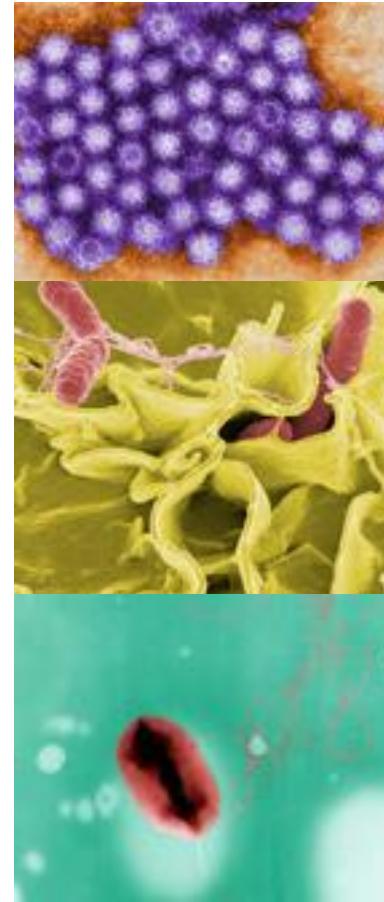


# 2022 AgrAbility National Training Workshop

## Food Safety Education Needs of Indiana Military Veteran Farmers

Betty Feng  
Purdue University

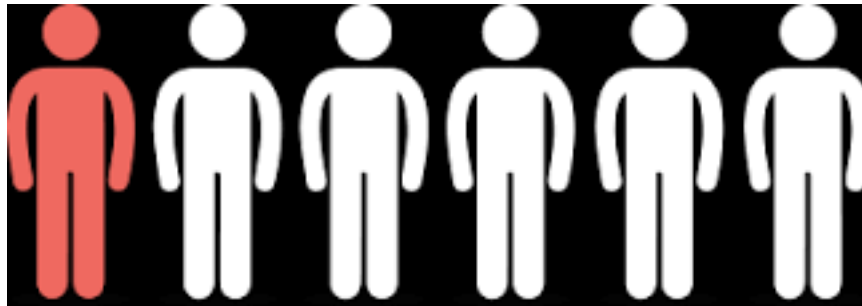
# Why it is important?



Images: ANR, CDC

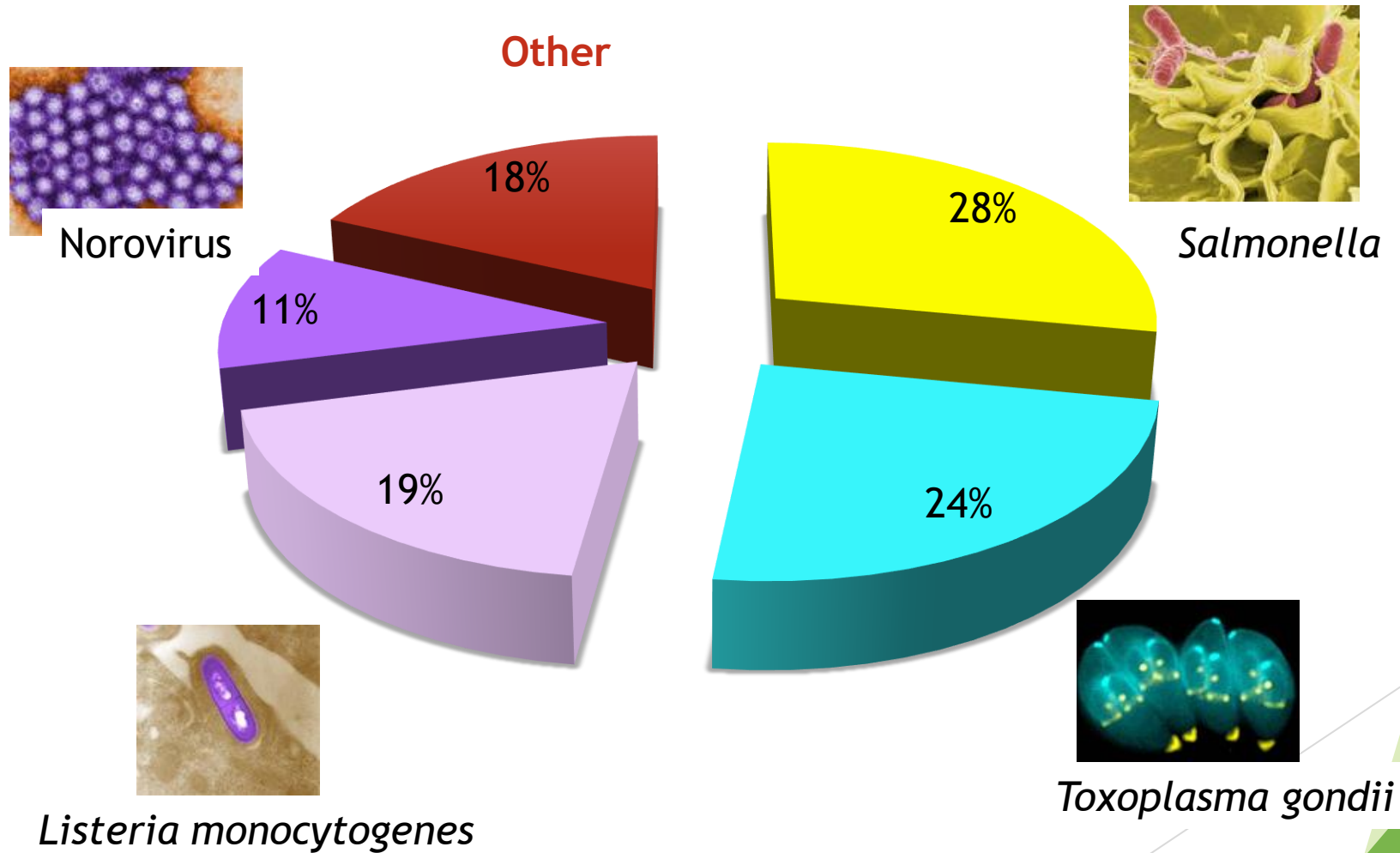
# CDC estimates that each year

- ▶ 1 in 6 Americans (or 48 million people) get sick,
- ▶ 128,000 are hospitalized,
- ▶ 3,000 die of foodborne diseases.



# Major Pathogens -

## Estimated Deaths: 1,400/year



# Botulism 2014

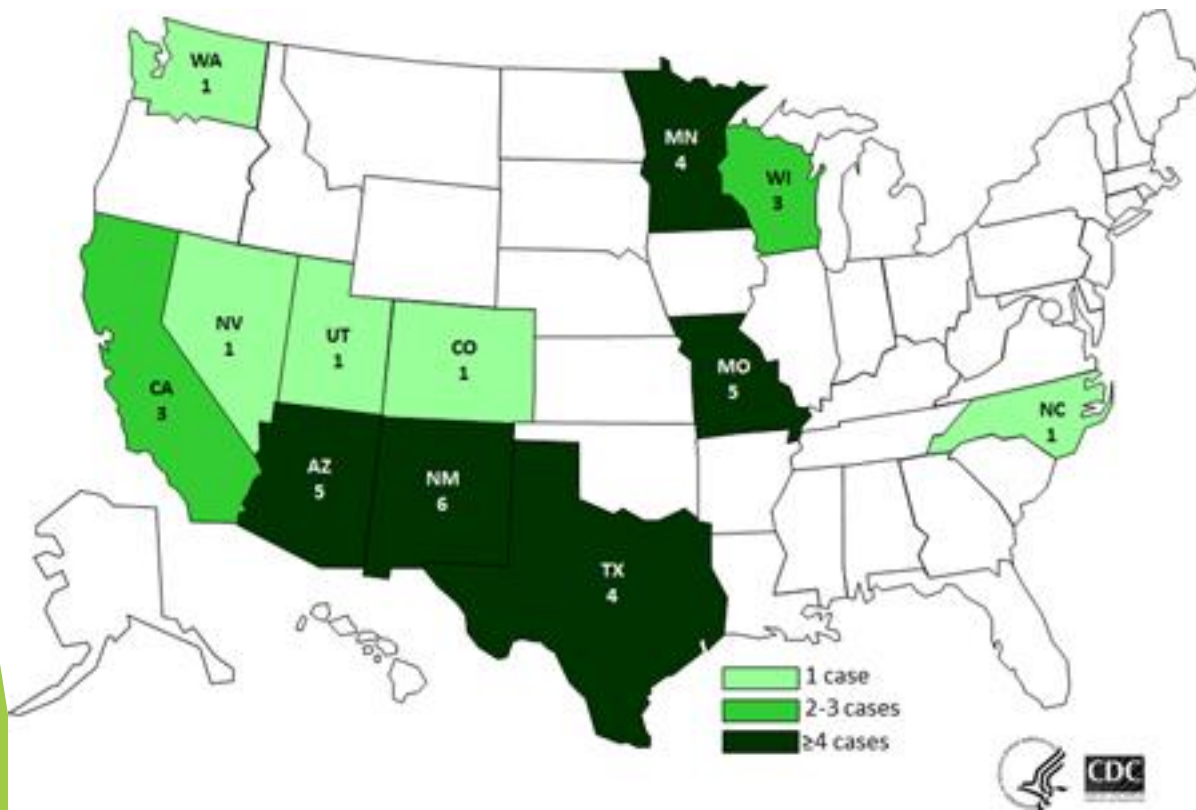
- ▶ Pesto sold farm stand “on and off for several years”
  - ▶ Father of bought 7 jars on a trip
  - ▶ Gave to friends in Colorado and daughter in Ohio
- ▶ 2 cases botulism in Ohio (daughter and friend in their 20s)
  - ▶ chicken pasta salad made with pesto sauce
  - ▶ Hospitalized and on ventilators
- ▶ **Unlicensed California facility (Napa)**
  - ▶ Inadequate process (pH 5.3 and water activity 0.965)
  - ▶ Inadequate label (incomplete ingredient statement, no lot code, best buy date, or a “Perishable Keep Refrigerated”)
- ▶ CDPH FDB described the manufacturing process to be conducted under “insanitary conditions at a home residence”.





# Listeria 2015

- ▶ 7 death, 34 hospitalized



# Listeriosis Linked to Soft Raw Milk Cheese 2017

- ▶ *Listeria monocytogenes* associated with raw milk cheese
- ▶ 8 people became ill, 8 hospitalized, 2 deaths

## Vulto Creamery shut down because owner did not 'understand'

By [Dan Flynn](#) on April 2, 2018

A federal court has shut down the Walton, NY, creamery that last year was the source of a multistate listeriosis outbreak that infected eight people in four states with listeriosis, resulting in two deaths.



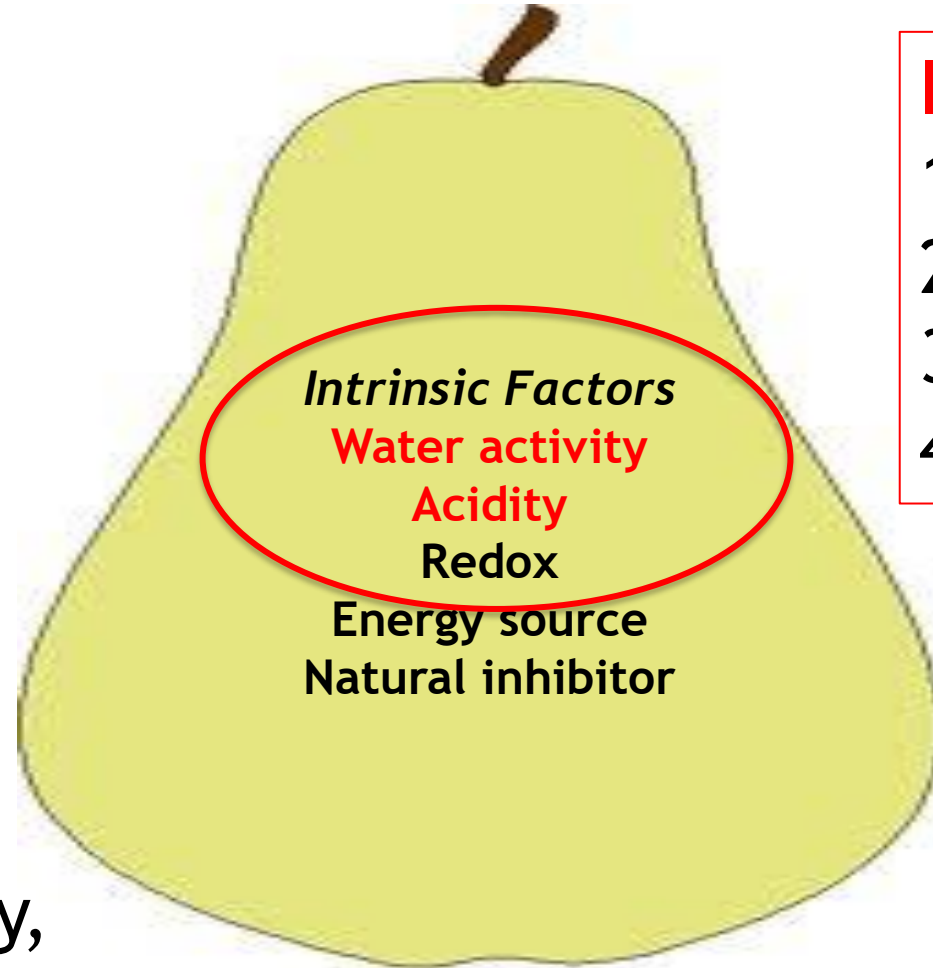
In a civil action, U.S. District Court Judge Brenda Sannes permanently enjoined Vulto Creamery LLC and its owner Johannes H. Vulto from any further manufacturing or distribution of food. The U.S. Food and Drug



# The Food System

## *Extrinsic Factors: Storage Conditions*

temperature, atmosphere, relative humidity



### Interplay of:

- 1) Intrinsic factors
- 2) Extrinsic factors
- 3) Processing
- 4) Packaging

**Packaging**  
atmosphere,  
relative humidity,  
physical protection

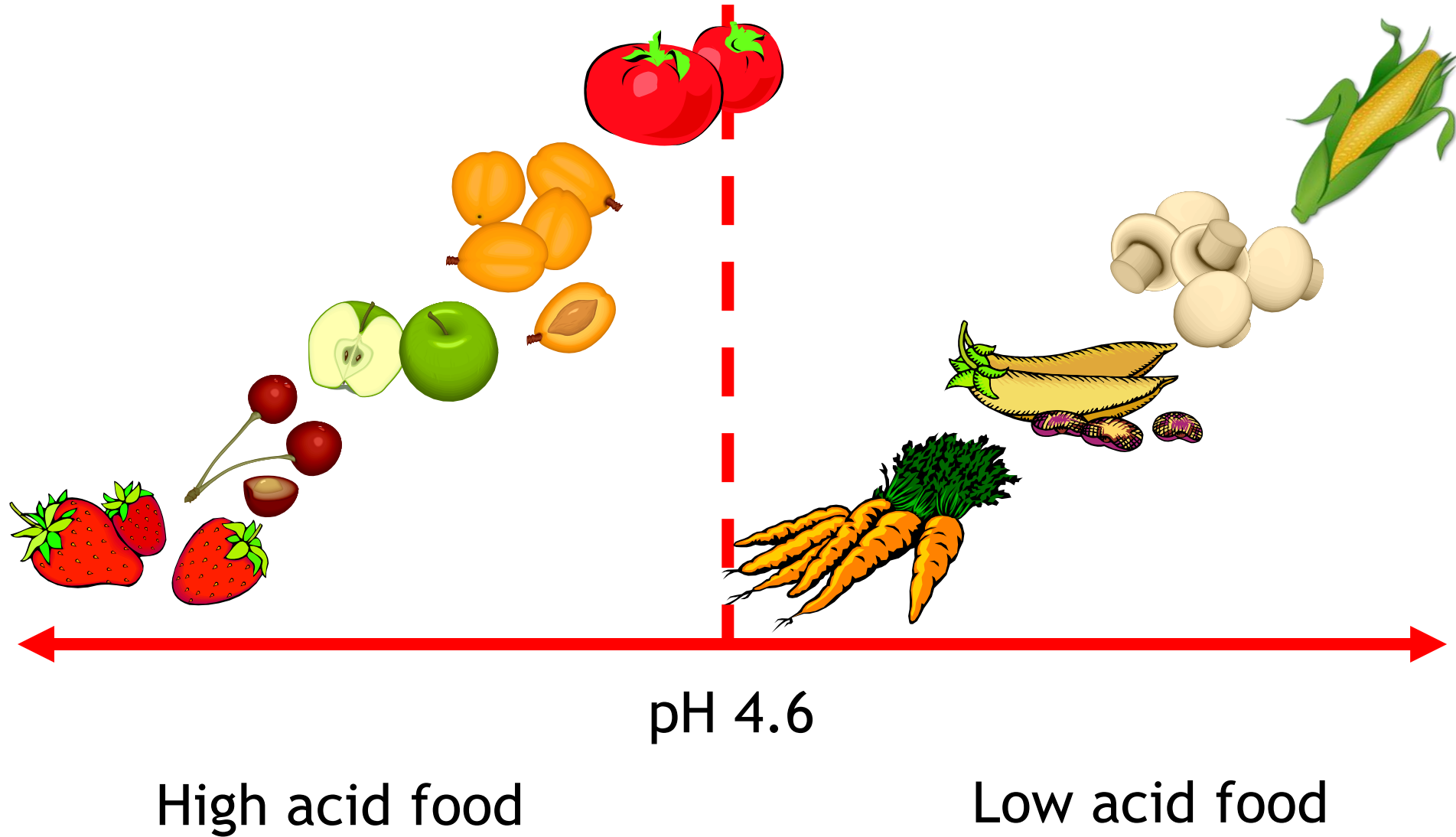
**Processing**  
Physical-heat  
Chemical -  
acid, or other  
preservatives,  
fermentation



# ~Water Activity ( $A_w$ ) of Some Foods

Food	~Water Activity	Microbial Growth Limits
Fresh meat, milk, fruits, vegetables	>0.95	Most microorganisms grow
Cheese spread	0.95	Some bacteria inhibited
10% salt	0.93	<i>Clostridium botulinum</i> inhibited
Fudge sauce	0.85	All growth of pathogenic bacteria growth inhibited
Soft moist pet food	0.83	Some yeasts inhibited
Peanut butter (15% total moisture)	0.70	
Milk powder (8% total moisture)	0.70	
Jam	0.65	Most yeasts and molds inhibited

# pH and Food Processing



# Background

- ❖ Nearly 400,000 military veteran farmers in the U.S.
- ❖ Farming helps veterans to transit back to civilian life
- ❖ Veteran farmers have low participation rate in normal education programs

# Study Objectives

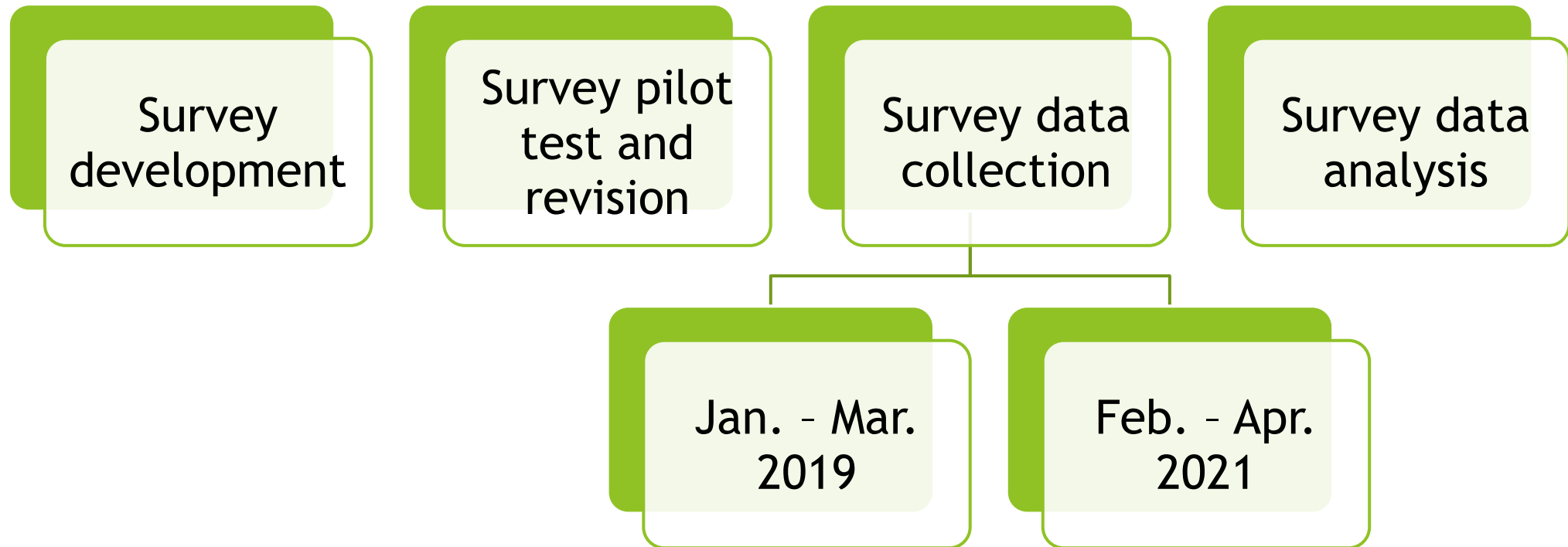


Assess veteran farmers' food safety attitudes, knowledge and practices



Identify their barriers to and needs in food safety education

# Methods



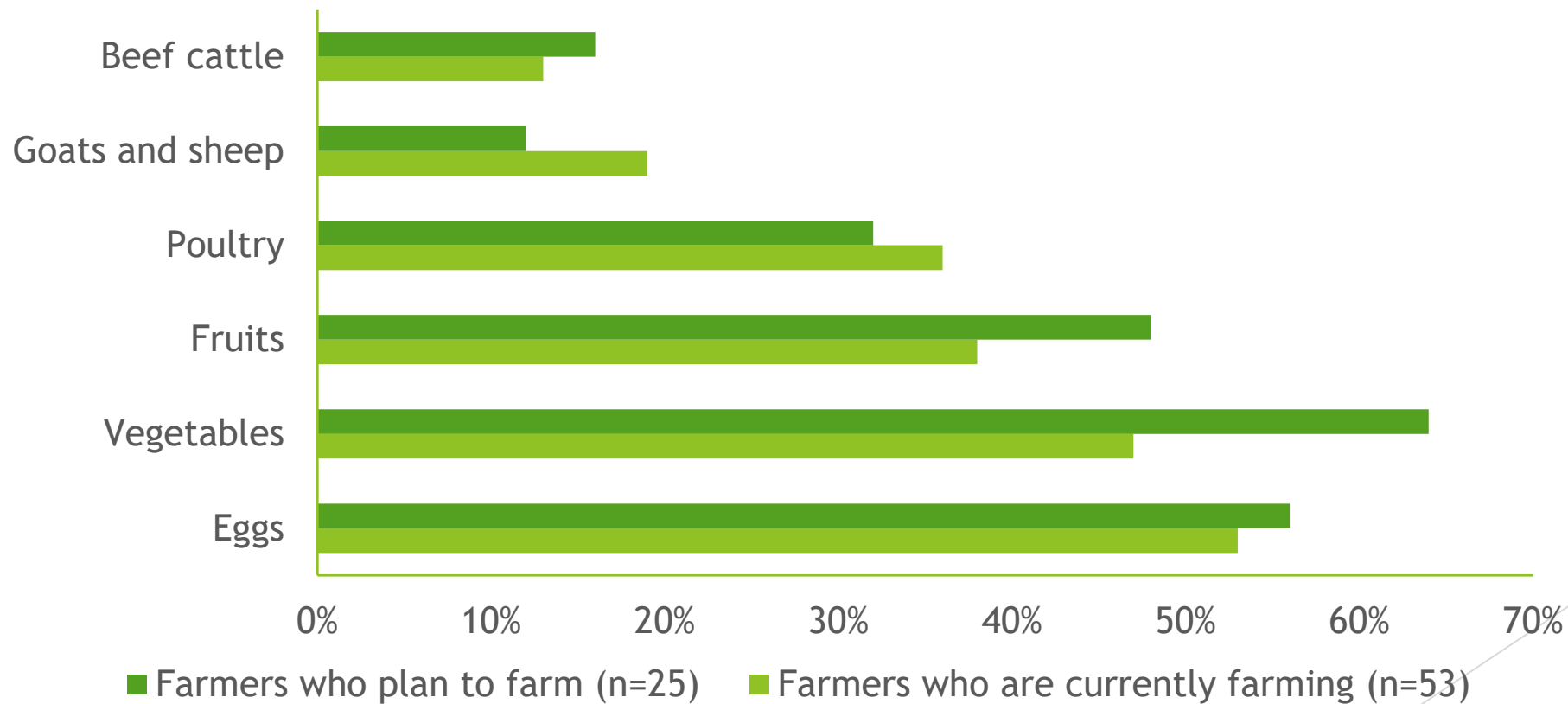


# Demographic characteristics

- ▶ 78 Indiana military veteran farmers participated
  - ❖ 82% male
  - ❖ 82% Caucasian
  - ❖ 71% aged 39 and above
  - ❖ 60% had bachelor's degree and above

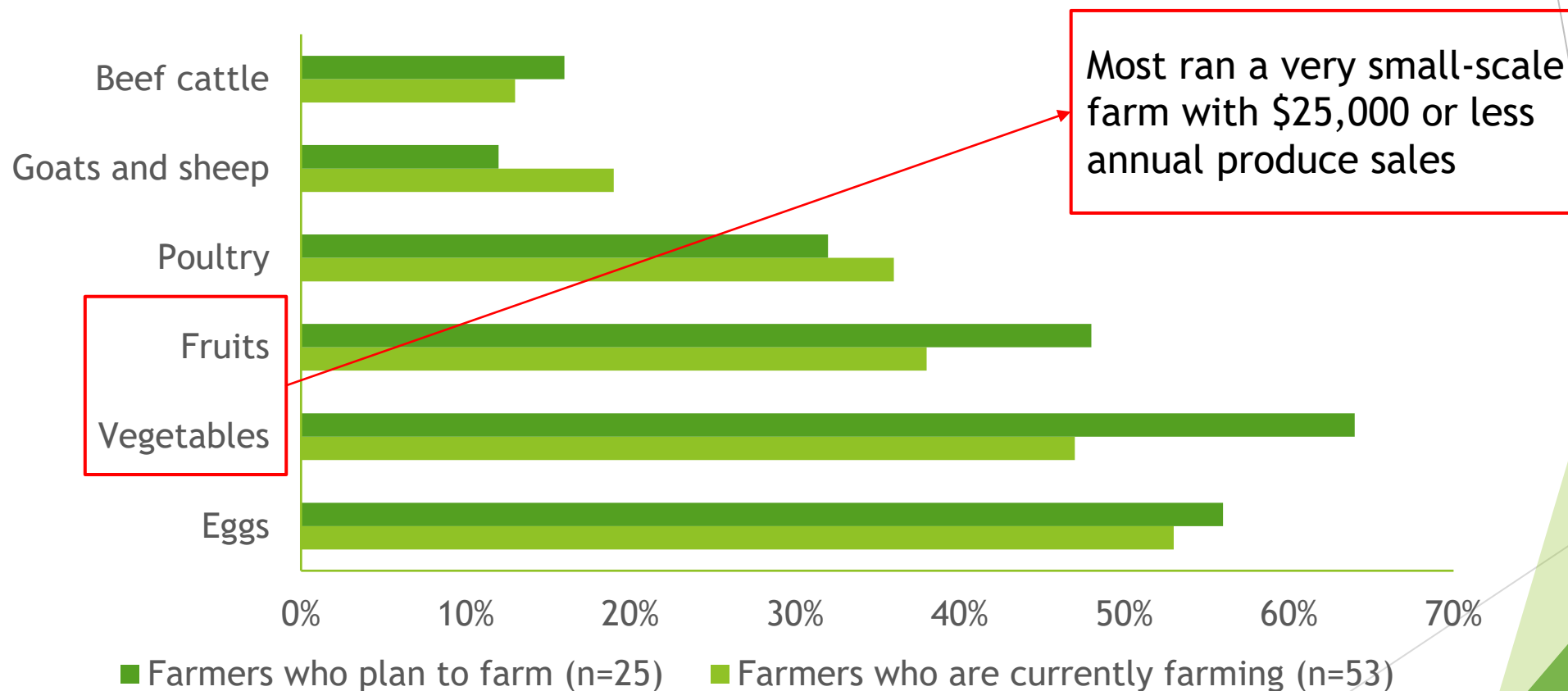
# Farming backgrounds

- Most (68%) had at least 1 year of farming experiences



# Farming backgrounds

- Most (68%) had at least 1 year of farming experiences



# Veteran farmers were aware of the importance of food safety

Statement	Mean Score $\pm$ SD (Strongly disagree = 1, strongly agree = 5)
Getting information from reputable sources is important to you.	4.79 $\pm$ 0.52 <sup>a</sup>
Being knowledgeable in food safety is important to you.	4.39 $\pm$ 0.81 <sup>b</sup>
Food safety on your farm is a top priority for you	4.13 $\pm$ 0.94 <sup>c</sup>
Outside inspections or third-party audits are an important aspect of food safety	3.75 $\pm$ 0.91 <sup>d</sup>

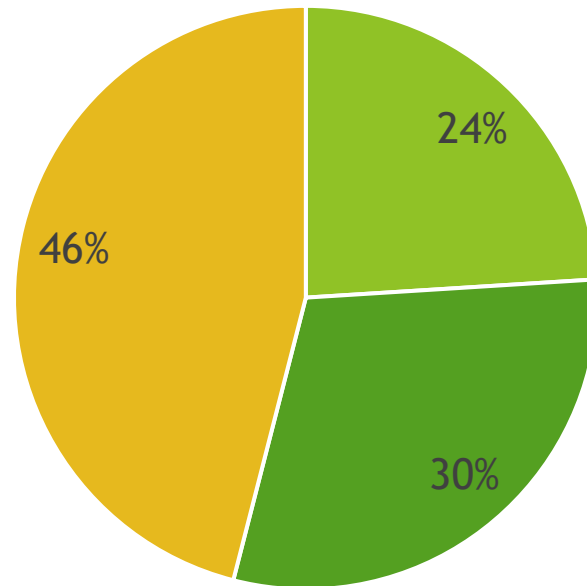
Note: Superscript a, b, c, and d indicate that the difference between the mean scores on the statements is statistically significant at the significant level of 0.05.



Many veteran farmers who grew fruits and vegetables failed to follow the recommended on-farm food safety practices

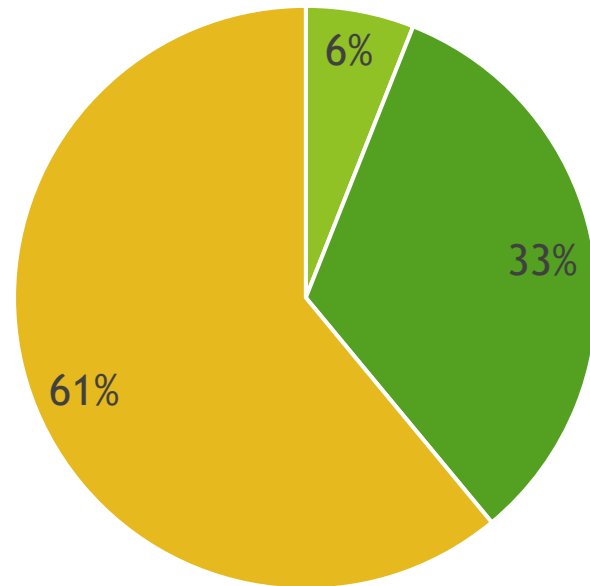


# Collect water samples for safety testing (like microbial test)



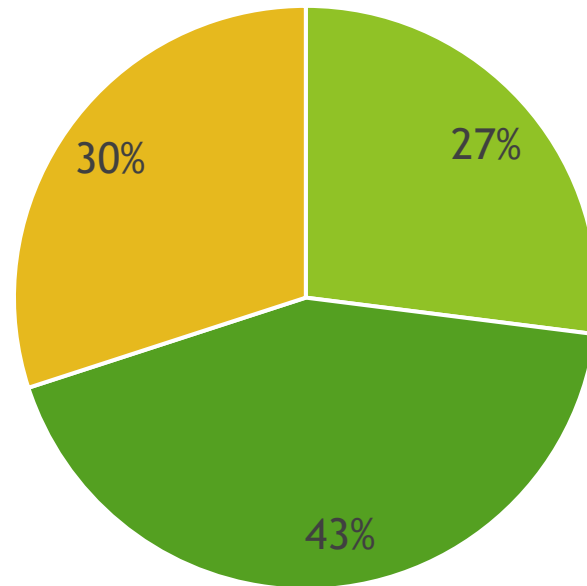
■ Yes    ■ No, I don't think it's necessary    ■ No, I don't know how to do it

# Have actions when field is contaminated with dirty water



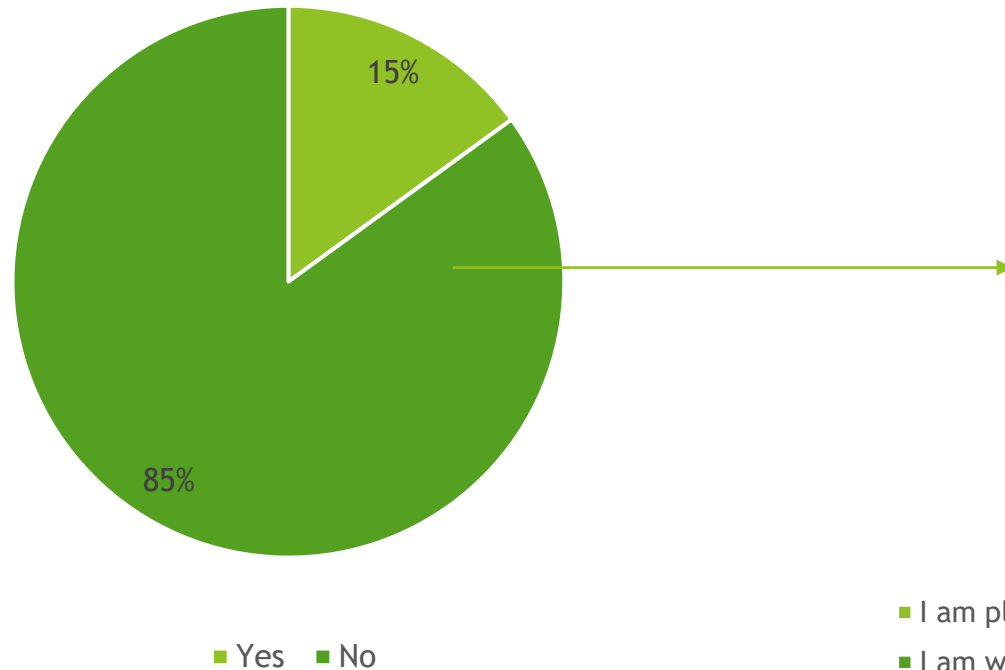
■ Yes    ■ No, I don't think it's necessary    ■ No, I don't know how to do it

# Have actions to prevent wild animals from entering the field

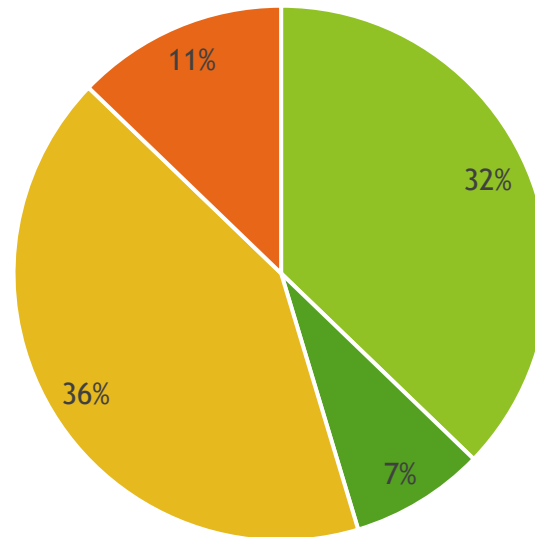


■ Yes   ■ No, I don't think it's necessary   ■ No, I don't know how to do it

# Have a food safety plan

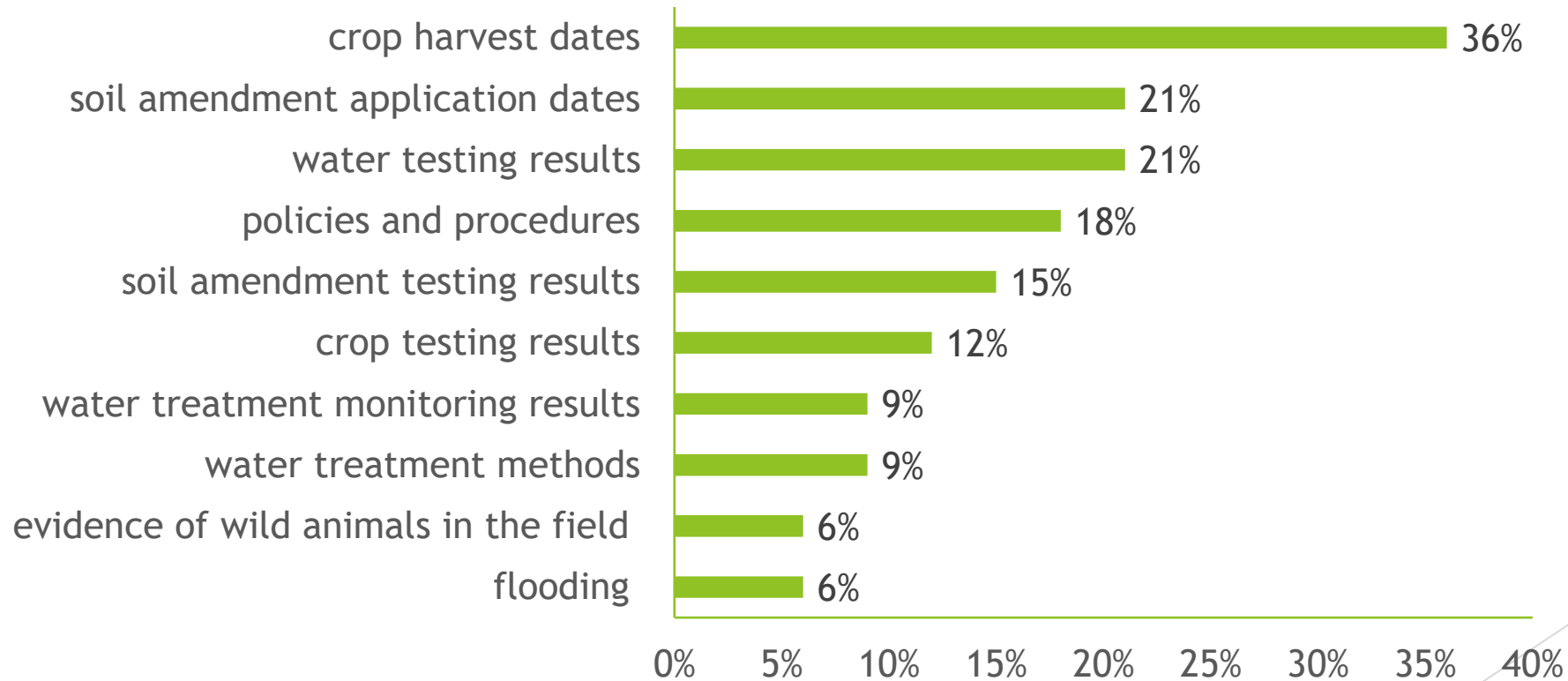


## Among growers who did not have a food safety plan



- I am planning on making one
- I am working on creating one
- I do not plan on making one, because I don't know how to make one
- I do not plan on making one, because I don't think it's necessary

# Self-reported recording-keeping practices of fruits and vegetable growers





# Barriers to food safety education

- ▶ Only 30% of the veteran farmers who were farming had prior food safety training experiences
- ▶ Top two barriers to food safety education:

## Limited time to learn (45%)

- Intense farm works
- Lack labors



## An overwhelming amount of information (32%)

- “One-size-fits-all” educational resources does not work well



# Future food safety education needs

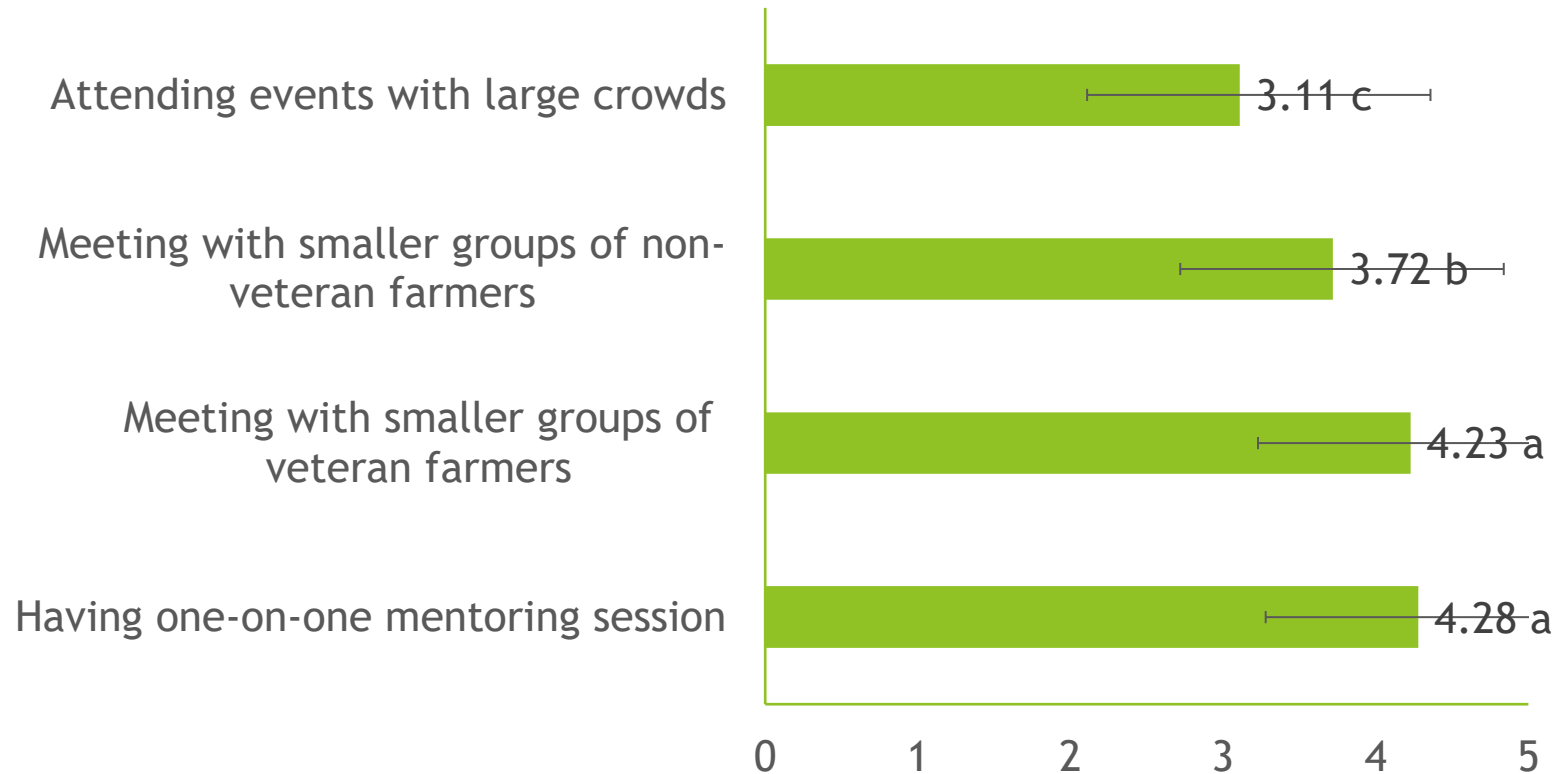
## Needs of food safety information:

- Soil amendments (55%)
- Agricultural water (54%)
- Post-harvest handling and sanitation (50%)

## Preferred education delivery formats:

- Electronic newsletters (59%)
- In-person workshops (55%)

# Veteran farmers' self-reported comfort level of attending events



Note: Extremely uncomfortable = 1, extremely comfortable = 5.

Superscript a, b, c, and d indicate that the difference between the mean scores on the statements is statistically significant at the significant level of 0.05.

# Veteran farmers' experiences with county extension office

- ▶ Over half of the veteran farmers (61%) did not receive advice from the county extension office before.
  - ❖ Reasons included:
    - ❖ Not familiar with the extension systems
    - ❖ Haven't had a questions to ask
    - ❖ Contacted the office, but didn't receive useful advice
- ▶ Many veteran farmers expected food safety educators to provide:
  - ❖ On-farm visits (51%)
  - ❖ Video-based extension presentations (46%)

# Examples of previous interactions with veteran farmers



On-farm workshop with the combination of farm tour and lecture



# Examples of previous interactions with veteran farmers



Canning workshop with the combination of hands-on canning activity and lecture

# Examples of previous interactions with veteran farmers



Learning circle for veteran farmers

# Examples of previous interactions with veteran farmers

## Agricultural Water

*Han Chen and Yaohua Feng*

### What is agricultural water?

Agricultural water is the water used during production and postharvest handling that contacts or is likely to come in contact with produce or food-contact surfaces. The water can be classified as production water and postharvest water. Production water refers to the water used in contact with produce during growth, including irrigation water directly applied, fertigation, crop sprays, frost protection, and growing sprouts. Postharvest water refers to the water used during and after harvest (packing and holding), including rinsing/washing, ice making, preventing dehydration, cleaning and sanitizing.



## Indiana Home-based Vendor Law

*Han Chen and Yaohua Feng*

### What is the home-based vendor law?

Food establishments refer to any open or enclosed areas, including building, room, basement, that used to handle foods that sold to the public, which are regulated under the Indiana Code (IC) 16-42-5. In 2009, House Enrolled Act (HEA) 1309 passed by Indiana Legislature provided the exceptions to the regulations that apply to food establishments for the home-based vendors (HBV). Although the home-based vendors are exempt from some regulations, they still need to follow the requirements and rules that refer to the Indiana home-based vendor law.



### What are the requirements for home-based vendors?

## Monthly electronic newsletters

# Next Steps

- From a statewide program to a multi-state program
- From knowledge change to behavior change
- From in-person learning circles to virtual learning circles

More to come at

<https://extension.purdue.edu/food-safety-for-military-veteran-farmers/>



Food Science



# Acknowledgement

- ▶ Collaborators: Cindy Chastain and Sara Creech
- ▶ This project was supported by USDA NIFA Food Safety Outreach Program 2018-70020-28851, 2020-70020-33029, Hatch S1077-1016049, Indiana State Department of Agriculture A337-19-SCBG-18-006.

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