



# Cropping system improvements and innovation session

**Paul Fixen, International Plant Nutrient  
Institute**

Nutrient stewardship innovations for  
increased cereal system resilience

**John Kirkegaard, CSIRO**

Cropping system management variables  
and effects on C, N, and water across  
production zones: Australian  
perspective

**Bram Govaerts, CIMMYT**

Increasing productivity in rain fed,  
semiarid systems by analyzing and  
remediating limiting factors



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

November 13-14, 2015

What are the principal gaps and opportunities for linking efforts in this area to the others covered in the breakout sessions?

Alternative system design  
principle: ***Stacked management***,  
(like stacked genes of variety  
development) approach for  
enhancing resource use  
efficiency (multi-year and pre-  
crop)



Partnerships with a focus on  
actors and participants;  
upside down extension model

Indicators and analytics to  
answer “how are we doing?”  
through a decision making (and  
evaluation) cycle

**G(enetics)\*E(nvironment)\*M(anagement)**  
**broad thinking, integrative innovations**

Whole systems approach (not just talking about working with a department in another college, but everyone in the value chain, e.g. bankers) to model risks faced by growers (personalized)

Partnerships in which growers prioritize research and extension needs

Reward for non-disciplinary goals, transdisciplinary team playing

Factoring in soil storage (i.e. soil organic matter) into assessments of multi-year efficiency metrics

Are bare bone inputs/outputs enough?

Do we need to include microbes and soil quality in our resource use efficiency assessments and management?

**De-convolute aggregate data to  
tease out mechanisms, impacts of  
site specific system alternatives**



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

# Value long term field research for modeling



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

– Question: what is holding back the adoption of conservation agriculture?

- » Ease of entry: adopt technology
- » Need flexibility in how we practice conservation management— “stacked management tools in various combinations”
- » Judge success of CT on several scales
  - One year yield and economics
  - Rotation
  - Economics of ecosystems services  
“who’s paying for the future?”





# Thank you!

University  
*of Idaho*



United States Department of Agriculture  
National Institute of Food and Agriculture



Pacific Northwest  
Farmers Cooperative



Monsanto