



**World Meteorological Organization**  
Working together in weather, climate and water

# Overview of WMO Drought Activities

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# Presentation

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- Introduction
- WMO Emphasis on Drought Issues
- WMO Actions to Promote Drought Preparedness and Management
- Support to Regional Institutions
- Lincoln Workshop on Indices and Early Warning Systems
- Current Actions
- Conclusions



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*“Drought is the most obstinate and pernicious of the dramatic events that Nature conjures up. It can last longer and extend across larger areas than hurricanes, tornadoes, floods and earthquakes...causing hundreds of millions of dollars in losses, and dashing hopes and dreams.”*

— US National Drought Policy Commission  
Report, May 2000

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# WMO VISION

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To provide world leadership in expertise and international cooperation in weather, climate, hydrology and water resources, and related environmental issues, and thereby to contribute to the safety and well being of people throughout the world and to the economic benefit of all nations



# WMO's Emphasis on Drought Issues

As the United Nations specialized agency with responsibility for meteorology and operational hydrology, the World Meteorological Organization (WMO), since its inception, has been addressing the issue of agricultural droughts. The fight against drought receives a high priority in the Long-term Plan of the WMO, particularly under the:

- Agricultural Meteorology Programme
- Hydrology and Water Resources Programme
- Technical Cooperation Programme





# Drought Management

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Drought management has three major components:

- Monitoring and early warning
- Risk and impact assessment
- Mitigation and response

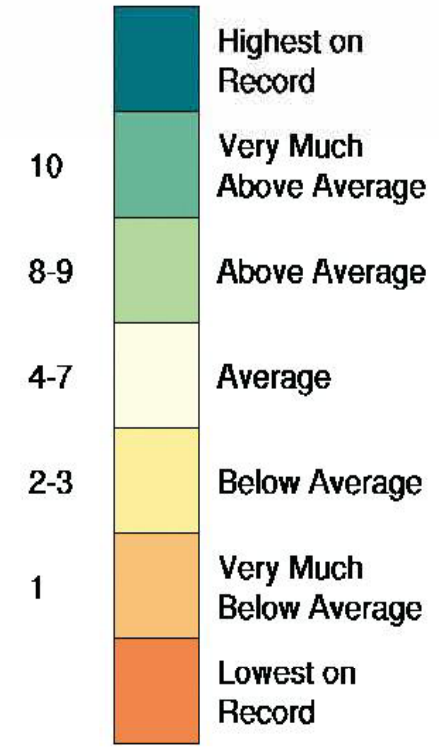
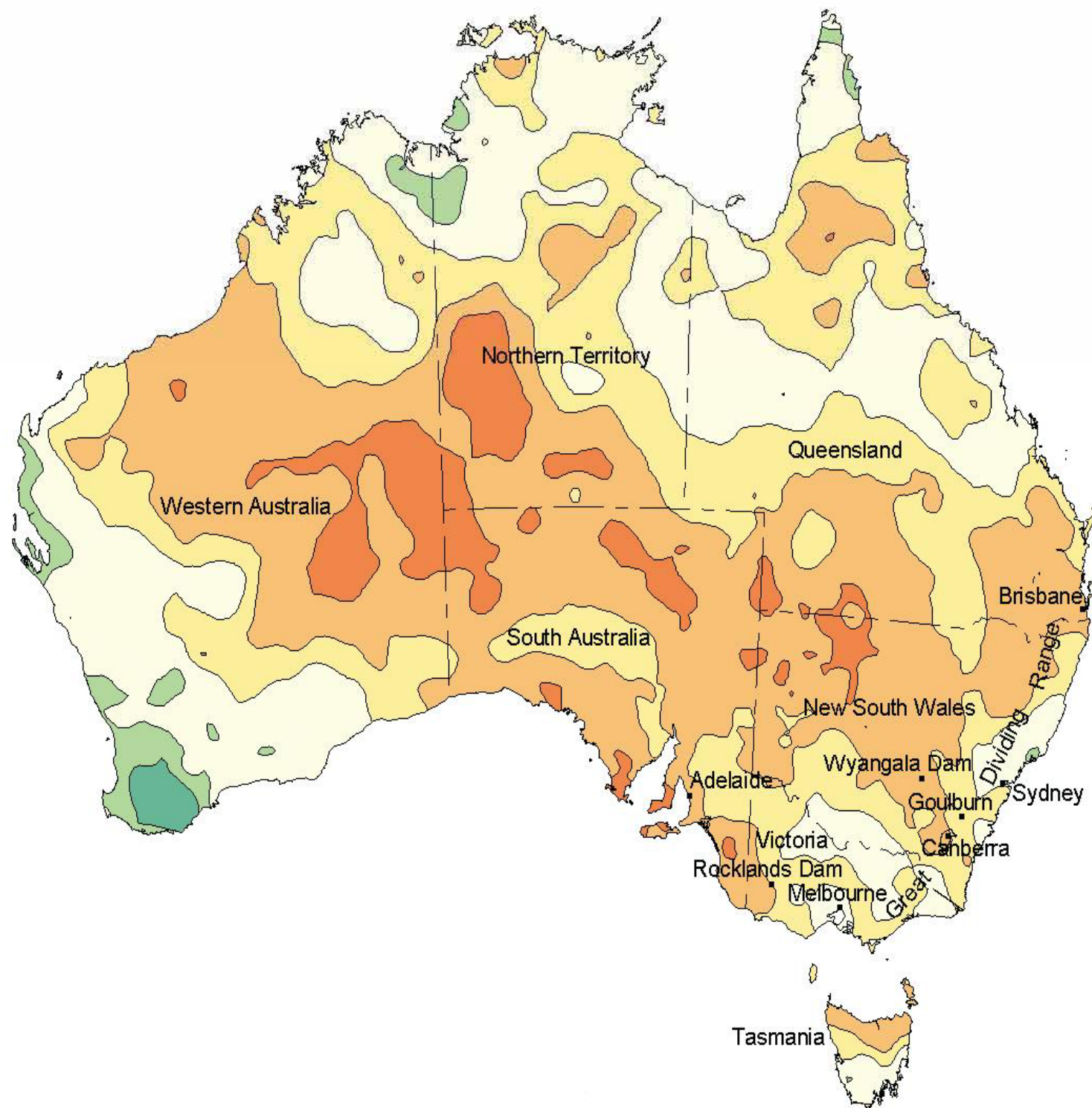


# Importance of Early Warning Systems for Drought

The provision of meteorological and hydrological support to early warning of droughts is perhaps the most fundamental aspect of services that are supplied by NMHSs and they contribute to all four phases of Early Warning Systems:

- Mitigation or prevention
- Preparedness
- Response
- Recovery

### Rainfall Decile Ranking





# WMO Secretariat and the NMHSs

- WMO's Agricultural Meteorology Programme and the Hydrology and Water Resources Programme work through the NMHSs in drought preparedness and drought management
- NMHSs play a crucial role in the drought task force at the national level
- NMHSs provide seasonal forecasts and early warnings
- They help build public awareness about droughts
- They teach people about drought

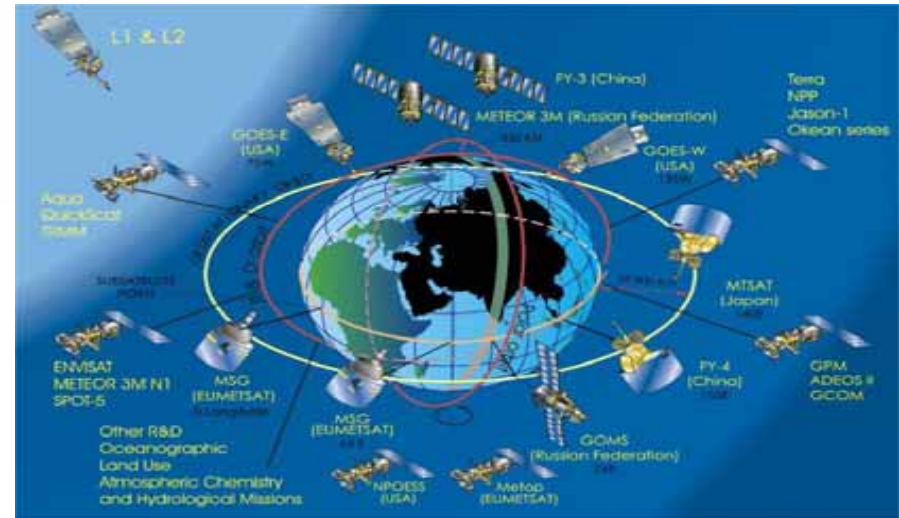


# WMO Coordinated Networks in Support of Early Warning Systems

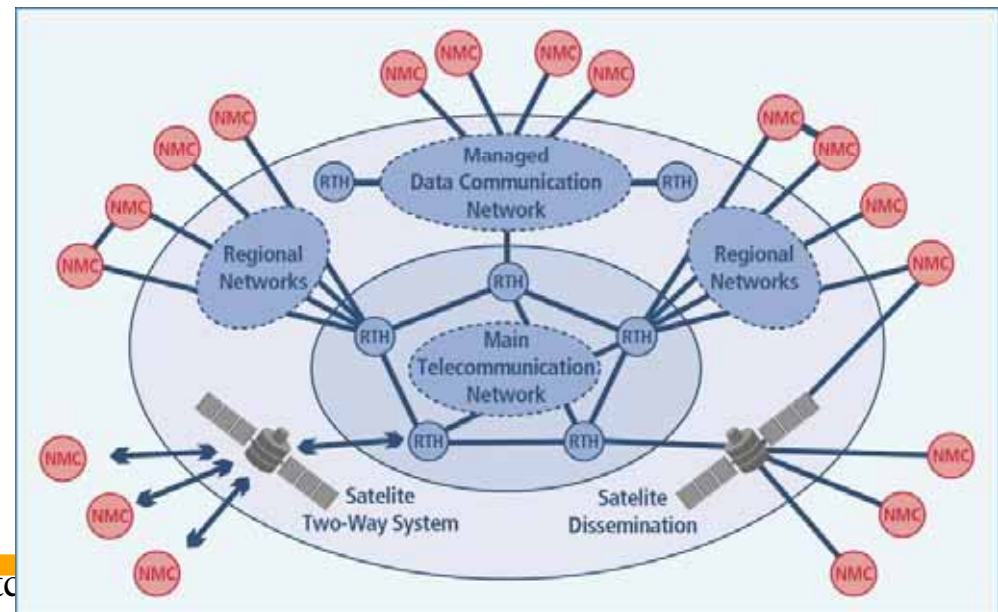
## Observation & Communication



**Global Observing System**



**Coordinated Satellite Activities**

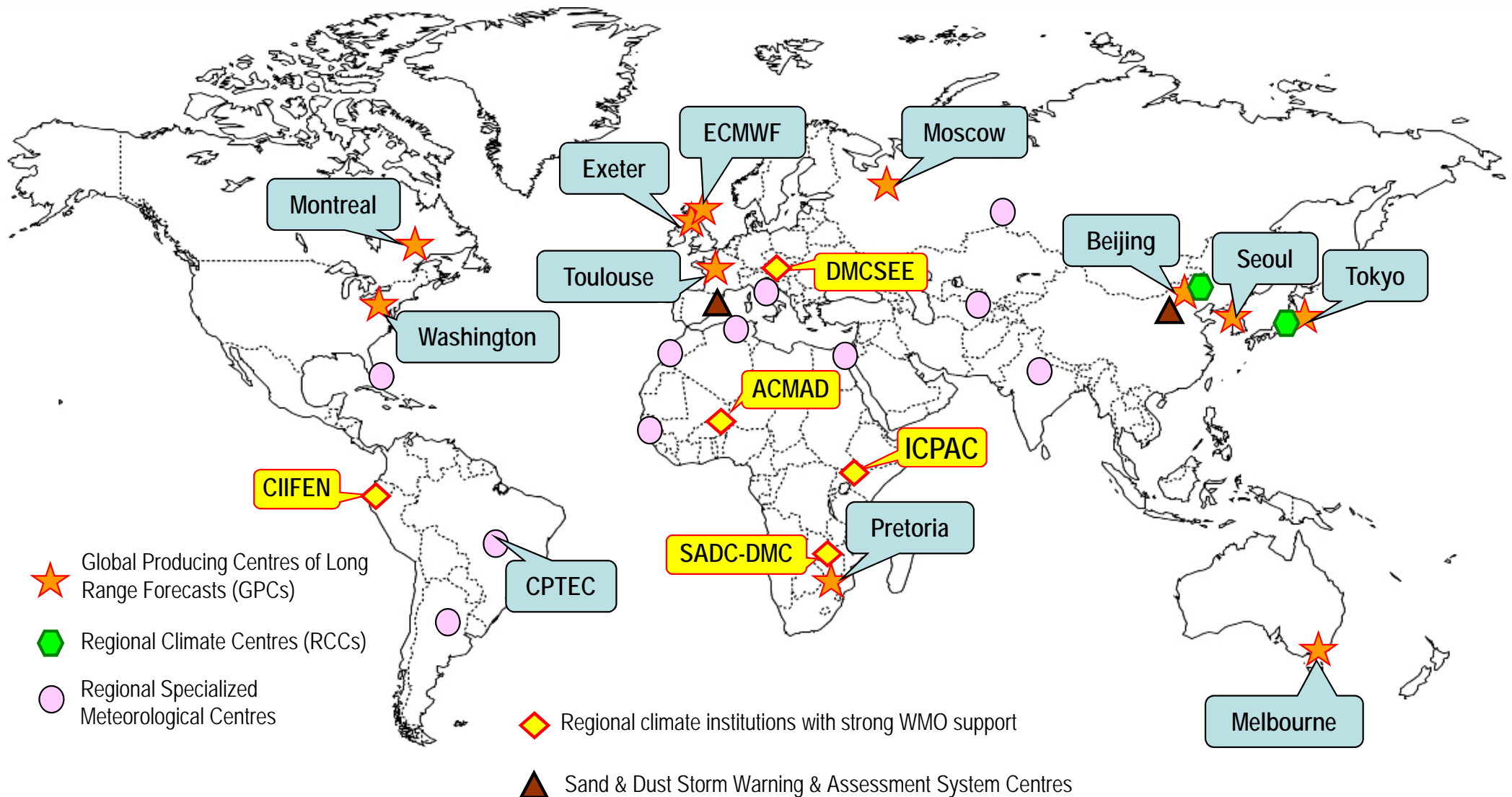


**Global Telecommunication System**

Joint Egyptian-Dutch



# WMO network of institutions





# WMO's Actions to Promote Drought Preparedness and Drought Management

- The Commission for Agricultural Meteorology (CAgM) of WMO has been very active in addressing the issue of agricultural drought and made recommendations regarding the role of agrometeorology in helping to solving drought problems in drought-stricken areas, particularly in Africa.
- The Commission appointed a number of working groups and rapporteurs with specific terms of reference
- Based on the activities of these working groups and rapporteurs, a number of reports were published and distributed by WMO.



# Working Groups on Drought appointed by CAgM: 1967-83

- CAgM-IV (Manila, 1967) – Working Group on Assessment of Drought
- CAgM-V (Geneva, 1971) – Working Group on the Meteorological Factors Concerning certain Aspects of Soil Deterioration and Erosion
- CAgM-VI (Washington, 1974) – Rapporteur on the Frequency and Impact of Water Deficiencies for Selected Plant-Soil Systems
  - (Resolution 2) – Drought and Agriculture
- CAgM-VII (Sofia, 1979) – Working Group on the Agrometeorological Aspects of Land Management in the Arid and Semi-Arid Areas with special reference to Desertification Problems
  - Rapporteur on Drought Probability Maps
- CAgM-VIII (Geneva, 1983) – Working Group on Meteorological Aspects of Agriculture in Drought-Prone and Semi-Arid Areas
  - Rapporteur on Drought Probability Maps



# Working Groups on Drought appointed by CAgM:1986-1999

- CAgM-IX (Madrid, 1986) – Working Group on Monitoring, Assessment and combat of Drought and Desertification
- CAgM-X (Florence, 1991) – Working Group on Extreme Meteorological Events
- CAgM-XI (Havana, 1995) – Working Group on Desertification and Drought
- CAgM-XII (Accra, 1999) – Working Group on the Impacts of Desertification and of Drought and other Extreme Meteorological Events



# Expert Teams on Drought appointed by CAgM: 2002-2010

- CAgM-XIII (Ljubljana, 2002) – Expert Team on Reduction of the Impact of Natural Disasters and Mitigation of Extreme Events in Agriculture, Rangelands, Forestry and Fisheries
- CAgM-XIV (New Delhi, 2006) – Expert Team on Drought and Extreme Temperatures: Preparedness and Management for Sustainable Agriculture, Rangelands, Forestry, and Fisheries
- CAgM-XV (Belo Horizonte, 2010) – Expert Team on Weather and Climate Extremes and Impacts and Preparedness Strategies in Agriculture, Rangelands, Forestry and Fisheries

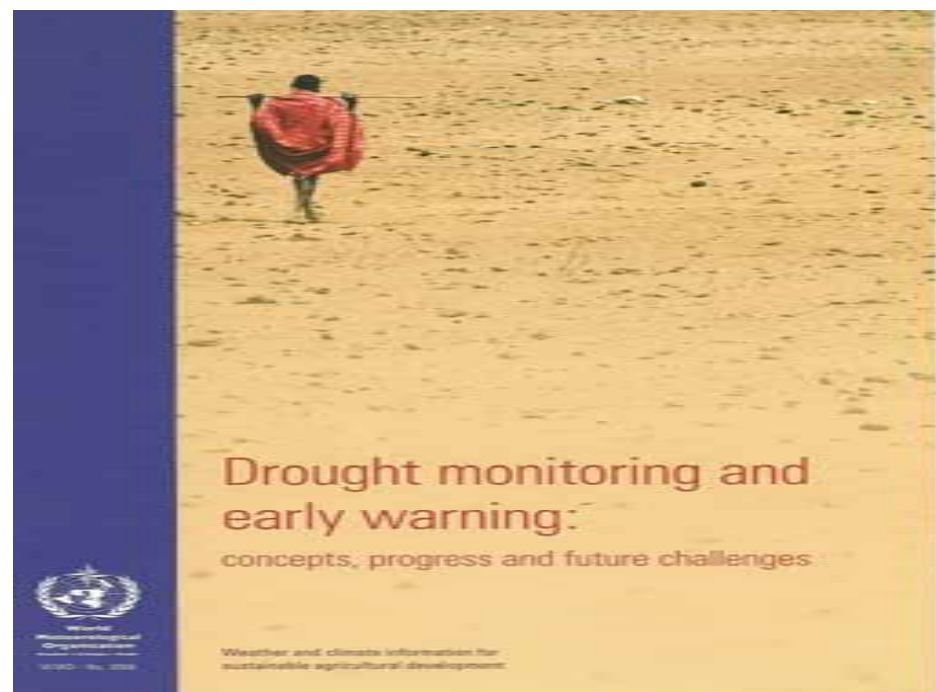
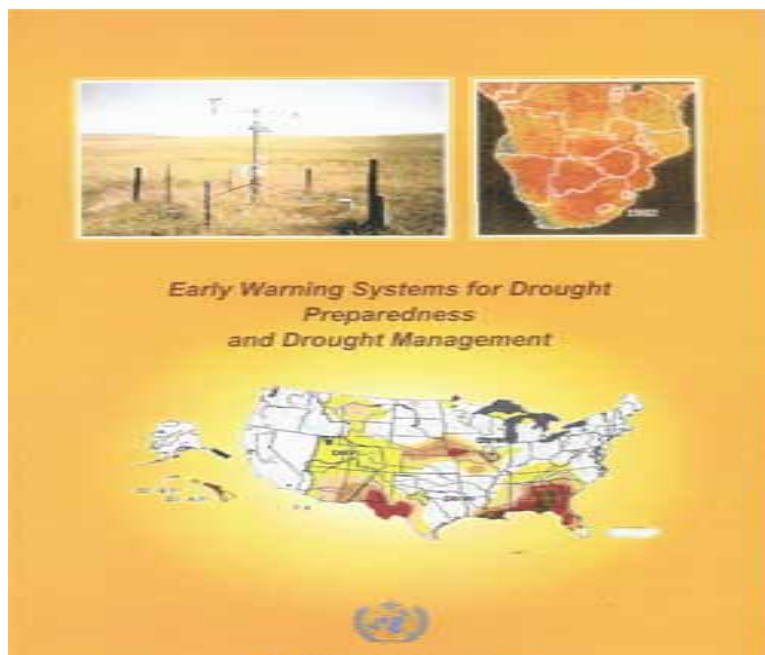
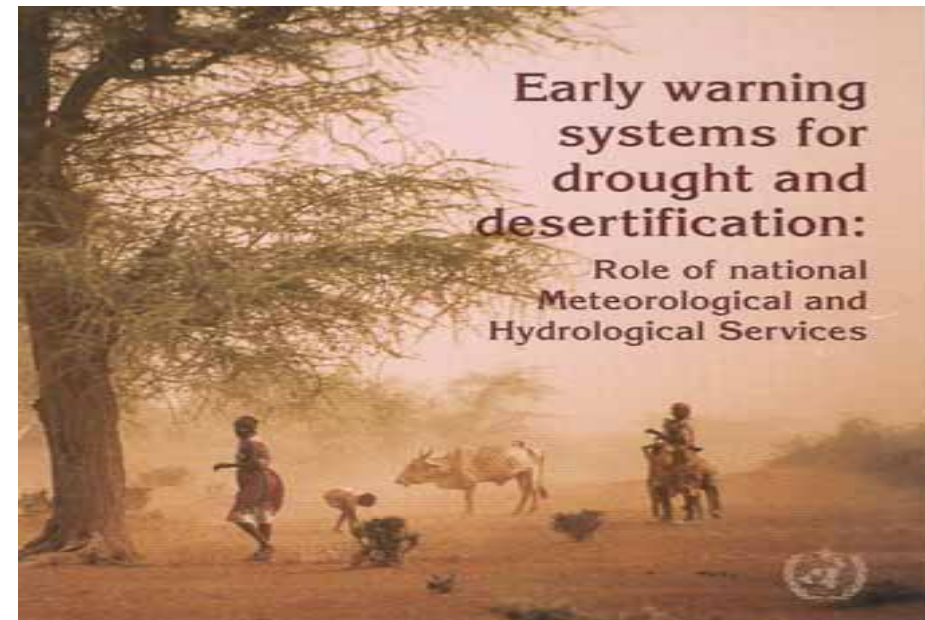
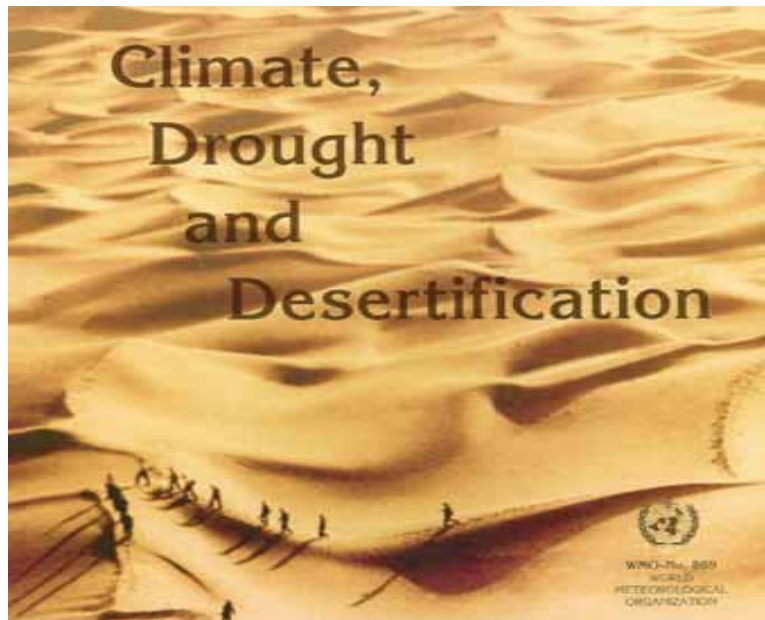


# Agrometeorological Applications addressed

- Drought monitoring, forecasting and control
- Meteorological aspects of drought processes
- Operational use of agrometeorology
- Measures to alleviate the effects of droughts
- Assessment of the economic impacts
- WMO/UNEP book "Interactions of Desertification and Climate"
- WMO/UNCCD book on "Climate and Land Degradation"
- Capacity building activities



# Publications issued on Drought





# Impact of drought and removal of vegetation on sand and dust transport

- It has been estimated that in the arid and semi-arid zones of the world, 24% of the cultivated land and 41% of the pasture land are affected by moderate to severe land degradation from wind erosion
- The world-wide total annual production of dust by deflation of soils and sediments was estimated to be 61 to 366 million tonnes.
- For Africa alone, more than 100 million tonnes of dust per annum is blown westward over the Atlantic.



# Wind Erosion in Africa and West Asia: Problems and Control Strategies

**M. V. K. Sivakumar**

**M. A. Zöbisch**

**S. Koala**

*and*

**T. Maukonen**

*Editors*

**International Center for Agricultural  
Research in the Dry Areas**





# Capacity building activities

- Workshop on Drought and Desertification in Israel (May 1997)
- UNDP/UNSO/WMO International Workshop on "Coping with Drought in sub-Saharan Africa: Best Use of Climate Information" in Zimbabwe (Oct 1999)
- Expert Group Meeting on Early Warning Systems for Drought Preparedness and Drought Management in Portugal (Sep 2000)
- Training Seminar/Workshop on Drought Preparedness and Management (Gambia, 1995; Morocco 1996)
- Roving Seminars on the Application of Climatic Data for Drought Preparedness and Management of Sustainable Agriculture (Ghana, 1999; China, 2001; Antigua, 2004)



# Support to Regional Institutions

- 1972 - WMO expert missions led to establishment in 1974 of AGRHYMET in Niamey (Niger) under the auspices of CILSS
- 1989 - WMO established 2 Drought Monitoring Centres (DMCs) in Nairobi (Kenya) and Harare (Zimbabwe), with support of UNDP
- 1993 - WMO & Economic Commission for Africa (ECA) sponsored establishment of African Centre of Meteorological Applications for Development (ACMAD) in Niamey (Niger)
- 2006 – WMO and the UNCCD Secretariat collaborated actively with the establishment of a Drought Management Centre for the South-Eastern Europe (DMCSEE). The 11 countries in the Region elected Slovenia to host this Centre and an International Steering Committee is now in place to guide the establishment and operations of this Centre.



# Historical Background of DMCs

- Established in 1989/90 by African Governments with WMO as Executing Agency.
- Initial funding from UNDP
- At the end of the UNDP funded Project in 1998 and due to the increased demand for climate information and prediction services, the Nairobi and Harare components started operating independently.
- DMC, Nairobi, now renamed ICPAC, caters for countries in IGAD (Intergovernmental Authority on Development) and other countries in the Horn of Africa region, while DMC, Harare, now moved to Gaborone, is responsible for the SADC countries.



## Historical Background (contd.)

- The 10th Summit of the IGAD Heads of State and Government that was held in Kampala, Uganda in October 2003 ratified the decision to absorb DMC, Nairobi as an autonomous specialized Institution of IGAD.
- Since April 2002, core activities of DMC, Harare are funded by SADC.
- However, programme activities are still being funded by cooperating partners:WMO, USAID, NOAA and others.



# ICPAC and SADC DMC

- Charged with timely monitoring of drought intensity, geographical extent, duration and impact on agricultural production; and issuing early warnings
- Improved applications of meteorological and hydrological data and products
- 10-day weather advisories, decadal climatological summaries, decadal agromet conditions and impacts, decadal synoptic review and weather outlook
- Monthly drought monitoring bulletins for the sub-regions



# WMO helped establish the DMCSEE

- Oct. 2004: Poiana/Brasow Workshop
- Apr. 2006: Sofia Workshop
- Sep. 2006: Decision on DMCSEE hosting country
- Nov. 2006: Technical meeting in Geneva
- Preparation of project proposal, Jan. – Apr. 2007
- Kick-off meeting in Ljubljana, Apr. 2007
- Two International Steering Committee Meetings in 2008 and 2009
- Funding received from the European Union





# DMCSEE

*Drought Management Centre  
for Southeastern Europe*



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## Drought Management Centre for Southeastern Europe - DMCSEE

Drought is a normal part of climate in virtually all regions of the world. South Eastern Europe is no exception; in past decades the drought-related damages have had large impact on the economy and welfare. Therefore the need to establish a Drought Center for SE Europe to alleviate the problems caused by drought in the area became evident at the end of the past century. The idea was further elaborated by International Commission on Irrigation and Drainage (ICID) and UN Convention to Combat Desertification (UNCCD). The UNCCD national focal points and national permanent representatives with the World Meteorological Organization have agreed upon the core tasks of the Drought Management Center for South Eastern Europe (DMCSEE) and the proposed project document.

The mission of the proposed DMCSEE is **to coordinate and facilitate the development, assessment, and application of drought risk management tools and policies in South-Eastern Europe with the goal of improving drought preparedness and reducing drought impacts.** Therefore DMCSEE will focus its work on monitoring and assessing drought and assessing risks and vulnerability connected to drought.

[www.dmcsee.org](http://www.dmcsee.org)

### Founding countries:

- Albania
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- FYROM
- Greece
- Hungary
- Moldova
- Romania
- Slovenia
- Turkey
- Montenegro
- Serbia

### Founding agencies:

- WMO
- UNCCD



# WMO working on establishing Drought Management Center for Central Asia (DMCCA)

- WMO, United Nations Convention to Combat Desertification (UNCCD) and the Organization for Security and Cooperation in Europe (OSCE)
- Technical Seminar (20-21 November, 2007, Tashkent, Uzbekistan)
- Second Workshop on establishing a Drought Management Centre in Central Asia (May 2008, Kyrgyzstan)
- WMO Consultant visited the five Central Asian countries in November 2009 to consult with relevant organizations and institutions and prepare project proposal.





# Lincoln Workshop on Indices and Early Warning Systems for Drought

- Inter-Regional Workshop on Indices and Early Warning Systems for Drought held in Lincoln, Nebraska, USA from 8 to 11 December 2009
- Co-Sponsors:
  - National Drought Mitigation Center (NDMC)
  - United States Department of Agriculture (USDA)
  - United States National Oceanic and Atmospheric Administration (NOAA)
  - United Nations Convention to Combat Desertification (UNCCD)
  - University of Nebraska-Lincoln, School of Natural Resources
  - World Meteorological Organization

**[http://www.wmo.int/pages/prog/wcp/agm/meetings/wies09/index\\_en.html](http://www.wmo.int/pages/prog/wcp/agm/meetings/wies09/index_en.html)**



# Lincoln Declaration – Recommendations (1)

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- The National Meteorological and Hydrological Services (NMHSs) around the world are encouraged to use the Standardized Precipitation Index to characterize meteorological droughts and provide this information on their websites, in addition to the indices currently in use.
- A comprehensive user manual for the SPI should be developed that will provide a description of the index, the computation methods, specific examples of where it is currently being used, the strengths and limitations, mapping capabilities, and how it can be used.



# Lincoln Declaration – Recommendations (2)

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- Two working groups with representatives from different regions and observers from UN Agencies and Research Institutions (and water resource management agencies for hydrological droughts) be established to further discuss and recommend, by the end of 2010, the most comprehensive indices to characterize agricultural and hydrological droughts.
- Recognizing the need to develop a framework for an integrated approach for drought monitoring to address all sectoral needs, a comprehensive study of consensus drought indicators is needed for potential global application.



# Lincoln Declaration – Recommendations (3)

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- A simple, systematic analysis of drought impacts in different sectors should be initiated in all affected countries in order to provide useful decision-making information for policy-makers.
- Drought indices and early warning systems must be implemented from the beginning with the end-users in mind. To accomplish this goal, a multi-disciplinary approach incorporating user involvement is absolutely necessary.



# Current Actions

- The recommendation to use the SPI was approved by the WMO Executive Council in June 2010. It will be sent to the WMO Congress in 2011, along with the recommendations from the other two working groups.
- The UN International Strategy for Disaster Risk Reduction (ISDR) is providing funding for the meetings of the working groups on agricultural (June 2010 - Spain) and hydrological (January 2011 - India) drought indices.
- Using the reports of the two working groups, WMO will assist ISDR in finalizing the chapter on drought risks for the 2011 UN Global Assessment Report on Disaster Risk Reduction (GAR-11).



# Conclusions

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- WMO will continue to place emphasis on sound monitoring and assessment of droughts, including hazard analysis and vulnerability assessment
- WMO has a major role through its early warning systems & preparedness strategies to reduce the societal vulnerability to risks associated with drought
- WMO will continue to place stress on capacity building related to drought preparedness and drought management



# Thank You

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