

12-1-2015

## Systematic Approach to Food Safety Education on the Farm

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### Recommended Citation

Shaw, A., Strohbhelhn, C., Naeve, L., Domoto, P., & Wilson, L. A. (2015). Systematic Approach to Food Safety Education on the Farm. *The Journal of Extension*, 53(6), Article 4. <https://tigerprints.clemson.edu/joe/vol53/iss6/4>

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## Systematic Approach to Food Safety Education on the Farm

### Abstract

Food safety education from farm to end user is essential in the mitigation of food safety concerns associated with fresh produce. Iowa State University developed a multi-disciplinary three-level sequential program ("Know," "Show," "Go") to provide a holistic approach to food safety education. This program provides knowledge on GAP (Know); guides development and documentation of food safety practices (Show); and aids in grower's readiness for third party auditing (Go). Evaluations suggest this program is effective in changing long term food safety knowledge, attitude, and behaviors. The multi-disciplinary sequential approach can be used by other Extension programs to reach.

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## Food Safety on Farm

The importance of safe food handling practices from farm to table has been highlighted by the introduction of the Food Safety Modernization Act (FSMA) Produce Safety Rule (FDA, 1998). It has been widely reported by the Centers for Disease Control and Prevention (CDC) that 46% of reported foodborne illnesses were linked to fresh produce and nuts (Painter et al., 2013). To mitigate the food safety risk, good agricultural practices (GAP) have focused on water, soil, manure, facilities, and employees (National Good Agricultural Practice Program, Cornell University, 2014).

Food safety educators through Extension have been charged with education of this diverse population of fruit and vegetable growers because growers view Extension as one of the best resources for information on GAP (Eggers, Ackerlund, Thorne, & Butte, 2010; Tobin, Thomson, LaBorde, & Bagdonis, 2011). Extension personnel have conducted GAP workshops throughout the

country with reported changes in knowledge and behavior (Nayak, Tobin, Thomson, Radhakrishna, & LaBorde, 2015).

## Sequential Approach to Food Safety Education

Iowa State University (ISU) Extension and Outreach has offered GAP-related programming to producers for two decades. In 2012, the ISU On-Farm Food Safety Team conceptualized a three-level sequential on-farm food safety educational program ("Know," "Show," & "Go") for fruit and vegetable growers (N=183 growers).

The program was administered by a multi-disciplinary Extension team of faculty and staff with expertise in horticulture, food science, food safety, value-added agriculture, and hospitality. The sequential program was based on existing workshops and restructured to focus on different aspects of GAP and good manufacturing practices (GMP) at various stages of produce production with a goal to increase knowledge and improve attitudes and food safety practices.

The program is promoted through ISU Extension and Outreach announcements, cross promotions in related workshops (i.e., MarketReady Iowa, High Tunnel workshops, Hydroponics workshops, and on-farm field days), and press releases to list serves of local food systems working groups and producer associations.

### Level 1 "Know"

The Level 1 "Know" workshop includes content on GAP, GMP, and general food regulations to inform growers on how to produce safe crops. This 7-hour course was based upon the Cornell University GAP curriculum established in 1999 and includes unique Iowa situations and interactive problem-solving activities.

The Level 1 workshop uses PowerPoint presentations on basic food safety recommendations for pre- and post-harvest fruit and vegetable practices, development of standard operating procedures (SOPs), sanitation standard operating procedures (SSOPs), and food regulations. The last hour of the workshop has small groups (2-3 people) work through two case studies to identify what best practices are needed to be emphasized on the scenario farms. The case studies are facilitated by the course instructors and concluded with group discussion.

**Table 1.**

Example of Agenda for a Level 1 "Know" Workshop Offered Through ISU Extension and Outreach Detailing Topics and Times Allowed

Time Allowed	Topic
15 minutes	<b>Introduction and Assessment.</b> Introduction of speakers and pre-workshop assessment for current food safety knowledge, attitudes, and behaviors
30 minutes	<b>Why are we here?</b> Overview of outbreaks of fresh produce, changing regulations, market requirements – set the stage;

	promote food quality and food safety correlation, identify goals of this workshop and the three program levels
30 minutes	<b>Is produce really safe? Microbial risks.</b> Overview of disease causing organisms associated with produce grown organically and conventionally.
30 minutes	<b>Food Safety Culture and the Regulatory Landscape.</b> Identification of internal and external forces impacting the safety of food. Food safety assurance within the market place
1 hour	<b>Pre-Harvest Good Agricultural Practices: Production and Safety Issues</b> Best practices in the growing of fresh produce can reduce the chances for pathogen contamination of your product and ensure product quality.
45 minutes	<b>Lunch</b> with a local foods. Discussion of how to market products outside of the farmers market setting.
1 ½ hours	<b>Post Harvest Handling: Production and Safety Best Practice</b> What happens after the product is harvested also affects food safety risks and product quality. Best practices from harvest through the end user. Discussion of expectations as the end user changes (e.g. restaurant versus wholesaler)
30 minutes	<b>The Paper Chase: Developing your Food Safety Plan.</b> Documentation that best practices are used on your farm provides the proof that many buyers want. GAPs audit forms, SOPs, and traceability measures will be discussed. This prepares participants for Level 2 course where documentation is expanded.
1 hour	<b>What Would You Do?</b> Small group discussion over case studies. Identify workable strategies to resolve decision cases related to common on-farm food safety issues
30 minutes	<b>Evaluation and Wrap-Up.</b> Assessment of immediate knowledge and attitude changes. Questions and to-do list making for growers.

## Level 2 "Show"

During the Level 2 "Show" workshop, participants learn how to promote their fruits and vegetables to wholesale markets and how to develop their farm food safety plan using documentation of on-farm practices. To participate in the Level 2 workshop, the Level 1 workshop has to be completed within 1 year prior to the training to ensure knowledge is current.

In this 8-hour workshop, PowerPoint presentations about SOPs, SSOPs, and documenting food safety practices are used for the first 2 hours, followed by a 1-hour presentation with multiple illustrative

examples of a farm food safety plan, SOPs, and SSOPs. The remaining 5 hours of the Level 2 workshop are allotted for participants to work on their own farm food safety plans and development of SOPs and SSOPs using the University of Minnesota's F2P (Food Safety Plan for You) template (Schermann, 2011) with technical assistance present.

**Table 2.**

Example of Agenda for a Level 2 "Show" Workshop Offered Through ISU Extension and Outreach Detailing Topics and Times Allowed

Time Allowed	Topic
15 minutes	<b>Introduction and Assessment.</b> Introduction of speakers and pre-workshop assessment for current food safety knowledge, attitudes, and behaviors
1 ½ hour	<b>Marketing.</b> Explanation of market potential for inclusion of food safety within your farm. Discussion of the requirements and strategies for different market options.
30 minutes	<b>Good Agricultural Practices Review.</b> Overview of Level 1 Good Agricultural Workshop
1 hour	<b>Examples of Food Safety Plans, Standard Operating Procedures, and Sanitation Standard Operating Procedures.</b> Walk through two examples of food safety plans, standard operating procedures, and sanitation standard operating procedures for two different markets. The samples are based on the participant's backgrounds and current markets vendors. Example food safety plans may include food hub, CSA, wholesale distributors, national chain grocery stores, and restaurants. Standard operating procedures may include... Sanitation standard operating procedures may include...
5 hour	<b>Food Safety Plan, Standard Operating Procedures, and Sanitation Standard Operating Procedures Development</b> Participants utilize the University of Minnesota F2P templates to develop personal plans. Extension specialist are present to answer questions and assist with discussion making.
30 minutes	<b>Evaluation and Wrap-Up.</b> Assessment of immediate knowledge and attitude changes. Questions and to-do list making for growers.

### Level 3 "Go"

The Level 3 "Go" workshops focus on readiness of growers for a third party audit and the ability to provide product to a large scale distribution vendor. To participate in this course, Level 2 workshop

must have been completed within the past year.

This four-hour course is held on a farm that has either passed a third party audit or is preparing for a third party audit. The group is led through a guided mock USDA GAP audit (e.g. USDA GAP Food Handling Practices Audit Verification Checklist) by two ISU Extension specialists who have been trained as approved auditors conduct this portion of the workshop. Participants receive examples of all auditor paperwork and the process details of a third party audit are provided. Differences between large distribution audits, USDA GAP audits, and large grocery chain audits are also discussed.

**Table 3.**

Example of Agenda for a Level 3 "Go" Workshop Offered Through ISU Extension and Outreach Detailing Topics and Times Allowed

<b>Time Allowed</b>	<b>Topic</b>
15 minutes	<b>Introduction and Assessment.</b> Introduction of speakers and pre-workshop assessment for current food safety knowledge, attitudes, and behaviors
1 hour	<b>USDA GAP Certified Farm.</b> Group meets on a Farm that has been USDA GAP certified. They will see field production of tomatoes, cabbage, salad mix, melons, beans and more as well as their packing facilities. The owner explains the markets they sell to, the challenges and benefits of being USDA GAP Certified.
1 1/2 hour	<b>Walk through the USDA Audit Form.</b> Group follows the ISU extension auditor as they conduct a mock audit for USDA certification. Question and answer section is provided after each section of the audit.
1 hour	<b>Discussion on Audit Options.</b> Extension personnel provide a lecture on the different types of audits available for different markets. The cost and benefits between one audit over another.
15 minutes	<b>Evaluation and Wrap-Up.</b> Assessment of immediate knowledge and attitude changes. Questions and to-do list making for growers.

## Evaluation of Outcomes

To evaluate the effectiveness of these workshops, a 49-question validated surveying tool (Ellis, Strohhahn, & Henroid, 2005; Strohhahn, Smith, Domoto, & Wilson, 2012) to determine if changes in knowledge, attitudes, and behaviors were met. Surveys are provided at the beginning and end of each level course, and a 3- to 6-month follow-up impact survey is sent electronically. Assessing knowledge, attitude, and behavior changes provides guidance for future programming needs and material development.

## Summary

The ISU On-Farm Food Safety Team three-level sequential on-farm food safety program ("Know," "Show," & "Go") goal is to provide growers with a holistic approach to food safety education. Our program has shown that growers positively changed their knowledge and opinions on key food safety principles and regulations (Shaw, Strohbehn, Naeve, Domoto, & Wilson, 2015b) and change on-farm food safety practices (e.g., policies, training, and documentation) (Shaw, Strohbehn, Naeve, Domoto, & Wilson, 2015a), which provides evidence that our program is effective method to educate growers.

## Acknowledgements

The work reported here was supported by the Specialty Crop Block Program through the Iowa Department of Agriculture and Land Stewardship.

## References

- Archer, T. M., Warner, P. D., Miller, W., Clark, C. D., James, S., Cummings, S. R., & Adam, U. (2007). Excellence in Extension: Two products for definition and measurement. *Journal of Extension* [On-line], 45(1) Article 1TOT1. Available at: <http://www.joe.org/joe/2007february/tt1.php>
- Eggers, S., Ackerlund, S., Thorne, S., & Butte, G. (2010). *Growers' understanding and implementation of FDA's GAP guidance*. Retrieved from: <http://www.fda.gov/downloads/Food/FoodSafety/ProductSpecificInformation/FruitsVegetablesJuices/FDAProduceSafetyActivities/UCM218641.pdf>
- Ellis, J. D., Strohbehn, C. H., & Henroid D. H. (2005). Assessing on-farm food handling practices of Iowa-grown produce and eggs in regard to food safety. *Food Protection Trends*, 25(10), 758-761.
- Food and Drug Administration (FDA), Center for Food Safety and Applied Nutrition, (1998). *Guidance for industry: Guide to minimize microbial food safety hazards for fresh fruits and vegetables*. Retrieved from: <http://www.fda.gov/downloads/Food/GuidanceComplianceRegulatoryInformationGuidanceDocuments/ProduceandPlanProducts/UCM169112.pdf>.
- National Good Agricultural Practices Program, Cornell University, (2014). *Food safety begins on the farm*. Retrieved from: <http://www.GAP.cornell.edu/>
- Nayak, R., Tobin, D., Thomson, J., Radhakrishna, R., & LaBorde, L. (2015). Evaluation of on-farm food safety programming in Pennsylvania: Implications for Extension. *Journal of Extension* [On-line], 53(1) Feature 1FEA9. Available at: <http://www.joe.org/joe/2015february/a9.php>
- Painter, A., Hoekstra, R. M., Ayers, T., Tauxe, R. V., Braden, C. R., Angulo, F. J., & Griffin, P. M. (2013). Attribution of foodborne illness, hospitalizations, and deaths to Food Commodities by using outbreak data, United States, 1998-2008. *Emerging Infectious Diseases*, 19: (3), 407-415.
- Schermann, M. 2011. A food safety plan for you (FSP4U). *University of Minnesota On-Farm GAPs Education Program*. Retrieved from: <http://safety.cfans.umn.edu/fsp4u/>.

Shaw, A., Strohebhn, C. H , Naeve, L., Domoto, P., & Wilson, L. (2015a). Current trends in food safety practices for small scale growers in Midwest. *Manuscript submitted for publication.*

Shaw, A., Strohebhn, C. H , Naeve, L., Domoto, P., & Wilson, L. (2015b). Knowledge gained from good agricultural practices courses for Iowa growers. *Manuscript submitted for publication.*

Shaw, A., Strohebhn, C. H , Naeve, L., Domoto, P., & Wilson, L. (2012). Impacts of GAP and post-harvest handling practices certificate training on producers' on-farm food safety behaviors and perceptions' of customer assurance. *Final Report Leopold Center*. Retrieved from:  
<http://www.leopold.iastate.edu/grants/m2010-14>.

Tobin, D., Thomson, J., LaBorde, L., & Bagdonis, J. (2011). Developing GAP training for growers: Perspectives from Pennsylvania supermarkets. *Journal of Extension*[On-line], 49(5) Article 5RIB7. Available at: <http://www.joe.org/joe/2011october/rb7.php>

United States Department of Agriculture, (2011). Dietary Guidelines for Americans, 2010. Office of Diseases Prevention and Health Promotion. Retrieved from:  
<http://www.health.gov/dietaryguidelines/2010.asp>

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