

Western Region Pesticide Risk Reduction through Professional Development for Western State IPM Programs

Final report for EW17-019

Project Type: Professional Development Program

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Grant Recipient: Oregon State University

Region: Western

State: Oregon

Principal Investigator:

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Oregon State University

Project Information

Abstract:

Co-PIs Paul Jepson (IPPC, OSU) and Katie Murray (IPPC, OSU) - this program is jointly led

We will significantly reduce pesticide risks in Western US agricultural production through capacity development with State IPM extension programs on pesticide risk assessment and risk education principles and processes. Collaborators include state IPM coordinators and other extension faculty from 12 Western region states: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Oregon, Utah, Washington, and Wyoming. This project seeks to grow a collaboration with these programs that was conceptualized at the July 2016 Western State IPM Coordinators annual meeting (WERA-1017), with an aim of implementing action on pesticide risk reduction. Specifically, this project provides capacity development on pesticide risk assessment and education through the implementation of two workshops, ongoing monthly discussion topics, the refinement and sharing of a new, internationally peer-reviewed pesticide risk classification process, and the development of a centralized website for key resources and tools. To assess project outcomes, an evaluation process will measure the skills and capacities developed among the participating collaborators, as well as the uptake of new tools and education by each program's participating stakeholders. Increasing the competency of Western state IPM programs to effectively assess and reduce pesticide risks will have broad and deep impact across the region, and this work will lead to a transferrable model of pesticide risk education for agricultural professionals in other regions and locations. Project collaborators will co-author a publication on this approach and its impacts. The project impacts will be shared widely based on our close affiliation with various regional, national, and international IPM groups.

Project Objectives:

1. *Conduct two annual pesticide risk education workshops for Western Region IPM Coordinators and other extension faculty, focused on pesticide risk education and impact evaluation, to coincide with the 2017 and 2018 annual meetings of Western Region IPM Program Coordinators (WERA-1017).*

The project will begin and end with an in-person workshop for Western state IPM program staff, designed to increase capacity in pesticide risk assessment and education, and impact evaluation, in order to achieve measurable pesticide risk reduction. Each state IPM program will learn about, design, and evaluate risk education programming, targeted to the specific needs of their respective audiences.

2. *Provide IPM Practitioners access to and education on a new pesticide risk classification tool to aid in risk-based decision-making and achieve increased use of reduced-risk products and risk mitigation practices, and diminished use of highly hazardous pesticides in the US Western region.*

By providing Western Region IPM coordinators and extension faculty access to and education on a state-of-the-science, risk classification system, we will achieve significant reduction in the use of highly hazardous pesticides in the West, and increase the use of reduced-risk products, and risk mitigation for other products. Alignment with this classification system will also bring Western US farmers more in line with internationally recognized and reviewed agricultural sustainability standards with respect to pesticide risk management, which will increase their access to certification and marketing opportunities.

3. *Design a 12-month pesticide risk education curriculum for IPM practitioners to be implemented through monthly conference calls.*

Using a curriculum targeted at capacity development in pesticide risk assessment and education to continue an established routine of monthly calls with the project collaborators, we will strengthen the capacity of all Western region statewide IPM programs on the concepts, principles, and delivery of pesticide risk assessment, communication, and education. This will directly translate to documentable pesticide risk reduction among the participating farmers served by these programs.

4. *Develop a centralized, publically accessible website focused on pesticide risk assessment, education, and mitigation.*

By hosting a centralized, publically-accessible website with tools and information on pesticide risk assessment and education that could be used by extension educators, consultants, and farmers, we will make pesticide risk education and reduction tools accessible to a wide and far-reaching audience. The risk classification tool described in Goal 2 will become an internationally accessible tool for pesticide risk mitigation and reduction.

Introduction:

The use of pesticides negatively affects agricultural sustainability through several externalities, including impacts to human health, and the development of pest resistance and environmental disequilibrium. The most recent version of the Food and Agriculture Organization's International Code of Conduct on Pesticide Management (2014) aims to address these impacts with pesticide risk reduction, specifically calling for increased capacity development, along with the removal from use of highly hazardous pesticides. This code also formally acknowledges the central role of Integrated Pest Management (IPM) in reducing pesticide risks to better protect human and ecological health and achieve lasting transformation to more sustainable practices. Reducing pesticide risks is also among the goals of the National IPM Roadmap. IPM Extension programs are essential to progress in risk reduction, and provide an essential component of pesticide risk management by contributing to safe and effective use, and employment of alternatives to pesticides. Successful efforts must address multiple pathways, including decision-support in pesticide selection to encourage low and reduced-risk products, risk mitigation education with the use of higher risk products, and encouraging the elimination of highly hazardous pesticides in order to best protect human health and safety and preserve ecological services.

At their 2016 annual meeting, Extension IPM professionals from the Western US overwhelmingly agreed that capacity development is needed to achieve pesticide risk reduction. In addition to knowledge and skill development in pesticide risk education, an informal survey of our collaborating Western region programs revealed three main needs: 1) professional development workshops for Extension IPM educators addressing methods to improve learning and outcomes regarding pesticide risks, 2) a central website for sharing information and tools on pesticide risk evidence, assessment, education, and mitigation, and 3) a science-based, user-friendly risk classification system for pesticide products, that could be adapted to specific assessment needs (e.g. agricultural, urban, home garden, institutional, etc.).

This project aims to address the needs expressed by our collaborating programs to achieve significant and documentable pesticide risk reduction across the Western US, a region representing some of the world's most productive and diverse agro-ecosystems. The likelihood of success is high based on existing collaborations, and successful risk reduction here would translate into significant progress globally. The collective expertise within the Integrated Plant Protection Center (IPPC) at Oregon State University in risk communication, outcome-based education (Adaptive, Learner-Centered Education), and decision-support (e.g. ipmPRiME.org) provide a unique opportunity for progress. In another SARE PDP grant led by Mary Halbleib at IPPC, within-state capacity is being developed in IPM extension program design, and the pesticide risk reduction methods that we develop in this proposal will be integrated with this process.

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Education

Educational approach:

1. *Conduct two annual pesticide risk education workshops for Western Region IPM Practitioners, focused on pesticide risk education and impact evaluation, to coincide with the 2017 and 2018 WERA-1017 meetings.*

The project would begin and end with an in-person, 1-day workshop for Western region IPM practitioners, designed to develop capacity in pesticide risk assessment and education, and impact evaluation.

At the first workshop, we will offer capacity development in pesticide risk assessment and education using an adaptive learner-centered education framework to design pesticide risk education and evaluation programming for each state IPM program, based on an outcome-based (OBE) education model. This process values the existing knowledge of our participating IPM professionals, and incorporates their needs into program development. In preparation for this workshop, we will review commonly used pesticides in each state to identify high-risk uses, and we will design our statewide programs around those.

At the last workshop, we will focus on program evaluation, documentation of impacts, and next steps individually and collaboratively, with reports on the implementation successes and limitations of each program.

These workshops will be dovetailed with the 2017 and 2018 annual meetings of Western State IPM Coordinators. We will invite international collaborators to participate via video conferencing to share expertise.

2. *Provide IPM Practitioners access to and education on a new pesticide risk classification tool to aid in risk-based decision-making and achieve increased use of reduced-risk products and risk mitigation practices, and diminished use of "Highly Hazardous" pesticides in the US Western region.*

This tool was built from risk assessment and extension IPM methods and processes developed at OSU. In 2016, the Sustainable Agriculture Network (SAN) formally adopted this process for pesticide risk classification, following a year of industry and peer review (SAN 2016). We will refine this tool for use by Western US farmers and state IPM programs, and provide access to and education on a version of this system adapted to the Western region. The system classifies a small number of products as "highly hazardous"

(<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/hhp/en/>) and isolates these from other high-risk pesticides for which risks can be mitigated. An important aspect of this objective is discussion regarding implementation of this approach, and supporting lower risk practices with western region farmers through our various IPM Extension education programs. Education on understanding the current practices and critical needs of farmers to encourage a transition away from highly hazardous pesticides will be an important component of this objective.

3. *Design a 12-month pesticide risk education curriculum for IPM practitioners to be implemented through monthly conference calls.*

We propose a monthly discussion curriculum that would continue an established routine of monthly calls with project collaborators. This curriculum will support and expand on the content of the two workshops. These monthly discussion teleconferences would be designed around the following topics:

- Pesticides and IPM compatibility
- Pesticide risk assessment: existing and potential tools and processes
- Stakeholder assessment: understanding current practices and pesticide usage and critical needs for transitions
- Engaging diverse audiences on risk communication
- Existing and potential decision-support tools for risk-based decision making among farmers
- Resources desired on central website
- Risk reduction programmatic updates
- Measuring impact of pesticide risk reduction education
- Demonstrating impact through documentation of reduction in pesticide use
- Publication drafting
- Model transferability
- Discussion on regional, national, and international collaborations to share impacts

4. *Develop a centralized, publically accessible website focused on pesticide risk assessment, education, and mitigation.*

Oregon State University's Integrated Plant Protection Center (IPPC) will host a centralized, publically accessible website with tools and information on pesticide risk assessment and education aimed at both agricultural professionals and farmers. Project collaborators will collectively develop the content of this site as part of both workshops (Objective 1). The site will include the risk classification tool (see Objective 3), as well as other tools and resources for pesticide risk reduction. The IPPC has a specialist in electronic communication who will continue to maintain and update this website beyond the project timeline.

Education & Outreach Initiatives

Conduct two annual pesticide risk education workshops for Western Region IPM Coordinators and other extension faculty

Objective:

Each state IPM program will learn about, design, and evaluate risk education programming, targeted to the specific needs of their respective audiences.

Description:

Western Pesticide Risk Reduction Project Workshop

July 26-27th, 2017

Irvine, CA

Agenda

Workshop goal: To provide participants with the knowledge and skills needed to integrate pesticide hazard and risk communication within IPM extension education programming

Wednesday July 26th:

4:15-4:45pm Case studies, and pesticide hazards

4:45-5:30 Introduction to the SAN/IPPC Lists for Pesticide Management

5:30 *Adjourn*

Thursday July 27th:

8:00am Small group exercise with case studies: how would you discuss the challenge; what questions would you need to be able to answer?

8:30am Discussion: the categories of challenge; concepts of hazard and risk; and the trade-offs with efficacy

9:15am Discussion of how the RM and HHP lists fit within regulatory and educational contexts, and their role in IPM decision-making

10:00-10:10 *Break*

10:10am Small group presentation planning

10:40am Group presentations and discussion

12:15-12:45 *Working Lunch-Presentation from Oliver Bach, Sustainable Agriculture Network*

12:45pm Round Robin-the greatest challenge from today

1:00pm Flash thinking activity: novel educational approaches to risk communication

2:00pm The HHP, and RM lists and their evolution; international, regional and state processes

3:00pm What can each state commit to, and how can we document outcomes from our work?

3:30pm Drafting a Western Region policy

4:00pm Round Robin—thoughts on the day; desired topics for future calls

4:30pm Adjourn

Western Pesticide Risk Reduction Project Workshop

May 18th, 2018

Portland, OR

Agenda

Friday May 18th

Pesticide Risk Reduction Workgroup meeting

Meet at OSU Foundation Office, 707 SW Washington St, suite 500 (5th floor of the Union Bank building, on the corner of SW Washington and SW Broadway).

8:30-8:45am Welcome; update on funding: Signature program proposal

8:45-11:00am Individual risk communication presentations

11:00-12pm Evaluation discussion: how can we track our impacts? Developing common evaluation questions, and a process for reporting back.

12-1pm Lunch

1:00-2pm Discussion: principles of risk communication

2-3pm EPA terms and definitions, website navigation

3-4pm Debrief from the day: what did we learn from each other; new questions; ideas for next steps/future calls

4-4:30pm Review/discussion of draft extension publication

4:30pm Adjourn

Outcomes and impacts:

Western Pesticide Risk Reduction Project

Meeting Summary

July 26-27th, 2017

Meeting sponsored by USDA Western SARE PDP Program

Present at the meeting were:

7/26: Cheryl Wilen, Emily Sims, Joy Newton, Karey Windbiel-Rojas, Ashley Bennett, Jim Farrar, Matt Baur, Peter Ellsworth, Al Fournier, Frank Peairs, Bob Nowierski, Lisa Blecker, Tunyalee Martin, Ronda Hirnyck, Diane Alston, John Connet, Fabiola Estrada, Katie Murray, Paul Jepson

7/27: Cheryl Wilen, Emily Sims, Joy Newton, Karey Windbiel-Rojas, Ashley Bennett, Jim Farrar, Matt Baur, Peter Ellsworth, Al Fournier, Frank Peairs, Bob Nowierski, Lisa Blecker, Tunyalee Martin, Ronda Hirnyck, Diane Alston, Naomi Peter, Katie Murray, Paul Jepson

Local hosting was by Cheryl Wilen to whom we all offer thanks: it's going to be hard to follow her example and the location, food and seamless organization!

This meeting was our first engagement as a working group and it was intended to provide all of us with practice in collective processes and decision-making around this complex topic. This is without doubt, the most expert group of IPM specialists that is convening anywhere at present, and the scope and extent of our programs is immense. We all accept that the complex scientific and social challenges of pesticide hazard and risk management will take time to be resolved. We are carrying out this project in parallel with all of our individual and collective responsibilities,

and we will strive to focus on topics, information and processes that best meet our individual and collective needs.

The meeting began on the afternoon of July 26th with a discussion of the Sustainable Agriculture Network (SAN)/IPPC Lists for Pesticide Management (attached to email). This offered the group background and information on both the risk mitigation and highly hazardous pesticide lists, how they came about, what lies behind them, and the current employment of these lists within standards and certification programs across nearly 50 countries.

Our group will use these lists and analyses in different ways to the SAN, as we have discussed in our telephone calls, but they represent a unique classification system that has been validated by extensive peer review, and there are a number of applications that can be developed from them by us. They are being adapted for an extension publication at present.

A brief review of the lists was followed by a discussion of the 5 Highly Hazardous Pesticide (HHP) case studies that were selected for the workshop (see more information on these case studies in attached "Case Studies" document). The active ingredients we discussed were linuron, phorate, methomyl, paraquat, and dichlorvos.

The second day started with small group discussions regarding the case studies, beginning by identifying the questions that we would need to answer before engaging in risk communication about these products. Our small groups came up with these ideas, among others:

- Are there residues on edible produce?
- Can the pesticide in question be transported into surface and groundwater?
- Is the product on a groundwater protection list, and are detections reported in surface or groundwater?
- Are there specific soil or pesticide characteristics that might contribute to off-site losses?
- How can losses, including drift, be limited?
- Is it possible to mitigate risks by reducing the application rate?
- What are other practices that might limit risks?
- Can best practices for use of products be defined?
- What are the alternative products?
- What are the specific human health effects?
- What are the acute AND chronic human health risks?
- Are human health risks mitigated by closed-application systems and other engineering approaches to risk management?
- What are the non-target effects on birds, beneficial insects, mammals, etc.?
- How can both benefits and risks be reported?
- Are there health or environmental incident records?

The group also discussed the need to be able to communicate risks to a broad range of stakeholders, not just farmers—e.g. consumers, sales reps, applicators, consultants, etc.

The second part of the group exercise sought explanations of how each group would engage in risk communication about their respective products. Each case-study

group presented an outline of how they would address hazards and risks to an example stakeholder audience. The expertise and experience of the group was very much reinforced by this exercise, and we proposed that future calls and meetings would continue to provide opportunities for case studies, and constructive feedback.

We also distributed a draft “decision guide,” which outlines considerations for thinking through an HHP use in the context of IPM, potential alternatives, and possible mitigations, as well as some key information needs and education points (see attached “Decision Guide” document).

The case studies were as follows (these notes summarize what was discussed in the workshop, and additional notes that were distributed to participants are attached:

- Dichlorvos, a vapor-active OP in strip formulation for domestic and for professional use. The concerns relate to exposure of users who may not adequately follow label instructions. There is also evidence for misuse, and preventative uses that may extend exposure – for example pest control professionals bagging clothes with professional-use-only strips without adequate instructions for handling by homeowners.
- Methomyl, a highly toxic carbamate, particularly via oral exposure. It is used in onions to control the thrips vectors of IYSV. There are alternatives but methomyl is effective and inexpensive, and can be used early season as part of a resistance rotation. It is also toxic to beneficial insects, birds, and mammals.
- Phorate, a highly toxic OP is a candidate for use against wheat stem sawfly in Colorado. WSSF in winter wheat has inflicted up to 25% yield losses, worth ~\$350 million a year. Solid-stemmed, resistant wheat is not available in Colorado. There are possible options in the medium term including winter wheat trap cropping in spring wheat field margins, and also planting of alternative crops such as winter triticale. Braconid wasps are parasitoids in 0-50% of stems. Alternative, foliar sprays would act as egg-laying inhibitors, and would need to be persistent and act rapidly. Use of 20% AI phorate granules poses a risk to birds, but ‘lock-and-load’ packaging in smart boxes reduces operator exposure. Phorate might be viewed as a transitional chemistry, but growers reacted negatively to it because of their experience with it in grasshopper control in the 1970s. Montana has a 24c registration for 5 years. It might also be used in a targeted way in margins only to limit risks and protect beneficial insect populations, including beetles.
- Linuron, a highly hazardous herbicide with both chronic and acute human health impacts. This chemical is not toxic to umbelliferous crops, where tillage as a weed suppression measure causes damage. There are few alternatives. Carrots can be planted within rotations as a weed management step. It has niche uses over small areas, and crop production may be dependent upon retaining use of this AI. It is on a ground water protection list because of prior records, and there is evidence for food chain effects. Options for risk management may include use of BMPs, and reduced application rates.
- Paraquat, a uniquely toxic herbicide which has no antidote. Important in crops such as nuts that are ground harvested, in winegrapes where there are concerns about glyphosate residues, and in seed crops where it is a burn down agent. Diquat may be an alternative, or glufosinate. Although there may be toxicity to certain wildlife and beneficial insects, and also to applicators, the main concerns with paraquat relate to its use internationally for suicide.

In outlining approaches to risk communication, individual groups discussed issues such as:

- Knowing your audience is critical: the message may need to be fine-tuned and adapted for farm workers, pesticide handlers, or applicators, PCAs/consultants, or farmers.
- Different approaches to setting up the conversation— how to present the range of information from benefits (including efficacy), risk and toxicity data, to alternatives, and how to discuss trade-offs.
- Discussing risk of non-target impacts vs risks posed by pests, and weighing the risks and benefits with an audience.
- Being specific about toxicity risks and data—including epidemiological data and specific exposure risks.
- Moving into mitigation strategies in cases where uses are unavoidable; ways to minimize risks (e.g. drip vs furrow irrigation; border vs whole field treatments; worker protection and limitation of critical exposure pathways)
- Thinking of ways to encourage questions from the audience

We then had some discussion about different approaches to risk communication, and both Paul Jepson and Bob Nowierski walked us through graphical representation tools for risk communication and decision-making (see attached photos -“Paul” and “Bob”).

The final part of our day was spent discussing challenges with the subject, and ideas for moving forward. The group provided the following thoughts:

- More information is needed by some regarding the lists and how they were derived to increase confidence in the classification system.
- Additional information is needed to understand toxicology data and the nature of specific risks.
- This has helped to advance the idea of engaging audiences on risk mitigation/communication and brought new thought processes and ideas to IPM that weren't there previously.
- It's up to us to “be the voice” for science; if we don't, who will?
- This group has the potential to offer a research-based unbiased source of pesticide toxicity information, and “safety in numbers” in putting this information to good use should this be helpful.
- More understanding is desired to be able to tease out the various risks posed by different AIs—bystander, off-target, dietary, etc.
- Incorporating graphics such as Paul's decision-graphic would be very helpful in education and web communication.
- Understanding is needed regarding the mechanisms of risk.
- This information could be very useful to IR-4/the IPM Criteria document; also to authors of IPM guidelines.

It was suggested that we establish a Western Region technical committee around pesticide risk reduction, and Bob Nowierski volunteered to be the NIFA representative for this (*Paul has already initiated this process*). There was also encouragement to apply for a larger grant that could take these ideas further. We will pursue both of these ideas.

We will continue our monthly calls beginning with our next call in late August/early September, date TBD. It was suggested that for some of our future call topics, a short podcast or video could be sent out ahead of the call, so that people could

review this before the call and engage in more discussion and Q and A during the call.

Ideas for future calls that came from comments throughout meeting:

- EPA risk assessment: findings, and understanding the risk assessment documents as a source of risk information that we can make use of.
- Toxicology 101
- Recording a demonstration extension talk
- Risk communication literature review
- Uncertainty analysis
- How to prioritize identification of “alternatives to HHPs” in our respective programs—with funding toward research and extension in this area
- Tracking outcomes
- Science Policy forum article

Meeting Summary

May 18th, 2018

Meeting sponsored by USDA Western SARE PDP Program

Present at the meeting were:

Peter Ellsworth, Al Fournier, Frank Peairs, Dawn Gouge, Mike Wierda, Cheryl Wilen, Karey Windbiel-Rojas, Marion Murray, Jim Farrar, Alex Latchininsky, Matt Baur, Tunyalee Martin, Diane Alston, John Connet, Naomi Pier, Doug Walsh, Katie Murray, Paul Jepson, Bob Nowierski (remote connection)

This was our second annual work group meeting, following the first in July of 2017. Based on our professional development curriculum topics on pesticide risk and hazard over the last year, workgroup members were asked to prepare risk communication projects that could be delivered to the group via a 10-15 minute presentation. The projects were intended to address some aspect of risk communication that would help deliver some of the new learning on pesticide risks, hazard, and risk communication to stakeholder audiences. The presentations were also designed to prompt group discussion and feedback regarding content, materials, methods of delivery, etc.

We had individual risk communication presentations from seven workgroup members: Diane, Peter, Dawn, Naomi, Frank, Matt, and Alex.

Diane’s talk focused on pollinator risks and was targeted toward specialty crop growers. Peter’s talk presented the group with new materials he has developed for use with the cotton industry- it included a table with natural enemy risks highlighted as green, yellow, red. Dawn’s talk was designed for a more public/urban audience, to communicate the relative risks of various products for residential use against cockroaches. Naomi designed a two-page handout that defines “risk”, for distribution to the general public and stakeholder audiences. Frank presented a talk he is refining that presents the risks vs benefits on the use of phorate in CO wheat. Matt discussed ways that we could work with PSEP programs to insert more information on pesticide risk and hazard. Finally, Alex gave a talk on his work with grasshopper management, demonstrating the ways he has introduced and discussed risks vs benefits of pesticide use to successfully reduce risks.

All of these talks elicited discussion. With Diane, we talked about making use of

information shared by Andony Melathopoulos in the WERA-1017 tour on pathways of exposure to pollinators. With Peter, we discussed ways of translating complex information into decision support. With Dawn, we saw scope for addressing formulation hazards – something we can add to our group agenda and address rapidly. With Naomi, we delved into the definitions and translation of risk and vulnerability concepts for lay audiences. With Matt we explored pathways for cooperation and integration with PSEP programs. With Frank, we discussed procedures for factoring risk-benefit data within the pesticide regulatory system, and farmer education. With Alex, we discussed education and scaling up experimental data to achieve efficacy and reduced risk across large scales.

We discussed evaluation, and focused on the ways we can track our impacts. We first deployed a short survey to learn about the ways each member currently evaluates programming related to pesticide risks. We then discussed methods for evaluating the work of our group, including the impacts that reach our stakeholders. We will work on developing common evaluation questions, and a process for reporting back.

In the afternoon, Paul gave a presentation on the principles of risk communication, followed by a presentation by Katie on 1) EPA terms and definitions (navigating EPA's Expobox <https://www.epa.gov/expobox>), and 2) navigating the regulations.gov website to find risk assessment data for products of interest.

Finally, we had a debrief from the day: what did we learn, new questions, ideas for next steps/future calls (a few members not listed here had to leave early to catch flights):

Doug – the work of the group is really important. We often have a limited ability to engage audiences on this topic, with short timeframes. A publication is needed and could be a collective effort.

Alex –the work is extremely important, and having material sources of information would be valuable – tools for extension to use.

Tunyalee –inspired by the meeting, will create a series of blog posts for UCIPM on pesticide risks. Considering a training for other faculty on EPA risk assessment.

Jim – interested in using pictograms, and finding a way of sharing understanding of risk assessment information.

Al – appreciated the day, interested in the dynamic between the end user expectations on risk communication and our capacity to deliver effectively. We need to know more about our audiences. Risk perception is a topic to explore further.

John – working on infographics on IPM principles and would like these to be used as general extension materials, will ask members of the group to vet these. Intimidated by toxicology, so this group is helpful in that sense.

Marion – challenge is how to incorporate this info given the short talks usually given. Marion is the Western SARE PDP coordinator and would like to pursue a training on this topic.

Mike – wants to push PSEP more toward the arena of risk communication and education, and is willing to play a role in this.

Naomi – Interested in pursuing risk communication as it relates to topics such as resistance management.

Dawn – will be doing things very differently in the future to help stakeholders make more informed decisions.

Peter – wants to get the tools out as quickly as possible, and to identify and mitigate the remaining risks.

Bob – wants to ensure that the public gets a complete picture of pesticide risks. thinks this group will have a legacy impact. J

Evaluation for Pesticide Risk Communication work group

Notes from AI

Audiences for Evaluation:

- Extension Educators
- End-users

What Educators Do:

- Increase knowledge about:
 - Risk
 - Hazard
 - Risk assessment process of EPA
- Learn new skills:
 - Use tools & resources associated with understanding / mitigating pesticide risk
 - How to read a Risk Assessment
 - How to navigate Regulations.gov
 - Gain Confidence / competency in:
 - Risk communication
 - Risk education program design
 - Change behaviors:
 - Make design changes Extension programs [?]
 - Educate end users about risk
 - Change the way they communicate about pesticides and pesticide risk
 - Revise publications, presentations, websites, etc.
 - Change pesticide use recommendations (document the difference in risk between new and old products * number of people reached to estimate potential impact)
 - Open ended
 - How many (and what types) of people did you educate about risk?
 - In what ways?
 - On what specific topics?
 - How well received was the information? Any resistance or challenges?

What End-users do:

- Increase knowledge about:
 - Risk

- Hazard
- Risk assessment process of EPA
- Learn that there are risks even to labeled use of registered pesticides
- Learn new skills:
 - Learn that there are different pesticide choices with varying levels of risk
 - Learn how to evaluate their options, e.g., how to use decision support tools
- Change behaviors:
 - Adopt decision support tools (can ask about specific ones, aggregate data on them)
 - Choose pesticides that have lower levels of risks associated with them
 - Choose reduced risk pesticides in place of broad spectrum pesticides
 - Communicate with peers, family and friends about reducing pesticide risk

Provide IPM Practitioners access to and education on a new pesticide risk classification tool to aid in risk-based decisions

Objective:

By providing Western Region IPM coordinators, extension faculty and others with access to and education on a state-of-the-science, risk classification system, we will achieve significant reduction in the use of highly hazardous pesticides in the West, and increase the use of reduced-risk products, and risk mitigation for other products. Alignment with this classification system will also bring Western US farmers more in line with internationally recognized and reviewed agricultural sustainability standards with respect to pesticide risk management, which will increase their access to certification and marketing opportunities. We will also seek to expand the reach of our program through US and international meetings and collaborations.

Description:

This tool was built from risk assessment and extension IPM methods and processes developed at OSU. In 2016, the Sustainable Agriculture Network (SAN) formally adopted this process for pesticide risk classification, following a year of industry and peer review. In 2019, it has been adopted by the Rainforest Alliance, as the basis for their certification standard for pesticide management. We have refined this tool for use by Western US farmers and state IPM programs, and provide access to and education on a version of this system adapted to the Western region. The system classifies a small number of products as “highly hazardous” (<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/hhp/en/>) and isolates these from other high-risk pesticides for which risks can be mitigated. An important aspect of this objective is discussion regarding implementation of this approach, and supporting lower risk practices with western region farmers through our various IPM Extension education programs. Education on understanding the current practices and critical needs of farmers to encourage a transition away from highly hazardous pesticides will be an important component of this objective.

Outcomes and impacts:

The classification system for highly hazardous pesticides and pesticides requiring mitigation of risks to bystanders, aquatic life, terrestrial wildlife, and pollinators was

distributed and discussed at the Irvine and Portland workshops, and a draft extension publication was reviewed in early 2019 during conference calls. (see reports above, and teleconference summaries). It was also outlined in a very well attended meeting at the International IPM Symposium in Baltimore, Maryland, March 2018 (see summary at foot of this section]

This system now forms the basis for our pesticide review process, and the development of novel extension hazard and risk-based extension communication tools.

The system was used in formulation of a chapter on hazard elimination and risk reduction in a Fall Armyworm IPM manual for Africa - this uses the pesticide risk classification system, and the chapter acknowledges the role of the workgroup in discussing and reviewing this application of the tools that we are implementing as part of this program. This system is now in use by USAID, and the UN FAO, and one goal for our workgroup is to become a consultative, expert body on the role of pesticide risk management in IPM systems.

It is also now used within IPM Strategic Planning processes, under the auspices of the Regional IPM Centers.

See:

Jepson, P.C., Murray, K., Bach, O., Kachigamba, D., Ndeithi, F., Kibaki Miano, J., McCracken, T., Onyango, D., Nthegna, I, Agboka, K., Byantwala, S., DeGroot, H. (2018) Pesticide hazard and risk management, and compatibility with IPM, pp 29-44. In Prasanna, B.M., Huesing, J.E., Eddy, R., Preschke, V.M. *Fall Armyworm in Africa: A Guide for Integrated Pest Management, First Edition*. Available at: <https://feedthefuture.gov/resource/fall-armyworm-africa-guide-integrated-pest-management-first-edition>

US/International workgroup meeting

International IPM Symposium

Baltimore, Maryland

March 21st, 2018

Tools and processes for the transition towards lower-risk pesticide programs in IPM systems

Organizers, Paul Jepson and Katie Murray, Oregon State University, and workgroup members.

This was a moderated panel, with 5-minute presentations to prompt discussion with audience members.

Moderators: Katie Murray and Paul Jepson

Panelists will include:

Paul Jepson: Integrated Plant Protection Center, Oregon State University [Pesticide hazard classification systems, risk assessment and risk communication]

Joseph Huesing: USAID lead entomologist Fall Armyworm Taskforce [Application of pesticide risk management tools to fall armyworm management]

Robert Nowierski : USDA NIFA (WERA 1017 representative): [Collaborative pesticide risk management programs across Western US IPM extension]

Katie Murray: Integrated Plant Protection Center, Oregon State University and Western IPM Center: [Farmer consultation, engagement and feedback to extension, research and policy]

The most recent version of the Food and Agriculture Organization's International

Code of Conduct on Pesticide Management formally acknowledges the central role of IPM in reducing pesticide risks to better protect human and ecological health and achieve lasting transformation to more sustainable practices. Reducing pesticide risks is also among the goals of the National IPM Roadmap. IPM Extension programs are essential to progress in risk reduction and provide an essential component of risk management by contributing to safe and effective use, and employment of alternatives to pesticides. Successful efforts in hazard elimination and risk reduction must address multiple pathways, including decision-support in pesticide selection to encourage use of low and reduced-risk products, risk mitigation education for higher risk products, and encouraging the phase-out of highly hazardous pesticides in order to best protect human health and safety and preserve ecological services.

The panelists all have direct experience in addressing hazard elimination and risk reduction through research, extension, regulatory processes and marketplace mechanisms, and they represent the main pathways via which risk reduction can be achieved. All are active in IPM and engage with farmers directly. A group of State IPM Coordinators in the Western USA are partnering in a regional collaborative effort and a representative from this group of over 20 extension educators will also participate in the panel.

The session is intended to inspire positive and practical follow-up by participants, and to enable follow-up in other US regions and developing countries.

Design a 12-month pesticide risk education curriculum for IPM practitioners, implemented through monthly conference calls

Objective:

Using a curriculum targeted at capacity development in pesticide risk assessment and education to continue an established routine of monthly calls with the project collaborators, we will strengthen the capacity of all Western region statewide IPM programs on the concepts, principles, and delivery of pesticide risk assessment, communication, and education. This will directly translate to documentable pesticide risk reduction among the participating farmers served by these programs.

Description:

Webinars are conducted with group members on a monthly basis, with some exceptions for the busiest time in Western cropping systems, and for the months where face to face meetings take place.

Attendance has been high, and engagement by group members is significant.

A list-serve has been created for group members, where call announcements and agendas are distributed, and meeting summaries are distributed.

The group is consulted about agendas and there are active on-line and follow up questions that are responded to in call summaries.

Outcomes and impacts:

21 calls have been conducted between September 2016, and April 2019.

Months and year of calls, [numbers attending], and brief topic descriptions are:

Sept 16 [16] The need for risk-based extension programming

Jan 17 [16] Highly Hazardous Pesticide (HHP) Classification

Feb 17 [14] HHP Classification contd.

March 17 [18] The WHO pesticide classification system
May 17 [13] Chronic risk criteria
Jun 17 [9] HHP use in Western States
August 17 [14] Linuron hazards use in AZ
Oct 17 [7] Chlopyrifos risks and use patterns in the W USA
Dec 17 [16] Christmas Tree pesticide hazards and risks; Fall Armyworm in Africa - HHP use
Feb 18 [12] State by state experience with using HHP and risk classifications (AZ, CA, NV, OR)
Mar 18 [13] Risk communication
Apr 18 [11] Planning for the year ahead
Jun 18 [7] REACH tables and access to hazard information within the GHS system
Aug 18 [12] HHP use in the West, state by state analysis process
Sept 18 [10] HHP registration in US: results of analysis
Oct 18 [11] Selection of materials for state by state case studies
Dec 18 [7] Publication planning
Jan 19 [10] Risk communication, HHP project discussion
Mar 19 [13] Risk management and IPM, HHP project discussion
Apr 19 [8] HHP project discussion, review pesticide risk management publication, and planning for annual meeting

Educational & Outreach Activities

23 Consultations
4 Curricula, factsheets or educational tools
21 Online trainings
1 Published press articles, newsletters
23 Webinars / talks / presentations
1 Workshop field days

PARTICIPATION SUMMARY:

25 Extension
30 Researchers
5 Nonprofit
30 Agency

Learning Outcomes

22 Participants gained or increased knowledge, skills and/or attitudes about sustainable agriculture topics, practices, strategies, approaches

21 Ag professionals intend to use knowledge, attitudes, skills and/or awareness learned

Project Outcomes

1 Grant received that built upon this project

25 New working collaborations

Project outcomes:

2017 Evaluation:

100% [N=15] of workshop participants in 2017 found the July workshop to be valuable education opportunity, 93% will apply this in their state IPM programs, 93% felt they contributed positively to the workshop, and 100% gained a better understanding of the complex criteria for hazard and risk.

In the curricular areas:

33% felt capable of responding to questions about hazard and risk classification

67% can classify pesticides by hazard and risk

33% can explain why particular pesticides are classified in a particular way

60% developed new education approaches to address hazard and risk

80% can discuss trade-offs between hazard, risk and efficacy with decision makers

2018 Evaluation: For 2018: see attached .pdf file [2018-Western-Risk-Reduction-Group-Meeting-Evaluation-Summary_Final](#)

25 Agricultural service provider participants who used knowledge and skills learned through this project (or incorporated project materials) in their educational activities, services, information products and/or tools for farmers

Additional Outcomes:

A list of education and capacity building needs for IPM educators has been assembled and we are actively responding to this in the continuation to this project.

We have published the risk classification system that provides the core technical support for our work. This acknowledges the WSARE funding source, and it is an Open Source publication that includes a technical guideline for IPM educators globally, as well as in the W USA.

The article is:

Jepson, P.C., Murray, K., Bach, O., Bonilla, M.A., Neumeister, L. Selection of pesticides to reduce human and environmental health risks: a global guideline and minimum pesticides list. *Lancet Planetary Health* 2020; 4: e56-63.

DOI: [https://doi.org/10.1016/S2542-5196\(19\)30266-9](https://doi.org/10.1016/S2542-5196(19)30266-9)

We are completing an analysis of highly hazardous pesticide use in the W USA, and

actively continuing the groups' work under sponsorship from the Western IPM Center.

The hazard and risk classification system is in active use by millions of farmers with Rainforest Alliance or UTZ certification, and it has been used throughout Africa and Asia as part of the response to the Fall Armyworm outbreak.

Monthly calls and annual meetings continue under W IPM Center sponsorship.

Success stories:

An extension faculty member from AZ demonstrated how she is trying a different approach with her audiences—being direct and clear about pesticide risks and hazards. Showing real photos of high-risk off-label uses of dichlorvos, identifying this product as a “highly hazardous pesticide”, and using language from labels to reinforce the risks and hazards.

An extension faculty member from AZ shared the ways he now engages audiences on risk communication. One tactic he uses is to walk them through an LD50 map. He converts mg/kg to oz/lb to help them understand the dose/risk relationship. He also shared that he has found people care more when discussing risks to children, pets, and the environment rather than to themselves, so this is a way that he tries to reach his clientele with this information.

An extension faculty member from Nevada shared her experiences working with college students applying pesticides and looking at the chlorpyrifos data we discussed as a group. They discussed some examples where the label isn't always enough to protect against exposure, and the ways to get additional information about certain products (EPA website). She has appreciated being able to give people access to additional levels of information. She pointed out again that people tend to care more about others' exposure, and personal risks are a lower priority.

An extension educator from OR shared a new table that she is using in IPM Strategic Plans that lists all pesticides used by an industry, and notes the IPM PRiME risk categories (aquatic, terrestrial, bystander, pollinator) for each product. HHPs are highlighted, and a definition is included. For each product, the workgroup fills out the average number of uses per crop stage. This is a start on a process that will be improved upon over time and fed into extension literature and education programs.

An extension educator from AZ shared that he had communication with a representative from the AZ carrot industry about the dietary risk involved with the use of linuron. This person's decision would impact most of the AZ usage of this product in carrots. He noted that chronic effects are more difficult to convey than acute effects, especially with exposure models that assume 100% use. One issue here is how to make real the risks and hazards, especially when chronic and not acute.

An extension educator in Colorado, used hazard and risk information from our analyses, in combination with efficacy data to argue against registration of phorate as a management treatment for wheat stem sawfly.

From above outcomes statement:

The hazard and risk classification system is in active use by millions of farmers with Rainforest Alliance or UTZ certification, and it has been used throughout Africa and Asia as part of the response to the Fall Armyworm outbreak.

Information Products

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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