Transitioning Cereal Systems to Adapt to Climate Change

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Linking Local and Scientific Knowledge: Opportunities and Challenges

Adaptation in agriculture is local

- While climate is a macro-concept—*adaptation in agriculture is local*
- Adaptation depends upon local context
  - soil, water and climate conditions vary significantly even between farms
  - the constraints imposed by infrastructure, individual financial situations vary
  - The goals and strategies of farmers to deal with can risk limit their options

Creating "Actionable Knowledge"

Disconnect

Knowledge produced by research generally cannot be directly applied by farmers

- Lack of understanding of farmer conditions and constraints

This is particularly true of results of climate modeling

Example: Farmers Business Network Raises $15M from Google ventures

- "Until now, farmers have had to rely on university trial data from highly controlled experiments, or on information from the seed companies about which seeds to use and what populations to plant," says Charles Baron, co-founder of FBN.
- "Yet neither of these sources accurately represent real-world performance of crops"

Successful Adaptation requires linking local knowledge and scientific knowledge

Local Knowledge

1. Empirical
2. Context specific
3. Explanations based on what "works" in a context
4. Focus holistic, multiple goals/quality of life
5. Principal language is practice

1. Empirical
2. Relationships that hold true over time and space
3. Explanations based on theory and observation
4. Focus reductionist – dependent variables and optimization
5. Principal language words, symbols

Comparing local and scientific knowledge

Perceptions

- Less rainfall
- Later onset of the rainy season
- Warmer
- More frost and hail risk

Meteorological Data

- Rainfall unchanged
- Onset of rainy season unchanged to date but will occur in future
- Warmer
- More frost in some areas but not in others

Both are Right

- Both are based on the observation of the same conditions but the conclusions are different
- Understanding this allows us to help farmers develop adaptation strategies under uncertainty rather than worrying about this gap as and educational gap.

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