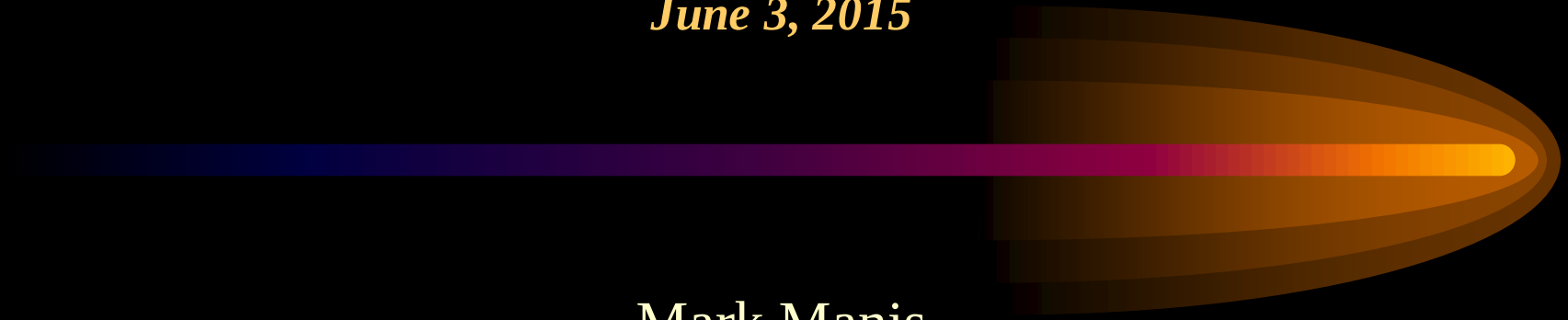
SBSTA Workshop

Assessment of and vulnerability of agricultural systems to different climate change scenarios at regional, national and local levels, including but not limited to pests and diseases

June 3, 2015



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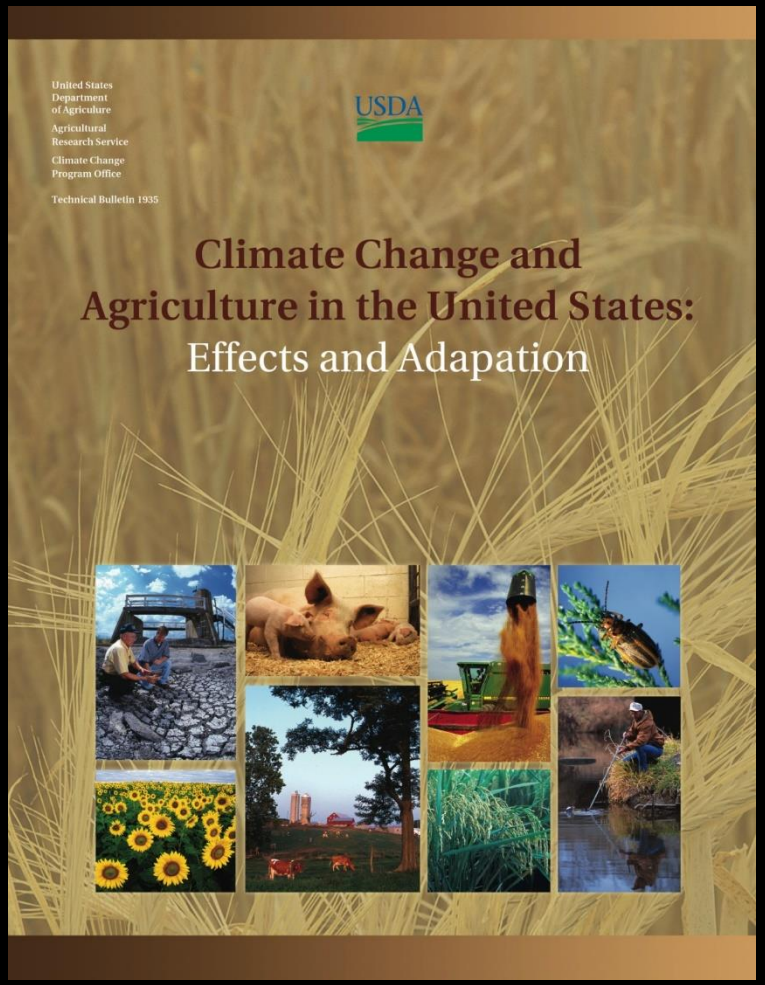
Presentation Topic



United States experiences with the assessment of risk and vulnerability of agricultural systems to different climate change scenarios at regional, national and local levels

USDA Report

- State of U.S. agriculture and climate science
- Effects of climate change on agricultural production
  - economics of these effects, and potential adaptation strategies
- Adaptation strategies to minimize the costs and capitalize on the opportunities

USDA Report: Climate Projections Across U.S.

- Interior U.S. see warming of 2-3˚C and coasts 1-2˚C
- Precipitation patterns uncertain, but likely that most areas will see more precipitation
- More precipitation = runoff and erosion

USDA Report: Direct Effects

- Air temp will increase, resulting in overall decrease in plant yield
- Night time air temperatures affect plant respiration
- Longer growing season, however will also increase crop water demands
- Livestock will be stressed: pregnancy, market weight, reduced milk
- Excess precipitation = erosion, decreased soil quality, death in young plants

USDA Report: Direct Effects

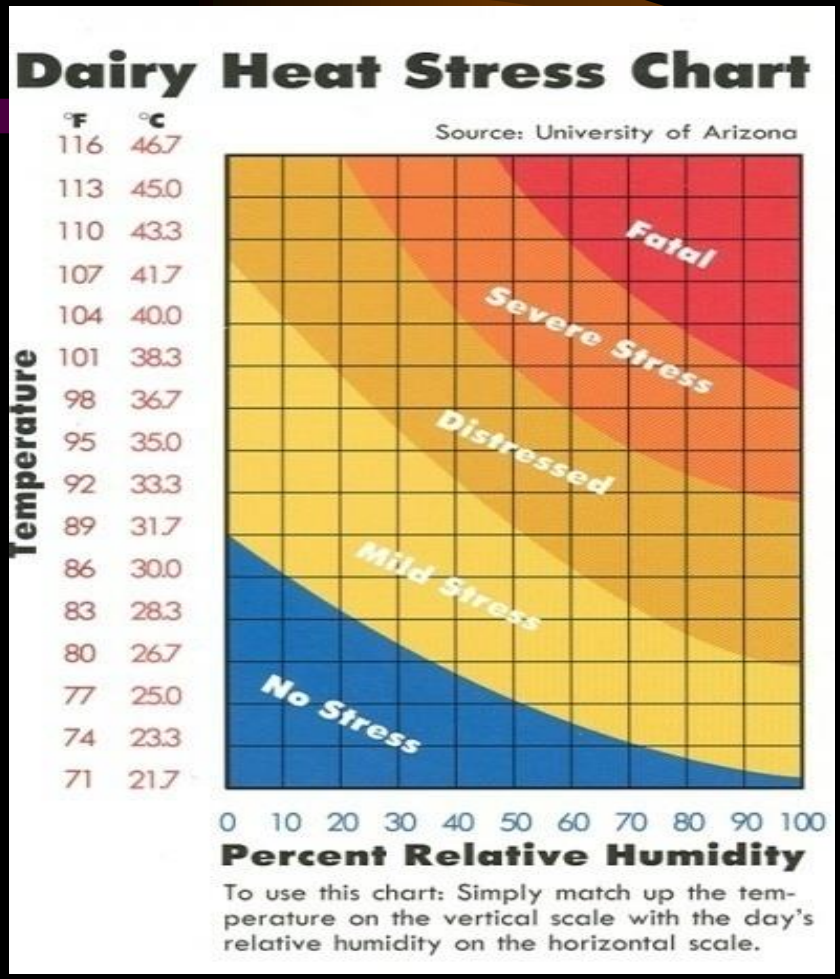
- Plant and weed response to CO_2 will vary
- Wheat, rice, soy, cotton increase with CO_2, corn not affected
- Elevated CO_2 can help reduce water loss and loss due to ozone
- Grasslands respond positively to CO_2, predicted increase
- Some N fixing plants fix less at elevated CO_2, which has implications for crop growth

USDA Report: Pests

- Ranges of pests limited to ranges of host plants and ability to survive winter temperatures
- Increasing temperatures generally good for insects
- Humidity positively affects insect growth and diseases they carry
- Tissue feeding insects ranges may expand: Bluetongue is 800km north
- Effects of CO2 hard to predict
- Management costs will likely increase

Livestock

- Projections for 2040 show a 6% loss in swine ($12.4 million annually), beef loss at 3.8% ($43.9m), dairy loss at 2.2% ($28m)
- Decreased production in southern U.S., decrease in North
- High producing animals more affected, conception rates are reduced
- **Key to adaptation:** breeding animals to be tolerant of heat stress, physical modification of environment, or improved nutritional management during periods of high heat



Adapting Strategies in Use Today

- USDA has prepared comprehensive climate adaptation plans for each Agency.
- Changing cultivar selection or timing of field operations
- Increased use of pesticides to control higher pest pressures
- New strategies for preventing rapid evolution of pest resistance to chemical control agents
- Development of new pesticide products and improved pest and disease forecasting
- Crop diversification and the management of biodiversity at both field and landscape scale to suppress pest outbreaks and pathogen transmission

California's Central Valley

Adaptation measures include:

- Developing crop and livestock production systems robust to drought, pest, and heat stress
- Diversifying crop rotation
- Integrating livestock with crop production systems
- Improving soil quality
- Minimizing off-farm flow of nutrients and pesticides

National Agricultural Adaptation Planning

- Solutions are at the local level, must integrate local responses with national actions
- National agricultural adaptation strategies promote development of sustainable agriculture
- Policies will have to be a balance between adaptation and mitigation measures
- US adaptation policy begun in 2009 when senior reps from more than 20 agencies joined taskforce chaired by White House, NOAA, CEQ

National Agricultural Adaptation Planning

- Strengthening climate-sensitive assets
- Integrating adaptation into relevant government policies
- Addressing climate stressors that degrade adaptive capacity
- Requires regular evaluation and revision of adaptation plans

USDA Climate Hubs

USDA Climate Hubs

- Delivering science-based knowledge, practical information and program support
- Supporting climate-informed decision-making
- Providing outreach, education and extension to farmers, ranchers, forest landowners, and rural communities on science-based risk management

USDA Climate Hubs

- Translate climate change projections into potential impacts on the agricultural and forestry sectors

- Provide periodic regional assessments of risk and vulnerability in the agriculture and forestry sectors to help land managers better understand the potential direct and indirect impacts of a changing climate

Thank You