Events (CTEs) and Key Data Elements (KDEs)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Northwest (NW) grows a variety of specialty food products. It contains a diverse array of micro- climates: high desert, dry plains, mountainous, valley, and coastal. Due to the strong demand for ?local,? ?organic,? ?natural? and ?wild? foods, there are many small producers and processors of foods in the NW. These producers and processors provide excellent models for the

study of the challenges faced by small/artisanal food processors in implementing traceability systems. Many of the operations are multi-generation farms; most of them still rely on manually written paper records for product tracing, resulting in delayed and unreliable recall.

The IFT has conducted several FDA funded studies on US food traceability systems. Based on their findings, the following key elements have been recommended to the FDA for implementation of future food traceability (IFT 2009a;IFT 2009b): (1) identifying Key Data Elements (KDE) for traceability, (2) defining Critical Tracking Events (CTEs), (3) establishing an electronic record of key data elements for each CTE, (4) selecting and implementing a standard data format, (5) providing education and training on government guidance, and (6) establishing third party audits. This project will address points 1, 2, and 5 of the FDA recommended elements.

What has been done

The Cornell University Produce Safety Alliance (PSA) was recently established under funding from the USDA and FDA (http://producesafetyalliance.cornell.edu). Committee members of PSA are developing a national curriculum to increase understanding of the principles of GAPs and to facilitate the implementation of food safety practices on fresh fruit and vegetable farms and in packinghouses. We are working closely with existing programs such as the Produce Safety Alliance (Cornell University), Western Institute for Food Safety and Security (University of California, Davis), and the Food Safety Program (Washington State University) and share information to facilitate implementation of FSMA and other food safety practices.

Results

We are currently developing a database of recently published materials on traceability and this information is being disseminated through a variety of workshop that were held in three Oregon locations with growers and processors to explain FDA FSMA proposed rules. Meetings and calls have been held with other researchers to further explore current availability of traceability software and practices to facilitate deployment and testing of the applications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
512	Quality Maintenance in Storing and Marketing Non-Food Products
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
902	Administration of Projects and Programs

Outcome #3

1. Outcome Measures

Identification of benefits and costs to implementing FTS

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Some members of the supply chain do not envision the potential economic incentives in implementing full-chain traceability systems. Some businesses interested in implementing traceability systems, fear losing their competitive edge due to the added time and costs involved (IFT 2009a). Consequently there are social and economic barriers to implementing product tracing, even with the passage of recent federal legislation, FSMA.

What has been done
Many small producers and processors are businesses with gross sales less than $500,000. The cost of implementing FTS is a critical factor for successful adoption by these stakeholders. Limited research exists on the cost of food traceability systems (IFT 2009a). An analysis of implementing FTS is being conducted in terms of currently available hardware and software, operation and maintenance cost, and training and education in food safety, production efficiency and sustainability.

Results
Dr. Gil Sylvia has led the development of FisTraxTM (http://fishtrax.org and http://pacificfishtrax.org) which is an electronic fish information system (eFIS) designed to provide multiple data and information services to the fishing and seafood industry. The system is designed to collect data from fishing vessels, laboratories, and other data sources and transform that data into knowledge useful to the broader fishing community as well as specific audiences including fishermen, processors, scientists, resource managers, the marketplace, consumers, and the public. The system uses a variety of tools to upload science and fishery data including computers, smart phones, and Ipads and stores that data in a central database.
FishTraxTM has many design features similar to those needed for terrestrial farming and natural

resource systems including low cost electronic data collection systems and devices, interactive databases, multiple portals, traceability, and a focus on information and knowledge, rather than data. Current efforts suggest it may be possible to integrate and/or adopt many FishTraxTM features to specific farming and terrestrial systems to improve management of food safety, product quality, marketing, and farming production and sustainability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
512	Quality Maintenance in Storing and Marketing Non-Food Products
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #4

1. Outcome Measures

Training for Stakehoders

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Training through workshops, conferences and seminars will bring stakeholder up-to-date with latest changes that are occurring in the Food Safety and Modernization Act with regard to traceability. Opportunities at these events will also be used to monitor how growers and processors are implementing traceability elements into their food systems.

What has been done

Team members have attended or participated in numerous workshops on FTS, including a Pesticide Risk Assessment and Risk Reduction Workshop held in Algiers, Algeria, December 15-18 , 20 13. The workshop was sponsored by the Foreign Agricultural Service (FAS) of the United States Department of Agriculture (USDA), with funding support from the United States Department of State. Its purpose was to provide an opportunity for countries in the region (Algeria, Egypt, Jordan, Morocco , Tunisia, and Yemen) to better understand the risk assessment pro cesses being followed in the region, as well as the process used in the United States; a major focus of the workshop was pesticide regulation to meet international trade, food safety and security goals.

Results
Regulators and those that provide services to food production and processing in the participating countries have been trained to better understand the relationship between pesticide use and the potential for pesticide residues in food, as well as the regulatory procedures design to insure food safety through the dietary risk assessment.

Numerous presentations have been made and/or scheduled with specialty crop producers and processors, fish and shellfish industry, and meat producers and processors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
401	Structures, Facilities, and General Purpose Farm Supplies
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
512	Quality Maintenance in Storing and Marketing Non-Food Products
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Researchers at OSU have worked with small producers and processorstounderstandtheiroverallattitudes and practices for food safety and traceability. What is needed now is information on detailed practices such as the type of data (data

fields andformat), when, where and how they capture those data and how they use the data. This information is crucial to designing and developing effective tools and information platformfor small scale producers and processors. CTEs and KDEs are the key traceability data for effective trace fromfield to fork since it determines what, where, when and how muchtraceability data and information have to be captured for a business. Well defined CTEs and KDEs at every supply chain will minimize the amount of traceability data while providing an effective tracing system. However, the CTEs and KDEs will vary depending on the production, inventory, andshipping systems of the particular food product.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This project was just initiated in late 2013. As the project matures, we expect to reveal a number of technological opportunities for tracking agricultural products from farm to fork. Similarly our researchers are uncovering numerous new techniques for improving food safety and making that information available to consumers. It will be imperative that policy makers continue to allow these new technologies to adequately mature and be made available to the market prior to enforcing restricitions for small producers.

Key Items of Evaluation

Our principal role is to evaluate the potential for providing small producers the same technology as that employed by larger producers and processors. Ideally, this technology can be made available at a cost that does not adversely impact producers or consumers. At the same time, new methods are being evaluated that will aid small producers to ensure that all agricultural products can be delivered to market wtih assurances that food borne pathogens have been eliminated without negative impacts to food quality.