

Strategic Plan for the IPM Network




“There would be many more robust state IPM programs if their basic organization, functions, and benefits were understood and more universally accepted.” Leppla et al. 2009

Framing in Talk

- Focused on 53 state/territory IPM programs and 4 regional centers funded by USDA NIFA CPPM (Crop Protection and Pest Management) program.
- State IPM funds became competitive due to changes in the language in the 2008 Farm Bill. Prior to this, these funds through 3D programs; amounts for each state were determined based on pesticide sales.
- State/territory programs apply every 3 years and centers every 4 years.
- It has been impressive to maintain a network of IPM programs since funds became competitive.
- But we can always do things better; we want to learn from these last 16 years.



Strategic Plan

- Plans for an improved IPM Network capacity
- Established that IPM is still needed (e.g., )
- Groundwork for Growth
 - Identify what **assets** the IPM Network currently has
 - Infrastructure survey (manuscript #1 in progress; more to come?)
 - Recognize strengths, weaknesses and opportunities
- Next:
 - Review IPM Network or closely related entities/activities to start conversation about **goals** and **scope** for the IPM Network
 - Identify key **issues** for our program efforts



U.S. Agriculture is Vulnerable to Weeds, Diseases, Insects and Other Pest Threats

The COVID pandemic illuminated many truths about the U.S. economy

Ongoing Investment in Integrated Pest Management Safeguards America's Agricultural Industry and Food Supply

Invasive Pests are a \$120 Billion-a-Year Threat to America's Farms and Lands

Invasive pests can and do routinely slip past federal and state regulators

The Growing Threat of Pests Resistant to Pesticides and Other Management Tactics

Agricultural pests, including insects, plant diseases and weeds, can become resistant to pesticides and other pest-management strategies. This means that the methods used to manage these pests no longer work as well as they once did, or stop working altogether. This costs growers money and threatens America's food supply. The science of integrated pest management helps prevent resistant pests from emerging and helps manage the ones already present. However, research must keep up with the threats, which can emerge every year.

Pests hurt U.S. agriculture — Resistance makes it worse

U.S. farmers spent an estimated \$9 billion on pesticides in 2019. An estimated 10 percent of this, some \$900 million, was just to reapply fields where pests survived a first pesticide application. Weather and application timing can contribute to pest survival, but pesticide resistance does as well.

Despite the \$9 billion spent on pesticides annually, U.S. farmers still lose approximately 10 to 35 percent of crops to pest damage. That's a huge financial loss for individuals and the agriculture industry, and also represents millions of tons of food that does not make it to supermarkets and dinner tables. In a time when childhood hunger and food-insecurity are all too common, this is a problem that cannot be ignored.

Science has a solution — Integrated Pest Management

The science of integrated pest management (IPM) can prevent resistant pest populations from emerging. As the name implies, IPM integrates multiple pest management tactics across seasons to protect crops. Because a number of different strategies and technologies are alternated and combined, no individual control method is overused and pest resistance is slowed or even stopped.

IPM programs are the best way — and in many cases the only effective way — to manage insects, weeds and pathogens that already are resistant. But new resistant populations or the arrival of new invasive pests can disrupt an IPM program and leave growers, and our food supply, vulnerable. As pests develop resistance, there is a consistent need to adapt and improve our IPM programs. For example, waterhemp is a weed resistant to six different types of herbicides. Weed scientists responded by developing an IPM strategy including narrow row spacing, cover crops to suppress weed populations, and careful herbicide selection to make use of multiple modes of actions.

Looking to the future

Managing pest resistance will be an ongoing priority for American agriculture, and ongoing funding for crop-protection efforts is essential. New research creates technology to identify and track resistance, develops management tools for newly resistant pests and identifies practices and new technologies that decrease pest damage. In addition, funding is necessary to support Cooperative Extension services that share this new information with farmers, ranchers, and crop protection specialists to help implement IPM programs necessary to slow resistance development and control damaging pests. *America's rural economy and the nation's food supply depend on it.*

IPM When new IPM programs are developed, they can help protect crops and food supply. In our ever-changing agricultural landscape, IPM is a system that evolves with the science of pest management. It is a science that evolves with the science of pest management. It is a science that evolves with the science of pest management. It is a science that evolves with the science of pest management.

Examining the Impact of IPM Examining the impact of IPM on the agricultural industry and food supply is a critical step in developing a strategic plan. This involves assessing the current state of IPM programs, identifying areas for improvement, and setting goals for the future. This process is ongoing and requires continuous communication and collaboration among all stakeholders involved in IPM.

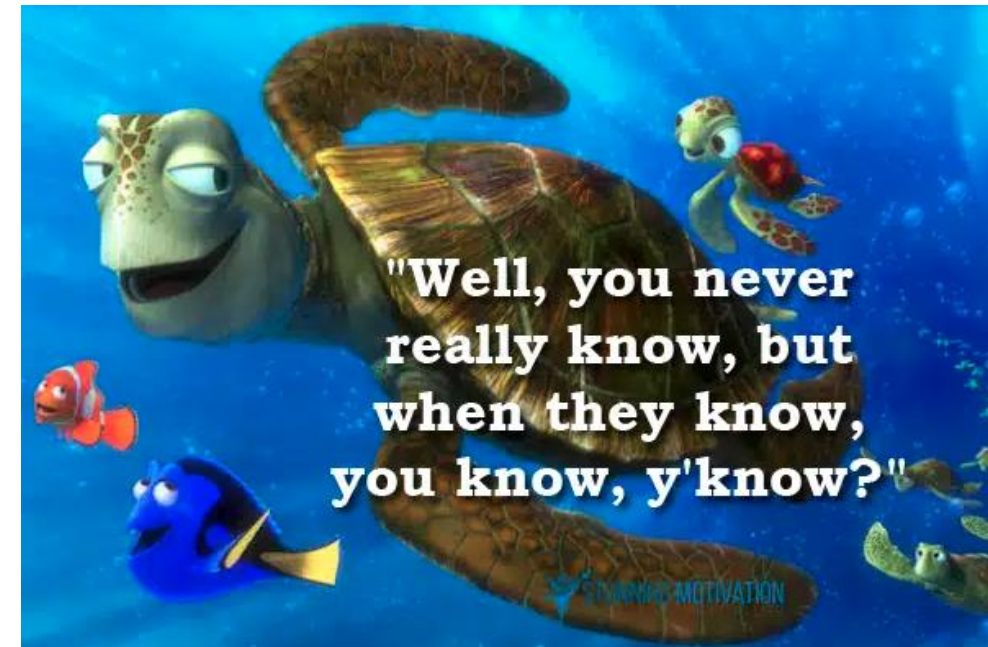
And And the science of IPM is constantly evolving. As new pests emerge and existing ones develop resistance, IPM programs must adapt and improve. This requires ongoing research, education, and collaboration among all stakeholders involved in IPM.

The National Integrated Pest Management Coordinating Committee is a committee of the Experiment Station Committee on Organization and Policy within the Association of Public and Land-grant Universities governing structure. It assists in development of reports and strategic plans on pest management issues and pursues activities that facilitate coordination and collaboration nationally among and between IPM research and extension at the land-grant universities, and between the land-grants and federal agencies involved in IPM. Learn more at: <https://tinyurl.com/d7yx9ny6>

Strategic Plan: Goal, Scope, Issues

- Identify the primary focus and **goal** for the IPM Network
 - Must be clearly outlined before you can identify appropriate accomplishments and impacts; ID common measures to assess success towards this goal
- Clearly define the IPM Network's **scope**
 - **Topical** scope
 - Pre-2008 scope: Agriculture, Communities, Natural Areas
 - What priority areas are the most important?
 - **Functional** scope
 - How do we fit into the larger web of USDA NIFA
 - What roles do we play?
- Identify IPM **issues**
 - Where can we make a difference and positive impact?

Make sure goal, scope and issues are clearly stated in the CPPM RFP (currently they are not!)











IPM Network

Definitions:

- IPM Network: as of today, this consists of the 53 state/territory IPM programs and 4 regional centers
- Collaboration: shared work expected across the IPM Network
- Plant Health Systems: As defined by the Tactical Sciences Network, organizations working towards food security by protecting plants (NPDN, IPM, IR-4, EDEN)
- Partnerships (Cooperation): interagency work within the government; e.g., between IPM Network and other governmental agencies and Plant Health Systems organizations

Example from SARE:
Investment in sustainable
farming and ranching

...
But we want an IPM
example by the end of
this presentation!

BY THE NUMBERS SARE Grants on Soil Health, 1988–2017		
	NUMBER OF GRANTS	TOTAL AMOUNT
 CONSERVATION TILLAGE	411	\$20.6 MILLION
 COVER CROPS	822	\$39.5 MILLION
 CROP ROTATION	318	\$16.4 MILLION
 INTEGRATED CROP/LIVESTOCK	259	\$9 MILLION
 NUTRIENT MANAGEMENT	265	\$15.4 MILLION
 SOIL HEALTH	600	\$31.9 MILLION
 SOIL MICROBIOLOGY	229	\$12.3 MILLION
 SOIL MOISTURE	460	\$14.4 MILLION
TOTAL	1,778	\$76.7 MILLION

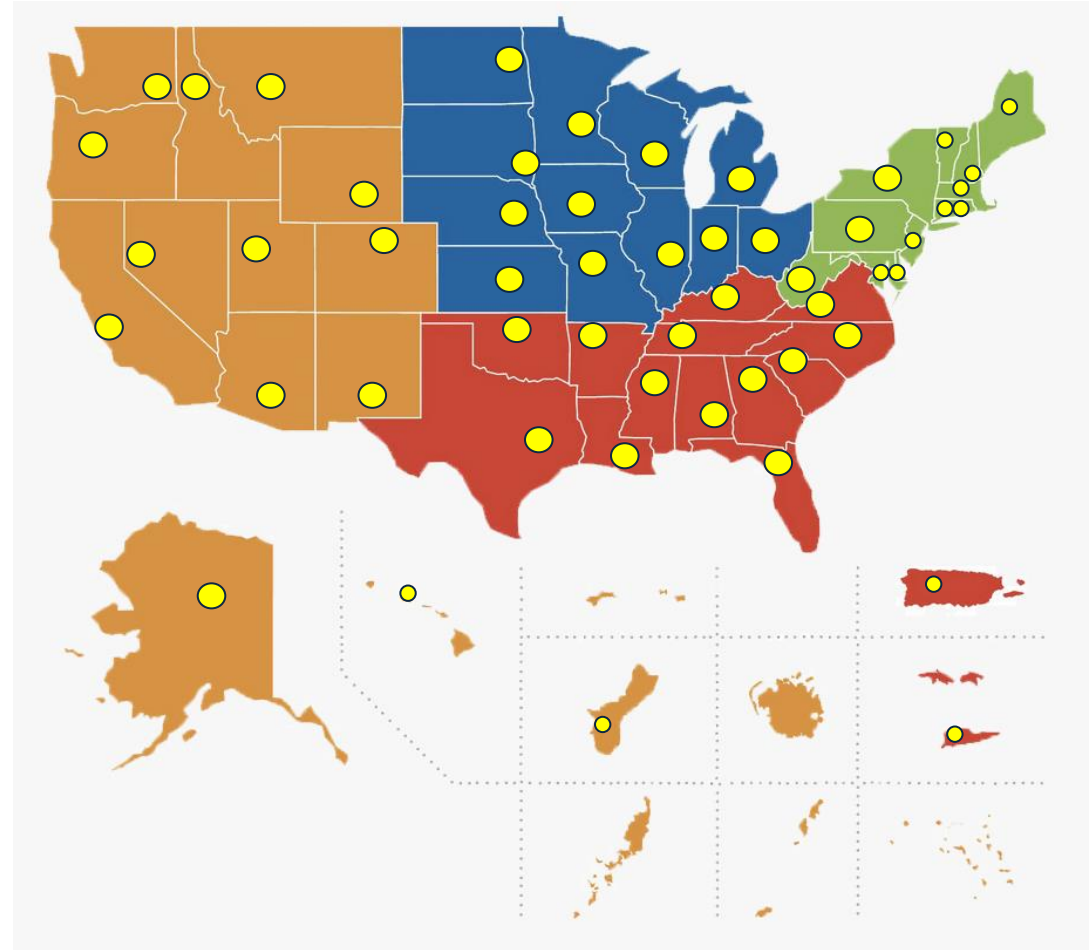
Because some projects address more than one topic, the total is adjusted to remove duplicates.

(30 years of SARE report)

IPM Network

State IPM programs

- EIP funds competitively available through USDA-NIFA CPPM program starting in 2008
 - 2008, 2010 (2011, 2013), 2014, 2017, 2021, 2024
- Select emphasis or priority areas when they apply for EIP funds
- Each program identifies their own stakeholders and IPM needs
- CPPM accounts for ~31% of total IPM funds; >50% total funds for 27 programs

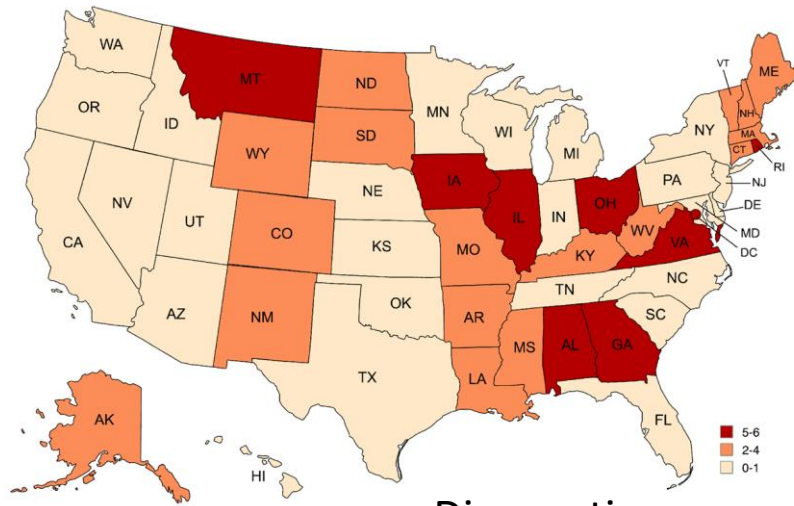


State IPM Programs – Priority Areas

Priority areas	2008	2010	2013	2014	2017	2021	2024
Agronomic Crops	x	x	x	x	x	x	x
Specialty Crops (called High Value/High Input or Intensively Managed Crops in 2008)	x	x	x	x	x	x	
Animal Agriculture		x	x	x	x	x	x
Communities (called Consumer/Urban 2008-2013)	x	x	x	x	x	x	x
Housing (Training and Implementation)	x	x	x	x	x	x	
Schools (Training and Implementation)	x	x	x	x	x	x	
Pollinator Health					x	x	x
Coordination with Conservation Partnerships	x	x	x	x	x	x	
Support for Pest Diagnostic Facilities	x	x	x	x	x	x	x
Recreational Lands	x	x	x	x	x	x	
Public Health (called Pest of Humans and Vectors of Diseases 2008)	x	x	x	x	x	x	x
Partnerships in Wide-Area Pest Monitoring and Reporting Systems	x	x	x	x	x	x	
Education for Pesticide Applicators				x	x	x	x
Other State-Specific IPM Needs							x

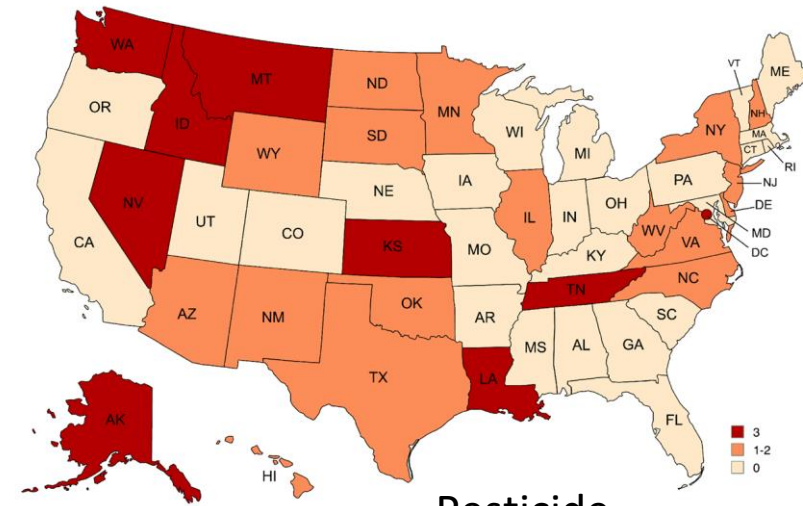
- Coordination and collaboration were required in early RFPs, this is not included
- Some years had specific funding restrictions for each priority area
- Some years separated priorities into primary or secondary with different funding limits
- We did **not** consider the percent time allotted for each priority area

State IPM Programs – Priority Area Frequency



Diagnostic Clinics

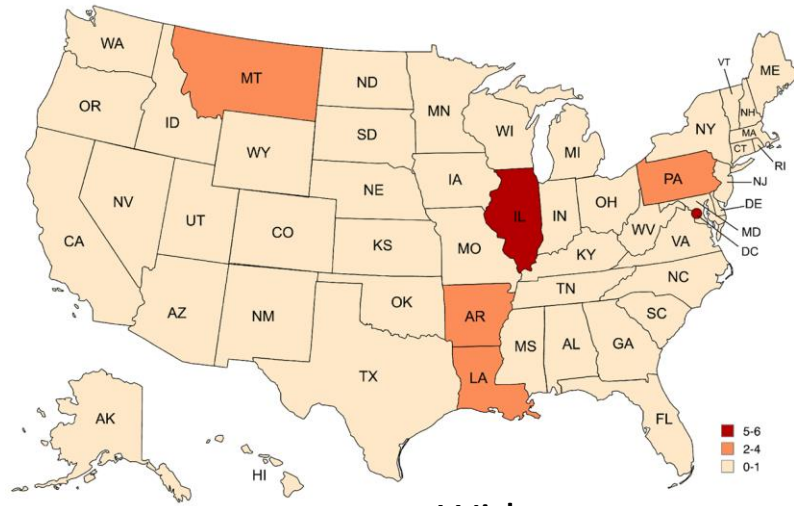
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Pesticide Safety

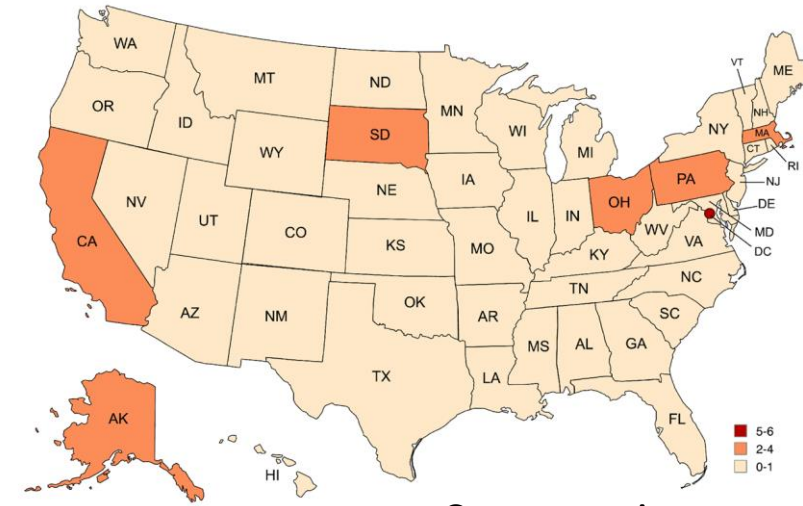
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State IPM Programs – Priority Area Frequency



Wide-area
Monitoring

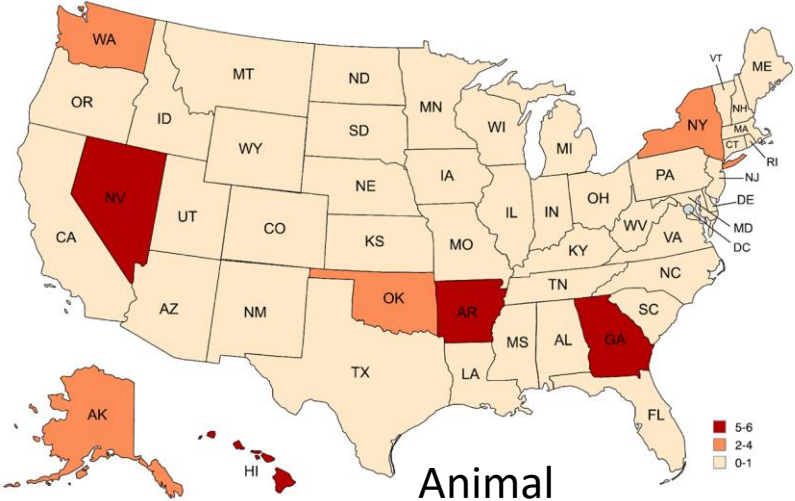
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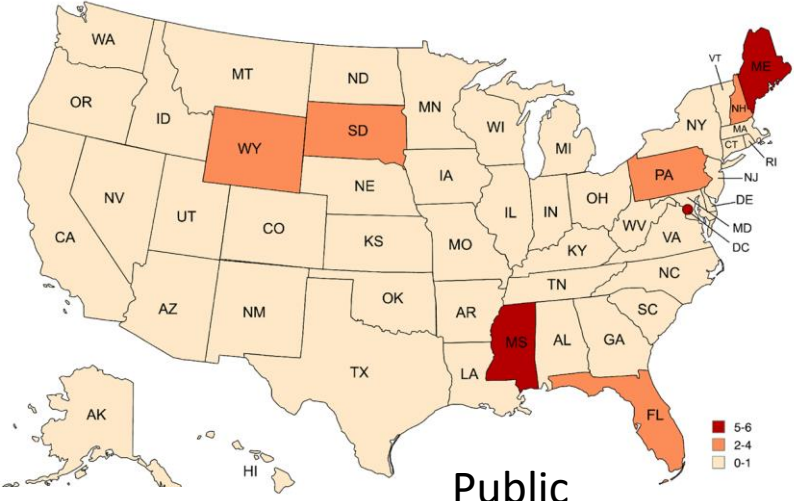
Conservation
Programs

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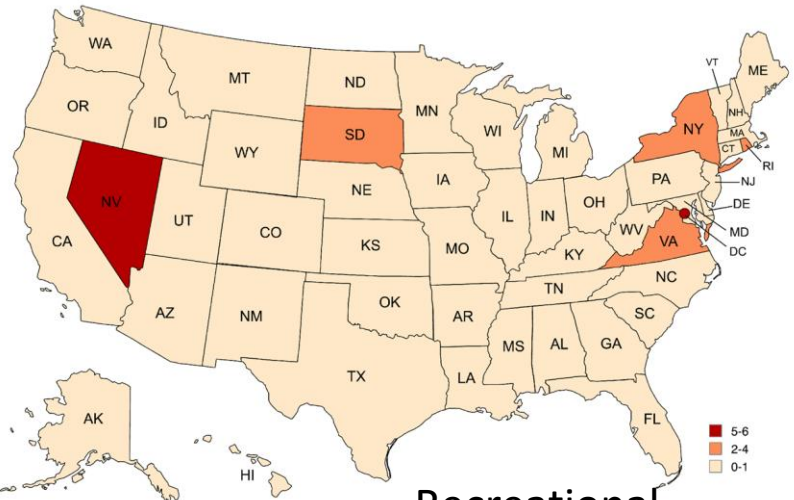
State IPM Programs – Priority Area Frequency



Animal
Agriculture



Public
Health



Recreational
Lands

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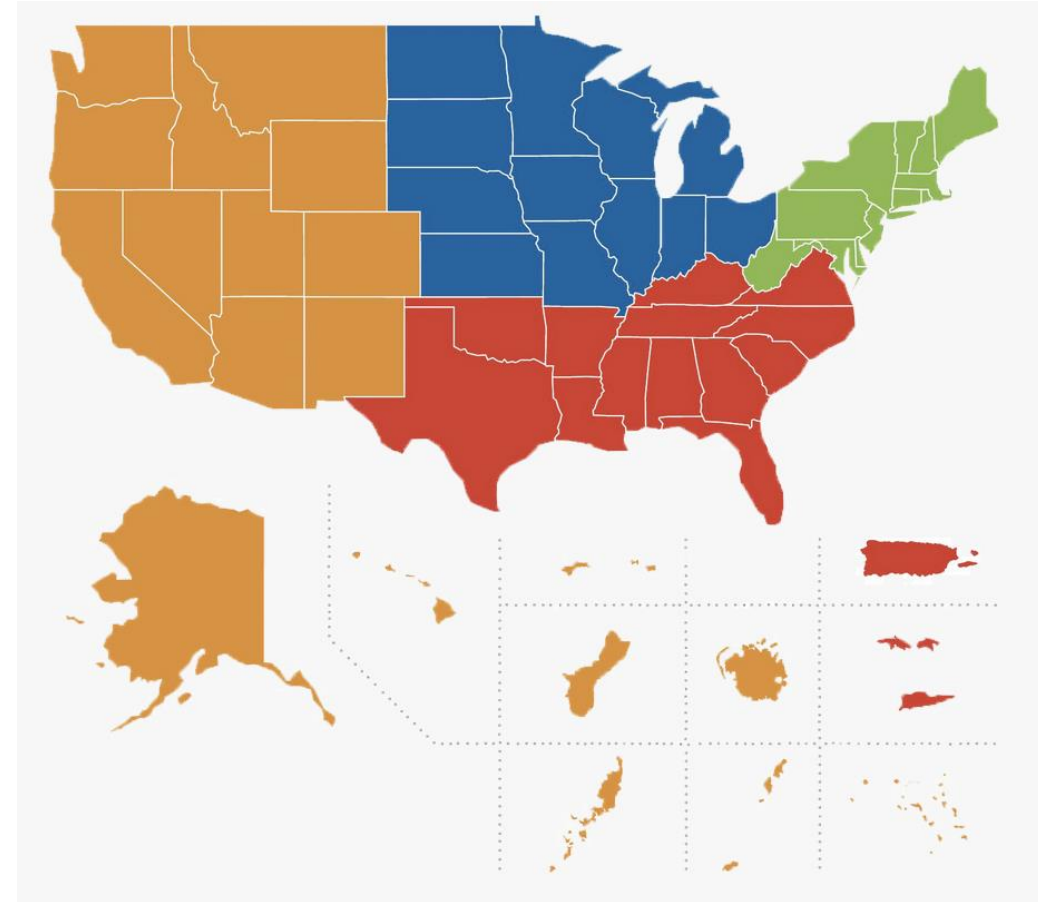
Identifying IPM Direction

Priority areas	% included in EIP proposals
Specialty Crops	78.5
Agronomic Crops	71.3
Communities	57.3
Pollinator Health	52.4
Support for Pest Diagnostic Facilities	36.2
Education for Pesticide Applicators	31.4
Schools (Training and Implementation)	26.7
Housing (Training and Implementation)	15.3
Public Health	10.4
Recreational Lands	9.8
Animal Agriculture	9.4
Wide-Area Pest Monitoring and Reporting Systems	8.5
Coordination with Conservation Partnerships	7.2

IPM Network

Regional IPM Centers

- Funds competitively available through USDA-NIFA CPPM program starting in 2006
- Goals (Lane et al. 2023):
 - to increase adoption, implementation, and efficiency of effective, economical, and safe pest management practices; and
 - to develop new practices where needed.
- Include signature programs or cross-cutting issues



IPM Centers – Signature Programs

Year	North Central	Northeast	Southern	Western
2006	Resistance management, school IPM, tribal IPM, urban agriculture IPM, and various aspects of production agriculture.	Community IPM, invasive species, biological control, weed IPM, organic, and sampling techniques.	Improving benefit/cost ratios, reducing human health risks, and minimizing environmental effects.	Water quality protection, pollinator protection, and weather-based decision-support tools.
2014-2015	Similar priorities but also included invasive species and emerging pests, indoor air quality, and urban agriculture.	IPM and organic systems, climate change and pests, rural and urban IPM, and next-generation education.	Facilitating innovation through technology and critical and emerging issues.	Similar priorities and added focus on IPM network coordination.
2017-2018	Resistance management, invasive species, pollinator conservation, and genetic tools.	Similar programs with added emphasis on pollinators and advanced production systems.	Pollinator protection, resistance management, and underserved audiences.	Invasive species, biological control, ecosystem services, and urban pest management.
2020	Diverse cropping systems, food security, pollinators, and advanced IPM tools.	Similar programs but with cross-cutting issues such as diversity in IPM, emerging invasive species, pesticide resistance, and economics.	Similar programs with additional emphasis on invasive species, climate change, and protection of beneficial insects.	IPM for indigenous, insular, and isolated people, pest resistance management, new technologies, and changing landscapes.
2022-present	Food security, Diversity, Equity, and Inclusion in IPM, youth education, regional partnerships, sustainability, and rapid pest management responses.	Similar focus areas with continued emphasis on advanced technology for IPM.	Early detection and rapid response, climate change, pollinator protection, and IPM identity.	Continued focus on invasive species, biological control, ecosystem services, urban pest management, and new IPM technologies.

Identifying IPM Direction

- Consistent emphasis on:
 - Identifying and managing emerging and invasive pests
 - Resistance management
 - Pollinator protection
 - Integrating advanced technologies into IPM
- Emerging themes include:
 - Addressing climate change
 - Improving sustainability
 - Ensuring food security
 - Increasing access to IPM resources

Hatch Multistate Committees

- 2008 Farm Bill required 25% of Extension and Research to be multistate
- Funding from State Agricultural Experiment Station (Research)
- 38 projects focus on IPM-related topics
- Reporting system through National Information Management & Support System (NIMSS)



Hatch Multistate Committees

Crop Specific (Field then Non-Field Crops)	
Corn	NC246 (insects)
Hemp	WDC56 (general)
Onion	W4008 (diseases, insects, weeds)
Peanuts	S1079 (general)
Potato	WERA89 (diseases – viruses)
Rice	SERA18 (general)
Small grains	NCERA184 and WERA97 (diseases); WERA77 (weeds)
Soybean	NCERA137 (diseases); S1080 (insects)
Turf	NCERA221, WERA11, SERA48 (general); NC1208 (disease – dollar spot)
Nurseries/ Landscapes	NCERA224 (insects)
Fruit Crops & Woody Ornamentals	WERA20 (diseases – systemic pathogens)
Fruit and Vegetable Specialty Crops	NC2336 (general – storage)
Eastern White Pine	NE2101 (general)

Other Groups	
Pollinators	NC1173 (bee health)
Biologicals	NE2001, NC2332, S1073, W5185, W5147
Human & Animal Health	NC1183 (mycotoxins), NE1943 (disease vectors), S1076 (insects and animals); W2193 (poisonous plants)
Specific Pest Systems	NC1197, NE2140, S1092, W5186 (nematodes); S1083 (soilborne pathogens); WERA1007 (curtovirus); WERA1021 (spotted wing drosophila); W509 (coconut rhinoceros beetle); NC2338 (weeds and climate); W5147 (Managing Plant Microbe Interactions in Soil to Promote Sustainable Agriculture)
Infrastructure	NCERA222 (North Center IPM), NEERA2104 (Northeast IPM), SERA3 (Southern IPM), WERA1017 (Western IPM); NRSP4 (IR-4)



Identifying IPM Direction

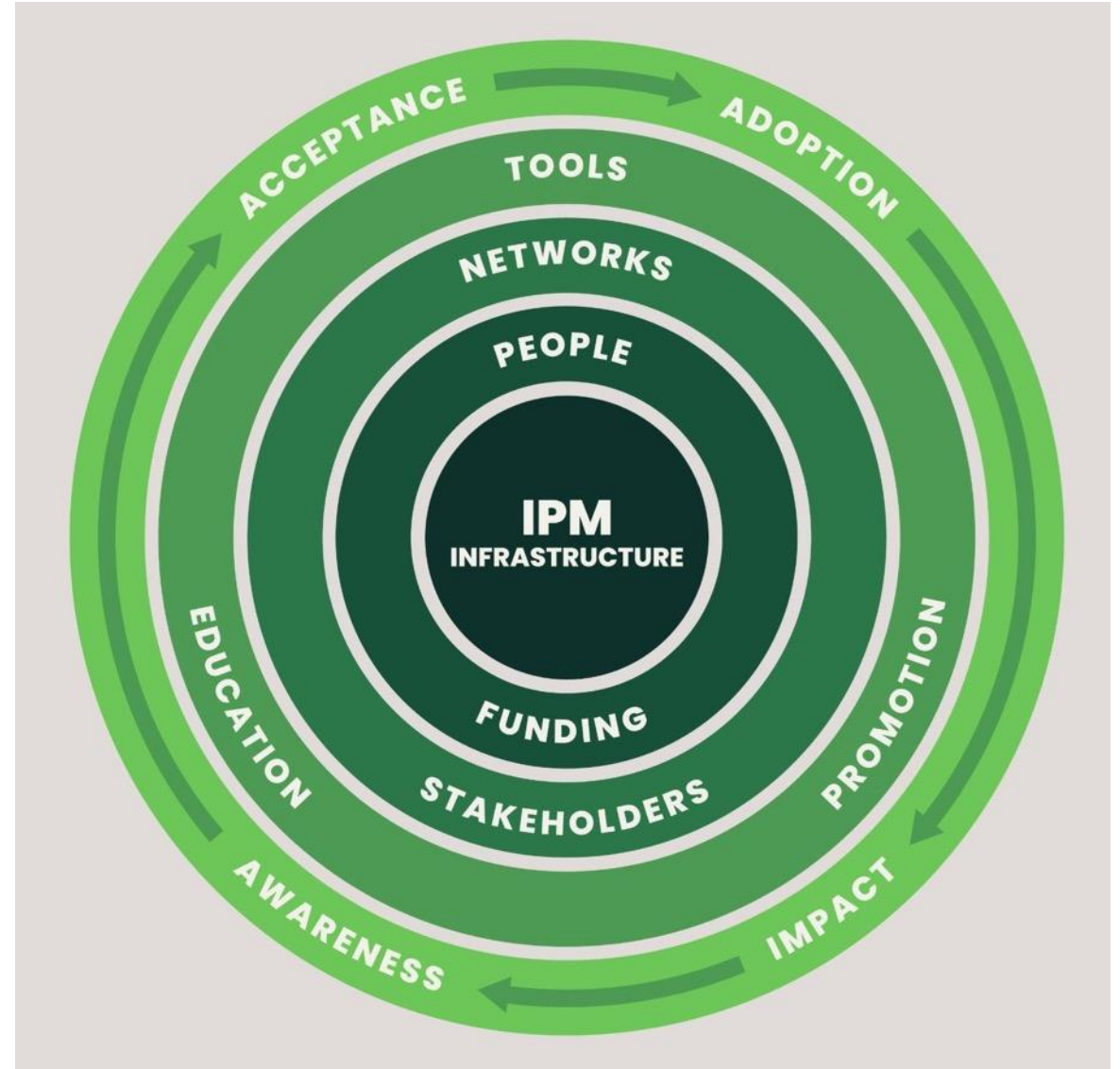
Topic*	Examples of NIMMS groups
Resistance management	NRSP4, NCERA184, WERA77, NCERA137, WERA97
Biological control	W4185, S1080, W5147
Climate change and IPM	WERA97, NE2101, WERA11, SERA48
Technology development and adoption	NRSP4, NCERA137, NCERA224
Human and animal health	S1070, NE1943
Sustainable agriculture	NC246, NC1186

* Identified by processing all projects' objectives through ChatGPT - asking for major themes.



IPM Infrastructure Survey

- Questionnaire sent out in November 2022, closed August 2023
- Received responses from 52 of 53 IPM programs
- Gathered complementary data
- See NIPMCC Basecamp for last year's PPT; handout has SWOT analysis (summaries)



Identifying IPM Direction

Themes & Challenges

Resource shortages

Personnel and expertise shortages

Resistance management

Communication

Technology changing quickly

IPM Topical Landscape Assessment

ORGANIZATIONS INTERVIEWED



IPM Topical Landscape Assessment

Ten distinct future priority topics based on frequency of which they were mentioned

Priority Topics	Priority Topics
Biologicals	Organic farming
Climate	Perception of IPM
Value proposition to adopt IPM	Predictive resistance management
Scaling IPM	Proactive risk management
Developing IPM areas	IPM enabling technologies

Ask Laura for the complete slide deck 😊

Tactical Sciences Network



Programs that apply strategy through on the ground tactics for Agricultural Biosecurity/ National Security.

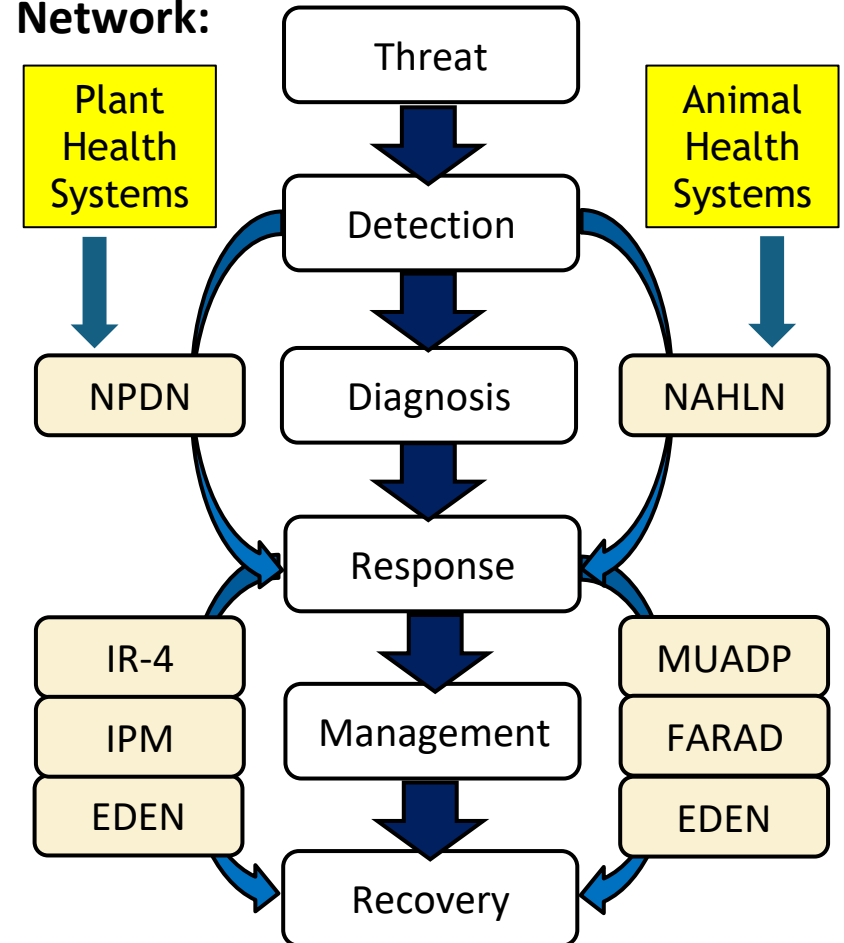
- Food and Agriculture Defense Initiative (FADI): NPDP, EDEN, NAHLN
- Stand Alone/Regulatory Funding lines: IR-4, MUADP
- USDA CPPM: Regional IPM Centers, State IPM Programs, ESCOP

Goals:

- Identify **common issues**
- Develop **coordinated** strategy of outreach, communications and program activities
- Develop public-private **partnerships**

Tactical Sciences Coordination

Network:



Program alignment with the threat response continuum.

Identifying IPM Direction



Common Themes/Needs Identified

Communications (audience recognition and messaging)

Next Generation Scientists (workforce development and succession planning)

Equipment obsolescence

Surveillance (observation networks, citizen science education, etc. – maybe also information sharing/communication?)

Information Technology

Sustainability

Stakeholder relations/input to NIFA

Identifying IPM Direction

Finding goals, scope and issues

Specialty Crops
Agronomic Crops
Communities
Pollinator Health
Support for Pest Diagnostic Facilities
Education for Pesticide Applicators
School IPM
Housing IPM

Identifying and managing emerging and invasive pests
Resistance management
Pollinator protection
Integrating advanced technologies into IPM
Addressing climate change
Improving sustainability
Ensuring food security
Increasing access to IPM resources

Communications (audience recognition and messaging)
Next Generation Scientists (workforce development and succession planning)
Equipment obsolescence
Surveillance (observation networks, citizen science education, etc.)
Information Technology
Sustainability
Stakeholder relations/input to NIFA

Resource shortages
Personnel and expertise shortages
Resistance management
Communication
Technology changing quickly

Biologicals	Organic farming
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Value proposition to adopt IPM	Predictive resistance management
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Developing IPM areas	IPM enabling technologies

Resistance management
Biological control
Climate change and IPM
Technology development and adoption
Human and animal health
Sustainable agriculture

Strategic Plan: Goal

National IPM Roadmap: to increase adoption, implementation and efficiency of effective, economical and safe pest management practices, and to develop new practices where needed.

Groundwork for Growth: A nation where everyone can access the IPM information, tools and services they need to protect their health, home and livelihood.

Possible Goal: Be a cornerstone in the Tactical Sciences Network to ensure **Food Security, Sustainable Agriculture, Human Health, and Environmental Health**

Showing we have a role in a larger portfolio of programs

Working towards long-term outcomes that matter

Identify common measures related to these four outcomes, assess what data are already exists

Strategic Plan: Scope

1. Topical Scope

- Clear leader - Plant Health Systems
- Distant second place - Communities

2. Functional Scope

- Partnerships/Cooperation, Collaboration, Networking?
- Research vs. Projects vs. Infrastructure
- Communication, Evaluation, Impact assessment

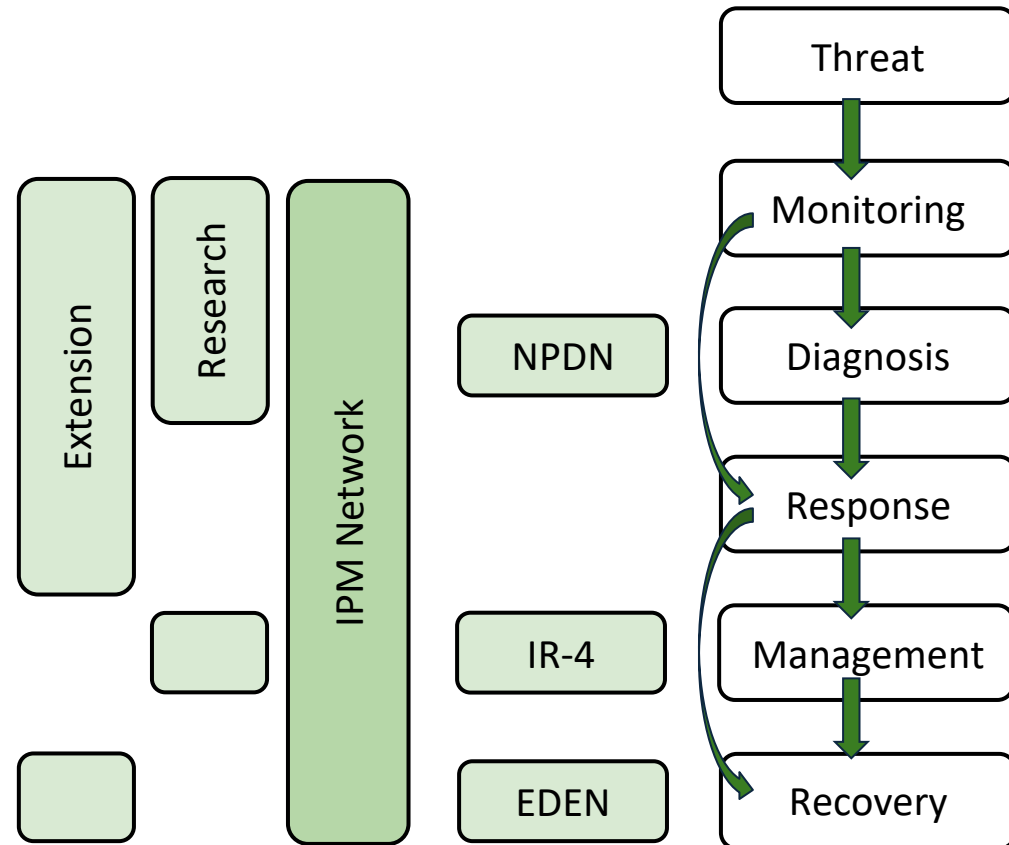
Possible Scope: Provide infrastructure and lead activities for Plant Health Systems

Local research, communications, evaluation, impact assessment, etc.

Scouting, surveillance, modeling, education, etc.

Speciality Crops, Agronomic Crops, Ornamentals, Urban Ag

Plant Health Systems: Speciality Crops, Agronomic Crops, Ornamentals, Urban Ag



Strategic Plan: Components of IPM Network

How can we merge centers and state IPM programs into a true IPM Network?

- Relationship between the State IPM Programs and Regional IPM Centers is not well defined
- Broadly, State IPM programs should focus on local needs that address the IPM issues
- Regional IPM Centers should address regional needs and help tie state programs together

See handout for questions and possible roles



Strategic Plan: Issues

Possible IPM Issues: What we do, current and future problems or opportunities

Possible IPM Issues
Pest Monitoring (scouting, surveillance, forecasting)
Emerging and Invasive Pests
Resistance Management
Bioprotection
Pollinator Health
Climate Change and IPM
Technology Development and Adoption for IPM
Next Generation of IPM specialists (multidisciplinary, new disciplines)

Current IPM Issues



Pest Monitoring



Emerging and Invasive Pests



Resistance Management



Bioprotection



Pollinator Health



Climate Change and IPM



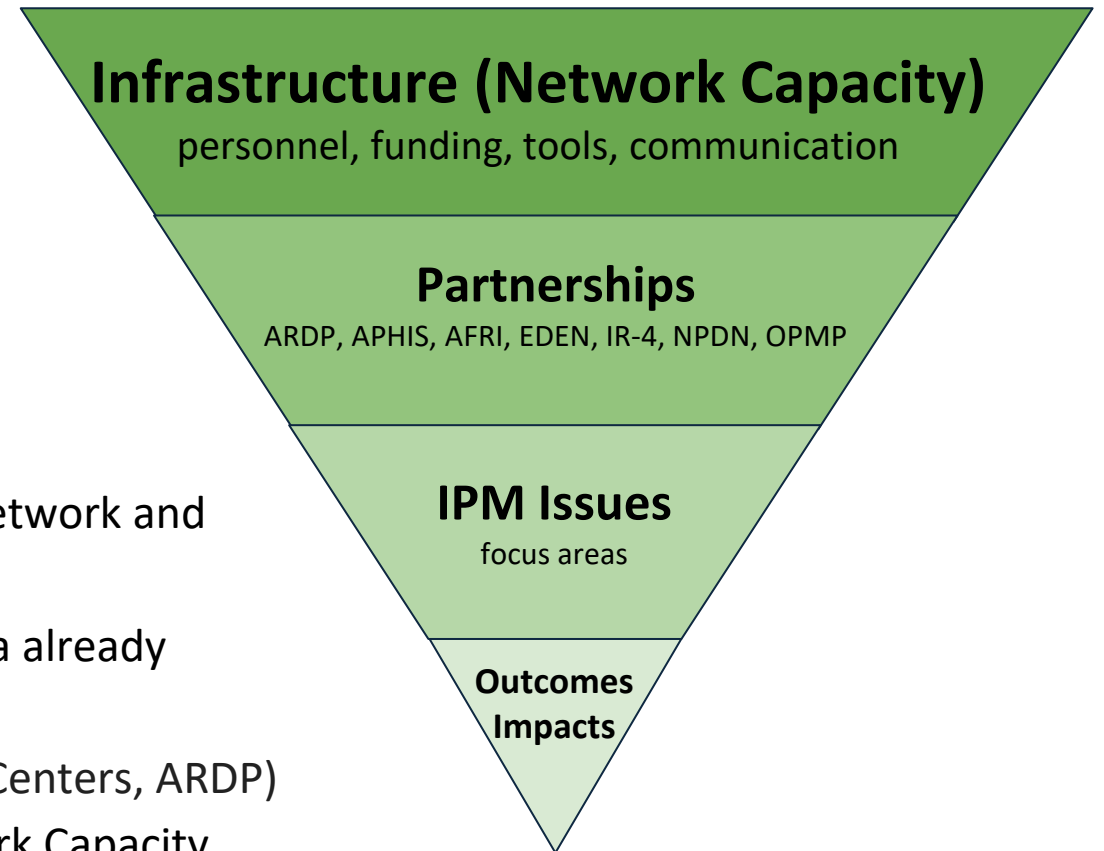
Technology Development and Adoption



Next Generation IPM Specialist

Summary

1. Strong State Level Infrastructures have been built during the past 50-years
 - a. What do we need to do to maintain strong infrastructure?
 - b. How can we continue to build better infrastructures?
2. **State Level Infrastructure Survey**—has helped identify strengths, weaknesses and opportunities.
 - a. Survey results contribute to Strategic Planning Process
 - b. Manuscript #1 is nearly done, working on next ones
3. **Strategic Planning Process**
 - a. Finalize goal and scope (topical and functional) of IPM Network and issues to be addressed
 - b. Identify common measures for the goal, assess what data already exists and what data should be collected to show impact
 - c. Define roles of CPPM entities (State IPM Programs, IPM Centers, ARDP)
 - d. How to develop a TRUE IPM Network; strengthen Network Capacity



Questions?

THE END

