Produce Food Safety for Small-scale Farms

May 3, 2012
Cooperative Extension

Your local door to resources of the University of California

University of California
Agriculture and Natural Resources
Cooperative Extension
Vegetable Crops Program
Research and Education

University of California
Agriculture and Natural Resources
Cooperative Extension
Vegetable Crops Program
On-farm Produce Food Safety

We will cover:

- PRODUCE
  - Growing
  - Harvesting & Packing
  - Transporting

We won’t cover:

- Food preparation
  - Fresh cut produce
  - Processing
  - Food preservation

Meat, eggs & dairy
Welcome to the University of California Food Safety website. Research and Extension faculty at UC Davis (Drs. Linda Harris and Trevor Suslow) are the hosts for this site but current information from a wide range of sources will be included. From here link to presentations, publications, and other websites with information relevant to the production, harvest, and processing of foods. The emphasis is on microbial food safety but we also include subjects related to food such as biotechnology, food quality and food security are also addressed.

Newly Added to Website - April 2012

The Bad Bug Book (FDA, 2nd edition)

USDA.gov Flickr Photostream

Calendar

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbial Challenge Testing for Foods Workshop</td>
<td>5/1/2012</td>
</tr>
</tbody>
</table>

View More Events

UC Food Blog

Cultivating California's Salad Bowl

Posted 5/1/2012

California could be converted into the nation’s salad bowl. In...
ANIMAL HEALTH AND FOOD SAFETY SERVICES (AHFSS)
1220 N Street, Sacramento, California 95814  •  916-900-5000  •  Fax: 916-900-5332

We serve the citizens of the State and consumers of California agricultural products to assure the safety, availability and affordability of agricultural products by promoting California agriculture, protecting public and animal health while enhancing stewardship of the environment.

AHFSS Protects....

- The safety and security of meat, poultry, dairy products, and other foods of animal origin
- Public and animal health through the prevention, detection, and eradication of livestock and poultry diseases and dairy contamination incidents
- Cattle owners against loss of animals by theft, straying or misappropriation through ongoing inspections and investigative services
Animal Production Food Safety Education Programs for the Poultry Industry
Sponsored by
United States Department of Agriculture, Food Safety and Inspection Services

California Egg Quality Assurance Plan

California Poultry Meat Quality Assurance Plan

Developed by the California egg and poultry meat industries in cooperation with the California Department of Food and Agriculture; U.S. Department of Agriculture; University of California Cooperative Extension; California Veterinary Diagnostic Laboratory System; California Department of Health Services; and the U.S. Food and Drug Administration.

The California Egg and Poultry Meat Quality Assurance Plans are voluntary producer oriented animal production food safety programs designed to ensure the highest quality and safety of poultry and poultry products. These programs utilize Hazard Analysis Critical Control Points (HACCP) principles on the farm to maintain a safe and wholesome product. Training, record keeping, testing and research are integral components in documenting the success of the plan. Each farm participant designs their own monitoring plan applicable to their specific operation. Farms and processing facilities are periodically reviewed by California Department of Food and Agriculture veterinarians to ensure compliance with all program requirements.

The California Egg and Poultry Meat Quality Assurance Plans enjoy a high level of participation. The enrolled farms represent about 95 percent of the state’s egg and poultry meat production. No other state or national voluntary quality assurance program approaches that level!
Is this safe to eat?
Number of Sickened People - *Salmonella* Saintpaul by state, as of August 19, 2008
“Small Farms” May Be Responsible for Large Multi-State Outbreaks
Local Fresh Strawberries Tainted With E. coli O157:H7 Sicken 14, One Dies

- Locally grown berries in NW Oregon, 2011
- Sold at U-pick, farm stands, farmers markets
- Consolidated berries from several farms
Reported outbreaks linked to FDA-regulated foods, by agent, 1996-2009 (N=532 outbreaks)

- E. coli O157:H7: 4.1%
- Salmonella: 17.5%
- Cryptosporidium: 4.3%
- Norovirus: 4.0%
- Unknown: 70.1%
- Chemical/Toxin: 4.1%
- Viral: 0%
- Parasitic: 0%

Source Credit: FDA/CFSAN 2011
Reported *outbreaks* linked to FDA-regulated foods, by *vehicle*, 1996-2009 (N=532 outbreaks)

- **Produce**: 39.3%
- **Seafood**: 26.5%
- **Dairy**: 8.1%
- **Egg**: 5.8%
- **Processed foods**: 3.9%
- **Sprouts**: 16.4%

*Source Credit: FDA/CFSAN 2011*
Why is Produce a Risk?

- Pathogens are killed by heat, but produce is often eaten raw
- Surfaces of fruits and vegetables provide hiding places for pathogens
- If pathogens grow into the produce, no amount of washing will remove them
Types of produce Associated with Outbreaks, 1996-2009 (N=87)

- Berries: 16.1%
- Green onions: 10.3%
- Herbs: 3.4%
- Leafy greens: 32.2%
- Melons: 6.9%
- Tomatoes: 17.2%
- Others: 65.5%
- Unknown: 3.4%

Source Credit FDA/CFSAN 2011
Salmonella and E. coli:
30 minute doubling time at 80°F

- 8 am  1 cell
- 9 am  4 cells
- 10 am 16 cells
- 11 am 64 cells
- 12 pm 256 cells
- 1 pm  1024 cells
- 2 pm  4096 cells
- 3 pm  16,384 cells
- 4 pm  65,536 cells
- 5 pm  262,144 cells
- 6 pm  1,048,576 cells

Fast growth rate
Medium growth rate
Why is produce getting so much attention now?

• Produce-related outbreaks in mid-’90s
• 1998: FDA created voluntary guidelines “Good Agricultural Practices” (GAPS)
• 2010: Federal legislation passed by Congress
Food Safety Modernization Act (FSMA)

- Passed by Congress in 2010
- Applies to fruits, vegetables, & processed food
- Does not apply to meat, poultry or dairy

- FSMA draft regulations were due out in January 2012, but could now be delayed until after November elections?
Three key areas of FSMA:

1. Practices for fruit and vegetable production & harvest
2. Food facility registration (*more to come*)
3. Traceability & Recordkeeping (*more to come*)
FSMA Small Farm Exemption

- FSMA exempts "small farmers" from food safety regulations, if they meet ALL of the following criteria:
  - 50% direct marketed to consumers, stores and restaurants
  - Direct market in the same state or within 275 miles
  - Total farm sales less than $500,000
  - Name, address and phone # provided to customer
The New FDA Food Safety Modernization Act (FSMA)

The FDA Food Safety Modernization Act (FSMA), the most sweeping reform of our food safety laws in more than 70 years, was signed into law by President Obama on January 4, 2011. It aims to ensure the U.S. food supply is safe by shifting the focus from responding to contamination to preventing it.

Get FSMA Updates by E-mail

Focus on Sprout Producers

Through the new Sprouts Safety Alliance, FDA is helping producers identify and implement best practices in the safe production of sprouts.

More >

Resources for You

- FDA Implementation Timeline
- Recalls, Market Withdrawals, & Safety Alerts

What’s New

- Role of the Food Safety Modernization Act in Ensuring the Safety of Pet Food
  Michael R. Taylor, Deputy Commissioner for Foods
  Pet Food Forum, Schaumburg, IL
  April 4, 2012
- FDA Progress Report on Implementing the Food Safety Modernization Act: January - March 2012
- Enabling Produce Safety in a Global Food System
  Michael R. Taylor, Deputy Commissioner for Foods
  America Trades Produce, Tubac, AZ
  March 22, 2012
- Interim Final Rule: Establishment, Maintenance, and Availability of Records: Amendment to Record
- More on What’s New...
Local & State Food Safety Requirements

BUT: Farms exempt from FSMA must meet local and state requirements:

– County Environmental Health Department
– CDFA
– CA Department of Public Health
Industry Food Safety Requirements

• Many customers require that produce suppliers have 3rd party food safety certification (CDFA, Primus Labs, NSF Agriculture)

• Cancelled policies or increased premiums for some farms that direct-market leafy greens
Probable Future Requirements

- Schools
- Farmers Markets
- Donations to Food Banks
Commodity-Specific GAPs and Food Safety Audit Checklists

- Melon
- Tomato
- Stone fruit
- Mushroom
- Lettuce & Leafy Greens
- Culinary Herbs
- Green Onions
- Sprouts
- Almond
- Citrus
- Strawberry
- Watermelon
- Blueberries
- Asparagus
How much should I do?

- Use common sense “good agricultural practices”
- Develop a food safety plan for your farm
- Conduct a self audit (Self Certification)
- Become certified by a 3rd-party auditing company
Key Areas Food Safety

**Water:** Pre- & Post-harvest

**Waste:** Manure & Compost

**Wildlife:** Intrusion & Fecal

**Workers:** Hygiene & Training

- Record-keeping
- Traceability
Previous Land Use?

Write down what the land has been used for previously; and if manures were applied:
- crop land, fallow?
- dairy, livestock, poultry farms?

Discuss what you have done to resolve possible problem:
- e.g., had the soil tested for bacteria

Discuss what you did to reduce the risk if there is possible flooding or runoff from neighbor’s horse pasture, hilly ground, etc.:
- e.g. dug a trench or put up a berm of soil on 2 sides of my farm
Horses adjacent to a farm

Make a trench or berm
Mapping a farm

• **Field map:** Record activities within & adjacent to your property.

• **Map should include:**
  - Crops
  - Roads
  - Wells and other water sources
  - Lakes, rivers, ponds, reservoirs
  - Ditches
  - Buildings, including semi-permanent portable toilets and break areas
  - Neighboring property features
Creating a map...

• Hand draw the map
• Download one from the internet (eg, Google maps, or Google earth)
• Contact your NRCS office for a map
• Re-use one previously submitted to Ag Commissioner
Another map

Source: U of FL IFAS Extension. Small Farm Food Safety, Fresh Produce, Part 4: Farm Map Activity. FCS8845
Agricultural Water

* Surface sources – canals, rivers, streams
* Reservoirs – open or capped
* Wells
* Municipal sources
Know source of water
Know what is upstream
Know seasonal variation (does source change?)

Source: NRCS
Irrigation Source ?
Case: Fillmore, CA.

Peppers initially irrigated with well water, then toward harvest, river water was delivered, contaminated with bacteria.
Ensure that wells are designed and maintained in a manner that prevents contamination.
Animal burrow at well head
Potential Fertilizer Contamination
Potential Fertilizer Contamination
Ground water may be contaminated by a variety of biological and chemical hazards

* Bacteria and viruses  
* Domestic waste  
* Nitrate nitrogen  
* Synthetic organic chemicals  
* Heavy metals  
* Petroleum residues  
* Combustion products from roadways

Source: Kawartha Conservation
Microbiological testing of water

List of labs licensed by the state is available from State Dept of Public Health

Keep records in case of a microbiological outbreak investigation
Irrigation Method?

Drip—Spray—Furrow—Flood

Water with less chance to contact plants has fewer problems of contamination
Spray Water Quality

• Make sure spray water quality is safe
• Keep spray & water quality records
• Low water volumes reduce risk
How often should I test water?

If water source is: Closed source – well
Then testing frequency is: Annually at beginning of season

canal, pond, river
Every 3 months during season

Municipal water
Keep records from district

What do water test results mean?

- Fecal coliform and generic E. coli are indicators, not pathogens
- No established standards for bacterial water quality for agricultural irrigation
- See handout and farm safety plan template for more information
**Bacteriological Water Analysis**

Lab No. 157969  
Sample Date 6/15/2011  
Sample Time 13:30  
Sampler  
Submitted Date 6/15/2011  
Submitted by Michael Yang  
Reported Date 6/16/2011  
Location/Project: [Blurred]  
Copy To  
Fax (559) 456-7575  
email rhmolinar@ucdavis.edu

Univ of Calif Coop Ext %Richard Molinar  
1720 S. Maple  
Fresno CA 93702  
2652  
21

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**Material Submitted:**

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**Rec'd Total MPN MPN Residual**  
**Date Time Temp Coliform E-Coli Chlorine mg/L**  
**Started Started °C per 100 ml per 100 ml mg/L**  

<table>
<thead>
<tr>
<th>RL</th>
<th>SM</th>
<th>Date</th>
<th>Time</th>
<th>Temp</th>
<th>Coliform</th>
<th>E-Coli</th>
<th>Chlorine</th>
</tr>
</thead>
</table>

Analysis Date: 6/16/2011  
Field test

---

001 McCall & Kings Canyon  
6/15/2011 15:36 28.4 83.6 <1

---

Coliform is a generalized category of bacteria that is a moderate health risk. Warnings are marked in **Orange Color**.  
E-Coli is a specific strain of bacteria and is a severe health risk. Warnings are marked with **Red Color**.

When coliform bacteria is detected, a full chlorination of the drinking water system is required.  
If E-Coli bacteria is detected, all human consumption should stop immediately (unless boiled). An immediate chlorination of the drinking water system must occur with retesting prior to allowing human consumption.

MPN _ Most Probable Number. This is a statistical number to represent the number of bacterial colonies found in a random sample of this water. The higher the number, the greater the amount of bacteria in the sample.

**MPN Coliform Description of terms:**  
No Bacterial Contamination Found = <1  
Bacterial Contamination Detected = greater than 1
Certificate of Analysis

Report Issue Date: 03/21/2012 14:39
Received Date: 03/13/2012
Received Time: 10:42

Lab Sample ID: A2C0852-01
Sample Date: 03/13/2012 10:42
Sample Type: Routine
Sample Control Qualifiers: SC02
Sample Description: Water Canal MID

Microbiology

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Method</th>
<th>Result</th>
<th>RL</th>
<th>Units</th>
<th>Batch</th>
<th>Prepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.Coli by 1x10 MTF</td>
<td>SM 9221</td>
<td>&gt;23</td>
<td>1.1</td>
<td>MPN/100 mL</td>
<td>A202592</td>
<td>03/13/12 15:18</td>
</tr>
</tbody>
</table>
Water, Waste, Wildlife, Workers

The major source of microbial contamination is associated with human or animal feces.

Growers need to identify obvious sources of fecal matter that could be a source of contamination.
Potential Sources of Contamination

• Untreated or improperly treated manure

• Manure composting or storage areas

• Livestock or poultry operations
Potential Sources of Contamination

Nearby municipal wastewater or biosolids storage, treatment or disposal areas
Potential Sources of Contamination

High concentration of wildlife

Even Domestic Pets
2006 outbreak of E. coli O157:H7 in spinach
Livestock nearby = runoff
Pasture runoff after a rain to ???
Compost Handling and Application

- Away from production/handling areas
- Barriers or physical containment
- Apply mature, properly made compost
- Maximize time between application and harvest
  - >45 days prior to harvest for composted manure
  - 120 days prior to harvest for raw, non-composted manure
Compost Application

No less than 45 days prior to harvest
Livestock in the field

Remove animals at least 120 days prior to harvest
What can Farmers Do?

Prevention- Avoid:

• animal facilities (within ¼ mile)
• where birds perch over the crop
• wildlife habitat
What can Farmers Do?

Monitoring: monitor fields for wildlife intrusion and define a no-harvest zone if fecal matter present.
What can Farmers Do?

**Exclusion:** If problem persists, fences, netting or other physical barriers can be used to exclude wildlife.
What can Farmers Do?

Management:
- Deterrents
- Trapping
- Baits

see UC IPM guidelines
(www.ipm.ucdavis.edu)
What can Farmers Do?

**Removal:** If possible and allowed, hunt or physically remove wildlife.
Some things you can’t control

But monitor for presence of fecal material
Water, Waste, Wildlife, Workers

Worker health and hygiene
How do workers pose a risk?

• Human bodies carry a variety of bacteria and viruses, greatest risk is human feces.

• Even if somebody is not sick, they may still be able to contaminate produce and others.

• Workers often must have close contact with produce as part of their job.
Some outbreaks associated with infected workers

<table>
<thead>
<tr>
<th>Date</th>
<th>Produce</th>
<th>Pathogen</th>
<th># of cases</th>
<th>Produce origin</th>
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</thead>
<tbody>
<tr>
<td>1987</td>
<td>raspberries</td>
<td>Hepatitis A virus</td>
<td>92</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>1990</td>
<td>strawberries</td>
<td>Hepatitis A virus</td>
<td>53</td>
<td>United States</td>
</tr>
<tr>
<td>1994</td>
<td>green onions</td>
<td>Shigella</td>
<td>72</td>
<td>CA</td>
</tr>
<tr>
<td>1996</td>
<td>leaf lettuce</td>
<td>E. coli 0157:H7</td>
<td>49</td>
<td>United States</td>
</tr>
<tr>
<td>1997</td>
<td>strawberries</td>
<td>Hepatitis A virus</td>
<td>250</td>
<td>CA</td>
</tr>
<tr>
<td>1997</td>
<td>green onions</td>
<td>Cryptosporidum</td>
<td>55</td>
<td>United States</td>
</tr>
<tr>
<td>1997</td>
<td>basil</td>
<td>Cyclospora</td>
<td>341</td>
<td>United States</td>
</tr>
<tr>
<td>1998</td>
<td>green onions</td>
<td>Hepatitis A virus</td>
<td>43</td>
<td>United States/CA</td>
</tr>
<tr>
<td>1999</td>
<td>parsley</td>
<td>Shigella</td>
<td>486</td>
<td>United States</td>
</tr>
<tr>
<td>2003</td>
<td>parsley</td>
<td>enterohemorrhagic E. coli</td>
<td>77</td>
<td>United States</td>
</tr>
</tbody>
</table>
Worker Illness

• 93% of outbreaks related to food handlers involved sick workers

• Sick workers must tell supervisor; supervisor may give alternative work or ask them to stay home

  • Vomiting
  • Diarrhea
  • Jaundice (yellow skin or eyes)

  • Fever
  • Sore throat
First aid/ open cuts

Train workers on:

• First aid kit location
• First aid for cuts and other injuries
• Wounds must be properly covered or worker should be reassigned to another job
• Throw away produce that could have been contaminated by blood or other body fluids
Follow OSHA regulations regarding toilet facilities

Provide toilets: 1-male and 1-female for every 20 employees

For less than 5 employees, 1 lockable toilet is OK

Supplied with toilet paper

Cleaning dates posted

Toilet must be located within ¼ mile or no more than of 5 minutes walk from the work site
Don’t allow toilets to become a source of contamination

- They must be cleaned on a regular schedule
- If you have toilet cleaning equipment, then it must be labeled and stored separately
- Have a plan in the event of a leak or spill
Nice and Clean at all times
Handwashing facilities

- Near toilet facilities
- Potable water only
- Liquid soap dispensers, Single-use paper
- Containers need to be emptied, cleaned and sanitized regularly
- Collection of drain water
- Trash can with lid
Hand washing policy

- Before starting work
- After breaks
- After using toilet
- After handling garbage
- After working with soil or rotten produce
- After sneezing or coughing on hands
Proper Handwashing Technique

Sanitizers may be used in addition, but not instead of soap and water.
Proper use of gloves

• Gloves are not a substitute for proper handwashing
• Wash hands before putting on gloves
• Change gloves anytime they might have gotten dirty (i.e. anytime you would wash your hands)
• For reusable gloves, clean/sanitized pair should be issued to employee as needed
Break areas

- Designated area away from where produce is being handled
- Handwashing facilities close by
- Marked on farm map
- Cleaned regularly so rodents do not become attracted to the area
- No smoking, chewing tobacco or gum, or eating outside break area
Other worker and hygiene issues

- Have a policy which limits jewelry
- No false nails, nail polish, keep pockets empty above the waist
- Request nails be trimmed short, wear clean clothes, bathe daily
- Drinking water containers: empty, clean and sanitize daily
Worker training

- Train everyone!
- Training materials (videos, posters – see resource list)
- Topics:
  - Health and hygiene
  - Illness and accidents
  - Pesticide safety
Training and recordkeeping

- Documentation of worker trainings
- Record maintenance of toilet and handwashing facilities
- Records of illness and injuries

<table>
<thead>
<tr>
<th>Worker Name</th>
<th>Date of Training</th>
<th>Type of Training</th>
<th>Name of Trainer(s)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Health and Hygiene</td>
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<tr>
<td></td>
<td></td>
<td>Accident and Illness Prevention</td>
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<tr>
<td></td>
<td></td>
<td>Pesticide Worker Safety</td>
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<tr>
<td></td>
<td></td>
<td>Pesticide Handler Training</td>
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</tbody>
</table>
Top things to reduce risk

• Keep toilet and handwashing facilities clean and easily accessible

• Training and signs showing proper procedures

• Do not allow sick employees to handle produce
Field Harvesting and Transportation & Post Harvest Water Use
Worker health & hygiene

During harvest, worker health and hygiene policies should be strictly enforced.
Potable drinking water in clean containers
During Harvest

• Keep equipment clean and free from oil, grease, broken glass or other contamination

• All contaminated produce is thrown away

• Inspect field and remove glass, metal, dead animals or any other toxic items
Cleaning and sanitizing harvest bins

• See handout for sanitizing procedure
Clean Field Harvesting Equipment with 1 Tbs. chlorine bleach(5.25%)/gallon

- **Step 1:** Place harvest containers next to sanitized surface (plastic) that has been pre-rinsed, scrubbed with detergent, rinsed & sanitized.
- **Step 2:** All buckets are pre-rinsed to remove visible soil.
- **Step 3:** Buckets will be scrubbed with detergent and rinsed.
- **Step 4:** Scrub buckets and dip in bleach then air-dried and stack.
- **Step 5:** Check water with chlorine test strips for proper strength.

- Dispose of wastewater daily away from production areas
- All cleaning tools labeled “Harvest Equipment Only”
- Workers must wear water proof aprons, rubber gloves, & goggles
- Maintain a written Farm Cleaning Record
Wash Water
Washing Produce

- Water must be potable
- Wash tanks, tubs and food contact surfaces are cleaned and sanitized regularly
- Chlorine will not sterilize produce
Washing Produce
with chlorine solution

\(\frac{1}{2}\) tsp. bleach (5.25%) in 6 gallons of water = 5 ppm

Use chlorine test strips to determine chlorine content

- Start with potable water - pH of between 6 and 7.5
- Use pH test strips to determine pH
- Change water in the dump tanks at least daily
- Change water when chlorine content < 5ppm
- Rinse produce with potable water prior to packaging
Produce Sanitizers

Trevor Suslow
Department of Plant Sciences
Center for Produce Safety Advisory Board & Technical Committee
tvsuslow@ucdavis.edu 530-754-8313
Use of Chlorine on Organic Produce

- Organic growers, shippers, and processors may use chlorine within specified limits.
- All forms of chlorine are restricted materials as defined by existing organic standards.
- California Certified Organic Farmers (CCOF) recently modified the threshold to permit 10 ppm residual chlorine measured downstream of the wash step.
- Growers certified by other agencies should check with their certifying agent.
PEROXYACETIC ACID

H₂O₂ + CH₂COOH ↔ H₃COOH

Hydrogen Peroxide  Acetic Acid  Peroxyacetic Acid

• Break-down products: acetic acid, O₂, CO₂, H₂O

• Permitted dosage (FDA):
  • Cleaning surfaces 85 – 300 ppm
  • Contact with food 85 ppm maximum
    • Typical rates 30-35 ppm
Peroxyacetic Acid (PAA) - Advantages

• Less impacted by organic matter and soil
• Low foaming
• Very good biofilm penetration
• Very good on molds and spores
Peroxyacetic Acid - Disadvantages

• More expensive than hypochlorite at effective dose
• Corrosive to soft metals and skin
• Strong, pungent odor of concentrate and dilute forms (worker discomfort & safety)
• Varied activity against fungi
• Prolonged exposure may cause product damage
  • build up of acetic acid in water
  • may cause sliming, browning, translucency
• Need to monitor water turn-over closely
Transporting Produce

- Vehicles have not carried sewage, manure or hazardous materials
- Keep vehicles clean
- Keep pallets, scales, carts, & forklifts clean
Standard pack = new box
Traceability
Why is Traceability important?

• Pinpoint the source of contamination
• Quickly remove from the food chain
USDA--GAPs Traceability Requirements

• G-1  Documented traceability program has been established

• G-2  Operation has performed a “mock recall” that was proven to be effective

• 1-26 Each production field is identified to enable traceability in event of a recall

• 2-21  Product moving out of the field is uniquely identified to enable traceability in event of recall
How to ensure traceability

• When direct marketing, traceability requires:
  – 1 link back *(suppliers)*
  – 1 link forward *(customers)*

• Record harvest date on every harvest bin as crop is harvested

• If multiple fields of same crop, also record field # & harvest crew
Examples of companies providing tracking/traceability services and supplies.
Traceability & Your Farm Map

- Have map of farm showing fields & crops
- Keep map updated
- Ensure that all farm personnel (particularly harvest crews) know codes for different fields
- Field number should be recorded on each harvest bin
Traceability for Farmers Markets

• When selling at farmers market, record:
  – harvest date (& field number, if harvest crop from 1+ fields)
  – crops sold
  – market name & date

• Prominent stall signage
• Business cards or stickers?
• Bags with name & contact information?
Traceability for a CSA

• CSA customers have your contact information

• Crops from multiple fields: record harvest date & field number on box, & keep a record by CSA delivery date

• Sourcing from other farms: record source farm by crop and CSA delivery date
Traceability for Farm stands

- Put your name & contact information on receipt
- Record harvest date & field# for crop
- Sourced products: record date & source farm for each crop sold
Traceability For Wholesale

• In California, produce sold through wholesale channels must have:
  – standard container for particular crop
  – farm name & location (printed or sticker)
  – date stamp (actual date or Julian date)
  – required crop name, pack, grade & size
  – can be hand written, printed on stickers, or stamped on box w/hand-held labeling gun
12/2 Bags

- Amount and weight of bags
- Type of cherry
- Row Size
- Federal State Inspection lot
- Net Weight
Traceability For Wholesale

- Placing a label on wrapped pallet is not sufficient

- Use hand-held labeling gun to code each box:
  - e.g., lot code – 020-16756170 indicates:
  - 020 = box number
  - 167 = (date harvested) Julian calendar date (such as 167 for June 13) or use the calendar date 613--reserves the first 3 digits for dates
  - 5 = grower
  - 6 = field picked or picker
  - 170 = packing date
Traceability For Wholesale

• At end of each packing day, record beginning & ending box numbers in book
• Code for these numbers needs to be recorded once & filed
• When you ship products, keep log by box number of which box was shipped where, with shipping date
Can this be traced back to a specific farm, specific field, and specific date?
# FARM SAFETY MANUAL: ABC FARMS

STANDARD OPERATING PROCEDURES (SOP's)
Checked boxes indicate I have read documentation to support this.  

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- General Farm Description  2
- Traceability  2
- Worker Health and Hygiene  3
- Illness and accident procedures  3
- General sanitation  3
- Chemicals and Pesticides  4
- Farm Review  
  - Water Assessment  4
  - Wildlife and Livestock  6
  - Manure and Biosolids  6
  - Land assessment and soil  6
- Field Harvest and Packing  
  - Worker sanitation  7
  - Equipment  7
  - Transportation  7
  - Forms  
    - Map 9
    - Training  
    - Visitor sign in 9+
Vegetable Crops In San Joaquin County

Growers in San Joaquin County produce vegetables on roughly 75,000 acres at a farm gate value of $350 million in 2009. Major vegetable crops, ranked by gross value in 2009, include:

- Processing tomatoes
- Fresh market tomatoes
- Asparagus
- Potatoes
- Bell Peppers
- Sweet Corn
- Pumpkins
- Watermelons
- Onions
- Cucumbers

We conduct research trials in commercial fields with local grower cooperators. Our goals are to improve profitability and solve pest management (weed, disease, nematode, and insect pests) problems affecting local vegetable producers.

http://ucanr.org/sites/veg_crop_sjc/Presentations/
4 levels of Safety Plan

1. Use common sense “good agricultural practices”
2. Develop a food safety plan for your farm
3. Conduct a self audit (Self Certification)
4. Become certified by a 3rd-party

USDA Good Agricultural Practices Good Handling Practices Audit Verification Checklist
Good Agricultural Practices (GAP’s)
Companies and Agencies that will do 3rd Party Audits

• California Department of Food and Agriculture - Inspection and Compliance Dinuba, California Telephone: 559-595-8000

• AIB International – Kansas, Telephone 800-633-5137

• NFS Davis Fresh Technologies – Watsonville, CA Telephone 831-768-7951

• Primus Labs – Santa Maria, CA Telephone (805) 922.0055

• Scientific Certification Systems – Emeryville, CA Telephone 510.452.8024

• Silliker – Modesto, CA Telephone 209/ 521 5503

• Global GAP – Germany Telephone +49 (0) 221 57 993-25

• ISO International Standards Org – Switzerland Telephone +41 22 749 01 11