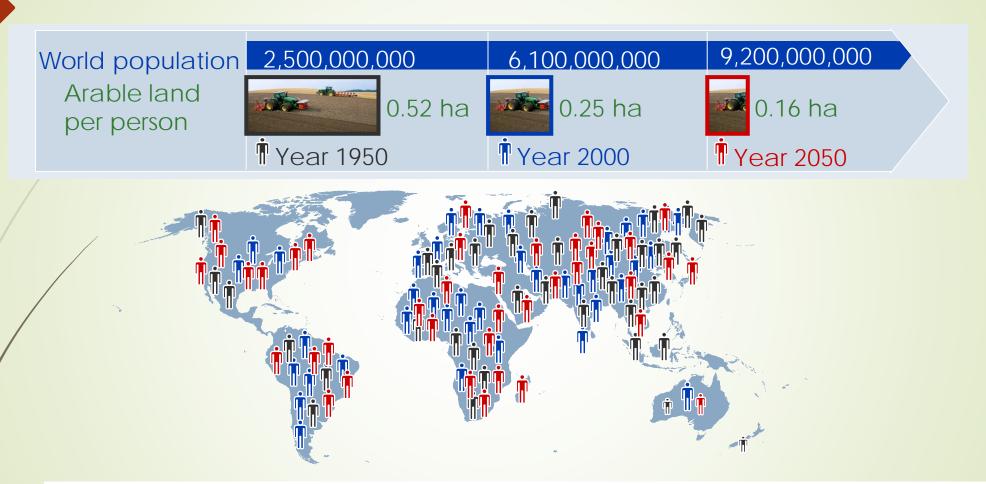
### Regulatory Considerations

Dr. Danesha Seth Carley

Director, Southern IPM Center

Associate Professor, Horticultural Science, NC State

#### Food Supply: A Global Challenge

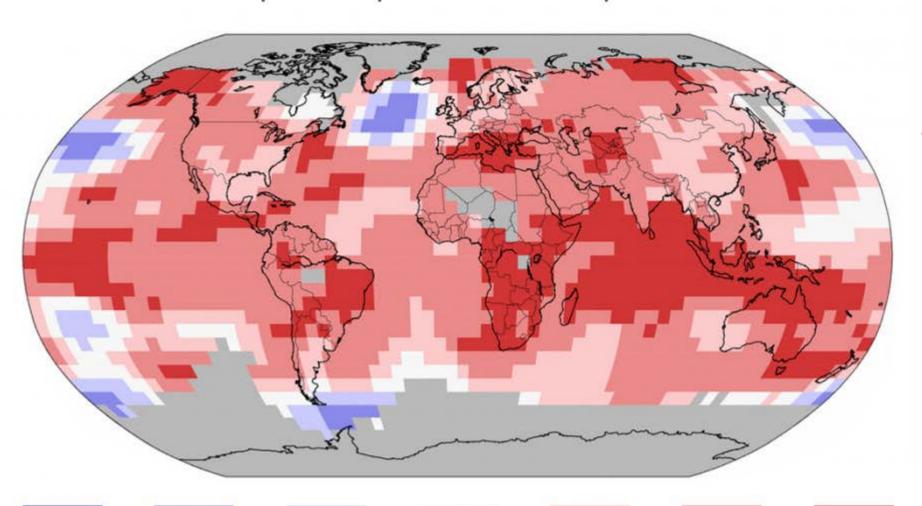


With limited arable land and a continuously growing world population, the available farmland per capita is expected to further decrease dramatically

# Average Global Temperature Anomaly 2003-2007 Temperature Difference Celsius NASA/Goddard Space Flight Center: Piecing Together the Temperature Puzzle, Animation 10574

#### 2016: Hottest Year so far

Land and ocean temperature percentiles Jan-Apr 2016



Hottest years in modern record

16 of thetop 17 haveoccurred since

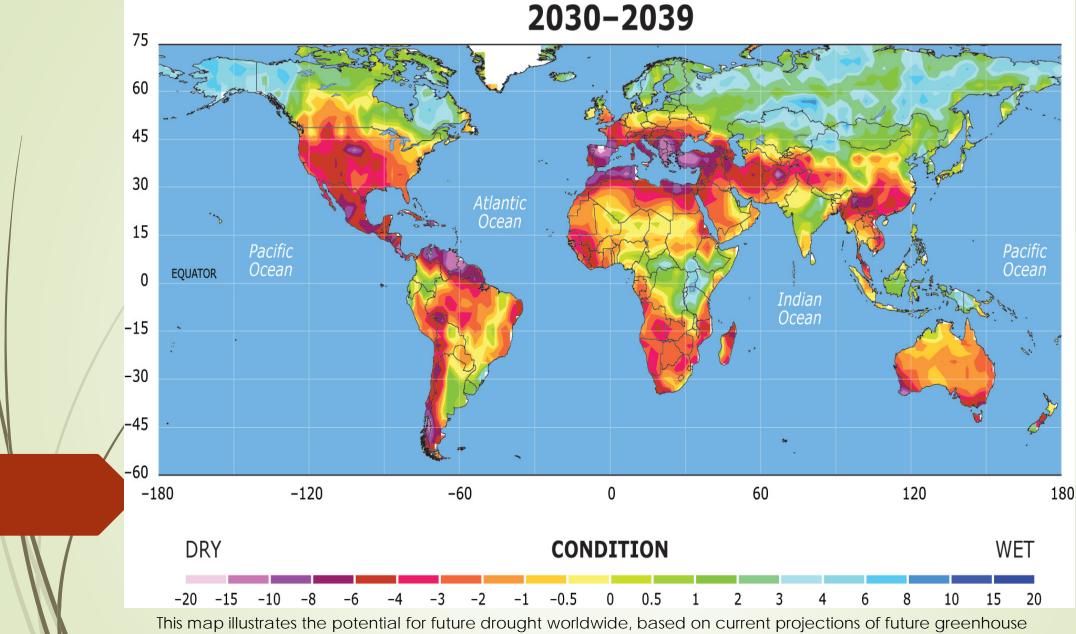
2000

Scientific American

Record coldest

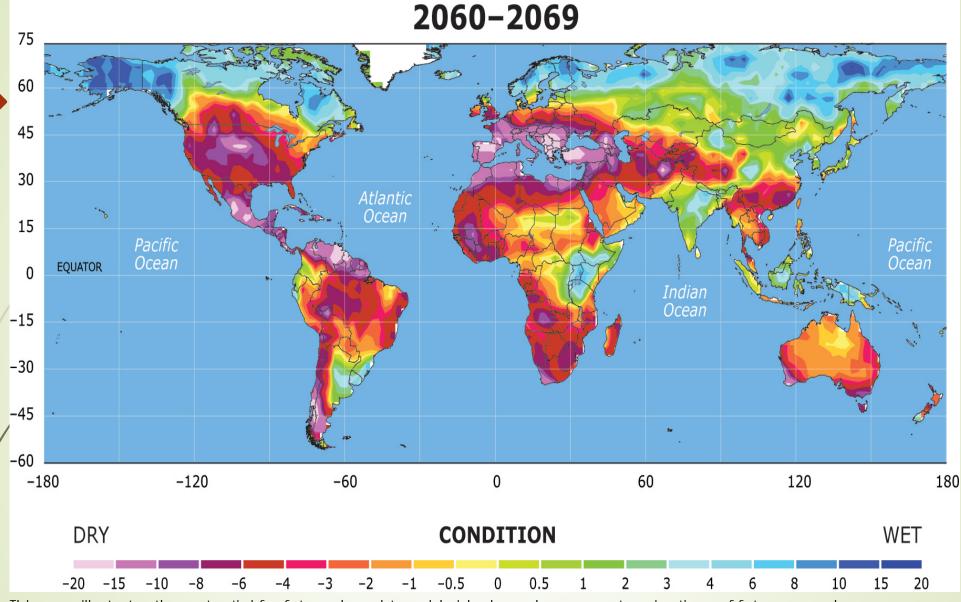
Much cooler than average Cooler than average

Near average Warmer than average Much warmer than average Record warmest



This map illustrates the potential for future drought worldwide, based on current projections of future greenhouse gas emissions. The maps use a common measure, the Palmer Drought Severity Index, which assigns positive numbers when conditions are unusually wet for a particular region, and negative numbers when conditions are unusually dry. A reading of -4 or below is considered extreme drought.

Source: University Corporation for Atmospheric Pessarch



This map illustrates the potential for future drought worldwide, based on current projections of future greenhouse gas emissions. The maps use a common measure, the Palmer Drought Severity Index, which assigns positive numbers when conditions are unusually wet for a particular region, and negative numbers when conditions are unusually dry. A reading of -4 or below is considered extreme drought.

Source: University Corporation for Atmospheric Research

GLOBAL POPULATION GROWTH<sup>4</sup> 7B 9B 2050

AGRICULTURAL PRODUCTION NEEDS TO INCREASE<sup>4</sup>

70% 2050

TODAY'S CROP PRODUCTION ALLOCATION

62% HUMAN FOOD 35% 3%
ANIMAL BIOEN
FEED SEED

3%
BIOENERGY CROPS,
SEED & OTHER
INDUSTRIAL PRODUCTS

<sup>&</sup>lt;sup>3</sup> www.crophutrition.com

<sup>&</sup>lt;sup>4</sup> FAO Expert Meeting on How to Feed the World in 2050; 200s

<sup>&</sup>lt;sup>5</sup> Institute on the Environment, University of Minnesota

#### What are Our Responsibilities?



#### Regulatory Challenges

- Regulation of new technology in food crops is important
- Safe and powerful technologies have tremendous impacts on agriculture
- Future innovation and deployment is slowed by a lack of understanding.

## Center for Regulatory Science in Agriculture at NC State

- Our challenge
- Awareness of regulatory issues
- Education
- Unbiased approach

#### **Education and Outreach**





#### Research and Engagement



