

Fundamentals of Creating a Colorado Farm Food Safety Plan

Food Safety Plan Guide

Introduction

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

This guide can assist you with recording the steps you take 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 is required for a specific practice since records are an important way to track and verify what steps you have completed as part of good agricultural practices.

The term **Good Agricultural Practices** (GAPs) is used to describe individual environmental and operational practices that prevent, reduce, or eliminate food safety risks on a farm. As a grower, you need to systematically identify, assess and control all hazards associated with your food production operation. A successful program helps you to avoid recalls, adverse publicity, and loss of sales. It also serves to enhance public health.

The guide is divided into sections that follow each section of the on-farm plan template. Many sections begin with a few GAPs audit questions, and then suggest example policies, best practices and references for constructing and documenting your farm's food safety plan.

Audit question:

- *Do you have a written food safety policy?*
- *Have you designated someone to implement and oversee your food safety program?*

Page 1. Cover Page

Personalize the cover of your farm food safety plan with:

1. your farm's name
2. location
3. 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.

This plan should always be available to the employee(s) designated as being in charge of food safety on your farm. You should be able to locate it easily both for recording and referring to this information and in case of an audit.

Page 2. Personnel

Audit questions related to personnel and worker health and hygiene (plan pages 2-4):

- *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 are 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.

Page 2. Personnel (continued)

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 the steps that 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.

Note: You should have a 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.

Page 2. Personnel (continued)

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 from discarded ashes and cigarette butts. Clearly designate break areas and show these on your farm or packinghouse map. Breaks in the field should not be taken in areas 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.

Allowed drink containers: Under no circumstances should glass containers be allowed in the field or packinghouse. Workers should carry bottled water in unbreakable, capped containers in growing areas.

Note: All personal items must be stored in designated areas in the field, break room, 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. Workers should not take tools home with them. Keep an inventory of all tools to make sure they are returned to the storage area after use.

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, or in the packinghouse or packing facility, with the exception of a plain wedding band (no stones allowed) and wrist watches.

Cleaning tools and equipment: Training for cleaning tools and equipment includes procedures for mixing sanitizing and cleaning solutions (see <http://www.extension.iastate.edu/publications/PM1974C.pdf>).

Page 2. Personnel (continued)

Agricultural chemical handling: See section on Agricultural Chemical Storage and Application (Page 13).

Farm security: All employees and farm volunteers 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 should be encouraged to share this information with their supervisors. See Example visitor/CSA member policy under Worker Health, Hygiene, and Sanitary Practices Policy section (Page 4).

Page 3. Worker Facilities

Audit question:

- *Are all your employees required 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?*

Note: 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. In fact, poor employee hygiene has been responsible for over 40% of source identified produce-related outbreaks (Chapman and Powell, 2005).

Facility locations: All workers are trained on good personal hygiene, proper hygiene and toilet facility use in language appropriate to worker. Document this training, as well as the location of hand washing stations and toilet facilities that are accessible to workers.

Example policies and procedures related to hand washing: Training in proper hygiene and hand washing should be completed at least once a growing season for all workers. Remember that volunteers and temporary workers will require hygiene training also prior to starting any work that involves handling food products. Post signs 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. 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.

Page 4. Worker Health, Hygiene, and Sanitary Practices Policy

Audit question:

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

Best practices for 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.
- 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 map should be provided showing where the sanitation unit(s) is located relative to the agricultural plots.
- Have a policy/procedure in place for handling a septic or sanitation hazard in the field or packinghouse.
- 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.
- 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 the water source documented.
- Personal protective equipment should be cleaned after each use to prevent contamination in the home and at work.

Page 4. Worker Health, Hygiene, and Sanitary Practices Policy (continued)

Example visitor/CSA member policy: 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 should be briefed about how to safely handle produce while on the farm. 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.

Note: Define what a visitor is versus a customer just picking up product from farm (Community Supported Agriculture- CSA pickup) or longer term visitor (volunteer, intern). Develop a short farm visitor policy that details areas open to visitors and which activities they may participate in. Visitors should sign in upon arrival and check out prior to departure.

For U-Pick operations, you should 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. Note that a visitor policy is part of GAP preventive food defense 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. You should have a policy on reporting worker illness and injury. For example, if ill or injured, a worker is to be given a job not handling food.

Page 5. Farm Environment and Field Map

Best practices:

1. Write a general farm description including commodities grown, acres cultivated, etc., on all owned and leased farming sites. 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. You should also include floor plans of all buildings (e.g. office building/home, storage buildings/sheds, packing houses, cull areas, machinery buildings, including those affiliated with your farm but located on another property. Label each building and mark what is in it, such as power/water connections, fuse boxes, etc. Include photographs and a legal description of property (for example, latitude-longitude or parcel number)
2. Generate a field map of your operation. Note that your farm map can also help you develop a traceability program if you label your fields. You can then keep a harvest log based on the fields or plots from which the produce was picked. Insert map(s) or use the grid in the template 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

Page 5. Farm Environment and Field Map (continued)

Note: Indicate North and the approximate distances to nearest towns and major roadways. Other resources to include with your farm map are:

- 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.
- 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>.
- 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." Look on Google Maps or use Google Earth to find an aerial view of the property and make notes on a printed copy.
- A copy of field records/growing history. Keep these records for a long time.

Page 6. Previous & Current Land Use

Audit questions related to previous land use and animal control:

- *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?*

Note: 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. 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.

Wild and domestic animals can act as carriers for many foodborne diseases that affect humans. Pathogens that are prevalent may vary by region, growing location, and surrounding natural habitat. For example, pathogens isolated from wildlife include:

- Campylobacter
- Cryptosporidium
- Salmonella
- Giardia lamblia
- Shiga toxin-producing E.coli /E. coli O157:H7

Many animals follow habit, so if they continually invade certain areas in your field, determine methods to deter animals from fresh produce fields. This assessment can be incorporated into your daily activities on the farm; be vigilant. Follow these steps:

1. Assess risk
2. Walk your fields
3. Scout for signs of animal activity
4. Document intrusion
5. Create a solution to the problem

Page 6. Previous & Current Land Use (continued)

Best practices for managing wildlife//livestock impacts on crops:

- 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 the minimum 120 day raw manure rule but longer period of time may be recommended, depending on type of crop.
- 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.
- Geese can contaminate surface water. There are several ways to break their habit:
 - Decoys
 - Mowing around water areas
 - Reflectors
 - Noise makers
- Change your scare tactic periodically so that animals/birds do not become habituated to one method.
- Plant a “buffer crop” to prevent wildlife from eating your valuable, for-market crop can help reduce losses.
- 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 off 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.
- The Leafy Green Marketing Agreement lists 10 ft. as a buffer zone to isolate once fecal contamination by wildlife is discovered. Experiments have shown that E. coli does not spread far from beyond the point of manure drop ~ 10 ft.

Best practices for using draft animals for cultivation:

- If draft animals will be used in a field from which food crops will be harvested, the animals’ manure should be captured so that it does not fall onto the soil.
- The last cultivation with horses should be no less than 14 days before harvest. Should any manure fall in the field, it should be removed immediately, and the produce growing nearby that may be contaminated should not be picked. One to two inches of soil at the site of the feces should also be removed to prevent fecal contamination of other produce.
- During harvest, horses or other draft animals should be kept in wide harvest lanes left for them when the field was planted and at least five feet from the crops being harvested. The person driving the draft animals should have no contact with the produce being harvested.

Page 6. Previous & Current Land Use (continued)

Previous land use policy: If the land was used as a dairy or feedlot within the last three (3) years, as a waste site at any time in the past, or the land was converted to production from another use, soil tests have been conducted to assure that crops will not become contaminated. Land where annual crops are grown and that have recently been subjected to flooding must be tested for potential microbial hazards (for example, *E coli*).

Adjacent land use policy: Crop production areas are sufficiently separated from dairy, livestock, or fowl production facilities, manure lagoons, or other sources of contamination to minimize opportunities for wind and/or water contamination from occurring. 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.

Entry of domestic animals into growing areas is forbidden.

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

Page 7. Water Quality

Audit questions pertaining to agricultural water:

- *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 sources 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?*
- *Do 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?*

Note: Water can come into contact with produce in a variety of ways: irrigation, cooling water, workers, flood events, frost protection, or wash water. Common causes of water contamination include:

- Wildlife (fecal contamination)
- Run-off (from manure storage or animal grazing)
- Storm water
- Septic tank leaks
- Well head impacts
- Application of manure to land (run off, drift)

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:

Part 1: Food Safety Basics, Regulatory Landscape, 3rd Party Audits, Worker Hygiene. Available from: <https://connect.extension.iastate.edu/p97225744/>; [Webinar 1 Slides](#)

Part 2: Minimizing Risks During Production: Irrigation Water and Manure Management. Available from: <https://connect.extension.iastate.edu/p26083829/>; [Webinar 2 Slides](#)

Part 3: Minimizing Risks During Harvest & Post-Harvest: Washing & Packing, Cooling & Storage, Transportation & Traceback. Available from: <https://connect.extension.iastate.edu/p51292549/>; [Webinar 3 Slides](#)

In addition to water source selection and testing, potential contamination of irrigation water may be minimized through physical barriers such as berms, diversions, fencing, etc.

Applicable documentation for water quality:

Frequency of water testing:

- 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 (see the list in this factsheet,

<http://www.ext.colostate.edu/pubs/crops/00520.html>). Follow the lab's 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, with no more than a 24-hour hold time on sample, but preferring a 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.

Page 8. Water Use and Source

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

Drinking water policy: Water used for drinking, water that contacts harvested produce, or water that contacts containers used to hold harvested produce meets the potable water quality standards prescribed by the US Environmental Protection Agency. If water used for hand washing does not meet EPA potability standards, it has been made safe by addition of chlorine or other acceptable agents. Potable water is used for chemical or irrigation applications that come in direct contact with the edible portion of the crop.

Testing requirements:

- Municipal water: Test results are acquired from the local water authority annually.
- Well water: Water is tested two (2) times during the growing season. If fecal coliforms are present, the well is treated with a sanitizer to reduce levels. Wells are monitored to make sure casings are secure and well-maintained and that livestock and manure storage areas are excluded from the well recharge and pumping area.
- Surface water: Water is tested three (3) times during the growing season – first at planting, second at peak use, third at or near harvest.

Note: Potable water is clean water that is safe to drink. Under the U.S. Department of Labor, OSHA regulations (29 CFR, Part 1910), this means water which meets the quality standards prescribed in the U.S. Public Health Service Drinking Water Standards, published in 42 CFR Part 72, or water which is approved for drinking purposes by the US Environmental Protection Agency, State or local authority having jurisdiction.

Municipal water supplies are regulated by law and are required to be potable. Well water may or may not be potable. Auditors should consider that if the company tests their well water, as the results would definitely indicate whether or not the water is potable. Surface water is subject to various uncontrollable influences and should not be considered potable without further testing or treatment to show that the water is potable.

Pages 9 & 10. Sewage, Manure and Biosolids

Audit questions:

- *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?*

Best practices:

- Document the source of the compost, the composition, and the process by which it was produced. Request a certificate of verifiable practices that the compost was treated properly. Keep records of analyses of applied compost or biosolids, and certificates for traceability are required in some audits (for example, GAP Harmonized).
- If you cannot document, or if the manure is not completely treated, you must handle it as if it is contaminated. The manure needs to be handled carefully as pathogenic organisms, such as *E. coli O157:H7*, can last in manure for many days.
- Document rates, dates and locations of manure applications to fields.
- Use your farm map to indicate location of storage and application areas on your fields.
- If the manure needs to be stored, keep it away or downhill from fields and the packinghouse. Avoid situations where runoff will be an issue (for example, keep manure 150 to 200 feet from water sources). Use a tarp to protect stored compost from environmental contaminants. If piles are uphill, rain can cause manure to trickle and contaminate everything down the hill.
- Prevent cross-contamination between raw and finished compost by using separate equipment for handling and/or application. Use barriers or physical containment to secure storage areas, such that materials do not leach, run off or blow into adjacent crop production areas.
- Do not sidedress with raw manure; only use properly treated compost.
- Refer to 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.

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

- Guidance from the USDA National Organic Standards Board on compost (and earthworm/vermiculture) teas:
 - 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).
 - Foliar applications of raw manure extracts or teas are prohibited.
 - Supporting research: <http://www.reeis.usda.gov/web/crisprojectpages/202285.html>.

Note: 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.

If you are not using manure, explicitly state that manure is not used on your farm. “We do not use any manure on our farm for vegetable/fruit production.” This is an automatic 35 points on a USDA-GAPs audit.

Pages 9 & 10. Sewage, Manure and Biosolids (continued)

Policy: Whenever raw manure is used, it is applied to soil at least 120 days before harvest. Whenever treated or composted manures or biosolids are used, they are treated, composted, or aged adequately to reduce pathogens to safe levels. Analysis reports document that the composted manure or treated biosolids are safe to use.

Best practices for using draft animals for cultivation:

- If draft animals will be used in a field from which food crops will be harvested, the animals' manure should be captured so that it does not fall onto the soil.
- The last cultivation with horses should be no less than 14 days before harvest. Should any defecation fall in the field, it should be removed immediately, and the produce around the defecation should not be picked. One to two inches of soil at the site of the feces should also be removed to ensure that all fecal matter is disposed of.
- During harvest, horses should be kept in wide harvest lanes left for them when the field was planted and at least five feet from the crops being harvested. The person driving the horses should have no contact with the produce being harvested.

Page 11. Facilities

Audit question:

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

Best practices:

- Make sure buildings are in good repair and are visually inspected on a regular basis.
- Make sure the immediate property around farm buildings is regularly maintained, lawns mowed, weeds removed, unused equipment stored properly. These areas can be breeding and nesting areas for pests.
- Store unused, unformed containers off the floor, and keep them clean and dry.
- 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, specifically:
- 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.
- Considerations for non-enclosed packing areas:
 - 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: Keep 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.

Example facility policy:

- 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].

- All windows are screened. Any holes are repaired to prevent pest entrance into the operation. Screening, wind curtains, bird deterrent tape or decoys may be used if necessary.

Example pest policy:

- Traps and non-poison bait stations are marked and flagged for easy recognition.
- The map of the packing facility shall include placement of each station.
- Only bait stations outside the facility may contain poison.
- Vermin are trapped and other pests are deterred as much as possible.
- Dogs, cats, and other animals are not allowed in the packing house.
- Employees are trained to report any signs of infestation in the field or processing and storage areas.

Page 12. Preharvest Activities

Preharvest activities include everything from field preparation, planting, crop management and input usage, up until you prepare for harvest. Preventing preharvest contamination of produce is an ongoing process that involves following all the applicable practices provided in this guide. A few best practices are listed below.

Best practices:

- Assess production fields prior to harvest for possible sources of contamination and document your assessment. For example, visually inspect fields from the outside to see if there are any noticeable signs of animal presence. If animal presence is noted, affected sections of the field should be noted and not harvested.
- Stay out of wet fields to reduce the spread of plant or human pathogens.
- Clean tractors that were used for manure handling prior to entering produce fields.
- DO NOT allow animals, including poultry or pets, to roam in crop areas, especially close to harvest time.
- Minimize wild animal and bird traffic in ponds and through fields where possible.

Page 13. Agricultural Chemical Storage and Application

Audit questions relevant to agricultural chemicals:

- *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?*

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

Best practices:

- 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 the contract company should be included in your farm plan.
- Store pesticides on impermeable shelves over an impermeable floor with curbs or dikes to contain leaks or spills. There is no floor drain OR the floor drains to an acceptable holding tank.
- Post signs stating pesticide applications. Prevent workers from re-entry to fields until the re-entry period has expired.
- Have a spill response plan in case of a spill or leak that clearly defines your policy.
- Have a written policy for mixing and loading agricultural chemicals. Isolate these chemicals from water sources and production fields.
- Ensure that products are registered for use with the Environmental Protection Agency for the crops being treated.
- Follow pre-harvest interval requirements for application prior to harvest.
- Never transport agricultural chemicals and harvested product in the same vehicle storage area.
- Have a plan to dispose of excess mixtures, and note the length of time during which a solution maintains its original strength and effectiveness.

- Do not spray if winds are greater than 10 miles/hour (small branches moving in wind), AND postpone spraying if heavy rain is forecast for within 24 hours AND write and follow a drift management plan.

Example training and application policy: Specify how treatments are applied (by hand, mechanically), where (soil, foliar), when (field preparation, planting, pre-harvest) and by whom (list trained individuals and license numbers, or contract company information). All personnel will have a working knowledge of, and comply with proper use of pre-harvest (pesticides, growth regulators, and fertilizers) and/or postharvest application material (waxes, fumigants and pesticides). Working knowledge will include the appropriate concentration and what to do if there is a spill.

When the use of materials is being completed by licensed or trained contractors, knowledge is demonstrated as applicators are covered by Federal, State or Local laws. All applicable State, Federal, and Local training and licensing requirements will be met by persons applying regulated or restricted use materials. If no restricted use materials are being used the applicator will hold training documents that prove they have received training on proper use. Spray records will be made available to inspector upon request.

Page 14. Harvesting, Field Packing, Post-harvest, and Transportation

Audit questions related to harvesting, transportation, and packinghouse activities (plan pages 14-17):

- *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) that only sound produce (appropriate for its intended use) is harvested and that produce that has been damaged to an extent where 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 conducted and 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?*

Page 14. Harvesting, Field Packing, Post-harvest, and Transportation (continued)

Audit questions related to harvesting, transportation, and packinghouse activities (plan pages 14-17):

- 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?
- Have you documented transport temperature ranges 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?

Best practices for harvest 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.
- Any sanitation aids such as knives or aprons, used to harvest produce will be cleaned and disinfected at the start of each work session. This item must be logged as *in use and disinfected* in the tool log book. If this is not done, that item may not be used for harvesting.
- 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.

Best practices for worker hygiene:

- Workers follow proper hand washing procedures before starting or returning to work.
- Workers wash hands and use new disposable gloves before entering areas where food will be handled.
- Train workers to avoid harvesting bruised or dropped produce and any produce with evidence of animal or bird feces or feeding marks.

Page 14. Harvesting, Field Packing, Post-harvest, and Transportation (continued)

Best practices for container use:

- 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.
- If field packing into used containers, inspect and sanitize prior to each use. Keep a log of when these containers are sanitized.
- Pallets are repaired and cleaned as necessary.
- No standing in containers is permitted.
- No glass containers are allowed in the field or packing house.
- 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.
- 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.

Best practices for vehicle use:

- All vehicles will be inspected for the following prior to entering the fields:
 - interior and exterior cleanliness
 - broken or cracked plastic or glass windows, fixtures, covers, or other parts
 - 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.
- Bulk handling vehicles carrying unwashed produce will be swept out and cleaned on a regular basis.

Page 14. Harvesting, Field Packing, Post-harvest, and Transportation (continued)

Best practices for 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.
- 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.

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. See Example visitor/CSA member policy under Worker Health, Hygiene, and Sanitary Practices Policy section (Page 4).

Page 15. Cold Chain Management

Audit question:

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

Note: 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.

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*.

Best practice cold chain 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 used to maintain temperature, and
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 is 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 2002, Kitinoja 2010).

Once harvested, using 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.

Best practices for water use:

- All water used in postharvest handling including cooling water and water used for ice production has to be potable.
- Backflow devices are installed and air gaps are present to prevent contamination of clean water.
- 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 pulp temperature.
- 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 temperature.
- Sorting of products might be an added step to visually inspect product for cut, blemishes, or signs of wildlife damage that can make products more susceptible to water infiltration.
- Maintain water quality by changing wash water in dump tanks, flumes, hydrocoolers, or other batch water tanks several times a day, and adding chlorine or other disinfectant. Monitor levels continuously to maintain appropriate levels (crop dependent). Water pH is monitored and adjusted to between 6.5 and 7.5.
- If chlorine is added to water for post-harvest treatment of fresh produce, it should be at 50-200 ppm total chlorine, while maintaining pH between 6.5 and 7.5, with a contact time of 1 or 2 minutes.

Best practices for ice management:

- 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.)
- Ice making machines need to be sanitized on a regular schedule. If ice is purchased from an outside provider, 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.

Note: 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.

Best practices for food contact surfaces:

- Use only food grade oils and lubricants in the packing facility.
- Any food contact surface needs to be easy to clean. When possible, upgrade from wood benches (which are impossible to sanitize) to surfaces that are easier to sanitize (plastic, stainless steel).
- Maintain food contact surfaces in good condition and clean and sanitize these surfaces before each work session.
- Design, inspect and maintain equipment to assist in maintaining water quality.
- Remove soil from produce and bins in the field to prevent contaminating wash water or other loads of produce.
- Wash all packing lines with soap and water, and sanitize at the end of each day. Inspect and clean brushes and sponges daily. Maintain an SOP for this purpose.
- Inspect packing lines before each operation to insure there are no sharp edges or drops in elevation that may bruise produce.

Best practices for storage coolers:

- Storage cooler temperatures should be checked and logged one time per day and any deviations 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 the 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 any 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.

- Thermometer calibration (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:
 1. Place ice in a container and let it melt.
 2. Stir to make sure the temperature in the ice/water mixture is uniform throughout the container.
 3. 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).
 4. 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).
 5. 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.

Note: 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.

Page 16 & 17. Packinghouse

Audit questions:

- *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, anti-microbial 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?*

Page 16 & 17. Packinghouse (continued)

Best practices:

- 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.
- Clean equipment when finished and store them in a clean designated area. Label tools in a way that everyone understands which tools have been cleaned. For example, store clean tools in the green bucket, dirty tools in the red bucket.
- 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.
- Use these for steps to clean and sanitize equipment in your packinghouse:
 1. Pre-Rinse: Remove visible soil and particulate matter
 2. Wash: Use detergent, scrub to disperse soil
 3. Rinse: Remove detergent/soil
 4. Sanitize: Apply sanitizer to reduce spoilage and pathogenic microorganisms

Page 17. Packing Flow Diagram

Best practices:

- Develop a map of each facility to so that you can monitor all processes that occur in your packing area, to include:
 - Production areas
 - Restrooms
 - Employee lounge/eating area
 - Staging area
 - Rodent trap/bait stations (numbered as they are labeled on the walls)
 - Trash receptacles, floor drains
 - Doors and their use/type
 - Water distribution system
 - Refrigeration areas
 - Dimensions
- Diagram traffic patterns to and around the facility to look for potential cross-contamination issues

Page 18. Traceability and Recall

Audit 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?*

Note: 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, and
- “one step back” means you know what field a particular lot or field it came from and the day it was harvested.

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 incurred by 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

In the event of a foodborne illness outbreak, you will be able to identify what products you have in the marketplace and recall product if necessary. 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. 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.

Page 18. Traceability and Recall (continued)

Best practices for direct marketing:

- 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 for sale 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 clip board how much you put out and sold that day.
- 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.

Example traceback system:

1. 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.
2. Each case of produce packed has a sticker that identifies:
 - a. Who packed the produce (Crew #, group, individual),
 - b. The field it came from,
 - c. The date it was harvested,
 - d. The date it was packed,
 - e. Corresponding ID# on the package, and
 - f. The date of shipment.

Page 18. Traceability and Recall (continued)

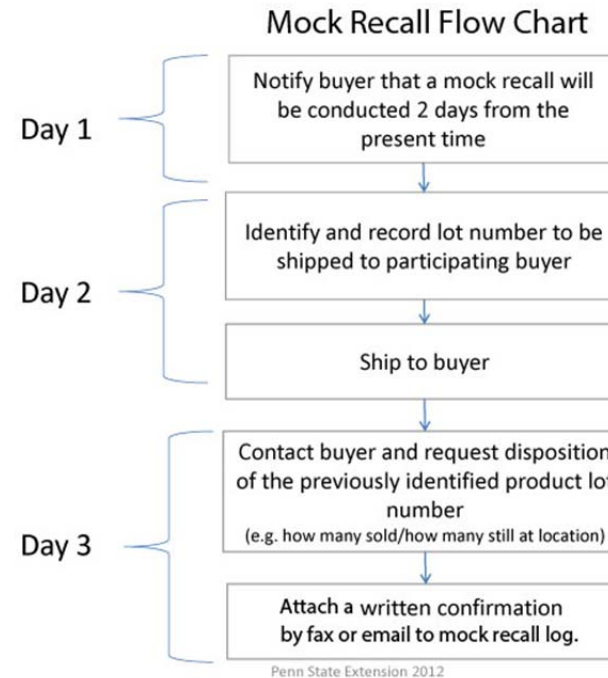
Applicable documentation on traceability:

- Develop traceback procedures that document the source of a product, and a mechanism for marking product for effective tracking throughout growing, packing, and distribution.
- 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.

Note: 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.

Mock recall policy:

- Conduct recall over a 3 day period of time.
- Day 1: Because it is a mock recall on your end, you want to notify your buyer that it will be occurring,
- Day 2: 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.
- Day 3: 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.



Mock recall log:

- Keep a mock recall log, to record the date you conducted the mock recall, 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.
- 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.
- Provide a description of how you label and identify lots (units). Lot identification/labels should be able to link each individual lot to the:
 1. Grower(s)
 2. Field (location)

3. Date harvested or date received if co-packing
 4. Individuals involved in harvesting
 5. Total number of packages in the lot
 6. 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.

References

Bachmann, J. and R. Earles. 2000. Postharvest Handling of Fruits and Vegetables, ATTRA.

Chapman, B.J. and D.A. Powell. 2005. Implementing on-farm food safety programs in fruit and vegetable cultivation in Improving the Safety of Fresh Fruit and Vegetables, ed. by W. Jongen, Woodhead Publishing, Cambridge, U.K. pp 268-292.

Gravani, R. B. and D. C. Rishoi. 1998. Food Store Sanitation. Cornell University Food Industry Management Distance Education Program, Lebar-Friedman Books, Chain Store Publishing Corp, Sixth Edition.

Kader, A. A., Ed. 2002. Postharvest Technology of Horticultural Crops, University of California.

Kitinoja, L. and J.F. Thompson. 2010. "Pre-cooling systems for small-scale producers." Stewart Postharvest Review 2(2).

Thompson, J.F. 2004. Pre-cooling and Storage Facilities. USDA Handbook 66 - The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks.

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