

# Changing the Drought Management Paradigm: *Adapting to a Changing Climate*

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# Presentation Outline

- The **MANY FACES OF DROUGHT**
  - Drought as hazard, definitions, characteristics
- Breaking the **HYDRO-ILL<sup>😊</sup>GICAL CYCLE**
  - Crisis management → Risk management
- Our **CHANGING VULNERABILITY—CHANGING CLIMATE**
- Building **SOCIETAL RESILIENCE—**  
**What are the 'pillars' for change?**
  - Drought monitoring and prediction, early warning and information systems
  - Vulnerability/risk and impact assessment
  - Mitigation AND response measures
- Moving towards a **POLICY FRAMEWORK** that enhances preparedness and risk reduction

# Two Phrases to Remember

- If you do what you've always done, you'll get what you've always got!
- Who and what is at risk and why?

# The Many Faces of Drought



甘蔗受旱，叶子卷起，  
植株枯萎。  
10.25摄于随屋



# Defining Drought

Hundreds of definitions—application and region specific

Drought is a deficiency of **precipitation** (intensity) from expected or “normal” that extends over a season or longer period of time (**duration**) . . . . .

## Meteorological Drought

and is insufficient to meet the demands of human activities and the environment (**impacts**).

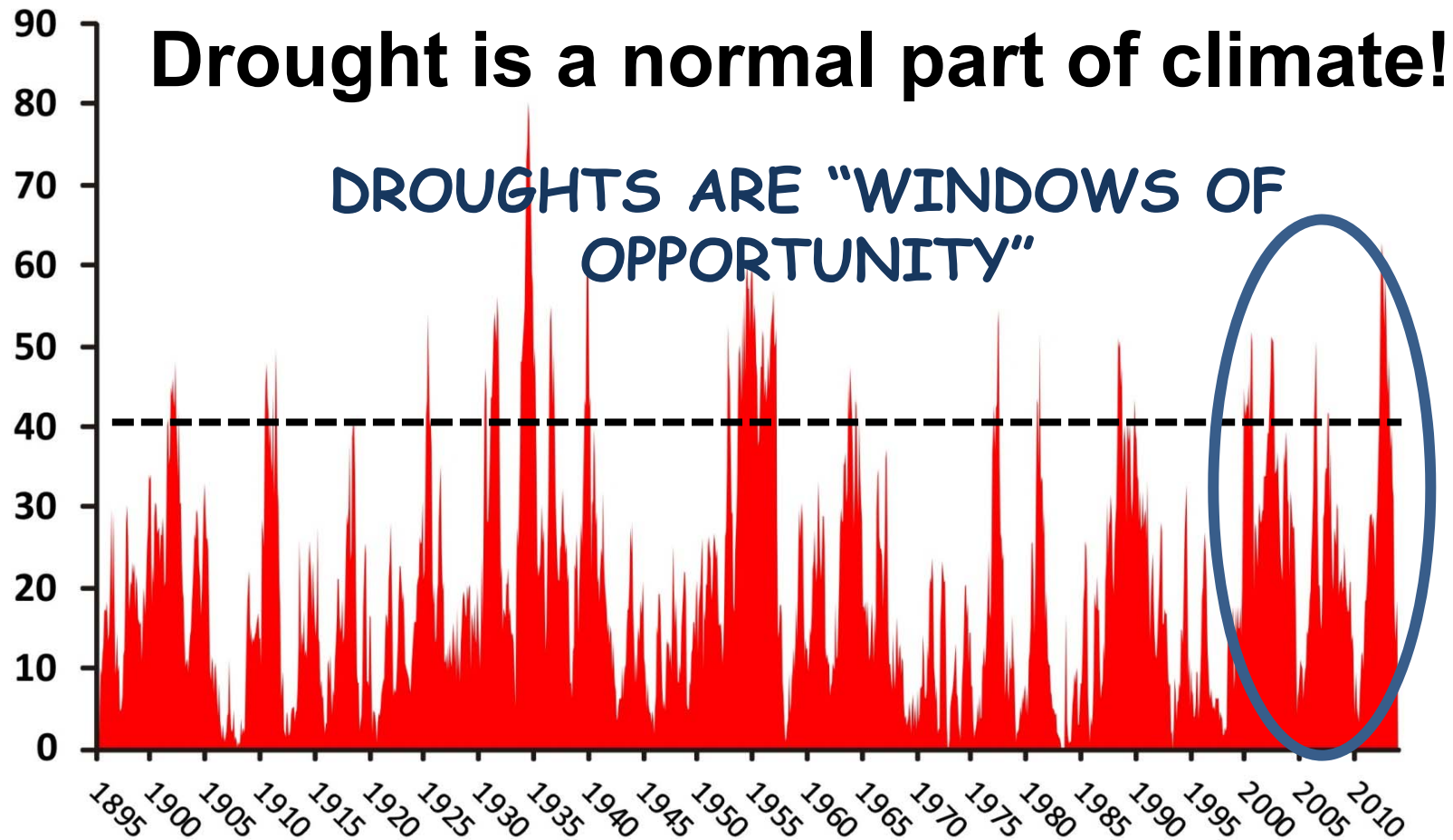


**Agricultural,  
Hydrological and  
Socio-economic  
Drought**



# Percent Area of the United States in Moderate to Extreme Drought

January 1895–December 2013



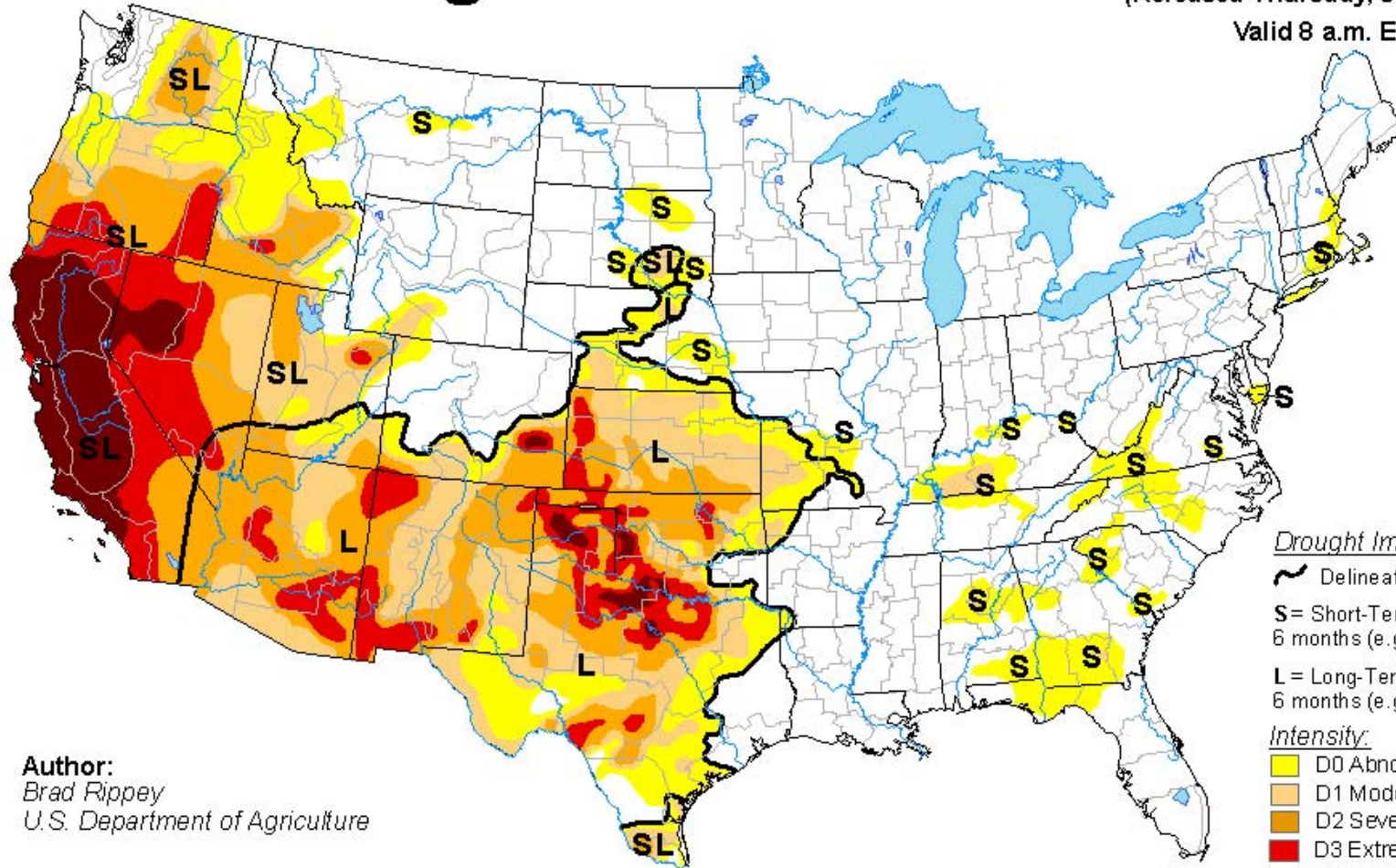
Based on data from the National Climatic Data Center/NOAA

# U.S. Drought Monitor

July 29, 2014

(Released Thursday, Jul. 31, 2014)

Valid 8 a.m. EDT



**Author:**  
Brad Rippey  
U.S. Department of Agriculture

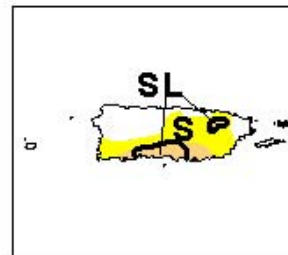
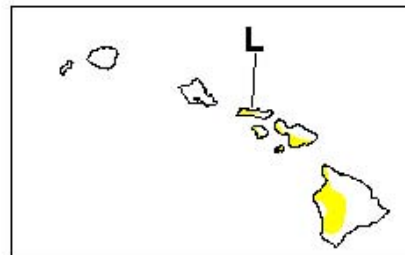
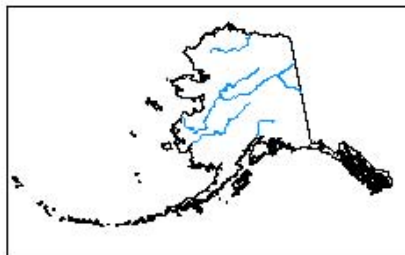
### Drought Impact Types:

- ~ Delineates dominant impacts
- S= Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L= Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

### Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



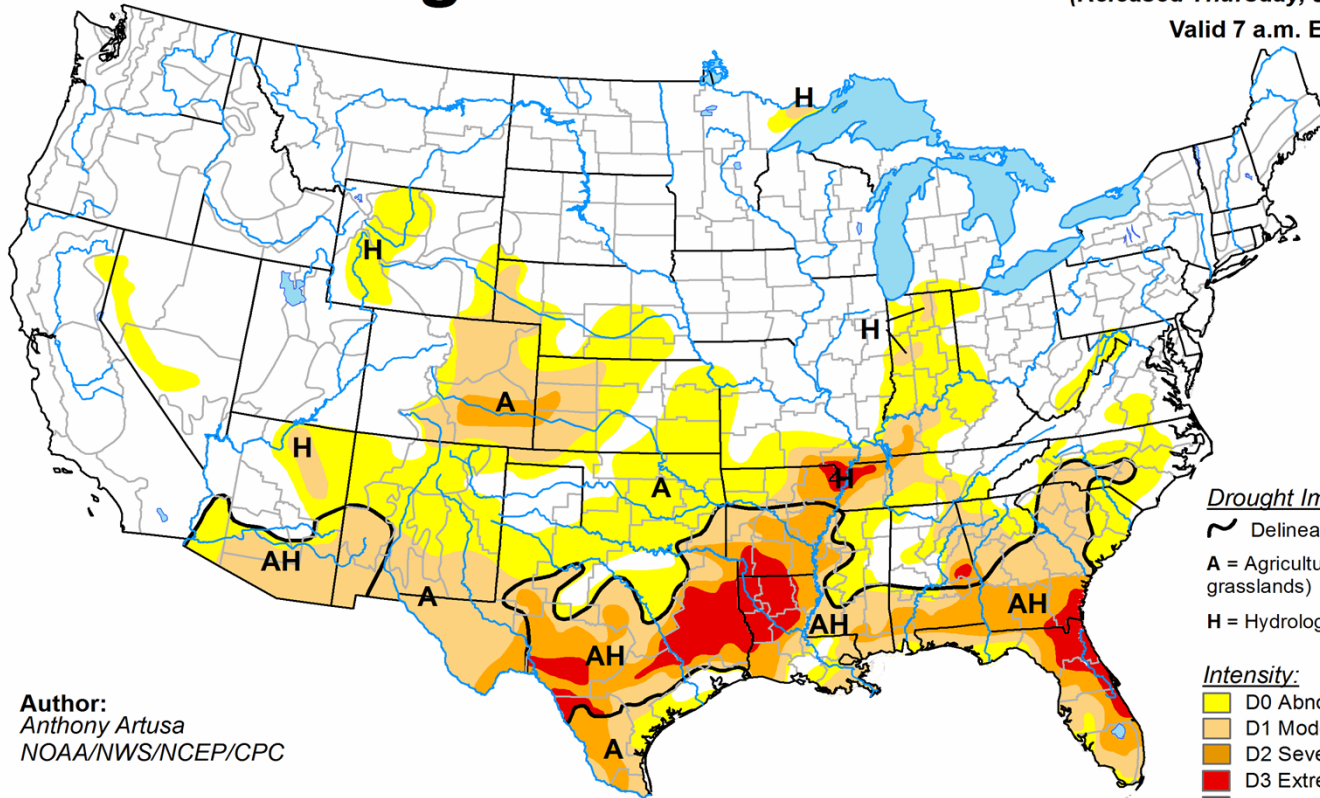
<http://droughtmonitor.unl.edu/>

# USDM Animation

## January 2011 to March 2014

### U.S. Drought Monitor

January 4, 2011  
 (Released Thursday, Jan. 6, 2011)  
 Valid 7 a.m. EST



Drought Impact Types:

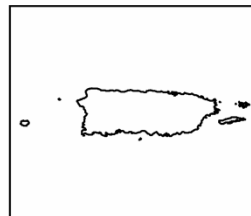
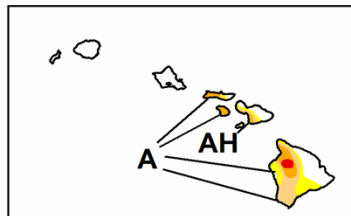
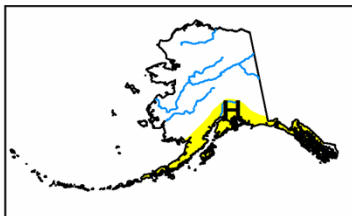
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

Intensity:

- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Dark Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

Author:  
 Anthony Artusa  
 NOAA/NWS/NCEP/CPC

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>

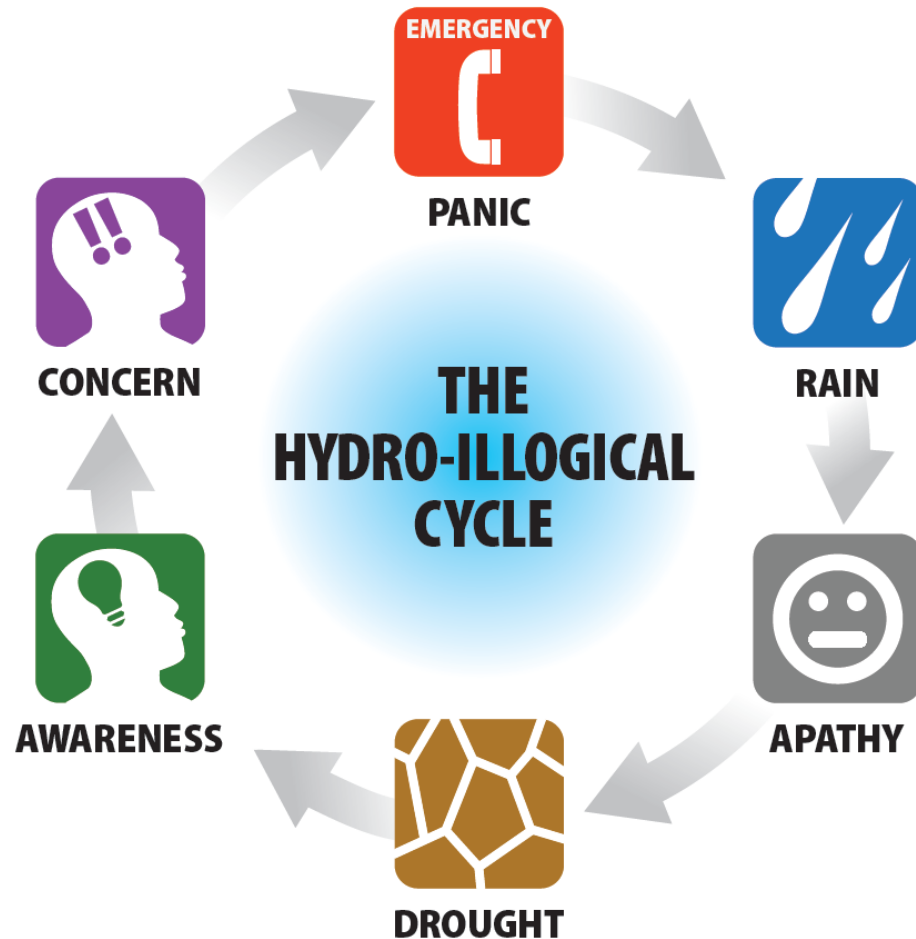


# Crisis Management Characteristics

- Ineffective, treats symptoms of drought
- Untimely, response actions
- Increases reliance on government/donors
- Poorly coordinated, national to local level actions
- Expensive, large expenditures from numerous government agencies
- Reduces vulnerability?
- Increases vulnerability?

# Breaking the Hydro-illogical Cycle:

## An Institutional Challenge for Drought Management



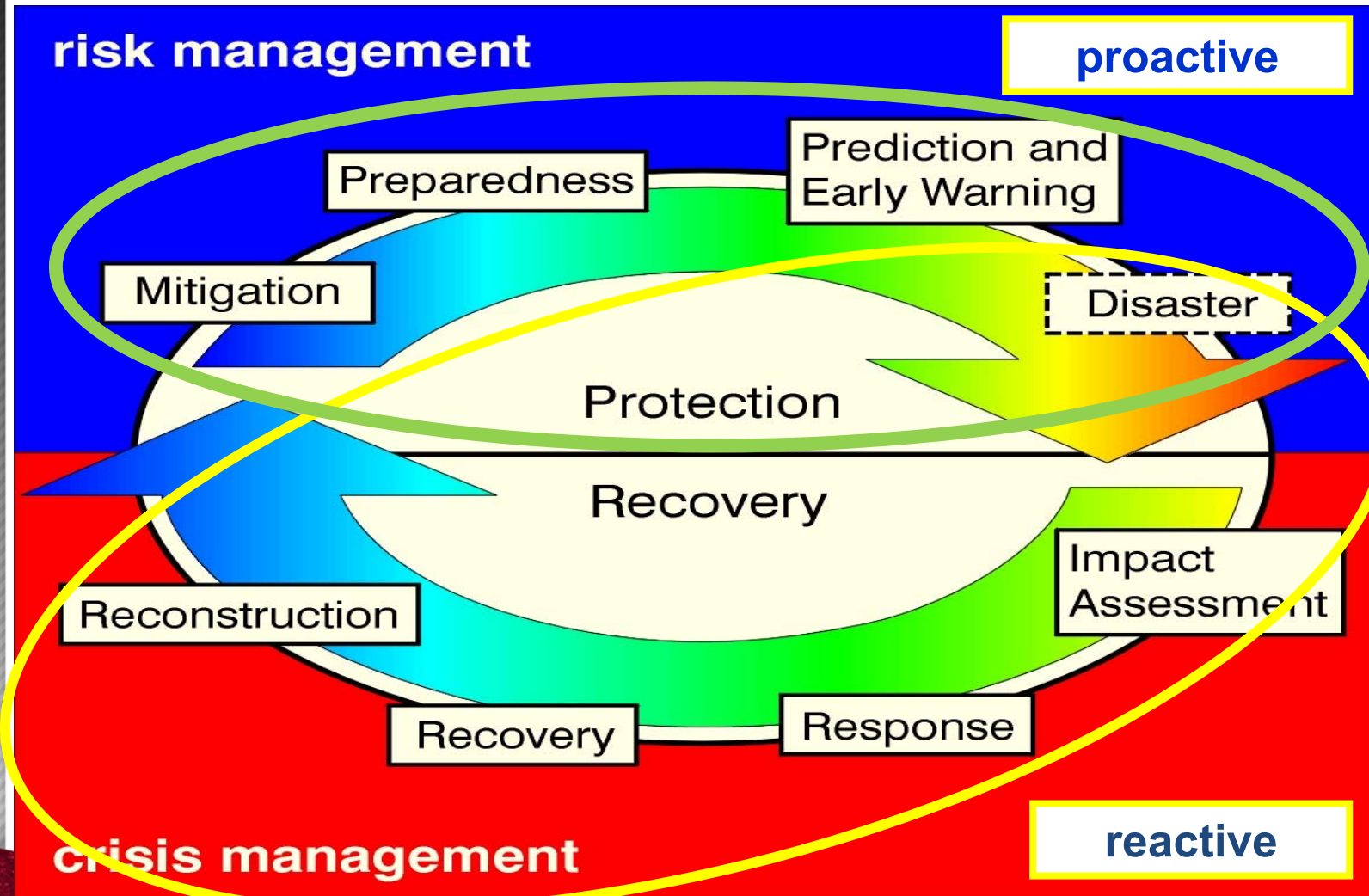
Crisis Management

If you do what you've always done, you'll get what you've always got.

We **MUST** adopt a new paradigm for drought management!

# The Cycle of Disaster Management

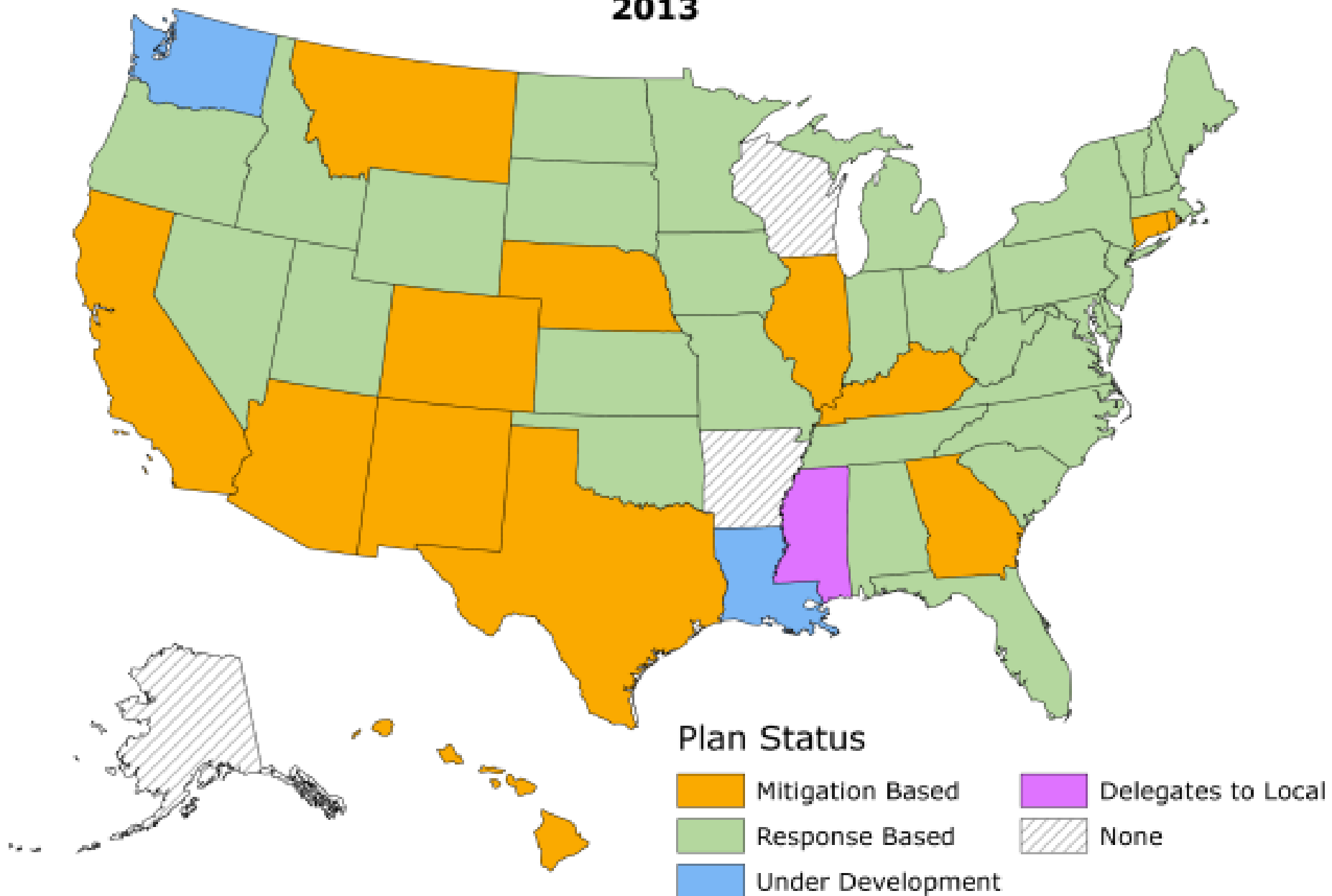
Risk management increases coping capacity, builds resilience.



Crisis management treats the symptoms, not the causes.

# Status of State Drought Plans

2013



# Changes in Societal Vulnerability

Drought impacts are more complex today as more economic sectors are affected, creating more conflicts between water users, i.e., *societal vulnerability is dramatically different and changing.*

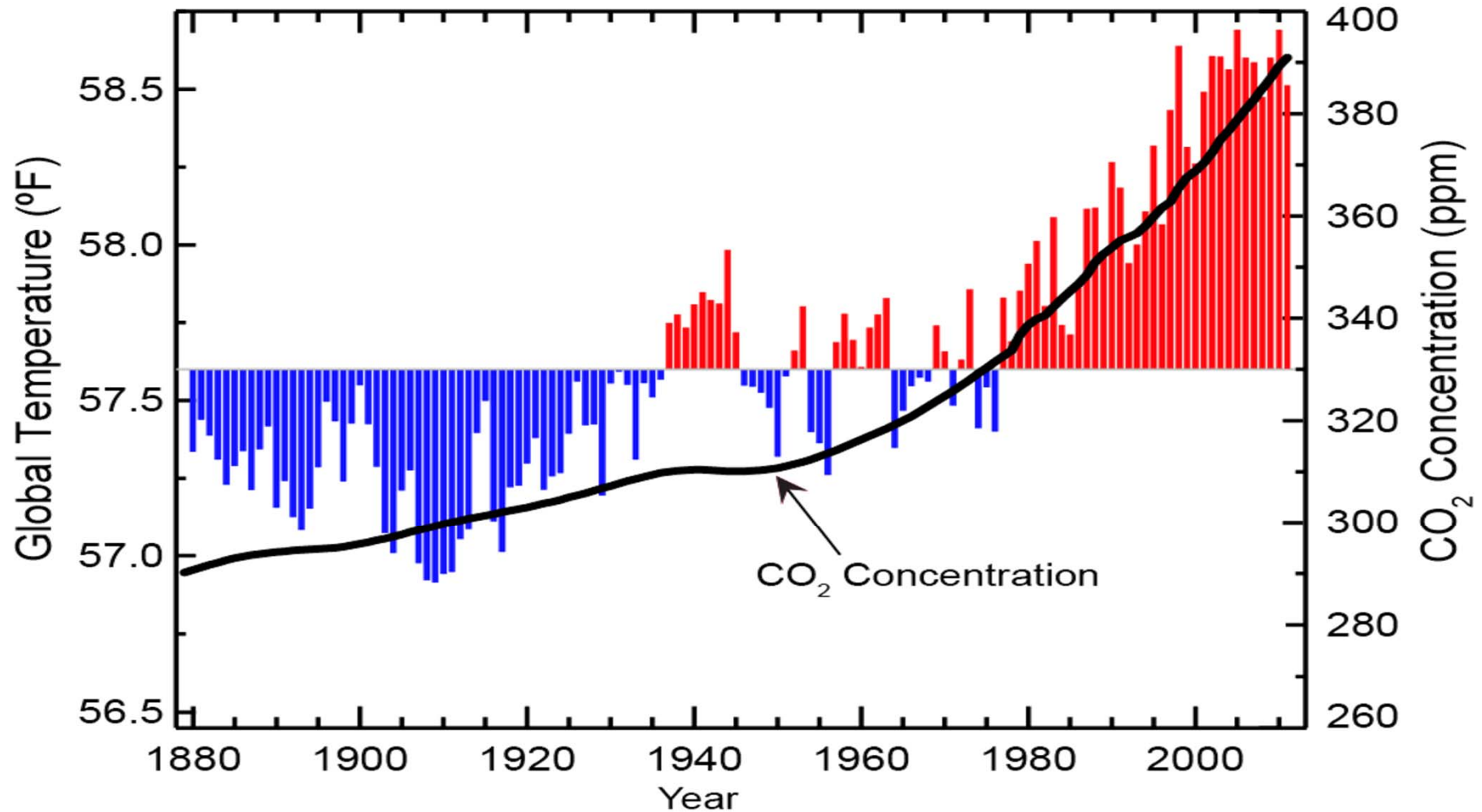


- Agricultural production
- Food security
- Energy
- Transportation
- Tourism/Recreation
- Forest/rangeland fires
- Municipal water
- Water quality/quantity
- Environment
- Ecosystem services
- Health



# Our Changing Climate

## Global Temperature and Carbon Dioxide



There is a close correlation between CO<sub>2</sub> and temperature that has been verified through many lines of research . This graph shows the relationship of temperature and CO<sub>2</sub> over the last 130 years.

# The Climate Change Challenge for Drought Management

- **Increasing mean temperature**
- **High temp. stress and increased heat waves/longer growing seasons**
- **Increased evapotranspiration**
- **Changes in precipitation amount, distribution and intensity**
- **Reduced soil moisture**
- **Changes in groundwater recharge**
- **Reduced runoff/stream flow resulting from reduced snowpack/sublimation**

**Building Societal  
Resilience  
through National  
Drought Policies  
and Preparedness  
Plans: The Way  
Forward**





# Hazard x Vulnerability = Risk

## EXPOSURE

- **Severity/Magnitude**
  - Intensity/Duration
- **Frequency**
- **Spatial extent**
- **Trends**
  - Historical
  - Future
- **Impacts**
- **Early warning**

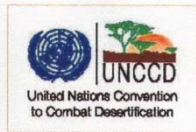
## SOCIAL FACTORS

- Population growth
- Population shifts
- Urbanization
- Technology
- Land use changes
- Environmental degradation
- Water use trends
- Government policies
- Environmental awareness

**RISK**

# Incentives for Changing the Paradigm

- Addresses spiraling impacts → multiple sectors
- Reduces conflicts between water users
- Promotes wise stewardship of natural resources—sustainable development
- Reduces need for governmental assistance—allows for resources to be invested more wisely
- More frequent and severe droughts (increased duration?) in association with climate change.
- What is the **cost of inaction?**



# HIGH-LEVEL MEETING ON NATIONAL DROUGHT POLICY

**(HMNDP)**  
TOWARDS MORE DROUGHT RESILIENT SOCIETIES

**11-15 March 2013**  
**CICG, Geneva**

**Final Report**



# Major Drought Areas—2012

Drought differs from one region to another in terms of its physical characteristics, impacts and coping capacity (level of preparedness, mitigation and response/recovery capability).

Drought policies cannot be **PRESCRIPTIVE** since each country is unique in institutional structure, legal framework, etc.

A UN-WATER INITIATIVE

UN WATER

ORGANIZED BY:

WMO

United Nations Convention to Combat Desertification

FAO

UNCCD

LOCAL ORGANIZER

METEO ROMANIA

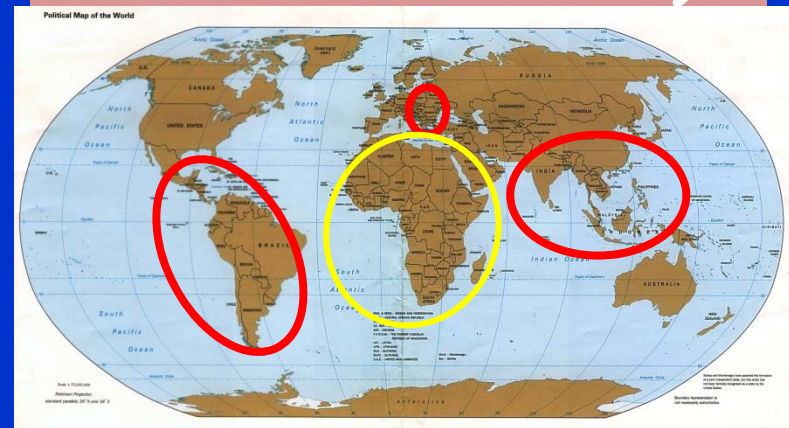
1<sup>st</sup> Regional Workshop | Bucharest, Romania

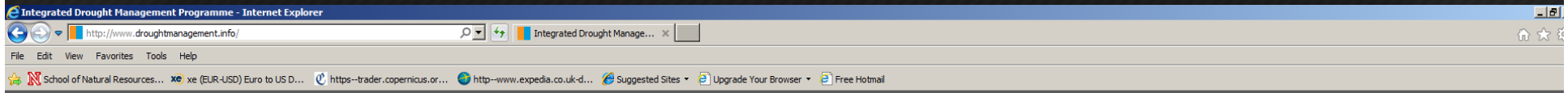
Capacity Development  
to Support  
**National DROUGHT**  
Management Policies

9-11 July 2013  
The Class Hotel | Bucharest, Romania

Find out more on the initiative:  
[www.ais.unwater.org/droughtmanagement](http://www.ais.unwater.org/droughtmanagement)

A series of regional workshops sponsored by WMO, FAO, UNCCD, UN-Water and the Convention on Biological Diversity (Eastern Europe, Latin America, Asia and Africa)





**IDMP**  
Integrated Drought Management Programme



HOME ABOUT FIND CONNECT-ACTIVITIES

Search



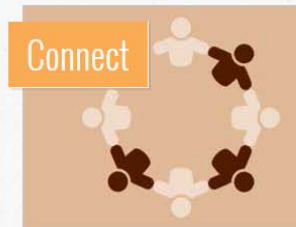
About

Find out more about the Integrated Drought Management Programme (IDMP)



Find

Find knowledge resources on integrated drought management



Connect

Learn about the activities of IDMP and connect to them

# Integrated Drought Management Programme (IDMP)

<http://www.droughtmanagement.info>



UNIVER



BRASKA - LINCOLN



# National Drought Management Policy Guidelines

A Template for Action

<http://www.droughtmanagement.info/about-idmp/guidelines/>

Integrated Drought Management Programme (IDMP)



# Necessary Ingredients for National Drought Policy Development

- **Political will and leadership!**
- **Initial investment in building greater institutional capacity**
- **Collaborative environment that supports and encourages coordination within and between levels of government/private sector**
- **Engaged and supportive stakeholders**
- **Engaged research community**
- **Strong outreach and media program**





# National Drought Policy

Preparedness Plans  
based on the principles  
of risk reduction

# A drought policy should be broadly stated and . . .

- Establish a clear set of risk-based principles or guidelines to govern drought management.
- Policy could be part of a disaster risk reduction or climate change adaptation framework
- Consistent and equitable for all regions, population groups, and economic/social sectors.
- Consistent with the goals of sustainable development.
- Reflect regional differences in drought characteristics, vulnerability and impacts.

# A drought policy should (continued)

- Promote the principles of risk management by encouraging development of
  - **Early warning and delivery systems**;
    - Reliable seasonal forecasts;
  - **Preparedness plans** at all levels of government, within river basins, and the private sector;
  - **Risk/Vulnerability assessments** —  
**Who and what is at risk and why?**
  - **Mitigation actions** that reduce drought impacts and the need for government intervention;
  - **Coordinated emergency response** that ensures targeted and timely relief, consistent with drought policy goals, during drought emergencies.

# Takeaway Messages

- Climate is changing—climate state/variability.
- Extreme climate events are increasing in frequency globally and locally, **managing impacts is critically important—we must increase our resilience to drought.**
- Past drought management has been reactive—ineffective, poorly coordinated & poorly targeted.
- Time is **NOW** to change the **paradigm** from crisis to **drought risk management.**
- Time is **NOW** for all drought-prone nations to adopt **appropriate** drought policies to reduce the impacts of future drought episodes through risk-based management.
- The **'cost of inaction'**!

A photograph of a cornfield at sunset. The sun is low on the horizon, creating a bright orange and yellow glow. The silhouettes of the corn stalks are visible against the bright sky.

# Thanks for your attention!

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