Drought Decision Tools, Planning, and Mitigation: Challenges and Opportunities

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Drought differs from other natural hazards

- Slow-onset, creeping phenomena (early warning systems, impact assessment, response)
- Absence of universal definition (leads to confusion and inaction)
- Severity is best described through multiple indicators and indices (early warning systems)
- Impacts are non-structural and spread over large areas (makes assessment and response difficult; mitigation actions less obvious)

**RESULT**, progress on drought preparedness has been slow
Drought: a deficiency of precipitation (intensity) from expected or “normal” that, when extended over a season or longer period of time (duration), is insufficient to meet the demands of human activities and the environment (impacts).

Risk = Hazard × Vulnerability
Why the Recent Global Interest in Drought?

- Single and **multi-year** severe droughts
  - Intensity and duration
  - Occurrence in arid to humid regions
- Spatial extent—e.g., 30 to 50% of U.S.
- Magnitude and complexity of impacts in both developing and developed countries
  - Agriculture, energy, transportation, urban water supply, recreation/tourism, fires, environmental, social
  - Conflicts between water users
  - Water restrictions (agricultural and urban)
- Increasing vulnerability in developing/developed countries
- Increasing capability to develop integrated drought early warning systems
- Experience with drought mitigation and preparedness planning—lessons learned
Is drought a departure from normal climate or a part of normal climate?
Percent Area of the United States in Severe and Extreme Drought

January 1895–November 2004

Based on data from the National Climatic Data Center/NOAA
Lessons Learned—U.S.

Federal assistance programs are numerous, poorly coordinated, and **reactive** (response/post-impact oriented)

Relief increases vulnerability, no incentive to change resource management practices → **greater impacts, increased need for government assistance**

Preparedness and mitigation reduces vulnerability, impacts, and the need for government intervention; **a good investment**

Early warning is the foundation of effective drought planning and mitigation → **integrated early warning**

- Improve monitoring networks and information delivery to end users to improve decision making → reduces risk and impacts
- Comprehensive, integrated assessments
Since 1988, the U.S. Congress has appropriated $48 billion in drought relief. Has this expenditure reduced or increased vulnerability to drought?
The Cycle of Disaster Management

- Risk Management
  - Preparedness
  - Prediction and Early Warning
  - Mitigation

- Crisis Management
  - Disaster
  - Impact Assessment
  - Reconstruction
  - Recovery
  - Response
  - Recovery

- Protection

National Drought Mitigation Center
U.S. Drought Monitor

January 4, 2005
Valid 7 a.m. EST

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)
  (No type = Both impacts)

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

http://drought.unl.edu/dm

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National Drought Mitigation Center
Red Willow County, Nebraska

July 25, 2002

168,000 acres of grassland affected by drought
(25% severe and extreme, 53% moderate)
376,000 acres of row crops affected by drought
(68% severe and extreme, 23% moderate)
41,800 acres of pasture/hay affected by drought
(40% severe and extreme, 40% moderate)
Creating a Drought Early Warning System for the 21st Century

The National Integrated Drought Information System (NIDIS)
NIDIS Vision

A dynamic and accessible drought information system that provides users with the ability to determine potential drought impacts and associated risks and the decision support tools needed to better prepare for and mitigate the effects of drought.
NIDIS Recommendations

- Establish NIDIS (NOAA as lead agency)
- Integrate data and tools (identify and fill gaps)
- Develop an impact reporting/methodology tool
- Establish an integrated federal drought research program
- Facilitate drought preparedness programs
- Provide a framework for education and user feedback/interaction
GOAL:
To help nations build greater institutional capacity to cope with drought by promoting risk management and sharing lessons learned on drought monitoring and prediction, mitigation, and preparedness.

Building a Network of Regional Networks through Regional and Global Partnerships
Conclusions
Shifting to a New Drought Management Paradigm

We need to:

- Adopt new monitoring, risk assessment, and planning tools and methodologies
- Improve coordination within and between national, provincial, and local levels to improve information flow and decision making
- Pursue Risk = Hazard x Vulnerability approach
- Facilitate building institutional capacity by developing regional and global networks
- Acquire greater recognition of drought as hazard by disaster management community
Thanks!

Visit the NDMC
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