

Fundamental of Creating a Colorado Farm Food Safety Plan

Webinar Notes

March 27, 2012

Slide 1.

Based on conversations with local growers, Extension professionals, Colorado Department of Agriculture personnel, and Good Agricultural Practices experts from other states, this set of PowerPoint slides and corresponding farm plan template were designed to be tools local producers could use in constructing their farm food safety plans.

This presentation can guide you through the process of recording the steps you are taking to ensure the safety of food produced on your farm and help in identifying potential risks that may be present. It can also help to identify written practices or training documentation that are required for a specific practice – records are a way to track and verify what steps you have completed as part of good agricultural practices.

The term **Good Agricultural Practices** is used to describe individual environmental and operational practices that prevent, reduce, or eliminate food safety risks on a farm.

Slide 3.

As a grower, you need to systematically identify, assess and control all hazards associated with your food production operation

A successful program helps to avoid:

1. Recalls
2. Adverse publicity
3. Loss of sales and
4. Serves to enhance public health.

- Physical: Examples are metal shavings or rust, paint chips, flakes, staples or nails, screws, bolts, washers, wood splinters or shavings, broken glass, bones, broken needles, buckshot, dirt, hair, skin and personal items such as bandages, jewelry and accessories, or fake nails.

Source of risk: primarily workers, equipment, facilities (buildings)

- Biological: Bacteria, viruses, parasites, and mold. “Pathogen” is a term given when one of these biological risks can cause illness in humans, ranging from mild to severe symptoms.

Source of risk: the use and presence of water, manure and compost, and worker health and hygiene are areas where biological risks are most likely to be present.

- Chemical: Can be a synthetic or natural substance that leaves a residue or causes a reaction. Examples are pesticides, cleaning supplies, chemical pest control products, preservatives, food additives, allergens, toxic metals (e.g. lead, cadmium), and toxins from molds (e.g. aflatoxin, patulin)

Source of risk: by workers primarily and how they manage conditions such as temperature and humidity at any point in field prep, food production, harvesting, packing and shipping.

Example: Surfaces you use for sorting and packing? Make sure they are non-toxic, easy to clean and non-absorbent.

Why conduct a risk assessment? A risk assessment puts you in control and gives you the ability as a manager to understand and manage risks on your farm. This also gives you more information to provide to consumers/buyers of your product because you can discuss your strategies and answer buyer questions.

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Understanding risk specific to your operation:

1. Location/source. Use your farm map to understand patterns and movements of people, animals, water, other inputs, and how they move across or use your farm property.
2. Time of year: presence and level of risks can change depending on the time of year. Is there spring run-off from an adjacent property into your water supply? Do deer or other animals move across your fields in the spring when you are planting or in fall when you are harvesting? Or congregate at an irrigation pond?
3. The various operations you engage in, from growing to end sales, may involve using inputs that pose different levels or exposure to risk.

Consider: a “traffic plan” for example if you have workers moving from areas of potential contamination (manure, compost, livestock, chemicals) into food production handling or storage areas, and establish protocols such as employees never walk in or through livestock areas and then into a greenhouse without changing footwear.

Avoiding risk is always preferable since once produce is contaminated, removing or killing pathogens is very difficult. You can't totally avoid the risks inherent in having workers on any kind involved in food production BUT you can manage when and how they handle food. By having procedures in place and training workers in those procedures.

Clearly it is important to develop your own plan and not rely on someone else who may have what seems to be a similar operation.

Slide 5. To assess risk

Walk your property and facilities at different times of the year so you can,

Observe animal, human, plant interactions. Is there evidence of rodents in your buildings at certain times? Have you eliminated weeds that might be nesting areas, any standing water, spilled or open feed, or trash,

What have your workers seen? What do your workers do when they find evidence of rodent activity?
Questioning/understanding practices used by farm managers & workers

Slide 6. To manage risk, thoroughly document

1. Document all practices from field prep thru post-harvest

Example: worker hygiene and movement throughout the day for each job they perform

2. All observed/known risks for each practice

Example: you observe and know that your employees will be using hygiene facilities throughout the day. They might not wash their hands at all or properly.

3. Any possible risks

Example: an employee get sick or gets hurt. You have new employees so they don't know, or many volunteers who rotate jobs on your farm.

4. How you will measure or monitor known and possible risks?

Example: develop a training schedule for all employees. Check your logs regularly to make sure that hygiene training is conducted.

5. Your steps to manage or prevent those risks

Example: Have a meeting first thing in the morning to determine who is ill and should avoid food production and handling. Establish sanitation procedures for cleaning your facilities and for worker hygiene. Conduct trainings regularly and communicate often with your employees.

What does documenting do for you? Documenting your findings and practices places you in control, and allows you to monitor the safety of your products throughout production, harvest and post-harvest. This also makes your food safety program credible to buyers.

Slide 7. To manage risk, thoroughly document

Those documents need to detail:

- When those steps or corrective actions are taken (have a log or schedule)
- Who takes the actions
- Records of your assessment (date, actions)
- Updates to your assessment whenever practices and/or products change

Example: Have a schedule for when the bathrooms are cleaned and keep a log of who did it and on which date. What did the employee find when s/he cleaned? No hand soap? What did they do in response? Or it could be a leaking sink with water pooling on the floor. How was that fixed, when and by whom?

Communication with employees is essential: Poor employee hygiene has been responsible for over 40% of source identified produce-related outbreaks (Chapman and Powell, year?). Remember your employees are on the front lines of food safety in your operation. Also, look at the different types of people involved in your business operations. Do you have a lot of volunteers, work-share members? These individuals also need to be in the on-farm food safety communication loop.

Slide 8. Documents you develop and maintain

What is a Standard Operating Procedure (SOP)? How you identify a corrective or procedural action. There are many forms available to do this, but for each activity:

1. look at the task;
2. Write out each step that should be followed to properly complete it (such as how you clean a piece of equipment and what you use)
3. Identify possible problems that the worker/operator might encounter

What is a schedule?

A schedule explains how often the SOPs will be completed (hourly, weekly, monthly, etc). Note that timing can change depending on degree of use (i.e., bathrooms are cleaned more frequently when there are more workers using them in July than in March).

Slide 9. Documents you develop and maintain

What is a log?

A record of:

1. what you have done, according to your schedule and established procedures,
2. any deviations from normal that are found,
3. who did it, and
4. the date.

Slide 10. Example risk assessment process

Look at all the sources where you might have standing water as a result of human action, equipment malfunction, or a weather event.

What is the potential for risk? (grey box)

A properly installed and approved backflow preventer keeps water contaminated with pesticides, fertilizers, animal waste or anything else you wouldn't want to use for food production from re-entering your irrigation system (keep unsafe water from reversing flow and entering the clean water supply due to a pressure drop in water flow).

Therefore, risk assessment is an ongoing process and you must continually monitor your practices and external conditions. All of the assessment steps are important and should be followed in order.

Slide 11 – Template, Slides & Resources

It is estimated that 48 million people in the United States each year suffer from foodborne illness.

About 128,000 are hospitalized and 3,000 individuals actually die as a result of a foodborne illness (Scallan et al. 2011). Salmonella, E.coli, Shigella, and Hepatitis A have all been on the rise in recent years.

The economic cost of foodborne illness in the US is very high- it is estimated that \$152 billion is lost annually to medical services, deaths, lost work, and disabilities. **Of this total, \$39 billion is due to produce related outbreaks.** Scharff, R. (2010) http://www.makeourfoodsafes.org/cost_map

<http://www.producesafetyproject.org/admin/assets/files/Health-Related-Foodborne-Illness-Costs-Report.pdf-1.pdf>

In the last 20 years, hundreds of produce and meat-related outbreaks have been documented. As detection methods have improved, more is known about the cause of foodborne illness and, a significant amount of foodborne illnesses occur from contaminated produce, poultry, and beef. Improvements have been made in the last 20 years in preventing foodborne illness associated with beef and poultry but **microbial contamination of fresh produce is one of the most challenging public health issues of our time.**

Microorganisms

- cause foodborne illness
- are invisible to us
- reproduce quickly
- survive in harsh environments
- attach effectively to many surfaces

What can we do? Develop strategies to prevent and limit contamination - **a food safety plan is a critical part of this strategy.**

Food safety problems can be prevented but it takes a strategic approach. Analyze the vulnerabilities and put a plan in place to manage risk – what does that mean? The most common cause of produce-related foodborne illness has been bacterial contamination. Steps can be taken to limit the introduction of contamination and to prevent the growth of microorganisms.

More information on food safety recommendations and regulations pertaining to specific commodities is available from the Colorado Farm to Market Website: <http://cofarmtomarket.com/>

The website was developed by CSU Extension personnel and graduate students and funded by Colorado Department of Agriculture.

Slide 12. There are as many ways to design a farm plan as there are farms but it helps to group together certain areas and activities that need to be addressed.

Slide 14. Packing/washing line or area diagram. This includes where you box/bag produce from where field harvest bins come in and where the finished product goes out before it leaves the farm.

Packinghouse flow diagram (if applicable). This includes all coolers, storage areas, cull areas, break areas, etc

Slide 15. *Audit General Requirement question - Do you have a written food safety policy?*

The template was formatted in landscape orientation for printing and placing in a folder or a 3-ring binder with holes at the top of the pages. The cover page could be printed separately for inserting into the outside binder cover.

Slide 16__ Page 1. Cover Page

Personalize with
your farm's name
location
logo

Food safety is an integral part of any food production operation. This plan is unique to your farm and outlines the policies and procedures that are in place to keep the food you produce as safe as possible. Your plan should include a set of standard operating procedures (SOPs), worker training programs, and record-keeping sheets which address areas of your agricultural operation, including worker health and hygiene, irrigation water, soil management, pesticide use, equipment and trace back procedures.

Slide 17__ Page 2. Personnel

Audit questions related to personnel and worker health and hygiene

- *Is there a person(s) at your farm who has responsibility and authority for food safety?*
- *Are you aware that documentation is required to demonstrate that your food safety plan is being followed?*

- *Do you have a written policy covering protective clothing requirements (including hair covering, jewelry and artificial nail restrictions if any)?*
- *Do you use gloves at your farm (disposable or re-useable)?*
- *Do you have clearly designated areas where employees can take breaks and which are located away from produce fields and handling/packing areas?*
- *Are all employees and visitors aware that eating, drinking (other than potable water for field employees), spitting, chewing gum and using tobacco is only allowed in these clearly designated break areas?*
 - *Are all employees and visitors aware that if they show signs of illness they need to restrict their direct contact with produce or food-contact surfaces?*
- *Are all employees aware that they need to restrict their direct contact with produce or food-contact surfaces if they have an open sore or lesion that cannot be effectively covered?*
- *Are all employees (and visitors) aware that they need to seek prompt treatment for cuts, abrasions and other injuries?*
- *Do you have a policy outlining handling/disposal of food or food contact surfaces that have been in contact with blood or other bodily fluids?*
- *Have your worker health and hygiene training and activities above been documented for all your employees?*

Personnel: Include contact information for farm owner, manager, supervisors, workers, insurance agent, etc. It is important to specify the person in charge of food safety and you may want to list other responsibilities as well

Worker Training: All employees should receive training when they start work on the farm and a refresher course at least once a year. Employees include those that work on the farm that plant, care for, harvest, scout pests, process, and pack fresh produce. Training includes instruction on all company policies related to worker health and hygiene and where appropriate specialized training related to specific jobs such as anyone who applies pesticide sprays as required by law. All worker training should be documented in the worker training logs.

Note: a high percentage of farm-related accidents are attributed to new employees. Time spent training new farm workers and verifying clear understanding of farm procedures and policies can prevent problems or accidents, benefiting you and the employee. An updated First Aid Kit with bandages, antiseptic solution, antibacterial ointment, and non-latex gloves should be accessible to workers at all times. Workers should be informed of the location of First Aid Kits and what steps need to be taken in case of an injury.

Proper hygiene: Employees should be instructed to wear clean clothing to work every day (this includes clothing and footwear that have not been exposed to the workers' own crop or animal production areas, prior to coming to work). Workers should not take gloves into lunch areas or rest rooms.

Illness & injury policies: Any worker who is ill or appears to be ill with a contagious disease should be sent home or assigned work away from crop production areas and harvested produce.

Blood and bodily fluid policy: Workers who get cut or have a nosebleed while working must stop immediately, contact the supervisor and have it treated. Wounds should be cleaned, disinfected, bandaged and gloved as soon as possible. Any product that is contaminated with bodily fluids must be discarded immediately and any container that is contaminated must be disinfected as soon as possible. All workers should be notified of the location of first aid kits and accidents and responses must be recorded.

Lunch and work break policy: breaks that include eating or smoking must be taken in areas away from fresh produce production and packing. Why? Food brought onto the farm by workers and consumed in food production and handling areas can cause contamination through spilled food, potential allergens, or broken glass. Tobacco products can contaminate food products through saliva from spitting tobacco and discarded ashes and cigarette butts. Clearly designate break areas and show on farm or packinghouse map. Breaks in the field are taken in areas not in production or near harvestable crops. Short rest breaks may be permitted in the field during production as long as workers are not eating or smoking.

All personal items must be stored in designated areas in the field, break room, or packinghouse. Under no circumstances should glass containers be allowed in the field or packinghouse.

Workers should be instructed to drink water frequently, especially in hot weather, and take breaks in shaded areas.

Establish your operation's cell phone policy: Are cell phones only allowed if they are required for farm business? Cell phones should be kept in designated areas or kept in a belt holster or pants pocket.

Proper clothing/allowed jewelry: When required, employees will wear appropriate supplied clothing including hats, aprons, and disposable gloves (preferably non latex). No jewelry or dangling strings are permitted in the field, around machinery, packinghouse, or packing facility with the exception of a plain wedding band (no stones allowed) and wrist watches.

Training for cleaning tools and equipment includes procedures for mixing sanitizing and cleaning solutions.

Farm security: All employees should be instructed to share information they observe regarding food safety and security. If employees see unusual individuals or situations, they should notify their supervisors so they can evaluate the situation. If employees notice pests or other food safety issues, they are encouraged to share this information with their supervisors.

Slide 18__Page 3. Worker Facilities

- Are all your employees aware that they need to wash their hands, with the correct technique for hand washing, before starting work, after using the toilet, after each break, before harvesting or engaging in post-harvest activities, after using a handkerchief/tissue and at any other times when their hands might become a source of contamination?

Good hygiene is one of the most important steps in food safety. Why? Foodborne illnesses are commonly transferred by hands through the fecal-oral route, such as not washing hands after using toilet facilities and before returning to food production, handling or storage areas. Foodborne illness outbreaks have been traced to produce handled by ill farm workers.

Key Best Practices concerning Worker Hygiene:

All workers are trained on good personal hygiene, proper hygiene and toilet facility use in language appropriate to worker. With this, document training and location of hand washing stations and toilet facilities accessible to workers.

All trainers in worker hygiene model proper hygiene and hand washing etc. daily while managing workers and ensuring training is completed at least once a growing season to all workers.

Signs posted on site instructing workers to use toilet and properly wash their hands after using toilet, smoking, eating etc. with soap and water in appropriate language to be understood by workers.

Reporting worker illness and injury. If ill or injured, then worker is to be given job not handling food.

Documentation of all of this is KEY!

Proper hand-washing technique includes the following:

- Wet hands with clean water (warm is preferred if available), apply soap, and work up a lather.
- Rub hands together for at least 20 seconds.
- Clean under the nails and between the fingers.
- Rub fingertips of each hand in suds on palm of opposite hand.
- Rinse under clean, running water.
- Dry hands with a single-use towel.
- It is important to remember to wash hands after touching any potentially unsanitary surface. When possible, turn off the faucet with the single-use towel instead of directly with the hand when using a sink and faucet that is not automatic or knee operated.
- Hand sanitizers are not a substitute for hand washing.

- First aid kits in well identified locations should be readily available for workers.

Videos for proper hand washing technique are available in the list of resources on the website.

Slide 19__Page 4. Worker Health, Hygiene, and Sanitary Practices Policy

- *Have all your employees been trained in the proper use of toilet facilities?*

Toilet and Hand Washing Facilities

Clean and well-maintained toilet and hand washing facilities should be provided for all employees and customers. All toilet/restroom facilities should be properly supplied with single-use paper towels and checked/resupplied on a daily basis. Include in your plan how often restroom facilities are serviced and cleaned, document monitoring, restocking, and cleaning, and indicate where these records are stored.

Signage: Signs should be posted to instruct workers to wash hands before and after handling food, harvesting, eating and smoking. Signs demonstrating how to wash hands (with soap and water after using toilet) are posted in toilet area.

Clean, Potable Drinking Water: is available, renewed daily, and water source documented.

Personal Protective Equipment: PPE should be cleaned after each use to prevent contamination in the home and at work.

If you have a significant number of farm workers and must meet OSHA requirements, be sure you have the appropriate number of toilets to meet the federal requirements) Currently, the ratio of workers to toilets is 20:1. Cleaning and servicing of the unit(s) may be contracted with a sanitation unit rental company. If this is the case, documentation should be provided by the contracted company. A representative map should be provided showing where the sanitation unit(s) is located relative to the agricultural plots.

Field toilets must be located away from the growing fields to avoid contamination by fecal material. Designate whether flush toilets and sinks located on the farm are on a private septic system or municipal sewage line.

Indoor facilities can be used in small operations if within ¼ mile walking distance from fields or if transportation is readily provided.

Have a policy/procedure in place for handling a septic or sanitation hazard in the field or packinghouse.

Visitor health and hygiene policy:

Define what a visitor is vs. a customer just picking up product from farm (CSA pickup) or longer term visitor (volunteer, intern).

Develop short company visitor policy. Visitors should sign in upon arrival and check out prior to departure.

All visitors will sign in at the farm and read a copy of farm policies regarding health and hygiene. Visitors are defined as anyone on the farm for more than 15 minutes to conduct farm related business. Visitors will wash their hands upon entering the farm. Hair protection may be required. Visitors are not allowed to pick produce or handle product without the expressed permission of the host.

U-Pick operations: you may want to have a visitor policy that includes location of toilet and hand washing facilities, whether or not you allow personal containers in the field such as glass bowls, etc.) Farm policies applicable to pick your own customers should be posted at the entrance to the field so customers are aware of farm policy.

Community Supported Agriculture (CSA) members/families should be given a copy of pertinent farm policies when they join the CSA.

Post your farm rules for visitors and CSA participants.

Slide 20 First aid procedures

Having a policy in place can save valuable time in case of an injury and can reduce the risk of contamination of the farm product. New employees should be informed – and current employees should be reminded – of illness symptoms that need to be reported to supervisors. It may be possible for employees to be reassigned to jobs that do not include handling fresh produce.

Slide 21__Page 5. Field Map

General farm description including commodities grown, acres cultivated, etc.

Field Map of your Operation

Insert map(s) or use the attached grid to identify:

crop specific production areas and acreage

the name/number you assign each field for traceability

staging areas

field sanitation units

active wells

surface water sources

areas that flood

manure storage sites

septic systems

roads and their names

Farm Description

Next, describe your farm. Maybe you already have a website and have written about your farm in order to entice your customers to come for a visit. Use descriptive words to write a paragraph or two about your farm just as you would talk about it to someone who has never been there. You can also mention how long you and your family have had the farm and how it started. Include the number of family members and hired workers (seasonal and part-time), descriptions of buildings, crops grown (including how many acres of each crop and the number of trees in the orchard, etc.), and list machinery and vehicles. Include photographs. Put it in a three-ring binder or organize it in a way that works for you.

Attach or draw the following, and include them in the binder: 1. A map of the property showing all buildings, fields, roads, and water features (e.g. irrigation heads, streams, ponds). Indicate North and approximate distances to nearest towns and major roadways. Look on Google Maps to find an aerial view of the property and make notes on a printed copy. Other online map services are also available.

Floor plans of all buildings (e.g. office building/home, storage buildings/sheds, packing houses, machinery buildings. Label each building and mark what is in it, such as power/water connections, fuse boxes, etc.

3. Map of fields

a. Attach a soil map. You can find and download a map from this site if you don't already have one: <http://websoilsurvey.nrcs.usda.gov/app/>. Describe the land's previous use. If the land history indicates a recent possible source of contaminants from dairy operations, feedlots, or other waste or flooding, the soil should be tested for microbial contaminants.

b. Attach a drainage map or indicate the direction of drainage on a topographical map. Many interactive maps are available at <http://www.lmic.state.mn.us/chouse/mapgallery.html>

c. Attach a map of the surrounding area. Either mark adjacent property and land-use characteristics on it, or describe them in writing and attach this to the map. For example, "Next section to the north is a conventional apple orchard, small (~75 head) cow-calf operation ¾ mile to the east and downstream of our watershed."

d. Attach a copy of field records/growing history. Keep these records for a long time.

Slide 22. Google maps view

Using Google Earth and Microsoft Snip-it tool, obtained aerial view of CSU Horticulture Research Farm – Extended view with adjacent property and enlarged view of produce fields, high tunnels and storage buildings.

Slide 23__Page 6. Previous Land Use

Previous land use and animal control questions

- *Have you performed an initial assessment of the risks associated with previous land use?*
- *Did you perform any preventive and/or corrective measures as a result of your land use risk assessment?*
- *Do you perform a risk assessment for animal activity (domestic and wild) in and around your growing area(s)?*
- *Do you routinely monitor animal activity in and around the growing area during the growing season?*

It is beneficial to do an adjacent land assessment so you know what is around your farm that may be a risk. Being adjacent to manure lagoons or animal operations including dairy and feed animal production may represent risks. If you have significant wild animal issues, you need to be aware and address the management of them if possible.

Previous and adjacent land use is a potential food safety issue because contamination of crops has been associated with run-off and flooding from nearby operations.

Google Earth offers aerial views of your land and surrounding properties that can give better insight to potential risks from other locations.

If livestock are grazed near fields where fresh produce is being grown, inspect and provide filter strips to separate livestock areas from production areas in the event of washout from rain event. Look at slope of land and adjust cropping strategies accordingly. Rotations with livestock – treat the same as 120 day raw manure rule but longer period of time may be recommended, depending on type of crop.

Wildlife:

Crop production areas are monitored and logged for presence of signs of wild or domestic animals. If there are signs that they are entering growing areas, all reasonable measures are taken to prevent reentry. A log is kept of this vigilance and the measures (such as noise makers, scare balloons, fencing, hunting etc.) taken to deter/eliminate animals are noted.

Note signs of animals passing through or feeding in the fields when carrying out everyday farming activities. You could identify species of concern and methods that are currently being used to deter them. A pre-harvest survey will help to ensure fields have not had significant animal activity. Significant animal activity means that there is noticeable fecal material or crop destruction due to animal traffic. If

fecal evidence is found, you can mark of an area of defined distance around the fecal material and harvest outside the perimeter. The distance will likely vary by crop. A starting distance to consider might be 5 feet radius around the fecal material. Be sure to include this information in your plan or as an SOP. Coyote decoys may be effective. To reduce nesting, mow down tall grass from around ponds.

Crop production areas are monitored and logged for presence of signs of wild or domestic animals. If there are signs that they are entering growing areas, all reasonable measures are taken to prevent reentry. A log is kept of this vigilance and the measures (such as noise makers, scare balloons, fencing, hunting etc.) taken to deter/eliminate animals are noted.

Adjacent and Previous Land Use—Best practices

When adjacent or previous land use indicates a possibility of contamination, preventative measures can be taken to mitigate known risks.

If the land was used as a dairy or feedlot within the last 3 years, or as a waste site at any time in the past, soil tests should be taken to assure that crops will not become contaminated. Land that has been subjected to **flooding** should also be tested for microbial hazards. (E coli)

Crop production areas must be separated from dairy, livestock, or fowl production facilities, manure lagoons, or other sources of contamination. Physical features may help this separation, such as berms, location, slope, containment structures, grass/sod waterways, ditches and the like. If there is a concentrated feeding operation with bare ground, not covered by vegetation, within a mile of a production area, this would be a problem.

Livestock should be confined or prevented from entering production areas by fencing. Animal waste from adjacent fields should not contaminate production areas.

When previous land use history indicates a possibility of contamination, preventative measures need to be taken to mitigate the known risks and soils should be tested for contaminants.

Crop production areas that have been subjected to flooding should be tested for potential microbial hazards.

Slide 24__Page 7. Water Quality

Agricultural water questions

- *Do you use water for field use (e.g., water used in the growing environment, for example in irrigation, cooling, frost protection or as a carrier for fertilizers and pesticides)?*
- *Is your water distribution system constructed so that human or animal waste systems are not cross-connected with agricultural water systems?*
- *Have you performed a risk assessment for your distribution system and all water source(s) to determine if they are adequate for their intended use? This assessment must be documented.*

- *Do you have an ongoing water management plan to ensure that the water quality at your farm remains adequate for its intended use?*
- *Does your water risk assessment, current industry standards and/or prevailing regulations for the commodities being grown require that water testing be performed as part of your ongoing management plan?*
- *Have activities associated with your water management plan been documented?*

A water quality assessment should be performed to determine the quality of water used for irrigation purposes and for spraying directly on crops. The type of irrigation method used will affect the risk of microbial contamination from the water source, especially during the period right before harvest. Evaluate water quality at least annually and choose the appropriate measure to correct the problem if necessary. All irrigation water should be tested for generic *E.coli* and the tests should be quantified. Depending on the source, the frequency of testing will vary.

More information on irrigation water quality and water testing is available on CSU's series of three GAPs webinars.

Frequency:

Municipal: Obtain a copy of testing results at least yearly from your county/municipality and keep it on record. A water bill is also acceptable to many audit companies

Well: At least twice per year during production.

Inspect well, especially shallow or hand dug wells for contamination when in low lying areas or near potential runoff can come into contact with water. Inspect cap to make sure it is intact.

Surface: At least once per month. Recommended sampling times include at the beginning of irrigation, high use, and any time there is concern about the water source.

Testing Protocols: Contact a reputable lab to test your water. Follow their instructions for taking the sample and submitting the sample. Here are some general guidelines to help you understand what labs may offer or ask you when you attempt to have your water tested.

100 ml sample, quantified generic *E.coli* using EPA certified methods.

An example would be Coli-lert with an upper limit of 2400 CFU/100 ml, no more than 24 hour hold time on sample, prefer 6-8 hour hold – which means the water sample needs to get to the testing lab in less than a day after collecting, sooner would be better. Use sterile sample container, Wash hands before collection, collect at consistent place, using a consistent method, and follow lab recommendations. You may need to make cup on stick for water recovery or purchase a water sampling tool.

Information about water sources and water quality are an important part of Farm Food Safety plans in any state but particularly a water-limited state like Colorado. A map of water sources, production areas, permanent fixtures, flow of watersystem (wells, gates, valves, returns, holding systems, reservoirs or any water capture systems) should be included in your farm plan.

Slide 26__Page 9. Sewage, Manure and Biosolids

- *Do you use soil amendments at your operation (soil amendments include raw, partially treated and treated manure, compost, compost teas, fertilizers, biosolids etc.)?*
- *Do you use soil amendments which do not contain raw or partially treated manure?*
- *Do you use treated compost (plant and/or animal based) or compost teas (made from treated compost)?*
- *Do you produce any compost yourself or compost tea from your own compost?*
- *For animal based soil amendments which do not contain raw or partially treated manure, do you keep records of composition, dates of treatment (if applicable), methods used and application dates and rates?*
- *Do you use soil amendments that contain raw or incompletely treated manure or biosolids?*
- *Do you store your soil amendments so they do not become a source of contamination of produce or the surrounding environment?*

Document the source of the compost, the composition, and the process by which it was produced.

Prevent cross-contamination between raw and finished compost by using separate equipment for handling and/or application.

Some buyers and marketing agreements have a requirement for aging manure beyond 120 days. If you voluntarily sign up for the marketing agreements, you MUST follow their parameters.

Here are the composting standards as outlined by the National Organic Program

USDA-AMS www.ams.usda.gov/nop/NOP/standards/FullRegTextOnly.html

§ 205.203 Soil fertility and crop nutrient management practice standard

(c) The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances. Animal and plant materials include:

(1) Raw animal manure, which must be composted unless it is:

(2) Composted plant and animal materials produced through a process that

(i) established an initial C:N ratio of between 25:1 and 40:1; and

(ii) maintained a temperature of between 131° F and 170° F for 3 days using an in-vessel or static aerated pile system; or

(iii) maintained a temperature of between 131° F and 170° F for 15 days using a windrow composting system, during which period, the materials must be turned a minimum of five times.

Here's what was decided, based on the USDA NOP guidelines.

<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5057102>

The advice from the USDA National Organic Standards Board on compost (and earthworm/vermiculture) teas includes:

- Use only potable water to make compost tea or to dilute it (other water, such as from rainwater catchment systems, might introduce pathogens into the tea).
- Sanitize all equipment used to prepare compost tea.
- Make compost tea only from compost that has maintained a temperature of at least 131°F for three days and has been mixed so the entire pile or windrow has heated up.
- Avoid additives when fermenting compost tea, as these can promote the growth of harmful organisms. In particular, simple sugar sources, like molasses, should be avoided.
- Additives can be used if sample batches of compost tea are tested before using to make sure it meets the EPA's recreational water quality guidelines for coliform bacteria.
- If compost tea is made with additives but is not tested, or if it doesn't meet water quality guidelines, then food crops may not be harvested until 90–120 days after the compost tea has been applied (the same rule applies to raw manure used on farms)

Some supporting research:

<http://www.reeis.usda.gov/web/crisprojectpages/202285.html>

Slide 27__Page 10. Manure Policy

Some buyers and marketing agreements have a requirement for aging manure beyond 120 days. If you voluntarily sign up for the marketing agreements, you MUST follow their parameters.

Here are the composting standards as outlined by the National Organic Program

USDA-AMS www.ams.usda.gov/nop/NOP/standards/FullRegTextOnly.html

§ 205.203 Soil fertility and crop nutrient management practice standard

(c) The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances. Animal and plant materials include:

(1) Raw animal manure, which must be composted unless it is:

(2) Composted plant and animal materials produced through a process that

(i) established an initial C:N ratio of between 25:1 and 40:1; and

(ii) maintained a temperature of between 131° F and 170° F for 3 days using an in-vessel or static aerated pile system; or

(iii) maintained a temperature of between 131° F and 170° F for 15 days using a windrow composting system, during which period, the materials must be turned a minimum of five times.

Here's what was decided, based on the USDA NOP guidelines.

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Some supporting research:

<http://www.reeis.usda.gov/web/crisprojectpages/202285.html>

Slide 28__Page 11. Facilities

- *Do you have buildings associated with production of produce at your farm (e.g., packinghouse, storage, cooling areas, etc.)?*

Are buildings in good repair and visually inspected on a regular basis? Is the immediate property around farm building regularly maintained, lawns mowed, weeds removed, unused equipment stored properly? These can be breeding and nesting areas for pests.

Considerations for packing areas that are not enclosed:

4 sticks and a lid: If your packinghouse is just a roof with supports or a tent or a canopy, you will need to consider other risks. For instance, if the roof has rafters, you will need to deter birds from roosting with nets or use some other method. You may not need rodent control for the ground, but may need to make sure you mow or maintain the grounds around the area to deter pest harborage. If flies are an issue, you could use fans to deter them. The important thing is to assess the risks and work to reduce whatever risks exist.

Open air: Keeping the area clear and control dust and dry dirt from blowing around if that is an issue. If your open air packing is under a tree, controlling birds may be an issue.

Farm operations are inevitably subject to animal and pest infiltration. You must do your best to keep pest problems under control. Special attention will be paid to the processing and storage facility due to the permeability of the structure. If this permeability becomes a pest problem, a plan to deal with the cracks and holes will be developed at that time.) If you hire an exterminator/outside pest control company, they should monitor the facilities on a monthly basis. All traps will be checked and documented daily by the farm manager. A service report from exterminating company will be provided or updated monthly. If a change in conditions develops, the monitoring company will be contacted immediately

Storage of unused, unformed containers (off the floor, clean and dry)

Slide 29__Page 12. Preharvest Activities

Animal information needs to be included such as species, if there's slaughter on-farm, disposal of carcasses.

Slide 30__Page 13. Agricultural Chemicals

Agricultural Chemical Questions

- *Do you use agricultural chemicals (e.g., pesticides such as herbicides, fungicides and insecticides, synthetic fertilizers)?*

- *Do you have a procedure for cleaning application equipment and for disposal of waste agricultural chemicals so that production and growing areas are protected against contamination?*
- *Are the people that apply chemicals suitably trained?*
- *Do you maintain a record of chemical use?*

Crops are grown using a variety of agricultural inputs and technologies which include the application of pesticides and fertilizers and associated risks vary from one production site to another. The inappropriate use, handling and storage of agricultural chemicals may result in a chemical hazard.

Safety during application of chemicals: Only licensed individuals may apply regulated substances including plant protective sprays. Non-regulated chemicals may only be applied by trained individuals. A list of trained individuals and license numbers or name of contract company should be included in your farm plan.

Even OMRI (organic materials review institute) approved substances may not be safe to have around ready to eat produce.

How treatments are applied (by hand, mechanically), where (soil, foliar) and when (field prep, planting, pre-harvest).

Slide 31__Page 14.

Questions related to Harvesting, Transportation, and Packinghouse Activities

- *Prior to harvest, do you check the area for any possible sources of contamination (physical, chemical, or biological risks)?*
- *Do you have a list of equipment (e.g. vehicles, tools, utensils and other items) which may pose a risk of contamination to produce during normal operation?*
- *Do you have scheduled repair, cleaning, sanitizing, storage and handling procedures for food contact surfaces to reduce contamination risks during harvest activities?*
- *Do you use water tanks such as those used for dust control (the water from which may contact produce in the field)?*
- *Do you use vehicles/production equipment in your fields which may pose a risk of contamination to produce (e.g. vehicles which use fuel, oil, or hydraulic fluids)?*
- *Do you have a written policy indicating that foreign objects (glass, plastic, metal or other debris) should be excluded from production equipment wherever possible?*
- *Do you have a written policy regarding containers, bins and packaging materials used for harvesting?*

- *During harvesting activities do you use water/ice in direct contact with product or food contact surfaces, such as in the field, as the final wash step prior to consumer packaging, or as a cooling aid in a consumer package?*
- *Do you have a documented procedure(s) addressing that only sound produce (appropriate for its intended use) is harvested and that produce that has been damaged to an extent that it may be a microbial hazard is not harvested or is culled?*
- *Do you have a written policy covering produce handling and storage post-harvest (post-harvest in this case means after harvest but before further processing)??*
- *Has training in your policies and procedures for field harvesting been documented for all relevant employees?*
- *Do you use vehicles, carts, trailers, etc. (i.e. shipping units) for transporting produce from the field to packinghouse or customer?*
- *Do you have written procedures for produce loading and unloading which outline practices to minimize damage and contamination?*
- *Do you have a requirement for temperature control during transport to ensure food safety?*
- *Has training in your vehicle policy (i.e. assessment of suitability for transporting produce), if applicable, and loading/unloading procedures been documented for all designated employees?*
- *Do you have a written policy to verify cleanliness and suitability of vehicle cargo bays/shipping units used to transport produce from the packinghouse to customers?*
- *Do you have written procedures for produce loading and unloading which outline practices to minimize damage and contamination?*
- *Do you have transport temperature ranges documented for applicable commodities, and is this information accessible to those transporting the product(s)?*
- *Has training in your vehicle policy (i.e. assessment of suitability for transporting produce), loading/unloading procedures and refrigerated transport policies/requirements (as applicable) been documented for all relevant employees?*

Harvesting equipment: If an object comes into contact with produce it must be clean, in good working condition, and sanitized or disinfected. This includes, but is not limited to, hands, harvesting equipment (knives, etc), harvesting totes and boxes, transportation equipment, processing equipment (tables, cooling tubs), and storage equipment. Prior to moving product from the field, excessive dirt and mud will be removed from totes and pallets as much as possible.

Harvesting totes will not be used for carrying anything but produce. If something other than produce is placed in a harvesting tote, that tote must be cleaned or disinfected. Totes not in use will be stored in a clean and secure location.

All containers used for field packing are new, single use containers. These containers are stored in clean, plastic wrapped boxes prior to use.[2-19, 2-20]

Garden Cart

Check the garden carts daily for cleanliness. The harvest/garden carts used for carrying cases of produce out of the field will be cleaned weekly or more often as needed. This cleaning and inspection will be recorded in a garden cart maintenance log.

Harvesting Tools

Any tool, such as a knife, used to harvest produce will be cleaned and disinfected before use each day. This tool must be logged as *in use and disinfected* in the tool log book. If this is not done, that tool may not be used for harvesting.

Pallets

Pallets are repaired and cleaned as necessary.

Broken Glass

No glass containers are allowed in the field or packing house. All light bulbs are shatter proof or are shielded with shatter proof sleeves or covers. Any broken glass will be placed in a cardboard box that is sealed, and placed in a secure trash can [This should be expanded to a SOP that addresses broad product contamination including glass, plastic, chemicals, pesticides, petroleum, and physical hazards per audit 2-11, 2-12].

Field Harvest Visitor Policy

All visitors must follow business Safety and Hygiene Rules which are posted in prominent places and restroom facilities. They are required to wash their hands before beginning or returning to handling produce. Directions for proper hand washing are posted in each wash area.

Standard Operating Procedure:

All field packing will be into new containers or into containers that have been sanitized prior to each use. We keep a log kept of when they are sanitized.

Best practices:

No one can stand in containers.

Bulk handling vehicles carrying unwashed produce will be swept out on a regular basis.

If using containers for refuse, they will be labeled as refuse containers only. Harvesting containers are not used for carrying or storing any non-produce items in the harvest season.

If harvesting implements are used, a log is kept showing when they are sanitized.

Machinery is clean and in good repair. There should not be any leaking or broken parts. Light bulbs and glass are protected to avoid contamination of fields.

Product being moved from field to storage or packing or processing is / is not protected from sources of contamination.

Packing containers that are not used immediately need to be covered to protect against rain and bird droppings. Using the top container as protection is not adequate.

Vehicles in the production fields

All vehicles will be inspected for the following prior to entering the fields:

interior and exterior cleanliness

no broken or cracked plastic or glass windows, fixtures, covers, or other parts

no dripping oil, anti-freeze, or other fluid, petroleum product, or automotive lubricant

If you are going to be moving produce with a passenger vehicle, there must be no contamination hazards present including food, pet hair, or other items that could compromise the produce.

(It is preferred that you only use designated carts, containers, and vehicles for moving produce to the storage shed.)

Consideration: all purpose vehicles that not only haul produce but carry other things such as dogs, compost, bags of fish fertilizer, hunted game, etc. Keep it clean for the picking season and going to market.

Transportation

Temperature and sanitary conditions are critical during transport. All vehicles used to transport produce to market should be inspected for odors and visually inspected for signs of unsanitary transport conditions prior to loading to ensure they are clean and sanitary. Fresh fruits and vegetables should not be shipped in trucks which have carried live animals or harmful substances. Special consideration/Standard Operating Procedures should be developed for operations that have only one truck that transports pesticides, farm pets, and fresh produce.

The vehicles must be thoroughly washed, rinsed, and sanitized before transporting fresh produce. Equipment used to carry animal products or other potentially hazardous items including carcasses, manure, or pesticides should not be used. For transporting more than short distances, use refrigerated trucks when possible to optimize crop post-harvest quality. Contracted truck operators should provide a cleaning schedule and temperature log for the vehicle prior to loading.

Special consideration/SOPs should be developed for operations that have only one truck that transports pesticides, farm pets, and fresh produce.

Equipment will be cleaned and sanitized (if necessary) before produce is loaded. Invoices and shipment manifests should be kept on file for the period of one year. Proper transport temperatures should be maintained and printed on manifests to ensure the quality and safety of the product.

To minimize damage to produce during loading, employees should be trained in loading produce out of the storage cooler and onto trucks.

Slide 32__Page 15. Cold Chain Management

- *Do you cool your produce to ensure food safety (e.g. hydrocoolers, air coolers, chilled storage areas)?*

All water used in postharvest handling including cooling water and water used for ice production has to be potable.

The temperature of the water in dump tanks, flumes, sinks, basins etc. should be monitored frequently either automatically or with a standard thermometer at the same time as the disinfectant concentration is measured. The water temperature should not be more than 10 degrees Fahrenheit cooler than the produce

Use thermometer to test pulp/core temperatures for accurate temperatures when washing produce in the “dunk tank” fashion. Tomatoes, netted melon, and apples are prone to absorbing water in the stem end or through blemishes when submerged in water that is colder than the pulp temp.

Sorting of products might be an added to visually inspect product for cut, blemishes, or signs of wildlife damage that can make them more susceptible to water infiltration.

Wash water quality is maintained by:

Dump tank water is changed (how often?) and disinfectant levels are maintained at (at what level?)

Multi bay sinks or other small communal washing basins are essentially the same as dump tanks. The benefit is that the water is usually changed more often (document this) and you have better control of the material that enters the basin (can pre-rinse with single pass water to remove leaves and field dirt) so you can use less disinfectant if the microbial and organic load is lower.

See list of OMRI approved sanitizers.

Follow label directions (include copy with SOP). More frequent water changes will be necessary if your monitoring system is not automatic. Describe how this is done in your plan.

Cleaning and sanitizing water-contact surfaces including dump tanks, flumes, and wash basins is done [how often]

Food contact surfaces are in good condition and cleaned and sanitized [how often]

Backflow devices are installed and air gaps present to prevent contamination of clean water

Equipment is designed, inspected and maintained to assist in maintaining water quality.

(Aside: Could add periodic water sampling and microbial testing)

Ice Management

Ice making machines need to be sanitized on a regular schedule. If ice is purchased, a copy of the sanitization log for the ice machine and water quality tests for ice production are attached with the water log. All ice hauled to a separate location should be transported in a closed truck or in covered bins. No ice should be transported in wood containers.

(Aside: When chlorine is used to disinfect produce, the concentration of free chlorine is generally between 50-150 parts per million with a contact time of one to two minutes. Concentrations may vary by commodity, so check before you implement this practice.)

Ice or cold water (hydro cooling) is often used to reduce the temperature of a product. Water used for this must be potable in order to reduce the risk of food contamination. If ice is purchased, a water report should be obtained from the source to ensure the water is potable. If using farm well water, the well should be tested twice a year for fecal coliform and generic *E. coli*. Ice making facilities must be sanitized on a regular schedule.)

Storage Cooler

Storage cooler temperatures should be checked and logged one time per day and problems addressed immediately. Multiple thermometers can be used to assure correct temperatures.

The cooler thermometer should be calibrated on a monthly basis to ensure a reliable and accurate reading. The calibration will be recorded in the calibration log. Scout for signs of rodents. Before using coolers for season, check for holes/cracks (check at night with a light on inside cooler and you look at it from the outside to see if light is visible).

The cooler should be cleaned on a monthly basis or sooner if needed. This cleaning should be recorded in the log and kept on file for one year.

A note on calibration of the thermometer

This information on thermometer calibration is brought from “Food Store Sanitation”, 1998, Sixth Edition, Gravani, Robert B., Rishoi, Don C., Cornell University Food Industry Management Distance Education Program, Lebhar-Friedman Books, Chain Store Publishing Corp.

Melting point of ice method

Place ice in a container and let it melt.

Stir to make sure the temperature in the ice/water mixture is uniform throughout the container.

When the ice is partially melted and the container is filled with a 50/50 ice and water solution, insert the thermometer and wait until the needle indicator stabilizes. The thermometer should be 32°F (0°C).

If the thermometer is not reading 32°F (0°C), it should be adjusted by holding the head of the thermometer firmly and using a small wrench to turn the calibration (hex) nut under the head until the indicator reads 32°F (0°C).

An important item to remember as you are calibrating your thermometer using the melting point of ice method is to never add tap water to ice because this will *not* be 32°F (0°C) but will be at a higher temperature. The calibration will be much more accurate if you use melting ice.

Slide 33. Strawberries

The cold chain is a term used to describe a temperature controlled supply chain. For produce, managing temperature is an important aspect of food quality and safety. When you harvest produce it is at its peak quality. After the point of harvest, quality cannot be improved, only maintained. The rate many perishable produce items decline in quality will be largely dependent on how quickly and effectively they are cooled and stored under the proper temperatures.

I like this illustration featured in Lisa Kitinoja’s postharvest handling manual from UC Davis because it reminds us that we’re shipping a product that is alive. Produce requires special handling to ensure the food you as farmers worked for months to grow, makes it to market in a condition that consumers find acceptable for purchase.

Produce safety, in terms of risk for foodborne illness, is much like quality, in that you can’t improve the safety of the produce using good cold chain management, you can only maintain the level of safety you achieved through implementing your on-farm food safety plan. Properly maintaining temperature cannot eliminate a bacterial hazard. However, proper temperature control can effectively reduce the growth of a bacterial hazard, *if* present.

In effect, the goal of managing the cold chain is to slow the speed in which perishable produce items like the strawberries on the left, will deteriorate and turn into the strawberries pictured on the right. This is a bit of simplistic view, however, there are some simple approaches that can be utilized to help maintain the quality and safety of your produce without significant investment. In the short I have I’d like to

outline a few cold chain fundamentals, as well as some technologies that are available for relatively low cost.

Slide 34. Harvest Strategies

In its simplest form, the cold chain comprises:

1. a pre-cooling step, where the field heat is removed rapidly
2. temperature controlled transport, where insulation or refrigeration is utilized to maintain temperature
3. Temperature controlled storage to maintain temperature.

Managing the cold chain begins in the field. Best practices for in-field temperature management include harvesting produce at the coolest time of day, usually early morning. The temperature of produce while it's in the field can vary greatly. Throughout the course of a long hot day, the produce can gain a lot of solar heat. Produce temperature may reach 75 to 80F, or more. However, in Colorado, our cool nights provide for heat removal from the produce. Harvesting in the early morning may mean produce is 30 to 40F cooler (potentially) than if you were to harvest in the late afternoon (Bachmann 2000, Kader 2004, Thompson 2010).

Once harvested, utilizing shade over produce will greatly reduce the amount of heat gain (Thompson 2004)

Minimizing the time from harvest to market, by harvesting what you need for market that day or the next, and quickly removing harvested produce from the field and transporting to market, will help reduce the quality loss due to the combination of high temperature and time.

Slide 35. Cooling Methods

I'd like to quickly describe two options that utilize modified home air conditioning units. Home AC units often aren't designed to cool air below approximately 55F. However, there are aftermarket modifications that can be done to create an affordable room cooling or small scale forced air cooling unit.

On the left is a diagram showing what is commonly referred to as a portacooler, which was developed by the USDA. The portacooler is designed to be used as a forced air cooler to remove field heat from produce. It is highly portable (as indicated by its name) and can run off a diesel generator, so it can be utilized in the field. It can cool small pallet quantities very rapidly, usually in less than an hour.

On the bottom right is a cool and ship system described in detail by North Carolina State University's extension program. It is a similar concept to the portacooler in that it utilizes a home window AC unit. An insulated box with an air plenum is built into the back of a pickup truck. Usually the AC unit will be external to the truck. The idea is that produce can be forced air cooled while the truck is stationary and

attached to the AC unit. The truck can then be detached from the cooling unit and drive to the market. The insulation on the truck will hold produce at the cooled temperature for short periods of time.

Slide 36. Walk-in cooler

Room cooling is a relatively low cost storage method that can also be used for cooling certain crops. It is much slower than forced air cooling and it will likely take twenty four hours at a minimum to cool most packed produce to its long term storage temperature. (Thompson 2004)

When using room cooling, it is important to take into account that only about 60% of the floor space in the room cooler will be usable for placement of product. The remaining 40% of the space is needed for aisles, door opening space, space between the products, and space between the product and the walls. Room coolers that are packed too tightly will further slow the cooling process of the products, or as a worst case scenario, not cool the products at all. Exceeding the refrigeration capacity of a room cooler will not only cause slow cooling, but will warm the room itself. As the room cools down slowly again, a mist or fog can form and condense on the ceiling and other surfaces, and then drip onto the produce. This can result in the contamination of the produce. This is the scenario described by the FDA as a contributing factor to the spread of Listeria in its report on the recent outbreak in cantaloupe.

Slide 37__Page 16. Packinghouse

- *Do you use raw materials in the packinghouse such as packaging, chemicals/sanitizers other raw materials?*
- *Do you receive raw product from external sources (e.g. not affiliated with your farm) for processing in your packinghouse?*
- *Do you have a storage area for non-product and packaging materials which minimizes risk of contamination?*
- *Do you have a written policy regarding storage, inspection, handling and proper use of food contact containers and bins for packinghouse activities?*
- *Does your packinghouse design help minimize contamination risks (e.g., ease of cleaning)?*
- *Do you have toilet facilities within your packinghouse?*
- *Do you use equipment lubricants in the packinghouse?*
- *Do you have a Preventative Maintenance and/or Master Cleaning Schedule with associated procedures for your packinghouse building?*
- *Are equipment and tools used for cleaning kept clean, in good working condition and stored properly away from product handling areas?*
- *Are all food-contact equipment, tools and utensils used in the packinghouse designed and made of materials that can be easily cleaned and maintained?*

- *Do you use water/ice in contact with product or food contact surfaces in packinghouse activities?*
- *Do you wash your produce?*
- *Do you use antimicrobial chemicals in your wash water?*
- *Do you use instruments to measure temperature, pH, antimicrobial levels and/or use other important devices used to monitor variables that impact food safety?*
- *Is microbial testing by an external lab performed on your product(s) or water?*
- *Do you use packaging materials for finished products?*
- *Does your packinghouse facility process produce that may contain allergens?*
 - *Has training in your policies and procedures for packinghouse activities been documented for all applicable employees?*

The Packing and Storage House should be accessed by authorized and trained personnel only.

Product delivered to the packinghouse from the field should be protected from contamination during the staging period through [Explain how product is protected].

The packing and storage facilities will be clean and orderly before and after use. At the end of each day, packing areas are dry swept. The washing, grading, sorting, and packing lines are cleaned and sanitized as well. A thorough cleaning will happen on a weekly basis or as needed and this will be recorded on the Storage Cleaning Log.

Only food-grade cleaners may be used in cleaning either the processing surfaces or the storage cooler. Sanitation chemicals have their own storage area separate from the processing line.

Source water used in the packing of fresh fruits and vegetables, either for washing or as a way to disinfect produce or apply waxes, MUST be potable. Copies of the municipal water test results are obtained yearly and kept with the water records. Farm wells should be tested at least twice a year to determine potability. Surface water (ponds, lakes, streams, etc.) is not considered potable for a packinghouse and cannot be used.

Slide 38__Page 17.

- *Do you have a description of the water distribution system for packinghouse use?*

Map of Facility may include:

Production areas

Restrooms

Employee Lounge/Eating Area

Staging Area

Rodent Trap/Bait Stations (numbered as they are labeled on the walls)

Trash receptacles

Doors and their use/type

Refrigeration areas

Dimensions

Processing Water:

In order to ensure and maintain water quality, the following may be done:

Periodic water sampling and microbial testing

Change water as necessary. Develop a water change schedule.

Clean and sanitize water contact surfaces. This is logged.

Install backflow devices and legal air gaps as needed.

Routinely inspect and maintain equipment used, such as chlorine injectors, filtration systems, and backflow devices.

If chlorine is added to water for post-harvest treatment of fresh produce, it should be at 50-200 ppm total chlorine at a Ph of 6-7.5 with a contact time of 1 or 2 minutes.

There are many options for water sanitation including ozone, ultraviolet radiation and various other chemicals. The strength and acidity of the treated water must be appropriate for the commodity. This is monitored and logged.

(Logs for all applicable processes are kept at the site of the process)

Slide 39__ Page 18. Traceability and Recall

General Audit Requirement Questions:

Do you have a written product traceability program in place?

Do you have a written recall procedure?

Do you have a documented corrective action procedure?

Has training in traceback, recall and corrective action procedures been documented for relevant personnel?

A functional traceability system allows you to trace your product one step forward and one step back. If you are a fresh produce grower, one step forward means when and to whom produce was sold, one step back means you know what field a particular lot came from and the day it was harvested. In the event there is a foodborne illness outbreak, you will be able to identify what products you have in the marketplace and recall product if necessary. The traceability system can be developed from a system you already have in place based on invoicing and harvest dates. Although it can be very high tech with bar codes and computers, it does not need to be. The important part is to know what product went where on what day.

Direct Marketers - It is seemingly impossible to track every individual who buys your product if you sell at a farmers market or have a farm stand. In this case, keep track of what you took to market (where it came from and when it was harvested) and document what was sold (date and location). Essentially, the market becomes the step forward. If you have an on-farm market, keep track of what you put out and how much is sold each day. The benefit to this is that it will help you keep first in-first out in your coolers and keep the inventory moving. If you are selling newly harvested crops, just document on a clipboard how much you put out and sold that day.

As an example, you can create a diagram/field map to reference and use a harvest log that gives locations of field and/or plots where product came from, the date it was harvested, packed, and sold. If you attend multiple markets, you can number the markets and reference the market number where it was sold. Use this to help simplify the method you use to create a reasonable traceability procedure.

Here is an example of a system you could use.

Our farm utilizes a [DESCRIBE YOUR SYSTEM HERE] traceability system that allows us to trace product one step back (field) and one step forward (customer). For example: when selling cases to a buyer use a sticker on each box/bag etc. Each case of produce packed has a sticker that identifies:

Who packed the produce (Crew #, group, individual), the field it came from, the date it was harvested, the date it was packed, corresponding ID# on the package, the date of shipment

Slide 40. Traceability

Traceback is the ability to track food items, including fresh produce, back to their source such as where they were grown or packed. Traceback cannot prevent foodborne disease but it can serve as a complement of GAPs and GHPs, which are intended to minimize liability and prevent food safety problems such as physical, chemical, or biological contamination. If an outbreak were to occur, traceback would help identify and eliminate the source of microbial hazards.

There are many advantages to using traceback systems. They can help:

- Identify a specific region, packing facility, or even a field, rather than an entire commodity group as the source of an outbreak, thus lessening the economic burden on industry operators not responsible for the problem.

- Help limit the population at risk in an outbreak through the speed and accuracy of tracing implicated food products.
- Minimize costs by valuable public health resources and reduce consumer anxiety.
- Help public health officials determine potential causes of contamination, in turn, providing information for growers and shippers for minimizing microbial hazards

Slide 41. Documenting Traceability on the Farm

- So on your farm, how do you manage traceback?
- Larger operations, which tend to have more control over the growing, packing, and distribution chain, will be able to implement traceback systems more easily. Smaller farms should develop traceback procedures that document the source of a product, and a mechanism for marking product for effective tracking throughout growing, packing, and distribution.
- First of all, have a map available of all your production facilities and locations of fields. You can do this simply by logging onto Google maps and printing out a picture of your location and then number or labeling areas.
- Second, assign numbers to identify specific growing areas – this will be very helpful when harvest crews are in the fields and will help in the process of correctly labeling harvest boxes and totes.
- Mark all packages with date, location, and crew members – by identifying crew members associated with specific harvests we can rule out potential contamination from human illness. You can create a simple label with the date, location, and crew members. You can just print these out from your home computer or handwrite them.
- Put the harvest date and location ID on each invoice – this will allow you to trace your step forward to the point of sale.

Slide 42. Mock Recall

The most effective way to test your recall plan is to conduct a mock recall. In the mock recall, a buyer is contacted and asked to identify a load/shipment received from your operation. As the producer, you ask how much of the product has been sold and how much they still have in inventory.

Mock recalls should be performed regularly. Hopefully it will be the only time your traceback program will need to be tested.

This slide shows a mock recall over a 3 day period of time. Because it is a mock recall on your end, you want to notify your buyer that it will be occurring, as is occurring here on day 1. On day 2 you will identify and record lot numbers to be shipped to the participating buyer and input this into your data system, prior to the shipment leaving your location.

On day 3 you will contact the buyer and request disposition of the previously identified product lot number. Specifically you want to find out how many have left their possession through a sale and how many they have left on hand.

Slide 43. Mock Recall Log

This is an example of a mock recall log, so as you can see you will fill in all the pertinent information including the date you conducted it, the buyer's name and contact information and then all the harvest, shipping and mock recall information. Be sure to include the results of the mock recall so you can improve on it in the future if you need to.

Finally, be sure to attach the buyer confirmation that a successful recall was performed. This information is recorded in a mock recall form and kept on file. Going through the steps of a mock recall will be beneficial to both your organization and the businesses you sell to.

For a mock recall for the direct market farm, which product went where is one step forward; what product came from which field/plot when is one step back. An example of something to use for record keeping with this can be the GAPs Field Log. The log can be tailored to fit your own operation.

Description of how you label and identify lots (units). Lot identification/labels should be able to link each individual lot to the:

Grower(s)

Field (location)

Date harvested or date received if co-packing

Individuals involved in harvesting

Total number of packages in the lot

Shipping and receiving dates

The traceability codes should be traceable on invoices delivered to the customers by date identification. Each date code label will correspond to a certain harvest period, person, and field.

Slide 44. Webinar info

Slide 45. References

Slide 46. Acknowledgements