Preparing to Adapt

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Northeast Climate Hub Partners Meeting
Rutgers University
MARCH 14 - 15, 2018
When to Adapt?

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Adaptation: adjustments in response to climatic changes (direct & indirect)

- Changes in practices (farming, financial, decision making)
- Changes in infrastructure

Mitigation: Reducing greenhouse gases in the atmosphere by limiting emissions or increasing their uptake
When to Adapt? When to do what?

• Business decision (What will it cost? What are the benefits?)

and keep in mind

• Climate change is only one of many factors already impacting an operation (prices, labor, weather, regulations)
• The details of how the climate will change are riddled with uncertainty
Consider climate and non-climate factors

Significance of climate factors

None   Medium   High

Significance of non-climate factors

None   Medium   High

Adapt
Climate adaptation decisions

Climate influenced decisions

Climate independent decisions

Willows et al. 2003 Climate adaptation: Risk, uncertainty and decision-making.
Adaptation Decision Errors

Willows et al. 2003 *Climate adaptation: Risk, uncertainty and decision-making*. 
Before we can answer the question “When to Adapt?” We need to know more.

1. What are the risks? Different climate events will have different risks (drought, excess rain, frost, freeze).
2. Risks need to be prioritized.
3. What will it cost to address the risk?
4. How much certainty do we have about this?
Risk is the combination of the probability of an outcome and its magnitude.

Risk = how likely X how bad ($$)

(bad can be good!)

Risk depends on individual

Willows et al. 2003 Climate adaptation: Risk, uncertainty and decision-making.
Likelihood of temperature change

Risk = how likely X how bad


RCP 8.5
Crop responses to warming depend on

Risk = how likely X how bad

- Wheat
- Corn
- Soy
- Rice

26 studies, '72-'06, sum. by Hatfield 2011

Mean June Temps, '81-'10

°F (24-hour mean)

Nitrogen & water not constraining.
Rainfall has a large impact on yield

Risk = how likely X how bad

Uncertainties

• How much and how fast will greenhouse gases rise? (economics, technology, policy)
• How will climate and weather respond to these changes?
• How will non-climate factors change?

However, the near-term (<20 y) is fairly well known
What to do when we can’t estimate risk?

Risk = how likely \times how bad

‘WIN-WIN’ situations – options which reduce the impacts of climate change and have other benefits (not directly motivated by the need to adapt). Cover crops, precision N

No regret options - worthwhile now (in that it would yield immediate economic and environmental benefits which exceed its cost), and continues to be worthwhile irrespective of the nature of future climate. Irrigation, drainage

Limited or low regret decisions - costs are very low while, bearing in mind the uncertainties in future climate change projections, the benefits under future climate change may be large. Siting of vineyards on N slope, new varieties

Wait for better information
Key Principals for Adaptation (and NE Hub Priorities):

1. **Estimate Risks** (how much is climate change going to cost?)
2. **Prioritize Risks** (what do you focus on?)
3. **Cost-benefit analysis of adaptation** (case studies, etc.)
4. Choose **“No regrets” and Win-Win options first**
5. Focus on near-term (<20 y)
Thanks!