Global Workshop on Conjunctive Management of Surface Water and Groundwater:
National to Transboundary Level

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Definition and Benefits of Conjunctive Water Management

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Conjunctive Water Management as a tool of Integrated Water Resources Management

Integrated Water <u>Resources</u> Management

- All users, stakeholders and sectors
- All water sources at basin level (including surface water and groundwater)
- 4 dimensions (SDG indicator 6.5.1):
  - Enabling environment;
  - Institutions and participation;
  - Management instruments;
  - Financing

Conjunctive Water <u>Resources</u> Management

- subset of actions, activities and techniques comprised in IWRM

Conjunctive Water Management *is an approach to water resources management in which* ***surface water, groundwater and other components of the water cycle are considered as one single resource****, and therefore are managed in closest possible coordination, in order to maximize overall benefits from water at the short and at the long term.*

Conjunctive Water Management in practice: Activities and Techniques

Planning level

Incorporating all water components / resources

- Exploring and analysing connectivities and exchanges of water
- Preventing 'double counting'
- Identifying promising opportunities
- Identifying hazards of harmful interaction

Implementation in the field

Optimal selection of source of supply

- Conjunctive use of surface water and groundwater

Resource augmentation

- Managed aquifer recharge (MAR)
- Watershed management
- *Desalination*
- *Recycling treated wastewater*
- *Improvement of irrigation efficiency*

Environmental control

- Restricting ground-water pumping to control surface water environmental flows
- Groundwater level control to prevent flooding
- *Managing wastewater*

Water circularity and interactions

Additional approaches

Conjunctive Water Management in practice

Planning level	Implementation in the field		
Incorporating all water components	**Optimal selection of source of supply**	**Resource augmentation**	**Environmental control**
• Exploring and analysing connectivities and exchanges of water • Preventing 'double counting' • Identifying promising opportunities • Identifying hazards of harmful interaction	• Conjunctive use of surface water and groundwater	• Managed aquifer recharge (MAR) • Watershed management • *Desalination* • *Recycling treated wastewater* • *Improvement of irrigation efficiency*	• Restricting ground-water pumping to control surface water environmental flows • Groundwater level control to prevent flooding • *Managing waste-water*

Better data and governance, investments needed in:

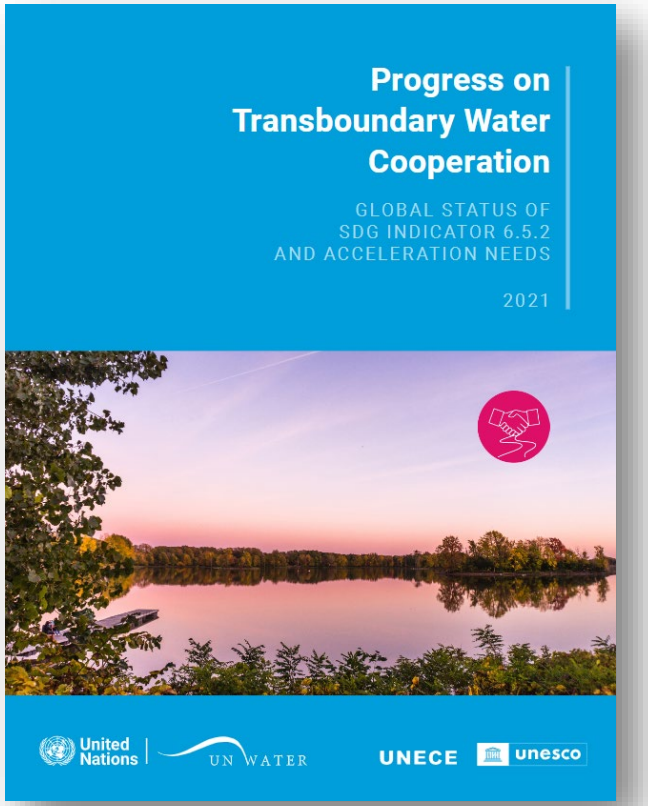
- **Groundwater systems / aquifers and interactions with surface water and ecosystems**
- **Including at transboundary level in transboundary river and lake basins (310) and aquifers (468)**

SDG indicator 6.5.2 promotes Conjunctive Water Management

Indicator 6.5.2: Proportion of transboundary basin area **(rivers, lakes and aquifers)** with **an operational arrangement** for water cooperation (UNECE and UNESCO co-custodian agencies)

What is an **'operational'** arrangement?

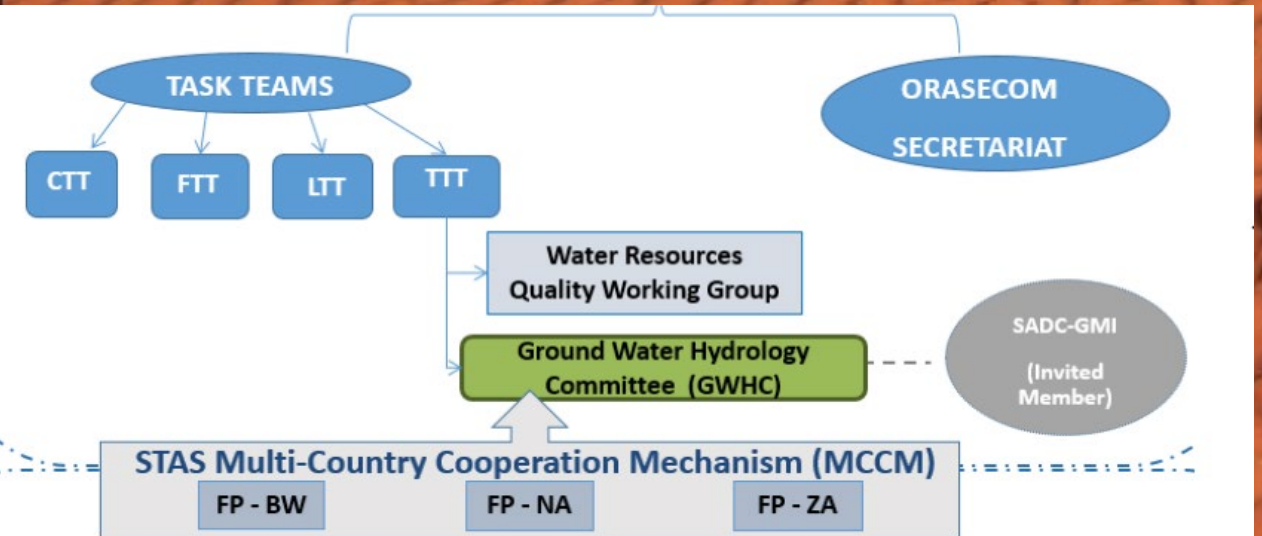
- Treaty, convention, agreement or other formal arrangement
  - ❖ Explicitly mentions "groundwater" in the text
- Joint body for transboundary water cooperation (RBOs)
  - ❖ With a subsidiary body / working group on specific topic, e.g. Groundwater Task Force, Hydrogeology?
- Annual meetings
- Annual exchange of data and information
  - ❖ Including on groundwater and aquifers?
- Joint/coordinated water management plan / joint objectives
  - ❖ Where groundwater is mentioned?



Example of integration of an aquifer into the work of river basin organization

Stampriet Transboundary Aquifer System (STAS)
(Botswana, Namibia, South Africa)

- Establishment of the STAS Multi-Country Cooperation Mechanism (STAS-MCCM) within the Groundwater Hydrology Committee of the Orange-Senqu River Commission (ORASECOM), which facilitates the application of IWRM
- Indicator 6.5.2 report from South Africa examines other examples of integration of shared aquifers into existing river basin organizations



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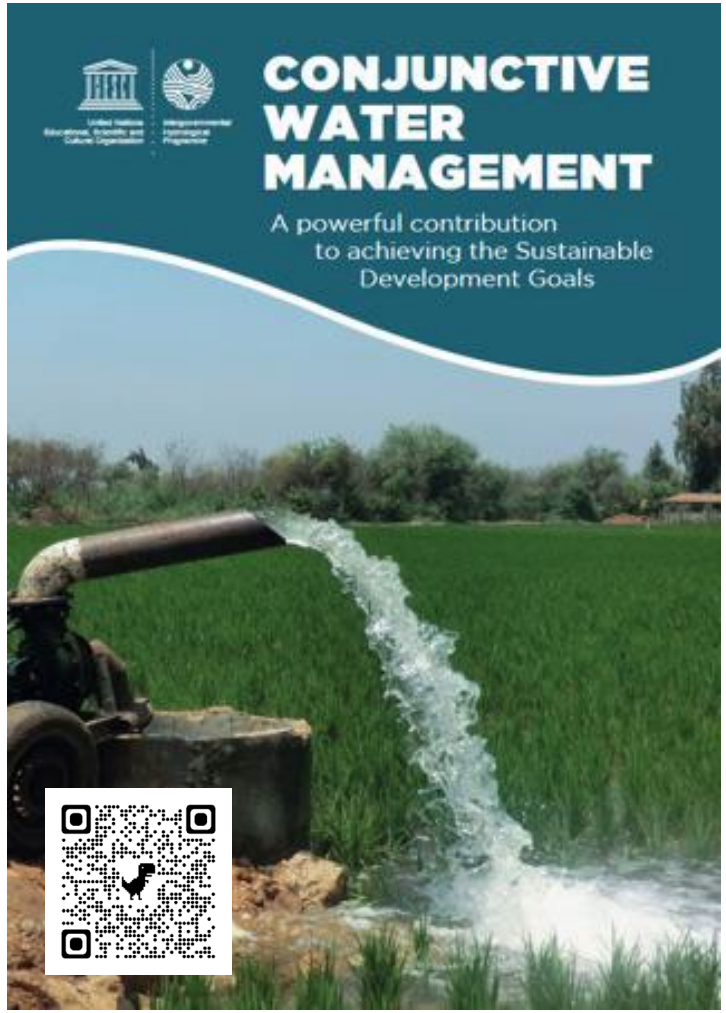
UNESCO expertise on groundwater and contribution to Conjunctive Water Management



Benefits:

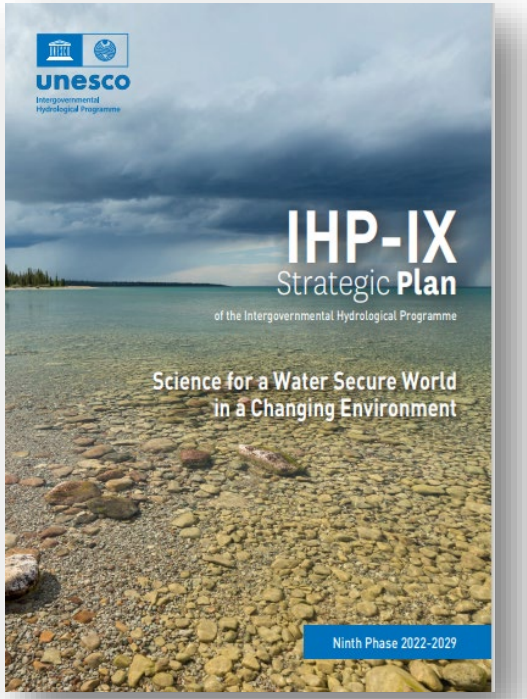
- Optimization of the resources available for use and lower risk of water shortages
- Water resources sustainability
- Environmental, economic and social benefits (SDGs)
- Elimination or reduction of planning flaws and errors (double-counting)
- Water security (creating reliable sources of drinking water)
- Contribution to the water circularity
- Reducing the potential for water associated conflict

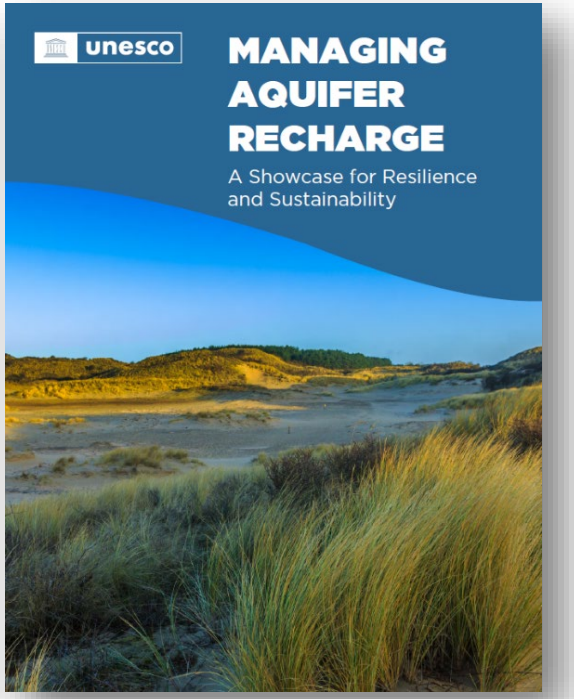
Investments needed in groundwater infrastructure to support conjunctive management

- **Groundwater technology** helps overcome pollution of groundwater, lack of water storage, saltwater intrusion
- **Experience sharing** and **raising awareness on groundwater technology** enhance resilience to climate change
- **Major barriers also** remain lack of awareness on the potential of groundwater technologies, lack of human capacities and governance and legal mechanisms for technology adoption and operation

Groundwater Monitoring

"We Cannot Manage What We Don't See or Measure": Improving Monitoring for Informed Groundwater Management





Thank you!

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