Produce Food Safety for Small-Scale Farmers

Food Safety Webinar - May 7, 2013

Cooperative Extension

Your local door to resources of the University of California

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Summary for Small-Scale Farmers

Common Sense Methods to Significantly Reduce the Potential of a Problem:

- Use Clean WATER
- Limit Access of WILDLIFE
- Take Care in using Livestock WASTE
- Train WORKERS in Safety Procedures
- Ensure Traceability
- Document Everything (Safety Plan)
- Self Certification Template

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

Is there anything more important than safety?

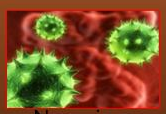
If it is not safe – that's scary!

Reported *outbreaks* linked to FDA-regulated foods, *by agent*, 1996-2009 (N=532 outbreaks)

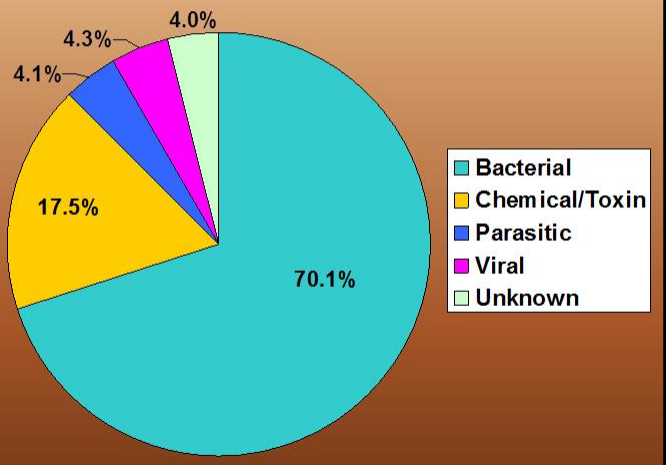
E. coli O157:H7

Salmonella

Cryptsporidium

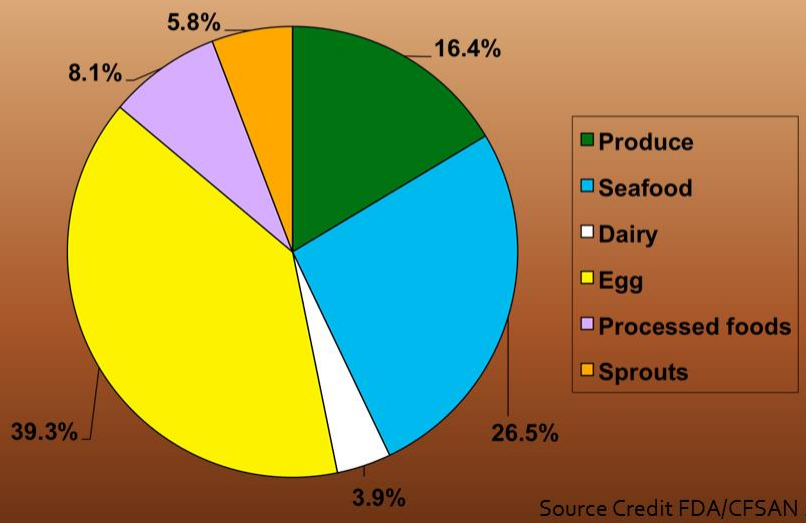


Norovirus



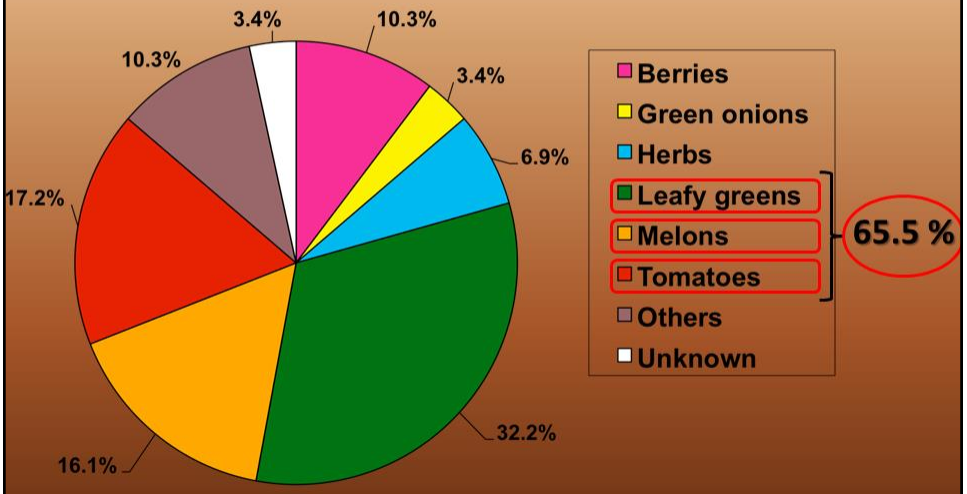
Source Credit
FDA/CFSAN 2011

Reported *outbreaks* linked to FDA-regulated foods, by vehicle, 1996-2009 (N=532 outbreaks)



Source Credit FDA/CFSAN 2011

Types of produce Associated with Outbreaks, 1996-2009 (N=87)



Source Credit FDA/CFSAN 2011

"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




Why is produce getting so much attention now?

- Produce-related outbreaks in mid-'90s
- 1998: FDA created voluntary guidelines "Good Agricultural Practices" (GAPS)
- Multi-state outbreaks associated with spinach and tomatoes (2006), cantaloupes (2008), hot peppers? (2009)
- 2010: Federal legislation passed by Congress

Food Safety Modernization Act (FSMA)

http://www.fda.gov/Food/FoodSafety/FSMA/ucm298665.htm

- **Passed by Congress in 2010**
- **Applies to fruits, vegetables, & processed food**
- **Does not apply to meat, poultry or dairy**
- **FSMA draft regulations 2013 – in comment period now**

Food Safety Modernization Act

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's 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

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

Environmental Health Department

Industry Food Safety Requirements

- Many customers require that produce suppliers have 3rd party food safety certification (CDFA, Primus Labs, NSF Agriculture)
- Recently, insurance companies have cancelled policies or increased premiums for some smaller farms that direct market leafy greens

Probable Future Requirements

- Schools
- Farmers Markets
- Grocery Stores
- Donations to Food Banks

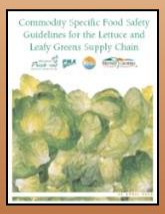
School Lunch Counter

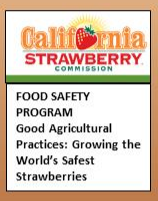
School Lunch Counter

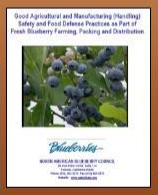
Student and Teacher Lunches

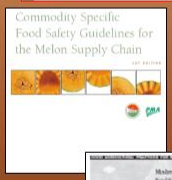
Commodity-Specific GAPs and Food Safety Audit Checklists

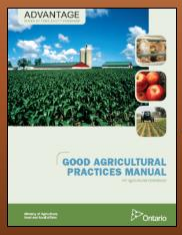
- Melon
- Tomato
- Stone fruit
- Mushroom
- Lettuce & Leafy Greens
- Culinary Herbs
- Green Onions
- Sprouts
- Almond
- Citrus
- Strawberry
- Watermelon
- Blueberries
- Asparagus











How much should I do?

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 auditing company

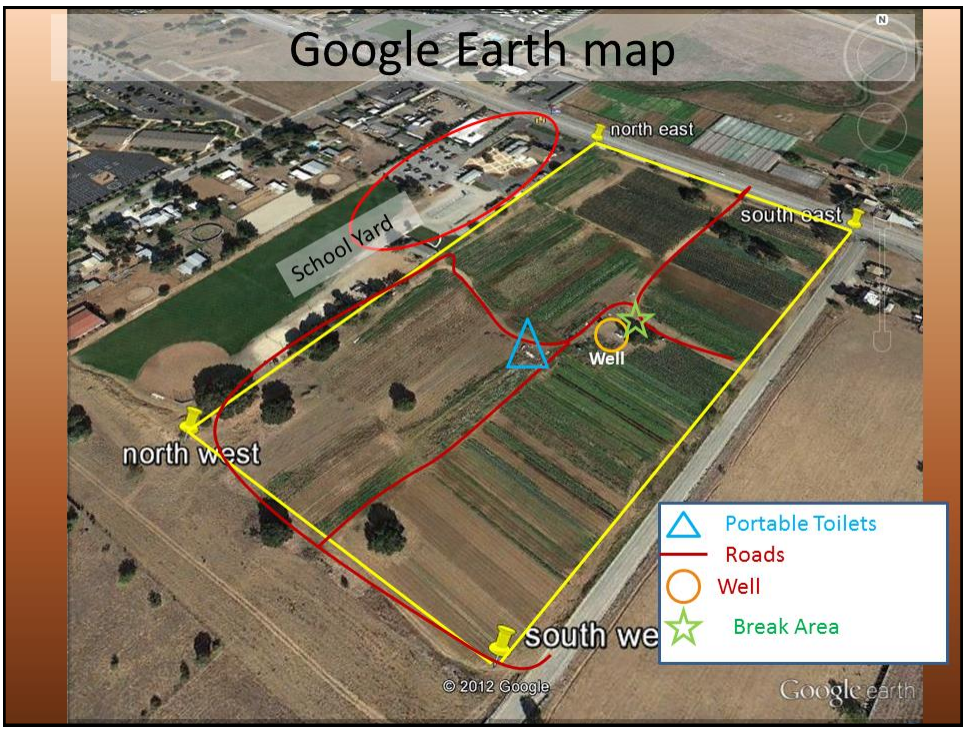
Common Sense Good Agricultural Practices (GAPS)

Mapping a farm

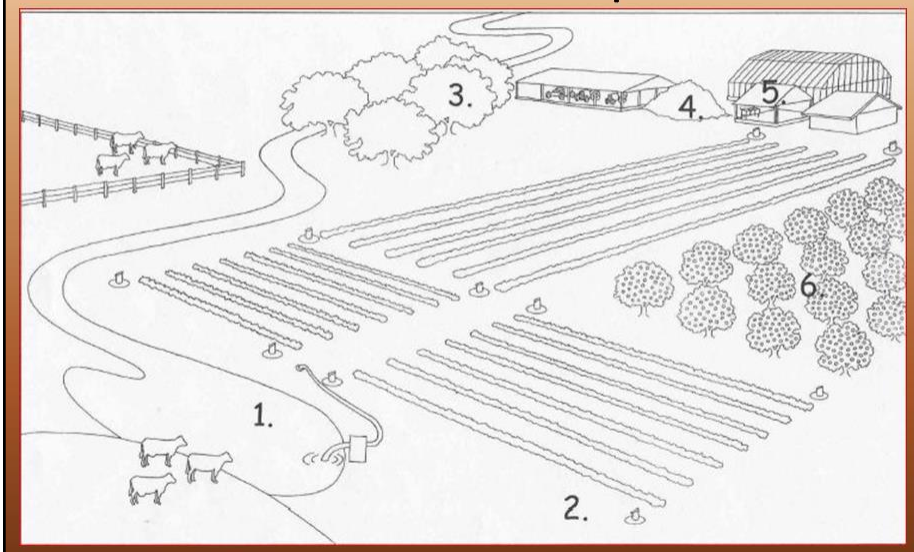
- Field map: Record activities within & adjacent to your property.
- Map should include:
  - Crops
  - Roads
  - Wells and other water sources
  - Lakes, rivers, ponds, reservoirs
  - Ditches
  - Buildings, including semi-permanent portable toilets and break areas
  - Neighboring property features

Creating a map…

1. Hand draw the map
2. Obtain one from:
   - Download one from the internet (eg, Google maps, or Google earth)
   - Contact you NRCS office for a map
3. Re-use one previously submitted to Ag Commissioner



Another map

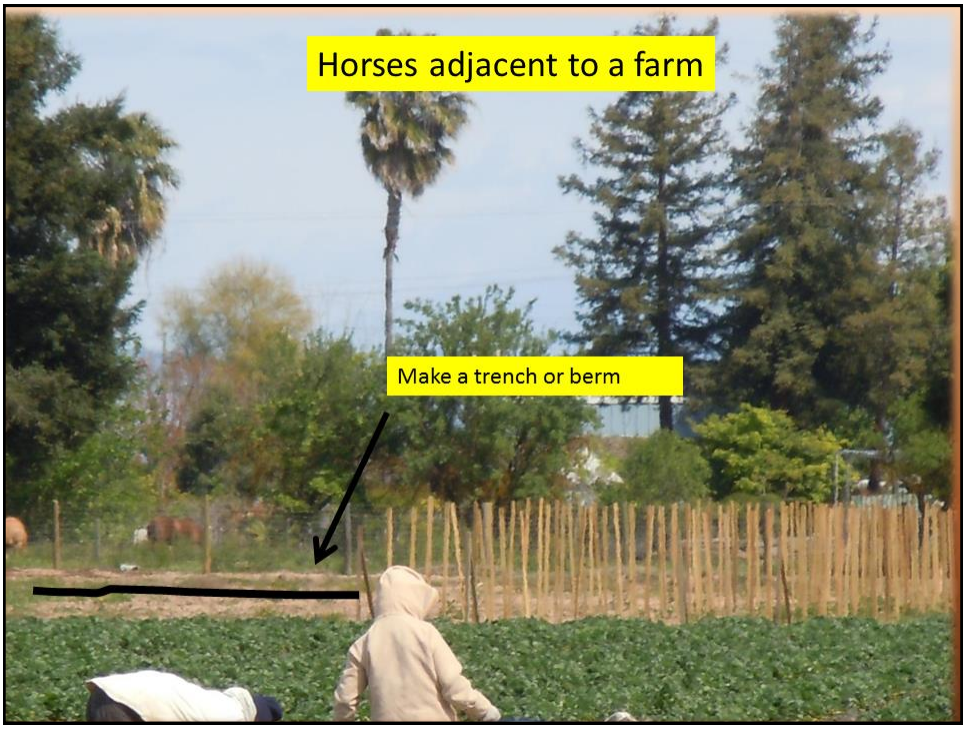


Source: U of FL IFAS Extension. ,Small Farm Food Safety, Fresh Produce, Part 4: Farm Map Activity. FCS8845

Soils, Previous Land Use

Previous Land Use Assessment

- Write down what the land has been used for previously; and if manures were applied.
  - crop land
  - fallow
  - dairy, livestock, poultry farms (possible contamination)
- Discuss what you have done to resolve contamination
  - had the soil tested for coliforms and E. coli
- Discuss what you do to reduce the risk if there is flooding or runoff from neighbors horse pasture, hilly ground, etc.
  - dug a trench or put up a berm of soil on 2 sides of my farm



Food Safety:
Water, Waste, Wildlife, Workers

Agricultural Water

Usually ag water comes from:

* **Surface sources – canals, rivers streams**
* **Reservoirs – open or capped**
* **Wells**
* **Municipal sources**

Know source of water
Know what's upstream and intended use
Know seasonal variation (does source change?)

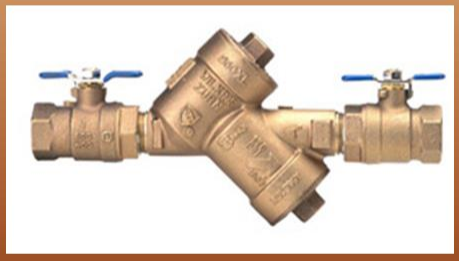
Source: NRCS

2006
E. coli O157.H7 contamination of irrigation water by feral pigs or possibly deer - 276 sick, 3 dead from eating raw spinach

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

Ensure that wells are designed and maintained in a manner that prevents contamination



Back Flow Preventer

Animal burrow at well head

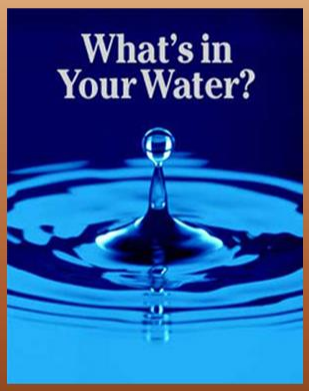
Potential Fertilizer Contamination

Microbiological Testing

Water Test

Bacteria are most important

Keep records in case of a microbiological outbreak investigation



Water Source Will Determine the Possible Frequency of Testing

If water source is:		Then testing frequency is:
Closed source – well	→	Annually at beginning of season
canal, pond, river	→	Every 3 months during season
Municipal water	→	Keep records from district

* Obtained from California Strawberry Commission (1998) Quality Assurance Program

Bacteria in Water

- Total Coliform = Environmental Contamination
- Fecal Coliform = Fecal Contamination
- E. Coli (generic) = Fecal Contamination
- E. Coli 0157:H7 = Fecal Contamination with known human pathogen

Suggested Standards for Irrigation Water Quality

The best water standard is from the EPA

http://water.epa.gov/type/oceb/beaches/local_index.cfm

US EPA Bacterial Water Quality Standards for Recreational Waters: 126 CFU E. coli /100 ml sample

BSK Associates
Engineers & Laboratories

Certificate of Analysis

[redacted]
P.O. Box 828
Selma, CA 93662

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
Sampled by: [redacted]
Matrix: Water
Sample Description: Water Canal MID

Microbiology

Analyte	Method	Result	RL	Units	Batch	Prepared	Qual
E.Coli by 1x10 MTF							
*E. Coli	SM 9221 B/F	>23	1.1	MPN/100 mL	A202592	03/13/12 15:18	

Food Safety:
Water, Waste, Wildlife, Workers

- Agricultural products can become contaminated at any point along the farm-to-table food chain
- A major source of microbial contamination is associated with 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

Compost/Manure Handling

- As far as possible from production
- Use barriers or physical containment
- Properly made compost - mature
- Maximize time between application and harvest
- Incorporate manure 2 weeks prior to planting
- 120 days for un-composted manure prior to harvest
- 45 days for compost prior to harvest

Livestock waste nearby = runoff

Pasture runoff after a rain to ???

Livestock in the field

Some things you can't control

What can Farmers Do?

- **Monitoring:** monitor fields for wildlife intrusion - do not harvest if fecal matter present

Deer droppings

What can Farmers Do?

- **Exclusion**
- **Management**
- **Removal**

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

Date	Produce	Pathogen	# of cases	Produce origin
1987	raspberries	Hepatitus A virus	92	United Kingdom
1990	strawberries	Hepatitus A virus	53	United States
1994	green onions	Shigella	72	CA
1996	leaf lettuce	E. coli 0157:H7	49	United States
1997	strawberries	Hepatitus A virus	250	CA
1997	green onions	Cryptospordium	55	United States
1997	basil	Cyclospora	341	United States
1998	green onions	Hepatitus A virus	43	United States/CA
1999	parsley	Shigella	486	United States
2003	parsley	enterohemorrhagic E. coli	77	United States

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
  - Fever
  - Sore throat
  - Jaundice (yellow skin or eyes)

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

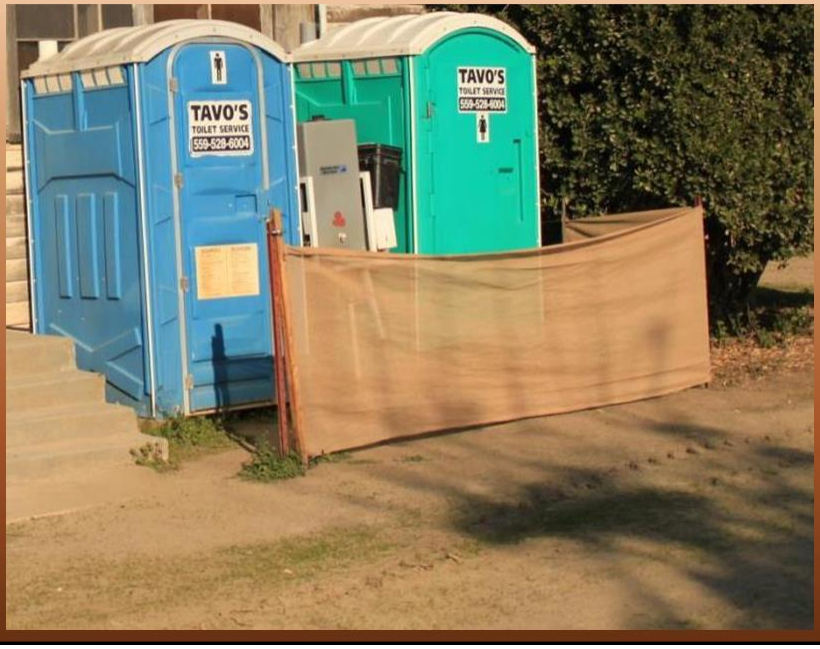
For less than 5 employees, 1 lockable toilet is OK

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

Located where water for cleaning does not get into the field



Hand washing policy

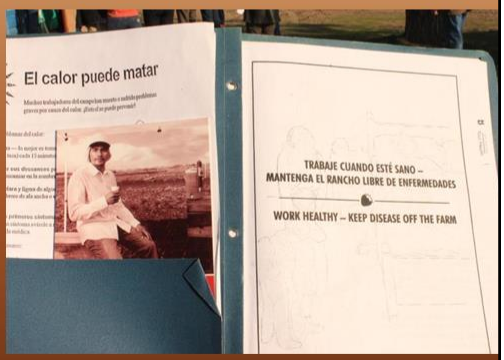
- Before starting work
- After breaks
- After using toilet
- After handling garbage
- After working with soil or rotten produce
- After sneezing or coughing on hands

Break areas

- Designated area away from produce
- Handwashing facilities close by
- Marked on farm map
- Cleaned regularly so
- No smoking, chewing tobacco or gum, or eating outside break area

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

5. Worker Training and Instruction Record

Name of Farm:_____

Manager Responsible:_____

Training Material (Please see Food Safety Manual for content of Worker Training).

Worker Name	Date of Training	Type of Training - Health and Hygiene - Accident and Illness Prevention - Pesticide Worker Safety - Pesticide Handler Training	Name of Trainer(s)

Field Harvesting and Transportation

During Harvest

- Clean equipment (1 Tbs bleach/gallon) and free from oil, grease, broken glass, etc.
- Contaminated produce is thrown away
- Inspect field and remove glass, metal, dead animals or any other toxic items

Washing Produce

- Water must be potable or microbially safe
- Use 1/2 tsp bleach in 6 gal water = 5ppm
- Chlorine will not sterilize produce

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

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?

- Reduces public health risk by pinpointing the source of contamination
- So that it can be removed from the food chain

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

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

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 Farmstands

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

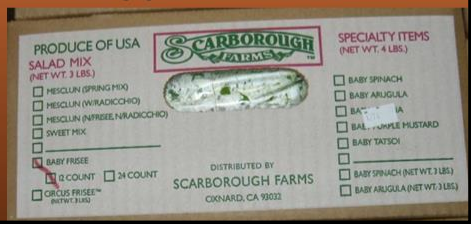
Traceability For Wholesale

- 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

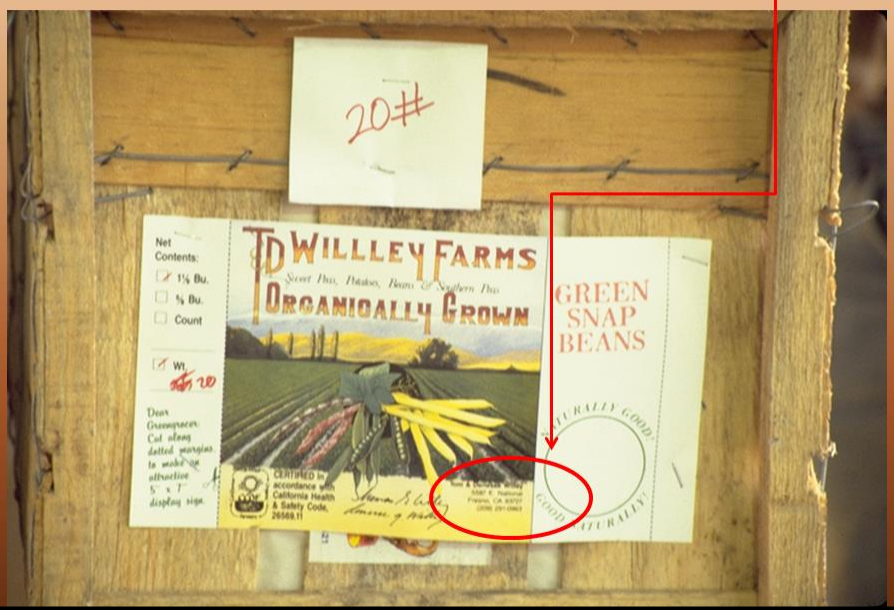
Example labeling

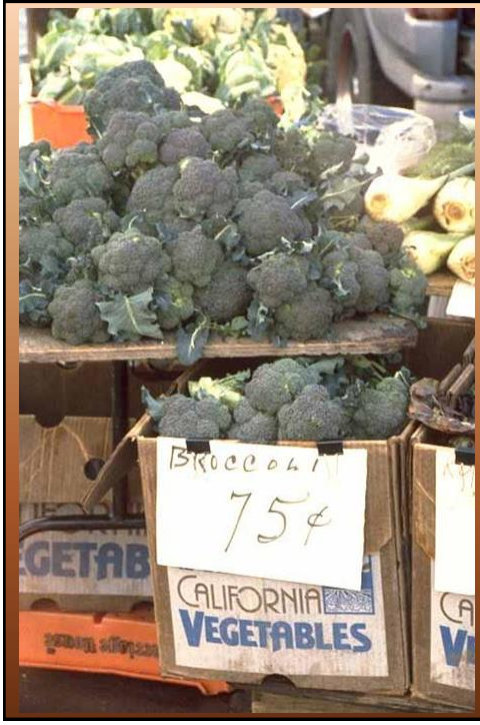
Traceability For Wholesale

- 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



Name – Address - Phone





Can this be traced back to a specific farm, specific field, and specific date?

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

USDA

Farm Safety Manual

Website:

[Change, delete, or fill-in parts in yellow highlight, remove highlights]

Good Agricultural Practices (GAPs) Manual

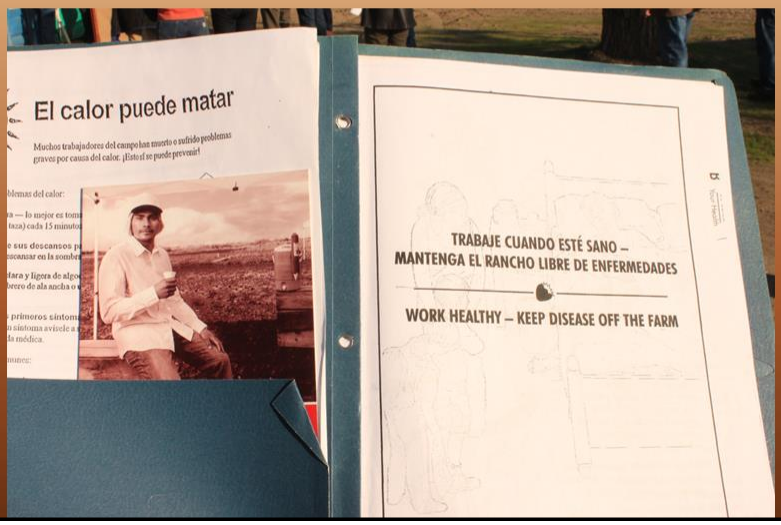
FARM SAFETY MANUAL: ABC FARMS

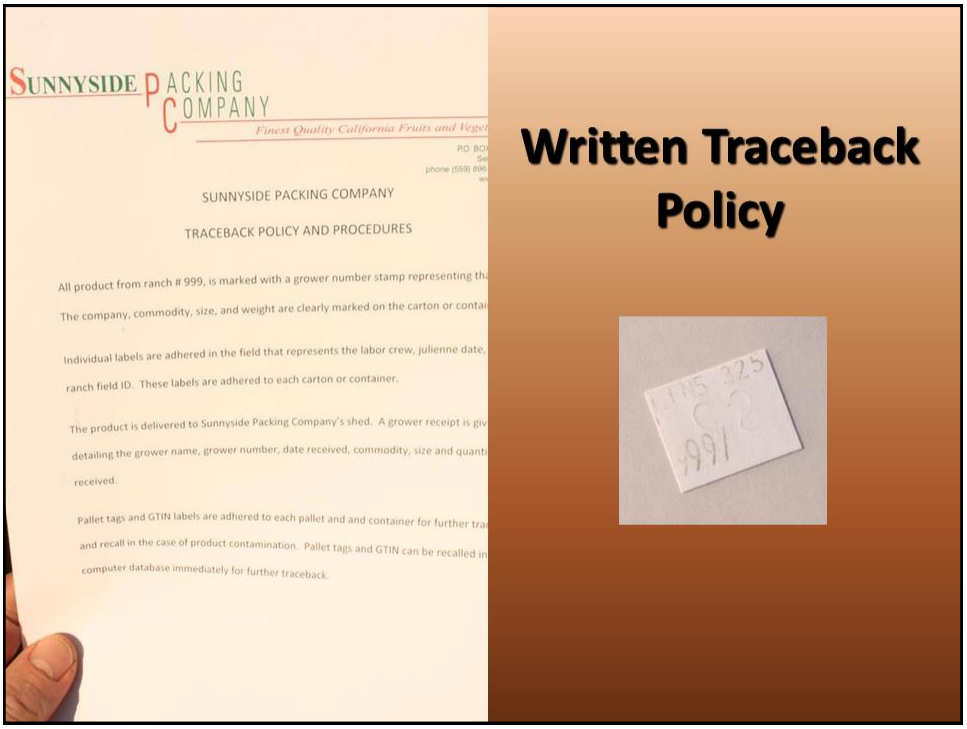
STANDARD OPERATING PROCEDURES (SOP's)
Checked boxes indicate I have read documentation to support this ☑

Table of Contents

1

- ✓ Water Test Results
- ✓ Compost or Waste Stats
- ✓ Wildlife Excluded
- ✓ Worker Training Docs





Self Certification - everything in order?

USDA Good Agricultural Practices Good Handling Practices
Audit Verification Checklist

USDA

This program is intended to assess a participant's efforts to minimize the risk of contamination of fresh fruits, vegetables, nuts and miscellaneous commodities by microbial pathogens based on the U.S. Food and Drug Administration's *"Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables,"* and generally recognized good agricultural practices.

Firm Name: _____

Contact Person: _____

Audit Site(s): _____

Main Address: _____

City: _____ State: _____ Zip: _____

Telephone No: _____ Fax: _____

E-mail: _____

Auditor (s): (list all auditors with the lead listed first) _____

_____

USDA or Fed-State Office performing audit:

Arrival Date: _____ Time: _____

Departure Date: _____ Time: _____

Travel Time _____ Code _____

Person(s) Interviewed (use back of sheet if necessary to list all persons interviewed) _____

_____

3rd Party- USDA Audit

USDA Audit Verification Example

Worker Health & Hygiene

	Questions	Points	Yes	NO	N/A	Doc
G-3	Potable water is available to all workers.	10				R
G-4	All employees and all visitors to the location are required to follow proper sanitation and hygiene practices.	10				P
G-5	Training on proper sanitation and hygiene practices is provided to all staff.	15				D
G-6	Employees and visitors are following good hygiene/sanitation practices.	15				
G-7	Employees who handle or package produce are washing their hands before beginning or returning to work.	15				
G-8	Readily understandable signs are posted to instruct employees to wash their hands before beginning or returning to work.	10				
G-9	All toilet/restroom/field sanitation facilities are clean. They are properly supplied with single use towels, toilet paper, hand soap or anti-bacterial soap, and potable water for hand washing.	15				
G-10	All toilet/restroom/field sanitation facilities are serviced and cleaned on a scheduled basis.	10				R

Other 3rd Party Auditors

Companies and Agencies that will do 3rd Party Audits

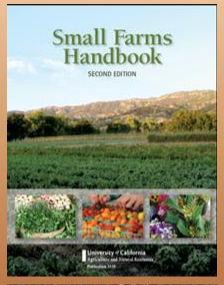
Good Agricultural Practices **(GAP's)**

- ***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*

Resources

Good agricultural practices (GAPs)
http://ucanr.org/uc_gaps
Las Publicaciones en Español (in Spanish)
http://ucanr.org/gaps_espanol
Post-harvest chlorination
http://ucfoodsafety.ucdavis.edu/files/26414.pdf
Water disinfestation for pre-harvest and post-harvest applications
http://anrcatalog.ucdavis.edu/pdf/7256.pdf
Post-harvest handling of organic crops
http://ucfoodsafety.ucdavis.edu/files/26413.pdf
California Department of Food and Agriculture
www.cdfa.ca.gov/ahfss/
UC Cooperative Extension – Sonoma County
http://cesonoma.ucdavis.edu/SpecialtyCrops/

ANR 3526 • Small Farm Handbook • Chapter 8



Postharvest Handling and Safety of Perishable Crops

Trevor Suslow, Elizabeth Mitcham, and Marita Cantwell

Faber, B. and L. Tourte (eds). In press. Small Farm Handbook. University of California, Division of Agriculture and Natural Resources, Oakland, CA. Publication 3526.

Questions ?