



**BUILDING
DROUGHT
RESILIENCE
TO REDUCE
POVERTY**

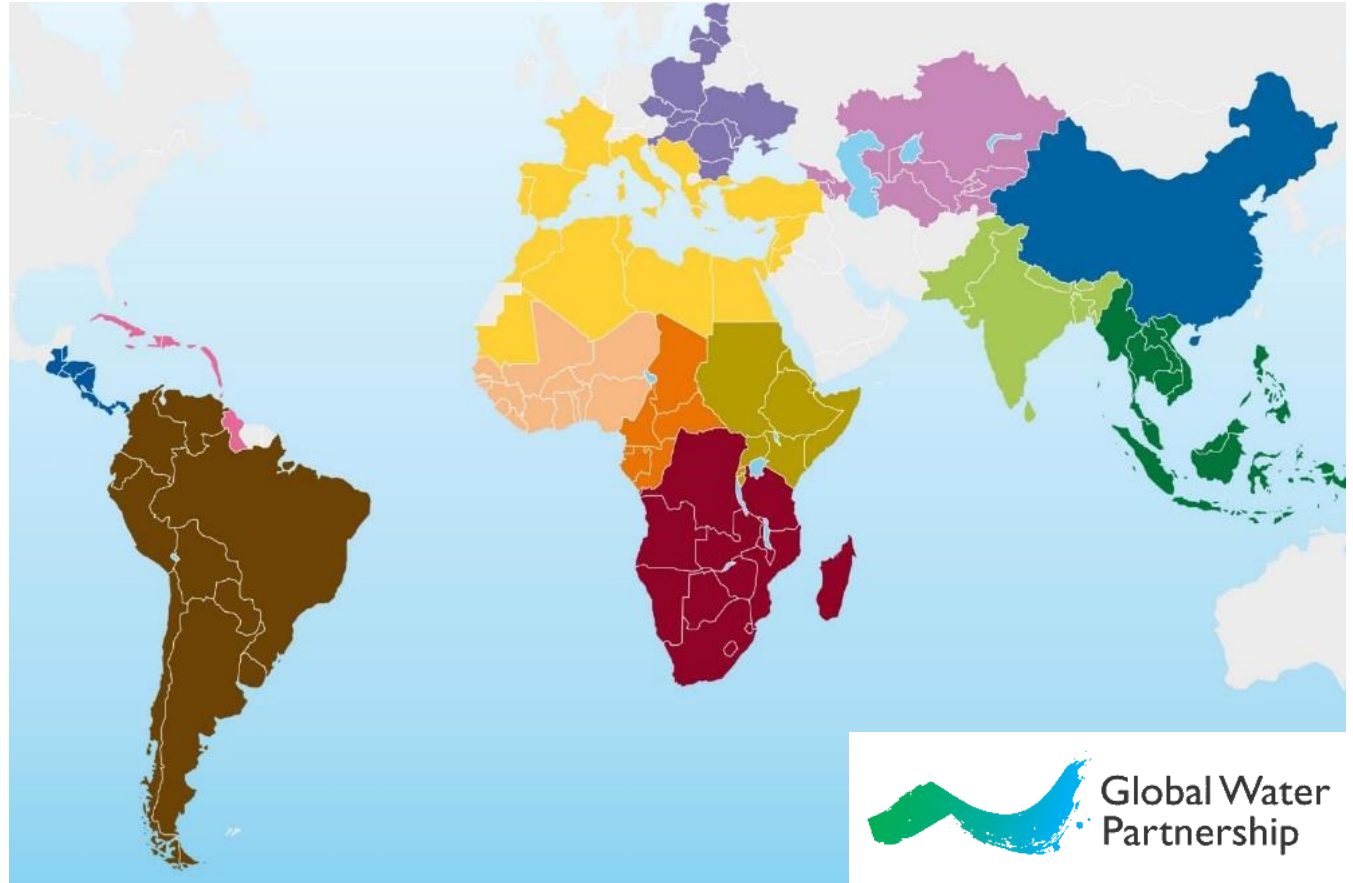
World Meteorological Organization

**WMO is the United Nations system's
authoritative voice on weather, climate and water**

WMO has 191 Members and
coordinates the activities of the National
Meteorological and Hydrological Services (NMHSs)
UN specialized agency on weather, climate, water,
and environmental issues

Global Water Partnership

- A growing international network since 1996
- 13 Regional Water Partnerships
- 85 Country Water Partnerships
- 3000+ Partners in 178 countries



WMO/GWP Associated Programme on Flood Management (APFM) WMO/GWP Integrated Drought Management Programme (IDMP)

- APFM established in 2001
- IDMP established in 2013
- APFM and IDMP provide a technical resource for water management extremes through:
 - Expert Advice (Joint Technical Support Unit of GWP and WMO in Geneva)
 - Guidelines and Tools
 - Project Preparation support
 - Capacity Development
 - Over 20 partners in each programme

IDMP Background

IDMP was launched by WMO and GWP in 2013 at the 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**

High-Level Meeting on National Drought Policies



- **March 11-15 2013**
- **Over 414 participants from 87 countries**
- **Main Partners – UNCCD, FAO, WMO**
- **Key message: Help countries move from reactive to proactive drought policies**
- **Representatives of UN agencies and international and regional organizations (UNU, IFRC, IOM, CBD, WFP, IAEA, UNECA, JRC, ICARDA, GWP, ACMAD, ISDR)**
- **Final Declaration adopted – www.wmo.int/hmndp**



Approach

■ Proactive rather than Reactive:

- Focus on drought prevention, mitigation, vulnerability reduction, planning and preparedness (including monitoring and early warning)
- Consider all aspects of disaster risk management and shift the focus to Risk Management (rather than crisis management)

■ Horizontal Integration:

- Draws on the principles of Integrated Water Resources Management
- Bring together partners from different disciplines and sectors to find solutions (sectoral approaches from the past are limited in reducing drought impacts)
- Highlight approaches to Integrated Drought Management of its partners, with a spirit that more can be achieved working together

■ Vertical Integration:

- Connects and exchanges experiences among the global, regional, national and local level
- Principles of Integrated Drought Management are adapted to the context applied

Overall Framework

Based on HMNDP outputs and IDMP AC discussions

**Drought Monitoring,
Early Warning Systems**

**Preparedness and
Mitigation Actions**

**Vulnerability and Impact
Assessment**

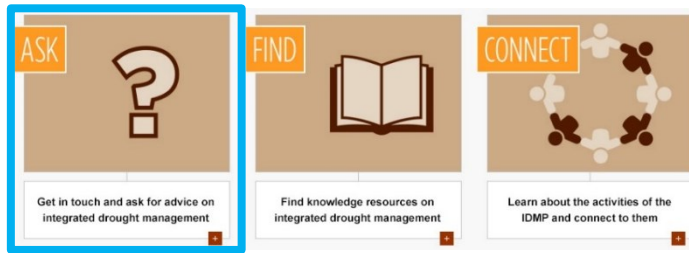
**Risk Transfer
Management of
Residual Risks**

**Relief measures that
reinforce preparedness**

**Costs of Inaction /
Benefits of Actions**

IDMP

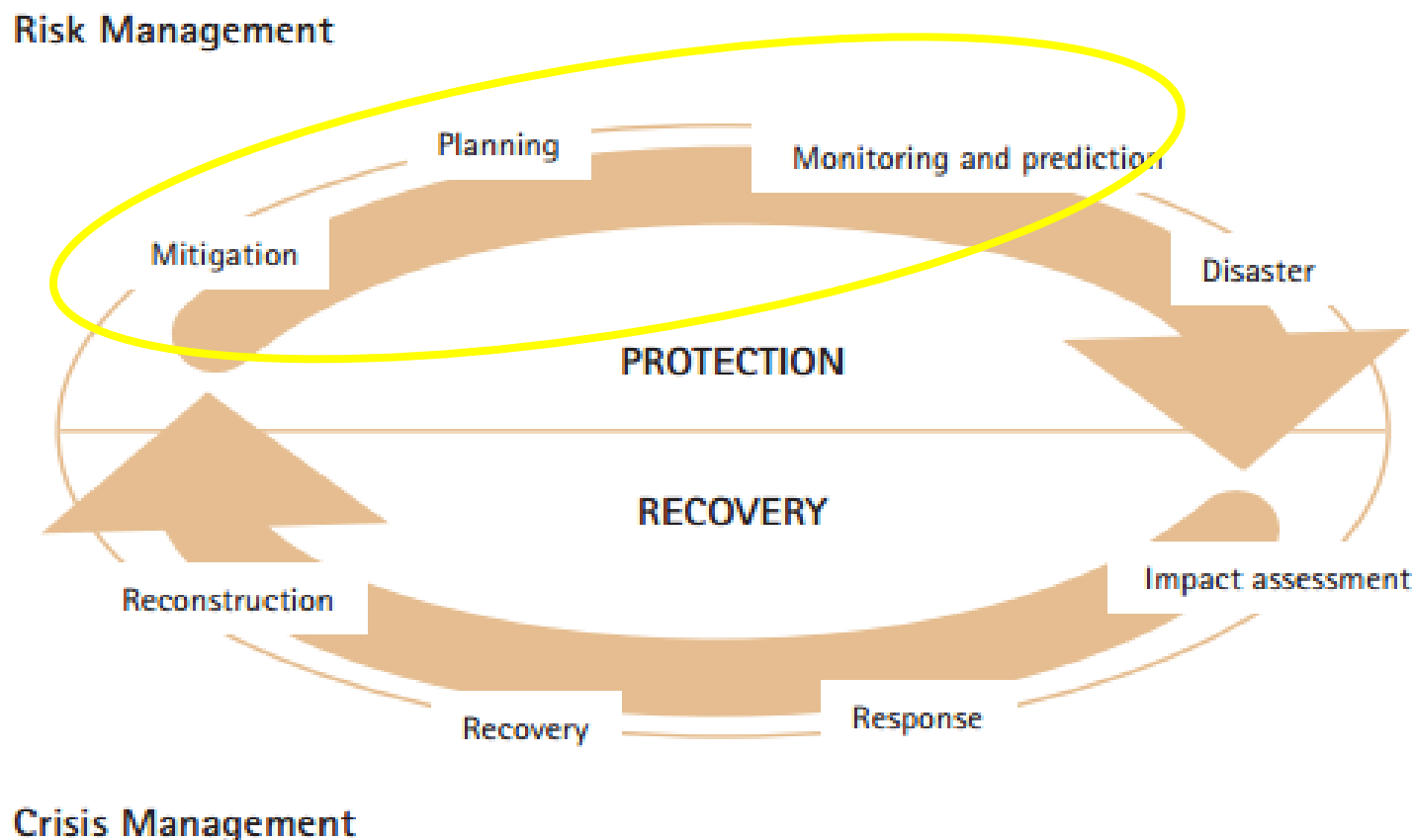
Integrated Drought Management Programme



Partners

- AEMET Spanish Meteorological Agency
- Australian Bureau of Meteorology
- CONAGUA Mexico's National Water Commission
- FAO Food and Agriculture Organization of the United Nations
- FEWS NET Famine Early Warning Systems Network
- UNCCD United Nations Convention to Combat Desertification
- UN CBD UN Convention on Biological Diversity
- George Mason University Global Environment and Natural Resources Institute
- ICARDA International Center for Agricultural Research in the Dry Areas
- ICID International Commission for Irrigation and Drainage
- IMTA Mexican Institute of Water Technology
- IWMI International Water Management Institute
- JRC Joint Research Centre
- SEI Stockholm Environment Institute
- NDMC U.S. National Drought Mitigation Center
- NIDIS U.S. National Integrated Drought Information System
- UNDP Cap-Net
- UNDP United Nations Development Programme
- UNESCO United Nations Educational, Scientific and Cultural Organization
- UNEP United Nations Environment Programme
- UNISDR United Nations Office for Disaster Risk Reduction
- University of Nebraska Daugherty Water for Food Institute
- University of Southern Queensland
- UNU Flores
- World Bank

The cycle of disaster management

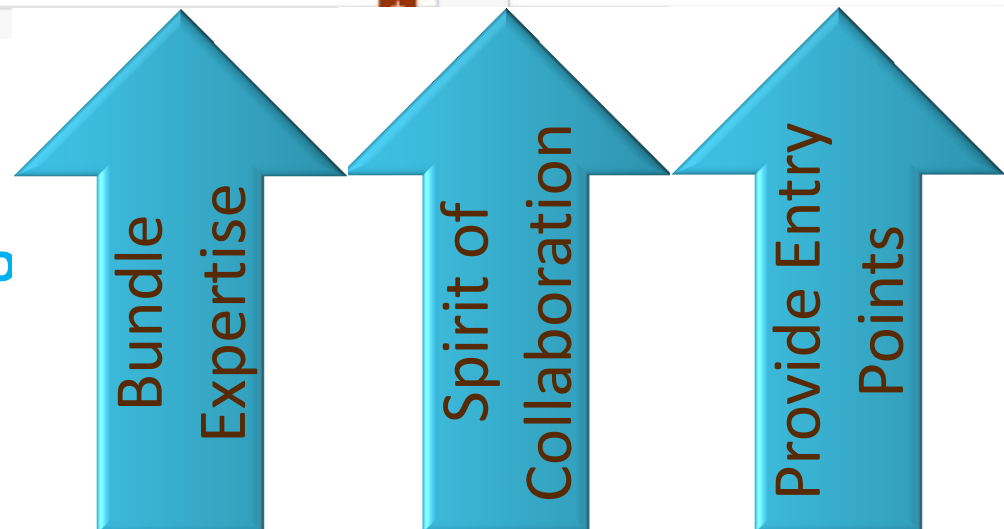


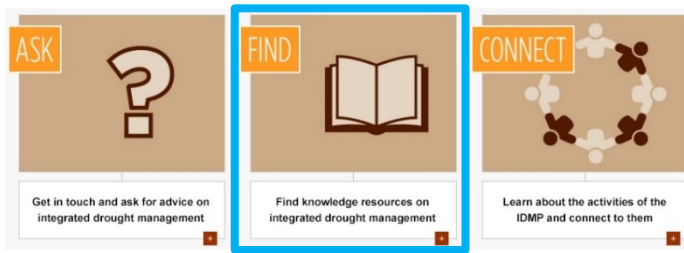
Source: National Drought Mitigation Center, University of Nebraska-Lincoln

Integrated Drought Management Helpdesk






www.droughtmanagement.info





Drought Management Library


Integrated Drought Management Programme

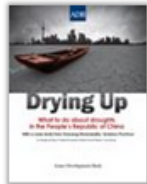

[HOME](#)
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[FIND](#)
[CONNECT-ACTIVITIES](#)

[HOME / FIND / LIBRARY](#)

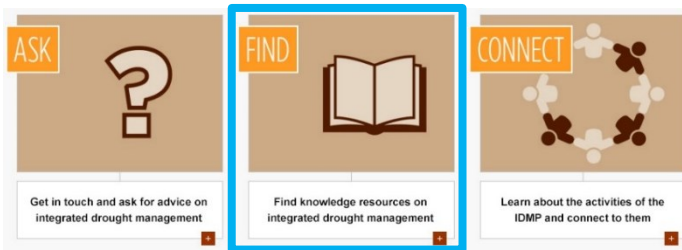
Click [here](#) for a list of acronyms

Show entries

Search:

Organization	Year	Title and Description	Preview
ADB	2012	Drying Up: What to do about Droughts in the People's Republic of China This publication addresses the issue of droughts and water management in the People's Republic of China (PRC) for environmentally sustainable development. It consolidates the highlights from several recent ADB strategic studies that relate to improving disaster risk management and water resources management in the PRC, and represents current policy direction in the Ministry of Water Resources, with whom ADB worked closely in developing this knowledge product. One interesting finding from these studies is that drought management in the PRC follows the reactive mode of its flood management system, which limits official uses of disaster relief funds until after an emergency is declared.	
ADB	2003	Kazakhstan - Issues and Approaches to Combat Desertification	

www.droughtmanagement.info/library

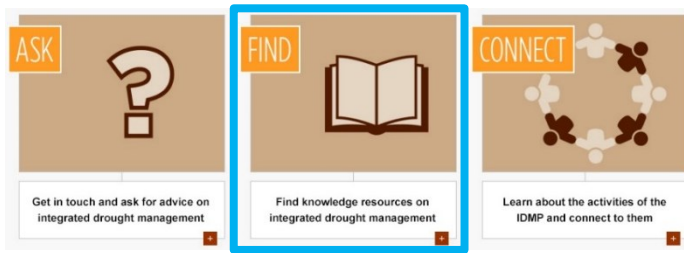


Guidelines and Tools

The screenshot displays the IDMP (Integrated Drought Management Programme) website. The header includes the IDMP logo, WMO logo, and Global Water Partnership logo. The navigation menu shows 'HOME', 'ABOUT', 'FIND', and 'CONNECT-ACTIVITIES'. A search bar is located on the right. The main content area is titled 'HOME / FIND / GUIDELINES & TOOLS'. Below this, a message states: 'Please click on the headings below to find IDMP guidelines, concepts, outcomes of expert meetings and the key documents of the High Level Meeting on National Drought Policy.' The 'Guidelines' section is highlighted, showing two items:

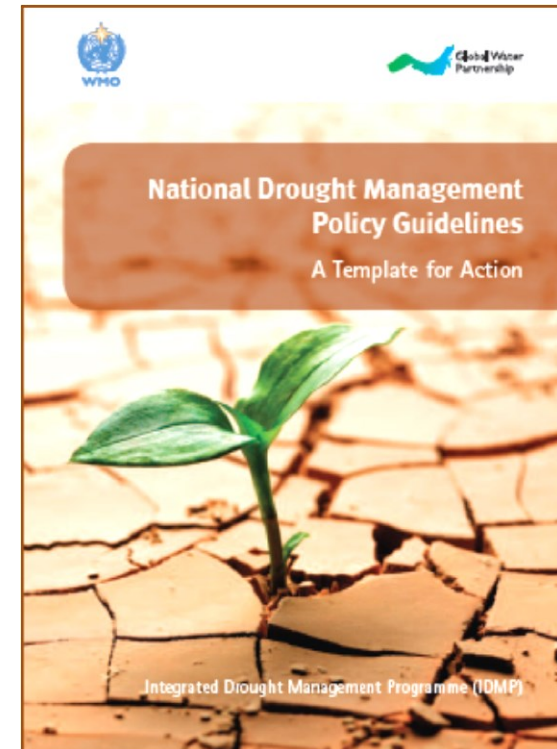
- National Drought Management Policy Guidelines – A Template for Action** (Donald A. Wilhite). WMO/GWP Integrated Drought Management Programme (IDMP). 2014. Tools and Guidelines Series 1. WMO, Geneva, Switzerland and GWP, Stockholm, Sweden. [English, Arabic]
- Standardized Precipitation Index User Guide**. World Meteorological Organization. 2012. M. Svoboda, M. Hayes and D. Wood. (WMO-No. 1090), Geneva, Switzerland. [English, Arabic, French, Russian, Spanish]

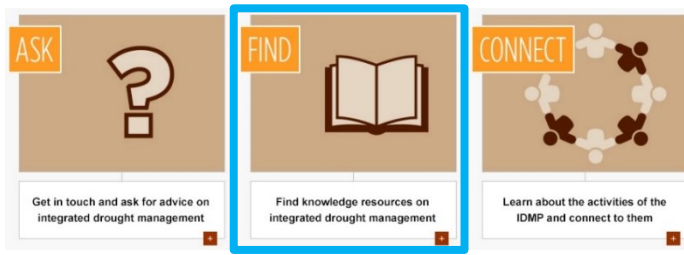
www.droughtmanagement.info/find/guidelines-tools



Policy Guidelines

- Adapting of 10-step process by Don Wilhite (National Drought Mitigation Center at the University of Nebraska-Lincoln)
- 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**





Handbook of Drought Indicators and Indices

- Handbook is a resource to cover most commonly used drought indicators/indices
- A starting point to describe and characterize the most common indicators and indices and their applications
- Does not recommend a "best" set of indicators and indices, given research requirements for appropriate application in location in question.

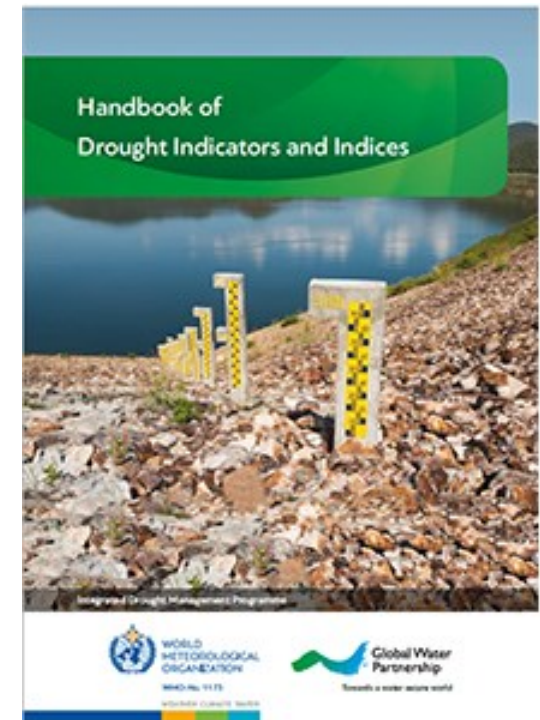


Table 1. Indicators and indices listed in this handbook

<i>Meteorology</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Aridity Anomaly Index (AAI)	11	Green	P, T, PET, ET	Operationally available for India
Deciles	11	Green	P	Easy to calculate; examples from Australia are useful
Keetch-Byram Drought Index (KBDI)	12	Green	P, T	Calculations are based upon the climate of the area of interest
Percent of Normal Precipitation	12	Green	P	Simple calculations
Standardized Precipitation Index (SPI)	13	Green	P	Highlighted by the World Meteorological Organization as a starting point for meteorological drought monitoring
Weighted Anomaly Standardized Precipitation (WASP)	15	Green	P, T	Uses gridded data for monitoring drought in tropical regions
Aridity Index (AI)	15	Yellow	P, T	Can also be used in climate classifications
China Z Index (CZI)	16	Yellow	P	Intended to improve upon SPI data
Crop Moisture Index (CMI)	16	Yellow	P, T	Weekly values are required
Drought Area Index (DAI)	17	Yellow	P	Gives an indication of monsoon season performance
Drought Reconnaissance Index (DRI)	17	Yellow	P, T	Monthly temperature and precipitation are required
Effective Drought Index (EDI)	18	Yellow	P	Program available through direct contact with originator
Hydro-thermal Coefficient of Selyaninov (HTC)	19	Yellow	P, T	Easy calculations and several examples in the Russian Federation
NOAA Drought Index (NDI)	19	Yellow	P	Best used in agricultural applications
Palmer Drought Severity Index (PDSI)	20	Yellow	P, T, AWC	Not green due to complexity of calculations and the need for serially complete data
Palmer Z Index	20	Yellow	P, T, AWC	One of the many outputs of PDSI calculations
Rainfall Anomaly Index (RAI)	21	Yellow	P	Serially complete data required

<i>Soil moisture</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Soil Moisture Anomaly (SMA)	25	Yellow	P, T, AWC	Intended to improve upon the water balance of PDSI
Evapotranspiration Deficit Index (ETDI)	26	Red	Mod	Complex calculations with multiple inputs required
Soil Moisture Deficit Index (SMDI)	26	Red	Mod	Weekly calculations at different soil depths; complicated to calculate
Soil Water Storage (SWS)	27	Red	AWC, RD, ST, SWD	Owing to variations in both soil and crop types, interpolation over large areas is challenging

<i>Hydrology</i>	<i>Page</i>	<i>Ease of use</i>	<i>Input parameters</i>	<i>Additional information</i>
Palmer Hydrological Drought Severity Index (PHDI)	27	Yellow	P, T, AWC	Serially complete data required
Standardized Reservoir Supply Index (SRSI)	28	Yellow	RD	Similar calculations to SPI using reservoir data
Standardized Streamflow Index (SSFI)	29	Yellow	SF	Uses the SPI program along with streamflow data
Standardized Water-level Index (SWI)	29	Yellow	GW	Similar calculations to SPI, but using groundwater or well-level data instead of precipitation
Streamflow Drought Index (SDI)	30	Yellow	SF	Similar calculations to SPI, but using streamflow data instead of precipitation
Surface Water Supply Index (SWSI)	30	Yellow	P, RD, SF, S	Many methodologies and derivative products are available, but comparisons between basins are subject to the method chosen
Aggregate Dryness Index (ADI)	31	Red	P, ET, SF, RD, AWC, S	No code, but mathematics explained in the literature
Standardized Snowmelt and Rain Index (SMRI)	32	Red	P, T, SF, Mod	Can be used with or without snowpack information



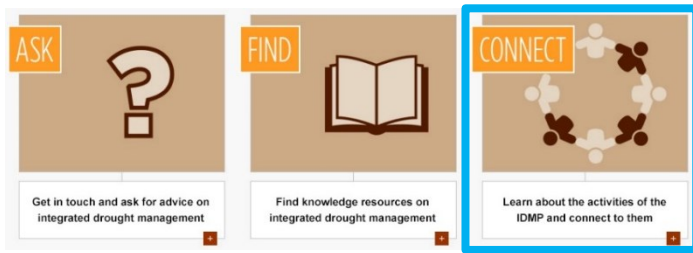
Forthcoming: Integrated Drought Management Framework Document

- To serve as the intellectual framework of the concept of integrated drought management.
- Synthesis of existing publications around the topic to define the concept and explain approaches to integrated drought management
- Put the principles agreed at the High Level Meeting on National Drought Policies into practice
- First draft developed and comments from 16 partners received.



Benefits of Action vs Cost of Inaction for Drought Preparedness

- Work stream on the costs of inaction and benefits of action of drought preparedness, including an analysis of social and environmental losses.
- Explores how lessons on pro-active drought management have been learned (and which actions were taken) over time and in different sectors.
- Consideration of obstacles in the transition from crisis management to risk management, such as lack of resources and other more impelling short term problems.
- Not only focuses on the costs of inaction, but also more short term benefits that make a compelling case for taking preventive measures.
- Expert Group Meeting held in Sep 2016
- Literature Review conducted –To be Published Jan 2017

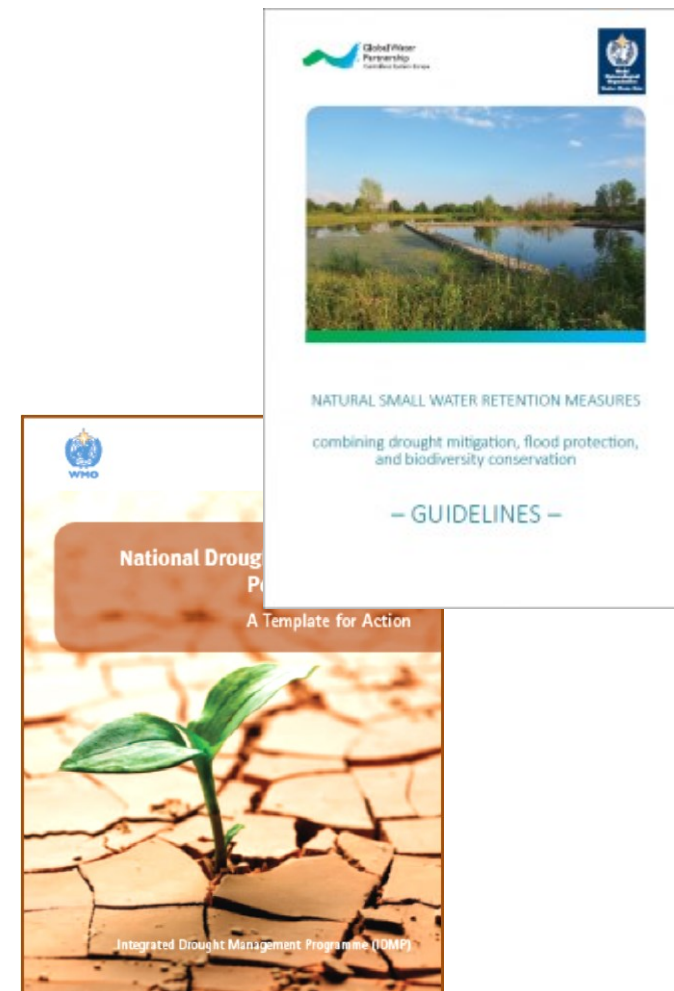


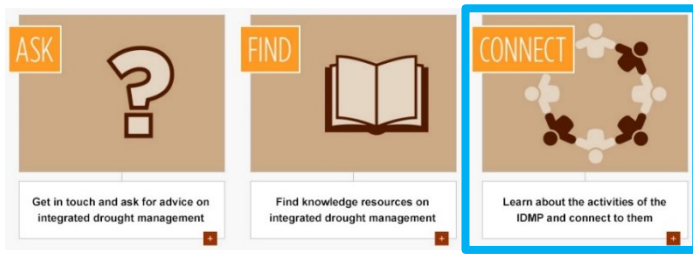
Case Studies

Under development to highlight actions that put an integrated approach to drought management into action

Case Study Guidelines available; Topics for case studies (from HMNDP Science Document):

- Promoting standard approaches to vulnerability and impact assessment
 - Implementing effective drought monitoring and early warning systems
 - Enhancing preparedness and mitigation actions
 - Implementing emergency response and recovery measures that reinforce national drought management policy goals
 - Understanding the cost of inaction
-
- Case studies on Natural Small Water Retention Measures and their application in Poland, Slovakia, Hungary, and Slovenia recently released by IDMP CEE
 - National Drought Management Policies in Brazil, Mexico, Morocco and USA
 - Currently under development are cases in Brazil, Ethiopia, India, Kenya, Philippines, Uganda

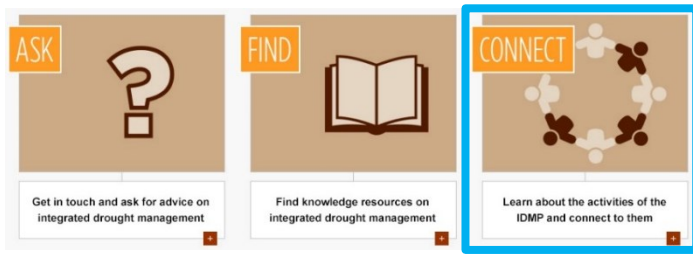




Regional programmes and initiatives

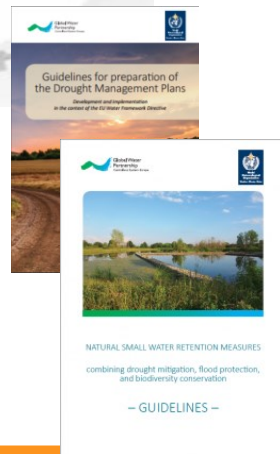
*Support action and implementation on the ground,
adding to existing efforts the strength of IDMP and its partners*

- **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 (2015):** 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 Afghanistan, 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 (2015):** Regional workshop in Bolivia leading to follow-up activities with partners on drought management planning and monitoring.



Example: IDMP Central and Eastern Europe

- **Implementation:** executed by GWP CEE; started in June 2013; 64 agreements with 28 institutions. Fundraising for continuation beyond 2015 ongoing.
- **Focus:**
 - Awareness raising
 - National Drought Policies/ Action Plans:
 - Guidelines for preparation of the drought management plans within river basin management plans according to EU Water Framework Directive
 - National consultation dialogues to discuss preparation of drought management plans
 - Drought monitoring platform with information for the region on the status of drought (enhancing existing web-based platform)
 - Demonstration projects testing innovative solutions for better resilience to drought
 - Capacity building trainings and workshops on national and regional levels
 - Documentation: Compendium of good practices





DMCSEE

*Drought Management Centre
for Southeastern Europe*



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[EN](#)

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.

[DMCSEE Project Proposal](#)

www.dmcsee.org

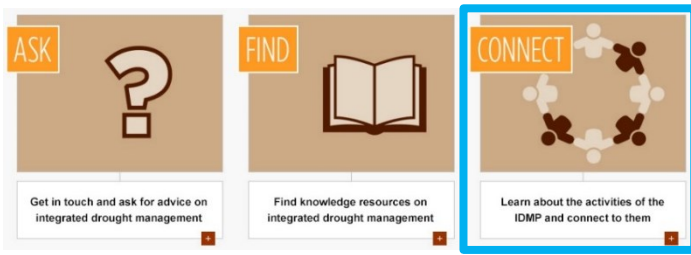
Latest news

Founding countries:

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

Founding agencies:

- WMO
- UNCCD



National initiatives

■ PRONACOSE Mexico:

- National Program against Drought (PRONACOSE) slated to run for the next 6 years in Mexico's 26 basin councils
- IDMP will provide technical advice, capacity building, project management and links to international expertise and platforms

■ Support to Turkish Government:

- Based on HMNDP (March 2013), Turkish State Meteorological Service (TSMS) started a process to formulate a national policy on drought management
- IDMP requested to provide guidance and international expertise
- IDMP contributes technical guidance and experiences from the Mexican PRONACOSE and the IDMP Central and Eastern Europe.

■ Pacific Islands Workshops

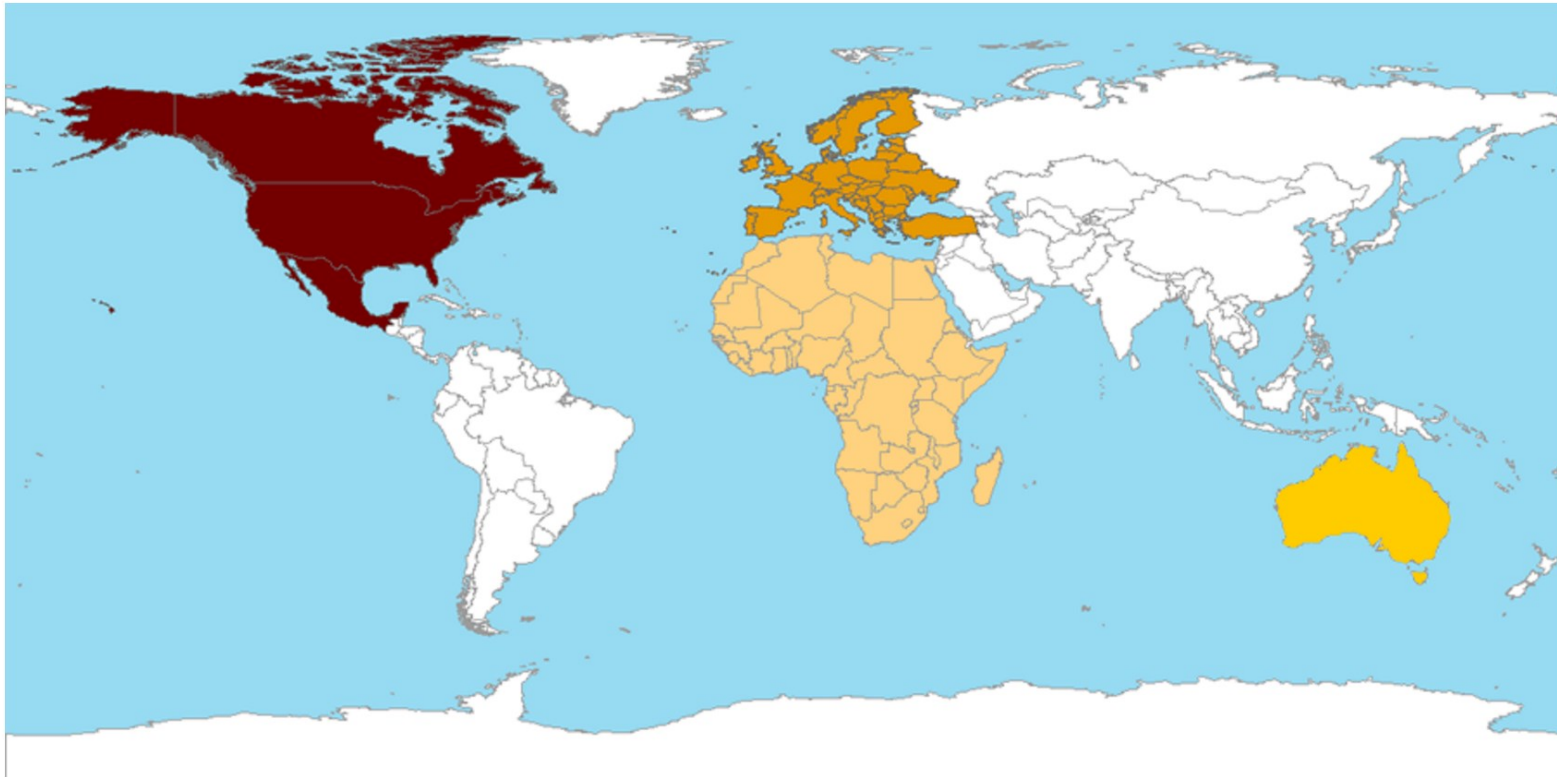
- Solomon Islands – Sep 2016
- Tuvalu and Kiribati – 2017

CURRENT CONDITIONS

INTERACTIVE MAPS

REGIONAL DROUGHT

Regional Drought



www.drought.gov/gdm/

IDMP

Integrated Drought Management Programme

For further information

www.droughtmanagement.info

idmp@wmo.int



IDMP

Integrated Drought Management Programme