

# Managing Drought Risk in a Changing Climate: *The Role of National Drought Policy*

Dr. Donald A. Wilhite  
School of Natural Resources  
University of Nebraska-Lincoln

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# Presentation Outline

- The **MANY FACES OF DROUGHT**
  - Drought as hazard, characteristics, definition
- Breaking the **HYDRO-ILLOGICAL CYCLE** 
  - Crisis management → Risk management
- Our **CHANGING CLIMATE—CHANGING VULNERABILITY**
- Building **SOCIETAL RESILIENCE --**  
**What are the 'pillars' for change?**
  - Drought monitoring and prediction, early warning/information delivery 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?
  - Issues of vulnerability and coping capacity

# 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**



**It's behind me...**

**Isn't it..?**

**Drought— it sneaks up on you!**

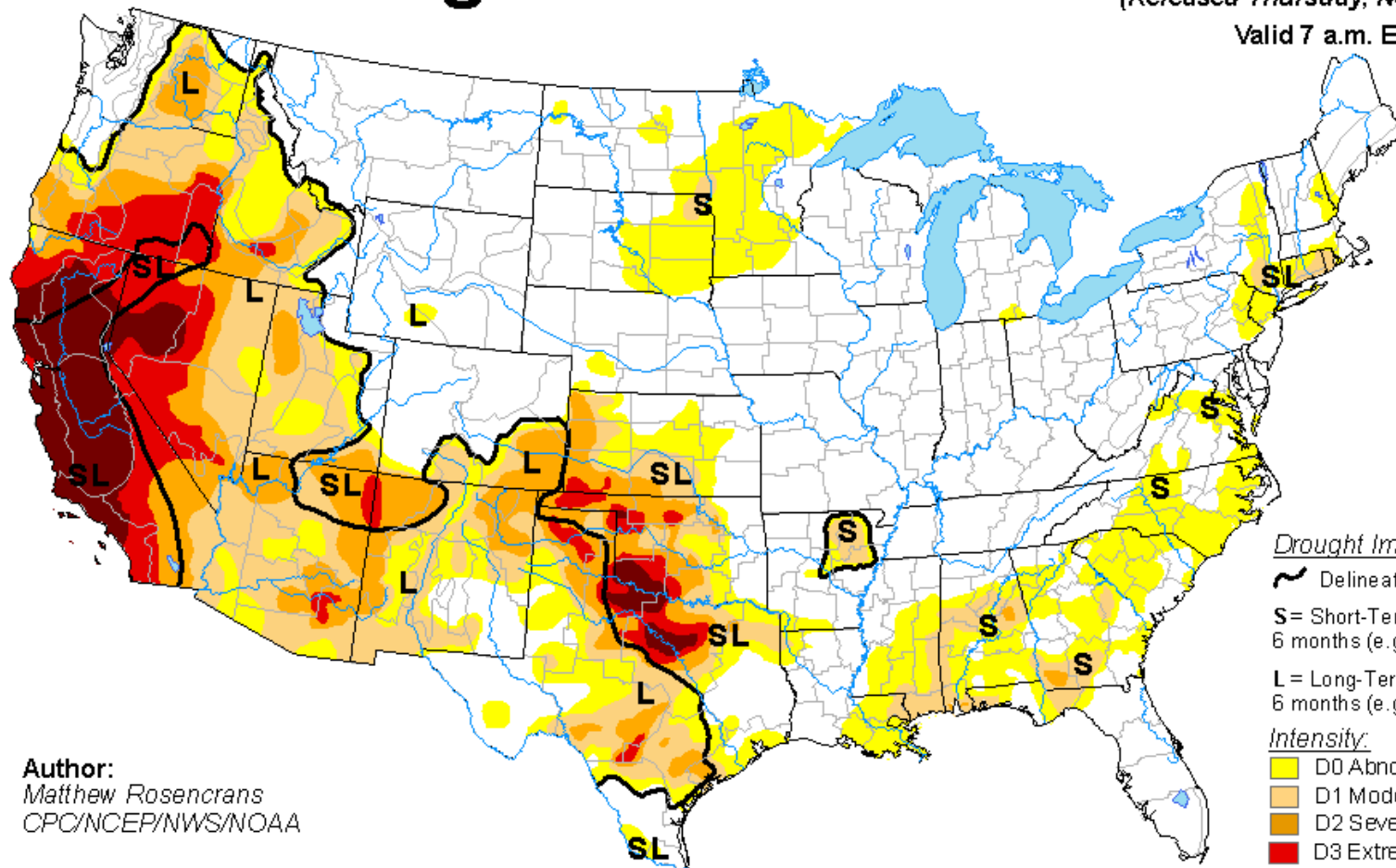
# Droughts differ in terms of:

- **INTENSITY**
- **Duration**
- **Spatial Extent**

As with other natural hazards,  
each drought event is unique in its physical characteristics  
and impacts.

# U.S. Drought Monitor

November 11, 2014  
(Released Thursday, Nov. 13, 2014)  
Valid 7 a.m. EST



Author:  
Matthew Rosencrans  
CPC/NCEP/NWS/NOAA

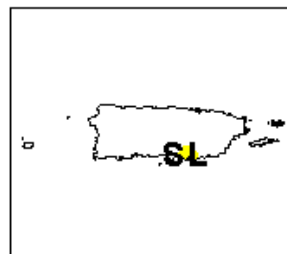
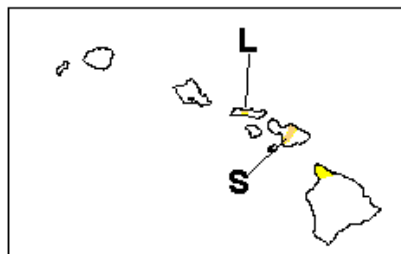
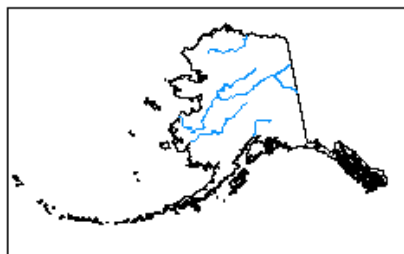
### Drought Impact Types:

- ~ 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.



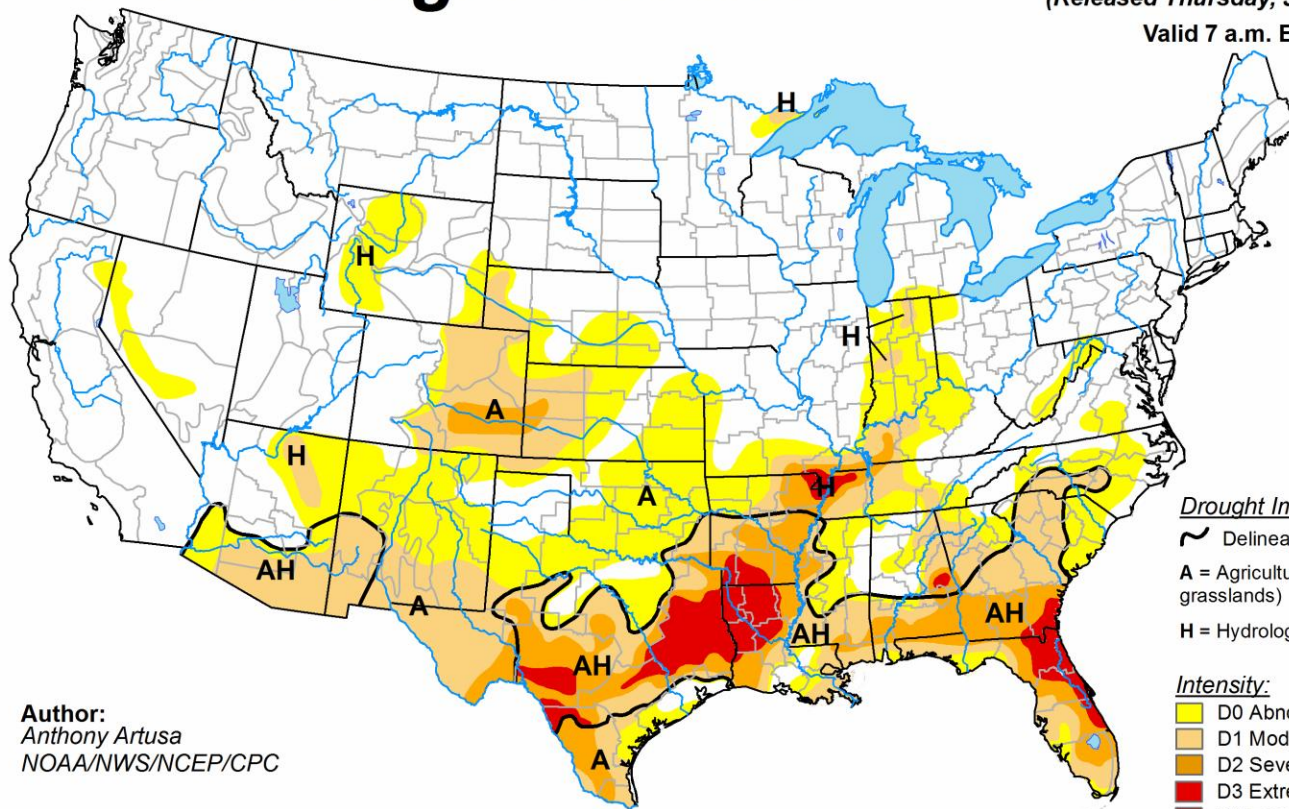
<http://droughtmonitor.unl.edu/>

# USDM Animation

## January 2011 to November 2014

### U.S. Drought Monitor

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



**Drought Impact Types:**

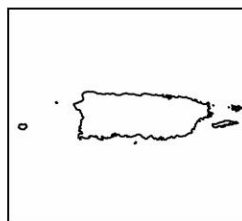
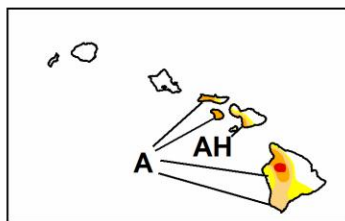
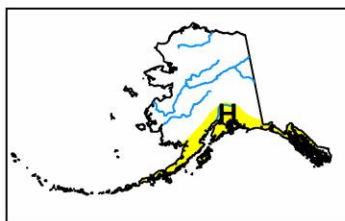
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

**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

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



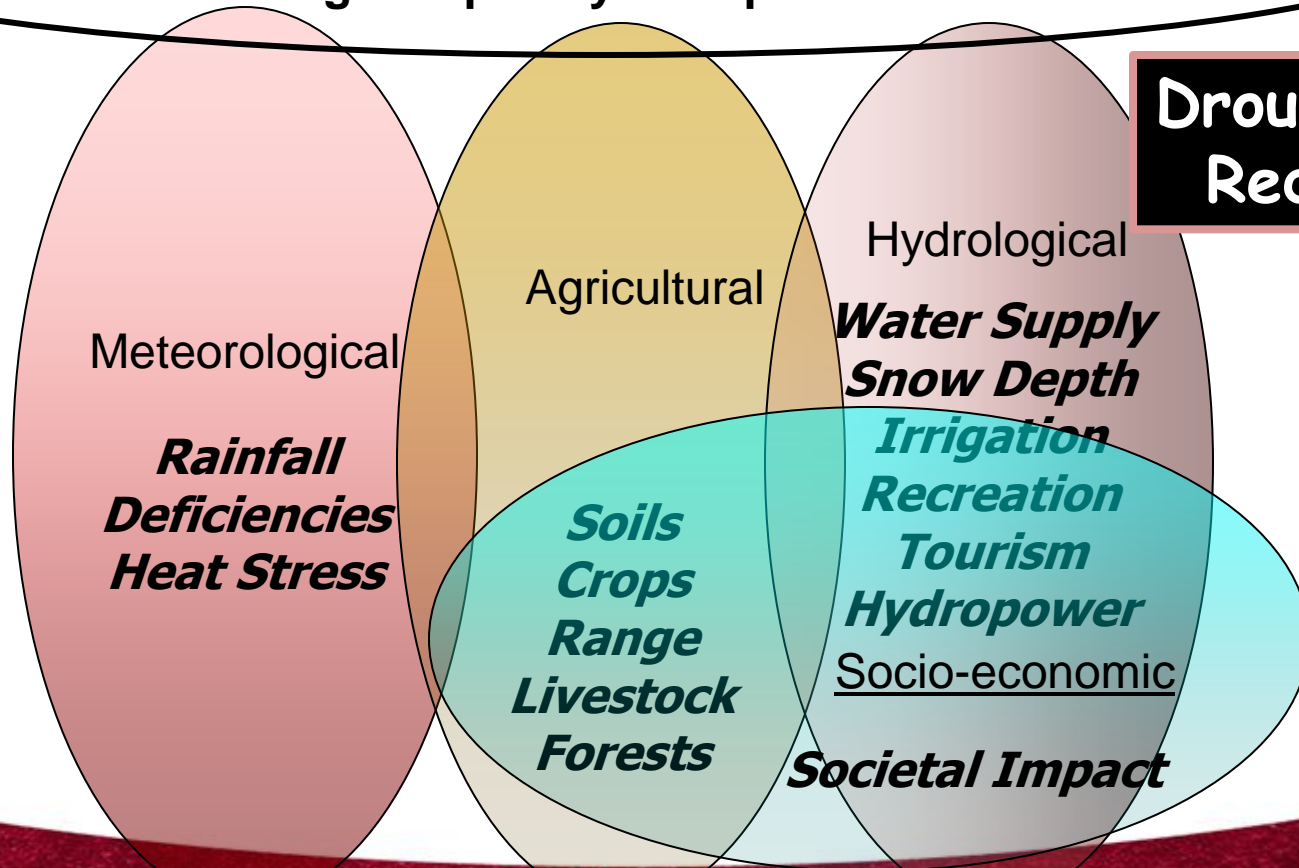
# Natural and Social Dimensions of Drought

Decreasing emphasis on the natural event (precipitation deficiencies)

Increasing emphasis on water/natural resource management & policy

Increasing complexity of impacts and conflicts

**Drought Risk Reduction**



Time/Duration of the event

# The Many Faces of Drought

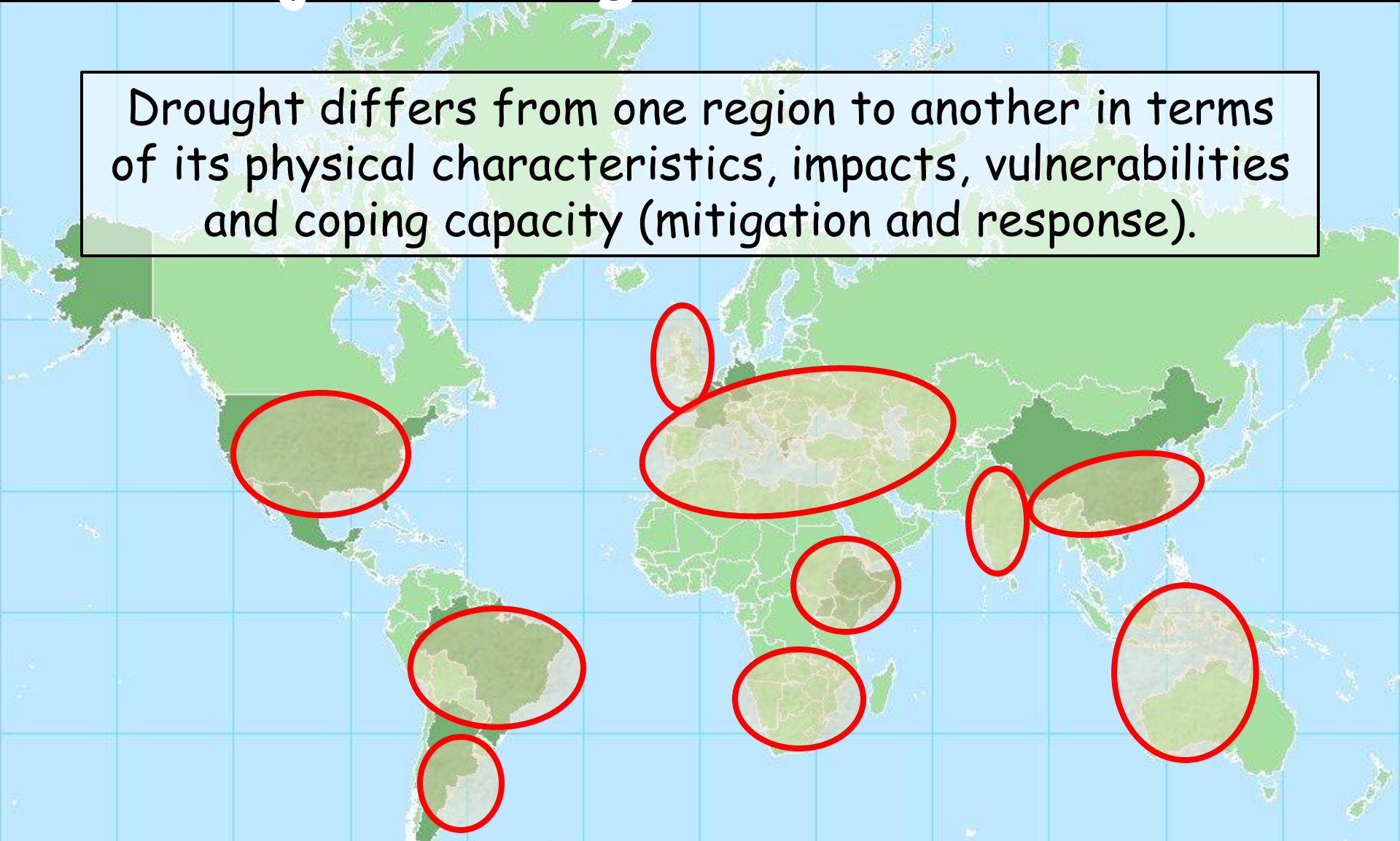


干旱导致，叶子卷起，  
植株枯萎。  
10.25摄于南屋



# Major Drought Areas—2012

Drought differs from one region to another in terms of its physical characteristics, impacts, vulnerabilities and coping capacity (mitigation and response).



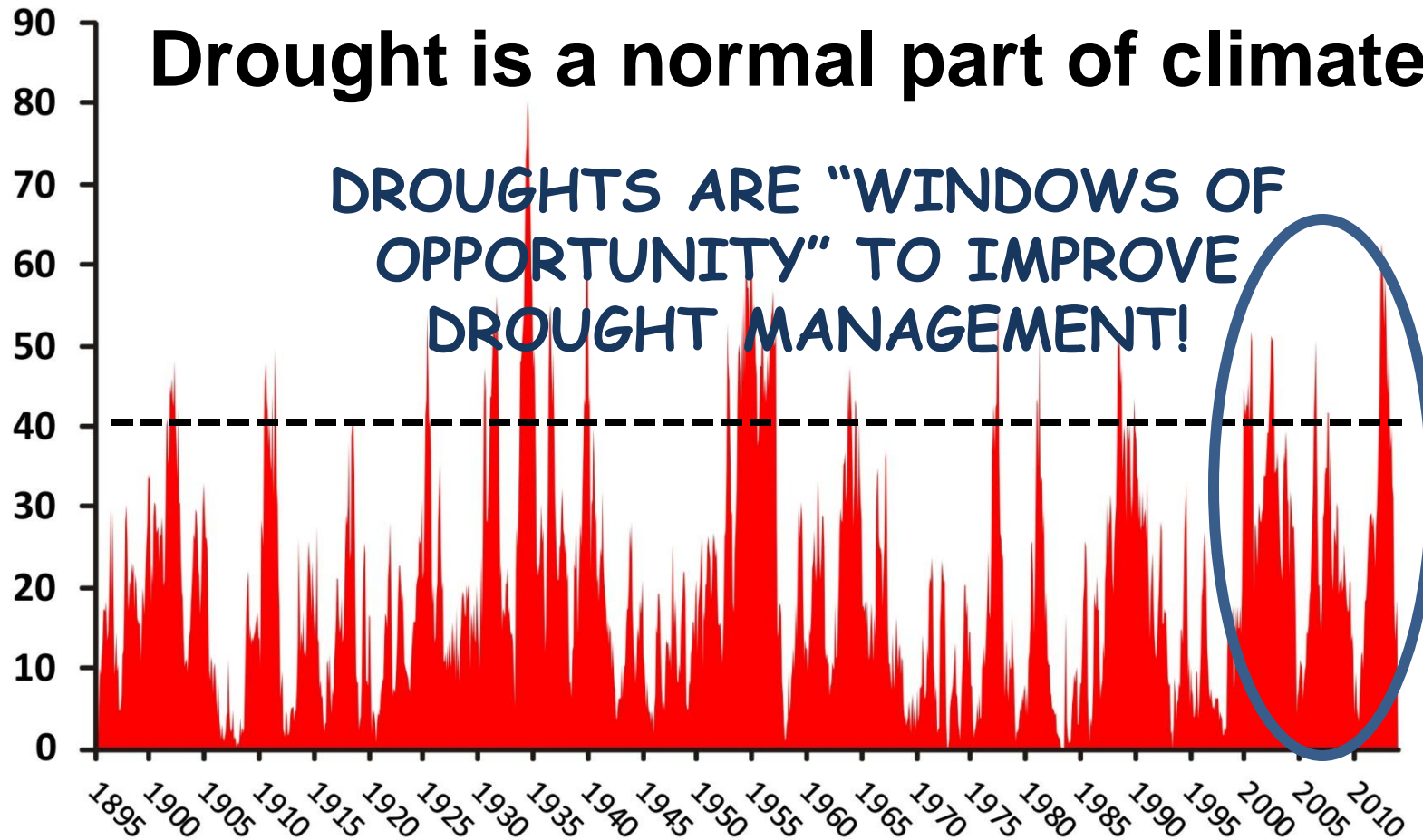
Drought policies cannot be **prescriptive** since each country is unique in institutional structure, legal framework, etc.

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

January 1895–December 2013

**Drought is a normal part of climate!**

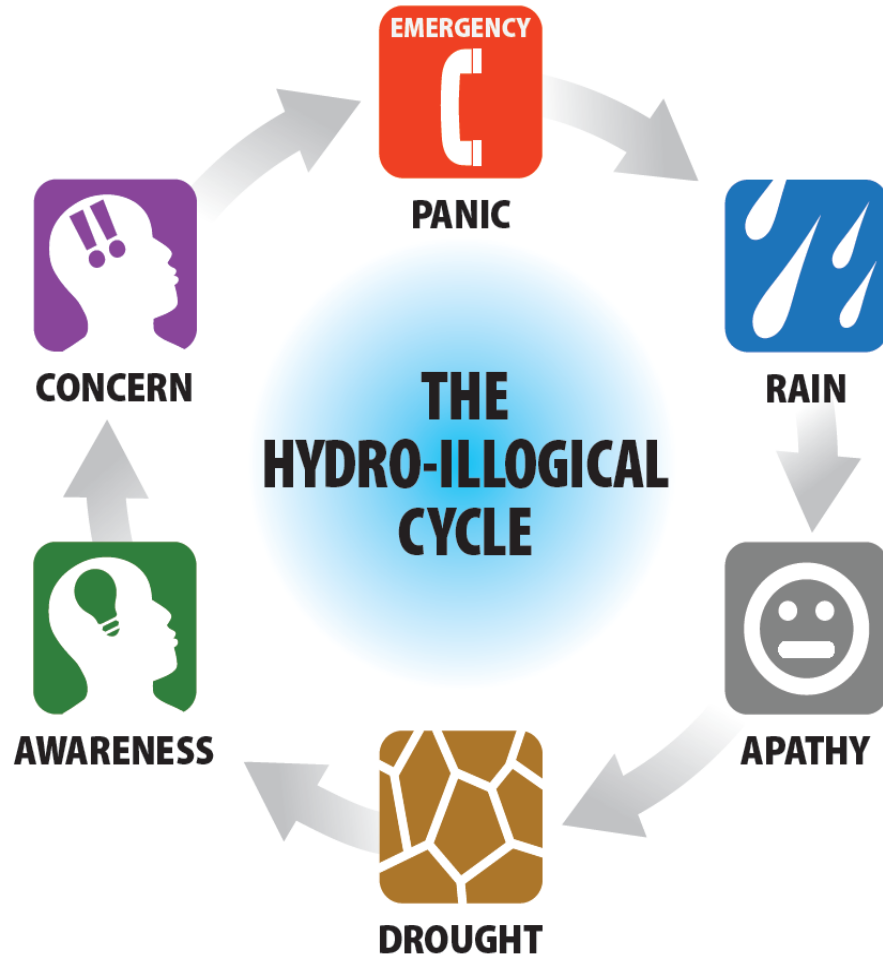
**DROUGHTS ARE "WINDOWS OF  
OPPORTUNITY" TO IMPROVE  
DROUGHT MANAGEMENT!**



Based on data from the National Climatic Data Center/NOAA

# Breaking the Hydro-illogical Cycle:

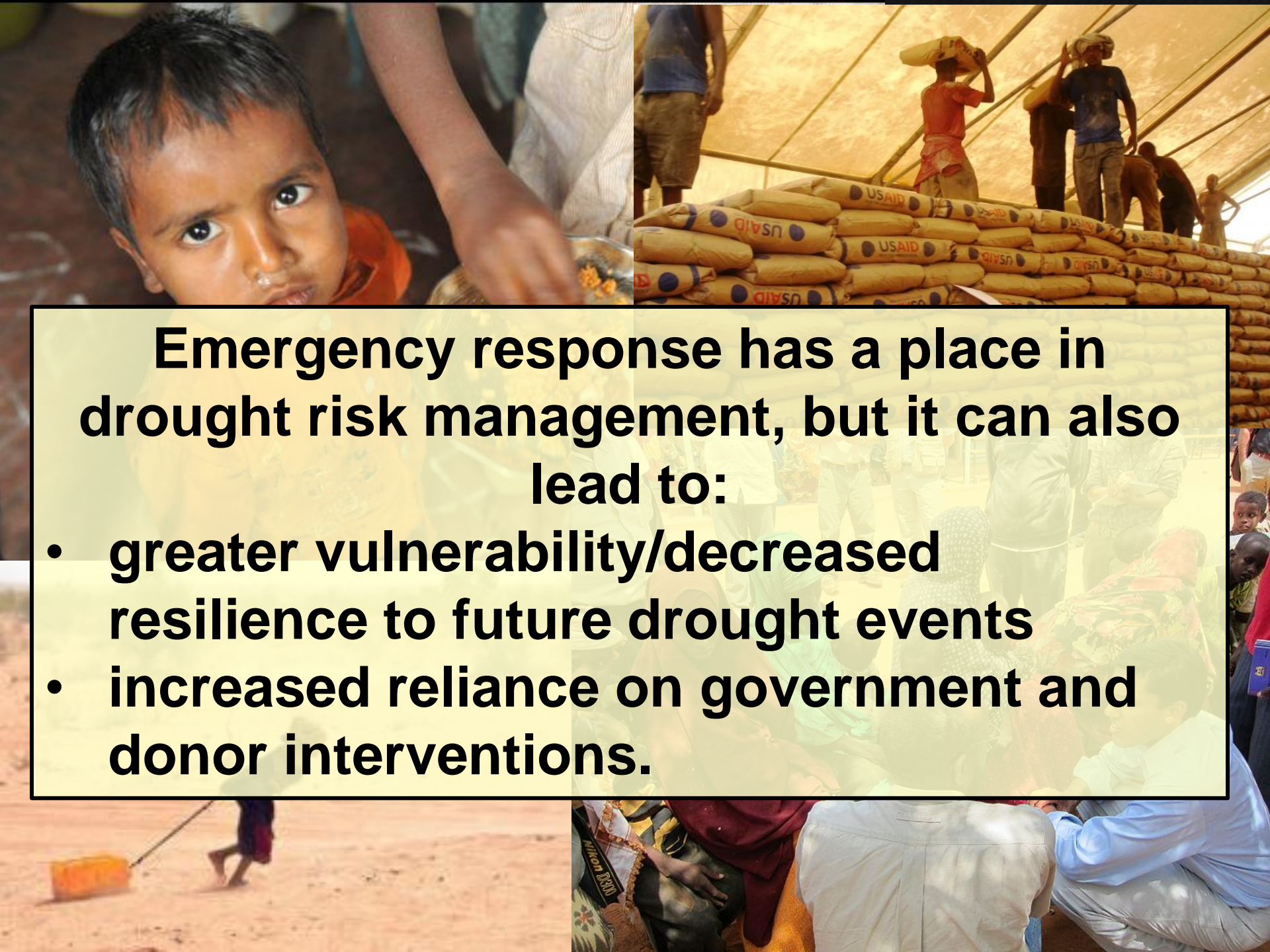
## An Institutional Challenge for Drought Management



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!



**Emergency response has a place in drought risk management, but it can also lead to:**

- greater vulnerability/decreased resilience to future drought events**
- increased reliance on government and donor interventions.**

# 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 (and donors)
- Increases vulnerability?

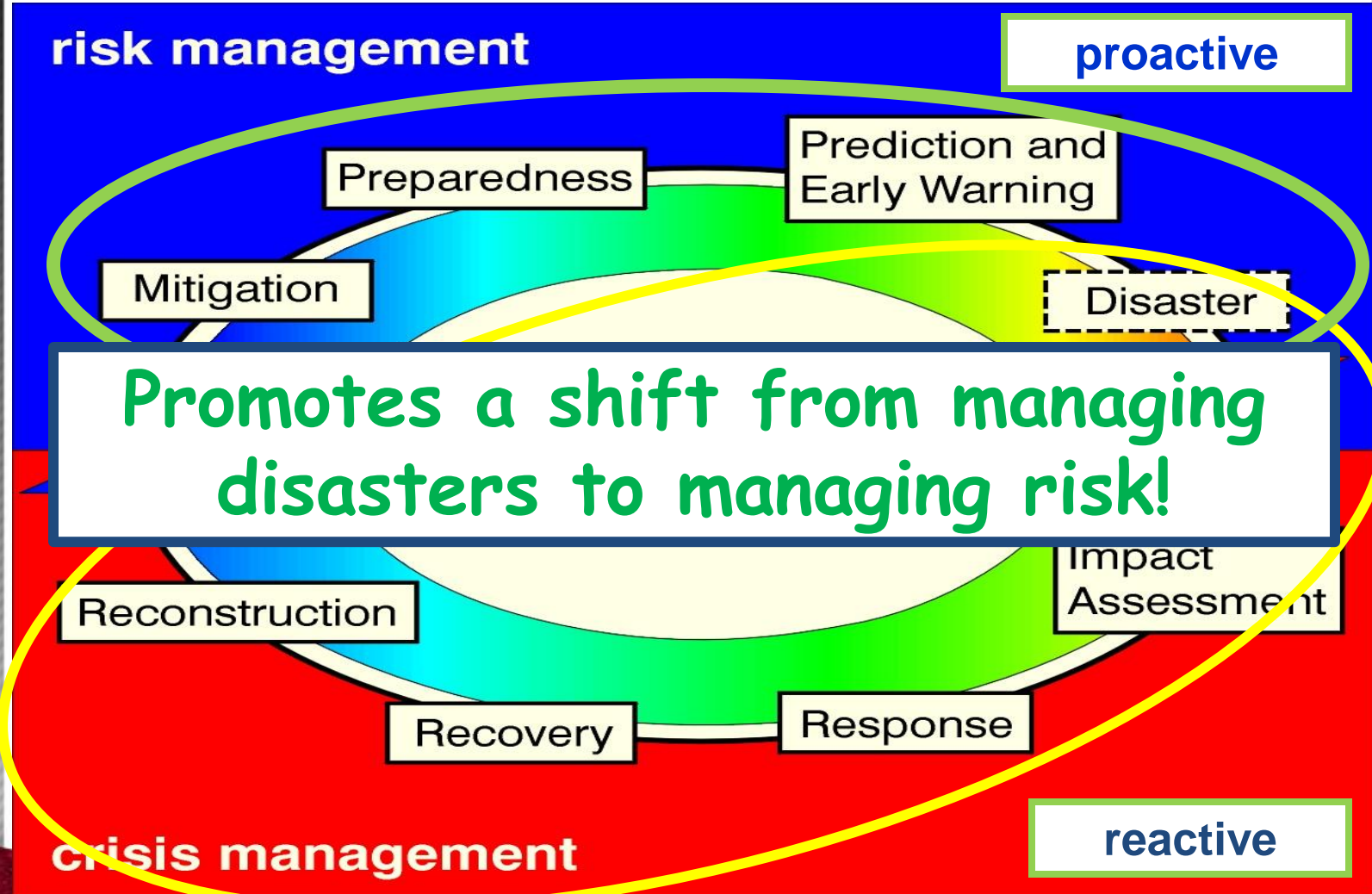
# Types of Policy Responses

- Post-impact government interventions—relief measures (i.e., **crisis management**)
- Pre-impact government programs—mitigation measures to reduce vulnerability and impacts, including insurance programs
- Risk-based drought policies and preparedness plans, organizational frameworks and operational arrangements



# The Cycle of Disaster Management

Risk management increases coping capacity, builds resilience.



Crisis management treats the symptoms, not the causes.

# Hazard x Vulnerability = Risk

## EXPOSURE

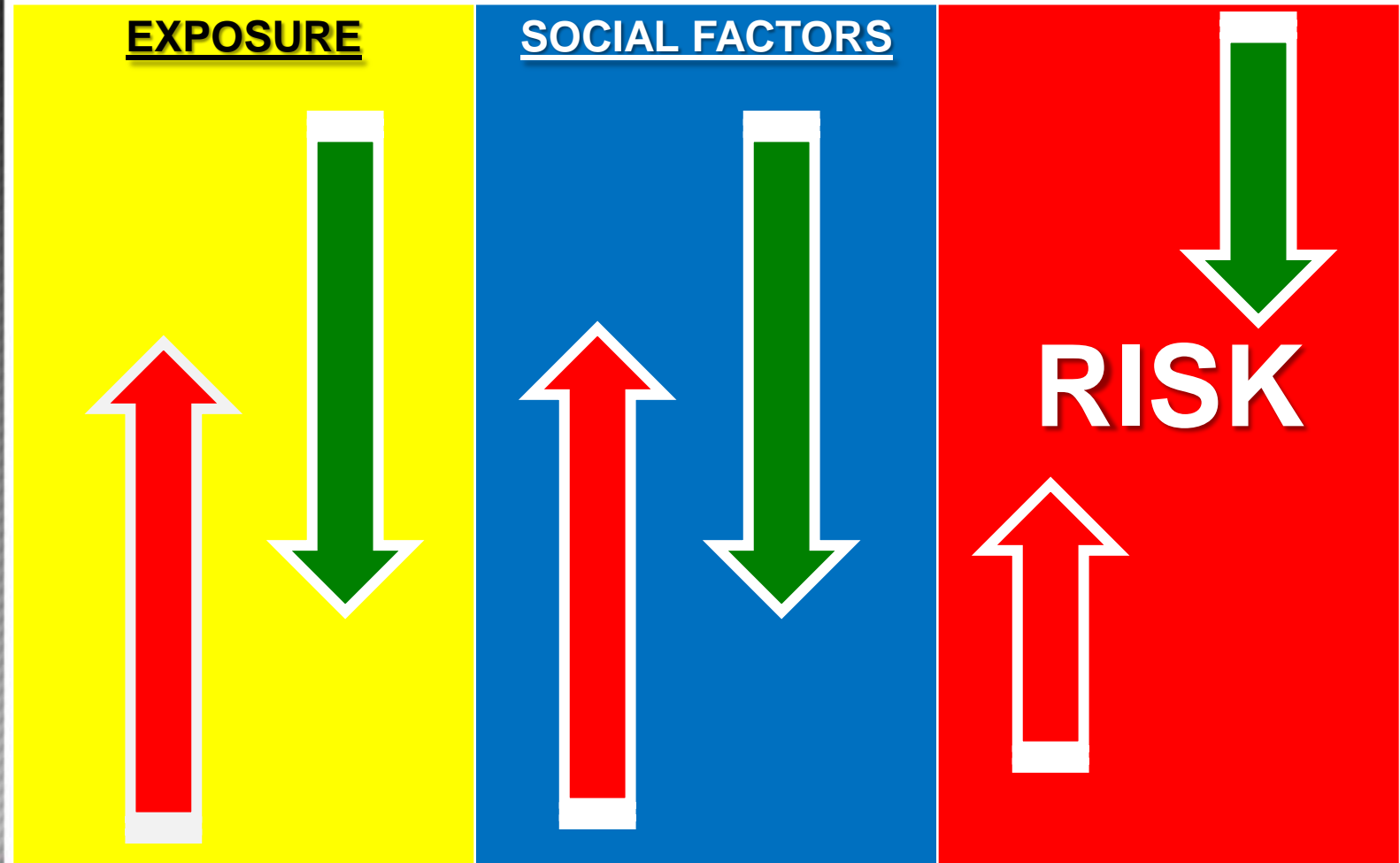
- **Severity/Magnitude**
  - Intensity/Duration
- **Frequency**
- **Spatial extent**
- **Trends**
  - Historical
  - Future
- **Impacts**
- **Early warning**

## SOCIAL FACTORS

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

**RISK**

# Hazard **x** Vulnerability = Risk



# 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



# Incentives for Changing the Paradigm

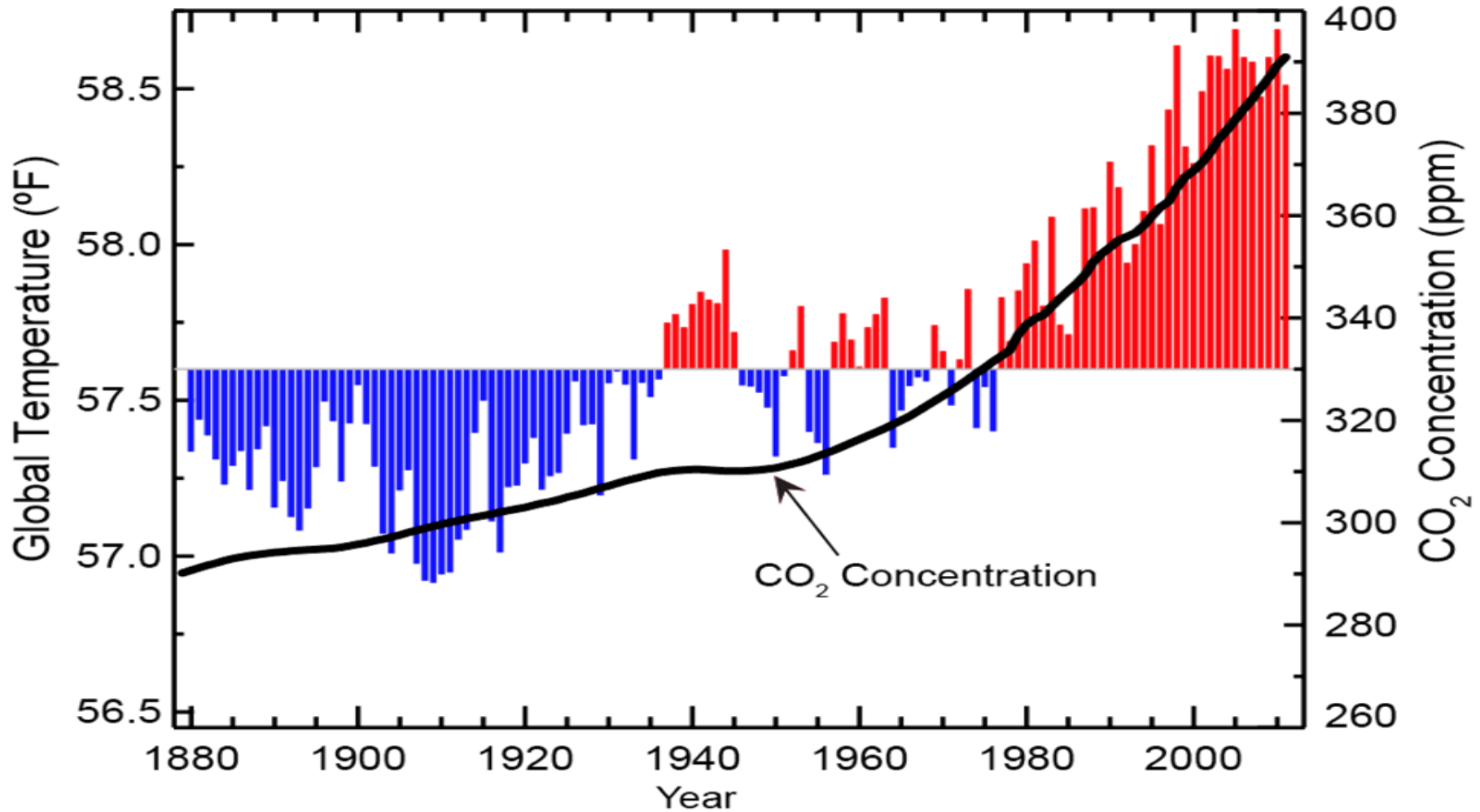
- Addresses spiraling impacts → multiple sectors
- Reduces conflicts between water users
- Promotes wise stewardship of natural resources—sustainable development
- Reduces need for governmental assistance—allows for resources to be invested more wisely
- More frequent and severe droughts (increased duration?)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

# Needed Actions for Change: Reducing Societal Vulnerability

- Improve **drought awareness**
- Develop/improve monitoring, seasonal forecasts, early warning and **information delivery** systems
- Improve **decision support** tools
- Complete **risk assessments** of vulnerable sectors, population groups, regions
- Improve understanding and quantification of **drought impacts vs. mitigation costs (4:1 ratio)**
- Develop and implement **drought preparedness plans**
- Create **national drought policies** based on the principles of risk reduction

# 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.

# Natural Catastrophes Worldwide 1980-2012

Number

500

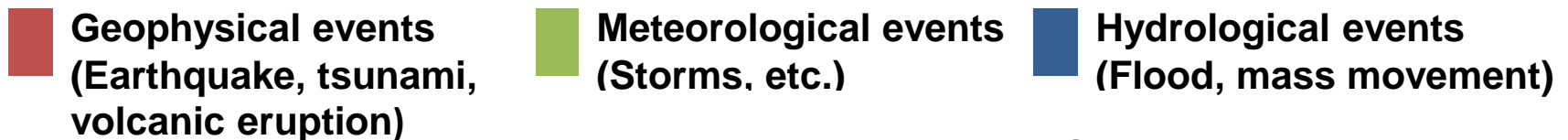
400

300

200

100

1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012



Source: Munich Re

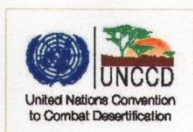


# The Climate Change Challenge for Drought Management

- Increasing mean temperature
- High temp. stress and 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**





# HIGH-LEVEL MEETING ON NATIONAL DROUGHT POLICY

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

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

**Final Report**



# 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.

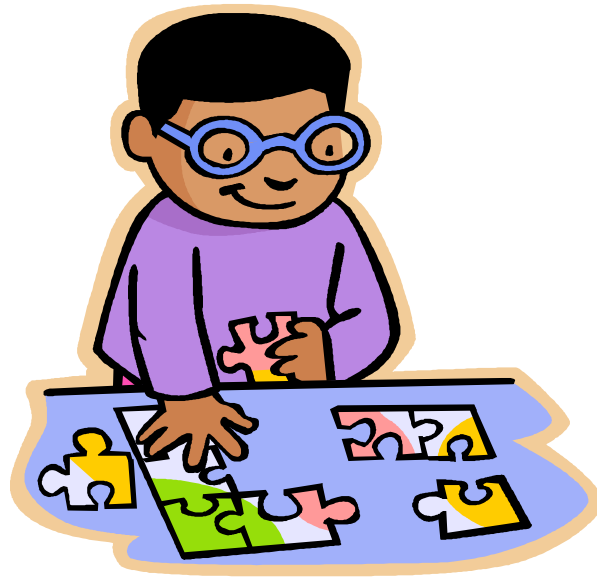
# A drought policy should

(continued)

- Promote the principles of risk management by encouraging an **integrated drought management approach** at all levels
  - **Early warning and delivery systems**;
    - Monitoring, reliable seasonal forecasts;
  - **Preparedness plans** at all levels of government, within river basins, and the private sector;
  - **Vulnerability assessments** —who and what is at risk and why? **Mitigation actions and interventions** 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.

Building an effective **national drought management policy and supporting preparedness plans** is like assembling the pieces of a puzzle.

Many of the puzzle pieces may be present, but there is a lack of coordination, data sharing and a collaborative plan of action. And, the emphasis is on post-impact response (actions and programs).

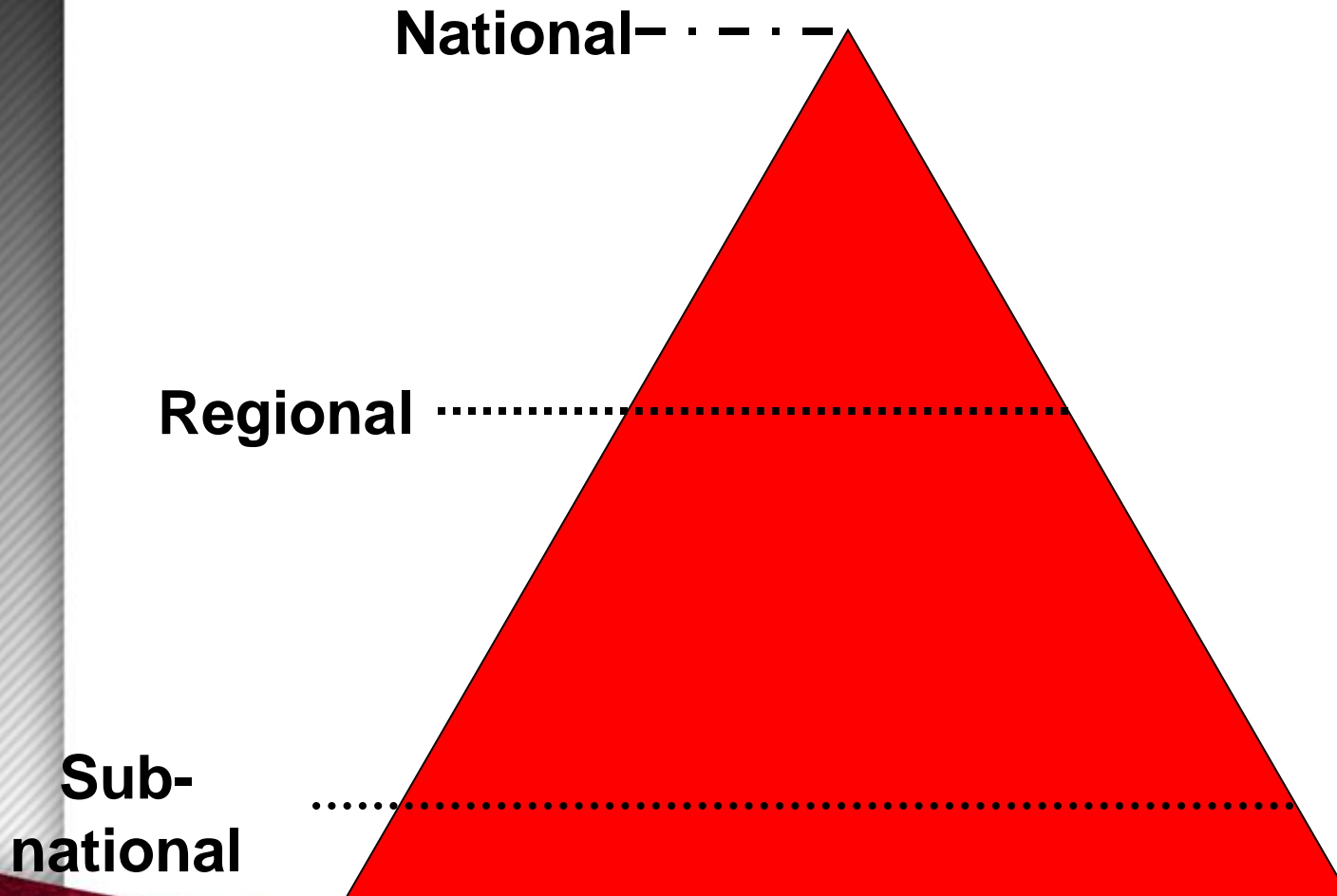


All relevant agencies/ministries, stakeholder groups, sectors, and regions in the policy and planning process must be included. We do not see the full picture until all pieces are in place.



# The process for RISK-BASED DROUGHT MANAGEMENT POLICY & PLANNING

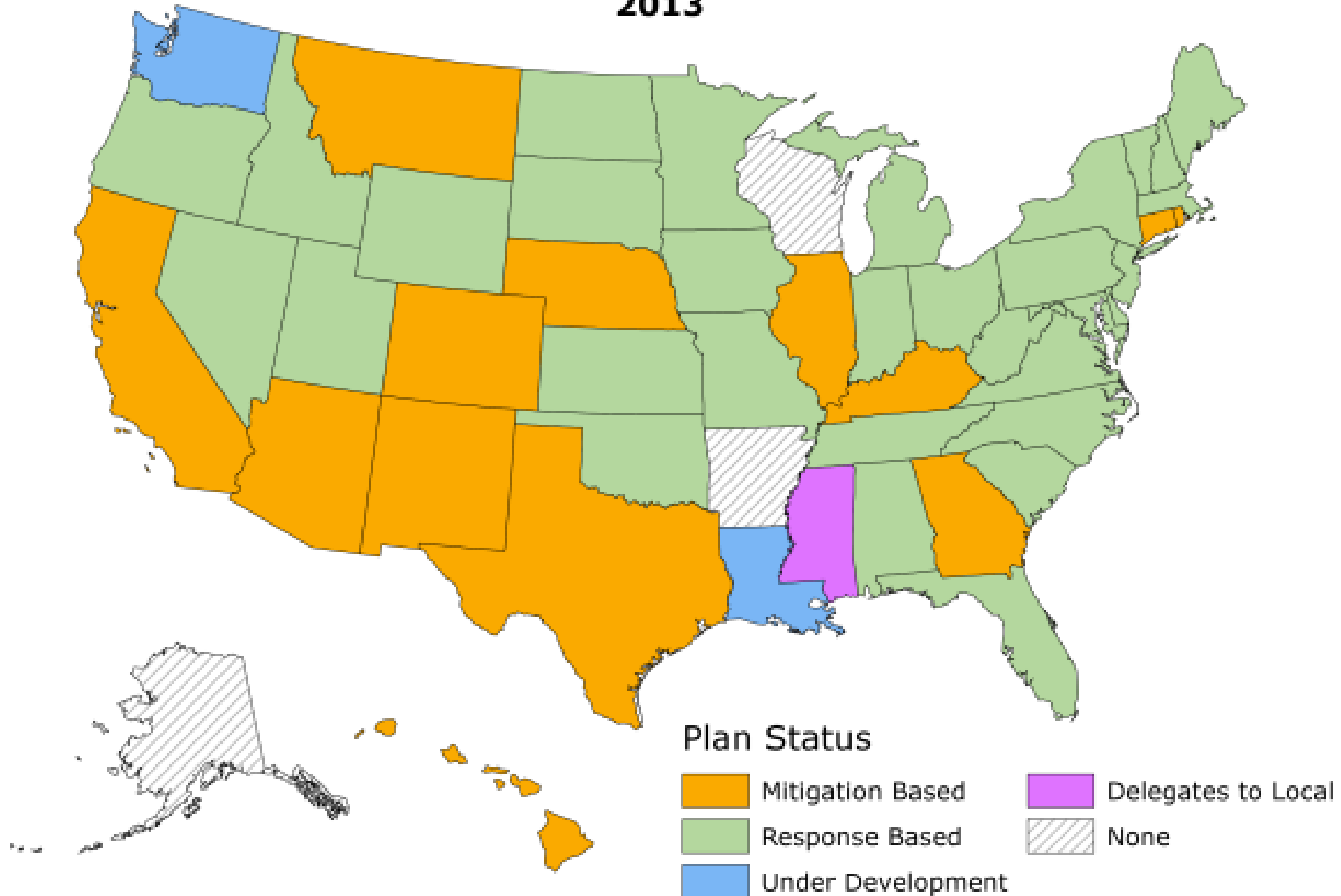
**TOP DOWN**



**BOTTOM UP**

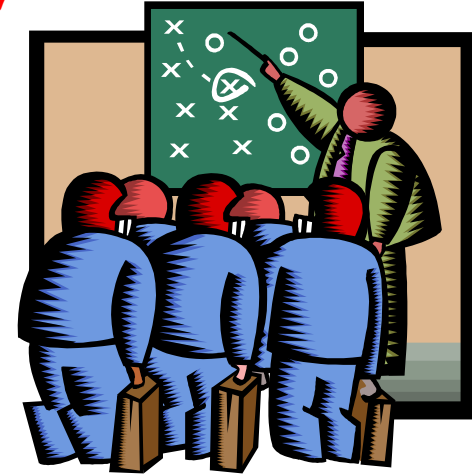
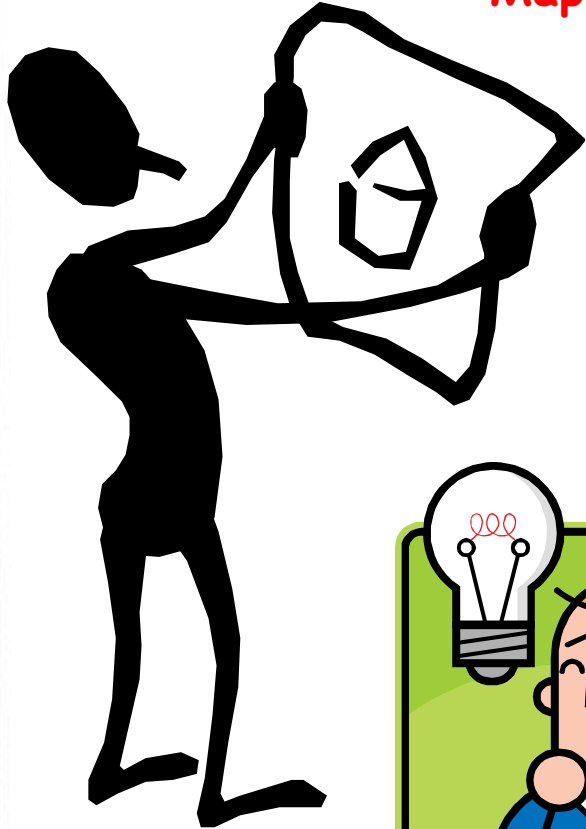
# Status of State Drought Plans

2013



# Where do we start?

Mapping out a strategy!



Leadership!



Financial Resources Required?  
Cost?

# Key Elements/Pillars of a Drought Preparedness Plan

- **Monitoring/early warning, prediction and information delivery systems**
  - **Integrated** monitoring of key indicators
    - Precipitation, temperature, soil moisture, streamflow, snowpack, groundwater, impacts, etc.
  - Use of appropriate indices
  - Reliable seasonal forecasts
  - Development/delivery of information and decision-support tools

# Key Elements/Pillars of a Drought Preparedness Plan

- **Risk/Vulnerability and impact assessment**
  - Conduct of risk/vulnerability assessments
  - Monitoring/archiving of impacts/losses
    - Critical for evaluating progress in risk reduction and also for vulnerability assessment
- **Mitigation and response**
  - Proactive measures to increase coping capacity
  - Response measures that support the principles of drought risk reduction
    - Examples

A UN-WATER INITIATIVE

UN WATER

ORGANIZED BY:



United Nations Convention  
to Combat Desertification



LOCAL ORGANIZER



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

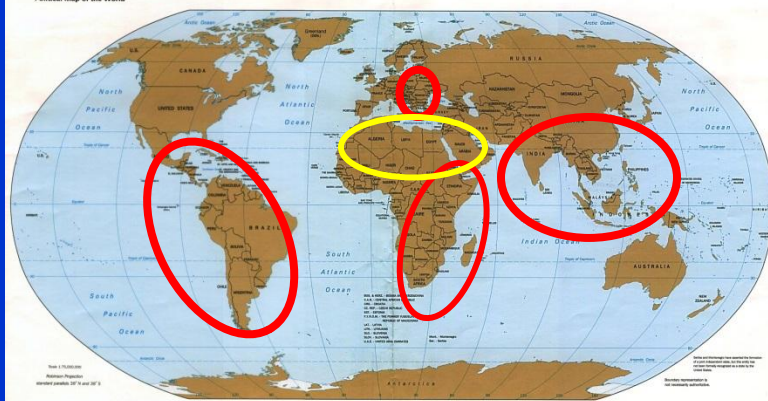
Find out more on the initiative:

[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)

Political Map of the World



# Integrated Drought Management Programme - Background

Launched by WMO and GWP in 2013 at High-Level Meeting on National Drought Policies (HMNDP) to support implementation of the HMNDP outcomes

[Excerpt of HMNDP final declaration, emphasis added]

- *Develop **proactive drought impact mitigation, preventive and planning measures**, risk management, fostering of science, appropriate technology and innovation, public outreach and resource management as key elements of effective national drought policy*
- *Promote **greater collaboration** to enhance the quality of local/national/regional/global observation networks and delivery systems*
- *Improve **public awareness of drought risk and preparedness for drought***
- *Consider, where possible [...] **risk reduction, risk sharing and risk transfer tools in drought management plans***
- *Link **drought management plans to local/national development policies***



# IDMP Regional Programmes and Initiatives



**Support action and implementation on the ground, adding to existing efforts the strength of IDMP and its partners**

**Central and Eastern Europe (2013):** Bulgaria, Czech Republic, Hungary, Lithuania, Moldova, Poland, Romania, Slovakia, Slovenia, Ukraine

**Horn of Africa (2014):** Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda.

**West Africa (2014):** First in Burkina Faso, Niger and Mali, and then share lessons learned with other neighbouring countries through the WMO partners, GWP Country Water Partnerships and other partners.

**South Asia Drought Monitoring System (2014)** with IWMI in Bhutan, Bangladesh, Nepal, India, Pakistan and Sri Lanka

**Central America (2013)** Regional workshop leading to training on SPI and assessment of current drought.

**South America (tbc 2015)** Regional workshop in Bolivia potentially leading to follow-up activities with partners.



# Framework of IDMP work on Drought Policies: National Drought Management Policy Guidelines

- Adapting of 10-step planning process by Don Wilhite to national drought policy development
- Response to need articulated at High-level Meeting on National Drought Policy (HMNDP)
- Template that can be adapted to national realities and needs
- Building on existing risk management capacities



U N I



# National Drought Management Policy Guidelines

A Template for Action



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

Integrated Drought Management Programme (IDMP)

# National Drought Policy: A 10-Step Process

## Step 1

**Appoint** a national drought policy commission

## Step 2

**State or define** the goals and objectives of a risk-based national drought management policy

## Step 3

**Seek** stakeholder participation and **define/resolve** conflicts between key water use sectors, considering transboundary implications.

## Step 4

**Inventory** data and financial resources available and **identify** groups at risk

## Step 5

**Prepare/write** the key tenets of a national drought management policy and preparedness plans  
*(monitoring, early warning and prediction; risk and impact assessment; mitigation and response)*

# *Risk Assessment: Purpose*

- 
- To identify those sectors, population groups, or regions most at risk from drought, most probable impacts, and mitigation actions that will reduce impacts to future events.



**Who and what is at risk and why?**

**Vulnerability Profile**

# National Drought Policy: A 10-Step Process

(continued)

## Step 6

**Identify** research needs and **fill** institutional gaps

## Step 7

**Integrate** science and policy aspects of drought management

## Step 8

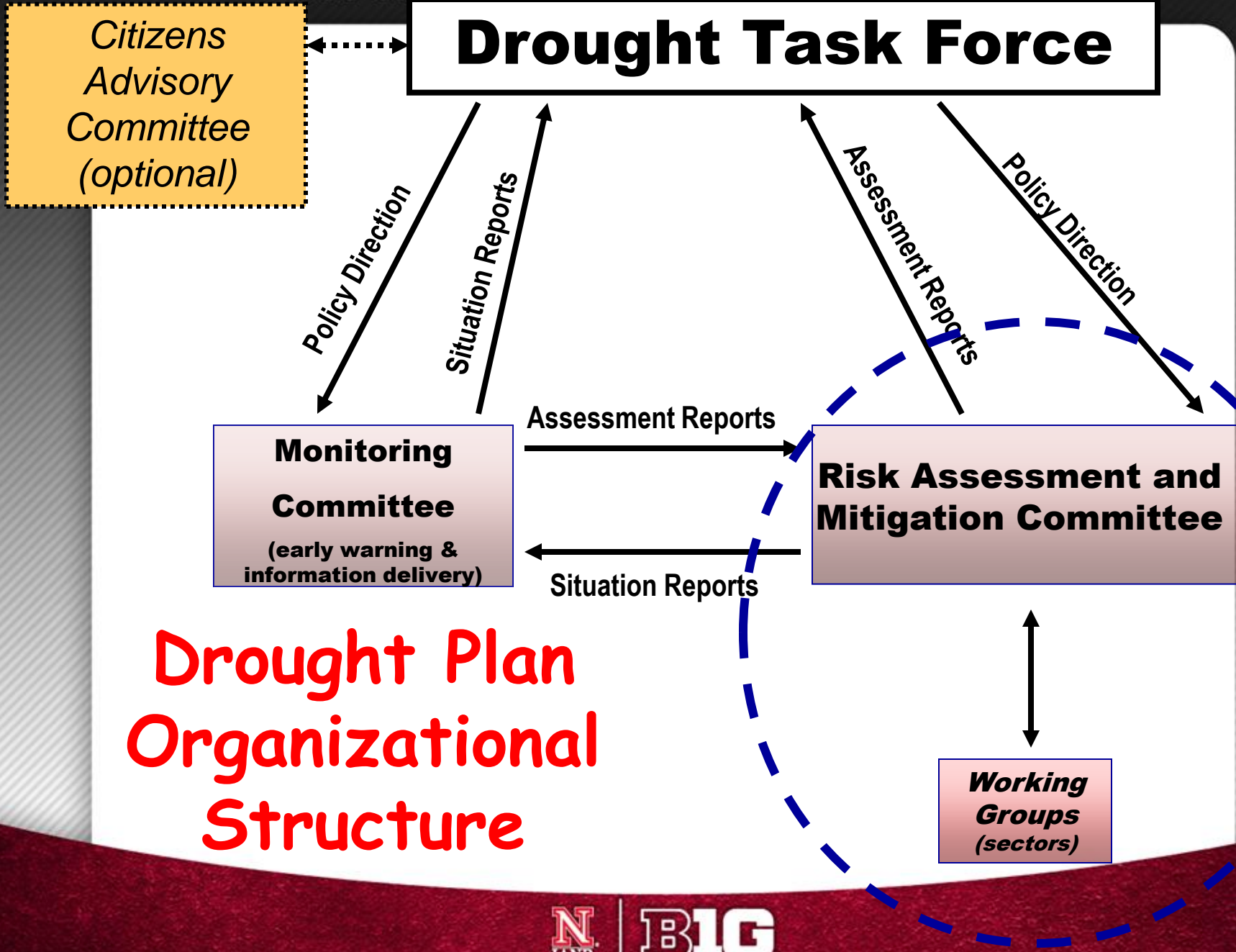
**Publicize** the national drought management policy and preparedness plans, **build** public awareness and consensus

## Step 9

**Develop** education programs for all age and stakeholder groups

## Step 10

**Evaluate, test** and **revise** drought management policy and supporting preparedness plans



# Drought Plan Organizational Structure

# 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 plants are visible against the bright sky.

# Thanks for your attention!

## **Contact Information:**

School of Natural Resources  
University of Nebraska-Lincoln  
[dwilhite2@unl.edu](mailto:dwilhite2@unl.edu)