



# Crop protection: pests, weed and pathogens

## Crop Protection : Pest, weeds and pathogens

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**Transitioning Cereal Systems  
to Adapt to Climate Change**

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What are the principal gaps and opportunities for linking efforts in this area to the others covered in the breakout sessions on **Crop Protection: pests, weeds and pathogens**

– **Gaps**

- » Institutional: need more mechanisms like the REACCH, covering CC issues in a holistic, systemic and integrated manner at local, national, regional and global scale
- » Formulation of transdisciplinary R&D questions and projects/ programs
- » Pest, weeds, diseases incorporated (better) into crop models
- » Better understanding of farmer decision trees and how cultural, social factors and technical information are integrated in those decisions about crop protection (and other management decisions)

– **Opportunities**

- » This meeting, mix of the key players for a new approach to R&D
- » Improve the modeling research by linking different and complementary models to provide information / projections to decision makers on their policy options for food security, taking into account all three sustainable development dimensions
- » NSF grants for system research in food systems
- » SDGs and the need to act on CC both for adaption and mitigation
- » AgMIP



## What sorts of **short and long-term activities** could promote the needed collaboration and integration?

### – Short term

- » **Implementation of known solutions in CC adaptation and mitigation (i.e, push pull or derivatives using different crops/trap/repellant plants)**
- » **Farmer communication programs, knowledge networks. Better connection between crop protection/plant health can be linked to crop production**
- » Assessment of food systems at different geographical levels to inform new policies to meet sustainability targets
- » Estimate the economic return of sustainable ag practices in terms of carbon sequestration, both for the actual carbon in the ground and the increased land productivity with increased organic matter in the soil

### – Long term

- » Overhaul of the incentive model (present subsidies) to favor sustainable practices
- » **Develop methodologies for true pricing, internalization of externalities in the product prices, to trigger and support the transformation**
- » Government funding for R&D in Universities, Research Institutions for transdisciplinary projects/ programs
- » **Research into details of the ag-food system, to improve the models that will inform policy changes, covering consumption to production in a circular manner**
- » **Better linkages between crop models and production systems models**
- » **Research into impact network analysis, ie seed distribution systems, effect of insurance pest management schemes**
- » **Need research into plant behavior/signaling and reaction to external cues (pests and also abiotic factors (CC), both above and underground**



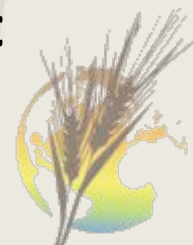
What are imminent threats or needs for pest-weed-disease risk assessment in cereal systems undergoing climate change?

## – Threats

- » **New outbreaks**
- » **Pests expanding range, where the natural enemies may be missing leading to major losses; other biocontrol disruption**
- » **Unpredictability**

## – Needs

- » **Better models, that would take a holistic view of the potential problems**
- » **Data collection and management, in the public domain**
- » **More capacity development in system thinking, system modeling and linking different models that can be used by policy makers**



What approaches are needed to address the combination of biotic factors affecting semiarid cereal cropping systems?

**– Approaches needed**

- » **Landscape approach that is inclusive of all its elements, including human systems**
- » **Transdisciplinary R&D, agronomists, pest management specialists, economist, plant breeders, ecologists, nutritionists, anthropologists, .....**
- » **Take inclusive approach in defining needs and opportunities (multistakeholder)**
- » **Need to know more about the adaptive capacity of pests and the natural enemies; about their potential for migration; about pest system management options, in particular at landscape level**



How could large scale changes in production systems as part of adaptation affect pests, weeds and diseases?

–CC adaptation changes in production systems that may changes affect pests

» Adaptation changes, if they are along the lines of increasing the diversity of systems, crops and animals at species and genetic levels, are likely to help with the pest, disease and weed problems, as to be successful, these changes will have to improve plant and animal health and resilience,

» x

» x



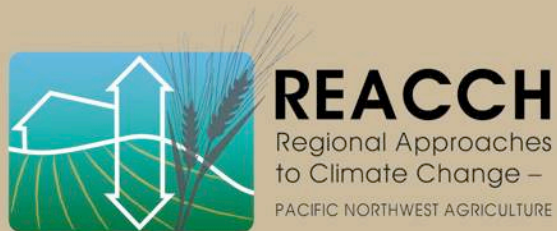


# Thank you!

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United States Department of Agriculture  
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Pacific Northwest  
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Monsanto