

2011

# Proposed Elements in the Compendium on National Drought Policy

Mannava V.K. Sivakumar

*World Meteorological Organization, Geneva, Switzerland*

Roger Pulwarty

*NOAA, Boulder, Colorado, USA*

Donald A. Wilhite

*University of Nebraska - Lincoln, [dwilhite2@unl.edu](mailto:dwilhite2@unl.edu)*

Justin Ginnetti

*UN International Strategy for Disaster Risk Reduction, Geneva, Switzerland*

Follow this and additional works at: <http://digitalcommons.unl.edu/droughtfacpub>

---

Sivakumar, Mannava V.K.; Pulwarty, Roger; Wilhite, Donald A.; and Ginnetti, Justin, "Proposed Elements in the Compendium on National Drought Policy" (2011). *Drought Mitigation Center Faculty Publications*. 81.  
<http://digitalcommons.unl.edu/droughtfacpub/81>

This Article is brought to you for free and open access by the Drought -- National Drought Mitigation Center at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Drought Mitigation Center Faculty Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# Proposed Elements in the Compendium on National Drought Policy

Mannava V.K. Sivakumar<sup>1</sup>, Roger Pulwarty<sup>2</sup>, Don Wilhite<sup>3</sup> and Justin Ginnett<sup>4</sup>

<sup>1</sup>World Meteorological Organization, Geneva, Switzerland

<sup>2</sup>NOAA, Boulder, Colorado, USA

<sup>3</sup>University of Nebraska, Lincoln, USA

<sup>4</sup>UN International Strategy for Disaster Risk Reduction, Geneva, Switzerland

## Abstract

Crisis management has typically characterized governmental response to drought. This approach has been ineffective, leading to untimely and poorly coordinated responses. The growing frequency and magnitude of droughts in many parts of the world call for the development of a pro-active, risk-based approach, the tenets of which are outlined in a national drought policy. Improved management of drought requires completion of a vulnerability assessment at the outset to determine those sectors, regions, and population groups most at risk to severe drought. Each country is unique in its vulnerability and institutional capacity to prepare for and respond to drought. Since the national drought policy for any given country will depend very much on the local circumstances and priorities, it is imperative that the guidance provided on the development of a national drought policy not be prescriptive to any government. Instead, we propose to develop a compendium of the desirable elements in a national drought policy from which countries could adopt those elements that will be appropriate to their local circumstances and national priorities. This paper describes some of those elements that could be included in the compendium on national drought policy under three main categories: Drought Monitoring and Early Warning Systems; Vulnerability Assessment and Impacts and Emergency Relief and Response.

## Introduction

Drought is recognized universally as the major natural hazard that carries multiple impacts on a wide range of economic, social, and environmental sectors, especially agriculture. Subsistence farmers in many developing countries are most vulnerable to the impacts of droughts. An efficient and effective policy approach to drought risk management is critical to the livelihoods of millions of people vulnerable to droughts. Improving drought management will require a more proactive approach that addresses the unique risks associated with drought in each country.

Despite the repeated occurrences of droughts throughout human history and the significant impacts on different socio-economic sectors, no concerted efforts have ever been made to initiate a dialogue on the formulation and adoption of national drought policies. The time is ripe for nations to move forward with the development of a pro-active, risk-based national drought policy.

There is no optimum set of drought risk management strategies that fit all countries. There are different layers of risks which require differentiated responses. Since a national drought policy for any given country will depend on local capacity and priorities, it is important that the guidance on national drought policy to any government should not be prescriptive. Instead, as explained by Sivakumar (2011), a compendium of desirable elements in a national drought policy (*hereinafter referred to as compendium*) should be compiled and countries around the world could be encouraged to adopt the elements that will be appropriate to their local circumstances and national priorities and design their national drought policies.

Hence, an Expert Meeting on the Preparation of a Compendium on National Drought Policy was held at the George Mason University in Fairfax, Virginia (USA), from 14 to 15 July 2011, the issue of the

desirable elements in the Compendium was discussed and three break-out groups were established to begin the process of defining the key elements of national drought policy under the three areas:

- 1) Drought Monitoring and Early Warning Systems
- 2) Vulnerability Assessment and Impacts
- 3) Emergency Relief and Response

Proposed elements for inclusion in the Compendium by the three break-out groups are described below.

### **Drought Monitoring and Early Warning Systems**

- 1) Evaluate the availability of comprehensive, integrated drought monitoring systems which couple multiple climate, water and soil parameters and socio-economic indicators to fully characterize the magnitude, spatial extent and potential impacts of droughts.
  - a) Establish and support a comprehensive integrated drought monitoring system at the national level;
  - b) Ensure that relevant parameters for climate, water, and soil and the indicators for socio-economic parameters are collected and made available through the system;
  - c) Place more emphasis on supporting research to characterize the magnitude, spatial extent, persistence length and potential impact of droughts;
  - d) Use an appropriate classification system on different types of droughts, i.e., meteorological, agricultural and hydrological droughts, while communicating information on droughts on a routine basis.
- 2) Assess the adequacy of meteorological and hydrological networks and data quality.
  - a) Ensure that an adequate network of meteorological and hydrological stations is established in the country to provide good spatial characterization of droughts and other climatic features;
  - b) Take full advantage of the advances in instrumentation technology such as Data Collection Platforms (DCPs), automatic weather stations, telemetry, hydroprobes in automating the data collection;
  - c) Encourage the wider availability and use of remote sensing data and products and provide training on the proper interpretation of these products for natural resource managers and policy makers;
  - d) Implement an effective data quality control system consistent with WMO quality control procedures;
  - e) Ensure the long-term sustainability of meteorological and hydrological networks in order to provide the user community relevant information on a regular basis.
- 3) Examine the current procedures for coordinating the collection and analysis of meteorological and hydrological data and eliminate fragmentation between many agencies and ministries at the different administrative levels.
  - a) Encourage close collaboration among meteorological, hydrological and other relevant agencies in the collection of comprehensive drought data;
  - b) Establish a centralized authority for the analysis of meteorological and hydrological data to generate integrated products related to droughts;

- 4) Evaluate existing procedures for data sharing and their applications of drought monitoring, preparedness, mitigation and response.
  - a) Encourage regular interaction between all relevant agencies and institutions at the national, regional, and local levels in developing appropriate drought products for application in all sectors affected by droughts.
  - b) Adopt agreed upon standards for sharing of data and products with all sectors concerned with the impacts of droughts;
  - c) Promote a policy of free and open exchange of data and products with all interested agencies and institutions in the public and private sectors;
  - d) Establish a rigorous monitoring system to ensure that data and products are shared freely between institutions and agencies in a timely manner.
  
- 5) Assess the availability of early warning and decision-support tools and methodologies in support of drought preparedness planning and policy development.
  - a) Undertake a comprehensive assessment of drought risks; identify potential threats and establish the degree of vulnerability of local populations and economic sectors to droughts and how these vulnerabilities vary by region within a country;
  - b) Evaluate the existing capabilities in the country for early warning of droughts, identify the gaps and take appropriate steps to develop and strengthen the national capabilities to provide effective drought early warnings;
  - c) Collaborate with the Global Producing Centres for Long-range Forecasts (GPCs) and the Regional Climate Centres (RCCs) to augment the ability in the country to provide seasonal and inter-annual forecasts for the drought outlook and decision making;
  - d) Strengthen research capacity at the national, regional and local levels into the causes and effects of climate variations and long-term climate prediction to provide drought early warnings;
  - e) Evaluate existing decision-support tools in close collaboration with the user community in different sectors which are impacted by droughts and improve these tools by taking advantage of current advances to provide better and more timely information for decision making;
  - f) Promote multidisciplinary collaboration among meteorologists, hydrologists, soil scientists, ecologists, agronomists, the social/behavioral sciences, and others in the collection of data and generation of drought products for the user community.
  
- 6) Evaluate the four phases in early warning systems, i.e., mitigation or prevention, preparedness, response and recovery.
  - a) Establish an evaluation procedure for each of the four phases of the early warning systems in the country i.e., mitigation or prevention, preparedness, response and recovery;
  - b) Implement a feedback process in the drought cycle to learn from past practices in the mitigation or prevention, preparedness, response and recovery strategies;
  - c) Ensure that the early warnings are delivered to the decision makers in a timely fashion and in appropriate formats and that preparedness, response and recovery plans are in place.
  
- 7) Examine the need for the development of useful end products or decision-support tools for delivery to the end users.
  - a) Ensure that the user community in different sectors impacted by droughts is involved right from the beginning in the development of useful end products or decision-support tools in order to ensure that the products meet their needs and expectations;
  - b) Develop appropriate decision support tools and products to assist the users in their decision making in drought risk management.

- 8) Assess the delivery systems for disseminating data to users in a timely manner to enhance their usefulness for decision support.
  - a) Establish a procedure/survey to ensure that the needs of the decision makers are being adequately met by the delivery system and modify the system as required;
  - b) Design the presentation of data and products to meet the specific needs for different decision makers (do not make users search through all data but provide access to different products for different groups, e.g., agriculture, education, policy makers);
  - c) Use the most cost effective and modern methods for information delivery including Internet, social media (Facebook, Twitter, etc.), mobile phones, radio, TV, etc., which are appropriate to the local conditions;
  - d) Place emphasis on training of the user communities in the use of decision support tools and products.

### **Vulnerability Assessment and Impacts**

- 9) Understand the natural processes and human activities that contribute to vulnerability and community resilience and how these will be integrated to inform risk reduction and management.
  - a) Address the gaps in knowledge, methodologies and types of information that are preventing the effective application of these methodologies. A key goal is the enablement of affected populations.
  - b) Assist communities facing hazards to manage their own environments more responsibly and equitably over the long term by joining in a global structure that supports informed, responsible, systematic actions to improve local conditions in vulnerable regions.
  - c) Encourage governments and institutions to support, provide incentives, coordinate data and decision support, and legitimize successful approaches to increasing capacity and action
- 10) Characterize and integrate drought-related impacts, vulnerability and risk information.
- 11) Define spatial scale of assessment using biophysical and socio-economic boundaries (watershed, city, agricultural community, ecosystem, etc.).
- 12) Elicit key stakeholder problem framing and needs (for seasonal and longer climate-sensitive information).
- 13) Describe socio-economic and management characteristics, capacity-mapping and trends in the countries/communities of concern, and include standards for data collection.
- 14) Develop risk assessments and profiles showing physical, social, economic and environmental pressures on a community from global, regional, and local scales.
- 15) Understand effective decision-making in the context of drought risk management – what it is and how it can be improved- research on decision making and risk perceptions, and applied research on implementation of risk management and mitigation programs.
  - a) Include critical actors at each jurisdictional level; the actors' risk assumptions; their needs for different types of information; and the design of an information infrastructure that would support their decisions at critical entry points
- 16) Develop, test and improve methodologies and measure progress in reducing vulnerability and enhancing community capacity—e.g., drought risk management, cost-effectiveness of methodologies and analyses, and societal impacts of catastrophic events.

- 17) Strengthen cross-sectorial coordination of impacts assessments and partnerships among state, academia and the private sector for conducting impacts assessments.
- a) Assess impediments and opportunities to the flow of information including issues of credibility, legitimacy, compatibility (appropriate scale, content, and match with existing practice) and acceptability.
  - b) Develop and test common drought risk reduction practices, coordinating information flow from different organizations into easily understandable language for all affected communities in countries and communities at risk.
- 18) Develop and mainstream effectiveness of Early Warning Information Systems that include warning of potential impacts on livelihoods.
- 19) Enable affected populations through support from governments and institutions, provision of incentives, and legitimization of successful approaches to increasing capacity and action at the local level.
- 20) Conduct risk profiles prior to the onset of droughts, and capture drought impacts on vulnerable populations. Risk profiles should consider vulnerable groups, including but not limited to:
- a) women;
  - b) children;
  - c) the elderly;
  - d) the landless;
  - e) farmers;
  - f) pastoralists;
  - g) marginalized communities; and
  - h) indigenous communities and populations
- 21) Record drought impacts on and conduct risk assessments for vulnerable economic sectors, including but not limited to:
- a) Rain-fed agricultural production
    - i. *Impact(s)*: Reduced yields
    - ii. *Potential mitigations*: Imports (short term); choosing to sow different crops or do not sow at all (short term)
  - b) Irrigated agricultural production
    - i. *Impact(s)*: Reduced yields
    - ii. *Potential mitigations*: Water rationing; water allocation review; sowing dryland crops.
  - c) Livestock production
    - i. *Impacts*: Weight loss; mortality; destocking; increase in incidence of diseases; lower fertility and reproduction rates
    - ii. *Potential mitigations*: Destocking; feed distribution; cattle parking/relocation of herds; nomadic migration; use of special reserved areas (stock routes and stock reserves)
  - d) Water
    - i. *Impacts*: degraded water quality (salinity, BOD/COD); surface water shortages; overdrawing and depletion of groundwater; increased competition and conflict over water

- ii. *Potential mitigations:* Ex ante identification of supplemental and alternative sources of water; use of reserve sources of groundwater; technical optimization of water resources; water laws and rules for special circumstances dry-year options (sale, expropriation, restrictions) using critical drought thresholds; development of critical thresholds; prediction of future water use to determine zoning.
- e) Environment
  - i. *Impacts:* Ecosystem degradation; loss of biodiversity; species migration and extension; landscape change and wind erosion; increased risk of wildfires; fisheries impacts
  - ii. *Potential mitigations:* maintenance of environmental flows
- f) Transportation
  - i. *Impacts:* Reduced transportation and navigation
- g) Health
  - i. *Impacts:* Morbidity; incidence of wind-, dust- and vector-borne diseases and respiratory illnesses; degradation of sanitation; levels of nutrition, happiness, depression, trauma and suicide; increased use and dependence on drugs and alcohol
  - ii. *Potential mitigations:* Food supplements; stockpiling food; more robust social safety nets; improved access to mental and physical health care
- h) Tourism and recreation
  - i. *Impact(s):* Loss of recreation areas
- i) Energy
  - i. *Impacts:* Decreased hydropower production; brownouts; increased demand; destruction of transmission lines
  - ii. *Potential mitigations:* Energy restrictions; improvements in efficiency; alternative energy supplies; diversification of energy sources
- j) Society
  - i. *Impacts:* Migration and loss of community; decreased marriage rates; increased divorce rates; increased conflicts; loss of assets and reduced property values; increased theft and crime; impacts on cultural practices
  - ii. *Potential mitigations:* Social protection and cash-transfer programs; diversification of rural livelihoods
- k) Education
  - i. *Impacts:* School dropout rates (short-term); lower school enrollment (longer term)
  - ii. *Potential mitigations:* Targeted social protection (e.g., Bolsa Familiar)
- l) Dues/costs of responding
  - i. *Impacts:* Amount spent on relief and response
- m) Secondary and tertiary impacts on economic productivity:
  - i. *Impacts:* Loss of income and productivity; opportunity costs; higher personal debt levels

22) Identify and assess vulnerable people and communities, and factors to consider such as:

- a) Gender
- b) Age
- c) Political status
- d) Dependency on agriculture

- e) Level of wealth/poverty and human development
  - f) Status of education
  - g) Access to natural assets
  - h) Access to alternative supplies of water and fodder
  - i) Access to markets
  - j) Baseline health
  - k) Livelihood and employment options, and access to alternative or supplemental employment
  - l) Social networks and level of isolation
  - m) Access to infrastructure
  - n) Underlying climate variability
  - o) Exposure to previous droughts, floods and other hazards
- 23) Develop criteria to weigh the importance drought impacts and vulnerability factors, and to identify high-leverage mitigation actions.
- 24) Develop mitigation options at multiple time scales.
- a) Use drought impact records to develop probabilistic drought-risk assessments and facilitate proactive planning and drought risk management.
- 25) Systematically monitor and record local drought impacts in real time.
- a) Measure and control data quality; and
  - b) Ensure that drought EWS information systems are designed to reach (and can be used by) local communities.
- 26) Develop common methodologies and terminology to assess drought vulnerability to facilitate the assessment of drought risk at multiple spatial scales and across political borders.
- 27) Link drought vulnerability assessments with assessments associated with other hazards.
- a) Use climate models and to integrate drought vulnerability assessments into climate change adaptation plans.

### **Emergency Relief / Response**

- 28) Develop drought response measures that reinforce the concept of risk management as a key element of a national drought policy while promoting environmental stewardship.
- a) Emphasize fundamental need for integrated monitoring/observational and analysis system.
  - b) Establish drought criteria or thresholds for taking action.
  - c) Differentiate between seasonal dry situations and prolonged drought situation in the context of implementing emergency relief and response measures.
  - d) Continue assessment of socio-economic consequences/impacts of the specific drought event.
  - e) Identify emergency measures that will reduce the impact of current drought while reducing vulnerability of future occurrences (at least has to be neutral).
  - f) Establish an effective communications and awareness building strategy for public education.
  - g) Policy should be developed to ensure that the relief reaches affected farmers in a timely fashion
  - h) Governments should provide a drought fund for relief and response as part of a National Drought Policy.

- 29) Promote training opportunities to enhance understanding of how seasonal forecasts and other decision support tools can be applied by vulnerable groups and within vulnerable sectors to improve resilience/coping capacity and preparedness.
- a) Develop business (management) plan training by sectors
  - b) Emphasize training of trainers to better communicate the policy instruments to user communities
  - c) Stress the application of climate risk information for management and policy
  - d) Understand user needs and involvement of users in decision support tools from the beginning
  - e) Employ the media to engage the public and policy makers and receive feedback on the effectiveness of emergency relief measures
- 30) Identify incentives that could be provided to vulnerable sectors/groups to enhance the adoption of risk-based management measures in support of a national drought policy.
- a) Consider financial incentives (implementation of a government approved program to provide loans on a tax-free basis to address drought)
  - b) Link drought relief to establishment/implementation of drought plans at any level (local, state)
  - c) Apportion a portion of funds provided for emergency relief payments to mitigation to reduce the impacts of future droughts
  - d) Evaluate existing drought insurance plans or schemes in terms of how effective the plans promote rewarding wise stewardship of natural resources and sustainable development
  - e) Use rewards for drought preparedness and effective response. Use matching funds to finance good / expand plans.
- 31) Conduct research that evaluates the effect of drought relief measures on societal vulnerability.
- a) Identify case studies at the local level how risk management can reduce vulnerability/risk (positive/negative)
  - b) Examine how drought drills or exercises could be effectively used to promote more effective preparedness and response
  - c) Develop virtual drought scenarios/exercises for policy and decision makers
  - d) Diversify activities and portfolio of assets as a drought mitigation strategy (i.e. crop production)
  - e) Assess the effectiveness of drought policies and look for areas of improvement and refinement
  - f) Use risk mapping to identify vulnerabilities in support of drought policies
- 32) Identify successful examples of how interagency coordination has enhanced drought monitoring, mitigation, response, and planning.
- a) Virtual drought scenarios/exercises for policy and decision makers
  - b) River basin agreements / compacts / working arrangements
  - c) Multidisciplinary working groups (AGRHYMET - West Africa)
  - d) U.S. Drought Monitor
  - e) Australia NAMS
  - f) Chinese example
  - g) Drought Monitoring/Management Centers (ICPAC, DMC-SADC, DMCSEE)
  - h) State of Ceara, Brazil

### **Reference**

Sivakumar, M.V.K. 2011. Current Droughts: Context and Need for National Drought Policies. Pages 127-135 (in this volume).