

Climate Change & Drought in the Danube River Basin: Transboundary Challenge and Coordinated Activities towards Water Resilience

Birgit VOGEL
ICPDR Executive Secretary

Drought Risk and Drought Risk Management in
Romania and in Europe
30-31 October 2023
Bucharest / Romania

The Danube River Basin



- ✓ 800.000 km²
- ✓ 10% of surface Continental Europe
- ✓ 19 countries
- ✓ 79 million people
- ✓ Role model in transboundary cooperation



Cooperation Framework / Danube as Connector



Danube River Protection Convention

- signed 29 June 1994, Sofia (Bulgaria)
- enforced in October 1998

1998/99 ICPDR established / ICPDR Secretariat in place

15 Contracting Parties

High diversity:

9 EU Member States; 5 Candidate States; 24 Observers



Protection of water & ecological resources



Sustainable & equitable use of water



Reduce nutrients & hazardous substances



Manage floods & ice hazards

Challenges and Activities

Joint identification and tackling / Sharing Information



Künzelmann, UFZ



ICPDR/Mello



Transnational Monitoring

Climate Change Strategy

Greener Navigation

Tailings Management



Stakeholder Involvement/
Public Participation



Künzelmann, UFZ



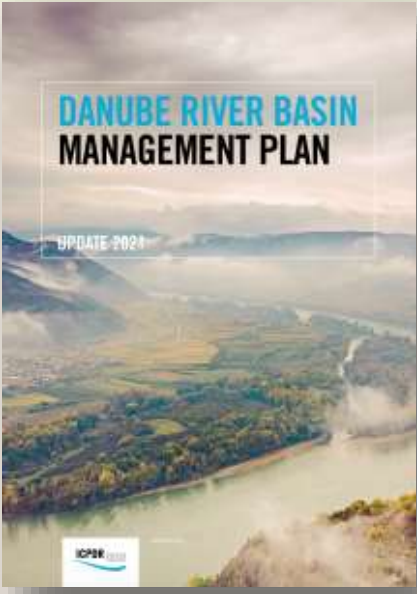
Joint Danube Survey

Accident Warning System

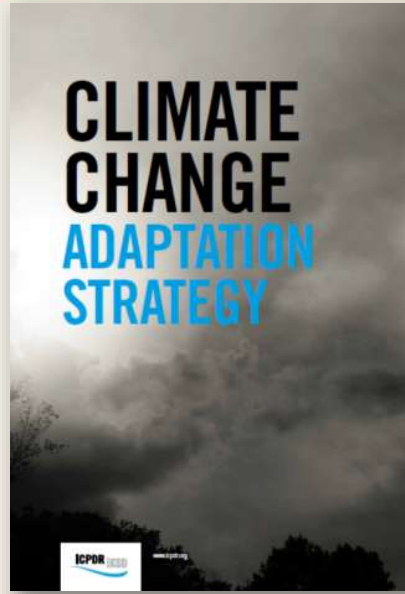
Sustainable Hydropower

Sustainable Agriculture

Transforming National RBM Approaches into Basin-Wide Ones



2021 / 3rd Edition



2018



2021 / 2nd Edition

Drought/Water Resilience - emerging topics



JRC (2022), Drought in Europe August 2022

Commitments for Action - Many achievements

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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 cooperation 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 implementing the ICPDR's goals for improving and maintaining the DRB.

Danube RBM Plan / Significant Water Management Issues



Organic
Pollution



Nutrient
Pollution



Hazardous Substances
Pollution



Hydromorphological
Alterations



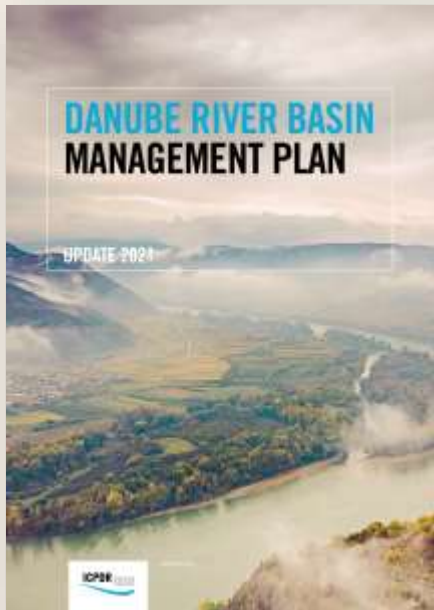
Effects of Climate
Change (drought,
water scarcity,
extreme hydrological
phenomena and other
impacts)



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Climate Change / The Basin-Wide Dimension



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

SWMI, Effects of Climate Change reflected in plans:

- **Respond** to increasing effects from CC
- **Assess** possible/additional negative impacts from CC on Surface waters and groundwater
- **Identify** possible adaptation measures/actions
- **Consider** affected **water uses** in the DRB (including infrastructure and morphological measures)
- Fostering **Stakeholder** involvement

Transforming Climate Change Effects towards Water Resilience

Current and future transformation tasks



CLIMATE CHANGE ADAPTATION STRATEGY

ICPDR is tackling CC adaptation with a strategy

- **Guides** how to integrate CC adaptation into overall ICPDR planning & management processes
- **Supports action** in transboundary context: **Tool-box of measures**
- **Influences and feeds into** national strategies and actions

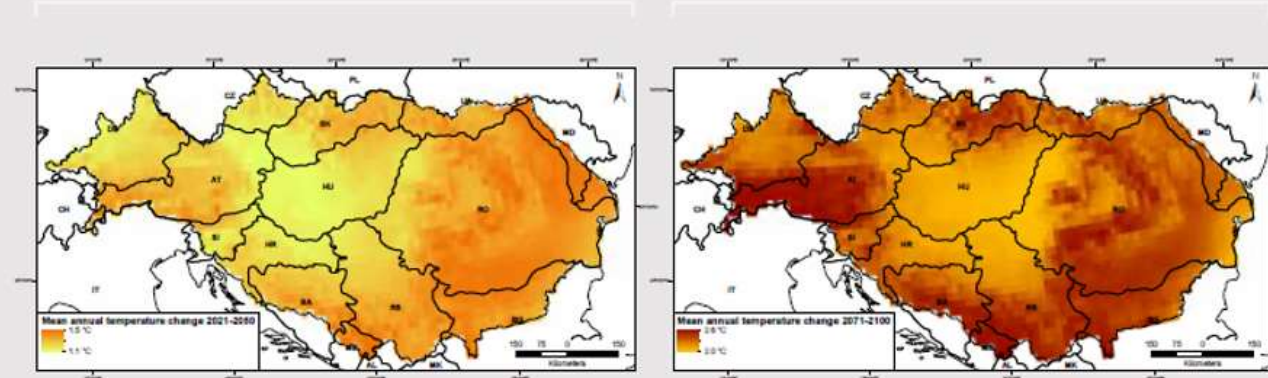
Transforming strategy into joint actions
in the DRB

Climate Change Scenarios in the DRB

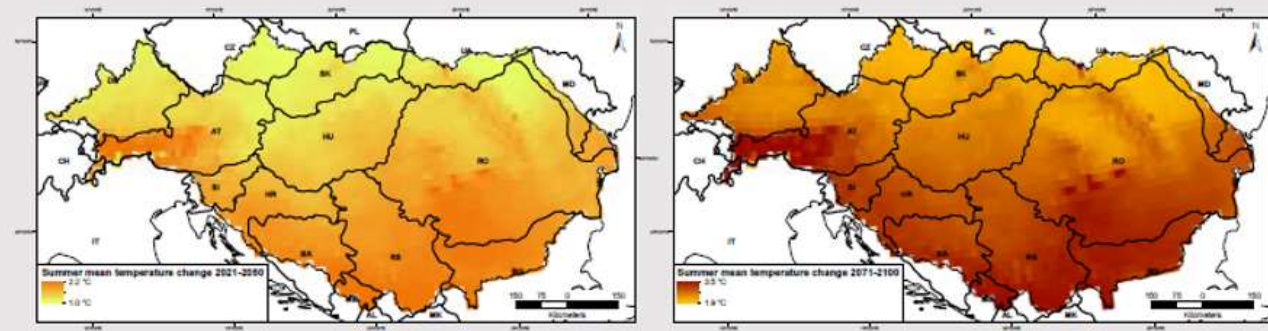
Changes for annual, summer mean and winter mean temperatures according to the Representative Concentration Pathways 4.5 of the EURO-CORDEX ensemble results (*Status 2018*)

2021-2050

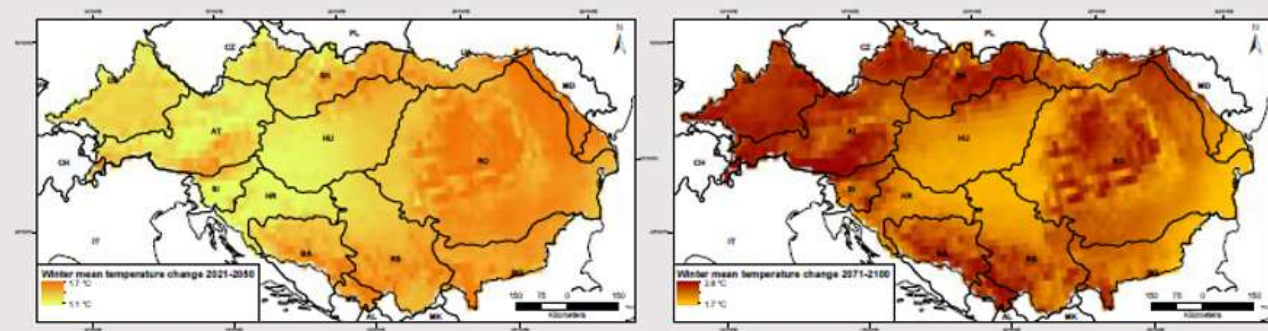
2071-2100



Annual mean temperature changes



Summer mean temperature changes

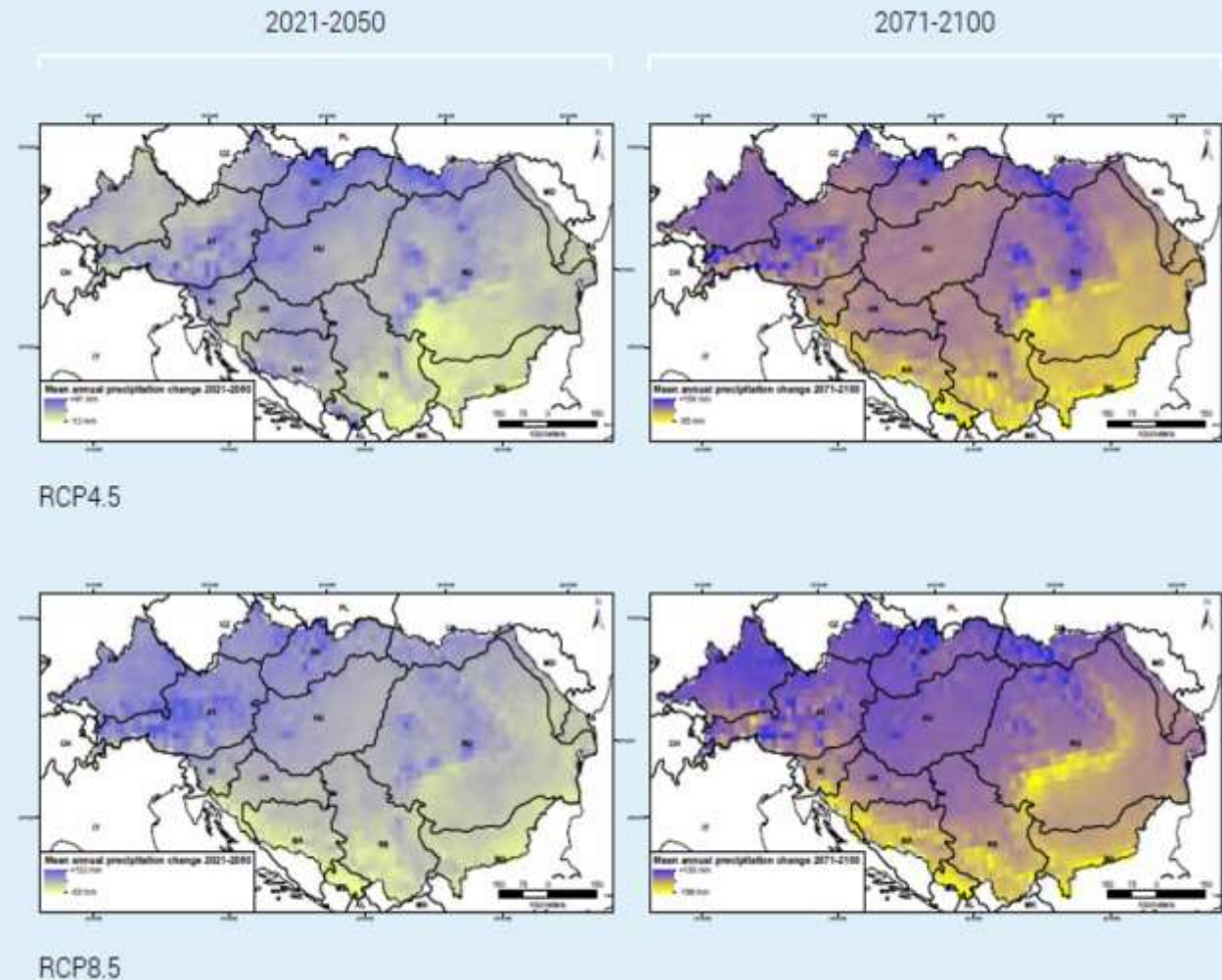


Winter mean temperature changes

Climate Change Scenarios in the DRB



Changes of **mean annual precipitation** for periods 2021-2050 and 2071-2100 according to the Representative Concentration Pathways 4.5 and 8.5 of the EURO-CORDEX ensemble results (*Status 2018*)



Projected Climate Change Impacts in DRB

| Sector | UDRB Upper Danube River Basin | MDRB Middle Danube River Basin | LDRB Lower Danube River Basin | DRB Danube River Basin |
|--|-------------------------------------|--------------------------------------|-------------------------------------|------------------------------|
| Changes in droughts and low/flows | | | | |
| Drought | | | | |
| Low flow | | | | |
| Changes in floods | | | | |
| Floods | | | | |
| Changes in agriculture | | | | |
| Growing season | | | | |
| Damage from extreme events | | | | |
| Reliable production | | | | |
| Water demand | | | | |
| Invasive species/pests | | | | |
| New species/shift | | | | |
| Changes in forestry | | | | |
| Growing season | | | | |
| Forest fires | | | | |
| Structure and stability | | | | |
| New species/shift | | | | |

Legend

- Beneficial change
- Adverse change
- Change neither beneficial nor adverse/small change

| | | | | | | |
|--------------------------------------|--------------------------------------|---|---|--|--------------------|-----------------------------|
| | | | | | | |
| Increase throughout most of a region | Decrease throughout most of a region | Increase in substantial parts of a region | Decrease in substantial parts of a region | Increase as well as decrease in a region | Only small changes | No information (empty cell) |

Projected Climate Change Impacts

| Sector | UDRB Upper Danube River Basin | MDRB Middle Danube River Basin | LDRB Lower Danube River Basin | DRB Danube River Basin |
|---|-------------------------------------|--------------------------------------|-------------------------------------|------------------------------|
| Changes in biodiversity/ecosystems | | | | |
| Number of native species | | | | |
| Number of invasive species | | | | |
| Water temperature | | | | |
| Shift of habitats | | | | |
| Vulnerability to changes in discharge | | | | |

Changes in water-related energy production

| | | | | |
|-------------------------------|--|--|--|--|
| Hydropower potential | | | | |
| Thermal electricity potential | | | | |

Changes in navigation

| | | | | |
|---------------------|--|--|--|--|
| Ice cover | | | | |
| Low flow conditions | | | | |

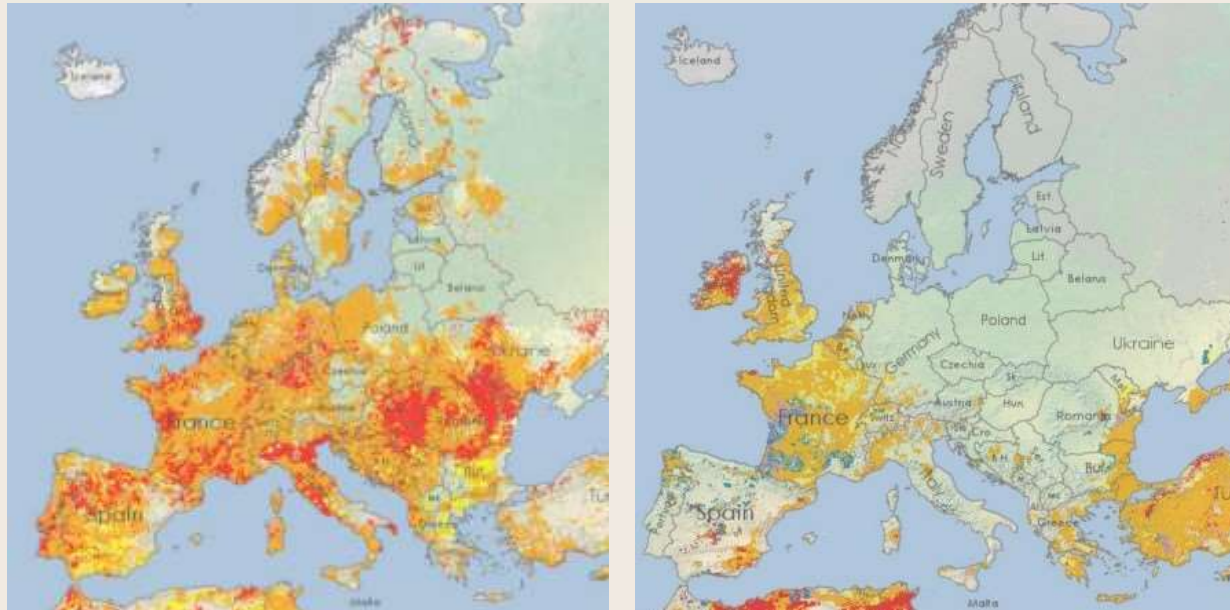
Legend

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Climate Change & Drought in the DRB

Combined Drought Indicator (combination of precipitation, soil moisture and vegetation conditions) for August 2022 (left) and March 2023 (right).



EDO (JRC) 2022/2023 Combined Drought Indicator

Drought consequences:

- Impacts on ecosystems / aquatic and terrestrial
- Impacts on water uses, e.g.
 - Reduced stored water volume - impacts on hydropower
 - Low water levels - impacts on navigation
 - Reduced summer crops' yield

Watch

Warning

Alert

Full recovery

Temporary soil
moisture recovery

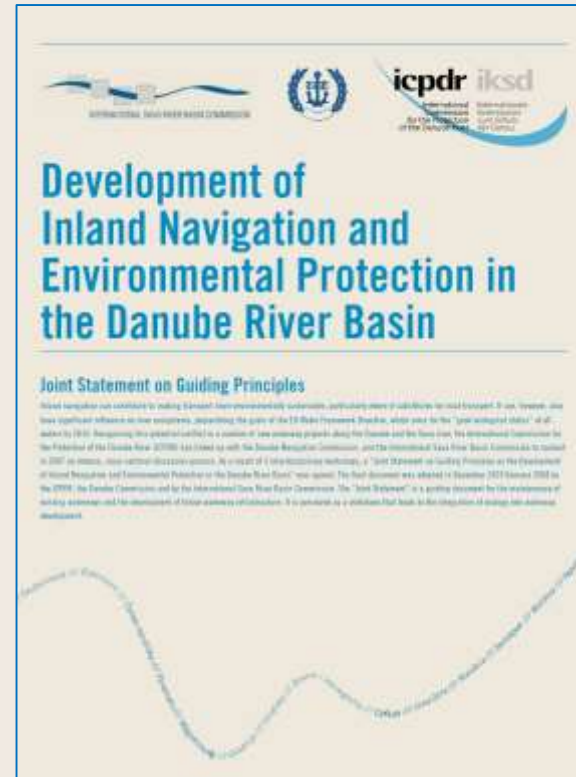
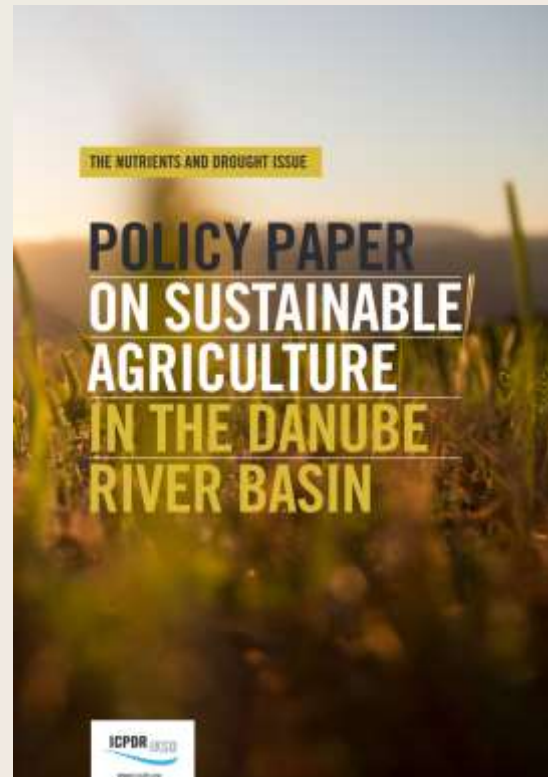
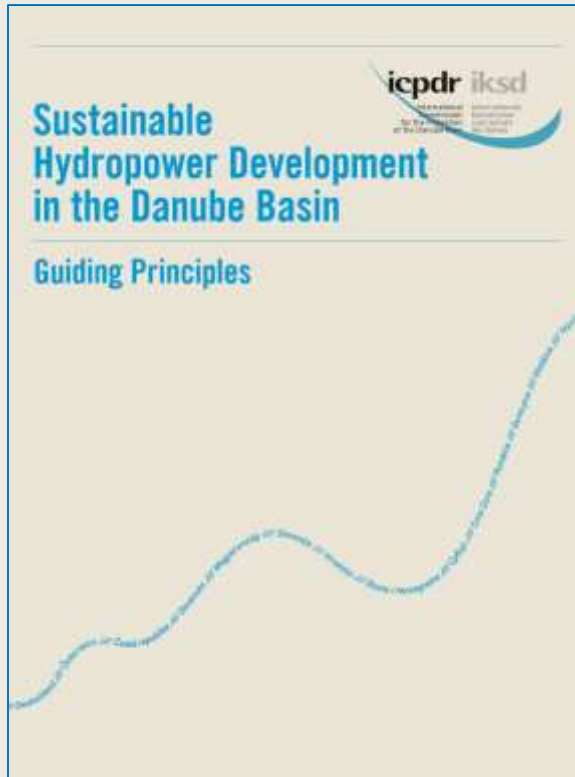
Temporary fAPAR
recovery moisture
recovery

No data

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Drought & Water Users



ICPDR Activities on Drought

- Discussed at 25th Ordinary Meeting in December 2022 and 21st Standing Working Group (15 June 2023)
- **Drought and low water is considered as important** for further actions by the ICPDR
- **Internal ICPDR Workshop on Drought and Low Water Level in the DRB**
 - 16 June 2023 in Belgrade/Serbia
 - Understand and identify DRB transboundary needs regarding droughts/low water levels to put forward possible actions on the ICPDR level to tackle these needs
 - Determine the role of ICPDR

ICPDR Workshop on Drought



Outcomes of the workshop

- ICPDR: **responsible body** for tackling drought on the basin-wide level
- Identify **priorities for the basin-wide level** focusing on those with a added value for the ICPDR with realistic objectives
- Tackle priorities with a **fact-based and stepwise approach**
- **Integrated approach** bringing together relevant stakeholders, sectors and experts ensuring inter-sectoral cooperation on drought
- **Awareness raising** to inform both the professionals and the public
- Assisting countries with discovering and promoting **drought monitoring and forecasting systems**
- Develop an **overview report** on approaches, activities and policies

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Development of a Drought Overview Report



- Initial overview addressing related **approaches, activities and policies** in the ICPDR countries
- A concise/tailor made document outlining **key aspects/challenges, priorities** and potential activities/solutions
- Considering the **drought related work** undertaken within the EC's CIS process and by the WB to avoid duplication of work
- Information to be **collected from the ICPDR countries**
- Result: **three to four basin wide activities** regarding droughts outlining a fact-based and stepwise approach to tackle them
- **Overview Report available in June 2024** and drafts as interim steps

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Thank You For Your Attention!



www.icpdr.org

birgit.vogel@icpdr.org

zoran.major@icpdr.org



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