Climate change adaptation towards Water Resilience in the Danube River Basin

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12nd World General Assembly of INBO
Thematic Session 1
8 October 2024
Bordeaux / France

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

Danube River Basin

- 800.000 km²
- 10% of surface Continental Europe
- 19 countries
- 79 million people

- Lifeline for people and countries
- Ecological richness & biodiversity

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Challenges and Basin-Wide Activities

Transnational Monitoring

Climate Change Strategy

Greener Navigation

Tailings Management

Stakeholder Involvement/
Public Participation

Joint Danube Survey

Accident Warning System

Sustainable Hydropower

Sustainable Agriculture

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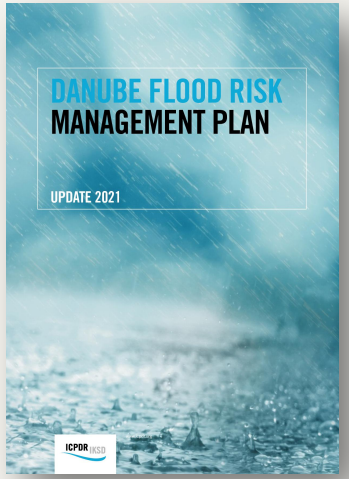
Basin-Wide Management Approaches and Tools

2021 / 3rd Edition



2021 / 2nd Edition

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Danube Declaration 2022

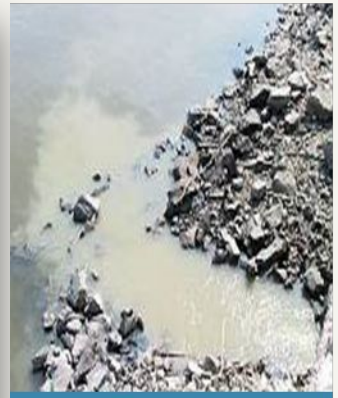
On 8 February 2022, in Vienna, the ICPDR convened its 4th Ministerial Meeting of Ministers and high-level representatives responsible for water management from the 14 Danube River Basin countries (**Austria, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Montenegro, the Republic of Moldova, Romania, Serbia, Slovakia, Slovenia, Ukraine**) as well as the **European Commission**.

This Ministerial Meeting endorsed two essential plans for the Danube: the updated **Danube River Basin Management** and **Danube Flood Risk Management Plans**. The meeting also adopted the 2022 Danube Declaration, which shows the highest level of commitment for the ICPDR concerning its future work to address the Danube basin's shared challenges.

Danube Declaration – Let us explain!

Every six years, a new and updated 'Danube Declaration' is signed and adopted by the ICPDR countries, updating, and extending the objectives and direction of travel for the Danube River Basin (DRB). It's a vital part of strengthening the ICPDR's goals for improving and maintaining the DRB.

5 Significant Water Management Issues



Organic Pollution

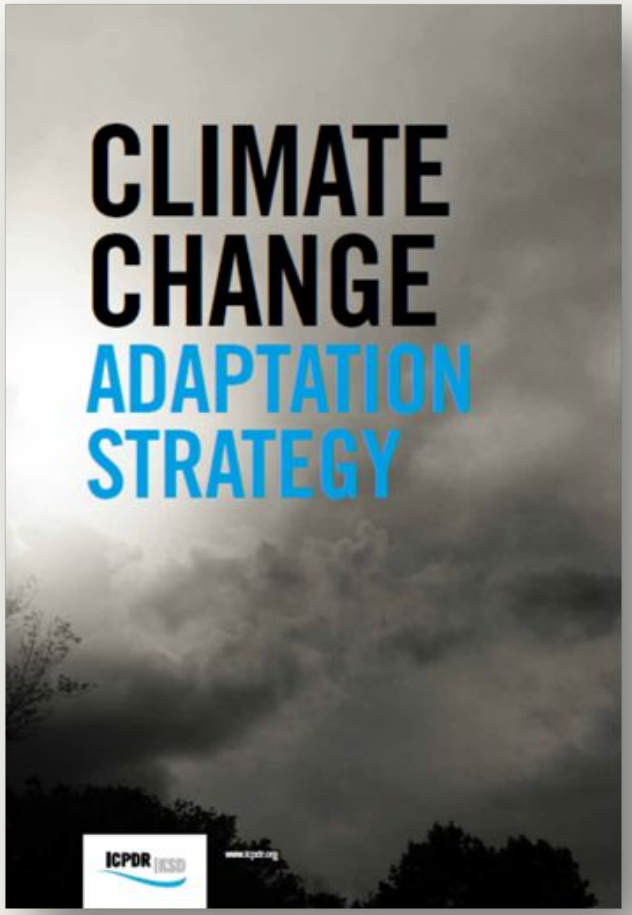
Nutrient Pollution

Hazardous Subst Pollution

Hydromorphological Alterations

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

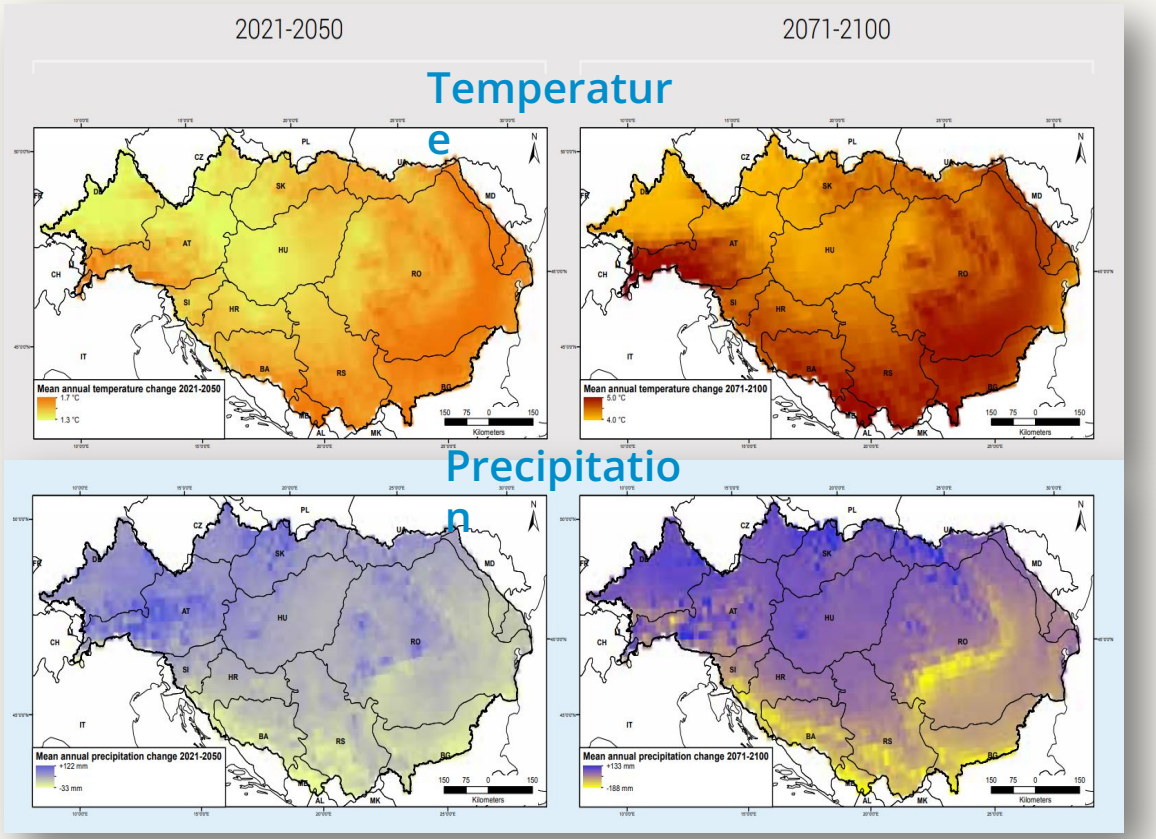
Climate Change as a Challenge in the Danube Basin



Basin-wide strategy to tackle Climate Change in the DRB:

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

Climate Change Scenarios for the Danube River Basin



RCP 8.5 of EURO-CORDEX (as of 2018)

Unfavorable future climate patterns

- Dramatic **temperature increase**
- Strong **precipitation gradient** from NW/SE
- **Increased intensity/alteration** of extremes
- **Increased peak river flows** by 10-30% for the upper and middle Danube
- **Increased drought duration, frequency & magnitude** during summer months

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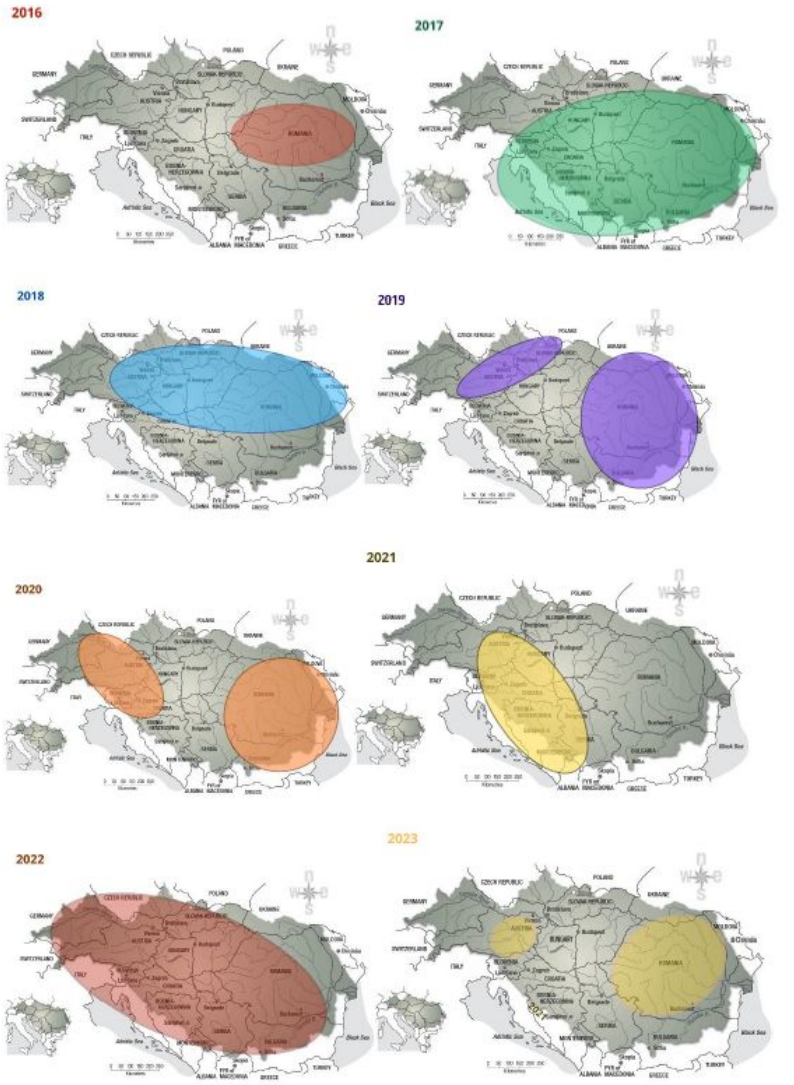
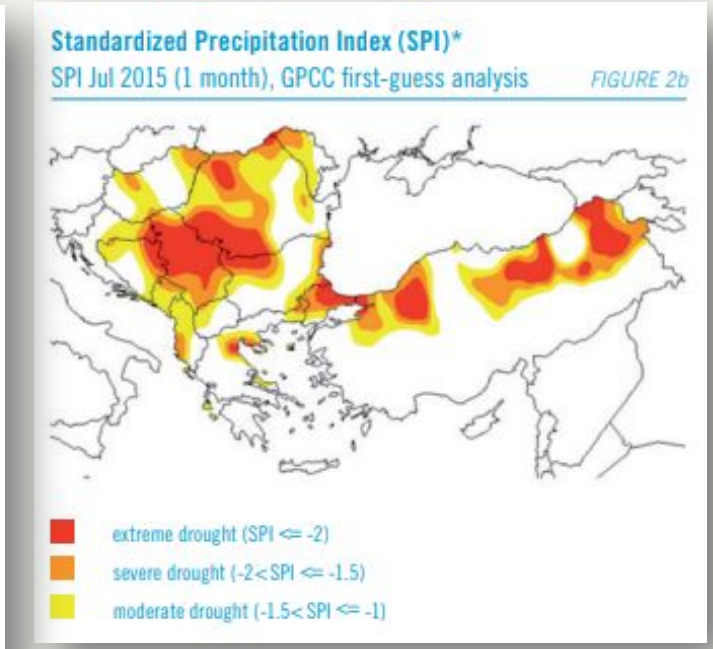
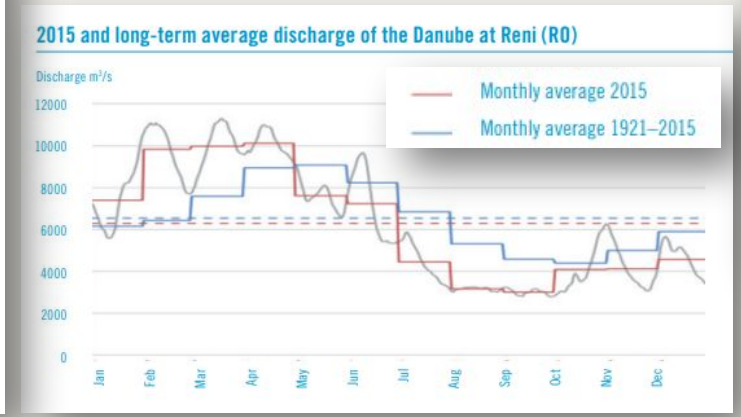
Drought events in the Danube River Basin

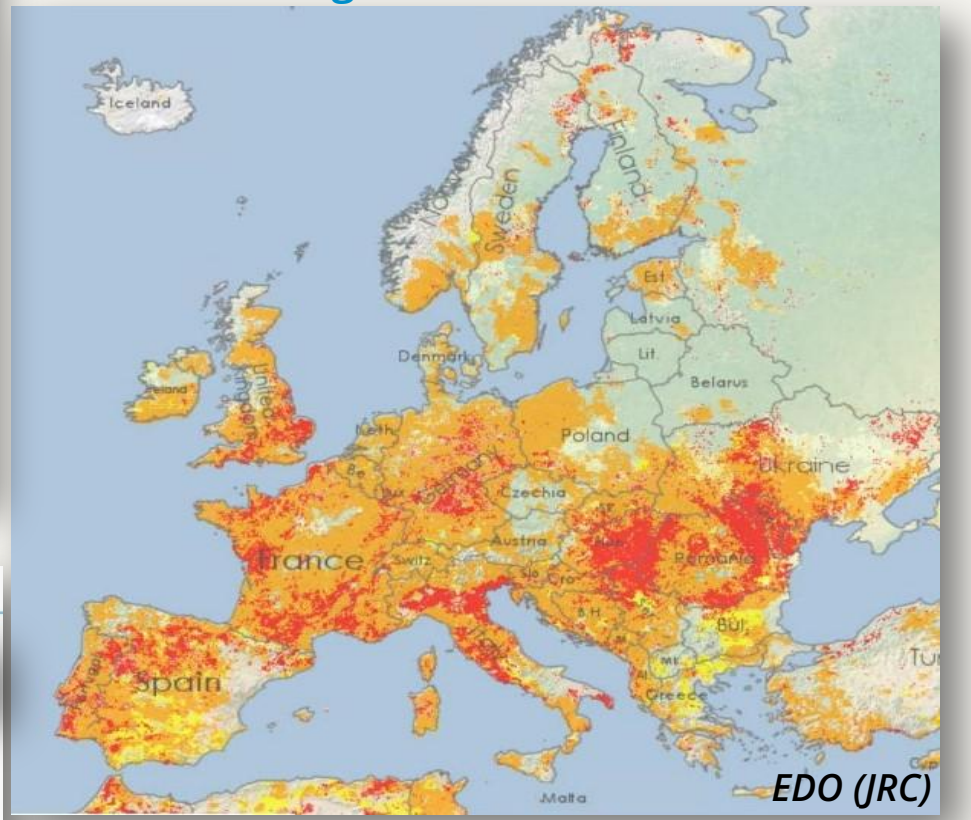




Drought in 2015



Combined Drought Indicator for August 2022

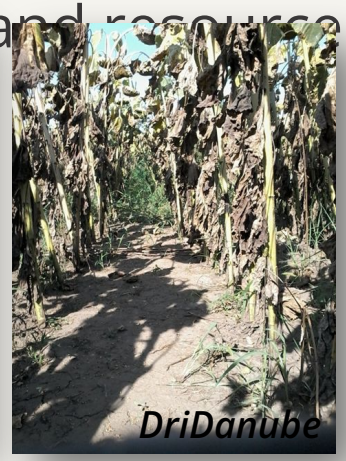


Watch	Warning	Alert	Full recovery	Temporary soil moisture recovery	Temporary vegetation recovery	No data

Drought Impacts in the Danube River Basin

Drought consequences

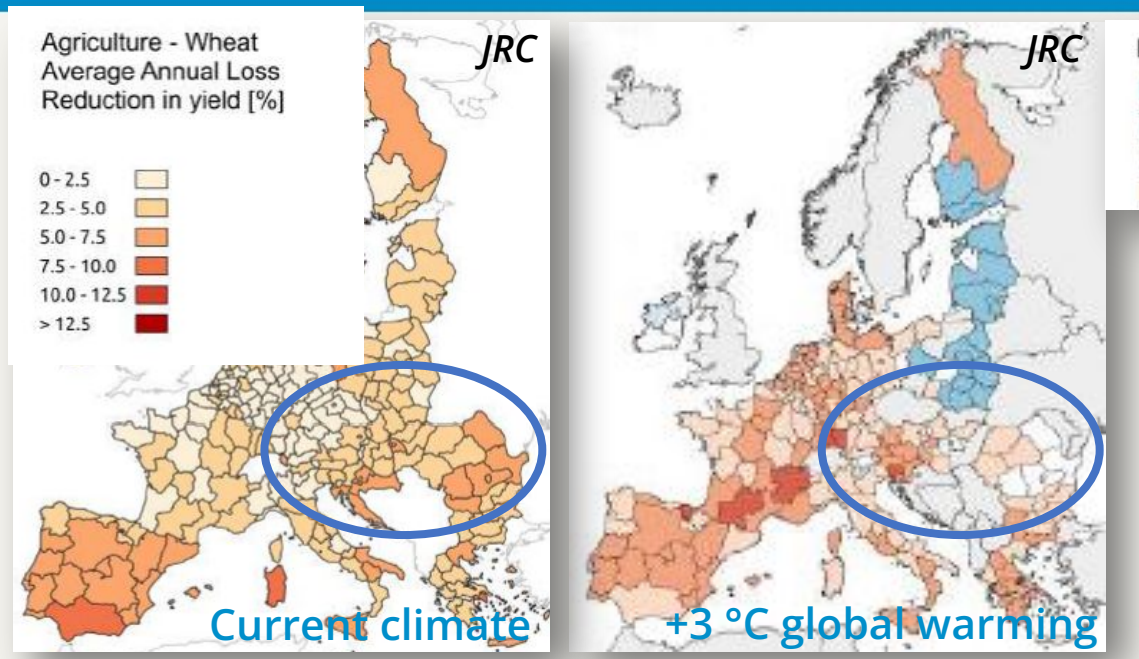
- Impacts on aquatic and terrestrial **ecosystems**
- Impacts on **water uses**, e.g.
  - Lack of precipitation - reduced summer crop yield
  - Low water levels - impacts on navigation
  - Reduced stored water volume - impacts on hydropower
- [illegible] and resource overexploitation



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

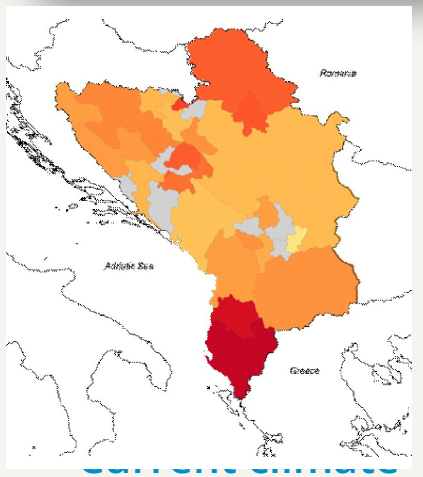
DriDanube

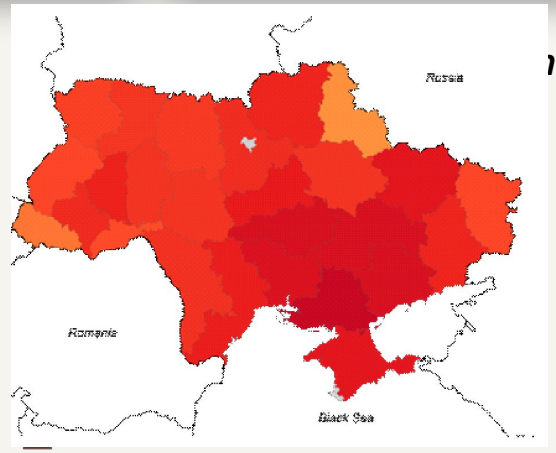
Drought Risk in the Danube River Basin

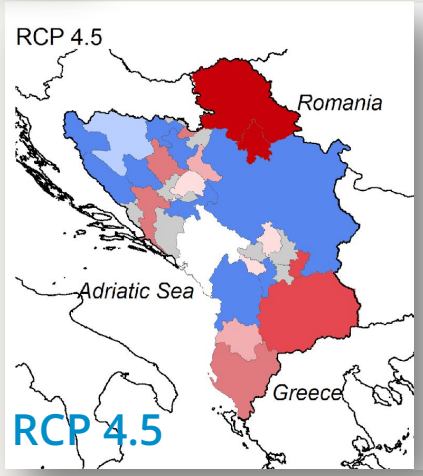


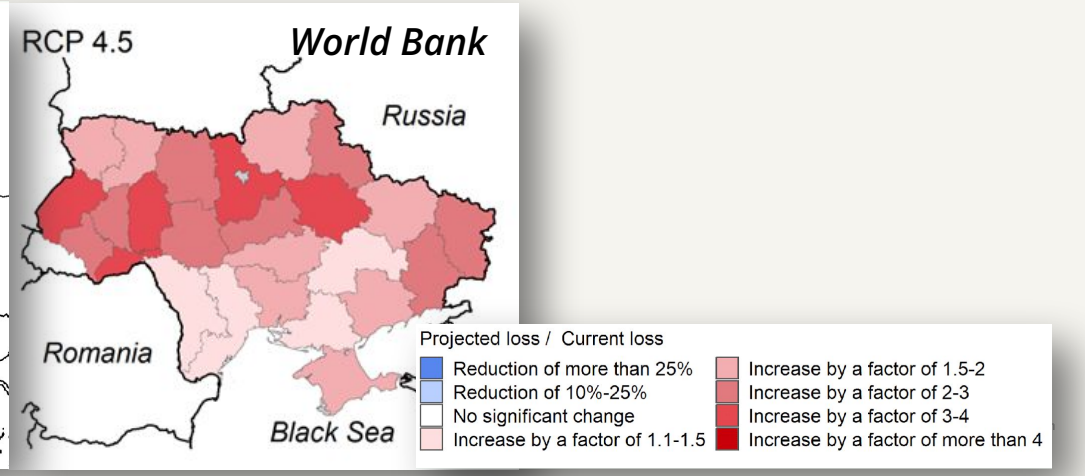
Annual losses in the DRB

- **Wheat yield:** up to 10%
- **Hydropower:** up to 15%
- **Water supply:** up to 5%









The Challenge of Managing Droughts in the Danube Basin

Drought monitoring & impacts

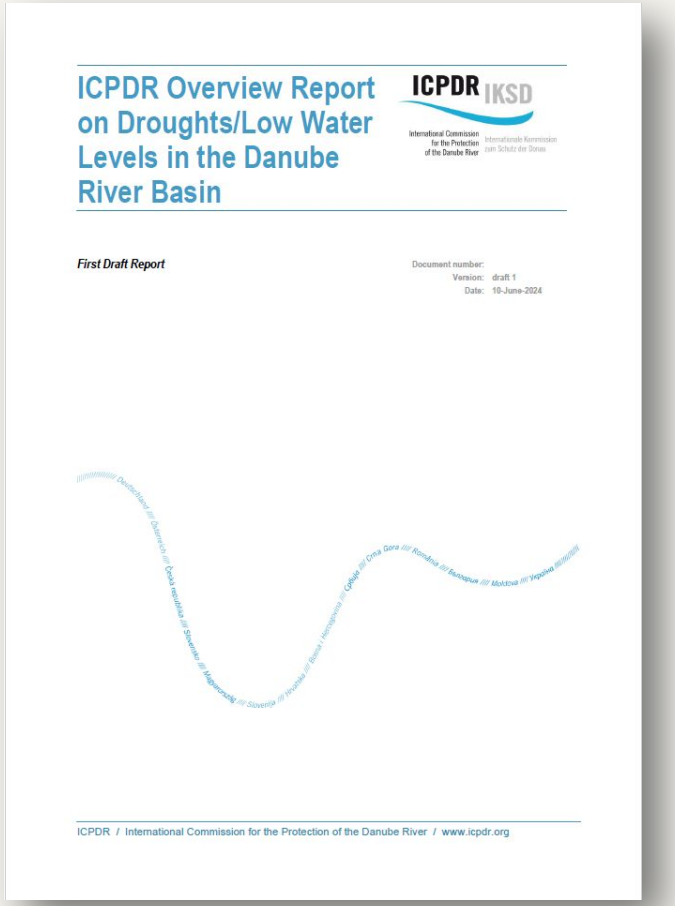
- Regionally **diverse drought monitoring**
- **No/no agreed thresholds** for agricultural drought
- **No systematic** and regular collection of impacts
- Early warning started at a **late stage**

Drought preparedness & response

- **Lack of cooperation** between institutions and sectors
- **No clear inter-institutional** responsibilities
- **Crisis-oriented** drought policies
- **No strategic document** on drought management

Reviewed drought management as Management aspects		National status Not in place In place but not systematic In place and systematic	National Unit: number of countries out of 10		
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

Basin-Wide Response and ICPDR Actions



ICPDR Workshop on Droughts / June 2023

- Drought recognized as an important DRB topic

ICPDR Drought Overview Report for the Danube Basin

- Policies, management plans, technical tools, databases and measures
- List of suggested actions to be tackled in the Danube Basin in future

Water Balance Project

- Setting up a basin-wide hydrological model

Interreg Danube Region
Co-funded by the European Union
Danube Water Balance

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Thank you very much for your attention!

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