

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

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

APEC Climate Symposium 2013: Regional Cooperation in Drought Prediction Science to Support Disaster Preparedness and Management (Jakarta, Indonesia)

Presentation Outline

- The **MANY FACES OF DROUGHT**
 - Drought as hazard, characteristics, definition
- Breaking the **HYDRO-ILLOGICAL CYCLE**
 - Crisis management
- Our **CHANGING CLIMATE—CHANGING VULNERABILITY**
- Building **SOCIETAL RESILIENCE**
 - Drought monitoring and prediction, early warning/information systems
 - Vulnerability/risk/impact assessments
 - Mitigation and response measures
- Moving towards a **POLICY FRAMEWORK** that enhances preparedness and risk reduction
 - Compendium of best practices in support of NDMP
 - Regional Capacity Building Workshops
 - Integrated Drought Management Programme (IDMP)

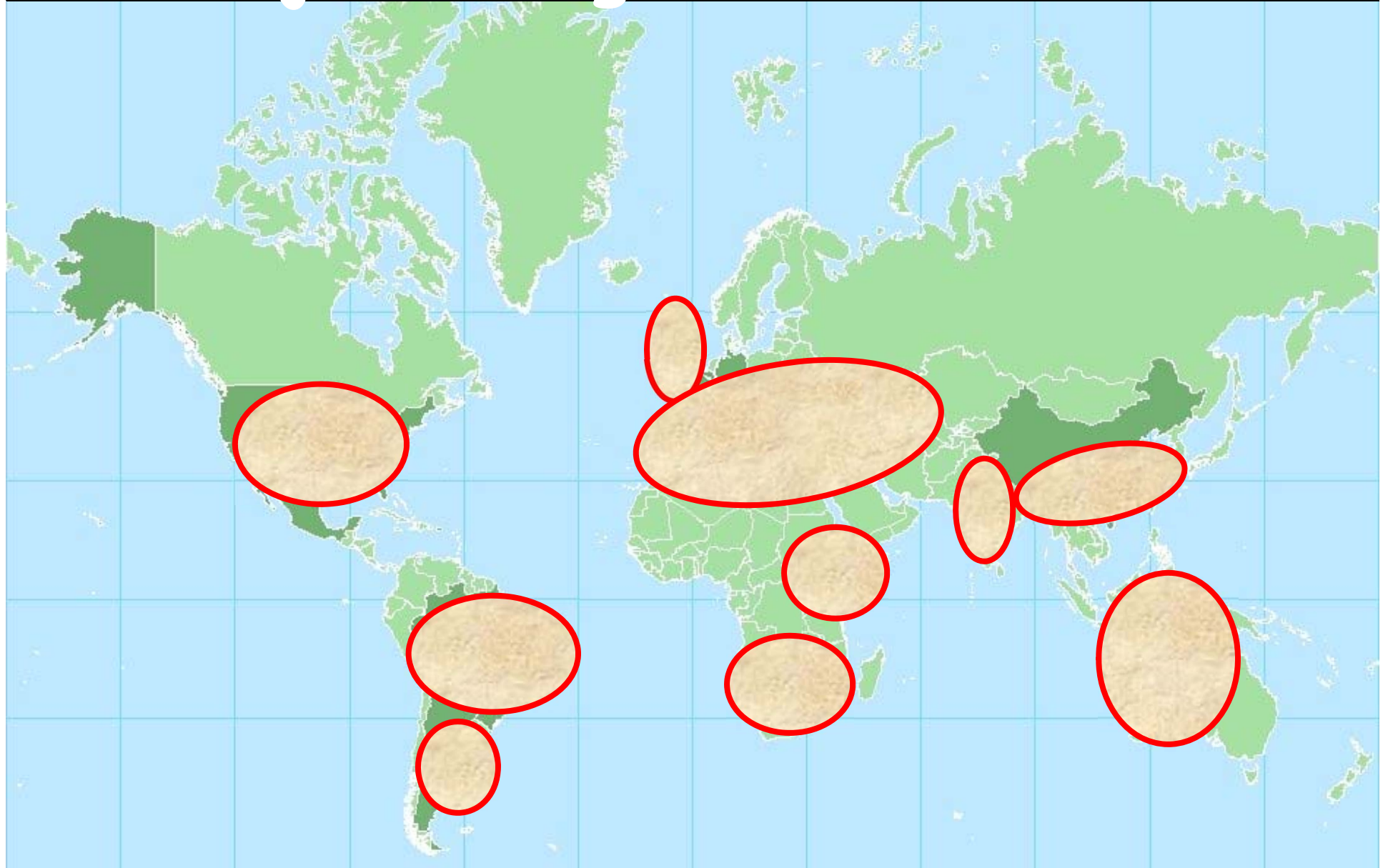
The Many Faces of Drought



甘蔗受旱，叶子卷起，
植株枯萎。
10.25摄于随屋



Major Drought Areas—2012



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**).

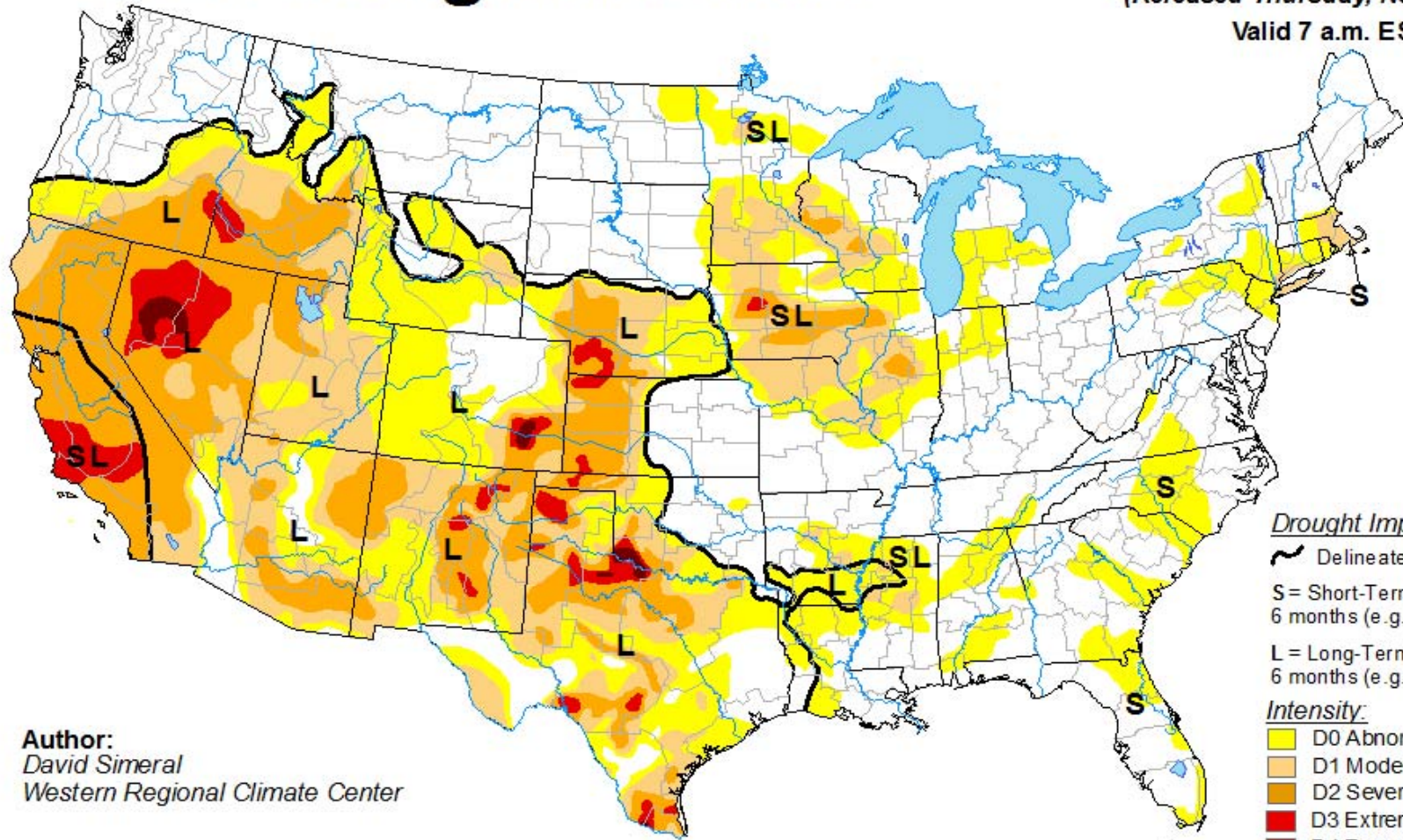


Agricultural, Hydrological and Socio-economic Drought



U.S. Drought Monitor

November 5, 2013
 (Released Thursday, Nov. 7, 2013)
 Valid 7 a.m. EST

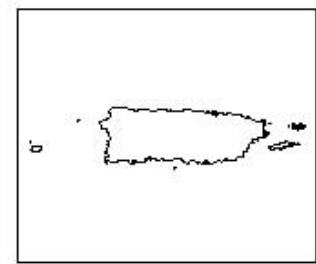
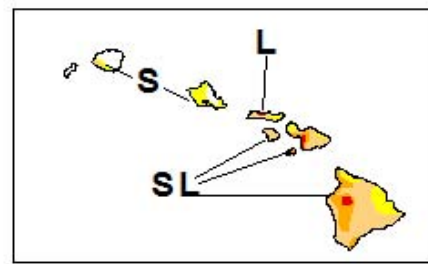
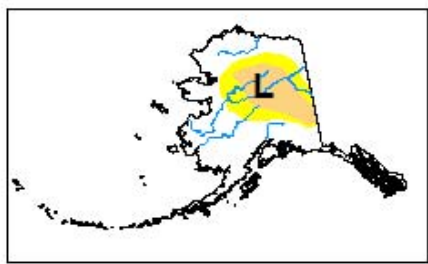


Author:
 David Simeral
 Western Regional Climate Center

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

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

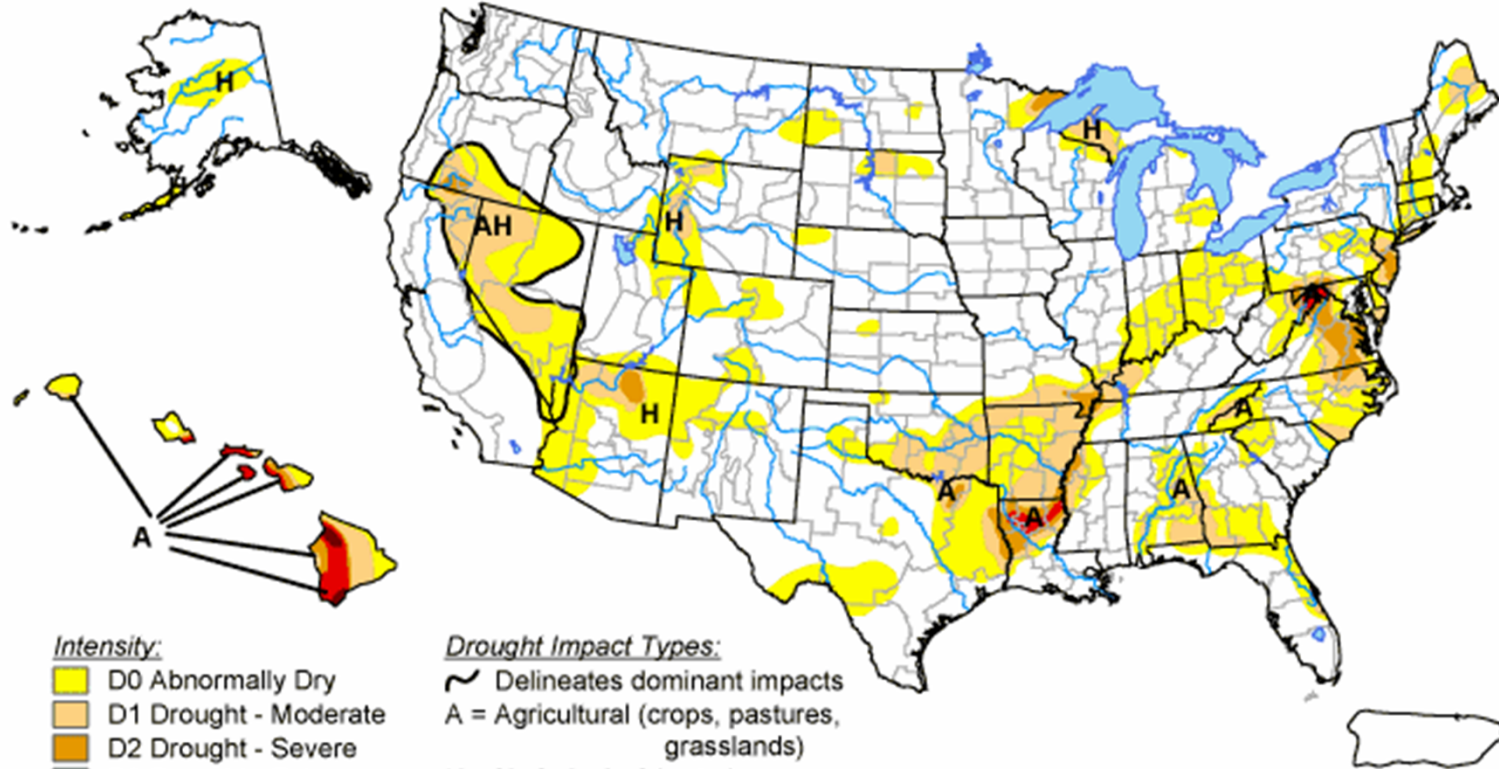


<http://droughtmonitor.unl.edu/>





3 Year Animation—USDM, 2010-2013

U.S. Drought Monitor


September 7, 2010
Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

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

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

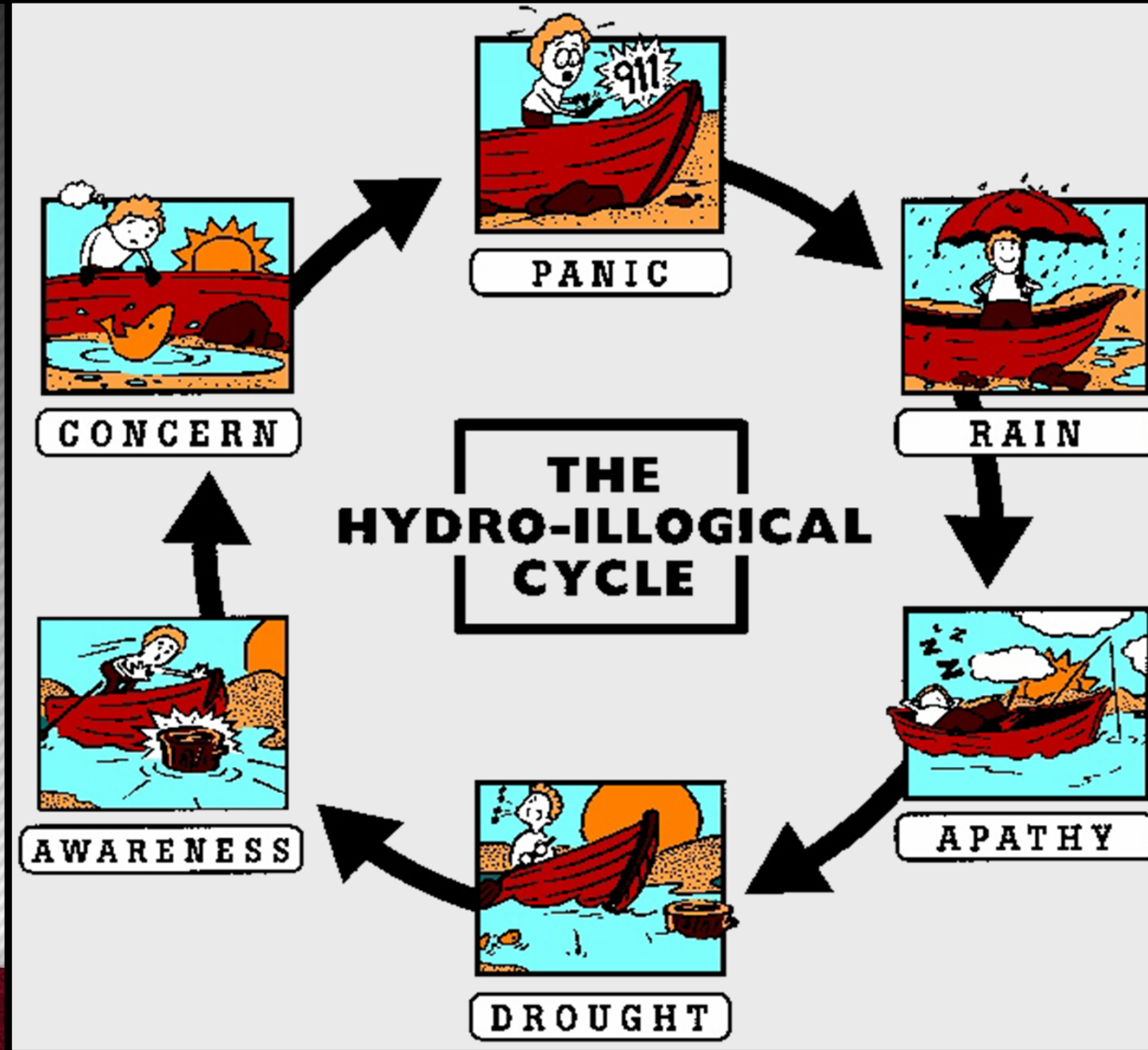
<http://drought.unl.edu/dm>



Released Thursday, September 9, 2010
Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

Breaking the Hydro-illogical Cycle:

An Institutional Challenge for Drought Management



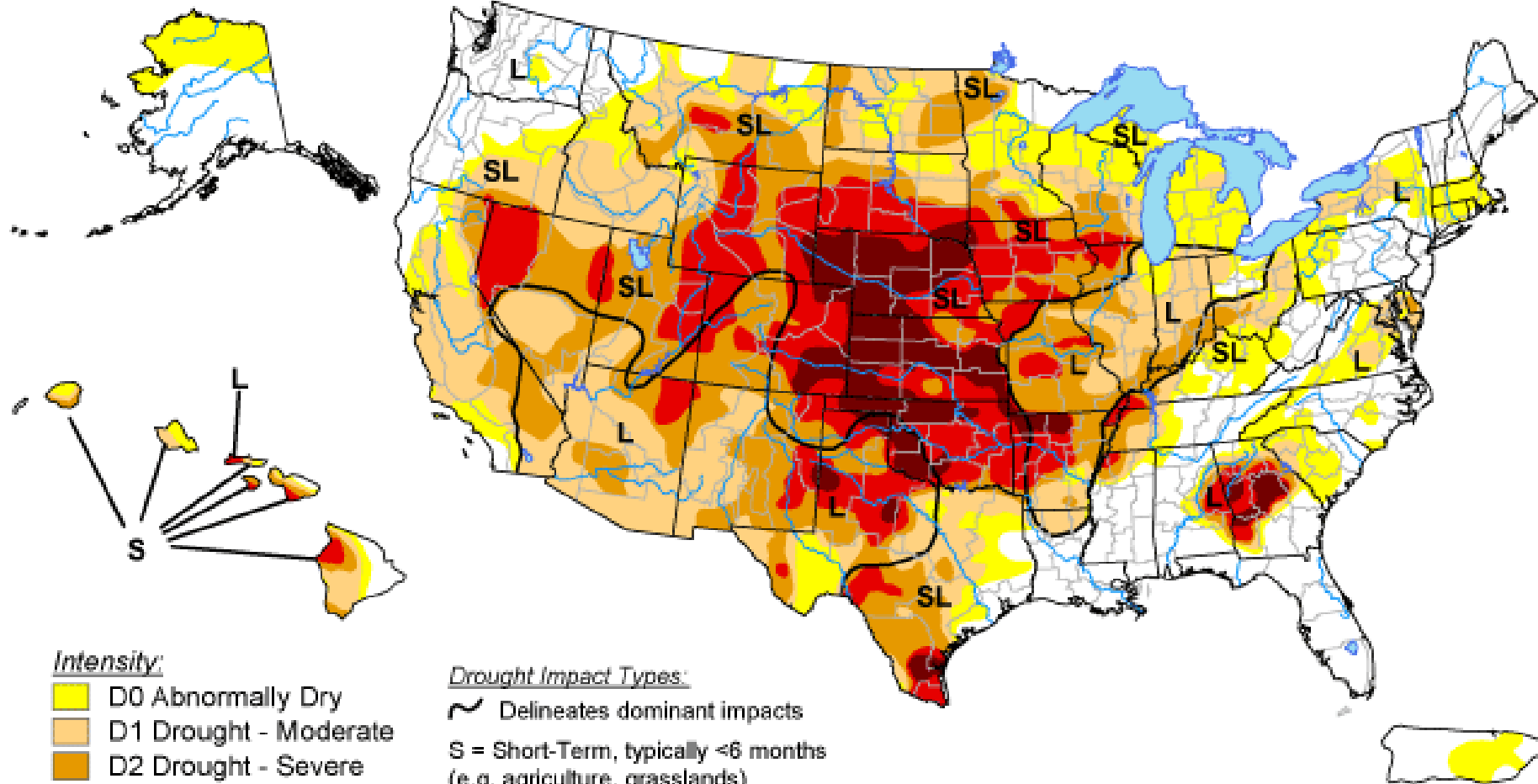
Crisis Management

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!

U.S. Drought Monitor


September 11, 2012
Valid 7 a.m. EDT



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months (e.g. hydrology, ecology)

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

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

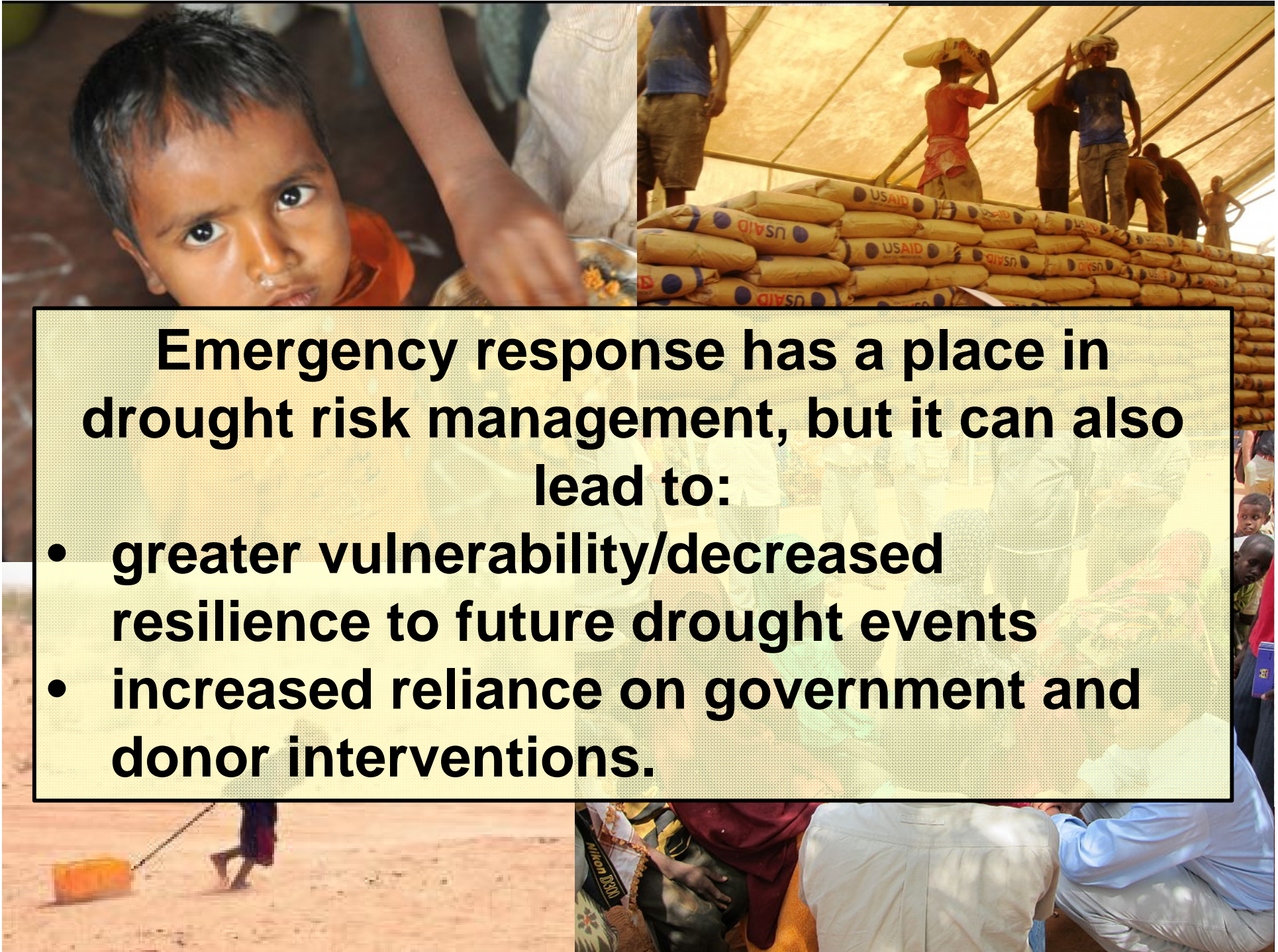


Released Thursday, September 13, 2012
Author: David Simeral, Western Regional Climate Center

Drought Disaster Designations

October 10, 2012

- 
- 2012, \$17.4 billion in crop insurance indemnities
 - 2011-12, \$28 billion in crop insurance indemnities
 - \$62 billion spent on U.S. disaster relief, 2011-12
 - Total drought impacts, \$30 billion, 2012
 - Superstorm Sandy, \$50 billion
 - Total U.S. drought losses, 1980-2012 ~\$250 billion
 - Total European drought losses, 1982-2012 ~\$100 billion

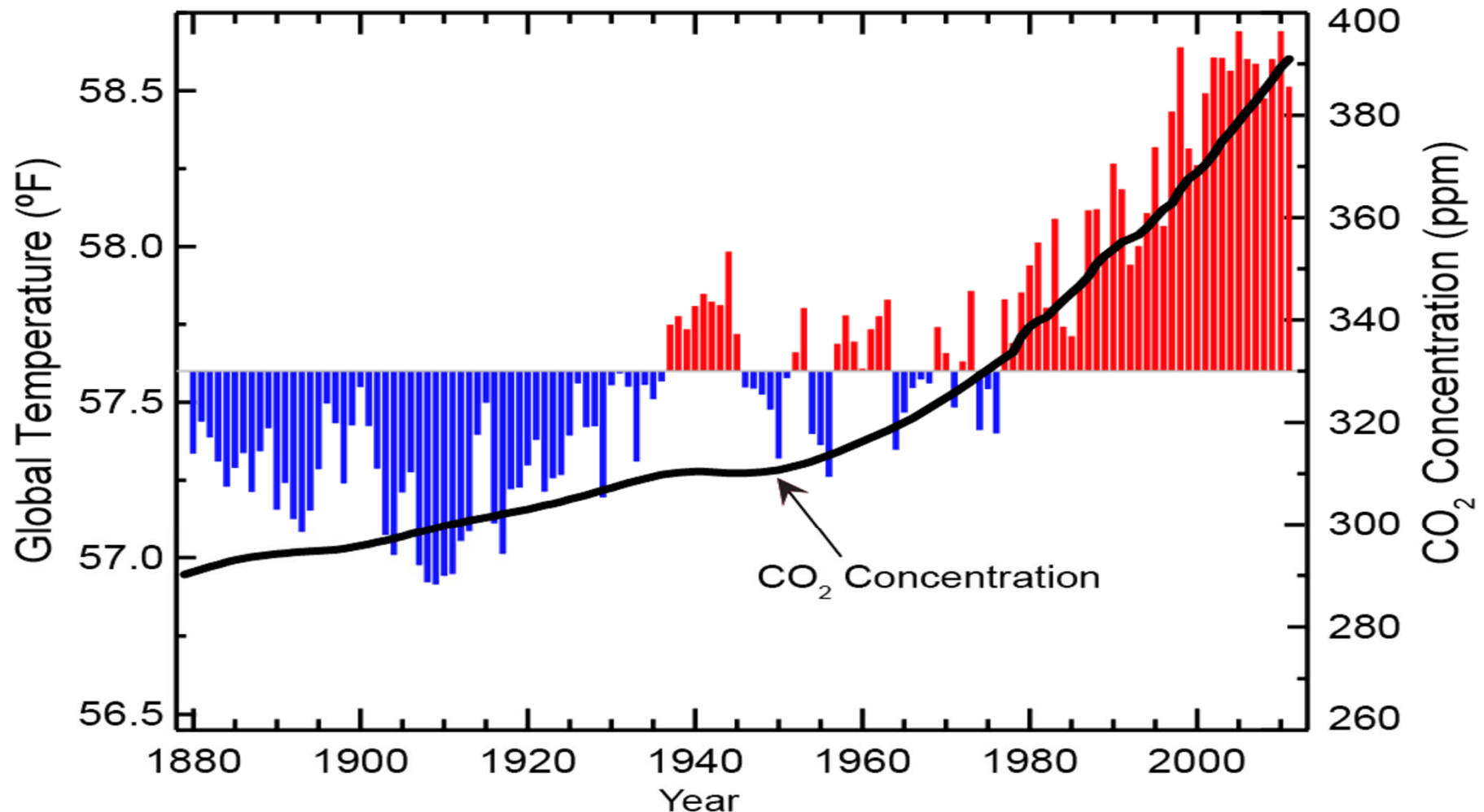


Emergency response has a place in drought risk management, but it can also lead to:

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

Our Changing Climate

Global Temperature and Carbon Dioxide



There is a close correlation between CO₂ and temperature that has been verified through many lines of research . This graph shows the relationship of temperature and CO₂ over the last 130 years.

Natural Catastrophes Worldwide 1980-2012

Number

500

400

300

200

100

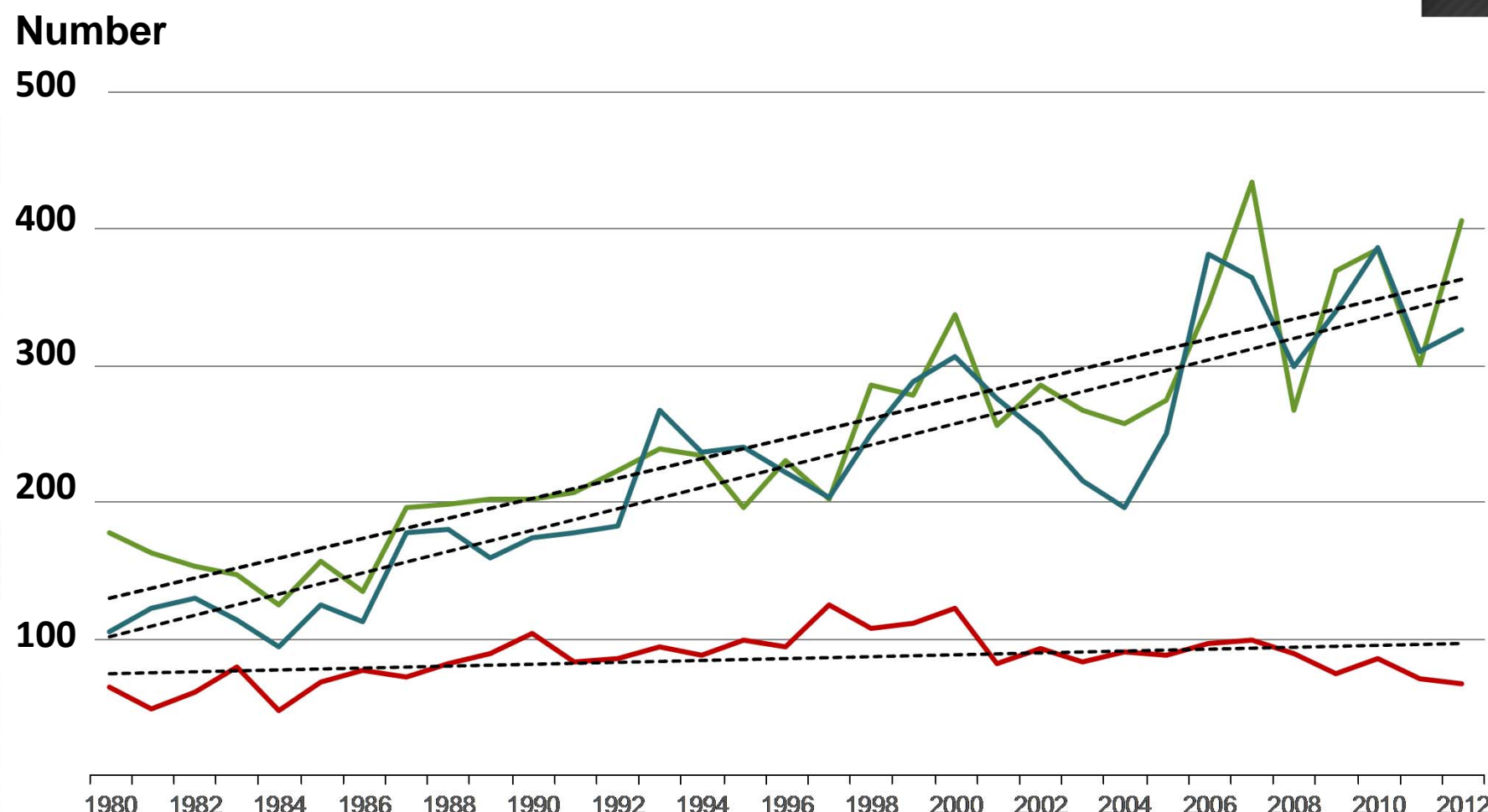
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012

Geophysical events
(Earthquake, tsunami,
volcanic eruption)

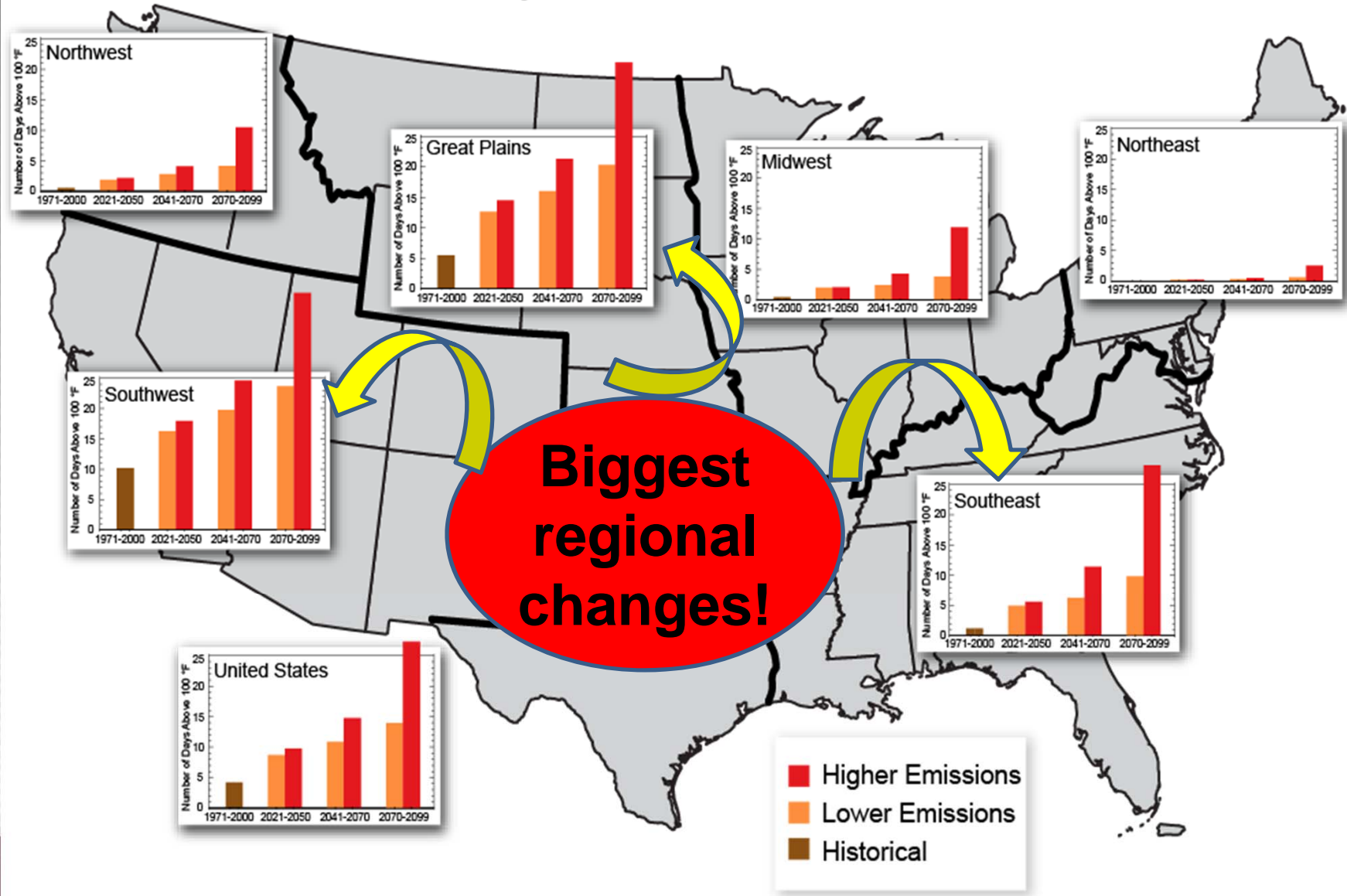
Meteorological events
(Storms, etc.)

Hydrological events
(Flood, mass movement)

Source: Munich Re



Days Over 100°F



Biggest regional changes!

- Higher Emissions
- Lower Emissions
- Historical

The Climate Challenge for Drought Management

- Increasing mean temperature
- High temp. stress and heat waves/longer

Are droughts increasing in frequency, intensity and duration?

distribution and intensity

- Reduced soil moisture
- Changes in groundwater recharge
- Reduced runoff/stream flow resulting from reduced snowpack/sublimation

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



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**
- Develop and implement **drought preparedness plans**
- Create **national drought policies** based on the principles of risk reduction

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

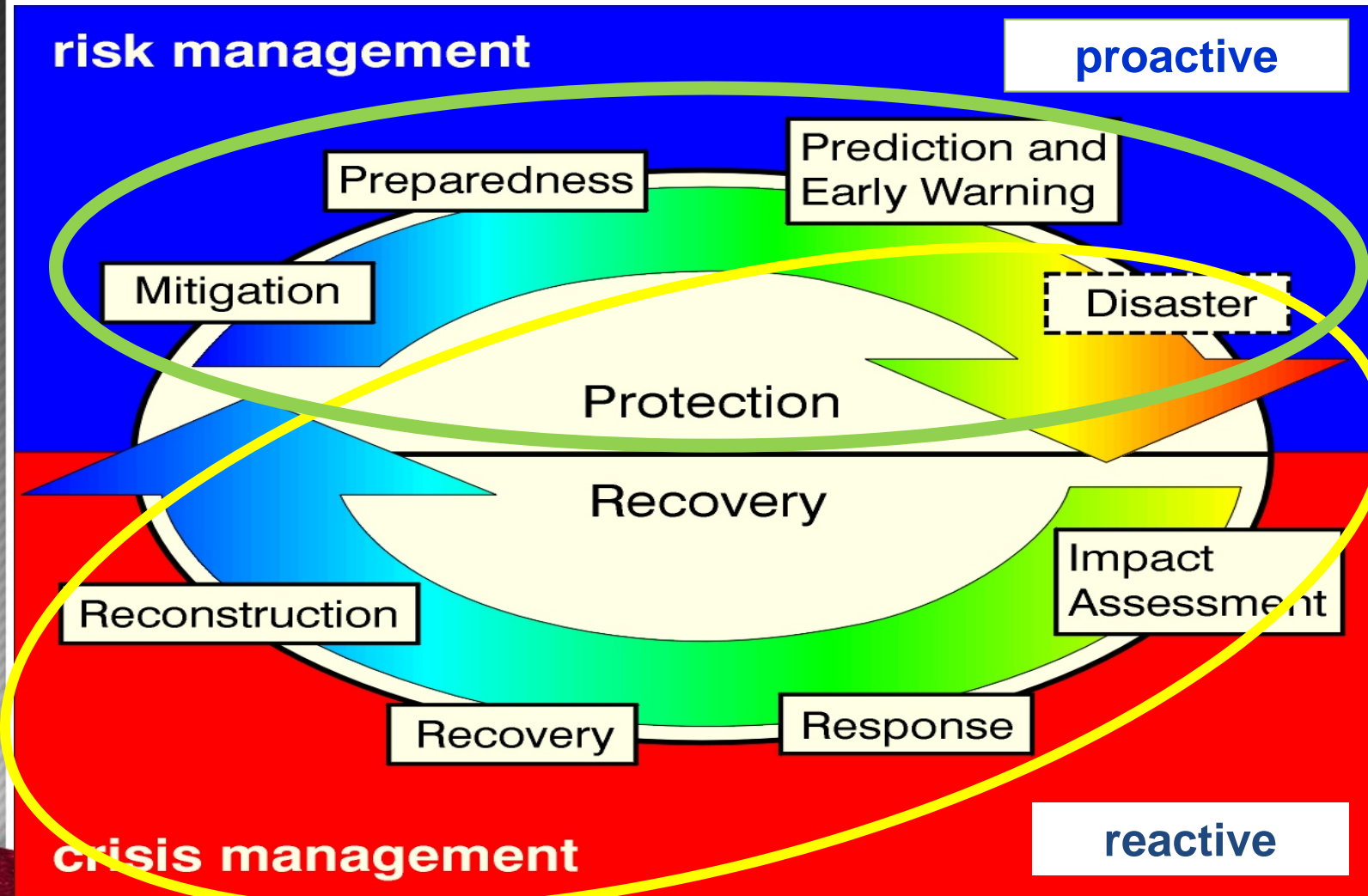


Types of Policy Responses

- 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

A blue umbrella stands on a surface of cracked, dry earth, symbolizing drought. The text "National Drought Policy" is written in white on the umbrella's canopy.

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.
- 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;
 - 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.

Key Elements of a Drought Mitigation Plan

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

Key Elements of a Drought Mitigation Plan

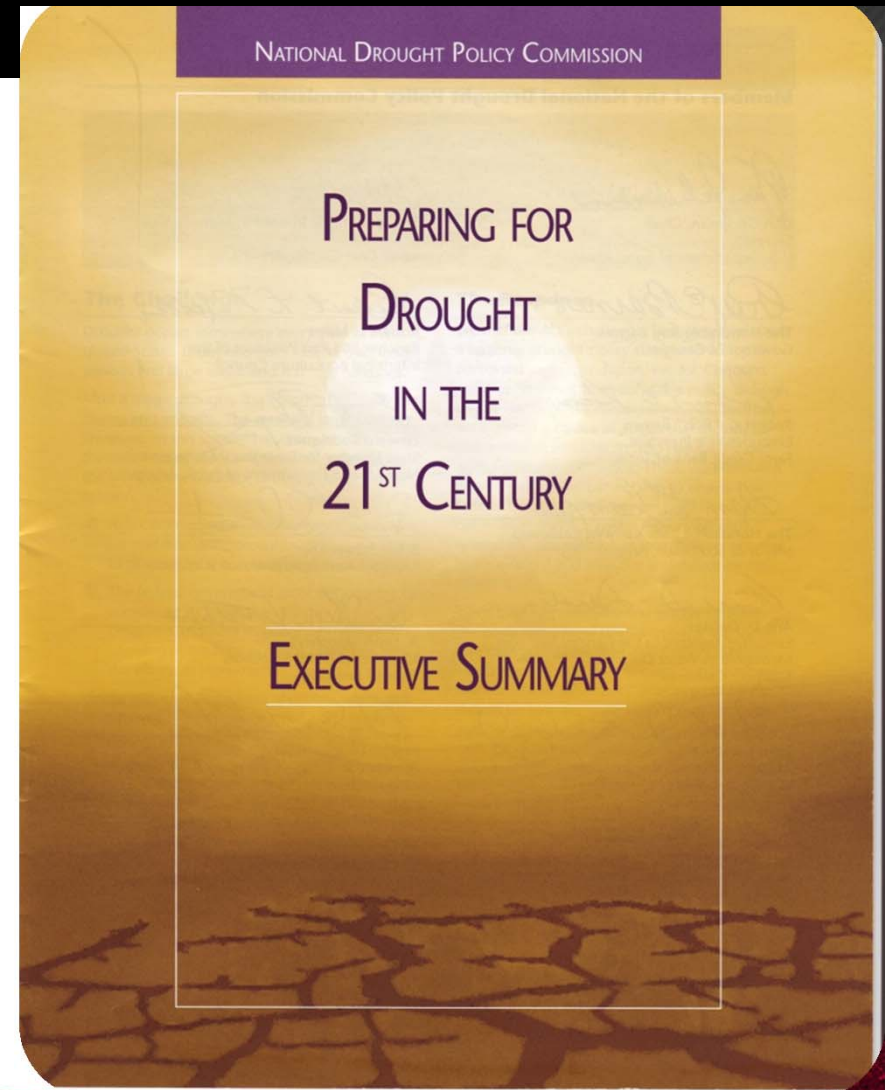
- **Risk and impact assessment**
 - Conduct of risk/vulnerability assessments
 - Monitoring/archiving of impacts/losses
- **Mitigation and response**
 - Proactive measures to increase coping capacity
 - Response measures that support the principles of drought risk reduction

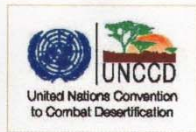
U.S. National Drought Policy

National Drought Policy Act, 1998

National Drought Policy Commission

"We can reduce this nation's vulnerability to the impacts of drought by making preparedness the cornerstone of national drought policy."





HIGH-LEVEL MEETING ON NATIONAL DROUGHT POLICY

(HMNDP)
TOWARDS MORE DROUGHT RESILIENT SOCIETIES

11-15 March 2013
CICG, Geneva

Final Report



National Drought Policy Goals

- Proactive mitigation and planning measures, risk management, public outreach and resource stewardship.
- Greater collaboration to enhance the national / regional / global observation networks and information delivery systems to improve public understanding of, and preparedness for, drought.
- Incorporation of comprehensive governmental and private insurance and financial strategies into drought preparedness plans.


National Drought Policy Goals

- Recognition of a safety net of emergency relief based on sound stewardship of natural resources and self-help at diverse governance levels.
- Coordination of drought programmes and response in an effective, efficient and customer-oriented manner.


A UN-WATER INITIATIVE

UN WATER

ORGANIZED BY:



LOCAL ORGANIZER




1st 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



A series of 4-5
capacity building
workshops
sponsored by
WMO, FAO,
UNCCD, and UN-
Water
(Eastern Europe,
Latin America,
Africa and Asia)



A UN-WATER INITIATIVE ORGANIZED BY:



**Capacity Development
National Drought Management Policies**

**Agenda for the first regional workshop for
9-11 July 2013
Bucharest, Roma**

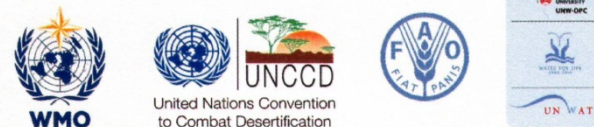
DAY I

- 8:30-09:00 Registration
- 9:00-12:00 Session 1: Opening Session/Country reports**
- 9:00-10:15 **Session 1a:** Opening statements and introductory remarks
- Opening statement(s) by Mrs. Elena Dumitru, State Secretary, Ministry of Environment and Climate Change (5 minutes)
 - Mr. Daniel Botanoiu, State Secretary, Ministry of Agriculture and Rural Development (5 minutes)
 - Dr. Ion Sandu, Director General, National Meteorological Administration (5 minutes)
 - Welcoming statements (Organizing partners) (10 minutes)
 - A roundtable introduction of participants and expectations (10 minutes)
- 10:15-10:45 **Group Photograph/Coffee break**
- 10:45-12:15 **Session 1b: Setting the scene**
- 10:45-11:15 Overview of the initiative and scope of the Regional Workshop
- 11:15-12:15 Key Note Address (Wilhite D.A) on "Risk based National Drought Management Policies: challenges and opportunities"

12:15-13:30 Lunch



A UN-WATER INITIATIVE ORGANIZED BY:



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

DRAFT

Agenda for the second regional workshop for "Latin America and the Caribbean" Countries

**04-06 Dec 2013
Fortaleza, Brazil**

DAY I

- 08:30-09:00 Registration**
- 9:00-13:00 Session 1: Opening & Country reports**
- 9:00-10:00 Session 1a: Opening statements**
- Opening statement(s) by High-level authorities from the Gov't of Brazil (15 Minutes)
 - Welcoming statement (WMO, on behalf of Organizing partners) (10 minutes)
 - A roundtable introduction of participants and expectations (35 minutes)
- 10:00-10:30 Session 1b: Overview**
- Overview of the initiative, objectives and scope of the Workshop (UNW-DPC)
- 10:30-11:00 Group Photograph/Coffee and tea break**

**New initiative
from GWP and
WMO
launched at
HMNDP,
March 2013.**

GLOBAL WATER PARTNERSHIP IWRM TOOLBOX

English PRESS ROOM CONTACT US + GWP Regional Websites Search

THE CHALLENGE ABOUT GWP OUR APPROACH **GWP IN ACTION** GET INVOLVED

GWP IN ACTION

- + News and Activities
 - Making a difference on the ground
 - International Year of Water Cooperation 2013
- + Events
- + Caribbean
- + Central Africa
- + Central America
- + Central and Eastern Europe
- + Central Asia and Caucasus
- + China
- + Eastern Africa
- + Mediterranean
- + South America
- + South Asia
- + Southeast Asia
- + Southern Africa
- + West Africa

Consultation Meeting on the Proposed Integrated Drought Management Programme



Share: f t in

Posted: 2010-09-27

The successes of the WMO/GWP Associated Programme on Flood Management over the last 10 years illustrate the integrated approach to flood management.

The lessons learned and the experiences of this joint programme will inform the development of a proposed new Programme on Integrated Drought Management. Potential Partners in this new programme are invited to an initial Consultation Meeting to discuss its concept and structure on 15-16 November 2010 in Geneva, Switzerland.

Read more about this event in [the invitation](#) (pdf).

GWP Publications



**Consultation meeting
held a World Water
Week, September
2013, Stockholm.**

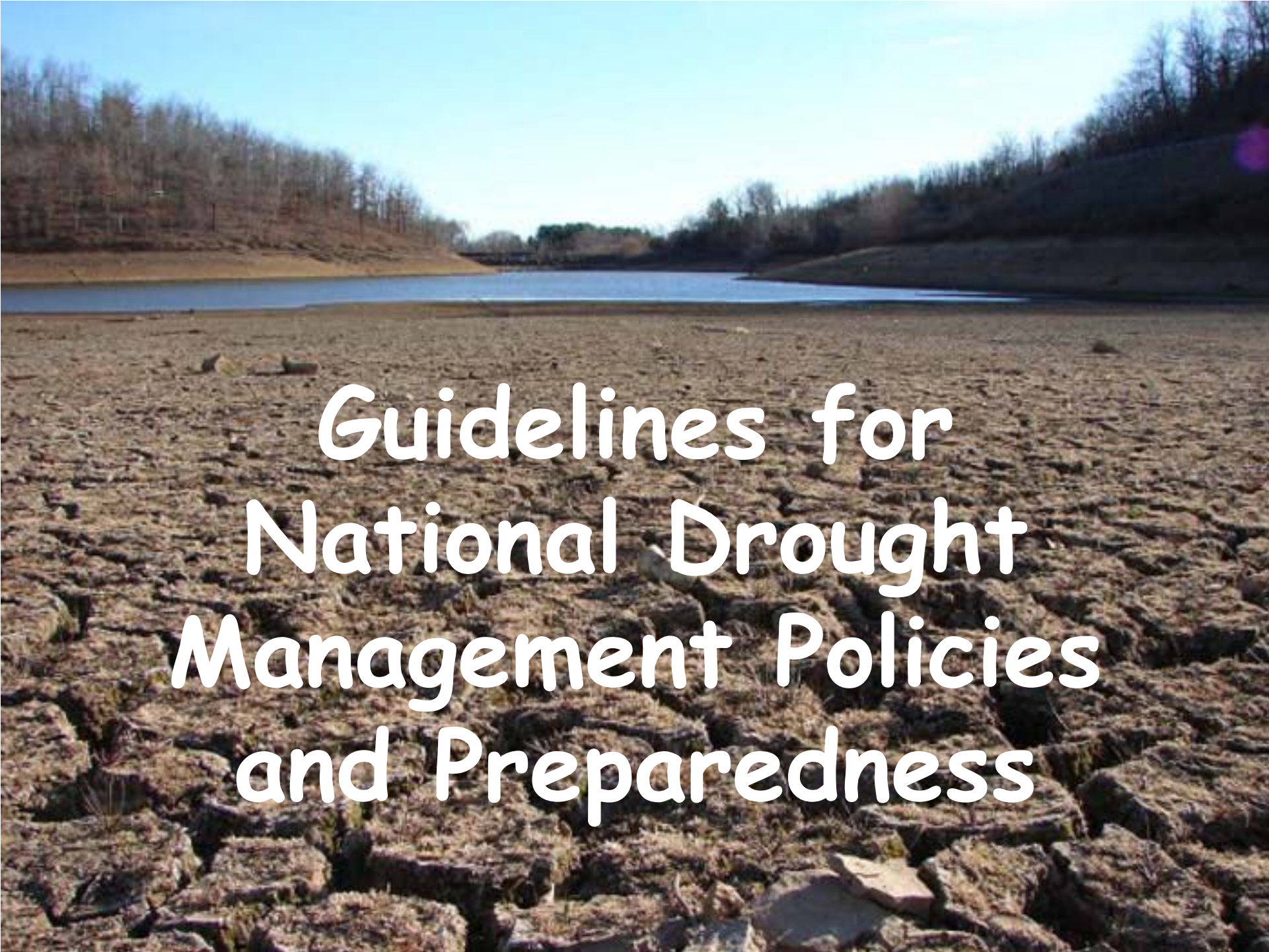


Integrated Drought Management Programme

The Integrated Drought Management Programme (IDMP) has been jointly established by [World Meteorological Organization \(WMO\)](#) and the [Global Water Partnership \(GWP\)](#) in March 2013 at the [High-level Meeting on National Drought Policy \(HMNDP\)](#) with the objective to support stakeholders at all levels by providing them with policy and management guidance through globally coordinated generation of scientific information and sharing best practices and knowledge for integrated drought management.

This website is under development and will be updated over the coming weeks. Please come back soon.

<http://www.droughtmanagement.info/>

A photograph of a dry, cracked lake bed with a body of water in the background under a clear blue sky. The foreground is filled with a dense network of deep, irregular cracks in the parched earth, interspersed with small, dark rocks. In the middle ground, a calm body of water stretches across the frame, bordered by a line of bare, brown trees. The background shows a clear, light blue sky. The overall scene conveys a sense of severe drought and environmental hardship.

**Guidelines for
National Drought
Management Policies
and Preparedness**

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 **resolve** conflicts between key water use sectors

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)

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

Step 9

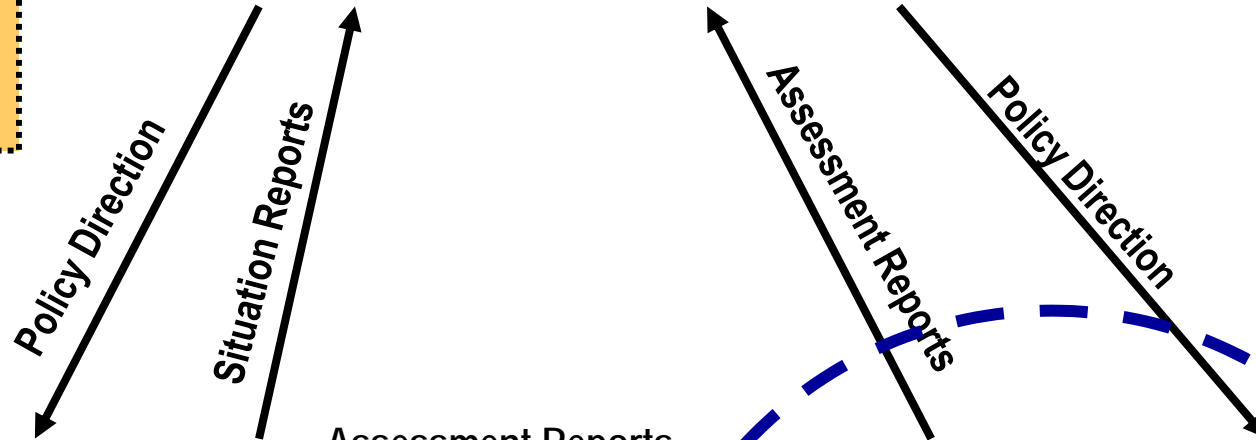
Develop education programs for all age and stakeholder groups

Step 10

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

Drought Task Force

Citizens
Advisory
Committee
(optional)



Monitoring
Committee

Assessment Reports

Risk Assessment
Committee

Situation Reports

Drought Plan Organizational Structure

Working
Groups

Takeaway Messages

- Climate is changing—climate state and climate variability.
- Extreme climate events are increasing in frequency globally and locally, ***managing impacts critically important—we must increase our resilience to drought.***
- 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.

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