Food Safety for Small Farmers

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MSU Extension
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Objectives

- Understanding Risks
- Worker health and hygiene
- Postharvest sanitation
- FSMA: Tell me what I've got to do.

Every Year…

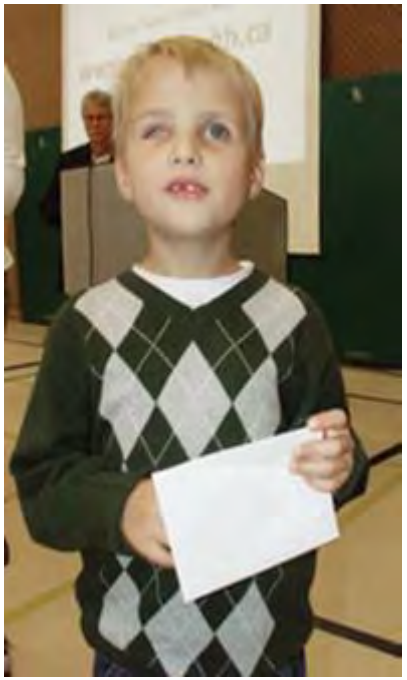
- One in Six will get sick
- 47.8 Million episodes annually
- 127,839 Hospitalizations
- 3,037 Deaths

Inspiration from Chapman, info from Scallan et al. 2011

Protecting Real People

22 year-old Stephanie Smith

"I ask myself every day, 'Why me?' and 'Why from a hamburger?



Travis Cudney
2010 Champion Child
Blind since age 2
Complications from a pathogenic E. coli infection

Slide from Chapman

Shutterstock

"Chipotle Mexican Grill will soon have stricter guidelines for its suppliers that will mean the chain will be using local produce less often."

-USA Today, Dec 2, 2015

What constitutes a vulnerable population?

What Specific Foods Cause Illness?

What people thought:

- 1: Chicken
- 2: Meats
- 3: Ground meats
- 4: Fin fish
- 5: Shellfish

Environics, 2005

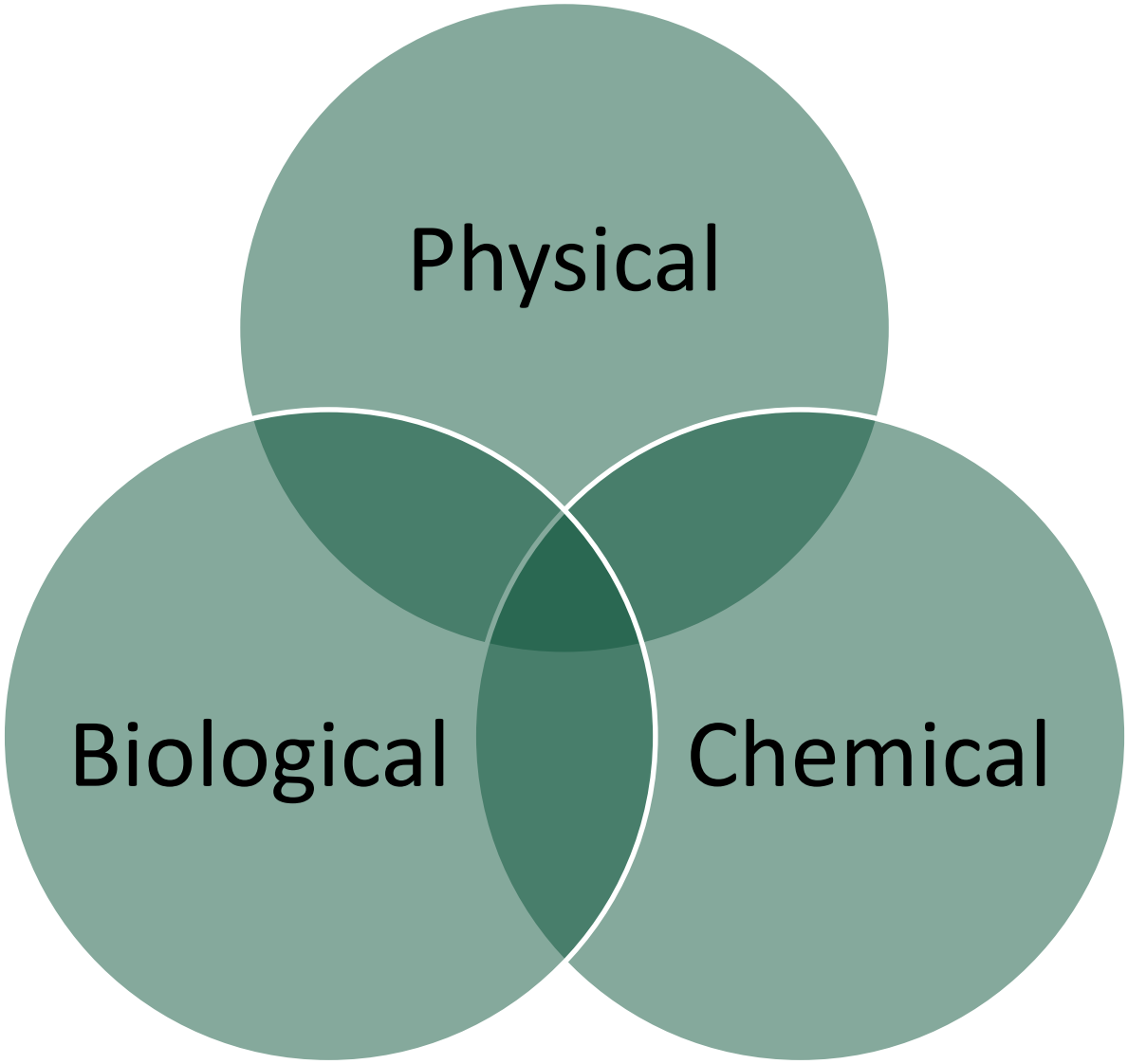
Actual causes of illness:

- 1: Produce
- 2: Poultry
- 3: Beef
- 4: Eggs
- 5: Seafood

CDC, 2009

Slide from Chapman

What Constitutes Crop Risk?



Q & A Box

CDCs Five Risk Factors

from a food preparation perspective

- Improper hot/cold holding temperatures of potentially hazardous food
- Improper cooking temperatures of food
- Dirty and/or contaminated utensils and equipment
- Poor employee health and hygiene
- Food from unsafe sources

~~CDCs~~ Five Risk Factors

from a food production perspective

- Improper cold storage temperatures of raw consumables (ie. leafy greens, et al.)
- ~~Improper cooking temperatures of food~~
- Dirty and/or contaminated equipment
- Poor employee health and hygiene
- Inputs from unsafe sources
- *Environmental Contamination (Microbial or Pesticides)*

Contamination With Microbial Pathogens: Where Can It Occur?

FARM to FORK

~~CDCs~~ Five Risk Factors

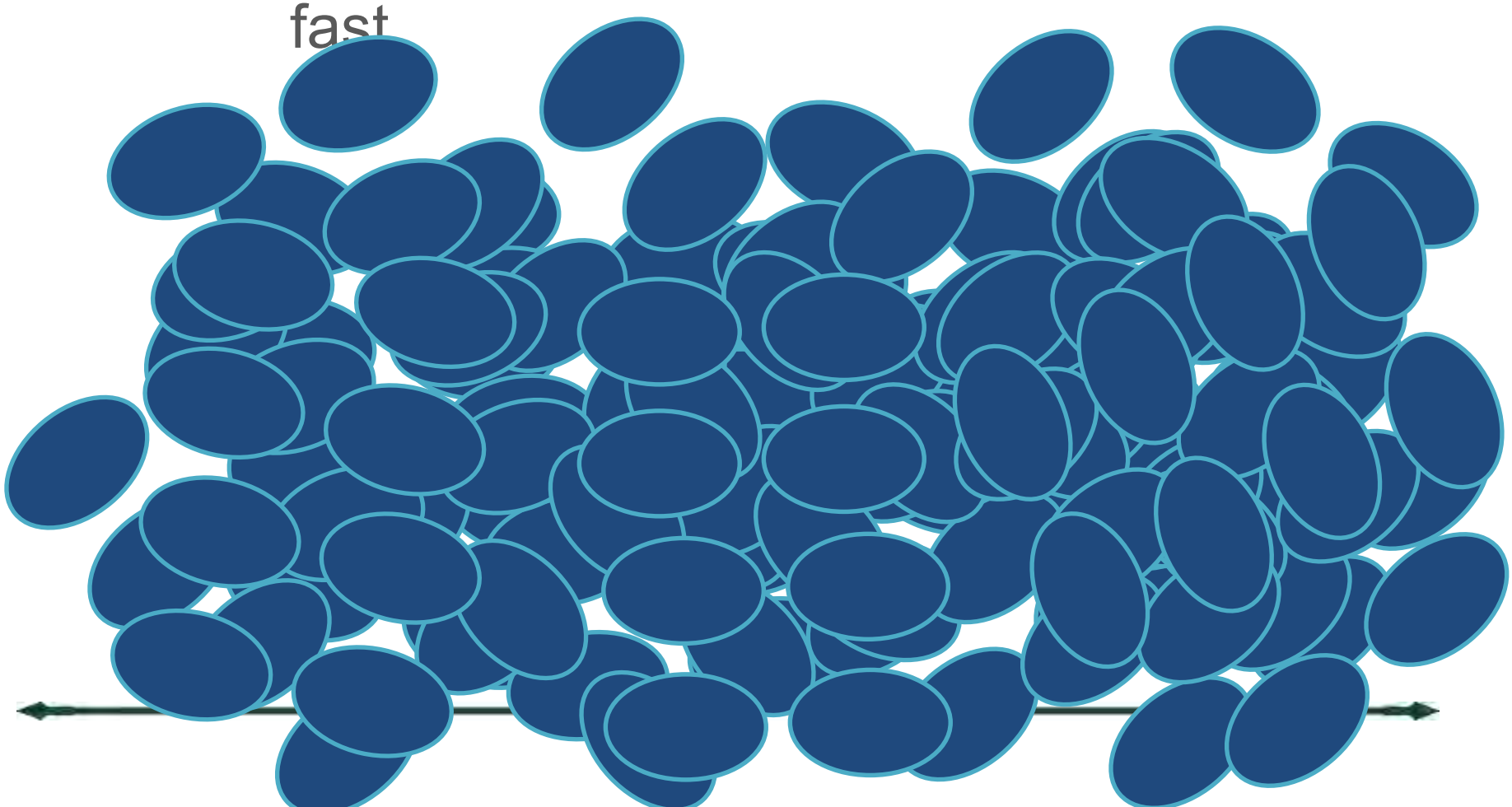
from a food production perspective

- **Manure**
- **Water quality**
- **Worker and field sanitation**
- **Post harvest handling**
- **Transportation**

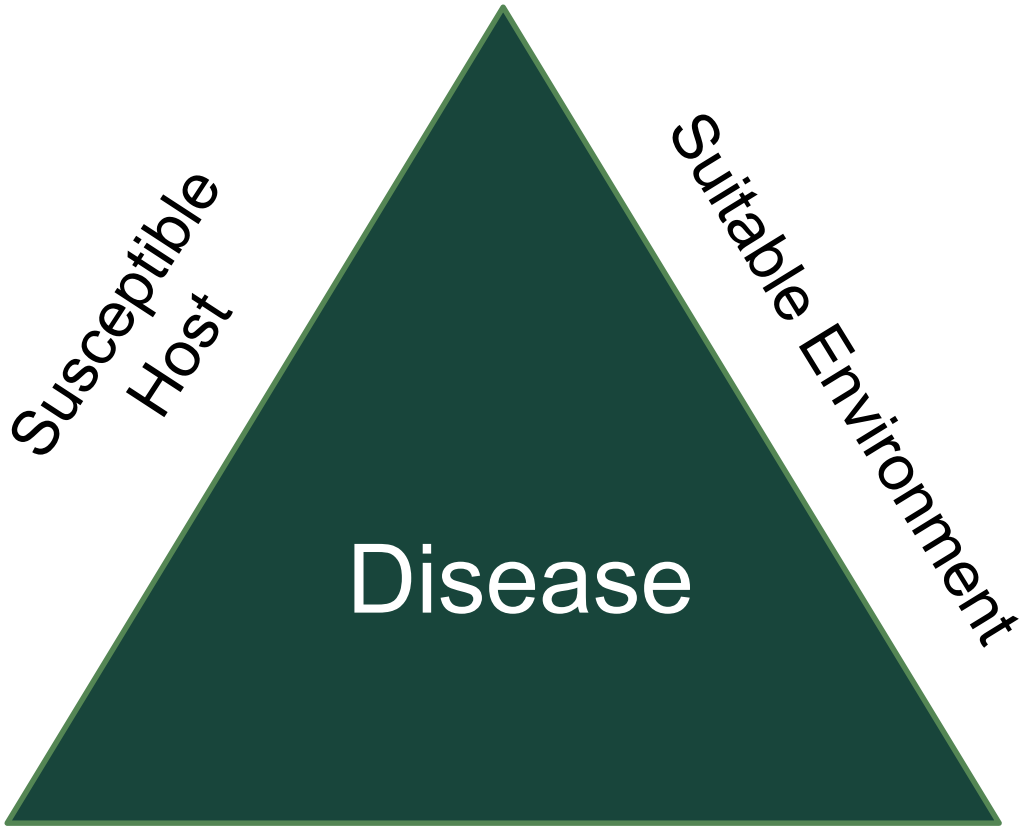
Microbiology Basics

Bacterial Reproduction

- Bacteria double over a given period making a small problem really big, really fast



Disease Triangle

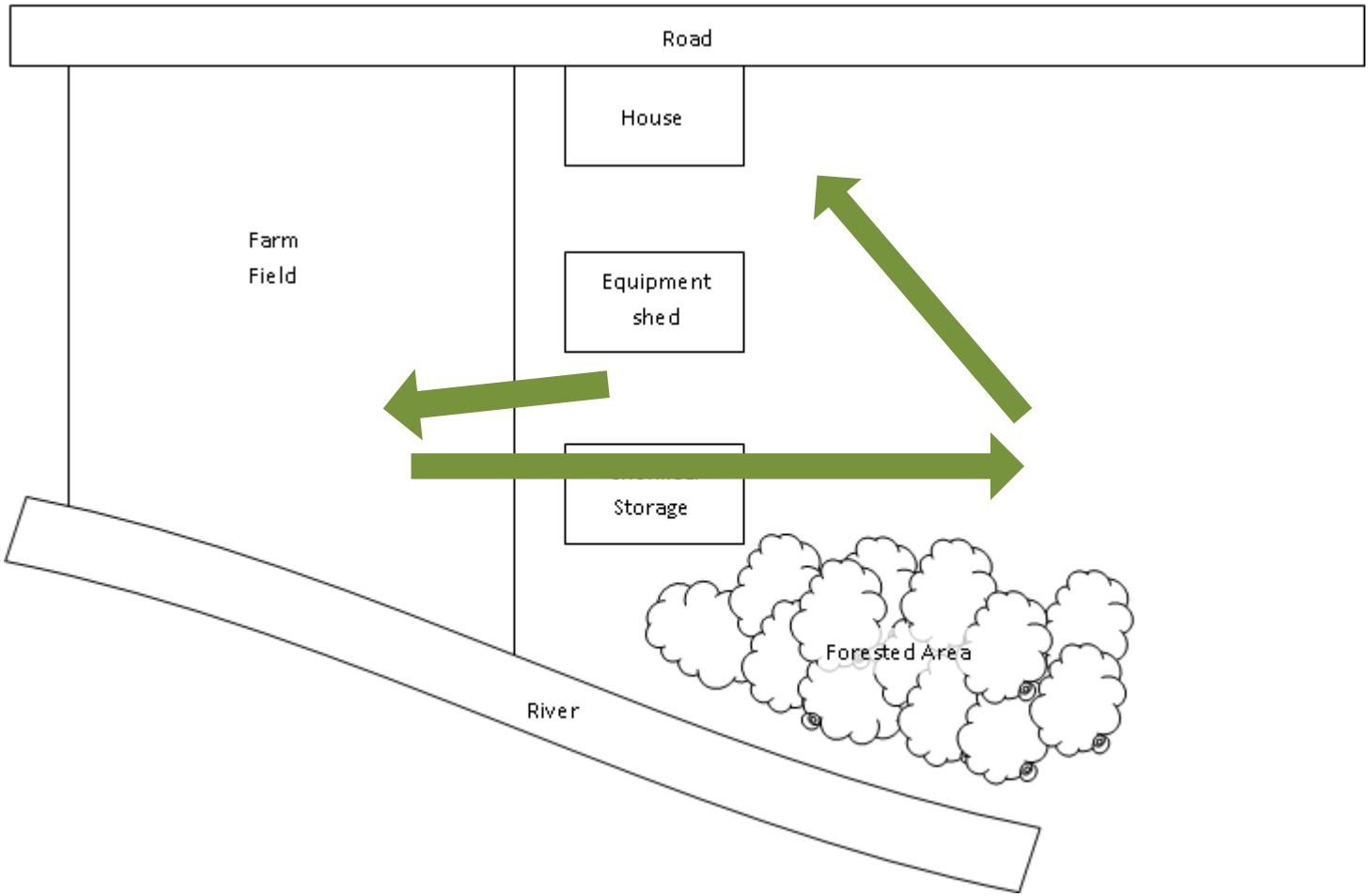


Hazard Analysis Critical Control Points (HACCP)

- A process that looks at all the possible hazards at every step in your operation.

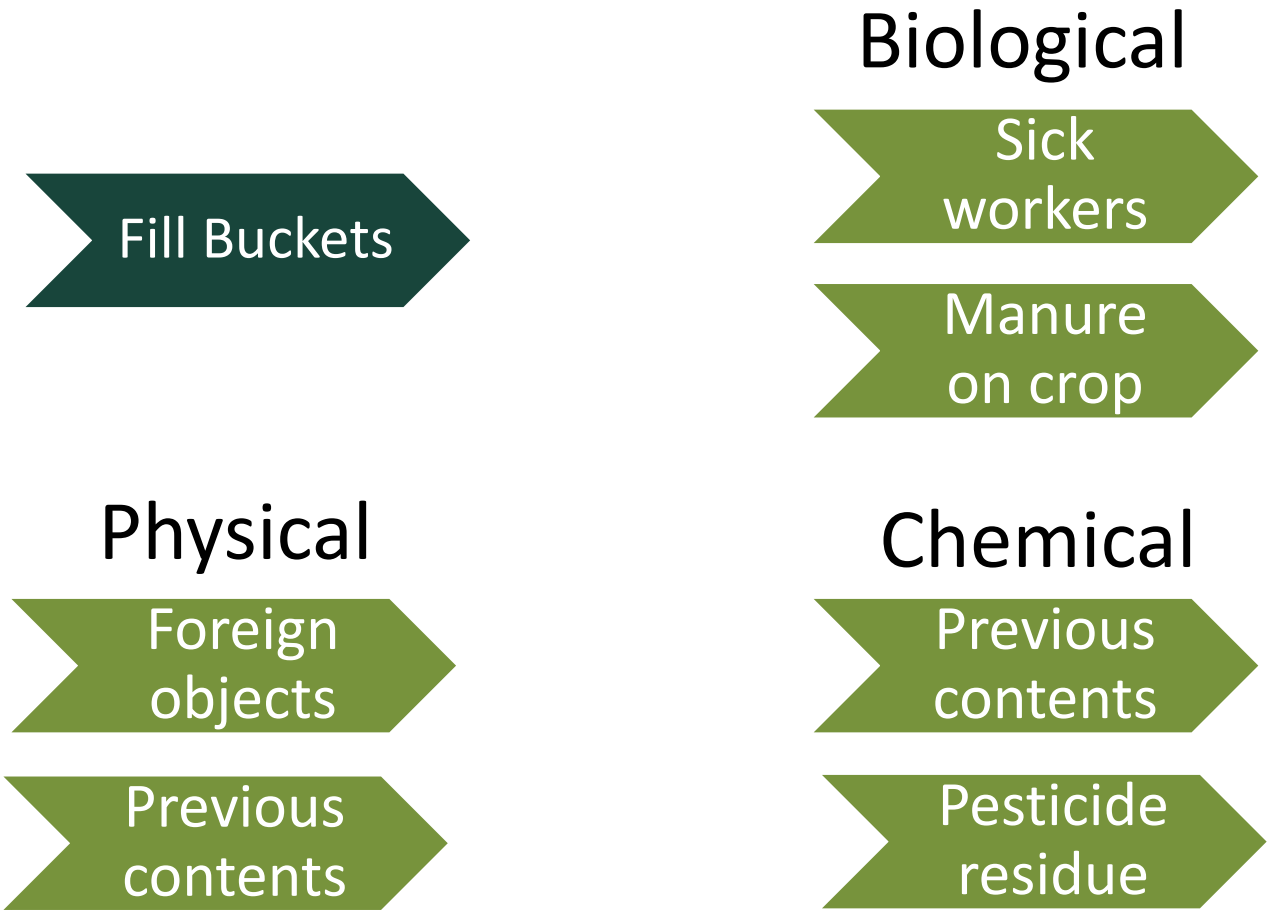
- Where the hazards are probable, controls are put in place to reduce/eliminate the risks.

Following the Flow of Food



Get buckets → Fill buckets → Transport to cleaning station → Wash and pack greens → Transport to refrigerator → Refrigerate until sale

Following the Flow of Food



Following the Flow of Food

- What are the Chemical, Physical and Biological hazards in each of these steps?
- How can their impact be reduced?
- How can they be prevented?

Following the Flow of Food

Fill Buckets

- What policies, procedures and records can you put in place to mitigate, reduce or eliminate the risks?

Preharvest Checklist

Field _____ Harvest Date_____

Last spray applied_____
PHI_____

- ❑ Are the totes clean, sanitized and free of foreign objects?
- ❑ Is there potable drinking water on site?
- ❑ Is the toilet clean and stocked?
- ❑ Is the handwashing station cleaned and stocked?
- ❑ Are the harvest workers healthy?

Signed_____

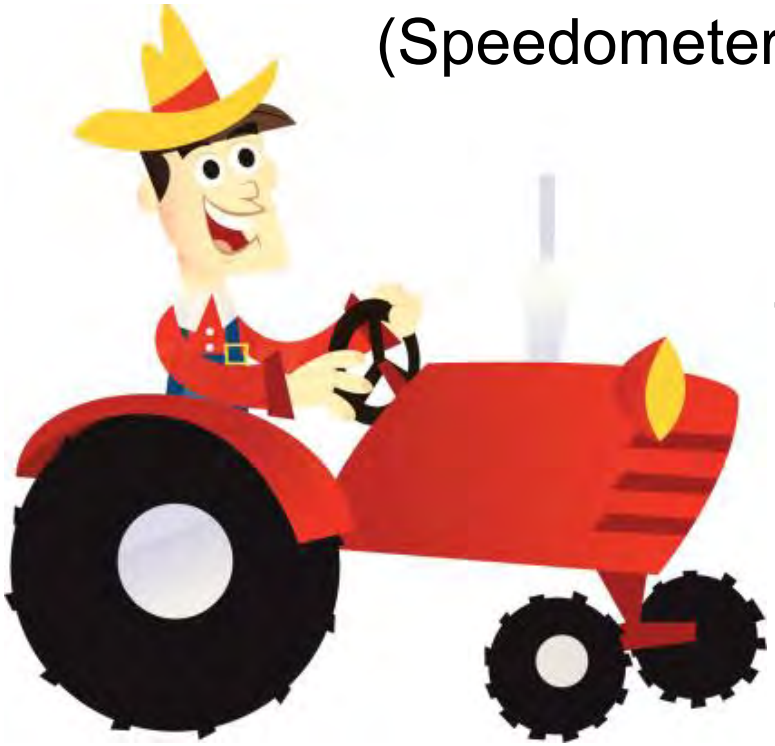
Seven Steps to HACCP

- Conduct a Hazard Analysis
- Identify Critical Control Points
- Establish Critical Limits
- Establish Monitoring Procedures
- Establish Corrective Actions
- Establish Verification Procedures
- Keep a Record of Activities

Operationalizing HACCP

Responsible Party
(Driver)

Feedback
(Speedometer)



Management
Tool
(Brakes)

Enforcement
(Grumpy Dad
Farmer)

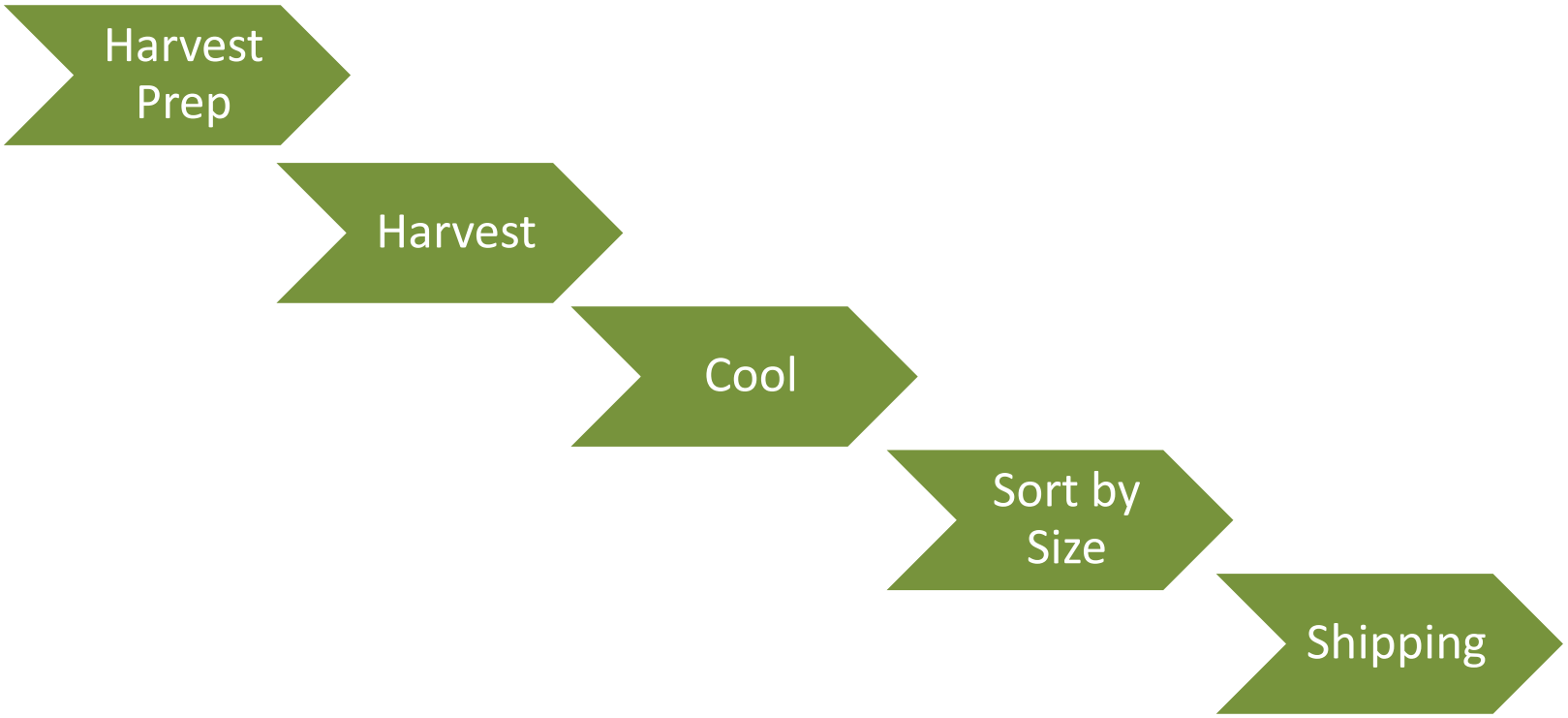
Developing a Farm Food Safety Plan

- Consider what you do from planting preparation to postharvest handling
- Pay attention to where contamination is a risk.
  - Work through a self assessment like the Safe Food Risk Assessment.
  - Enumerate the issue areas and how risky your practices are compared with best practices.

Developing a Farm Food Safety Plan

- Of the areas that are high risk, how can you monitor or measure risk?
  - Regular testing?
  - Regular self-inspections?
  - Change the way something is done?
- Consider changes in terms of time and money that reduce risk.
- Document changes and continue to measure or monitor the risk.

Operationalizing HACCP



Operationalizing HACCP

Operationalizing HACCP

Sanitary Surfaces

Packing Container Policy

OR

Cleaning SOP

Log of cleaning

Operationalizing HACCP

Packing Container Policy

Packing Container Policy

It is the policy of Good Earth Farms to use only new cardboard boxes for field packing melons.

Operationalizing HACCP

Cleaning SOP

Standard Operating Procedure

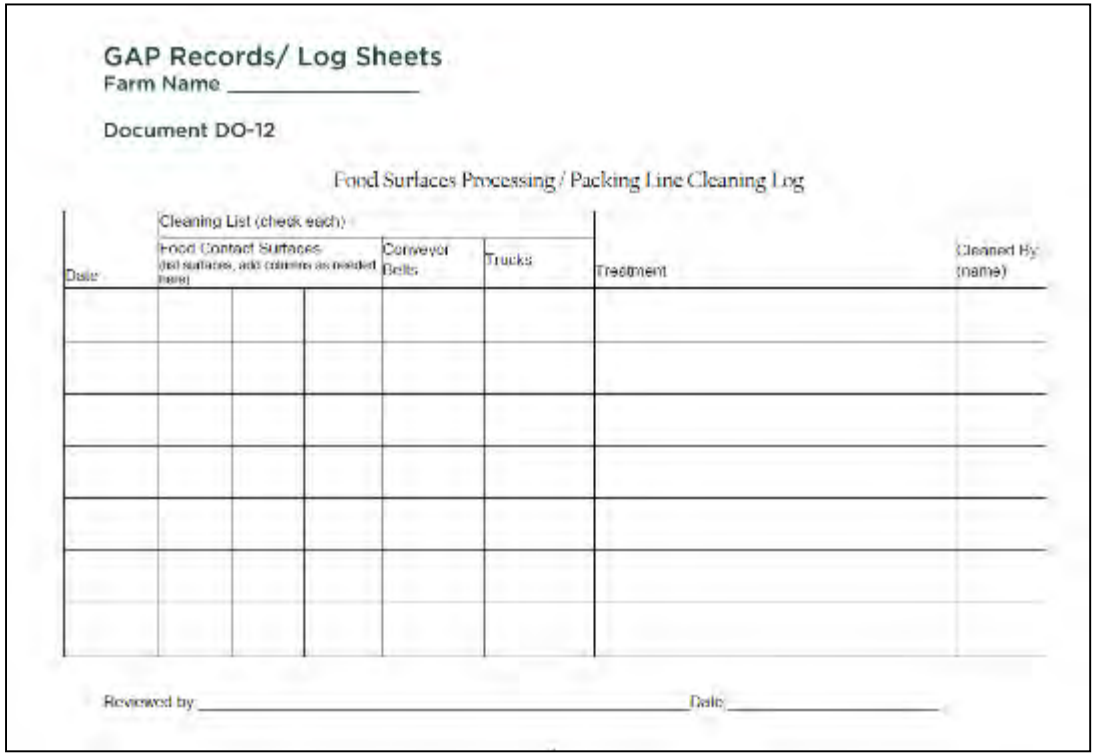
Farm Name _____

Doc.No. **SOP-08**
Title: Container Cleaning
Effective Date: January 1, 2013
Developed by: Phil Tocco, Michigan State University
Reviewed by: _____ *GAP Coordinator, Date:* _____

1. Containers are pre-rinsed with water to remove visible soil particles.
2. Containers are then washed with a food grade surfactant applied to the surface, either in dispersion or directly, to break down contaminants and soil. A brush is used to scrub the containers while they are soapy to further remove soil and other possible particles from the inside and outside surfaces.
3. Containers are then rinsed with water to remove soil particles, contaminant particles and any soap residues.
4. Containers are sanitized with sanitizer inside and outside (Grower's choice, explain the type and concentration of the sanitizer here).
5. Containers are air dried then maintained in a sanitary situation until ready for use.

Operationalizing HACCP

Log of cleaning



GAP Records/ Log Sheets
Farm Name _____

Document DO-12

Food Surfaces Processing / Packing Line Cleaning Log

Date	Cleaning List (check each)					Treatment	Cleaned By (name)
	Food Contact Surfaces (list surfaces, add columns as needed here)			Conveyor Belts	Trucks		

Reviewed by _____ Date: _____

Food Safety Tactics

- Water quality verification and assurance
- Worker Training
- Traceback and Positive Lot ID

Water Quality

verification and assurance

- Recall our discussions about bacteria.
- When it comes to control points, water is a critical control point.
- Sources of water and uses are

Water Quality

verification and assurance

- Test to determine if the E. coli counts exceed the threshold.
- Specify in the food safety manual what the mitigation will be.
- If the test results exceed the threshold, be prepared to implement the mitigation.

Water Quality

verification and assurance

Type of irrigation affects potential contamination risks.

- Overhead irrigation is high risk.
- Drip under plastic is low risk

Water Quality

verification and assurance

- Surface water is a high risk source.

•Streams are considered the highest risk source, with ponds being somewhat less risky.

Patrick Hartmann, Trueblue Farms

- Wells are considered low risk.

Water Quality

verification and assurance

- Irrigating plants that are not nearing harvest or are postharvest are low risk.

- Irrigation events near harvest or between harvest events is high risk

Irrigation Water

Agricultural Water

Indirect Water

Irrigation Water

Indirect Water

- Indirect water is not regulated.
- No need to test indirect water.
- Can apply over threshold water indirectly.

Irrigation Water

Agricultural Water from Surface Sources

- Growers must establish a water profile of 20 samples by full implementation of the rule (Compliance + 2 yrs)
- Profile must have no more than:
  - Geometric Mean (GM)of 126 CFU/100 ml
  - Standard Threshold Value (STV) of 410 CFU/100ml

Irrigation Water

Agricultural Water from Wells

- Growers must establish a water profile of 4 samples by full implementation of the rule (Compliance + 2 yrs)

- Profile must have no more than:
  - Geometric Mean (GM)of 126 CFU/100 ml
  - Standard Threshold Value (STV) of 410 CFU/100ml

Irrigation Water

Establishing a Profile

5 samples (2016)

5 samples (2017)

5 samples (2018)

5 samples (2019)

Irrigation Water

Handling an Exceedance

- Growers have options if their water tests exceed the thresholds. These can include:
  - Water Sanitizers (UV, Chlorine, Hydrogen Peroxide, and others)
  - Waiting a number of days to bring it into compliance. (0.5 log/day up to 4 days)
  - Washing or produce storage*
  - Alternative water supplies (Municipal water, well water, etc.)
  - Changing method of irrigation to make it indirect water

	Overhead at harvest	Overhead vegetative	Drip at harvest	Drip Vegetative
Rivers and Streams	Treat	Treat	Test, Treat as necessary	Test, Treat as necessary
Ponds	Test, Treat as necessary	Test, Treat as necessary	Test, Treat as necessary	Test, Treat as necessary
Wells	Test, Treat as necessary	Test, Treat as necessary	Test, Treat as necessary	Test, Treat as necessary
Municipal	Keep testing records	Keep testing records	Keep testing records	Keep testing records

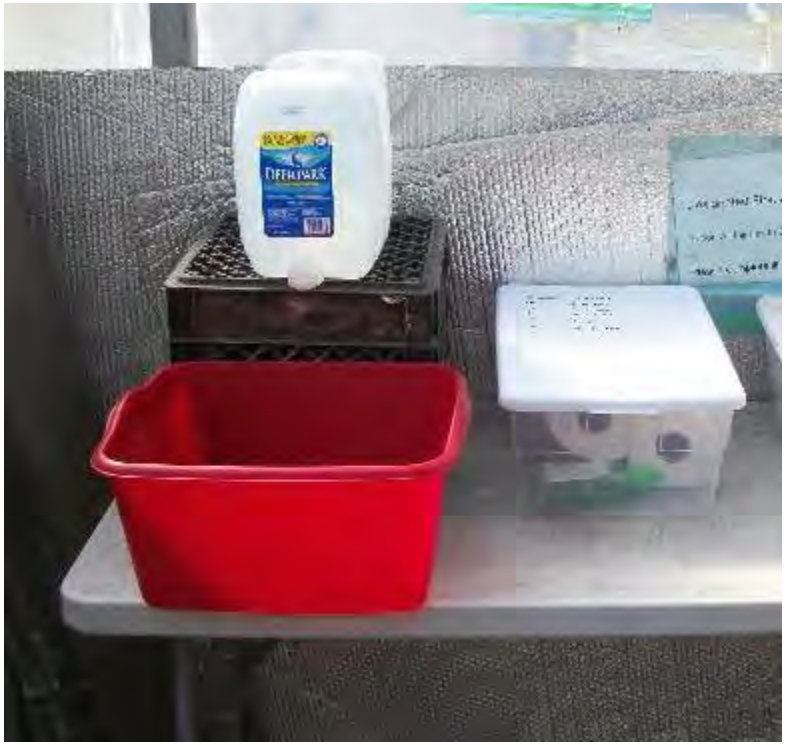
Worker Training

Employee and Volunteer Training

- Everybody needs to know:
  - Proper hygiene.
  - Signs and symptoms of illness.
    (If you're sick, don't pick)
  - When not to harvest produce.
    (Don't pick poopy produce)
  - Inspecting containers
  - Handling contaminated produce.
  - Report issues to the person in charge.

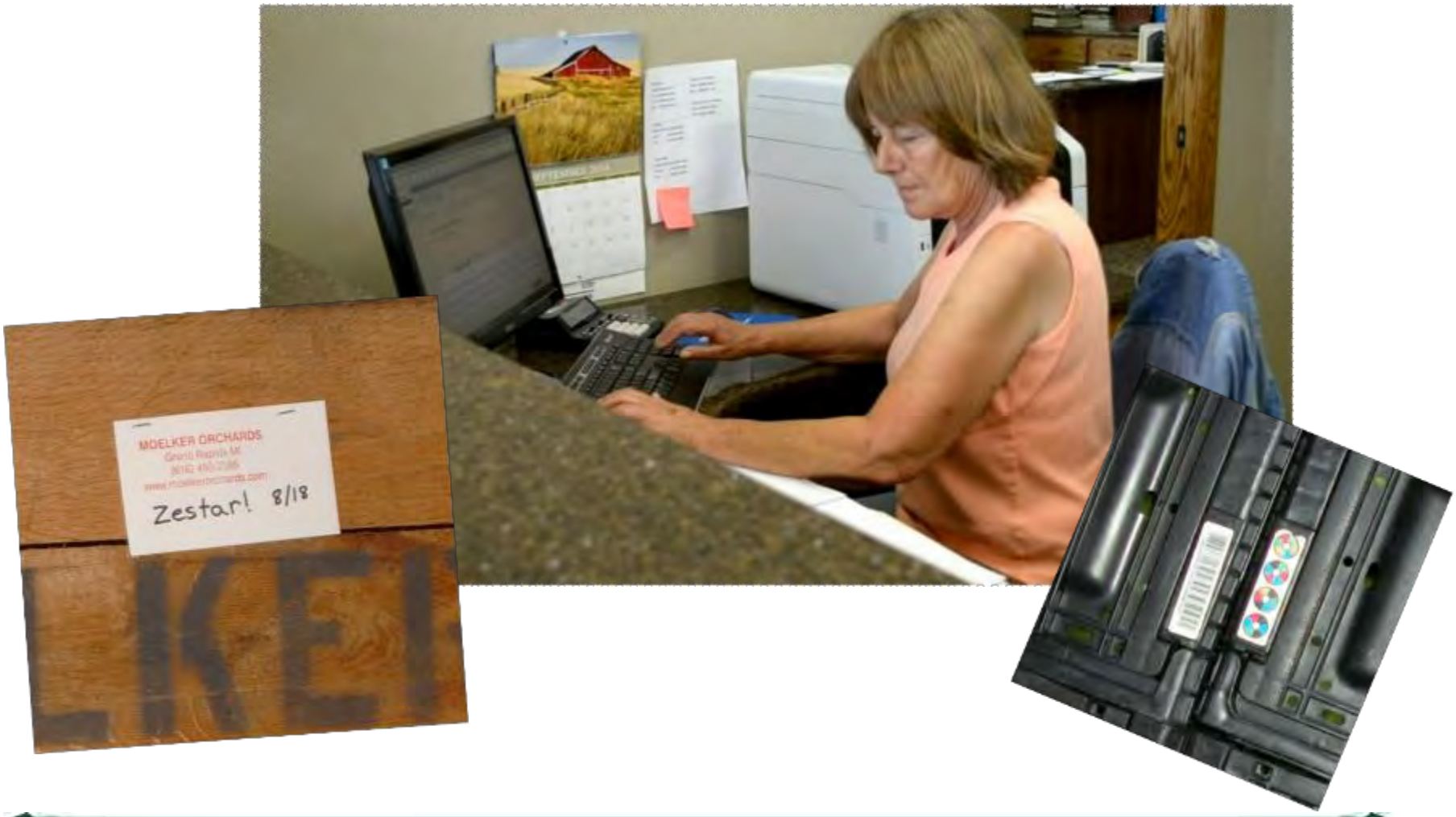
Employee and Volunteer Hygiene

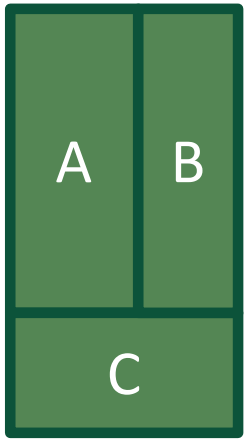
- Wash your hands…
  - Before you handle produce
  - After you eat
  - After you smoke
  - After going to the bathroom
  - After breaks.
- Wear clean clothes
- Avoid jewelry
- Minimize kids under 12 handling/harvesting produce



Health Symptoms of Concern

Traceback and Positive Lot ID





213-11-03-03

Log Book

213-11-01-03 Meijer
213-11-02-03 Meijer
213-11-03-03 Meijer

INVOICE
Received

213-11-01-03
213-11-02-03
213-11-03-03

Traceback Info Needed

- Date of Harvest
- Crop and Variety Harvested
- Field Location
- Harvest Crew

- Evidence that the system works

Traceback Info Needed

- Date of Harvest
- Crop and Variety Harvested
- Field Location
- Harvest Crew

- Evidence that the system works

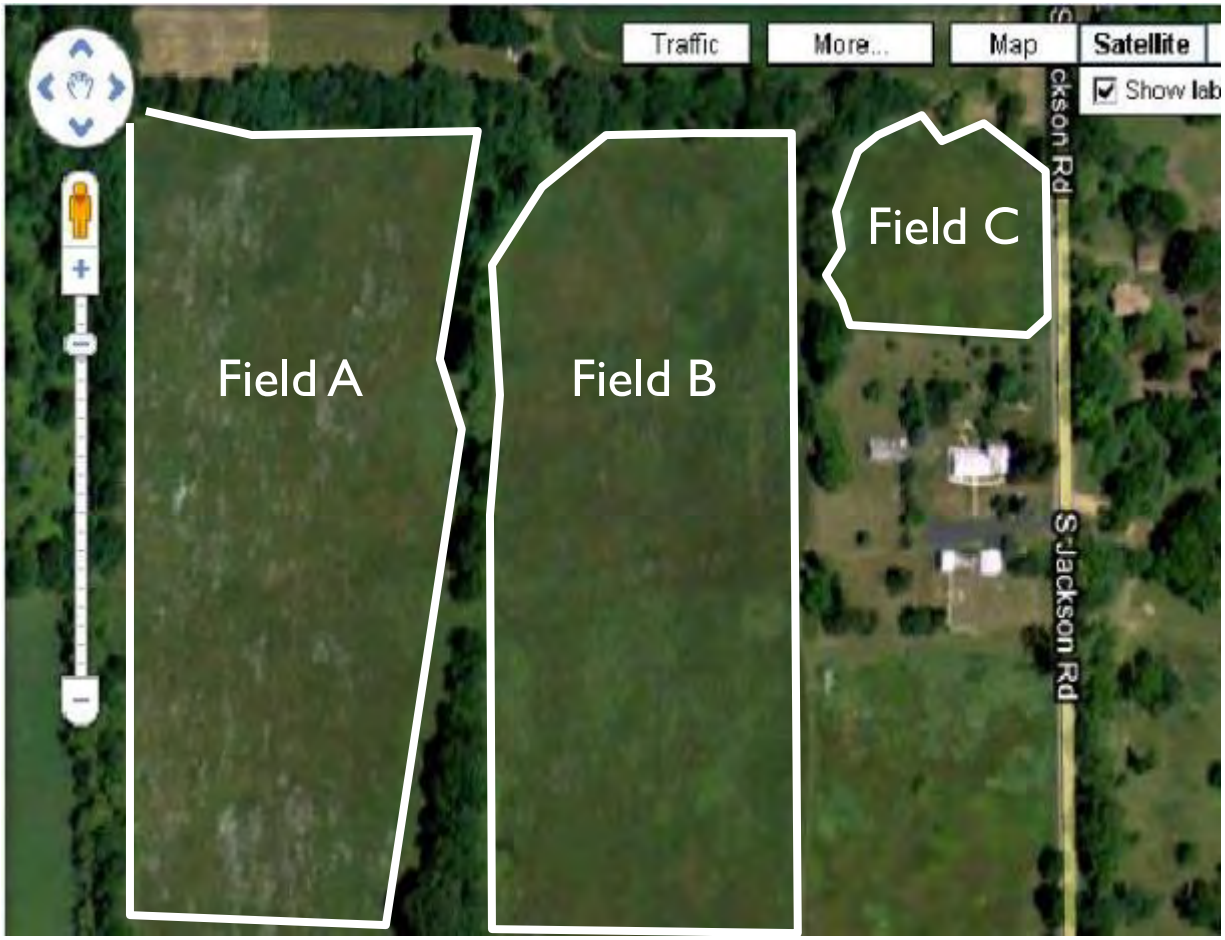
Traceback Info Needed

- Keep it simple
- Keep it short
- Be prepared to add to it if necessary

On date & year, I harvested crop from field number

Creating a Traceback Program

Creating a Traceback Program



Creating a Traceback Program

TRACEBACK DATE CODES

Based on Julian Calendar- Regular Year

1-Jan	1	1-Feb	32	1-Mar	60	1-Apr	91	1-May	121	1-Jun	152	1-Jul	182	1-Aug	213	1-Sep	244	1-Oct	274	1-Nov	305	1-Dec	335
2-Jan	2	2-Feb	33	2-Mar	61	2-Apr	92	2-May	122	2-Jun	153	2-Jul	183	2-Aug	214	2-Sep	245	2-Oct	275	2-Nov	306	2-Dec	336
3-Jan	3	3-Feb	34	3-Mar	62	3-Apr	93	3-May	123	3-Jun	154	3-Jul	184	3-Aug	215	3-Sep	246	3-Oct	276	3-Nov	307	3-Dec	337
4-Jan	4	4-Feb	35	4-Mar	63	4-Apr	94	4-May	124	4-Jun	155	4-Jul	185	4-Aug	216	4-Sep	247	4-Oct	277	4-Nov	308	4-Dec	338
5-Jan	5	5-Feb	36	5-Mar	64	5-Apr	95	5-May	125	5-Jun	156	5-Jul	186	5-Aug	217	5-Sep	248	5-Oct	278	5-Nov	309	5-Dec	339
6-Jan	6	6-Feb	37	6-Mar	65	6-Apr	96	6-May	126	6-Jun	157	6-Jul	187	6-Aug	218	6-Sep	249	6-Oct	279	6-Nov	310	6-Dec	340
7-Jan	7	7-Feb	38	7-Mar	66	7-Apr	97	7-May	127	7-Jun	158	7-Jul	188	7-Aug	219	7-Sep	250	7-Oct	280	7-Nov	311	7-Dec	341
8-Jan	8	8-Feb	39	8-Mar	67	8-Apr	98	8-May	128	8-Jun	159	8-Jul	189	8-Aug	220	8-Sep	251	8-Oct	281	8-Nov	312	8-Dec	342
9-Jan	9	9-Feb	40	9-Mar	68	9-Apr	99	9-May	129	9-Jun	160	9-Jul	190	9-Aug	221	9-Sep	252	9-Oct	282	9-Nov	313	9-Dec	343
10-Jan	10	10-Feb	41	10-Mar	69	10-Apr	100	10-May	130	10-Jun	161	10-Jul	191	10-Aug	222	10-Sep	253	10-Oct	283	10-Nov	314	10-Dec	344
11-Jan	11	11-Feb	42	11-Mar	70	11-Apr	101	11-May	131	11-Jun	162	11-Jul	192	11-Aug	223	11-Sep	254	11-Oct	284	11-Nov	315	11-Dec	345
12-Jan	12	12-Feb	43	12-Mar	71	12-Apr	102	12-May	132	12-Jun	163	12-Jul	193	12-Aug	224	12-Sep	255	12-Oct	285	12-Nov	316	12-Dec	346
13-Jan	13	13-Feb	44	13-Mar	72	13-Apr	103	13-May	133	13-Jun	164	13-Jul	194	13-Aug	225	13-Sep	256	13-Oct	286	13-Nov	317	13-Dec	347
14-Jan	14	14-Feb	45	14-Mar	73	14-Apr	104	14-May	134	14-Jun	165	14-Jul	195	14-Aug	226	14-Sep	257	14-Oct	287	14-Nov	318	14-Dec	348
15-Jan	15	15-Feb	46	15-Mar	74	15-Apr	105	15-May	135	15-Jun	166	15-Jul	196	15-Aug	227	15-Sep	258	15-Oct	288	15-Nov	319	15-Dec	349
16-Jan	16	16-Feb	47	16-Mar	75	16-Apr	106	16-May	136	16-Jun	167	16-Jul	197	16-Aug	228	16-Sep	259	16-Oct	289	16-Nov	320	16-Dec	350
17-Jan	17	17-Feb	48	17-Mar	76	17-Apr	107	17-May	137	17-Jun	168	17-Jul	198	17-Aug	229	17-Sep	260	17-Oct	290	17-Nov	321	17-Dec	351
18-Jan	18	18-Feb	49	18-Mar	77	18-Apr	108	18-May	138	18-Jun	169	18-Jul	199	18-Aug	230	18-Sep	261	18-Oct	291	18-Nov	322	18-Dec	352
19-Jan	19	19-Feb	50	19-Mar	78	19-Apr	109	19-May	139	19-Jun	170	19-Jul	200	19-Aug	231	19-Sep	262	19-Oct	292	19-Nov	323	19-Dec	353
20-Jan	20	20-Feb	51	20-Mar	79	20-Apr	110	20-May	140	20-Jun	171	20-Jul	201	20-Aug	232	20-Sep	263	20-Oct	293	20-Nov	324	20-Dec	354
21-Jan	21	21-Feb	52	21-Mar	80	21-Apr	111	21-May	141	21-Jun	172	21-Jul	202	21-Aug	233	21-Sep	264	21-Oct	294	21-Nov	325	21-Dec	355
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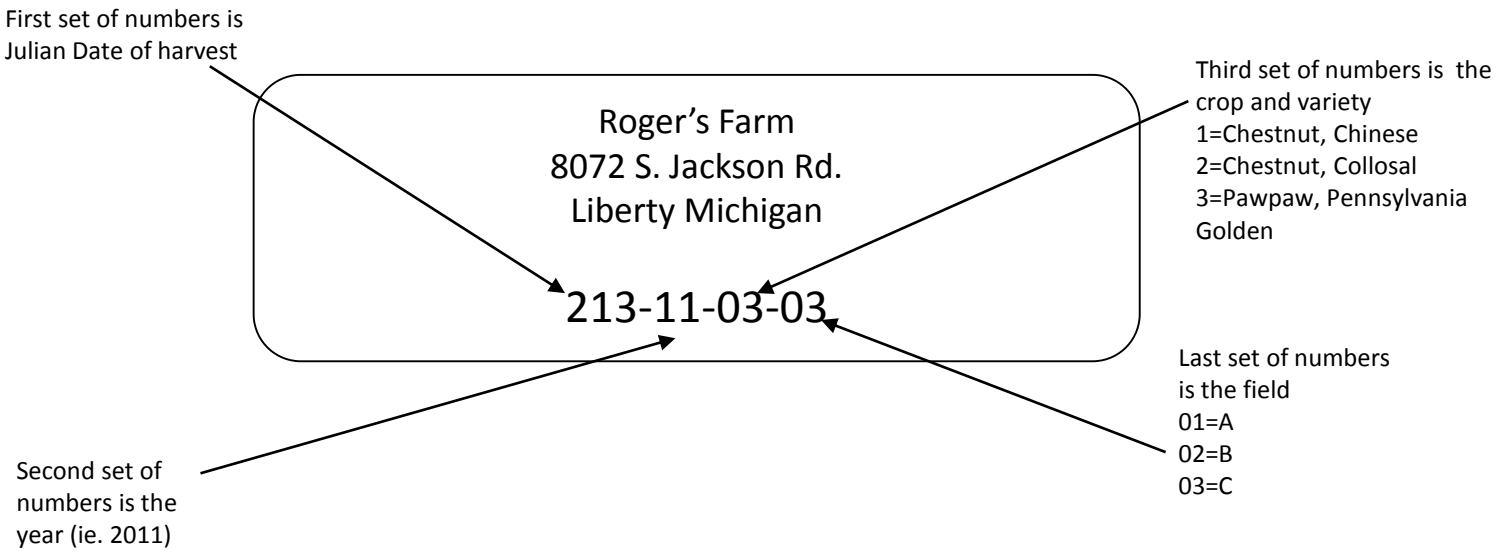
23-Jan	23	23-Feb	54	23-Mar	82	23-Apr	113	23-May	143	23-Jun	174	23-Jul	204	23-Aug	235	23-Sep	266	23-Oct	296	23-Nov	327	23-Dec	357
24-Jan	24	24-Feb	55	24-Mar	83	24-Apr	114	24-May	144	24-Jun	175	24-Jul	205	24-Aug	236	24-Sep	267	24-Oct	297	24-Nov	328	24-Dec	358
25-Jan	25	25-Feb	56	25-Mar	84	25-Apr	115	25-May	145	25-Jun	176	25-Jul	206	25-Aug	237	25-Sep	268	25-Oct	298	25-Nov	329	25-Dec	359
26-Jan	26	26-Feb	57	26-Mar	85	26-Apr	116	26-May	146	26-Jun	177	26-Jul	207	26-Aug	238	26-Sep	269	26-Oct	299	26-Nov	330	26-Dec	360
27-Jan	27	27-Feb	58	27-Mar	86	27-Apr	117	27-May	147	27-Jun	178	27-Jul	208	27-Aug	239	27-Sep	270	27-Oct	300	27-Nov	331	27-Dec	361
28-Jan	28	28-Feb	59	28-Mar	87	28-Apr	118	28-May	148	28-Jun	179	28-Jul	209	28-Aug	240	28-Sep	271	28-Oct	301	28-Nov	332	28-Dec	362
29-Jan	29			29-Mar	88	29-Apr	119	29-May	149	29-Jun	180	29-Jul	210	29-Aug	241	29-Sep	272	29-Oct	302	29-Nov	333	29-Dec	363
30-Jan	30			30-Mar	89	30-Apr	120	30-May	150	30-Jun	181	30-Jul	211	30-Aug	242	30-Sep	273	30-Oct	303	30-Nov	334	30-Dec	364
31-Jan	31			31-Mar	90			31-May	151			31-Jul	212	31-Aug	243			31-Oct	304			31-Dec	365

Traceback Info Needed



Food Safety Modernization Act

- **Produce Safety**
- **Human and Animal Food Preventive Controls**
- **Foreign Supplier Verification**
- **Third Party Verification**
- **Sanitary Transportation**

Food Safety Modernization Act (FSMA)

Produce Rule includes:

- Manure Source, Use, and Handling
- Irrigation and Wash Water Sources
- Employee Training and Hygiene
- Wild and Domesticated Animals
- Farm and Equipment Sanitation

FSMA Implementation

Two years for firms over $500,000.

Three years for firms $250,000.

Four years for firms above $25,000.

All farms above $25,000 are subject to the rule. Farms below $500,000 are qualified exempt **IF** more than half of gross sales are sold to the end user or within 275 miles from where it's grown.

The Future of FSMA

- Determine if you're Exempt.
- **IF** you're exempt, fill out an Annual Review of FSMA Exemption by 2018 at the earliest.
- If you're **NOT** exempt, begin complying and be aware of your full compliance date.

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