

Droughts and Water Scarcity in the Danube River Basin: Coordinated Activities towards Water Resilience



EUSDR Climate & Water Conference

28 November 2023

Budapest / Hungary

Adam Kovacs

ICPDR



The Danube River Basin (DRB)



Danube River Basin District Overview

DRBMP Update 2021 - MAP 1



- 800.000 km²
- 10% of surface Continental Europe
- 6.500 m³/s mean discharge
- 79 million people
- Large heterogeneity
- 19 countries



www.icpdr.org

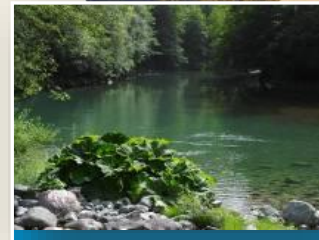
ICPDR IKSD

International Commission for the Protection of the Danube River / Internationale Kommission zum Schutz der Donau

ME where the data from the IT, ME and PL

Cooperation Framework: ICPDR

- Danube River Protection Convention signed in 1994
- ICPDR established in 1998 to implement the Convention
- Coordination of the implementation of **EU WFD (2000) & EU FD (2007)**
- In charge of **policy making and technical work**
- Synergetic cooperation with the **EUSDR**



Protection of water & ecological resources



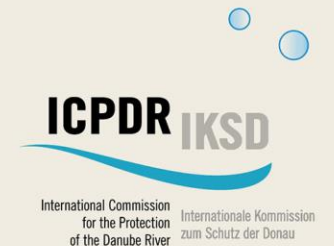
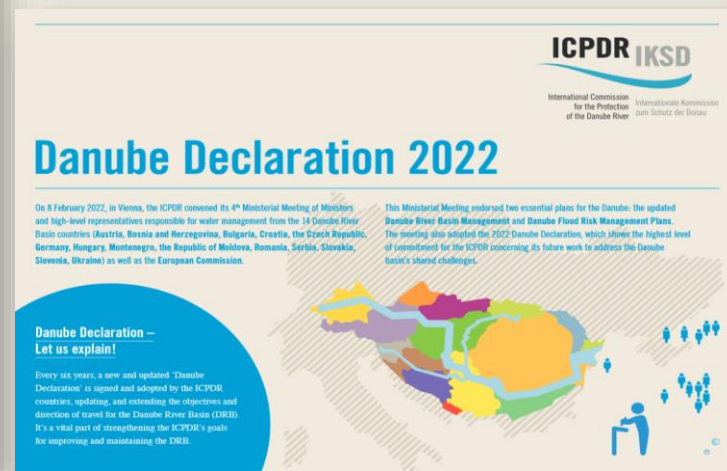
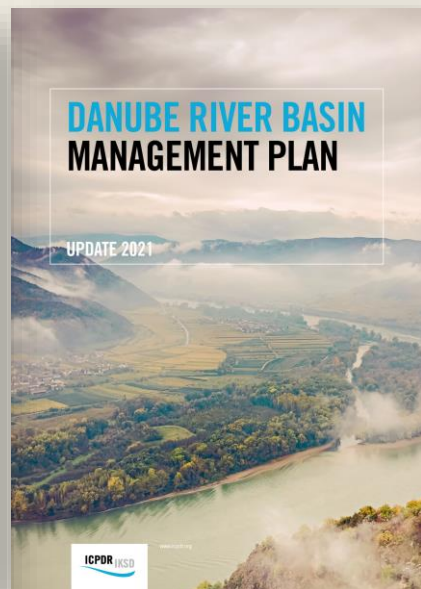
Sustainable & equitable use of water



Reduce nutrients & hazardous substances



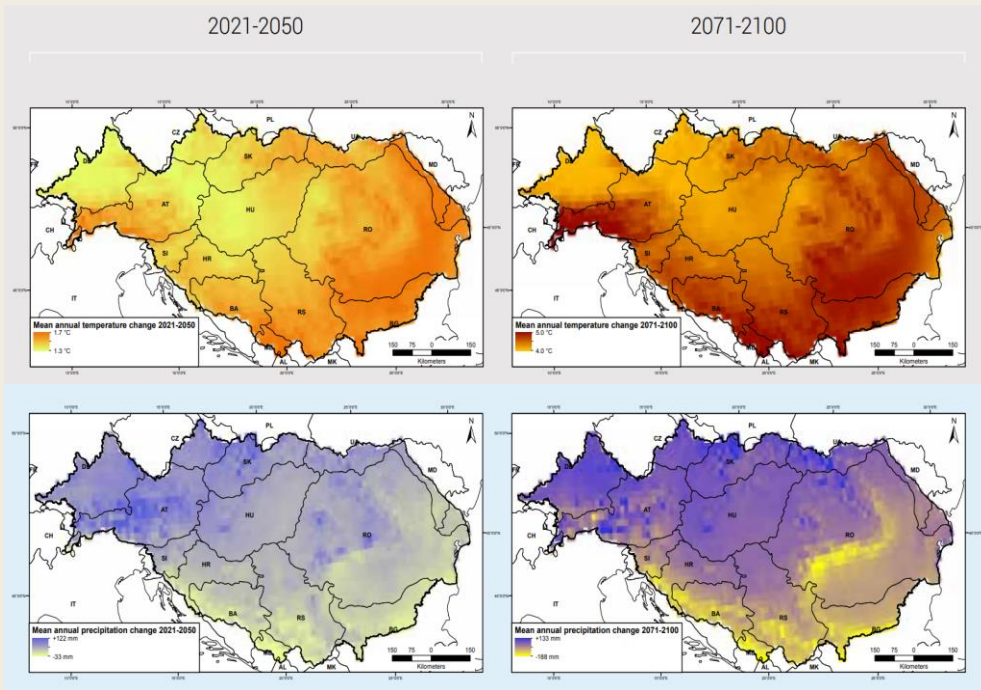
Manage floods & ice hazards



Climate Change Scenarios for the DRB



Changes of annual mean temperature and precipitation according to the RCP 8.5 of the EURO-CORDEX (as of 2018)

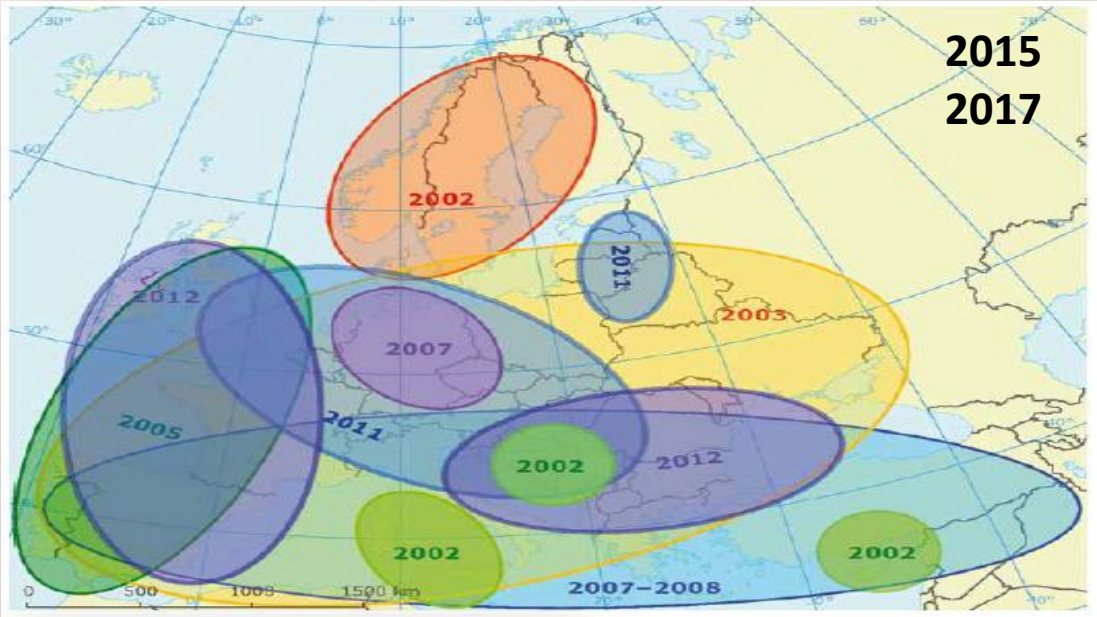


Extreme impacts on water resources (JRC, 2018):

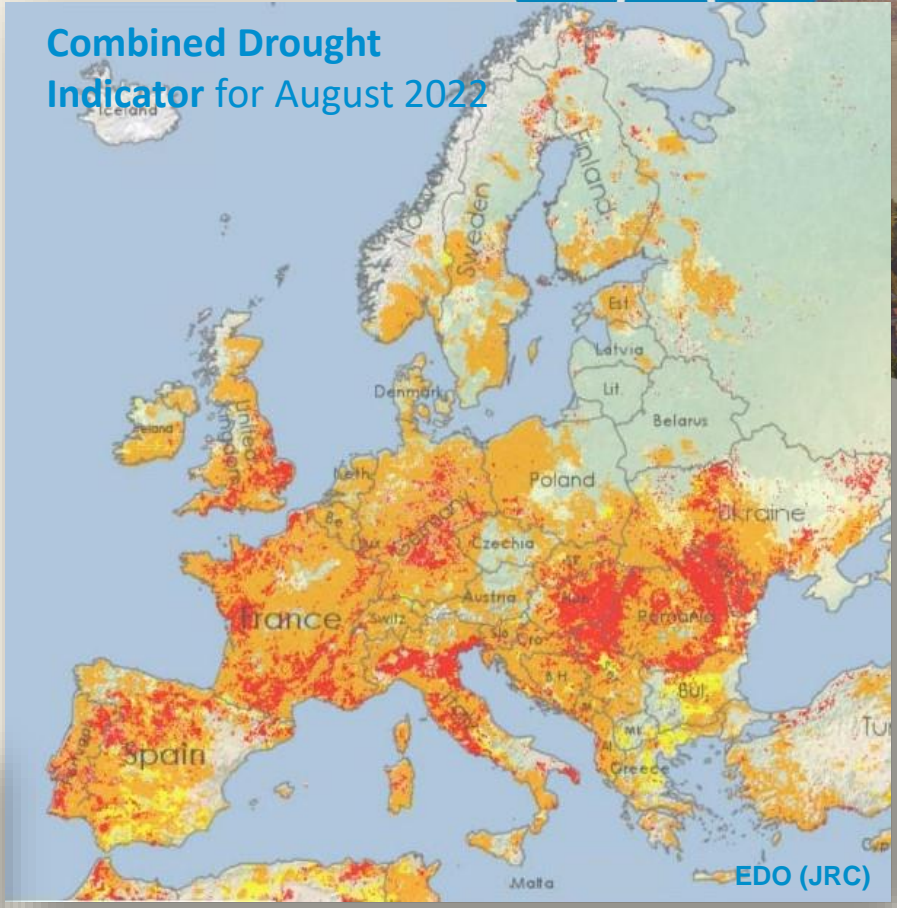
- Increased **peak river flows** by 10-30% for the upper and middle Danube
 - Increased **duration, frequency and magnitude** of droughts during summer months
 - Heavily increased **water scarcity** in Bulgaria, Serbia, Romania, Hungary, Slovakia and Moldova
 - **Agriculture and energy** sector with lack of water and loss of production
- **Seasonal changes** in precipitation
 - **Increased intensity** of extremes



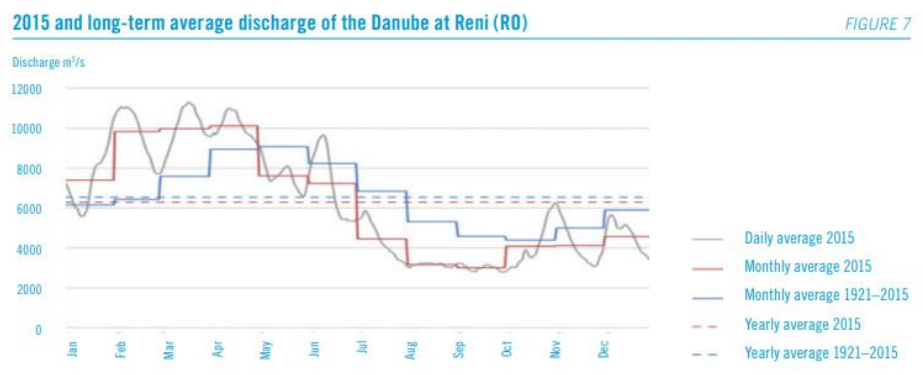
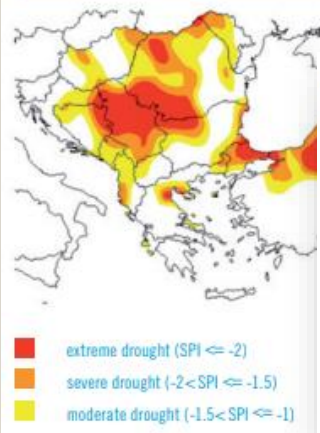
Droughts in the DRB



2015
2017



Standardized Precipitation Index (SPI)*
SPI Jul 2015 (1 month), GPCP first-guess analysis *FIGURE 2b*



Watch	Warning	Alert	Full recovery	Temporary soil moisture recovery	Temporary vegetation recovery	No data
-------	---------	-------	---------------	----------------------------------	-------------------------------	---------

10000

Drought Impacts



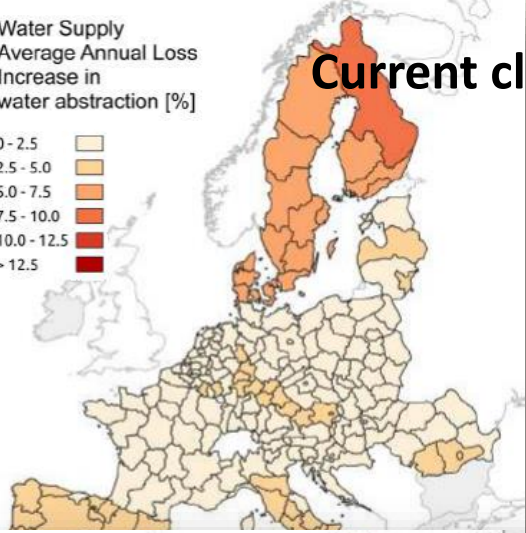
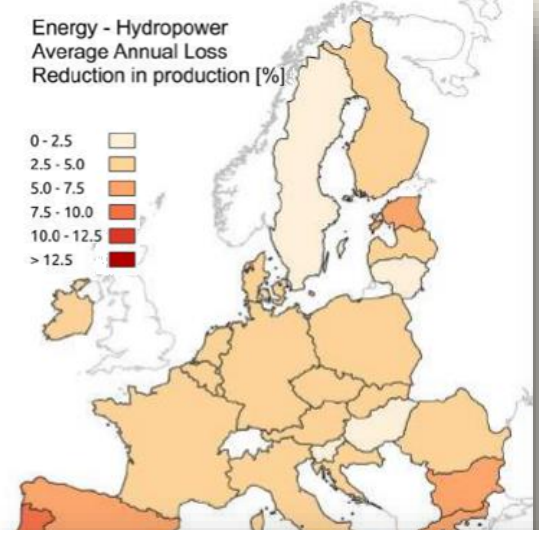
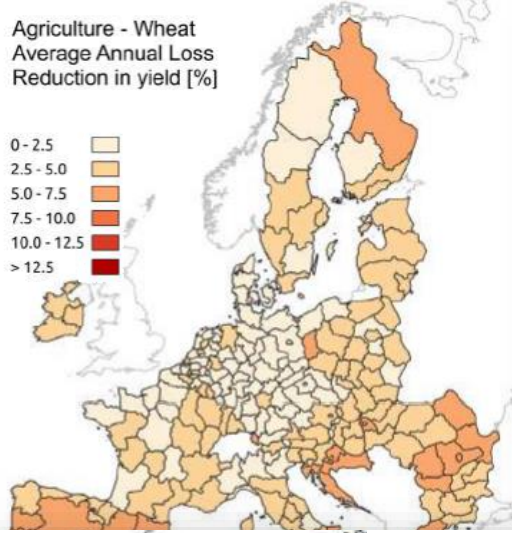
Drought consequences:

- Impacts on aquatic and terrestrial **ecosystems**
- Impacts on **water uses**, e.g.
 - Lack of precipitation - reduced summer **crop yield**
 - Low water levels - impacts on **navigation**
 - Reduced stored water volume - impacts on **hydropower**
- Potential **water scarcity** and resource overexploitation

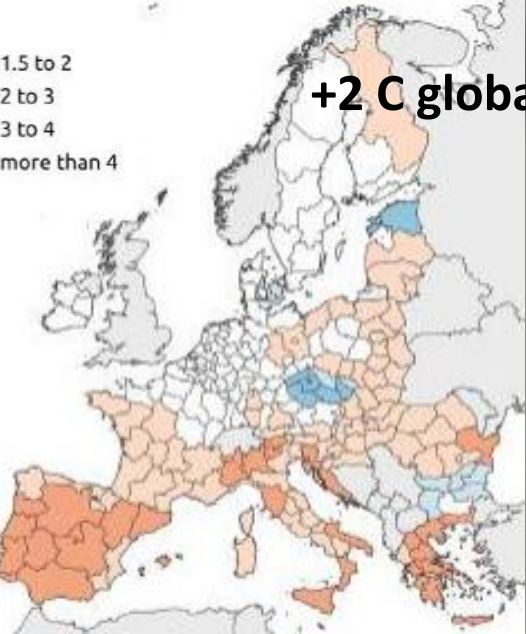
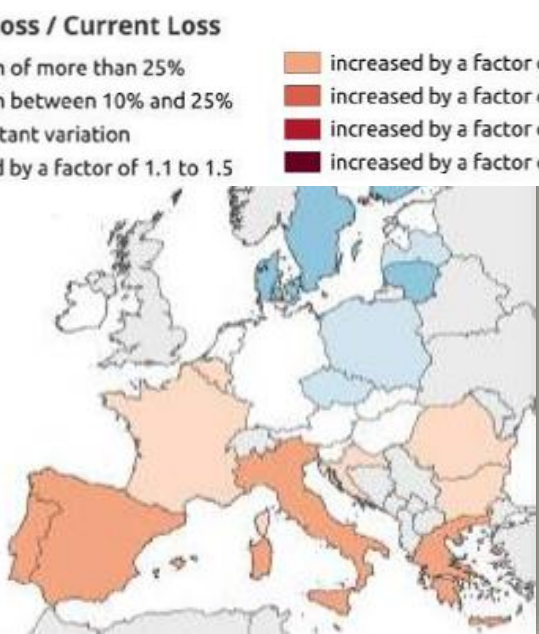
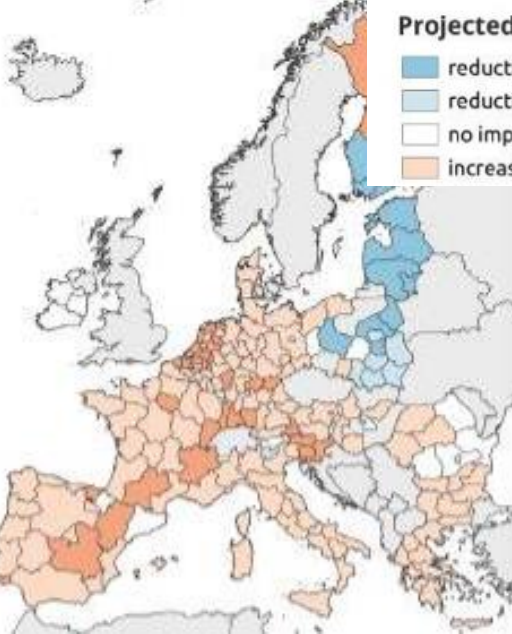


Damage and losses caused by drought 2017	
Austria	140 mio EUR/crop failure and fish mortality.
Bosnia and Herzegovina	126 mio/agriculture, 40 % losses in energy production (Bileća).
Croatia	125 mio EUR/agriculture, >4000 fires over 86 500 ha of the Adriatic coast; islands water supply shortages.
Czech Republic	120 mio EUR/agriculture.
Hungary	51 000 ha of agricultural land damaged.
Montenegro	50 % lower yield in viticulture, 42-50 % losses in energy production (Perućica, Piva), fish mortality.
Romania	reduction of Danube flow for 60 %, higher electricity prices, crop transportation problems.
Serbia	Substantial losses in agriculture, water shortage, dried-up lakes, disturbed energy production. >1 bn EUR/all sectors.
Slovakia	20-40 % lower crop yields, dried-up rivers, hydrological drought.
Slovenia	65 mio EUR/agriculture

Drought Risk in Europe



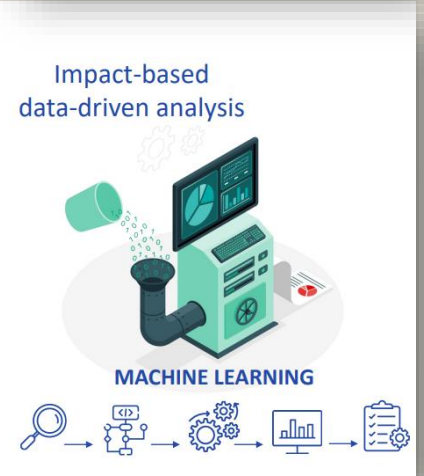
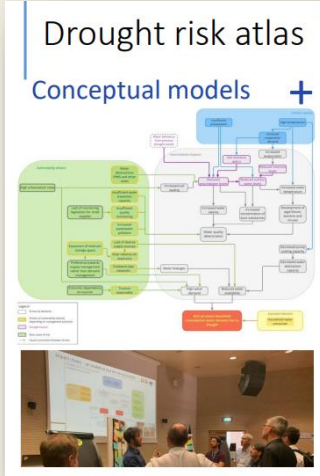
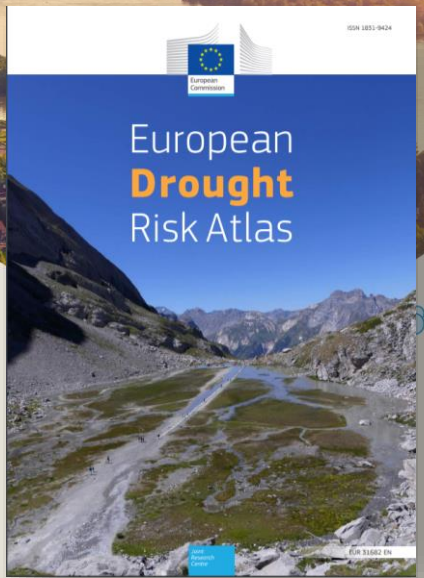
Current climate



Projected Loss / Current Loss

reduction of more than 25%	increased by a factor of 1.5 to 2
reduction between 10% and 25%	increased by a factor of 2 to 3
no important variation	increased by a factor of 3 to 4
increased by a factor of 1.1 to 1.5	increased by a factor of more than 4

+2 C global warming



The Challenge of Managing Droughts in the DRB



Drought monitoring & impacts

- Regionally diverse drought monitoring
- No/no agreed thresholds for agricultural drought
- No systematic and regular collection of drought impacts
- Early warning started at a late stage

Drought preparedness & response

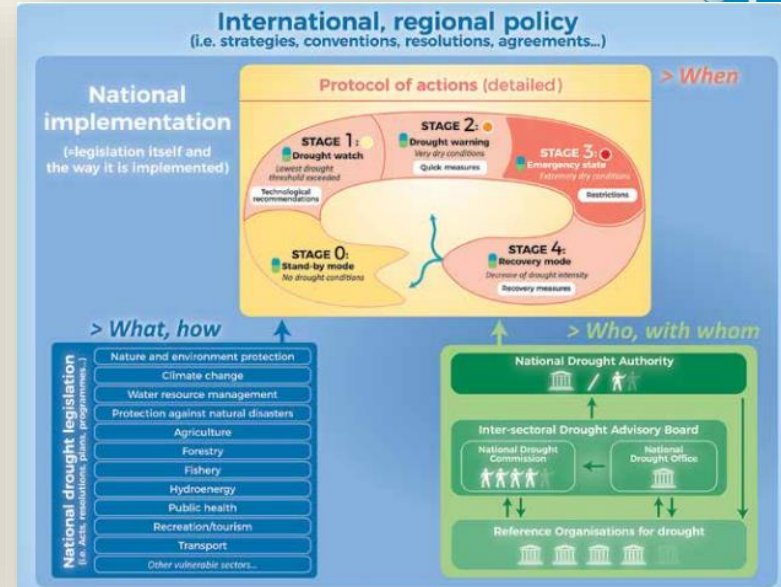
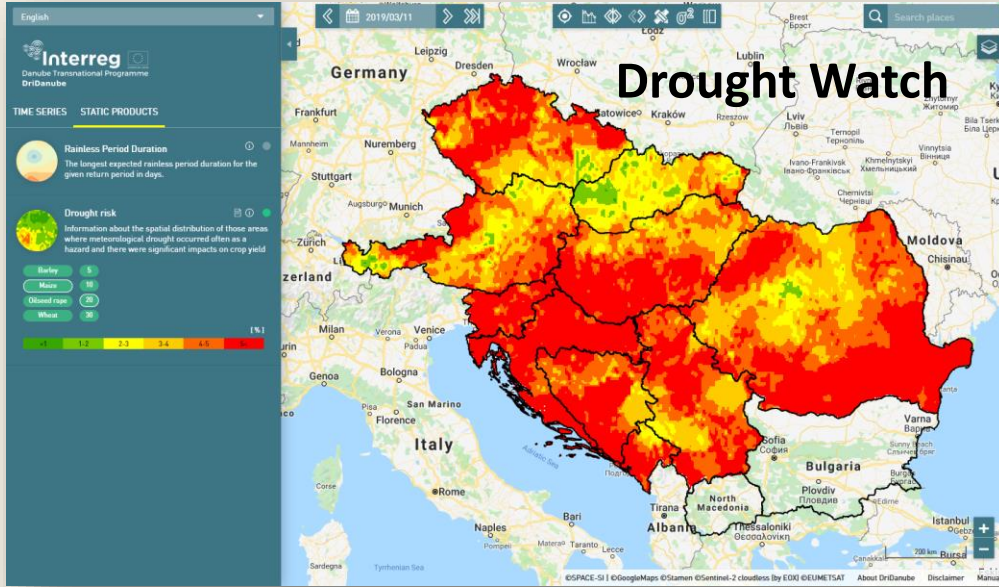
- Lack of cooperation between institutions and across sectors
- No clear inter-institutional responsibility and communication
- Crisis-oriented drought policies
- No formal umbrella document on drought management

	National status	Reviewed drought management aspects		
		National Unit: number of countries out of 10		
		In place and systematic	In place but not systematic	Not in place
Strategic elements in nat. legislation	Drought recognized and/or declared as natural hazard	9	-	1
	National drought management strategy or similar umbrella document on drought exists at governmental level	2	1	7
	National drought management plans prepared, or in preparation	1	1	8
Monitoring and early warning	Drought monitoring in place of public bodies with drought indices	7	3	-
	Defined thresholds for different drought types	1	4	5
	Regular, periodic and on-time informing of public about the level of severity of drought in place (early warning system)	4	4	2
Communication on drought	Information about drought spreads spontaneously through media	10	-	-
	Communication with stakeholders about drought risk, mitigation and damages	-	6	4
	Communication within different level governmental bodies on drought risk, mitigation and damages	1	1	8
Drought response	Systematic adoption of actions to prevent further drought damages	-	2	8
	Regular drought impact collection and/or sectoral damage evaluation in place at public bodies	3	5	2
	Established national drought damage compensation scheme	6	3	1

From crisis-oriented to proactive : DriDanube



Operational Drought Management Model



- Initiate political will and call for **coordinated legal approach**
- Encourage **collaboration** and partnerships
- Ensure **resources and capacity**
- Develop and adopt a **national strategic document** on drought management
- Form a **drought impact inventory** managed by national authorities
- Support knowledge sharing, **awareness raising** and education

The Basin-Wide Response to Climate Change



CLIMATE CHANGE ADAPTATION STRATEGY

Tackling climate change adaptation with a **basin-wide strategy**:

- Guiding how to **integrate adaptation** into overall ICPDR planning
- Relevant actions incorporated in the **DRBMP and DFRMP**
- Supporting transboundary actions and feeding into **national strategies**
- Toolbox of potential **adaptation measures**

Effects of Climate Change reflected in the last management plan:

- Declared as a **Significant Water Management Issue**
- **Assess** possible/additional negative impacts (pressures)
- **Consider** affected **water uses** in the DRB
- **Identify** possible adaptation measures/actions

DANUBE RIVER BASIN MANAGEMENT PLAN

UPDATE 2021



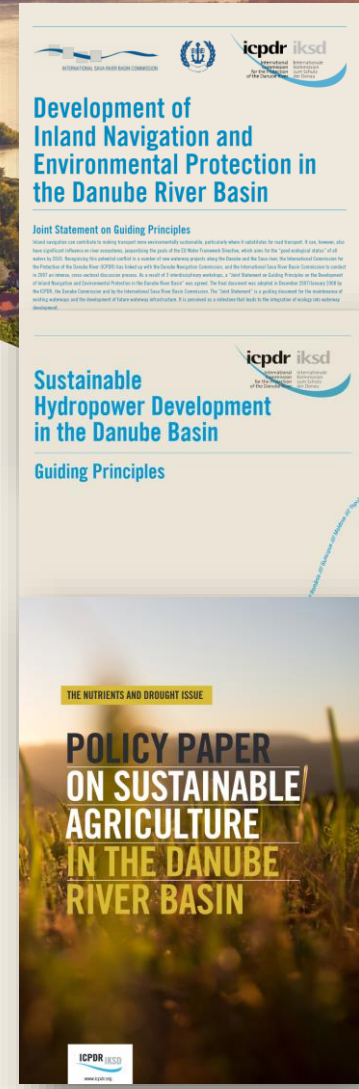
Effects of Climate Change (drought, water scarcity, extreme hydrological phenomena and other impacts)

ICPDR IKSD

International Commission
for the Protection
of the Danube River
Internationale Kommission
zum Schutz der Donau

ICPDR Activities on Droughts

- **Internal ICPDR Workshop** on drought in the DRB:
 - Understand and identify DRB **transboundary** needs
 - Determine the **role of ICPDR** to put forward possible basin-wide actions
- **Sate-of-the-art Overview Report** being developed (in cooperation with the GWP):
 - **Inventory** of policies, management plans, technical tools, databases and measures
 - Recommended **basin-wide actions**
- Potential **follow-up activities** for the near future:
 - Developing a **water balance** model for the DRB (DRP project)
 - Developing basin-wide consistent a **drought impact** database (EU JRC)
 - Promoting **smart agriculture** and mapping irrigation/water use efficiency (FAO)
 - Organizing an international drought **expert workshop** (World Bank)
 - Fostering intersectoral dialogues with **water users**



Thank You for Your Attention!



www.icpdr.org

ICPDR **IKSD**

International Commission
for the Protection
of the Danube River

Internationale Kommission
zum Schutz der Donau