National Climate Assessment (NCA): Agriculture Chapter

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NCA: agriculture chapter

• Ag is a very broad field
  – multiple dependencies on climate
  – 8 pages, including tables, figures, and title page(!)

• Traceable accounts/key messages

• Sections (1 June version)
  – Introduction
  – Crops & livestock responses
  – Impacts on soil and water
  – Extreme events
  – Adaptation and economics
  – Research needs
NCA: traceable accounts

• Abiotic
  – CO₂, T, P changes affect and in some cases stress crops/livestock.
  – Detail of changes uncertain; interactions (e.g. animal/rangeland); adaptation likely on short term.

• Biotic
  – Exacerbate pest pressures; pollination, growth cycles altered
  – Timing matters but is uncertain; interactions (e.g. pests and ag product); departures from past equilibria

• Natural resources
  – Soil fertility/erosion losses; water availability (e.g. ground water drops; less snow ‘banking’)
  – Precip changes: shifts, timing & intensity uncertain; adaptation limited and already started (e.g. drip)

• Extreme events
  – Thresholds matter & differ quite a bit between commodities; combinations matter (high RH with high T); timing can be more critical than magnitude(e.g. slight freeze at blossom)
  – Simulation of extremes (esp. combinations) uncertain; rarity introduces uncertainty

• Economics
  – Larger market forces; adaptation has costs (e.g. changing crops, water delivery); infrastructure and critical size issues; regulation
  – Quantifying complex interactions of market sectors uncertain; economic value of ecological services uncertain
NCA: Sections highlights

• Introduction
  – 300$B enterprise; climate change a major challenge to ag; ag resilient on short term

• Ag Crops & livestock responses
  – CO₂ affects plant growth (crop & weeds); interactions (soil, water avail, T, etc.); some adaptation possible; crop zone shifts (e.g. chilling hours figs.)

• Impacts on soil and water
  – Erosion (increased rainfall intensity); tillage demands; water demand up availability?

• Extreme events
  – impacts greatest at early development & harvest; other phenological issues (bolt); conditioning livestock

• Adaptation and economics
  – Adaptation & pest control have costs & need infrastructure;

• Research needs
  – Quantify clim. chg. interactions on yield across species
  – Develop management tools/systems for extremes
  – Eval clim. chg. on pests range & crop interaction
  – Integrated assessment of various adapt strategies
  – Future climate chg on range of time & space scales, especially for extremes (& wx combinations)