





BEYOND SCARCITY

WATER SCARCITY AND DROUGHT RISK MANAGEMENT IN THE DANUBE REGION

Summary, conclusions, lessons learned and potential future actions



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Objectives of the workshop

- 1. Raising awareness about the **relevance**, **past and potential future impacts** of water scarcity and droughts in the Danube region
- 2. Providing a **forum for a technical exchange** on good practice approaches and options to address the issue in order to make the region more resilient against such extreme events
- 3. Tacking stock on challenges and potential support needs for future action

Droughts in the Danube: the past

Drought proneness is not homogeneous



Most of the basin is already experiencing more and worse droughts

> Trends in frequency and severity of meteorological droughts between 1950 and 2012 (SPI + SPEI + RDI 12). Source: EEA website



Droughts in the Danube: impacts in 2003, 2007, 2012, 2015 and 2017



Agricultural **drought** has been a major impact, as summer soil moisture shows a drying trend



However, many other sectors/ elements were affected!

NAVIGATION: Austria, Czech Republic, Germany, Croatia, Serbia, Bosnia and Herzegovina, the Slovak Republic and Moldova

SNOW COVER & MELT PATTERNS CHANGED FOREST FIRES & ECOLOGICAL IMPACTS: High impacts in Czech Republic and Moldova, while low impacts in Austria, Bosnia and Herzegovina, Germany, Croatia, Hungary, Serbia and the Slovak Republic

> EUTROPHICATION, LOW VELOCITY AND HIGH T^a → Impacts in fish

HYDROPOWER PRODUCTION

Droughts in the Danube: the future

Precipitation totals are expected to decrease in part of the basin





Estimated annual mean precipitation trends in the Danube region 2021–2050 and 2071-2100 Source: ICPDR (2018)

The lower basin will likely become drier and with more frequent deficits (soils, discharge, etc.)

Drought is going to become more frequent in some parts, not necessarily where it occurred more often



Changes in meteorogical drought frequency for different periods and scenarios

Months/30-year period



Droughts in the Danube: the future



c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in agricultural and ecological drought North GIC America Europe NWN | NEN RAR Increase (12) WNA CNA ENA EEU VSB ESB RFE Asia Decrease (1) . MED NCA ECA TIB EAS W Low agreement in the type of change (28) Small Islands CAR SCA SAH] ARP SAS SEA Central Limited data and/or literature (4) PAC • 0 0 America WAF CAF NEAF NWS NSA Confidence in human contribution Small SAM NES WSAF SEAF to the observed change MDG Islands EAU • CAU . • • • High SWS SES South ESAF Africa -•• Medium America . NZ Australasia Low due to limited agreement SSA Low due to limited evidence Type of observed change since the 1950s

However, a drought becomes a disaster if not well managed/prepared → work on Vulnerability

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International & Regional Action: framework

- Instruments for water management: Water
 Framework Directive (WFD) → quality issues vs quantity issues, RBMPs, Flood Risk MPs
- EU Communication → "Addressing the challenge of water scarcity and droughts in the European Union" (2007) & Policy evaluation
- Danube Climate Change Adaptation Strategy, updated 2018, will feed into the 2021 update of the RBMPs → puts drought as a relevant issue for the future of the basin, considering it a main field of action
- The Danube RBMPs (2015, 2021) aligned with WFD→ now drought is SWMI → need of addressing its management in the international basinwide RBMP which is due by December 2021.



International & Regional Action: partnerships, activities, initiatives

- The EU Strategy for the Danube Region (EUSDR) Environmental Risks Priority Area (PA5)→ Addressing the challenges of water scarcity and droughts though the Danube RBMP and contributing to reports & strategies
- The IDMP in Central and Eastern Europe
- The Drought Management Centre for Southeastern Europe (DMCSEE), by UNCCD & WMO, focuses its work on monitoring and assessing drought risk
- The Interreg **DriDanube Project** (2017- 2019), to increase the capacity of the Danube region for DRM
 - ✓ Danube Drought Strategy & ODMM
 - ✓ Drought Watch
 - ✓ National Reporting Networks (NRNs) Unified drought risk assessment
- European Drought Centre (EDC) → virtual knowledge hub
- European Drought Observatory → scientific backup

- Integration of drought management issues into national programs, policies and plans
- ✓ Capacity for the integrated drought management approach
- ✓ Awareness rising and communicating the knowledge gathered
- ✓ Demonstration projects

International & Regional Action: partnerships, activities, initiatives

Drought Watch→ www.droughtwatch.eu



- Monitoring, Impacts and Response
- Near real time, RS based
- Drought risk maps for different drought varieties
- Fed by NRN regarding impacts: community involvement

Alpine Drought Observatory→ /www.alpine-space.eu/



- Adjusted for snow monitoring: status, impacts of disruptions, etc.
- Drought occurrence and importance in the Alps

Data, Information and Knowledge!

Water balance at Danube level





- Better understanding → basin and sub-basin level→ single, basin-wide model
- Tool to influence management policies leading to good quantitative status of water bodies→ DRBMP and nationals RBMP,
- Assessment of CC on elements of water balance
- Based on already existing data and as little additional data collection, straightfw models

Some National Action Examples: Slovakia

National Action Plan to address the effects of drought and water scarcity adopted in 2018

Three pillars:

- Prevention first
 - Specific focus on forests, agriculture, urban settlements
 - Increase the natural retention capacity of the landscape
- Management and operation measures
 - Find synergy of measures for flood protection and drought mitigation (reconstruction, maintenance of water storage constructions)
 - Coordinate efforts with nature protection (revitalization of wetlands)
- Research, education and public awareness



Some National Action Examples: Austria

- Groundwater is highly important for the main uses, especially when irrigation needs are higher
- Detailed groundwater availability and socio-economic assessments in Austria → basic information for sustainable and secure uses of groundwater
- Projections of : a. CC scenarios, b. socio-ec. Scenarios → identification of areas that will be more problematic from the point of view of availability and demand
- Ecology needs are considered



This dialogue is currently very much "alive" in Austria

Some National Action Examples: Czech Republic

- Resources variability challenge in the countries, in space and time → longer summer dryness
- 2014- 2020 major drought, large deviation compared to the average
- Focus: Multipurpose infrastructure









Some National Action Examples: Hungary



Detection

- 102 monitoring stations (2021), and densifying
- GPRS remote system
- Database Web service / queries



• Hungarian Drought Index (HDI), very comprehensive and includes soil moisture

2007 Crszágos területi átlag

- Weekly drought reports released
- Evaluation of water shortage (based on measured data)





Alert & Intervention practices

Short term forecast and DSS in the pipeline

http://aszalymonitoring.vizugy.hu/index.php?lang=eng

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Coordination arrangements

Existing legal approach & planning

- Most countries are missing formal umbrella document on drought management
- Policy development needs to advance, since water scarcity and droughts not yet recognized and addressed at the required level of importance the topic deserves
- RBMPs not fully developed for quantity issues, so drought planning is difficult
- How to address drought: supplementary measure to RBMP, CC Strategies, Separately?
- In place for emergency, not so obviously for preparedness
- They could be improved, for example, for making DEWS guide measures to take





Assessing the risk

- There are initiatives but vulnerability and risk assessment is much less advanced than drought hazard characterization and monitoring
- Data availability has diverse situations in Europe → fostering dialogue with countries. Missing regular collection of info on sectoral drought impacts
- Need for more detailed €, \$
 assessments of impacts on
 water-related sectors required
 as basis for risk-based approach
 versus crisis-management
 approach → "making the
 economic case", evaluate better
 the economic benefits of risk based approach





Monitoring and early warning

- It is more advanced, but not homogeneously, even if all countries have drought monitoring in place at the national level
- No consensus on thresholds for different drought types nor used to influence measures
- DEWS followed mainly when drought has started
- More tracking of water use is required (permits, audits, monitoring...)





Communicating the risk and becoming aware of it

- There are initiatives like youth campaigns and increased media coverage to raise awareness, but it needs to continue
- Journalists are more prepared, but it varies
- Uncertainties and DEWS/model results are not interpreted or "translated" for the public



Adequate and sustainable resourcing

- Institutions and tasks do not count on enough budget yet
- At household and sectoral activity level, financing and insurance need more thinking

Mitigation and preparedness measures

- Crisis-oriented drought measures prevail
- Preparedness, mitigation and response: Gaps
- We need to ensure water for aquatic ecology → how to keep environmental flows in a changing regime?
- Opportunities!→ DRM teaming-up with other sectors like flood protection and nature conservation, think of cobenefits as well as avoided losses and risk reduction, tap from incentives for conservation of terrestrial ecosystems
- Sectoral agendas might not be aligned with drought or different timings: hydromelioration for agriculture sector, not very climate-smart forestry and Ag, infrastructure building...

Main take away messages

Drought is a very relevant issue in the region, and it is gaining traction, but we need more frameworks and protocols Awareness, communication and education, so that the risk is perceived → encouraging people & governments to take adaptation action

Even if steps are taken, there is variation among countries and pillars→ Followup needed Work with governments and <u>accross</u> <u>sectors</u> for <u>proactive</u> <u>action</u>, before drought hits

Facilitate development of DRM: Global perspectives and approaches









Drought action promotion

"If not now, when?, If not us, who?"

Thank you!

