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Good Agricultural Practices Educational Program

2019 -2020

GAPs Educational Program

- Introduction to Produce Safety
 - Who is responsible for ensuring safe produce?
 - Costs, causes and outcomes of foodborne illnesses
 - National GAPs Program and FSMA
 - - USDA Group GAPs Food Safety Program
 - Farm Food Safety Plan
- Land Use Risk Assessment
- Water
- Waste (Manure and Compost)
- Wildlife and Domestic Animals
- Worker Health and Hygiene
- Produce Storage, Transport and Traceability



What Does Produce Safety Mean to You?



Who is Responsible For Ensuring Safe Produce?



FARMERS
Grow, Harvest,
Handle and Pack
Produce Safely



DISTRIBUTORS
Store, Handle, and
Transport Produce
Safely



**RETAILERS and
RESTAURANTS**
Store, Handle, and
Prepare Produce
Safely



CONSUMERS
Store, Prepare and
Consume Produce
Safely

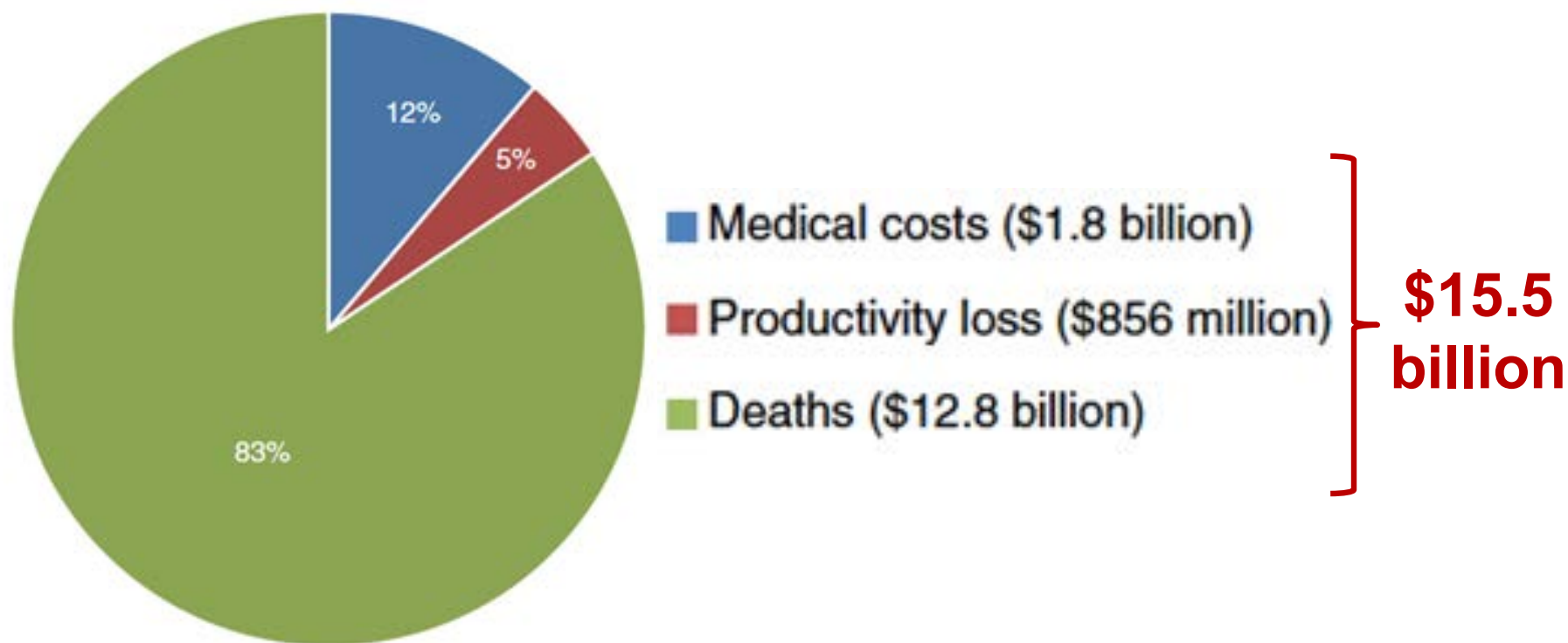
Everyone must identify produce safety risks and take corrective action!





The Cost of Foodborne Illnesses in the US

Mean cost of illness for foodborne illnesses acquired in the United States (\$ 2013) from 15 leading pathogens, by type of cost

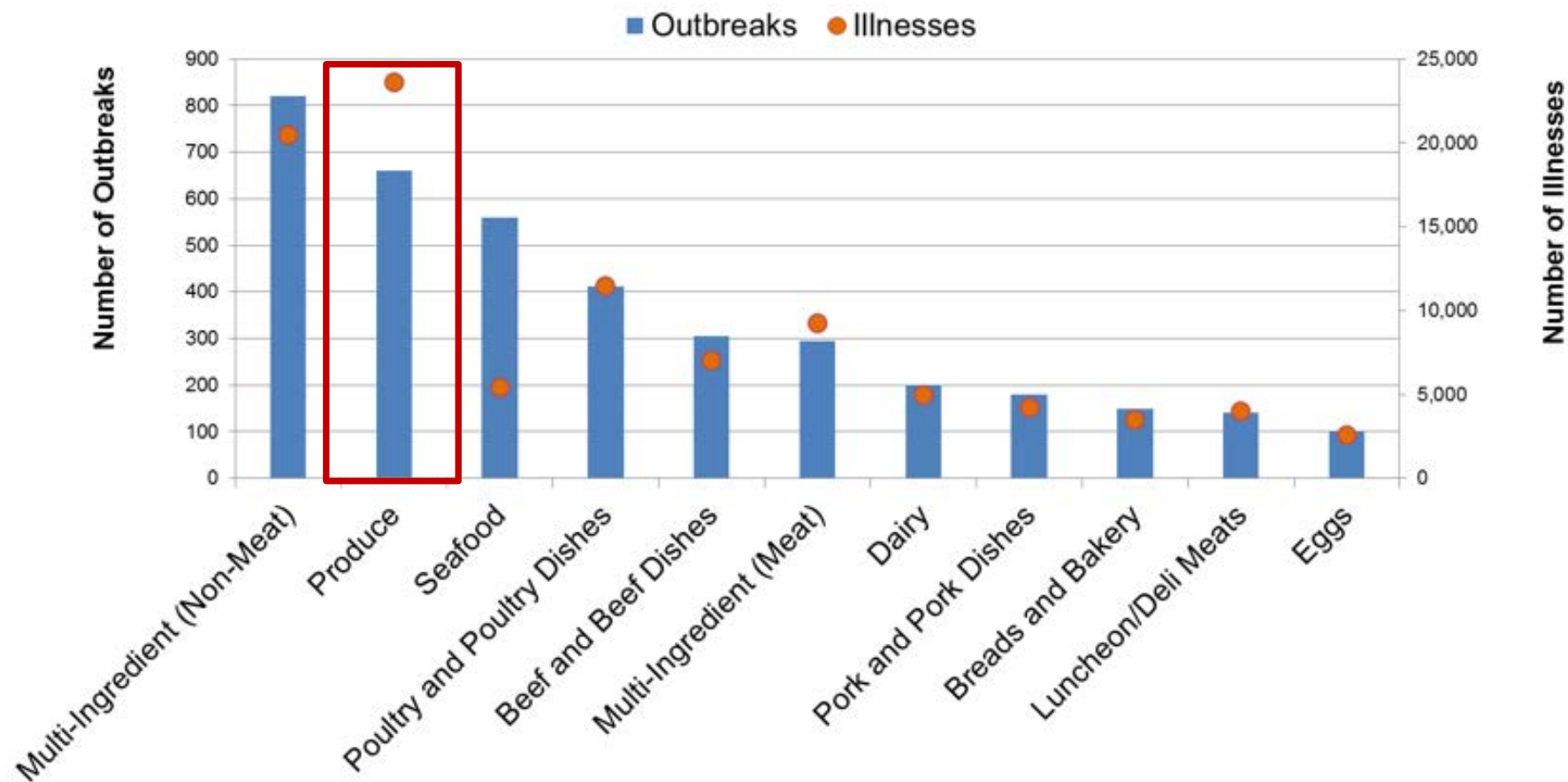


Source: Computed by authors based on: Hoffmann et al. 2012, ERS, Cost Estimates of Foodborne Illnesses [<http://www.ers.usda.gov/data-products/cost-estimates-of-foodborne-illnesses.aspx>].



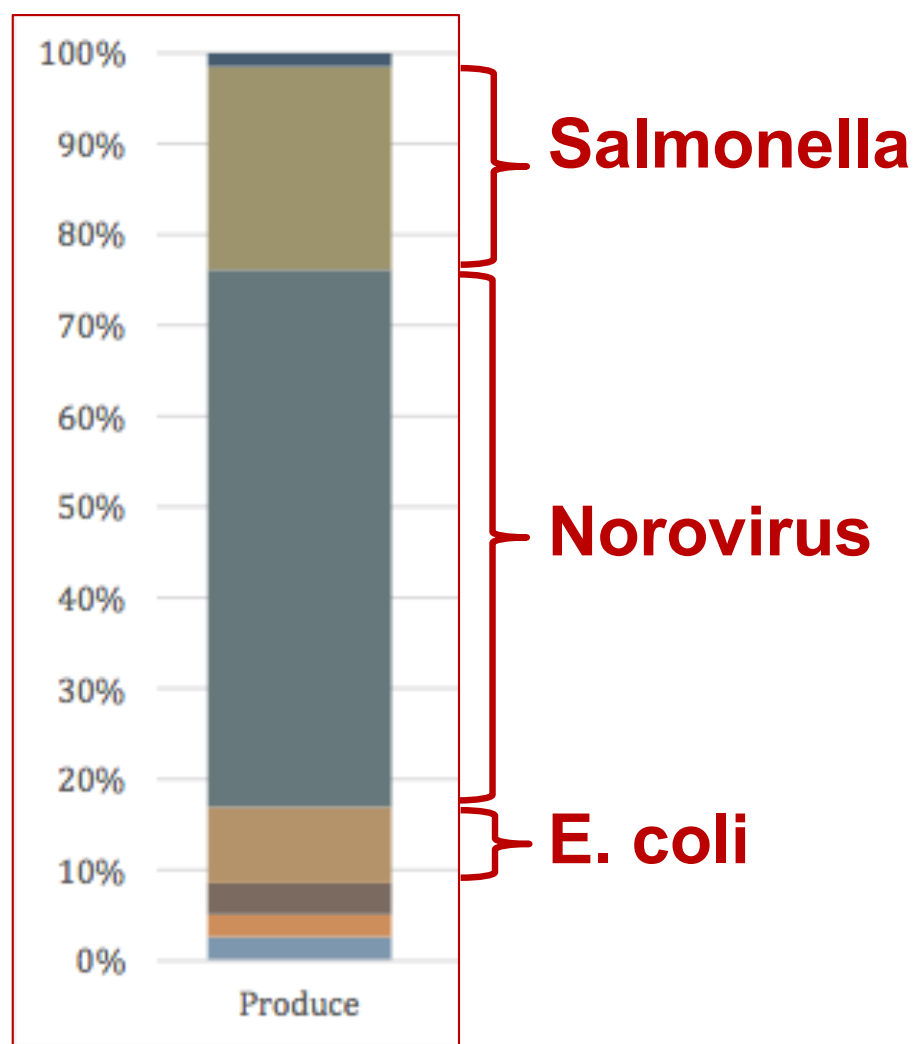
Outbreaks and Illnesses Due to Food Commodities

Outbreaks and Illnesses Due to Food Commodities, 2002-2011





Causes of Foodborne Illnesses in the US From Produce (2002-2010)





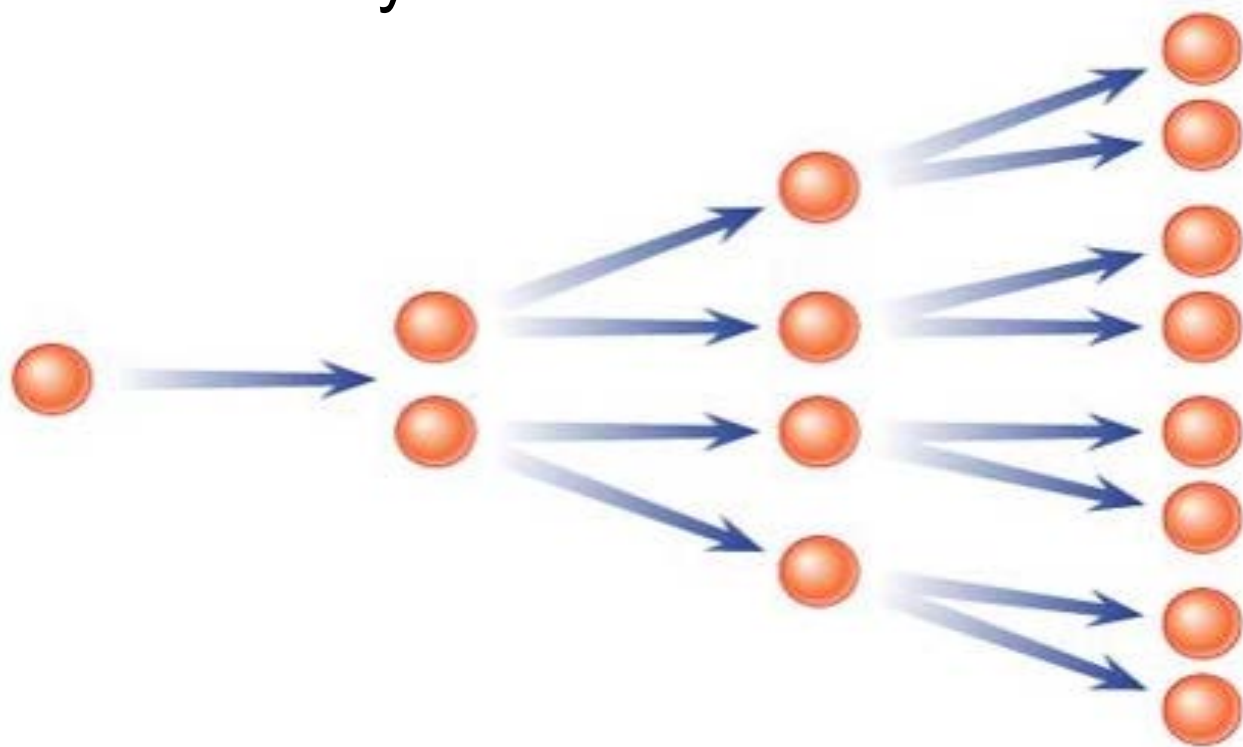
Causes and Outcomes of Foodborne Illnesses in the US

Pathogen	Natural Habitat	Minimum Infectious Dose	Worse Case Scenario
Norovirus	Humans	<10	Vomiting Diarrhea
<i>Salmonella</i>	Animals/Humans	<10–10 ¹¹	Reactive arthritis
<i>E. coli</i> (STEC)	Animals/Humans	<10-100	Kidney failure
<i>Listeria monocytogenes</i>	Animals/Humans	10-100	Death Miscarriage
<i>Hepatitis A</i>	Humans	10-100	Jaundice Liver disease



Growth of Bacteria Under Optimal Conditions

At optimal growth conditions, most bacteria double every 20 minutes



One
... trillion

0 minutes
One bacterium

20 minutes
Two bacteria

40 minutes
Four bacteria

60 minutes
Eight bacteria

12 hours



Challenges Associated With Fresh Produce

- Once pathogens are introduced onto the produce they are difficult to remove
- Bacteria can multiply rapidly
- Infectious doses of bacteria and viruses may be low
- Produce is often consumed raw
- Internalization of pathogens into the produce tissue can occur



How Does Produce Safety Affect You?



1. You are responsible for providing a safe product to the public.



2. Buyers have heightened expectations of you.



3. Produce safety will affect your profitability and your bottom line.



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National Good Agricultural Practices Program And USDA GroupGAP Food Safety And Audit Program



National GAPs Program and USDA GroupGAP Food Safety and Audit Program

- National Good Agricultural Practices (GAPs) Program
- Differences between FSMA and GAPs
- USDA GAPs Audit Verification Program
- USDA GroupGAP Food Safety Program
 - Is USDA Group GAPs for You?
 - Requirements for an USDA GroupGAP Food Safety Program
 - GroupGAP Quality Management System
 - GroupGAP Audit System
- Preparing for an USDA GAPs Inspection
- Importance of a Farm Food Safety Plan
 - What is a Farm Food Safety Plan?





National Good Agricultural Practices (GAPs) Program

- Established in 1999 to address on-farm food safety hazards associated with fruits and vegetables funded by USDA and FDA
- Collaborators in 34 states
- **Voluntary program** that provides **guidelines** and educational materials for ensuring safe on-farm practices
- **Market-driven**





USDA GAPs Audit Program

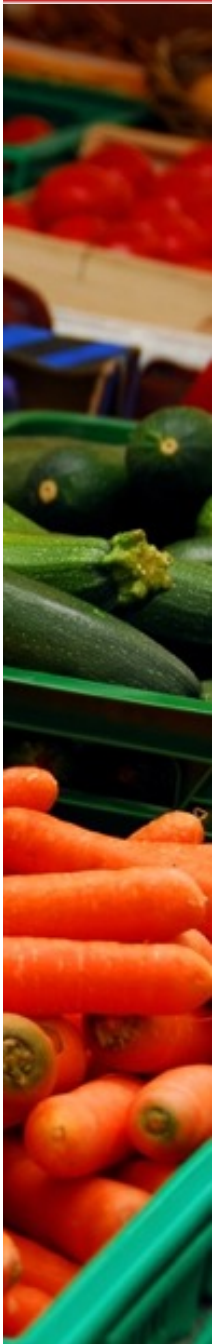
- Certification is **NOT** federally mandated, but may be required by your buyer/market





USDA GAPs Audit Program

- Certification is **NOT** federally mandated, but may be required by your buyer/market
- On-site inspection required during harvest/activities
 - Cost depends on farm size and proximity to inspector
 - Ex: Auditor's cost: \$108/hour (preparation, audit and travel time)
 - May require unannounced follow-up inspection





USDA GAPs Audit Program

- Certification is **NOT** federally mandated, but may be required by your buyer/market
- On-site inspection required during harvest/activities
 - Cost depends on farm size and proximity to inspector
 - Ex: Auditor's cost: \$108/hour (preparation, audit and travel time)
 - May require unannounced follow-up inspection
- Entire farm or specific crops can be certified
- Requires a **farm food safety plan**
- Certification is valid for 12 months





USDA GroupGAP Food Safety Program

- Established in 2016
- Makes the audit process accessible for small and middle-sized producers
- Allows for varied farm practices and different crops
 - One shared *farm food safety plan*



Is USDA GroupGAP for You or Your Growers?

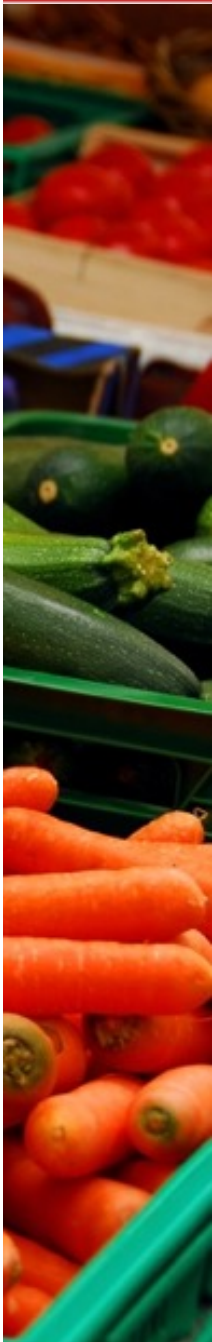
- Are you a member of a group or can you create a group?
- Are you willing to share responsibility for implementing food safety practices?
- Are **ALL** Group members willing to implement GAPs?
- Will your buyer(s) accept USDA GroupGAP Food Safety Program?





Requirements for an USDA GroupGAP Food Safety Program

- Requirements:
 - A “Group” of farms and Group Leader
 - Quality Management System (QMS)
 - A *farm food safety plan*
 - Annual internal and external audit of QMS and farms





GroupGAP Quality Management System (QMS)

- Establishes a system for ensuring that **ALL** group members are in compliance with the GroupGAP Food Safety Program
- Modeled after ISO 9001
- Records of the group and group activities (i.e. distribution or transportation plan)





USDA GroupGAP Audit System

- Internal audit of QMS and each producer location
- External audit process
 - USDA annual QMS audit
 - USDA annual GAPs external audits
 - Representative of group members' production practices and crops
 - Number audited = $\sqrt{\text{number of member farms}}$
 - 4 farms = 2 audits; 16 farms = 4 audits; 25 farms = 5 audits, etc.
- Application fee of \$736 (8 hours of USDA staff time)
- Inspection costs \$92/hr



Preparing for an USDA GAPs Inspection

- Have all documents in one location and organized
- Conduct a walk-through of the farm and structures before the inspection date
 - **Do what you say you are doing!**
- Let all workers know that you will be having an inspection for USDA GAPs Food Safety Program
- Remember that the inspector is a visitor to your farm

IMPORTANCE OF A FARM FOOD SAFETY PLAN



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What is a Farm Food Safety Plan?

- A set of written standard operating procedures (SOPs) that a grower implements to prevent or reduce food safety hazards
- Plans begin at the field and follows the path of the produce to the point where it is purchased
- Plans include:
 - Who should do it?
 - What should be done?
 - How should it be done?





What is a Farm Food Safety Plan?

- Plans should include:
 - Policies
 - Procedures
 - Records (logs)
 - Risk assessment and maps
 - Flow chart of how produce flows through your operation
- **Do what you say and only say what you plan to do!**





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Food Safety Starts on the Farm!

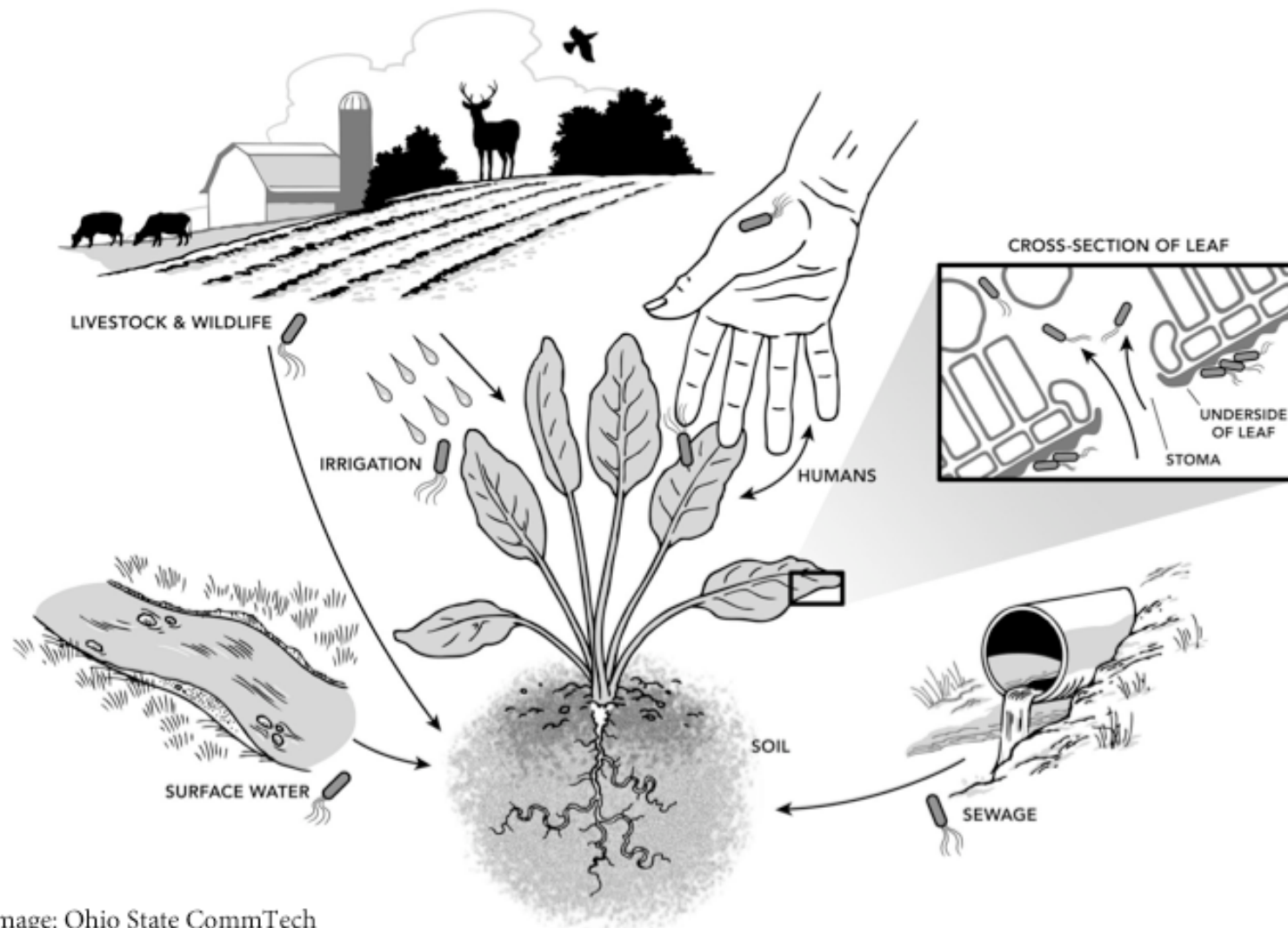


Image: Ohio State CommTech

Land Use Risk Assessment

- Assess potential food safety hazards on the farm
- Map your farm and risks around it
- On-farm risk assessment for irrigation water
- Risk assessment for using raw manure

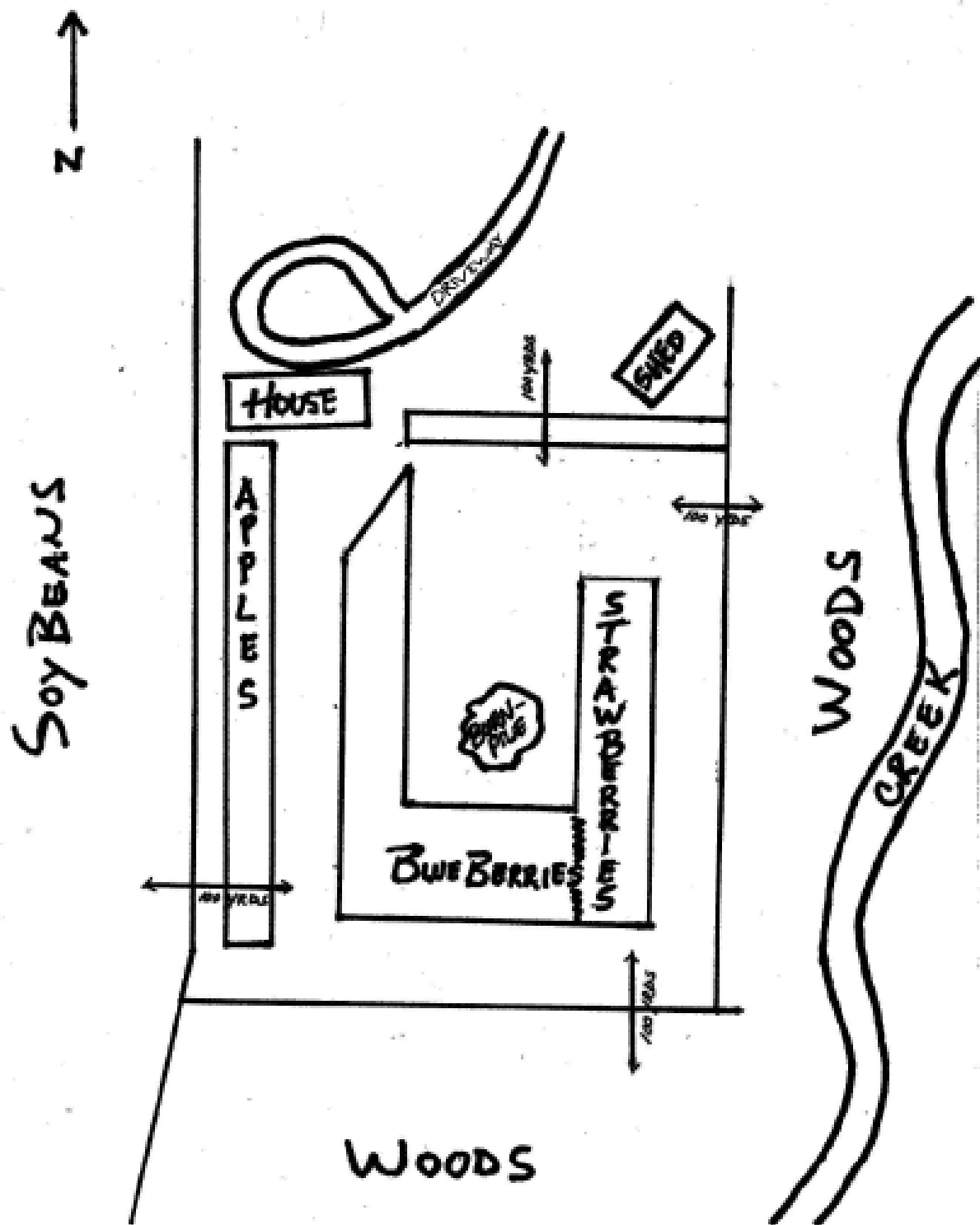




Assess Potential Food Safety Hazards on the Farm

- Consider on- and off-farm hazards
- Consider the major routes of contamination
- Prepare a map of each field
- Target your management strategies to reduce identified hazards





Where are the risks?



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On-farm Risk Assessment for Irrigation Water

Identify risk factors:

- Live stock operations
- Manure piles
- Cull piles
- Wildlife
- Flood potential





Risk Assessment For Using Raw Animal Manure

Consider prior land use and adjacent land use

- Follow National Organic Program (NOP) guidelines for manure application



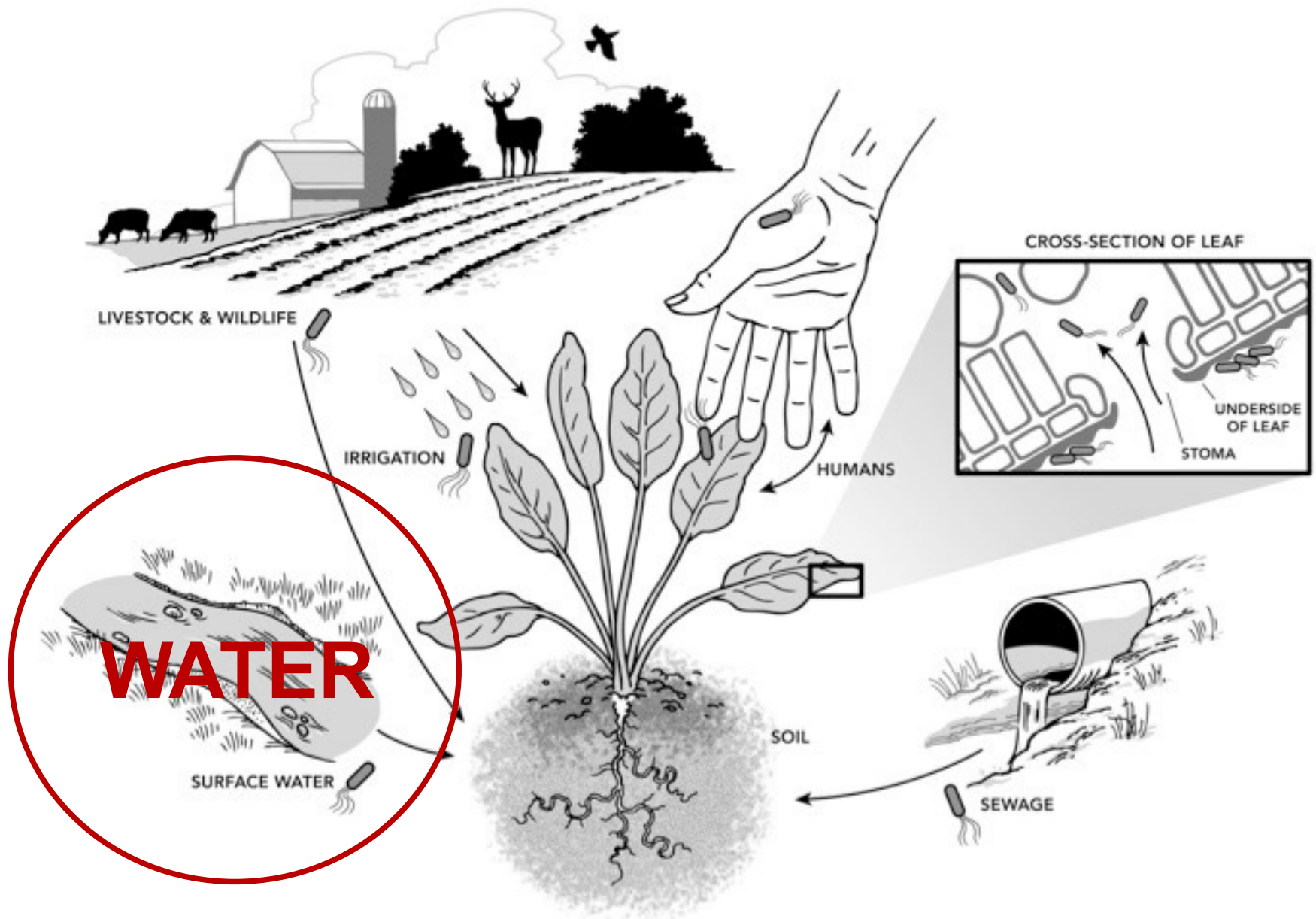


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Water

- Human pathogens and pests associated with water
- On-farm water usage
- Factors that influence produce contamination by water
- Pre-harvest water (Agricultural Water)
 - Risk Levels Associated With Agricultural Water
 - Water Quality Assessment
 - Pre-Harvest Water Quality Standards for Ohio
 - Interpreting the Results of a Water Test
 - On-farm Management Recommendations for Irrigation Water
 - Flood Water
 - Guidelines for Flood-affected Crops



Water

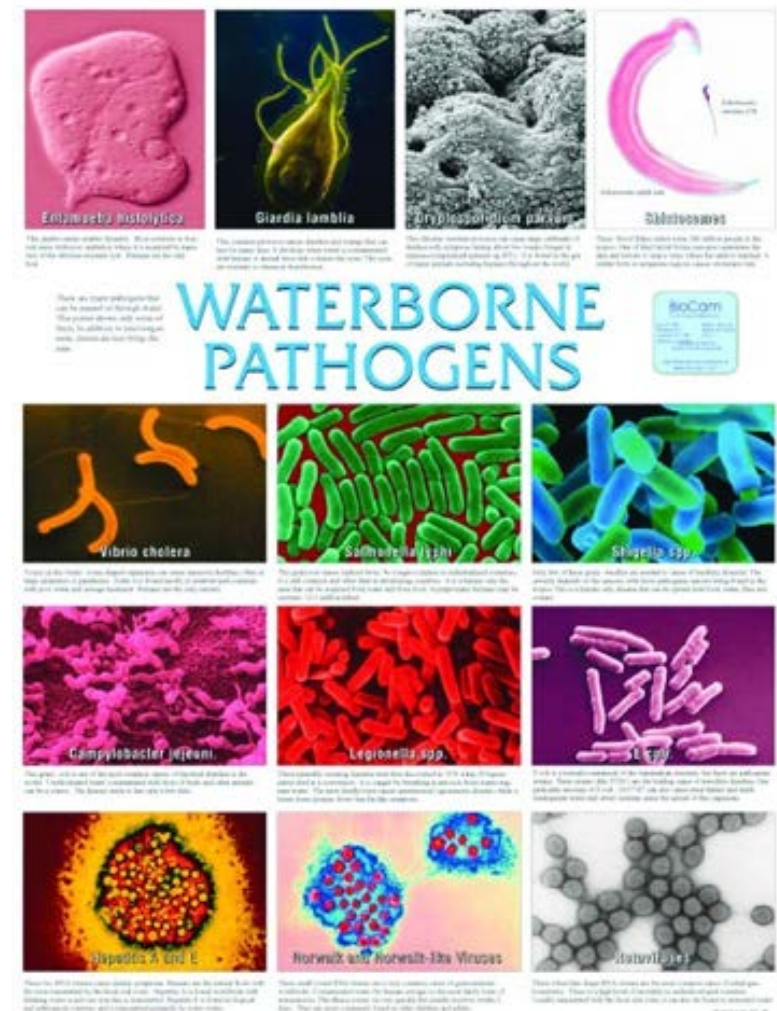
- Post-harvest water
 - Microbial Water Standards
 - Wash Water Conditions
 - Guidelines For Using Sanitizers for Washing Produce
 - Guidelines For Using Chlorine-based Sanitizers
 - Documentation Guidelines For Using Sanitizers
 - Cleaning and Sanitation of Contact Surfaces
 - Examples of food containers and other food contact surfaces
 - Four Step Cleaning and Sanitizing Procedure
 - Pre-rinse
 - Wash/clean
 - Rinse
 - Sanitize (Rinse)





Human Pathogens Associated With Water

- Bacteria
- Viruses
- Protozoa
- Helminths





Pests Associated With Water

- Plant pathogens:
 - Water molds
 - Fungi
 - Bacteria
 - Foliar nematodes
- Weed seeds





On-Farm Water Usage

- Pre-harvest Practices
 - Irrigation
 - Agrochemical applications
 - Harvesting applications
 - Equipment cleaning
- Post-harvest Practices
 - Washing operations and practices
 - Cooling practices
 - Equipment cleaning
- Hand Washing, Health, and Hygiene





Factors That Influence Produce Contamination By Water

- Water quality
- Crop characteristics
- Irrigation practices
- Growing practices
- Harvesting practices
- Post-harvest practices





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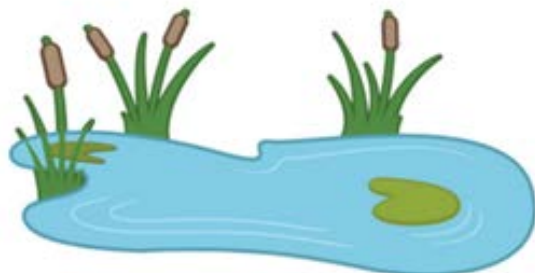
AGRICULTURAL WATER

THE QUALITY OF WATER VARIES DEPENDING ON THE SOURCE

HIGH RISK
LOW QUALITY



LOW RISK
HIGH QUALITY



SURFACE WATER



GROUND WATER



CITY WATER



Risk Levels Associated With Agricultural Water

High

Surface water: *overhead* irrigation

Surface water: *drip* irrigation

Ground water: *overhead* irrigation

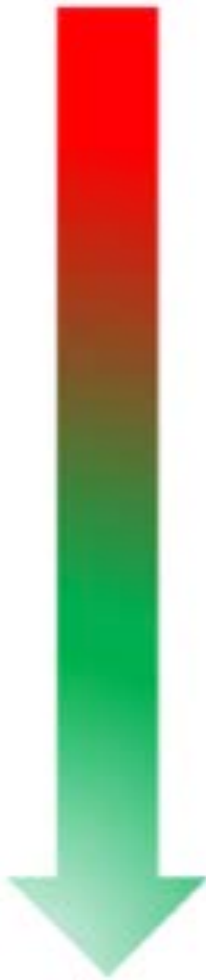
Ground water: *drip* irrigation

Municipal water: *overhead* irrigation

Municipal water: *drip* irrigation

Recycled water, hydroponics

Low





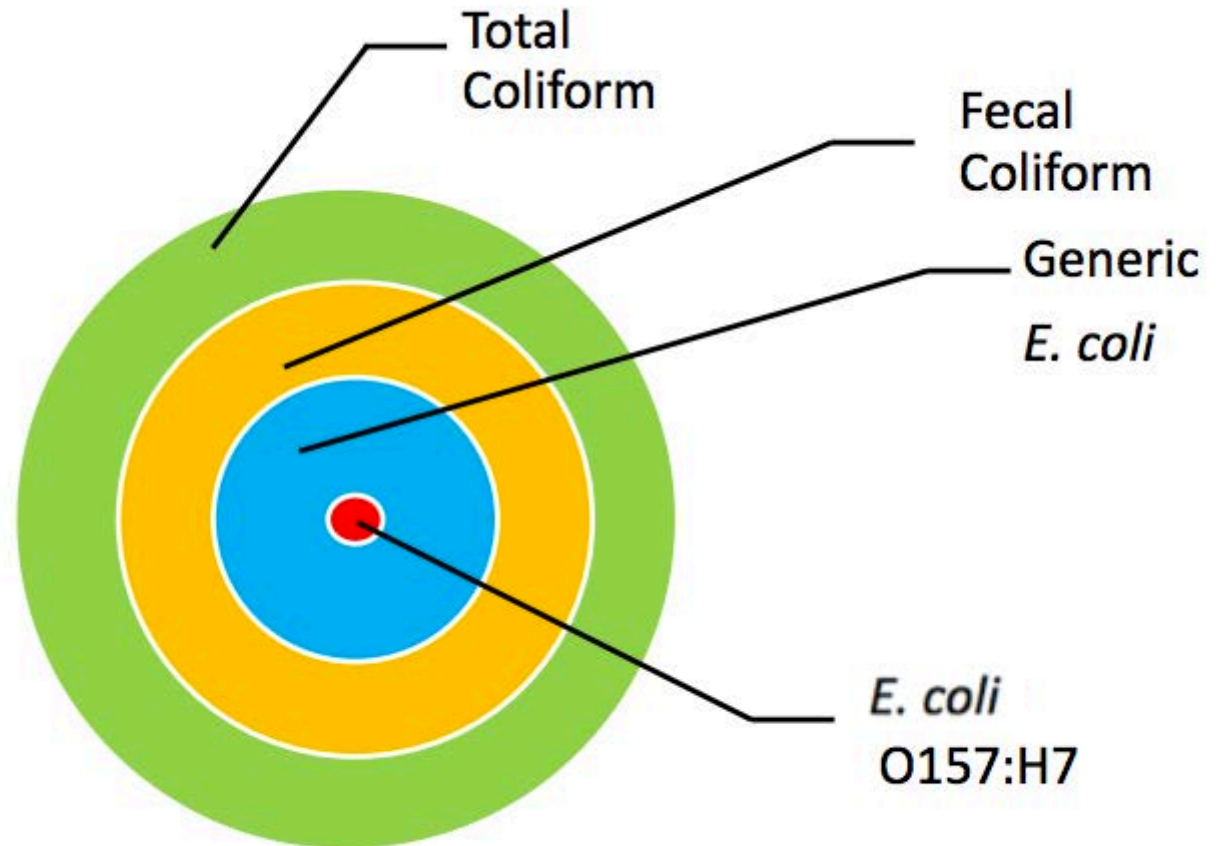
Water Quality Determined By...

- **Physical and C**

- Temperature
- pH
- Salinity
- Turbidity

- **Biological**

- Indicator microorganisms





Pre-Harvest Water Quality Standards for Ohio

- **Primary contact** recreational standards for irrigation water are recommended

Indicator	OH Primary Contact (2017)	US EPA Primary Contact (2012)
Fecal coliforms	Not recommended	Not recommended
Generic <i>E. coli</i>	126 CFU*	126 CFU
Enterococci	-	35 CFU

Colony forming units (CFU) based on a geometric mean of at least 5 samples

Interpreting the Results of a Water Test

HOLMES LABORATORY INC.
3559 US 62
Millersburg, OH 44654

WATER
ANALYSIS REPORT
[A Vital Key to Today's Agriculture]
(330) 893-2933 * www.holmeslab.com
Test Performed: Q

Lab and client
contact information,
sample details,
testing date

OSU-Lindsey Hoover
1680 Madison Ave
Wooster, OH 44691

Date Reported: 08/18/2015
Lab Number: 15-2896
SAMPLE I.D.: Water
Hydrant Packin Ho

Parameter	Units	Your Results*	Ideal Water Suitability levels should be less than these values.
pH			6.5-7.5
Hardness (CaCO3 Equiv.)	ppm		200
Hardness	grains per gal.		12
Total Dissolved Solids (TDS)	ppm		500
Calcium	(Ca) ppm		50
Magnesium	(Mg) ppm		50
Potassium	(K) ppm		20
Sulfate	(SO4) ppm		50
Sodium	(Na) ppm		50
Chloride	(Cl) ppm		50
Copper	(Cu) ppm		.20
Manganese	(Mn) ppm		.05
Zinc	(Zn) ppm		1.50
Iron	(Fe) ppm		.20
Lead	(Pb) ppm		.02
Phosphorus	(P) ppm		.70
Nitrate-Nitrogen	(NO3-N) ppm		4
Nitrate	(NO3) ppm		20
Electrical Conductivity (EC)	dS/m		.78
Barium	(Ba) ppm		
Fluoride	(F) ppm		2.00
Free Chlorine	(Cl) ppm		.50
Total Chlorine	(Cl) ppm		2.00
Total Coliform**	CFU/100ml	365	Comments
E-Coli**	CFU/100ml	<1	**<1=Safe Water for Drinking or Post-Harvest Rinsing
Pseudomonas Aeruginosa			

Physical and chemical
parameters

Biological
parameters





Interpreting the Results of a Water Test

Total Coliform**	CFU/100ml	365	Comments
E-Coli**	CFU/100ml	<1	**<1=Safe Water for Drinking
Pseudomonas Aeruginosa			or Post-Harvest Rinsing

- Results must provide an actual count
 - Presence or absence is **not** acceptable
- Total coliform is not the same as fecal coliform
- Always use the generic *E. coli* count
- Keep ALL results and any other documents associated with the water test (i.e. emails)

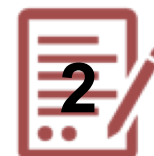




Frequency of Irrigation Water Testing for USDA GAPs Certification

Water Source	Testing Frequency	Corrective Action
Municipal	Annually (by local authority)	<ul style="list-style-type: none">• None on the grower part
Well	Once/growing season	<ul style="list-style-type: none">• Chlorination followed by re-testing
Surface	Quarterly	<ul style="list-style-type: none">• Change source• Filtration and/or chemical treatment

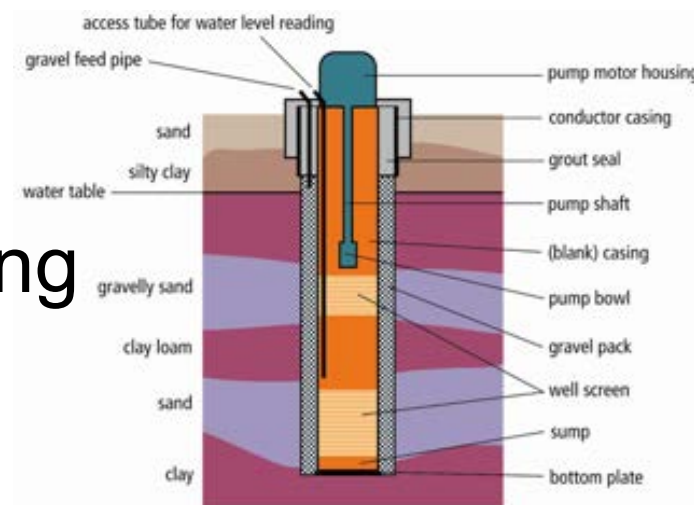
- Send samples to a certified laboratory (see handouts)
- Take corrective action immediately
- Keep records of all water tests and corrective actions





On-farm Management Recommendations for Irrigation Water

- Know your water source
- Know your local watershed
- Maintain wells in good working condition
 - Well casing is secure and maintained
 - Pump is operating correctly





On-farm Management Recommendations for Irrigation Water

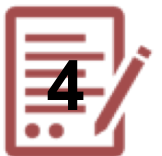
- Use drip (trickle) irrigation whenever possible
- For overhead irrigation
 - Use potable water
 - Water early in the morning to promote leaf and fruit drying





On-farm Management Recommendations for Irrigation Water

- For overhead irrigation:
 - Avoid irrigating prior to harvest
- Inspect irrigation pipes, lines and emitters for cracks or leaks





On-farm Management Recommendations for Irrigation Water

Protect the quality of your water

- Grass or sod waterways
- Vegetative buffer zones
- Berms
- Sand filtration
 - Slow vs. rapid
- Sanitizers
 - Chlorine-based
 - Ultra violet (UV) light





Flood Water

- High risk of exposure to contaminants
 - sewage
 - animal waste
 - pathogenic microorganisms
 - chemicals
 - toxins
 - heavy metals
- Large volumes increases risk





Guidelines for Flood-affected Crops

- Federal Food, Drug, and Cosmetic Act (FDCA)
- Direct contact with produce
 - Adulterated
 - No reasonable way to recondition
 - Should not enter the food chain
- Indirect contact with produce
 - May enter the food chain if there is a kill step (i.e. cooked)





Post-harvest Microbial Water Standards

- **Potable** water (no detectable *E. coli*) should be used for the following practices:
 - Washing produce
 - Cleaning equipment and surfaces
 - Cooling (water and ice)





To Wash or Not to Wash?

- Washing produce is NOT recommended
- Washing produce increases the risk of cross-contamination and pathogen infiltration
- Minimal handling and processing is recommended





Wash Water and Washing Conditions

- Use potable water
- Use a sanitizer in your wash water
- Maintain water temperature **equal to or warmer** than the produce pulp temperature
- For produce with stem scars hold for at least 4 hours prior to dunking





Wash Water and Washing Conditions

- Drying produce
 - in a clean area
 - on a clean and sanitized surface
 - use single use towels for fruit





Guidelines For Using Sanitizers for Washing Produce

- Use EPA registered products only
- Use recommended rates only
- Monitor sanitizer's effectiveness
 - Concentration
 - pH
 - Temperature
 - Turbidity
 - Oxidation reduction potential (ORP)





Sanitizers For Wash Water

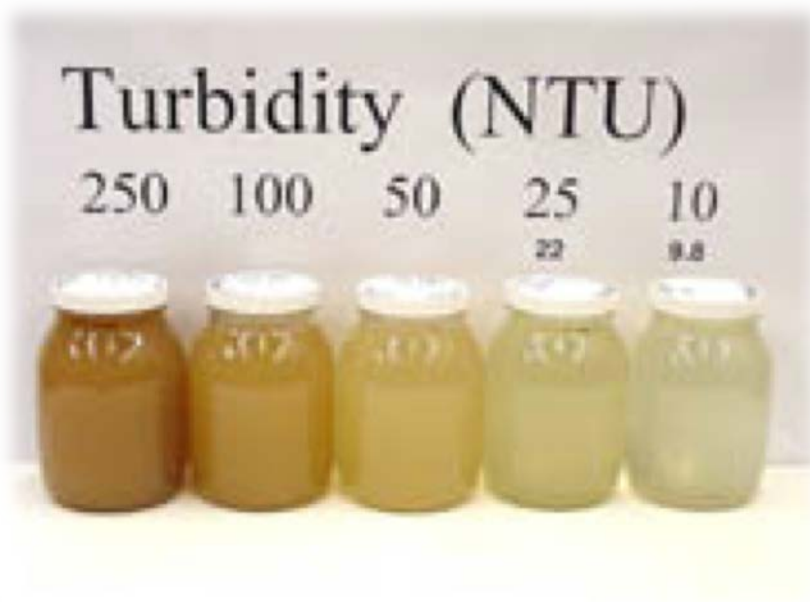
- Chlorine-based sanitizers
- UV light
- Other products labeled for food use





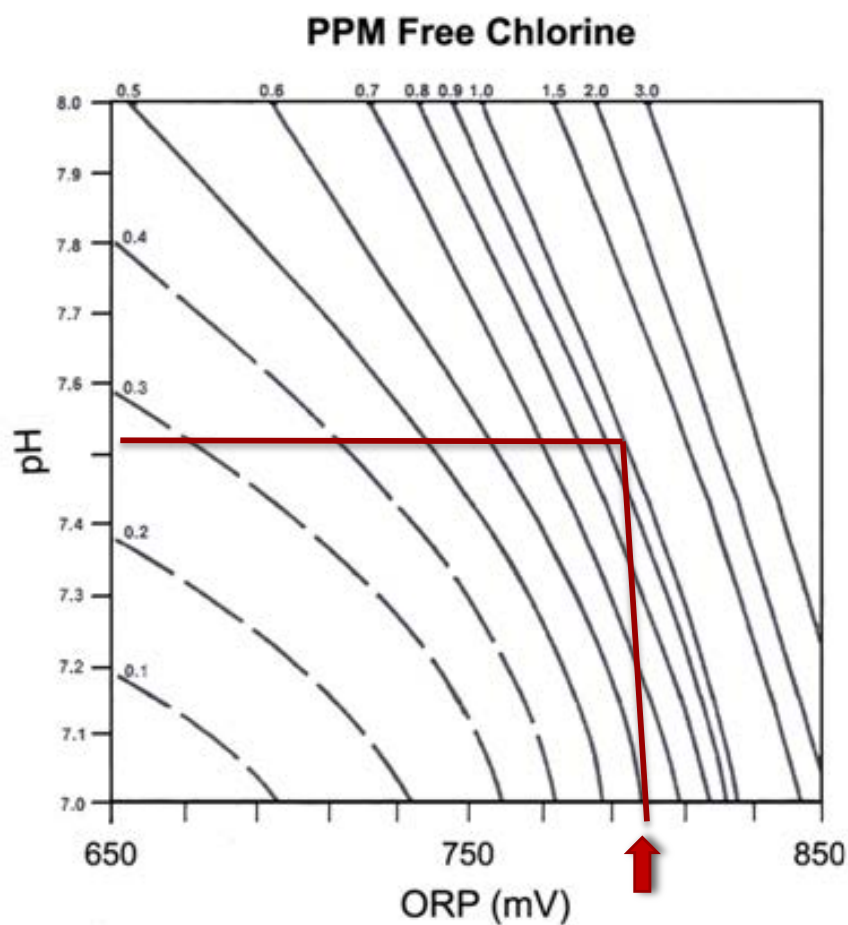
Guidelines For Using Sanitizers

- Change the water when quality is reduced or water is dirty and add more sanitizer





Guidelines For Using Chlorine-based Sanitizers

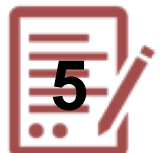


- pH=7
- ORP>700
- Warm water



Documentation Guidelines For Using Sanitizers

- Keep accurate and current records of sanitation practices
 - Product
 - Application rate
 - Water temperature, pH, ORP
 - Date and time of application
 - Date and time of changing solution



**NOTE: CLEANING /
SANITIZING AND
CONTAINERS**



Cleaning and Sanitation of Contact Surfaces

- **Cleaning/Washing**
 - The act of removing foreign material (i.e. dirt) from a surface through friction.
- **Sanitation**
 - The process of adding a disinfecting chemical to your clean surface to kill bacteria as opposed to physically removing it.
- **You can not sanitize a dirty surface!**





Harvest Containers

- Different materials pose different levels of risk





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Other Food Contact Surfaces





Four Step Cleaning and Sanitizing Procedure

- All re-usable surfaces that come into direct contact with produce should be cleaned and sanitized
 1. Pre-rinse
 2. Wash/clean
 3. Rinse
 4. Sanitize (Rinse*)





1. Pre-Rinse to Remove Dirt and Plant Debris

- Dirt and plant debris reduces the effectiveness of sanitizers
- Rinsing loosens and removes dirt and plant debris from surfaces including cracks and crevices
- Use potable water and high pressure to rinse





2. Wash/Clean and Scrub Surfaces

- Add a food-use detergent to the water
 - Use labeled rates
- Scrub surfaces to dislodge remaining soil and debris





3. Rinse to Remove Remaining Dirt and Detergent

- Rinse surfaces with potable water
- Rinsing removes and remaining visible dirt and plant debris





4. Sanitize to Kill Pathogens

- Use EPA registered products for food use only
- Use recommended rates only
- Pay attention to the contact time
- Use sanitizer appropriate for the surface type
 - Porous vs. non-porous
- May require a third rinse





Documentation Guidelines For Cleaning and Sanitizing Food Contact Surfaces

- Keep accurate and current records of sanitation practices
 - Item that was sanitized
 - Date and time of application
 - Product and product rate



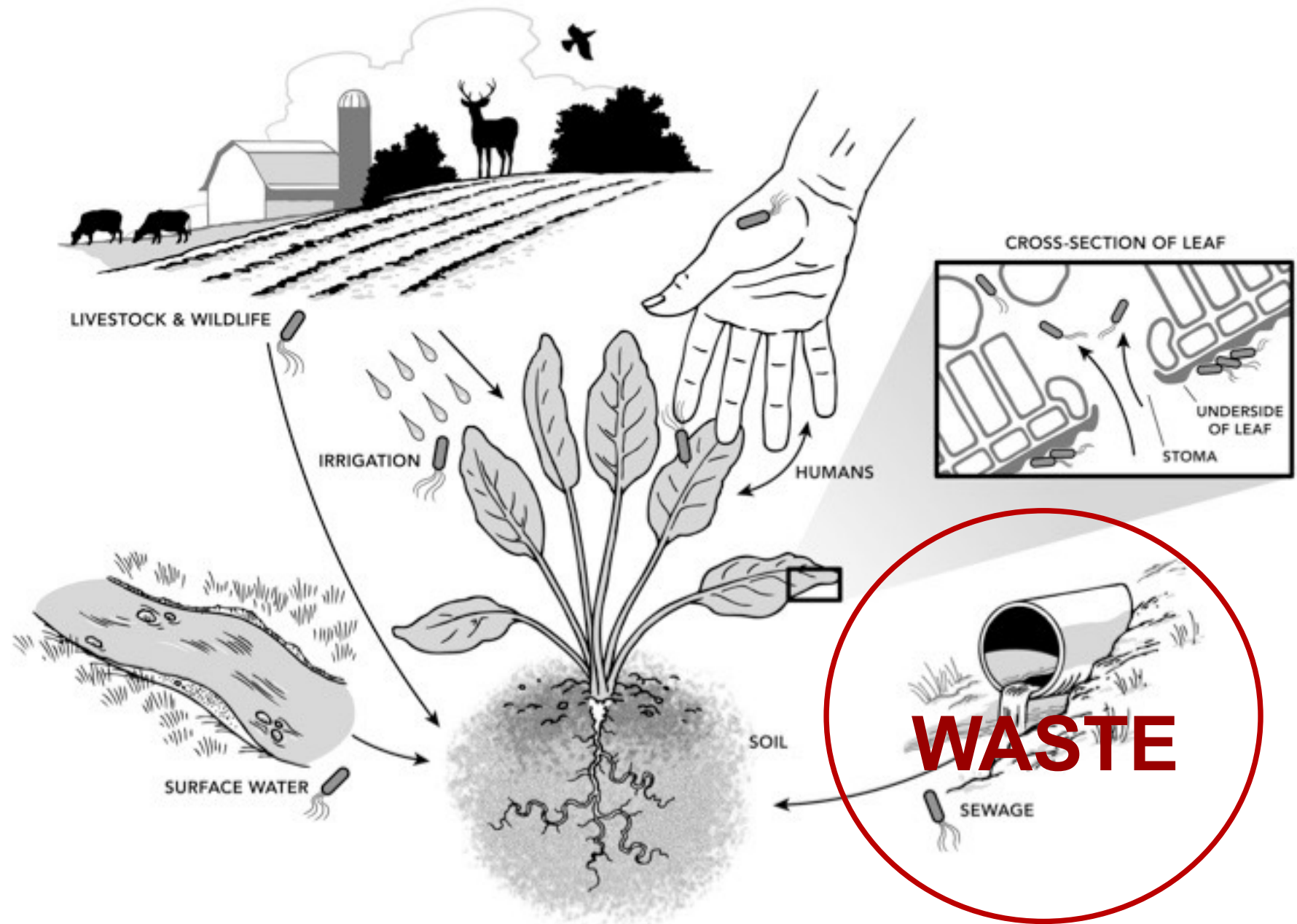


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Soil Amendments

- Soil Amendments Are a Source of Foodborne Pathogens
- Types of Biological Soil Amendments
 - Risk Levels Associated With Soil Amendments
- Best Practices For Using Raw Animal Manure
 - Application Timing For Raw Animal Manure
- Methods For Producing Compost
 - Phases of Composting
 - Composting Guidelines
 - Best Practices For Using Compost
 - Best Practices For Storing Compost





Soil Amendments Are a Source of Foodborne Pathogens

- Pathogen transfer can be direct or indirect
- Human pathogens can survive in soil for an extended period of time
- Level of risk depends on the type of amendment





Types of Biological Soil Amendments

- Raw animal manure
- Raw plant material (green manure)
- Aged animal manure or plant material
- Composted animal manure or plant material
- Alternative amendments
 - Teas
 - Meals (fish or bone)
 - Vermicompost





Risk Levels Associated With Soil Amendments

High

Raw animal manure

**Aged (improperly or incomplete
composted) animal manure**

Compost teas

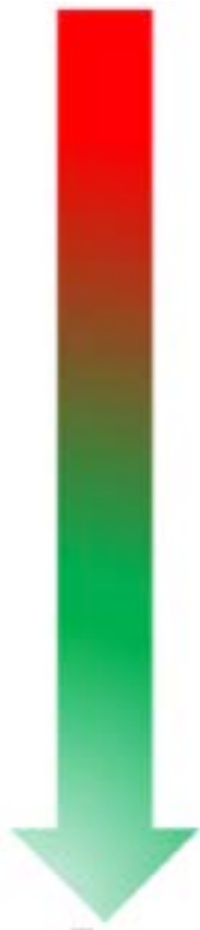
Composted animal manure

Composted plant material

Raw green manure

Low

Meals and vermicompost





Best Practices For Using Raw Animal Manure

- Avoid direct contact with produce (never side dress!)
- Incorporate into the soil
- Apply at time intervals that minimize potential for cross contamination
- Keep records of when and what was applied to the soil





Best Practices For Using Raw Animal Manure

- Prevent cross contamination of raw manure with fields, equipment and water sources
 - Cover piles or contain within a closed structure with a non-permeable floor
 - Physical barriers and adequate distances from water sources





Best Practices For Using Raw Animal Manure

- Safe distances from surface water
 - 100 ft sandy soil
 - 200 ft clay or loam soil
 - 300 ft if slope is $>6\%$
- Safe distance from fields or handling sites - **400 ft**
- Safe distance from well heads - **200 ft**





Application Timing For Raw Animal Manure

- National Organic Program (NOP) standards are recommended

Criteria	Crop Examples	Days Before Harvest
Edible portion likely to contact manure	Root crops Leafy greens Strawberries	120
Edible portion NOT likely to contact manure	Brambles Tree fruit Pepper/tomato	90



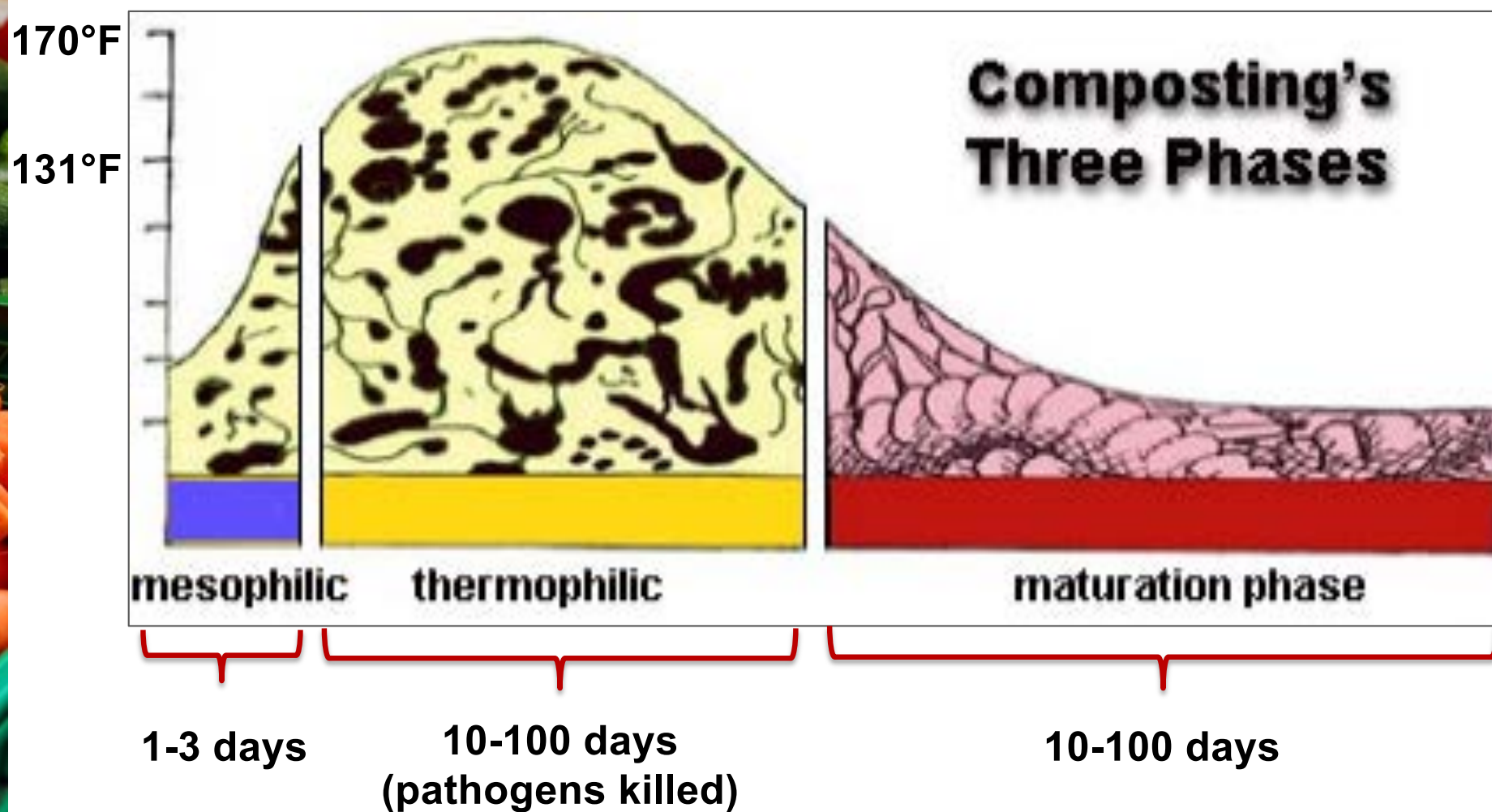
Methods For Producing Compost

- Two methods
 - Static aerated
 - Turned (windrow)





Phases of Composting





Composting Guidelines

- Conditions are based in Federal Biosolid Law (40CFR503)

Method	Temperature (°F)	Incubation Period (Days)	Turning Required?	Curing Time (Days)
Static Aerated	$\geq 131^{\circ}\text{F}$	≥ 3	No	45
Windrow	$\geq 131^{\circ}\text{F}$	≥ 15	Yes (<u>>5 times</u>)	45



Best Practices For Using Compost

- Store, cover or immediately apply compost following curing
- Protect compost from cross contamination





- Keep compost certification on record
- Document when compost was applied





Best Practices For Storing Compost

- Store compost away from production fields, packing houses and processing areas
- Store compost down-hill of production fields
- Store compost away from water sources



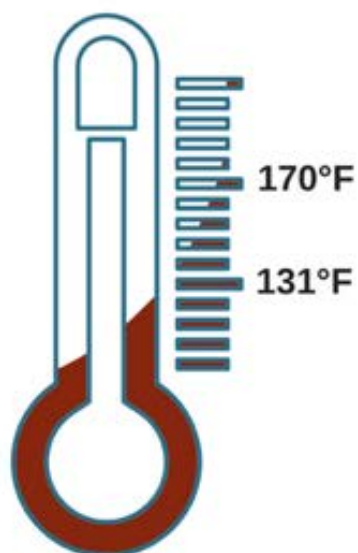


WASTE OR SOIL AMENDMENTS

COMPOSTED MANURE CAN SIGNIFICANTLY REDUCE FOOD SAFETY RISKS

SAFE MANURE APPLICATIONS

- Never apply during the growing season
- Apply 90 to 120 days before harvest
- Incorporate it into the soil within 72 hrs of application
- Avoid run-off from piles into water supply



SAFE COMPOST CONDITIONS

- 131 to 170°F for 3 days (enclosed system)
OR
- 131 to 170°F for 15 days (windrow system)
AND
- turned 5X or more AND
- cured for 45 days AND
- covered while being stored



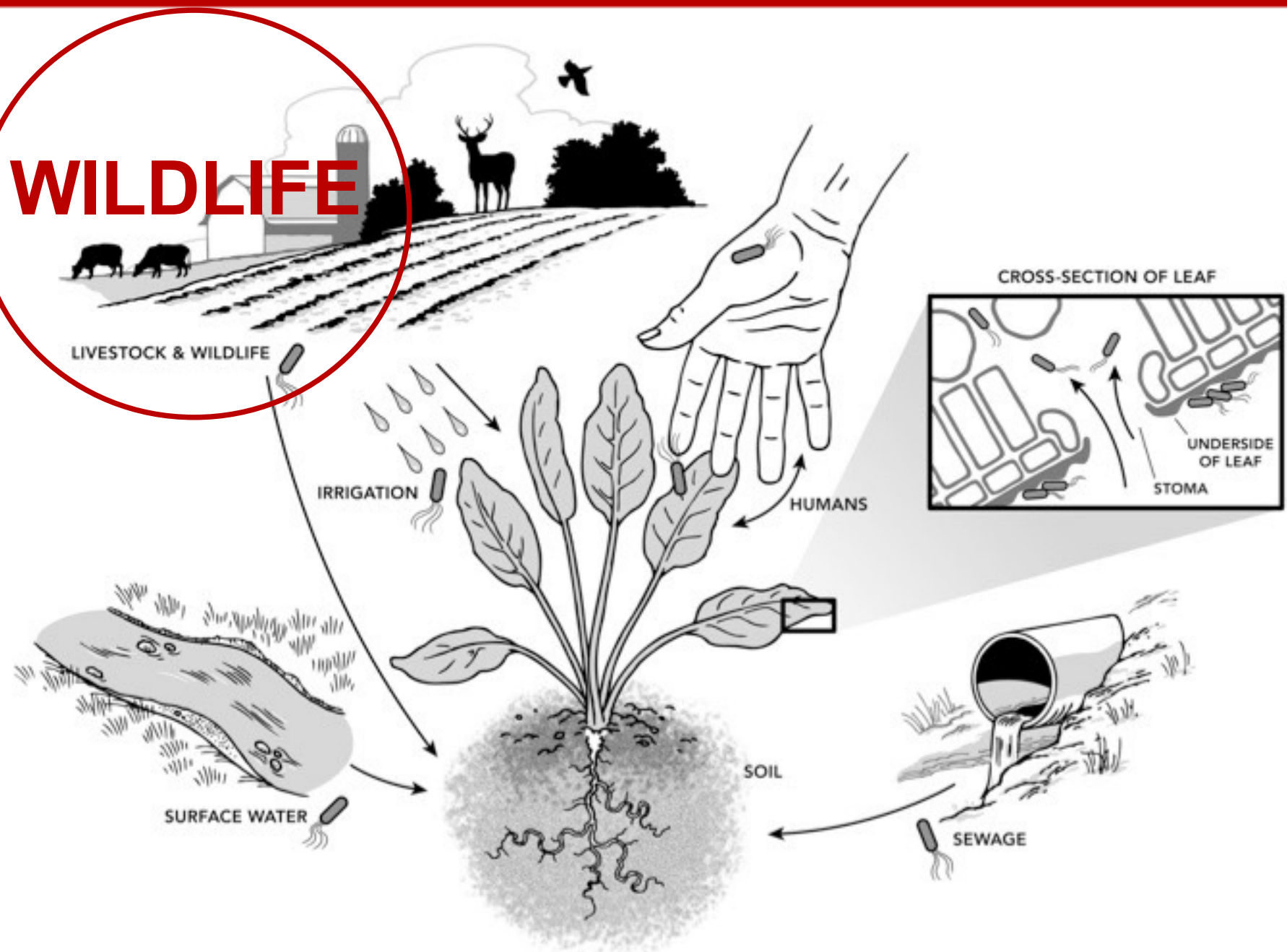
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WILDLIFE



Wildlife

- Wildlife and Domestic Animals
- Best Practices For Using Domestic Working Animals
- Domestic Non-Working Animals
- Best Practices To Handle Animal Intrusions
- Best Practices To Deter Animal Intrusions



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Wildlife and Domestic Animals

- All manure can carry pathogens
- **Domestic animals**
 - Livestock (cattle, sheep, goats, pigs, chickens)
 - Cats
 - Dogs
 - Rabbits
 - Horses
- **Wildlife**
 - Deer
 - Coyotes
 - Rabbits
 - Raccoons
 - Birds
 - Rodents
 - Insects (flies)





Best Practices For Using Domestic Working Animals

- Implement guidelines for **how** animals will be used and **when** they will be used
- Keep animals out of growing rows at least 7 days prior to harvest
- Do not house/ pasture draft animals and ruminants.





Best Practices For Using Domestic Working Animals

- Avoid handling the animals while handling produce
- Driveways should be ≥ 10 ft wide and seeded with grass





Domestic Non-Working Animals

No domestic non-working animals in:

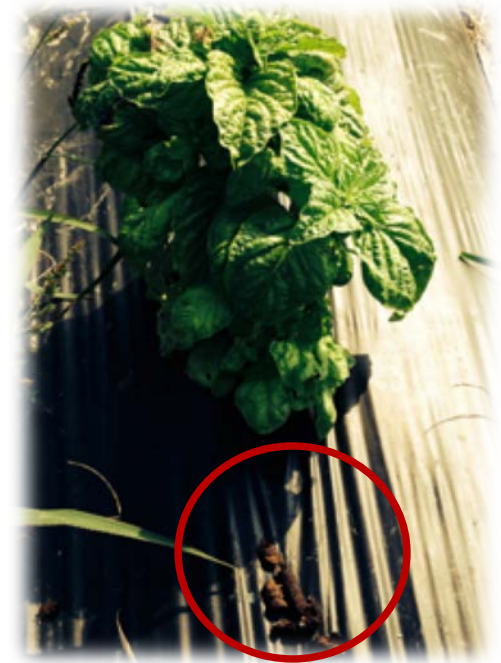
- Production fields
- Packing houses
- Processing facilities
- Vehicles used to transport produce





Best Practices To Handle Animal Intrusions

- Look for signs of intrusion or contamination prior to harvest
 - Tracks
 - Feces
 - Damaged product





Best Practices To Handle Animal Intrusions

- Flag or mark contaminated area
- Do not harvest contaminated produce
 - >5 ft radius
- Document the intrusion and corrective action





Best Practices To Deter Animal Intrusions

Deter animals by using:

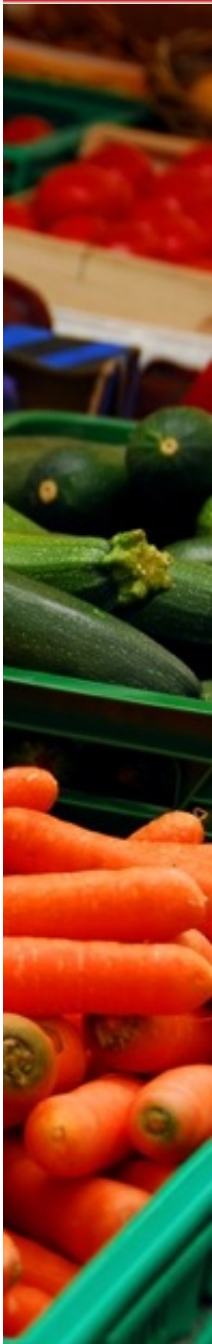
- Physical barriers
- Noise makers
- Decoys
- Netting on structures
- Strings across open water sources
- Falcons
- Bait stations





Best Practices To Deter Animal Intrusions

- Remove culls and plant debris to deter rodent or small mammal infestations
- Minimize standing water, which is a drinking water source for animals
 - Repair leaking irrigation pipes, tape and emitters
 - Level land to avoid low lying areas





Best Practices To Deter Animal Intrusions

- Place rodent traps around buildings and near entrances
- You can place rodent traps inside the produce storage areas, but they DO NOT have to have food in them.
- Check traps regularly





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WILDLIFE & DOMESTIC ANIMALS

PREVENT AND MINIMIZE ANIMAL ENTRY INTO FIELDS, PACKING HOUSES
AND STORAGE AREAS



FENCES

DECOYS



NOISE CANNONS



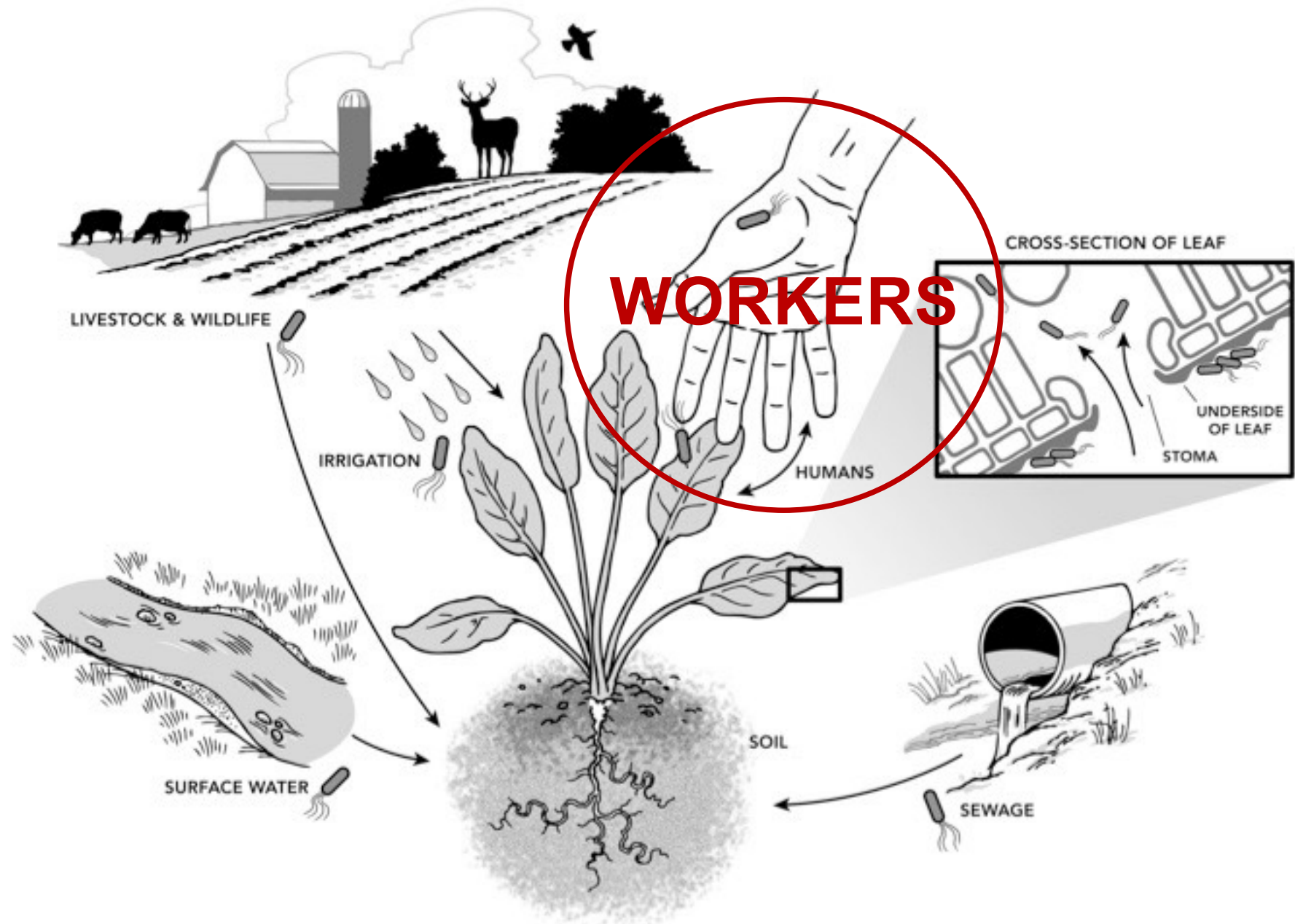


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Workers

- Worker Health, Hygiene and Training
- Best Practices For Worker Hygiene
 - Worker Clothing Guidelines
 - Importance of hand washing
 - Using hand sanitizer
 - Examples and key components of handwashing stations
 - Options for Grey Water Disposal
 - Restroom Facility Guidelines
 - Best Practices for Restroom Usage
 - Recordkeeping for Restroom Facilities
 - Signs and Symptoms of Illness
 - Plan in Place for Sick Employees
 - Injuries and First Aid
 - Recordkeeping illnesses and injuries





Worker Health, Hygiene and Training

- Everyone should be able to understand, identify and reduce produce safety risks on the farm!
- Before the growing season starts, *every worker and volunteer* should receive training on:

Farm Policies

GAPs/GHPs
SOPs

Hygiene

- Handwashing
- Clothing

Health

- Illnesses
- Injuries



Best Practices For Worker Hygiene

- Workers can directly or indirectly contaminate produce
- All workers and volunteers should:
 - Maintain personal cleanliness
 - Wear clean clothing
 - Remove or cover jewelry
 - Wash hands frequently and at designated times
 - Eat, drink, and use tobacco products in designated areas only





Worker Clothing Guidelines

In the field:

- Avoid handling raw manure before:
 - Harvesting
 - Sorting
 - Pruning (or other crop maintenance activities)
- Do not wear the same clothing that is worn to handle livestock





Worker Clothing Guidelines

In the packinghouse:

- Clean or change field clothes prior to entering packinghouse
- No hand or arm jewelry
- Use clean aprons, gloves and boots in packinghouse





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Hand Washing - First Line of Defense!

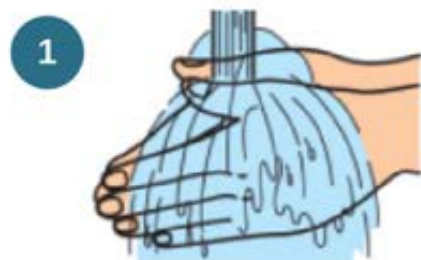


Resident microorganisms on
unwashed hands



WORKER HEALTH & HYGIENE

HANDS ARE ONE OF THE MOST CRITICAL OF ALL CONTROL POINTS



Thoroughly wet hands



Take an adequate amount of soap



Rub palms and back of hands, rub thumbs and interlace fingers



Rinse well with running water. Dry hands thoroughly with paper towel



***Wash your hands
BEFORE AND AFTER:***

- WORK
- EATING OR DRINKING
- SMOKING
- HANDLING FRUITS AND VEGETABLES
- USING THE TOILET



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Areas on the Hands Most Often Missed During Hand Washing



-  Most Often Missed
-  Often Missed
-  Less Often Missed





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Importance of Hand Washing



Unwashed hand



Washed hand





Using Hand Sanitizer

- Sanitizers are not effective when applied to visibly dirty hands.
- Sanitizers are **not** a substitute for soap and water.

BEFORE



AFTER





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Handwashing Stations



\$435-\$1100



\$205



\$20



Key Components of a Handwashing Station

1. Potable water with continuous flow
2. Soap
3. Single-use towels
4. Catch basin (for grey water)
5. Waste receptacle





Options for Grey Water Disposal

- Dump in grassy area or graveled area **AWAY** from field or handwashing station
- Utility floor drain, mop sink drain, or flush down toilet
- Water from farmer's markets should be hauled away or managed according to the market's guidelines





Restroom Facility Guidelines

- Permanent (house, office, etc.) or portable restrooms are acceptable
- Restroom access within a 10 minute walk of working area (including field)
- One toilet per 20 workers
 - >40 workers requires one toilet seat and one urinal
- Handwashing station available
- Restroom and handwashing supplies maintained and replenished regularly





Best Practices for Restroom Usage

- Train ALL employees on best restroom practices:
 - Use restrooms only!
 - Sit on toilet seat, do not stand on seat
 - Place used toilet paper inside the toilet, not beside the toilet or in a trash can
 - Report a problem immediately





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Best Practices for Restroom Usage

PLEASE USE TOILETS PROVIDED IN THE FIELD



YES SI



NO NO

POR FAVOR, USE LOS BAÑOS DISPONIBLES EN EL CAMPO

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POR FAVOR, DEPOSITE EL PAPEL HIGIÉNICO USADO DENTRO DEL INODORO



EL PAPEL HIGIÉNICO NO ATORA LOS INODOROS



TOILET PAPER WILL NOT OBSTRUCT TOILETS

PLEASE PUT USED TOILET PAPER IN THE TOILET

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Location of Portable Restrooms

BAD Placement



GOOD Placement





Recordkeeping for Restroom Facilities

- Restroom facility SOP and recordkeeping should meet the needs of your farm
- Document and retain restroom cleaning and sanitation records:
 - Date
 - Time
 - Restock supplies
 - Clean facility
 - Additional notes
 - Signature

Restroom Checklist

Date	Time	Facility is in Sanitary Condition	Supply Levels Replenished	Notes	Signature
1/10/14	8:04 AM	✓	✓		Jordan Smith
1/10/14	8:00 AM	✓	✓		Jordan Smith
1/12/14	9:50 AM	✓	✓		Jordan Smith
1/12/14	8:45 PM	✓	✓	Restock out fresh	Jordan Smith
1/12/14	8:00 AM	✓	✓		Jordan Smith



Signs and Symptoms of Illness

- **Signs**

- Frequent restroom breaks
- Weak or lethargic
- Open wounds

- **Symptoms**





Signs and Symptoms of Illness

- **Symptoms**

- Coughing/sneezing
- Red eyes or nose
- Jaundice
- Sweating
- Rashes





Have a Plan in Place for Sick Employees

- Send the employee home if they have the following symptoms:
 - Vomiting
 - High fever
 - Diarrhea
 - Persistent cough





Have a Plan in Place for Sick Employees

- Assign employee to a job that doesn't involve:
 - Handling produce
 - Handling packing materials
 - Direct contact with other employees





Injuries and First Aid

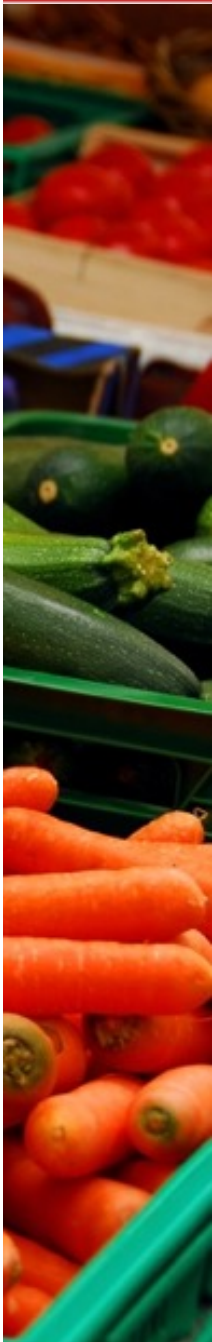
- Have a first aid kit stocked and accessible:
 - On the farm
 - In the packinghouse
 - In field vehicles
- Monitor and restock supplies regularly





Injuries and First Aid

- Follow these steps for injuries that occur in the field:
 - Stop harvest
 - Administer first aid or call 911
 - Notify supervisor of injury
 - Mark or flag area where injury occurred
 - Dispose of any produce in contact with bodily fluids (vomit, blood, urine, etc.)
 - Make record of incident
- Workers with minor injuries that can be cleaned, bandaged, and covered may resume work.





Recording Illness and Injury

- Keep a record of illnesses and injuries

Date	Employee	Event	Action taken	Date return to work	Signature
7/20/2013	Joe Smith	Cabbage field 1 Finger injury	<ul style="list-style-type: none">• harvest stopped• supervisor notified• wound cleaned, bandaged, and gloved• Bloody produce thrown out	Same day	<i>Jane Smith</i>



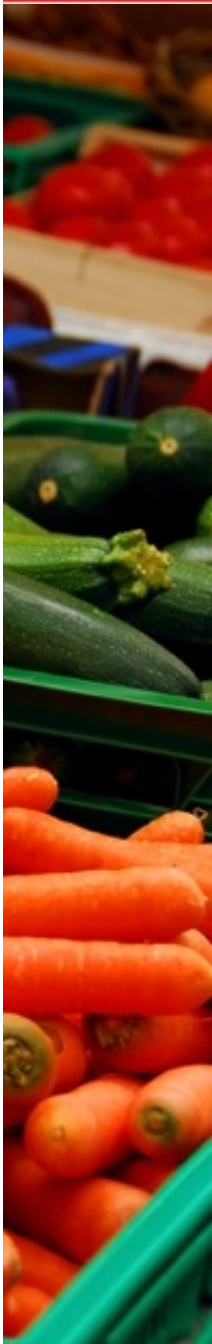
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PRODUCE STORAGE, TRANSPORT AND TRACEABILITY



PRODUCE STORAGE, TRANSPORT AND TRACEABILITY

- Produce Storage Guidelines
- Produce Transport Guidelines
- Traceability
 - One Step Forward - One Step Backward Approach
 - Documentation Guidelines for Traceability
 - Establish a Coding System to Assist With Traceability
 - Methods of Keeping Track of Produce
 - › Conducting A Mock Recall





Produce Storage Guidelines

- Produce should be stored at **40 F or below** within 2 hours of harvesting
- Maintain temperature throughout the storage unit
- Verify temperature using an appliance thermometer
- Store produce in clean and sanitized containers
- Store containers off of the ground and away from the wall





Produce Transport Guidelines

- Inspect all vehicles prior to loading produce for:
 - peeling paint and rust
 - broken glass
 - leaking oil, gas or other fluids
 - foul odors
- Cover produce to prevent cross-contamination (or put in closed containers)





Produce Transport Guidelines

- Do not haul produce in vehicles used to haul:
 - compost or manure
 - animals
 - pesticides or other chemicals
- For refrigerated vehicles:
 - monitor temperature and humidity
 - inspect air conditioner





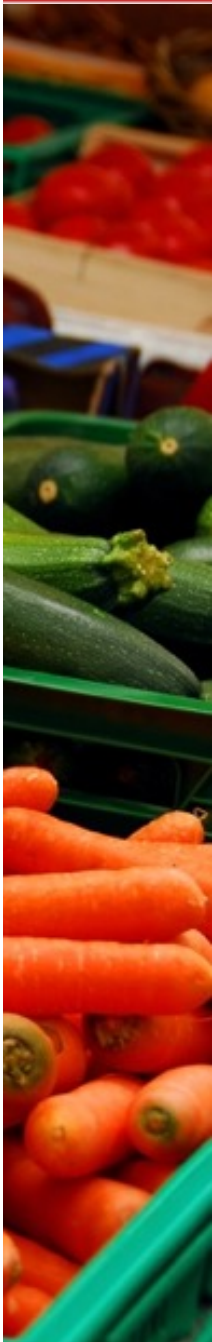
Traceability

- Why Traceability?
 - Provides greater visibility into a supply chain, thereby helping to be better prepared if something goes wrong.
 - Improves response time by all stakeholders if something does go wrong.



One Step Forward - One Step Backward Approach

- One step forward
 - Tracks when the product leaves the farm and where it goes
- One step backward
 - Tracks where the product was grown and when it was harvested





Documentation Guidelines for Traceability

- **One step forward**
 - **What** type of produce left the farm
 - **Date** produce left the farm
 - **Amount** of produce that left the farm
 - **Where** the produce went





Documentation Guidelines for Traceability

- **One step backward**
 - **What** was harvested
 - Harvest **date**
 - **Where (field)** the product was harvested
 - **Who** harvested the product





Establish a Coding System to Assist With Traceability

- Assign a number/letter to:
 - Produce (type and variety)
 - Field
 - Worker

Crop Number	Variety	Field	Worker ID
Apples = 01	“Honeycrisp” = 5	A1	9981, 6551
	“Golden Delicious” = 4	A2	7431
Blueberries = 02	“Aurora” = 1	B1	4421
	“Bluejay” = 2	B4	9981
Strawberries = 09	“Diamante” = 3	C2	2178



Methods of Keeping Track of Produce

- Containers or produce can be labeled
 - Barcoding
 - Stamps
 - Labels/tags
- Receipts (i.e. bill of landing)
- Grower/consignor numbers





Conduct A Mock Recall

- Required for USDA GAPs food safety audit
- A mock recall demonstrates the effectiveness of your traceability system
- Contact buyer and indicate that you are conducting a mock recall
- Provide buyer with **ALL** information on the produce that you are recalling





Conduct A Mock Recall

- Ask buyer for the following information:
 - How much product is remaining on location
 - How much was sold
 - How much was destroyed
- Record date and time of mock recall



GAPs Training Evaluation

The educators would like to hand out a GAPs Training evaluation. The purpose of this study is to evaluate the effectiveness of the GAPs Training course. Participation is voluntary and anonymous. You may attend the GAPs training and refuse to participate in this study without penalty. By taking this survey you are giving your consent for the OSU Fruit and Vegetable Safety Team to use the results to secure future funding for GAPs education, possible extension publications and to assist Extension Educators in improving the course. Thank you for your time and assistance.



Thank You!

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