SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

REG-7: "Drought Hazard (DH) Analysis and Mapping" (DRMM-W1) and ST-6: "Drought Hazard (DH) Analysis, Mapping and Good Practices/Measures to Address it" (DRMM-W1)
24-27 September 2018, Murcia, Spain
WELCOME & OVERVIEW

Presented by:

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24-27 September 2018, Murcia, Spain

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Drought vs Water Scarcity

1. Water Scarcity

Water scarcity occurs where there are insufficient water resources to satisfy longterm average requirements. It refers to longterm water imbalances, combining low water availability with a level of water demand exceeding the supply capacity of the natural system.

2. Drought

Natural occasional (random) temporary state of continuous reduction in rainfall and water availability with respect to normal values, covering a significant period of time and covering a wide area. It is caused by natural causes.

3. Water Scarcity and Drought

Water scarcity and drought are different phenomena although they are liable to aggravate the impacts of each other. In some regions, the severity and frequency of droughts can lead to water scarcity situations, while overexploitation of available water resources can exacerbate the consequences of droughts. Therefore, attention needs to be paid to the synergies between these two phenomena, especially in river basins affected by water scarcity.

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Drought as a Natural Hazard

Drought differs from other natural hazards (e.g., floods, tropical cyclones, and earthquakes) in several ways. First, since the effects of drought often accumulate slowly over a considerable period of time and may linger for years after the termination of the event, the onset and end of drought is difficult to determine. Because of this, drought is often referred to as a creeping phenomenon.

Drought impacts are nonstructural and spread over a larger geographical area than damages that result from other natural hazards. For example, a recent analysis of drought occurrence by the (US) National Drought Mitigation Center for the fortyeight contiguous states in the United States demonstrated that severe and extreme drought affected more than 25 percent of the country in twenty –seven of the past one hundred years. This represents an area of 750,000 mi^2 (1,942,500 km^2) or more.

Drought Hazard, Vulnerability & Risk

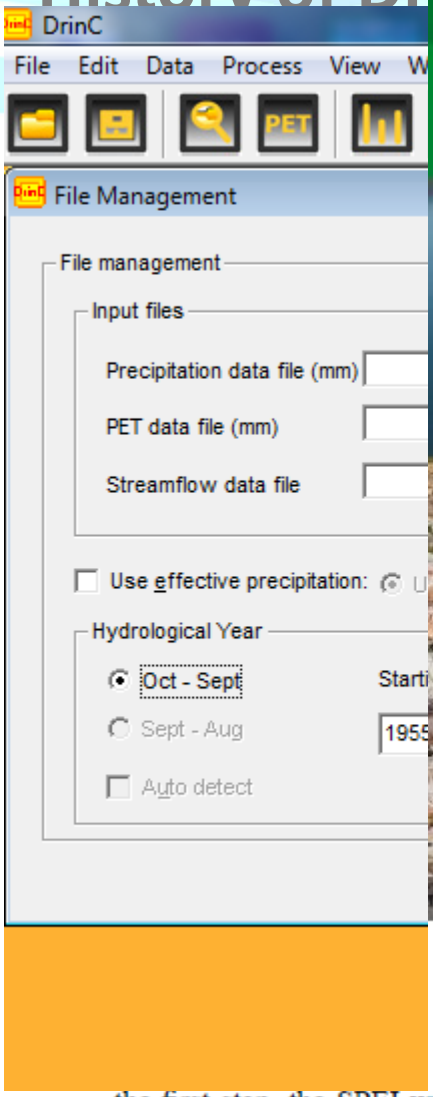
Components of drought

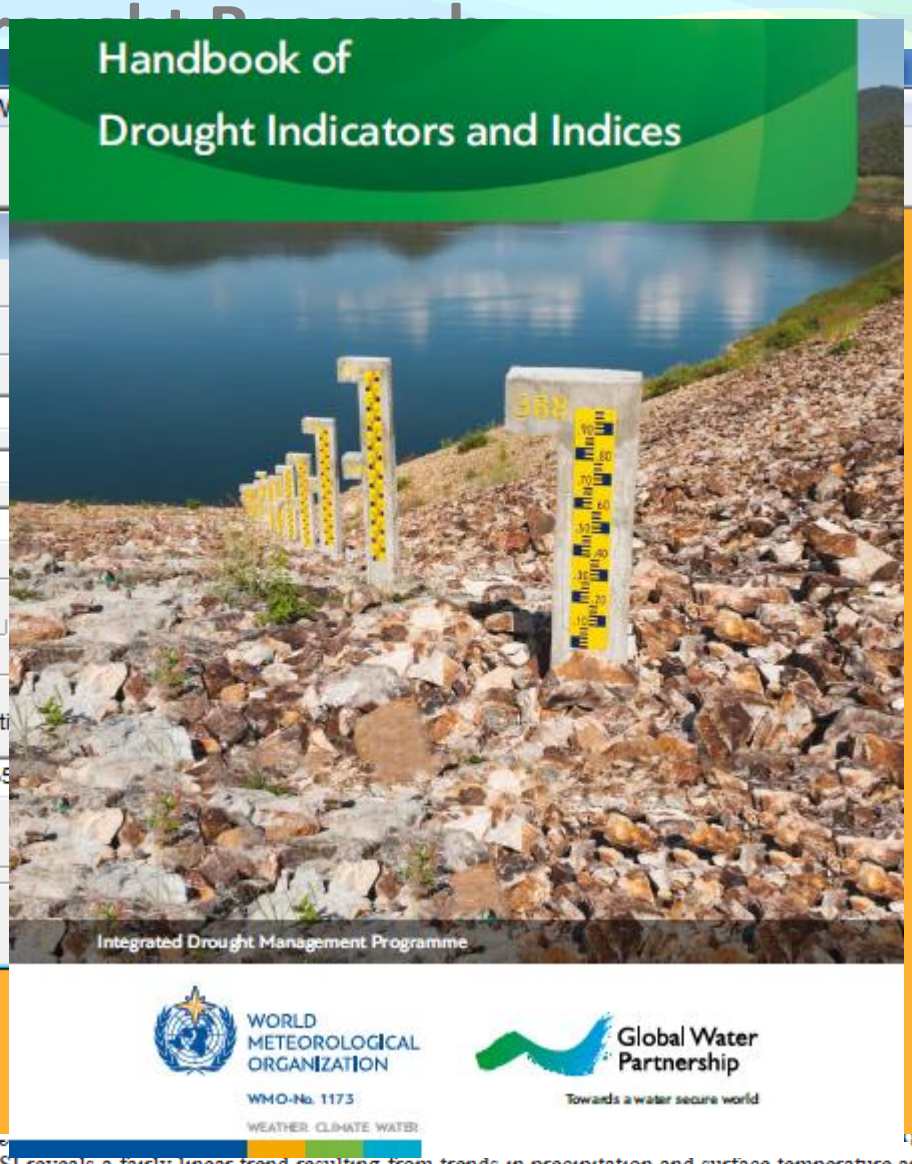
HAZARD (natural event) ⟷ **Vulnerability** (social factors)

- Prediction
- Monitoring/Early warning
- Mitigation
- Preparedness

- Hazard + Vulnerability = RISK

History of Dr





PDSI reveals a fairly linear trend resulting from trends in precipitation and surface temperature and an El Niño–Southern Oscillation (ENSO)-induced mode of mostly interannual variations as the two leading patterns. The

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Objectives and Expected Outcome

1. Objective

Training of technical staff on (a) drought characterization using suitable indicators, (b) the development of indicators for declaring the drought alert, (c) the development of drought indices, other than the Standard Precipitation Index (SPI) (for example for hydrological and agriculture droughts), and on (d) mapping of the drought hazard.

2. Expected Outcome

Improved knowledge on the different types of drought indicators, improved technical capacity in the development of the indicators and their analysis to support decision-making, and in the mapping of the drought hazard

Methodology

To achieve the event objectives, a highly dynamic, interactive, facilitated and participatory approach will be adopted, including the following:

- A study tour to accompany the on-site training with visits to public institutions which offer good examples in drought management.
- Key-Note presentations from distinguished researchers that work both in universities and in private design firms with particular reference to the study area.
- Presentation of the case of Spain in Drought Management Planning (with a view to demonstrate the practical use of drought indicators).
- Presentations and discussion on drought issues for groundwater and issues related to drought monitoring in heavily modified aquifers and groundwater protection zones.
- Presentation and discussion of prevailing drought hazard monitoring experiences in the project countries.
- Specific Training Sessions on “Drought Hazard Monitoring and Early Warning Systems” focused on participatory and hands-on exercises with the participants.
- Specific P2P Session on “Drought Hazard Monitoring and Early Warning Systems” focused on the progress so far gained from the P2P sessions (webinar, questions and answers).

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Structure of REG-7

Following the successful experience of the REG- 5 in Vienna, Austria, by splitting the Study Tour prior to and after the On-Site Training Event, the structure of the combined event will be as follows.

- Day 1 (24th of September) Study Tour: Automated Hydrological Information System, Strategic groundwater pumping network and Irrigation community of Campo de Cartagena .
- Day 2 (25th of September) Regional on Site Training: Mostly presentations and discussions with Training Session #1.
- Day 3 (26th of September) Regional on Site Training: Training Sessions #2 and #3, presentations and P2P-9 session.
- Day 4 (27th of September)) Study Tour: Sea Water Desalination plant and the Waste Water Treatment Plant of Los Alcázares.

The Regional on Site Event (REG-7) will consist of **(a) seven presentations** and **(b) three training sessions**. Also a session in the P2P-9 will be included.

The Regional on Site Event will cover all aspects of drought hazard monitoring and assessment.

Personnel

Trainers

1. **Mr Demetris Zarris**: SWIM-H2020 SM - Drought Management Expert and Technical Coordinator of the training, LDK, Greece

2. **Mr. Floris Verhagen**: SWIM-H2020 SM - Senior Groundwater (Drought) Non-key expert (NKE), RHDV, Netherlands

Invited Speakers (in the order of appearance)

1. **Prof. George Tsakiris**, National Technical University of Athens, Greece

2. **Dr. Tobias Tornros**, Sweco Sweden, previously University of Heidelberg, Germany

3. **Dr. Johannes Hunink**, FUTUREWATER Inc.

4. **Dr. Sandra García**, University of Cartagena (UPCT), Spain

5. **Dr. Salomón Montesinos**, Geologist, GEODIM Inc., Spain

The Water Key Expert, **Ms. Suzan Taha**, will act as resource person and will oversee the harmony of the training workshop and its alignment with the objectives assigned to it.

Presentations (Day 1)

The presentations are the following:

1. Drought hazard monitoring and analysis - early warning systems: State of the Art (by **Prof. G. Tsakiris**) will cover all aspects of the drought hazard monitoring indices and provide recent advances in early warning systems.

2. Addressing drought conditions under current and future climates under climate change scenarios in the Jordan Valley: (by **Dr. T. Tornros**) will describe drought hazard assessment in the Jordan Valley (where many of the beneficiary countries are situated) and, most interestingly, will focus on climate projections under climate change scenarios.

3. Groundwater drought hazard indices: (by **Mr. F. Verhagen**) will introduce drought hazard indices tailored to groundwater. This is very significant since merely all beneficiary countries are actually depended on their groundwater reserves.

4. Drought monitoring with remote sensing and satellite imaging: (by **Dr. J. Hunink**) will describe and explain how remote sensing and satellite imagery can help with drought hazard assessment and present sources of data available over the internet.

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Presentations (Day 2)

5. Operational early warning system for drought based on seasonal precipitation input in Israel: (by **Mr. A. Givati**) will present how Israel is technologically capable of predicting droughts to be prepared to mitigate its adverse effects.

6. Crop production and agricultural drought monitoring: (by **Dr. S. Montesinos**) is very important for countries with significant percentage of rainfed agriculture. New techniques for the monitoring of agricultural drought will be presented.

7. Recent advances in drought hazard monitoring and climate change impact assessment over Spain (by **Dr. Sandra García**)

Training Sessions

- **Training Session #1:** The scope of this Training Session is to explore the Drought Hazard Monitoring issues, calculating the drought hazard indices, recognizing the onset of a drought event, its duration and intensity, its severity and finally declaring its end. Real data will be used from the Republic of Cyprus, area with very similar characteristics with most of the beneficiary countries. The data include rainfall, potential evapotranspiration, runoff, etc. The attendees will work (hands on) with their personal computers with two software models (freeware), namely (a) the SPI Calculator developed by the World Meteorological Organisation (WMO), and (b) the DrinC model for the calculation of RDI and SDI indices (alongside with SPI) developed by the National Technical University of Athens.
- **Training Session #2:** The scope of this Training Session is to explore the Drought Hazard Monitoring issues focused on groundwater. Groundwater resources are very important for the beneficiary countries and the identification of drought especially for groundwater is equally important. Drought hazard indices tailored for groundwater will be explored by using rainfall and aquifer elevation data especially adjusted for processing within the limited time available.
- **Training Session #3:** The scope of this Training Session is to explore the Drought Hazard Monitoring issues using remote sensing technologies.

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Thank you for your attention.

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