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Integrated Pest Management (IPM) Evaluation Training

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USDA United States Department of Agriculture National Institute of Food and Agriculture

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What is IPM?

* Integrated Pest Management (IPM) is a sustainable, science-based, decision-making process that combines biological, cultural, physical and chemical tools to identify, manage and reduce risk from pests and pest management tools and strategies in a way that minimizes overall economic, health and environmental risks.

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What is Evaluation?

"Evaluation is a systematic process to determine merit, worth, value or significance."

-American Evaluation Association

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How do we evaluate Extension IPM activities and Programs?

Course 1: Quantitative approaches

Course 2: Qualitative approaches

Course 3: Using secondary data sources

- USDA NASS Chemical Use Survey
- Pesticide Risk Tool

Course 4: Summarizing Results/Impact Statements

Overview of Evaluation Training

* Goals, challenges, purposes, and stakeholders frequently associated with evaluating Extension IPM activities and programs
* Review logic models

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Crop Protection and Pest Management Logic Model

Inputs	Outputs: Participants	Outputs: Activities/Products	Outcomes/Impacts: Change in Knowledge (Short Term)	Outcomes/Impacts: Change in Actions/Behavior (Medium Term)	Outcomes/Impacts: Change in Condition (Long Term)
Legislative authority Annual appropriation USDA involvement NIFA intra-agency coordination Multi-state projects Program directors Support staff Panel Managers Peer Review Panels Stakeholder and partner comments	Stakeholders Commodity associations Public interest groups Farmers Ranchers General public NGOs End Users or Consumers Underserved individuals or communities Land-grant university partners Cooperative Extension Research, teaching and extension faculty State agencies Federal agencies USDA-NIFA Other allied state and federal agencies Regional IPM stakeholders Extension Networks NGOs Public interest groups	Respond to Congressional authorization and appropriation Publish RFA Recruit panel managers and peer review panelists Conduct peer review panel meetings Award funds to meritorious applications Support IPM research to address priority IPM needs Promote collaborative team building through national and regional coordination meetings and activities and broad-based stakeholder participation Promote the development and implementation of IPM by facilitating coordination and collaboration across states, disciplines, and programs Establish and maintain pest management information networks Build partnerships and address challenges and opportunities Develop notable IPM training programs and foster their sustainability Review and evaluate impacts of IPM implementation and communicate successes Communicate positive outcomes to key stakeholders Manage funding resources effectively Collect program impact data	Increase knowledge and implementation of new IPM tools and tactics in integrated strategies for IPM Adapt existing science based IPM knowledge to new pest scenarios and foster sound IPM solutions Engage broadest possible IPM scientific, extension, and education communities in challenges faced by IPM Engage new stakeholder communities challenged by pest issues who could benefit from IPM Facilitate production of audience-appropriate information/training materials including mobile, web-based, and other digital, as well as traditional formats Facilitate communication among the scientific IPM community and among the research, teaching and extension communities, practitioners, stakeholders, and consumers in a proactive communication strategy Facilitate production of original materials and collaboration with existing or new Extension networks	Innovative and diversified IPM systems are adopted on an area-wide or landscape scale Key information systems, networks, and decision-support tools are adopted for emerging and high-consequence pests and diseases Enhanced coordination and responsiveness of IPM research, education, and extension effort for critical, priority pest management and food security challenges New stakeholders are using IPM; Stakeholders are using more advanced IPM best management practices Producers and processors adopt newly developed IPM technologies and innovations Regional and national trans-disciplinary systems approaches are being used to solve IPM problems A new generation of research and extension scientists capable of and adept at working in effective, trans-disciplinary regional and national teams are in place Networks improve information flow among IPM components, among stakeholders, and among IPM research, education, and extension communities Stakeholders can document why IPM was beneficial for them and the environment	Crop protection systems are more profitable with IPM Agricultural production increased through reduced pest and disease losses Cost benefit ratios of adopting IPM practices are improved Sustainable IPM practices are adopted Human health and environmental risks from managing pests are reduced U.S. food producers are more competitive globally Global capacity to meet growing food demand improved Safe, affordable, and high-quality crops are widely available to consumers Hunger is reduced through improved food security in vulnerable populations Effective, affordable, and environmentally-sound IPM strategies are in place to reduce economic, environmental, and societal losses from pests and diseases that affect crops and livestock, human well-being, and community vitality Coordinated state-based, region-wide, and national research, education, and extension programs function as catalysts for promoting further development and use of new IPM approaches

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Crop Protection and Pest Management Logic Model

Outcomes/Impacts: Change in Knowledge (Short Term)	Outcomes/Impacts: Change in Actions/Behavior (Medium Term)	Outcomes/Impacts: Change in Condition (Long Term)
Increase knowledge and implementation of new IPM tools and tactics in integrated strategies for IPM	Innovative and diversified IPM systems are adopted on an area-wide or landscape scale	Crop protection systems are more profitable with IPM
Adapt existing science based IPM knowledge to new pest scenarios and foster sound IPM solutions	Key information systems, networks, and decision-support tools are adopted for emerging and high-consequence pests and diseases	Agricultural production increased through reduced pest and disease losses
Engage broadest possible IPM scientific, extension, and education communities in challenges faced by IPM	Enhanced coordination and responsiveness of IPM research, education, and extension effort for critical, priority pest management and food security challenges	Cost benefit ratios of adopting IPM practices are improved
Engage new stakeholder communities challenged by pest issues who could benefit from IPM	New stakeholders are using IPM; Stakeholders are using more advanced IPM best management practices	Sustainable IPM practices are adopted
Facilitate production of audience-appropriate information/training materials including mobile, web-based, and other digital, as well as traditional formats	Producers and processors adopt newly developed IPM technologies and innovations	Human health and environmental risks from managing pests are reduced
Facilitate communication among the scientific IPM community and among the research, teaching and extension communities, practitioners, stakeholders, and consumers in a proactive communication strategy	Regional and national trans-disciplinary systems approaches are being used to solve IPM problems	U.S. food producers are more competitive globally
Facilitate production of original materials and collaboration with existing or new Extension networks	A new generation of research and extension scientists capable of and adept at working in effective, trans-disciplinary regional and national teams are in place	Global capacity to meet growing food demand improved
	Networks improve information flow among IPM components, among stakeholders, and among IPM research, education, and extension communities	Safe, affordable, and high-quality crops are widely available to consumers
	Stakeholders can document why IPM was beneficial for them and the environment	Hunger is reduced through improved food security in vulnerable populations
		Effective, affordable, and environmentally-sound IPM strategies are in place to reduce economic, environmental, and societal losses from pests and diseases that affect crops and livestock, human well-being, and community vitality
		Coordinated state-based, region-wide, and national research, education, and extension programs function as catalysts for promoting further development and use of new IPM approaches

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Measuring IPM Performance: Getting Started

* Outline a 3-step process for planning an effective IPM evaluation
* Introduce some basic evaluation terminology
* Describe how the "Logic Model" relates to evaluation planning
* Provide references and links to relevant resources that provide more detailed information

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How do we evaluate?

* IPM adoption?
* Economic benefits of IPM?
* Human Health benefits?
* Environmental benefits?

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How do we evaluate?

* Communication of IPM?

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Evaluation Goals?

- **K**nowledge
- **A**ttitudes
- **S**kills
- **A**spirations

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Evaluation Goals?

* What should we measure?
* How will we use this information?
* Will the questions we asked help us reach our evaluation goals?

➢ Keep it honed.

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Measuring IPM Performance: Economic and Environmental Benefits

* Adoption of IPM Practices
* Impacts and Outcomes of IPM Adoption
* Economic, Environmental or Health Benefits
* Public Awareness
* Training and Technology

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Measuring IPM Performance: Human Health Benefits

* Pesticide Exposure
  * Consumers
  * Pesticide applicators
  * Residents
* Human Health Impacts

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Measuring IPM Performance: Environmental Benefits

* Endemic Pest Control
* Invasive Species Damage and Invasion
* Contaminants
* Environmental Health Improvements

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University of California

IPM Impacts Assessment - Western and Regional IPM Centers

Module 1: Getting Started with IPM Evaluation Planning
Module 2: Surveys
Module 3: Economic Analyses
Module 4: Focus Groups
Module 5: Secondary Data
Module 6: Case Study
Module 7: Interviews
Module 8: Social Network Analysis
Module 9: Impact Statements

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Surveys

1. Determine if a survey is appropriate
2. Planning for and designing a survey
3. Obtaining institutional approval
4. Piloting a survey
5. Administering a survey
6. Analyzing data
7. Reporting results

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Surveys

* Pesticide use
* Scouting or monitoring practices
* Sources of information that growers use to make decisions
* Participation in partnerships and networks
* Characteristics of farms or farmers (e.g. # farm acres, # of years farming)
* Characteristics of facility managers or facilities (# occupants, # type of facility manager)

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Surveys

* Surveys
* “IPM Adoption and Impacts in the United States”
* David Lane, Tegan Walker, and Deb Grantham
* *Journal of IPM (2023)*

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IPM Adoption Perspectives from the Regions: Barriers and Recommendations

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Introduction

- Increased IPM adoption hinges not only on the future of innovative research, but also on the willingness of growers to adopt new IPM technologies.
- Adoption and diffusion of innovations can encounter many different challenges.
- By better understanding the barriers to IPM adoption, future research, extension, and education can better target behavior change.

Methods

- This study sought to better understand the barriers to IPM adoption from the perspective of state IPM coordinators via an online Qualtrics survey.
- These professionals have a statewide perspective of IPM adoption.

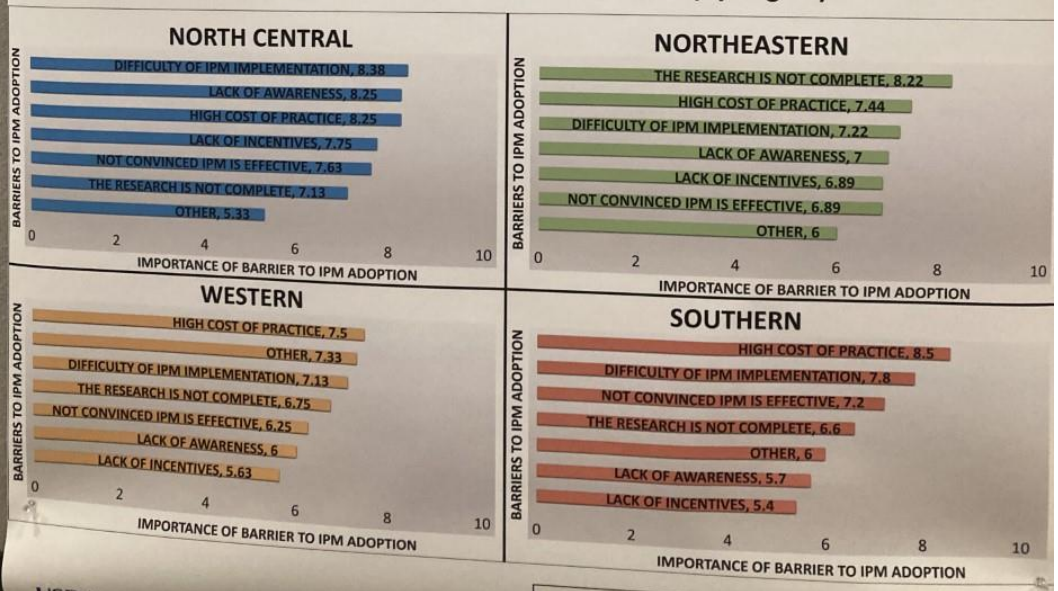
Results

- There were 37 completed surveys out of 56 email survey invitations, which equals a 66% response rate (88% with partially completed surveys).
- Overall, the participants ranked "high cost of practice" as the most critical barrier to IPM adoption.
- "Difficulty of implementation" and "lack of awareness" were also highly ranked as critical barriers to adoption.
- When asked about ways to increase IPM adoption, participants ranked "Improved cost-benefit analysis" as the most critically important.

Recommendations

- These findings demonstrate the importance of providing improved IPM economic cost-benefit analyses to accompany the promotion of new and existing IPM innovations.
- These data suggest the need for more comprehensive extension and education programs to address the perceived "high cost of practice," "difficulty of implementation," and "lack of awareness" because they are critical IPM adoption barriers.

IPM Adoption Barriers in the United States (By Region)



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Regional IPM
ipm 2012 Implementing IPM across Borders

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Economic Analyses

* Cost effectiveness analysis: evaluates which program or policy creates the desired result at the lowest cost.
* Cost-benefit analysis: compares the economic pros and cons of policies and programs to help decision-makers identify the best or most valuable options to pursue.
* Partial budget analysis: determines the net benefit by only examining the costs and gains that change for a program (e.g., using different pesticides or practices).

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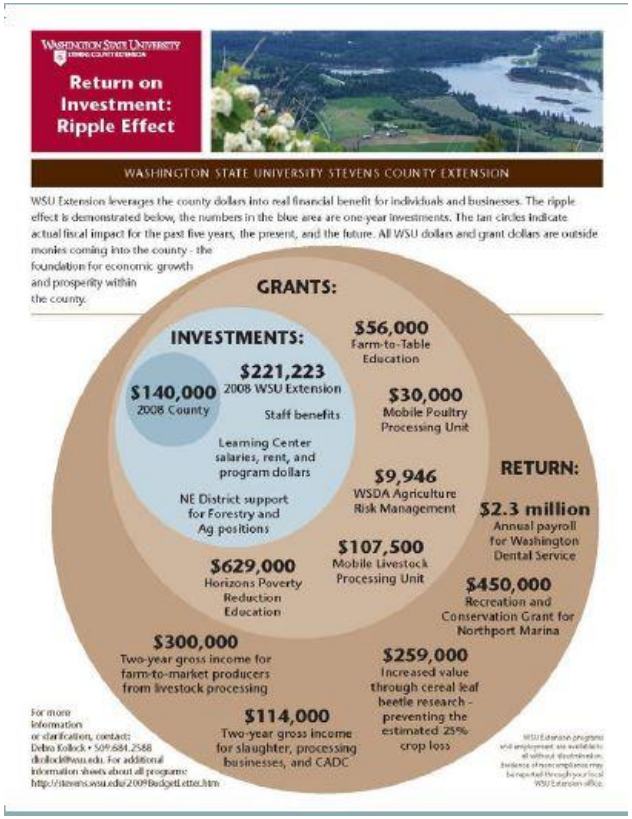
Quantitative Methods

Ripple Effects Mapping



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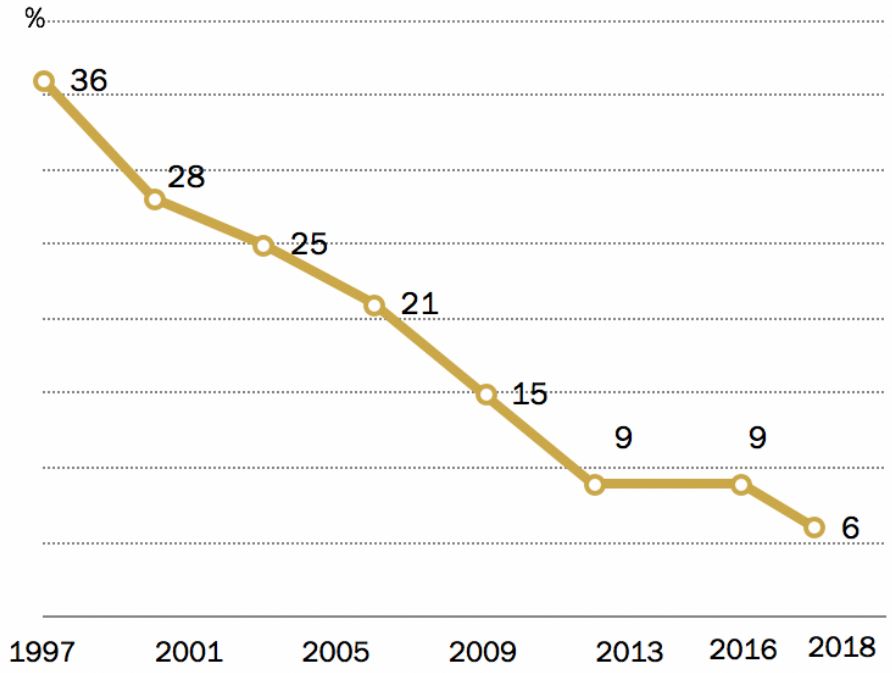
Why Polling on Zoom?

After brief plateau, telephone survey response rates have fallen again

Response rate by year (%)



Note: Response rate is AAPOR RR3. Only landlines sampled 1997-2006. Rates are typical for surveys conducted in each year.
Source: Pew Research Center telephone surveys conducted 1997-2018.

PEW RESEARCH CENTER

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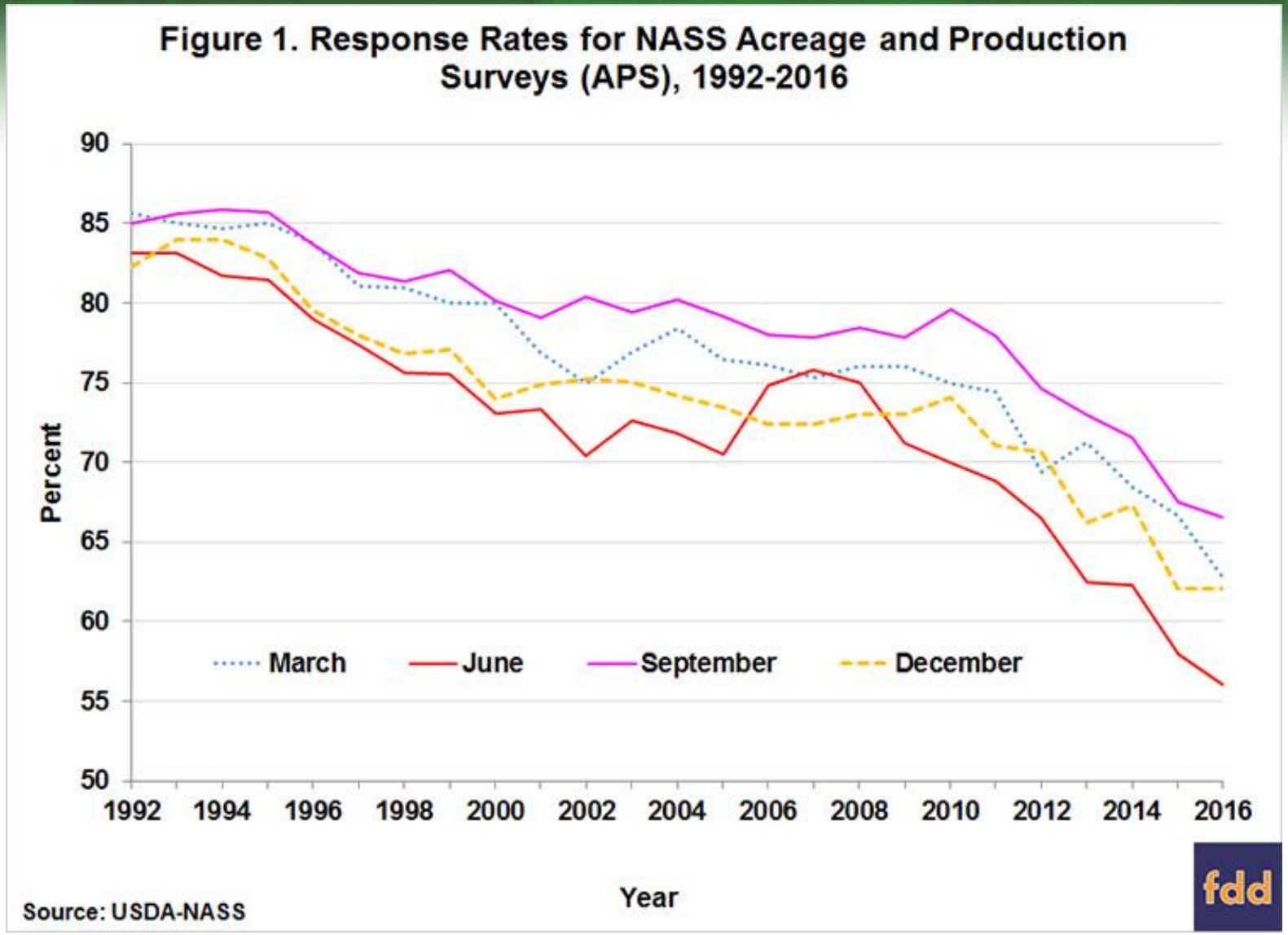
NASS is Better, but…



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Polling on Zoom

* Add polling question(s)
* Launch poll during meeting
* Share results if needed
* Download report

Scheduling a Webinar

Scheduling a Meeting

Zoom Polling and Breakout Rooms

* Open new tab in browser
* Log in to Zoom
* Turn on Polling and Breakout Rooms in Zoom Settings
* Schedule a meeting or webinar
* Add polling questions
* Make pre- and post-questions

Polling on Zoom

* Make a “Webinar Template” to replicate your polls.
* Zoom is working on creating “Polling Templates.”
* Create a “New Meeting” if you want to use Breakout Rooms also

Polling on Zoom

Polling on Zoom

* Let's discuss our polling questions in "Breakout Rooms"

Breakout Rooms

Zoom Reports

* Webinar Reports
* Meeting Reports

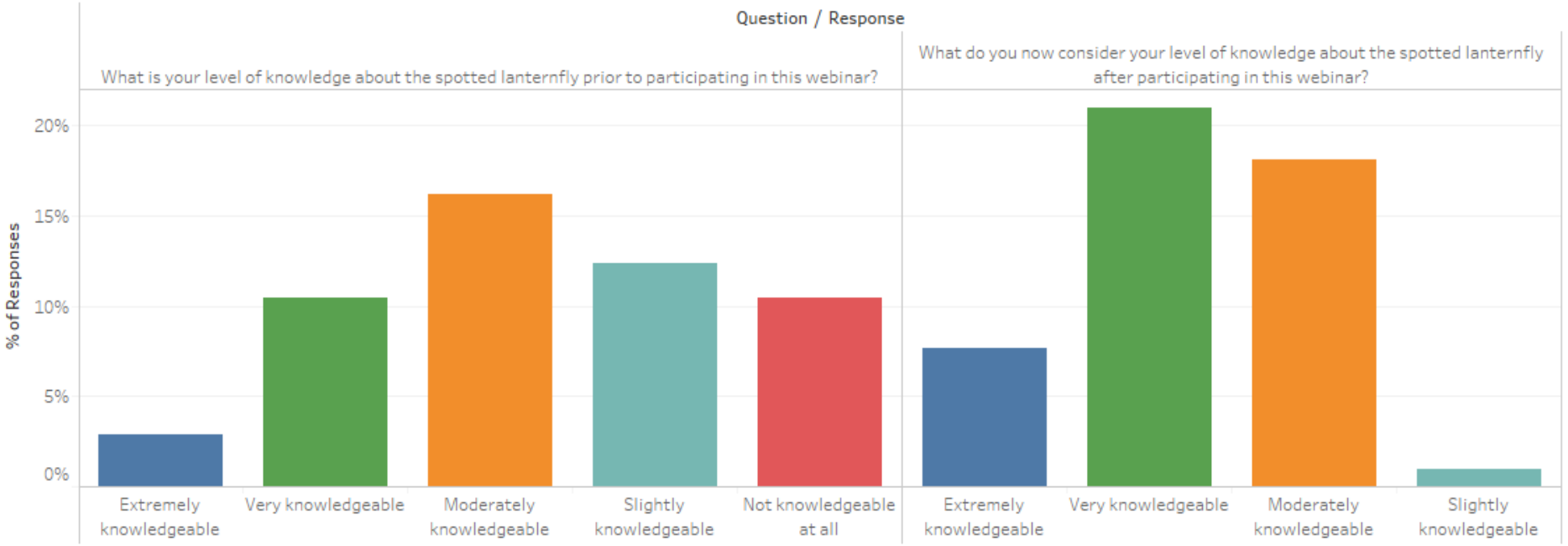
Polling on Zoom

Data Visualization

* Excel or Tableau Software (Recommended)
* Record your webinar

Data Visualization (Tableau)

Spotted Lanternfly Grape and Apple: Change in Perceived "Level of Knowledge"



Thanks and Questions

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