SDC Network RésEAU

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Learning Journey on Groundwater

Welcome to the e-workshop hosted by the SDC water network RésEAU

Launching Event, 21 November 2024

We are starting soon ...

Technical housekeeping

Your microphone is currently off.
If you want to speak, click on the button at the bottom of the screen **to raise your hand.**
Thank you for opening the mic only upon invitation.

If you have comments or questions during presentations, please post them in the chat, or wait for the Q&A moment to unmute yourself.

If you can't hear or see: leave and rejoin the meeting after closing other programs and/or contact our technical administrator by e-mail to receive again the link: delphine.magara@skat.ch

Parts of this event are being recorded and made available to the online knowledge platform RésEAU.

Agenda

1. Welcome and setting the stage for the Learning Journey
2. Keynote by Karen Villholth on ‚Global Groundwater Challenges and Solutions’
3. Map of past and ongoing groundwater projects by SDC
4. Breakout group discussions
5. Closing and next steps

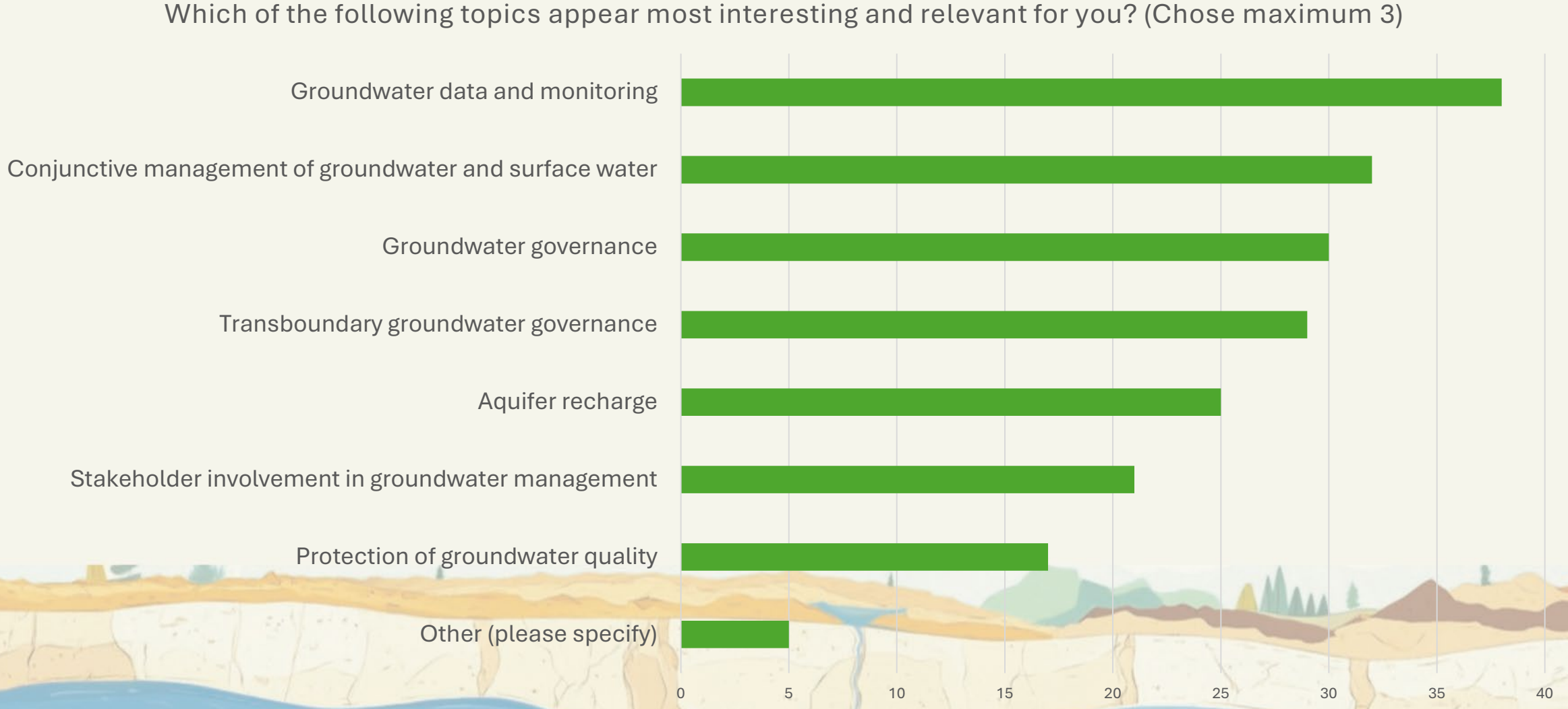
Welcome / intention of the Learning Journey

- Groundwater for a water secure future is increasingly important in many partner countries & regions of Swiss International Cooperation
- Interest in SDC and among RésEAU members for groundwater is on the rise – need to take more allies on board
- Why a multi-regional Learning Journey on groundwater:
  - to connect RésEAU members interested in groundwater and provide a space for exchanging and learning from past and current experiences
  - to widen the interest about groundwater and sensitize (SDC internal) decision makers and programme officers
  - to help create a Community of Practice (CoP) if there is sufficient interest

Potential reasons to deal with groundwater

- Groundwater is invisible and thus largely unknown and/or neglected by (Swiss) development cooperation
- Groundwater is heavily dependent on contextual characteristics and doesn't allow for a 'one size fits all' comprehension: why and how?
  - it has region-specific challenges and requires respective solutions
  - it shows extensive spatial variations in natural conditions such as geology, geomorphology and hydrology
  - it is affected by specific human interventions as well as political, cultural and socio-economic realities
  - => to achieve a sustainable water (cycle) management it is critical to understand social transformations and societal drivers and governance challenges

Topical survey among RésEAU members



Roadmap Learning Journey on Groundwater

Community of Practice on Groundwater

2025+

Regional in-person event(s) (*support from RésEAU based on demand*)

2025/2026

Series 2 of e-workshops (*provided by RésEAU based on demand*)

September-December 2025

E-workshop 3: transboundary groundwater management

April 2025

E-workshop 2: groundwater data & monitoring

March 2025

E-workshop 1 : groundwater governance & conjunctive management of surface and groundwater

February 2025

Launching Event

21.11.2024

Keynote

Global Groundwater Challenges and Solutions

Dr. Karen Villholth
Director Water Cycle Innovation (Pty) Ltd.

Launch event

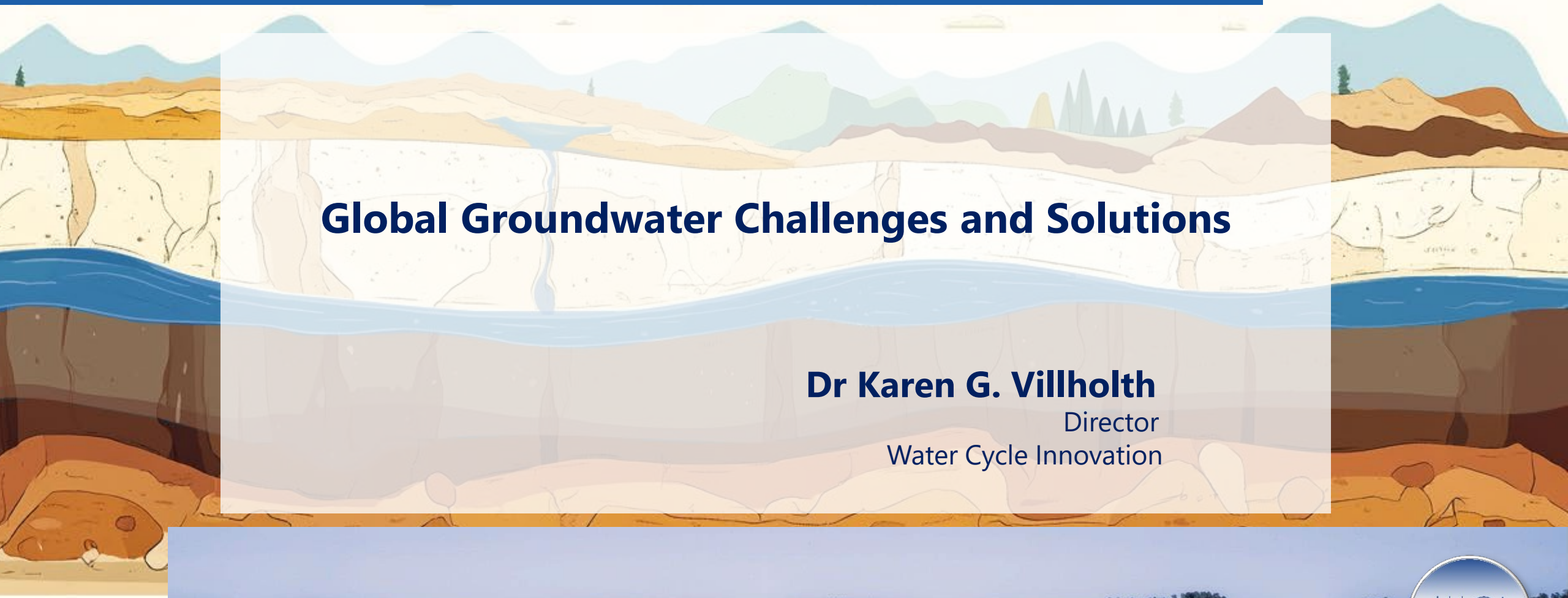
Learning Journey on Groundwater

Keynote (online)
20 Oct 2024

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

RésEAU



Global Groundwater Challenges and Solutions

Dr Karen G. Villholth
Director
Water Cycle Innovation

Outline

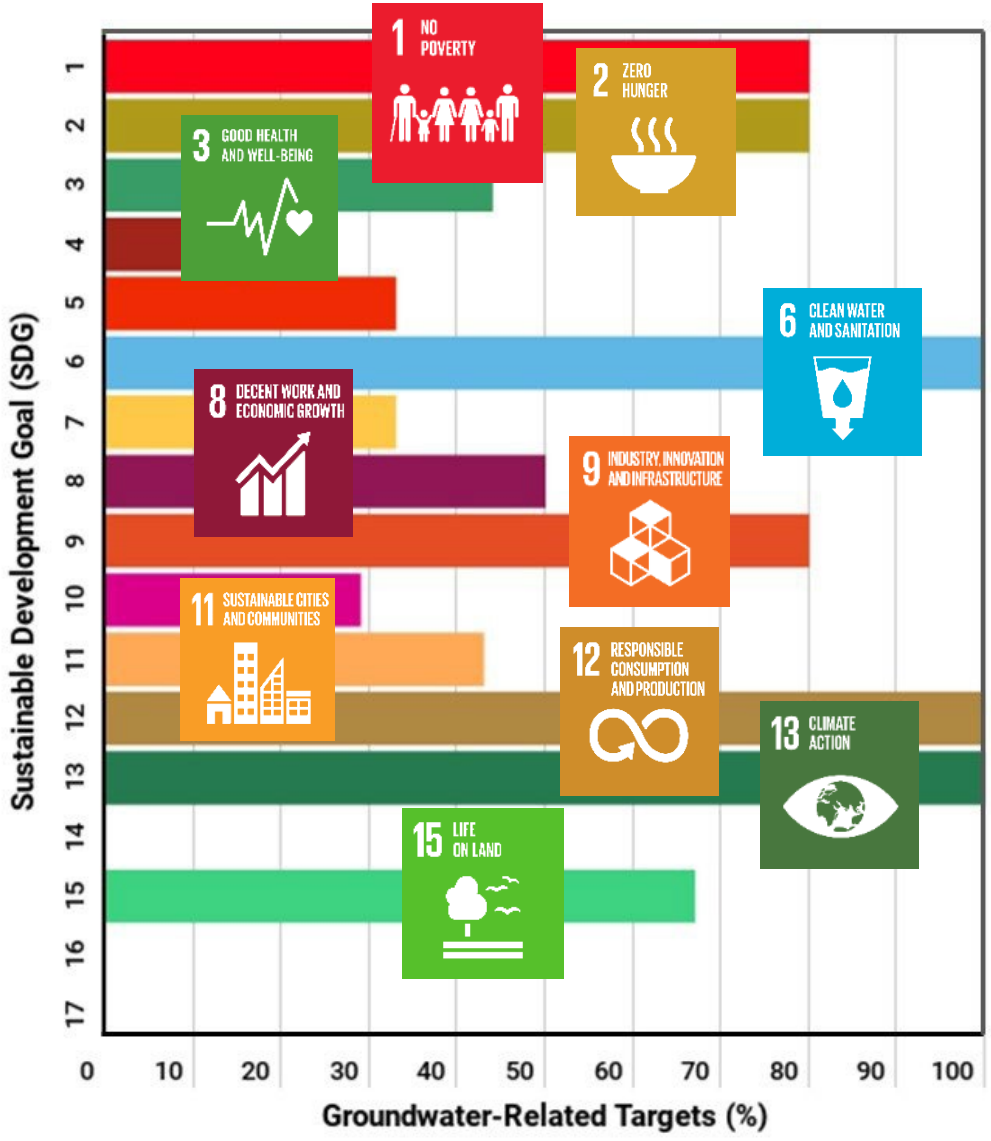
Groundwater & the SDGs

Groundwater challenges

Facts & Figures

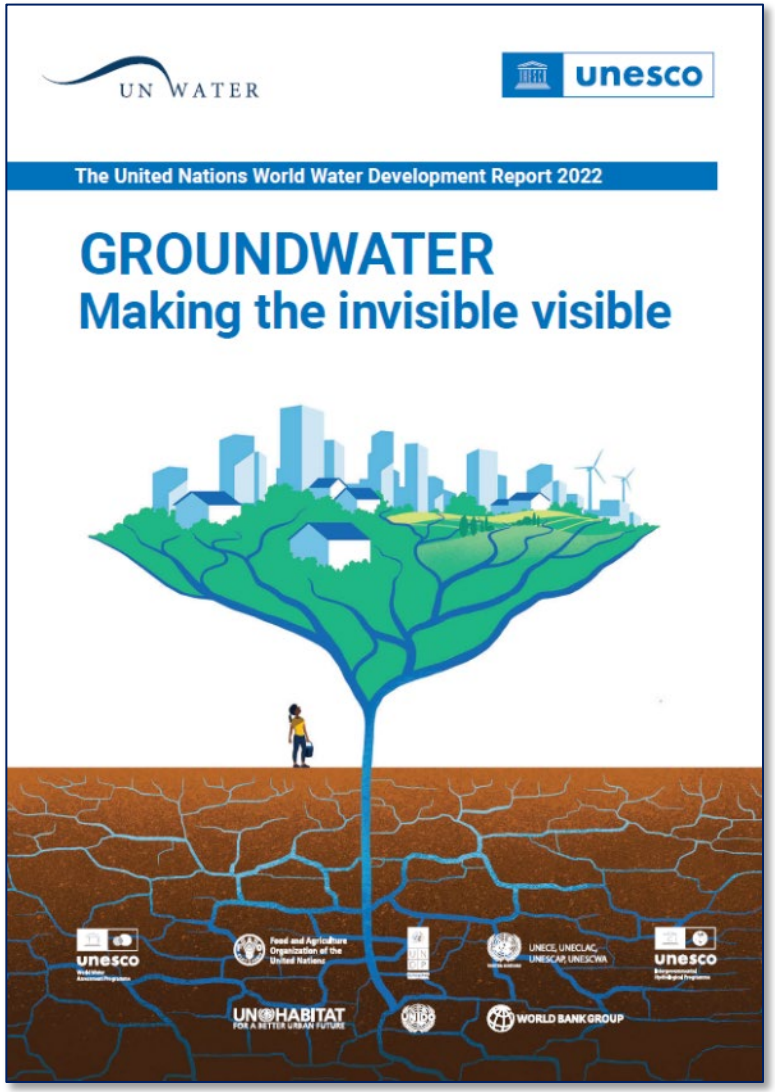
Groundwater solutions

Groundwater and the SDGs



Guppy et al. (2018)

Groundwater - Making the Invisible Visible



UN WATER
22 MARCH
WORLD WATER DAY
2022 Groundwater

GROUNDWATER SUMMIT 2022
UN-Water Summit on Groundwater

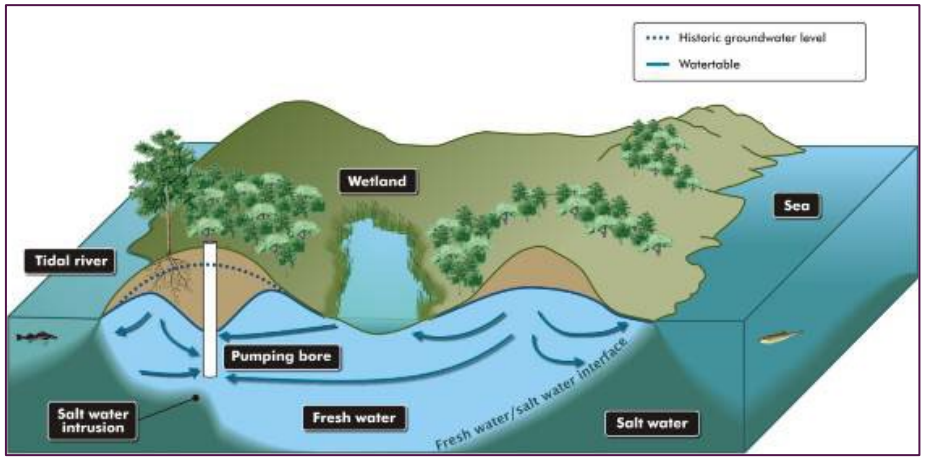
UN
2023 WATER CONFERENCE
NEW YORK 22–24 MARCH 2023

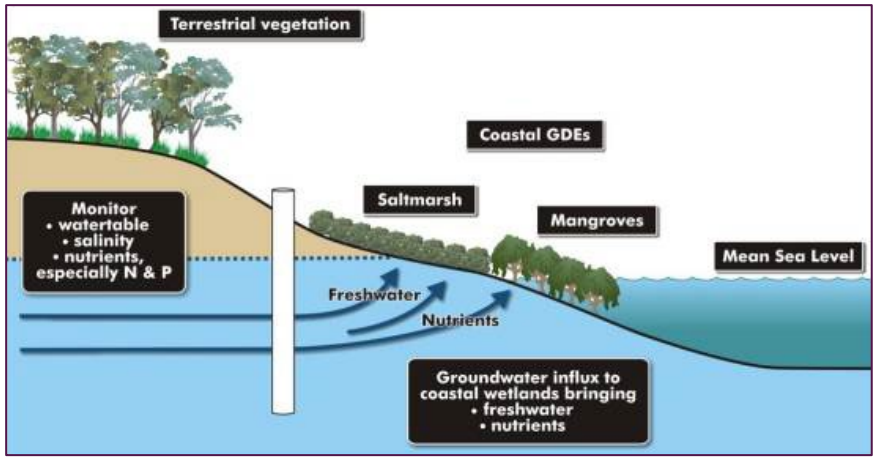
United Nations (2022)

Groundwater facts and figures

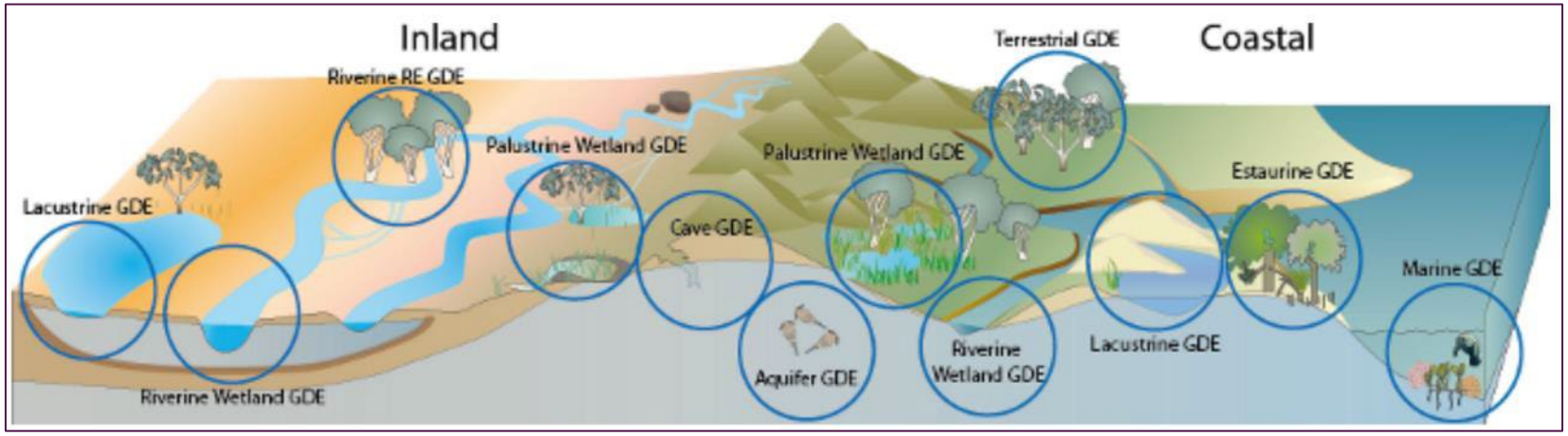
GW provides drinking water to 33% of the global population

Groundwater-dependent ecosystems





http://www.bom.gov.au/water/groundwater/gde/GDEToolbox_PartOne_Assessment-Framework.pdf

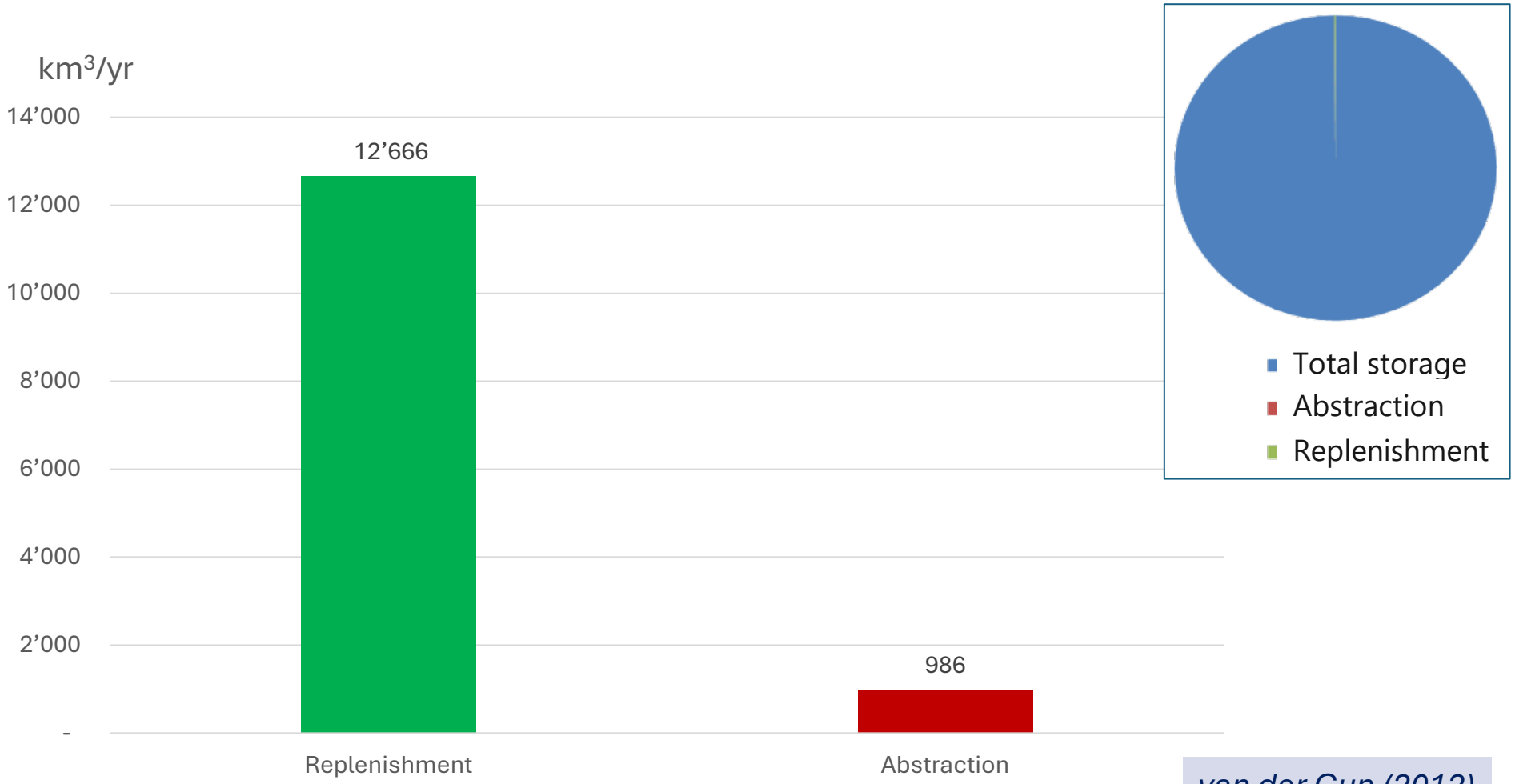


GDE types:

- Aquatic
- Terrestrial
- Sub-surface

https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/

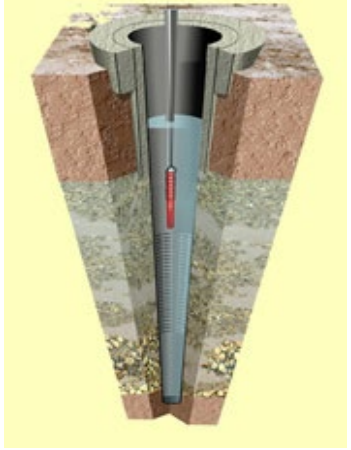
Groundwater facts and figures



van der Gun (2012)

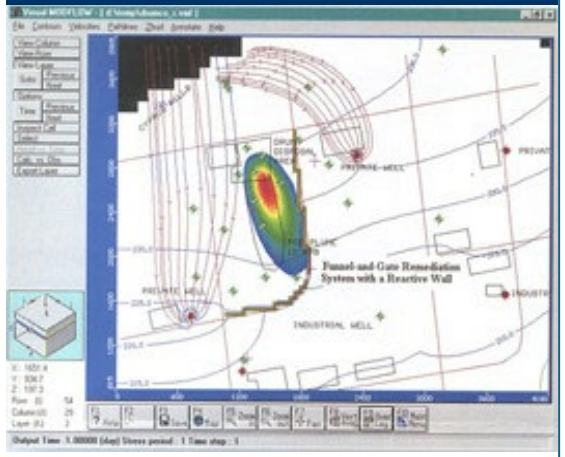
Development of technology

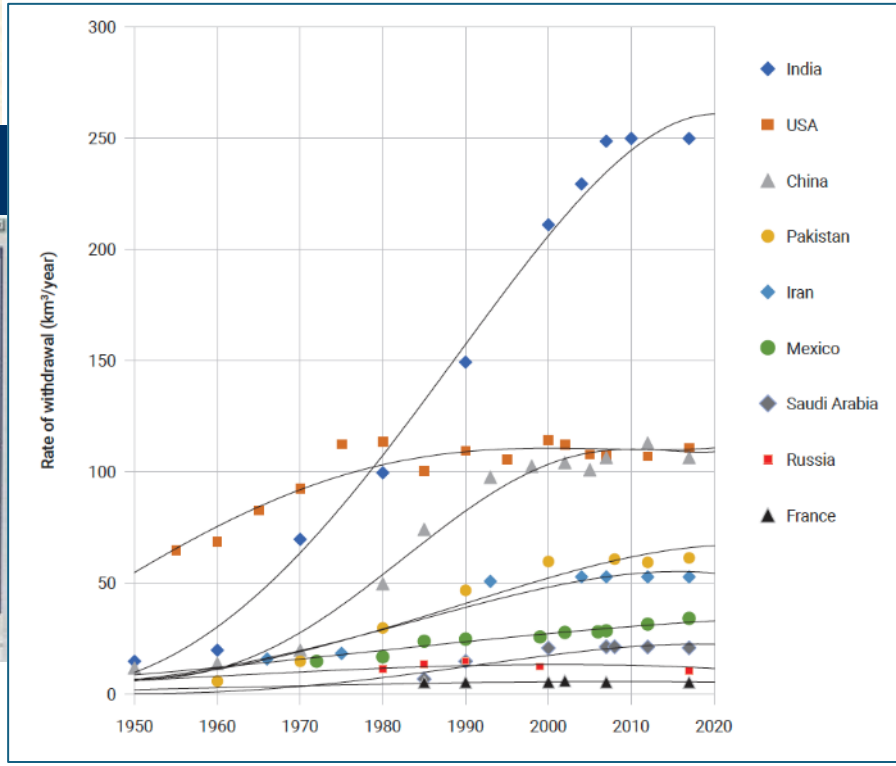
From the dug well to the deep borehole



From the waterwheel to the submersible pump

From the water witches to hydrogeology





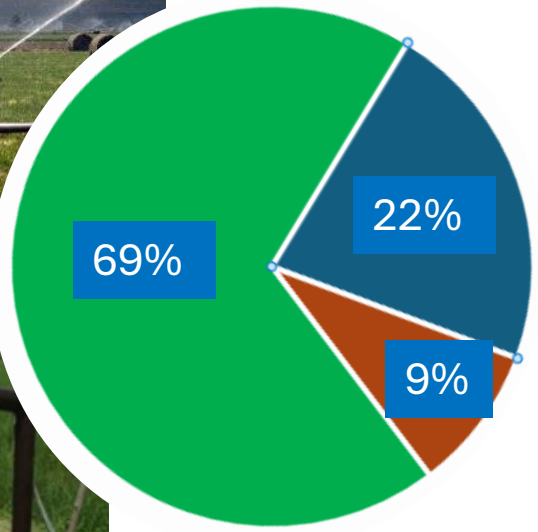
United Nations (2022)

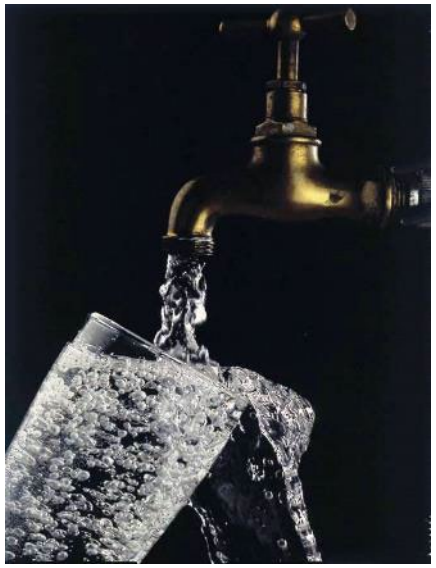
Why is GW an often-preferred resource?

GW provides a reliable and suitable water source:

- Prevalent across the landscape
- All-year availability and drought resilience
- In-built distribution and storage
- Individual access and management possible
- Little loss from evaporation
- Normally a safe source of drinking water

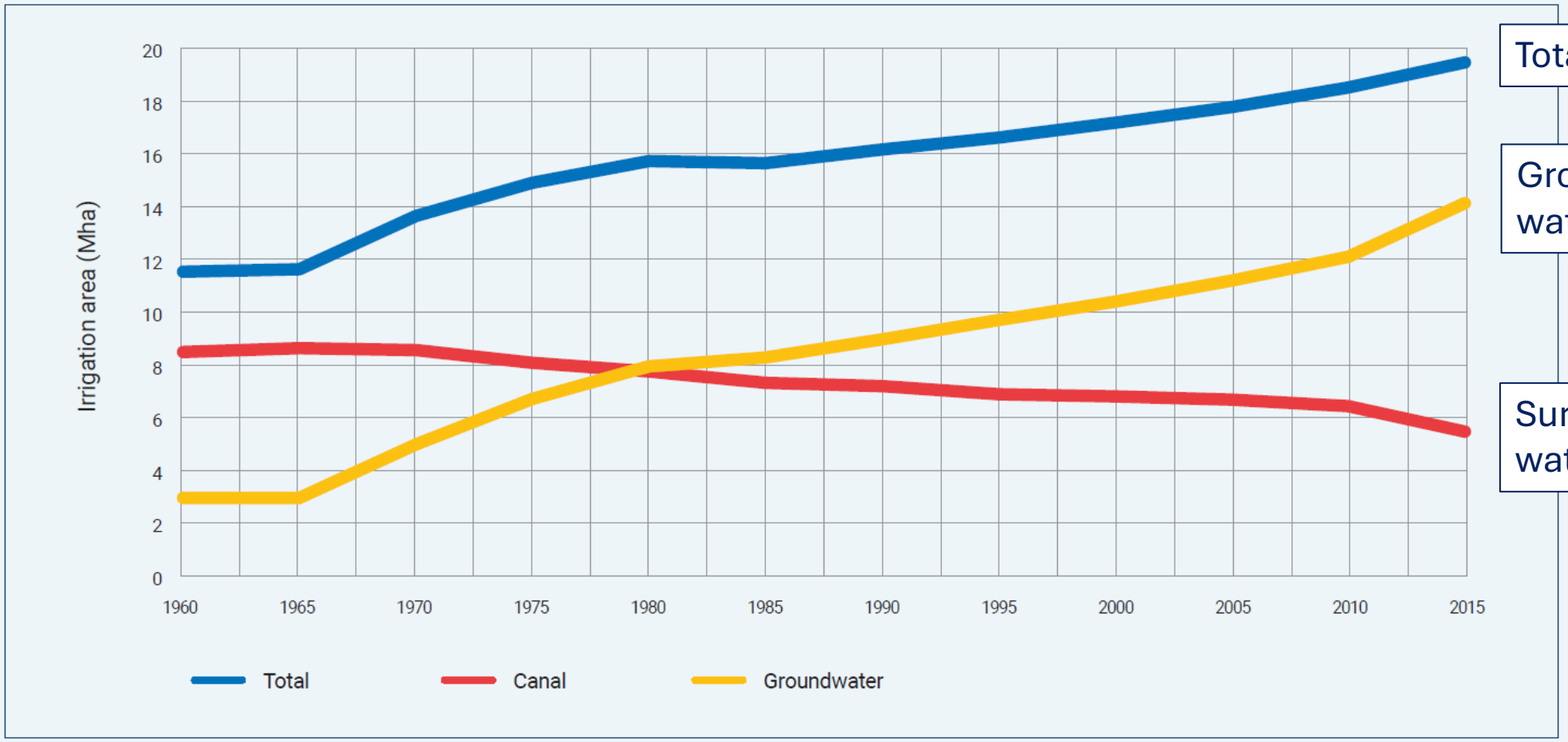
Groundwater facts and figures





United Nations (2022)

Groundwater facts and figures



Source: Qureshi (2020, fig. 4, p. 6).

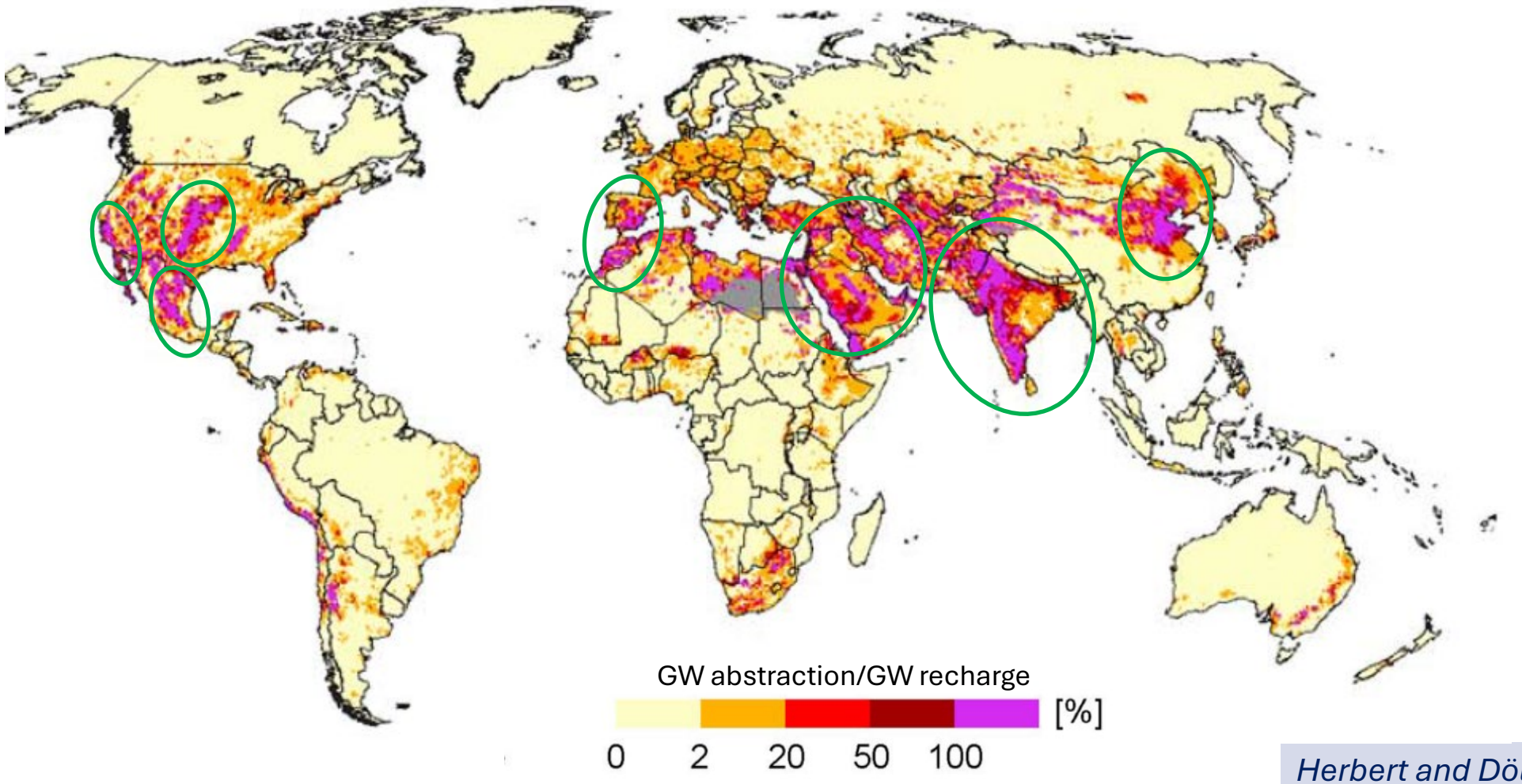
Total

Ground-water

Surface water

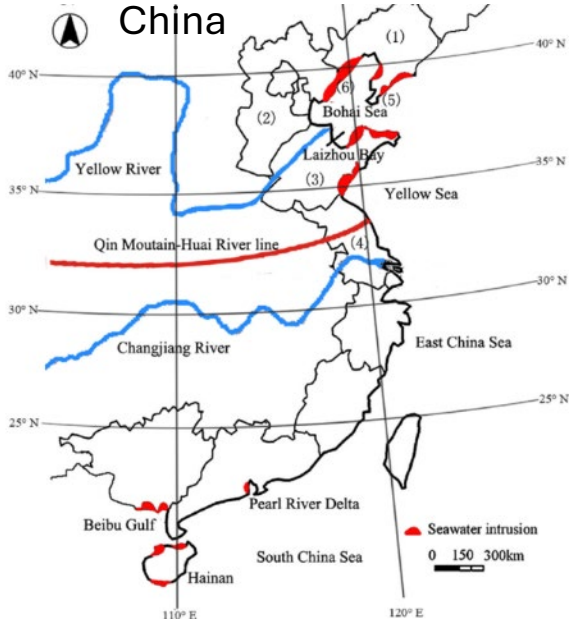
United Nations (2022)

Groundwater stress



Herbert and Döll (2019)

Impacts of GW depletion



Challenges to groundwater management

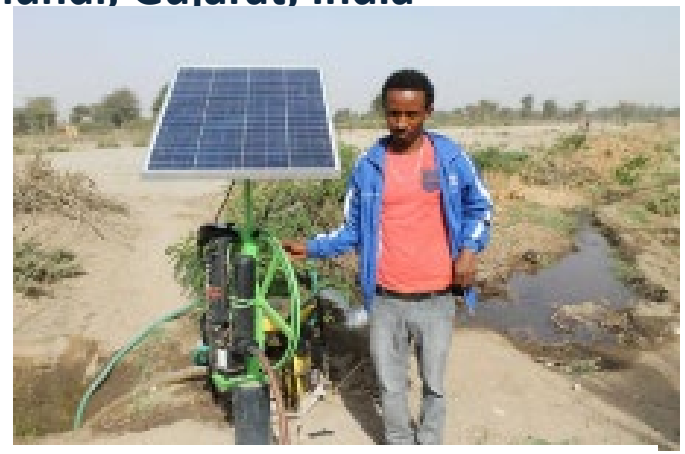
- Difficult to control the use, and make users comply with regulations and restrictions in use
- Difficult to determine/decide the sustainable use
- GW use is often associated with land use
- GW impacts are slow to appear and slow to remediate
- GW dependence is difficult to reverse
- GW is a complex 3-dimensional resource
- GW is developed as a ‘new’ or ‘alternative’ or ‘last-resort’ resource
- GW is developed/managed ‘in the dark’

=> Gaps in knowledge, capacity, and incentives
=> GW problems/solutions can be longterm/intergenerational

Solar-powered irrigation – a new challenge

1: On grid: SPICE Dhundi, Gujarat, India

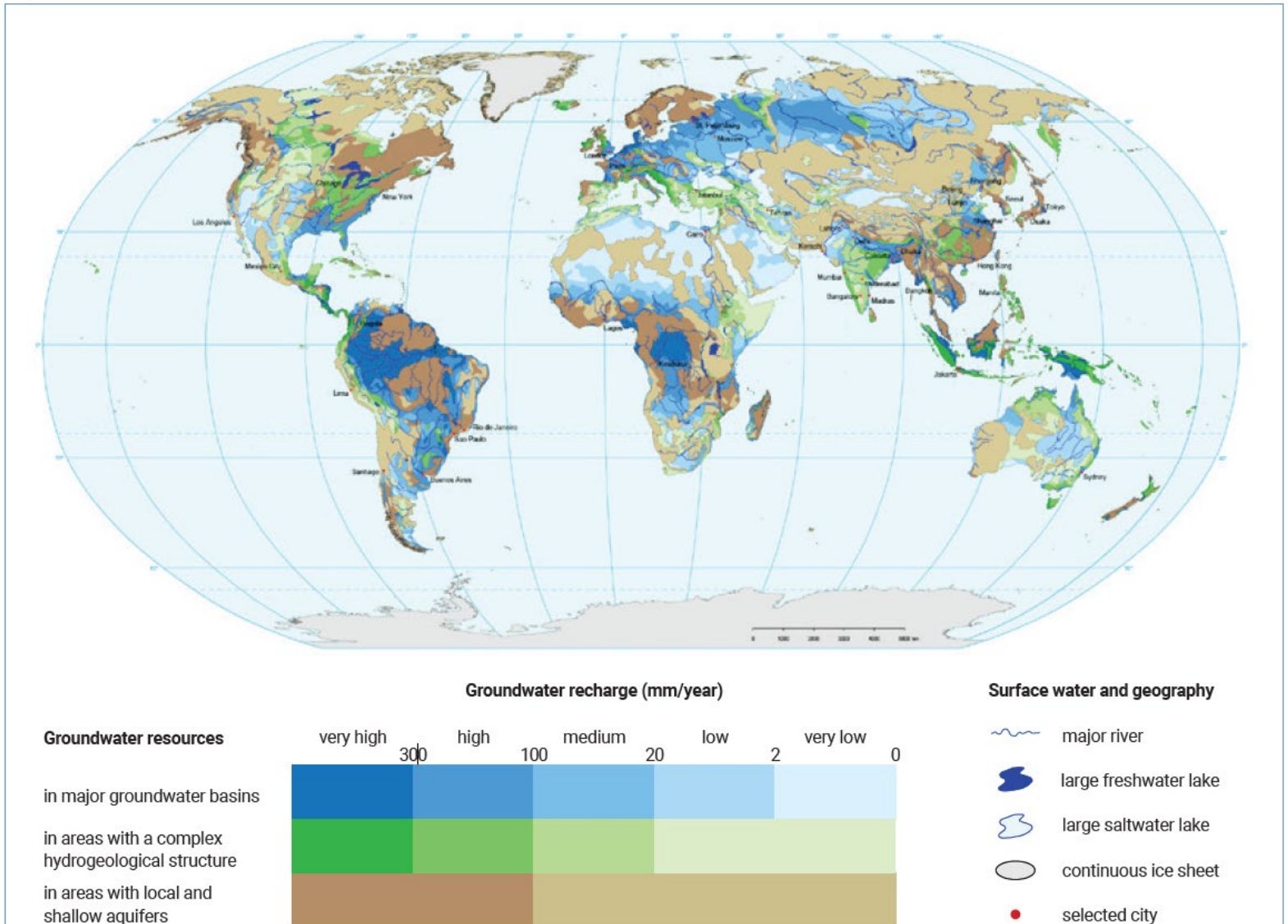
2: Off grid: Irrigation Service Provider (ISP Model) – Bihar, India



3: Off grid: Micro-irrigation Ethiopia/Ghana, Africa

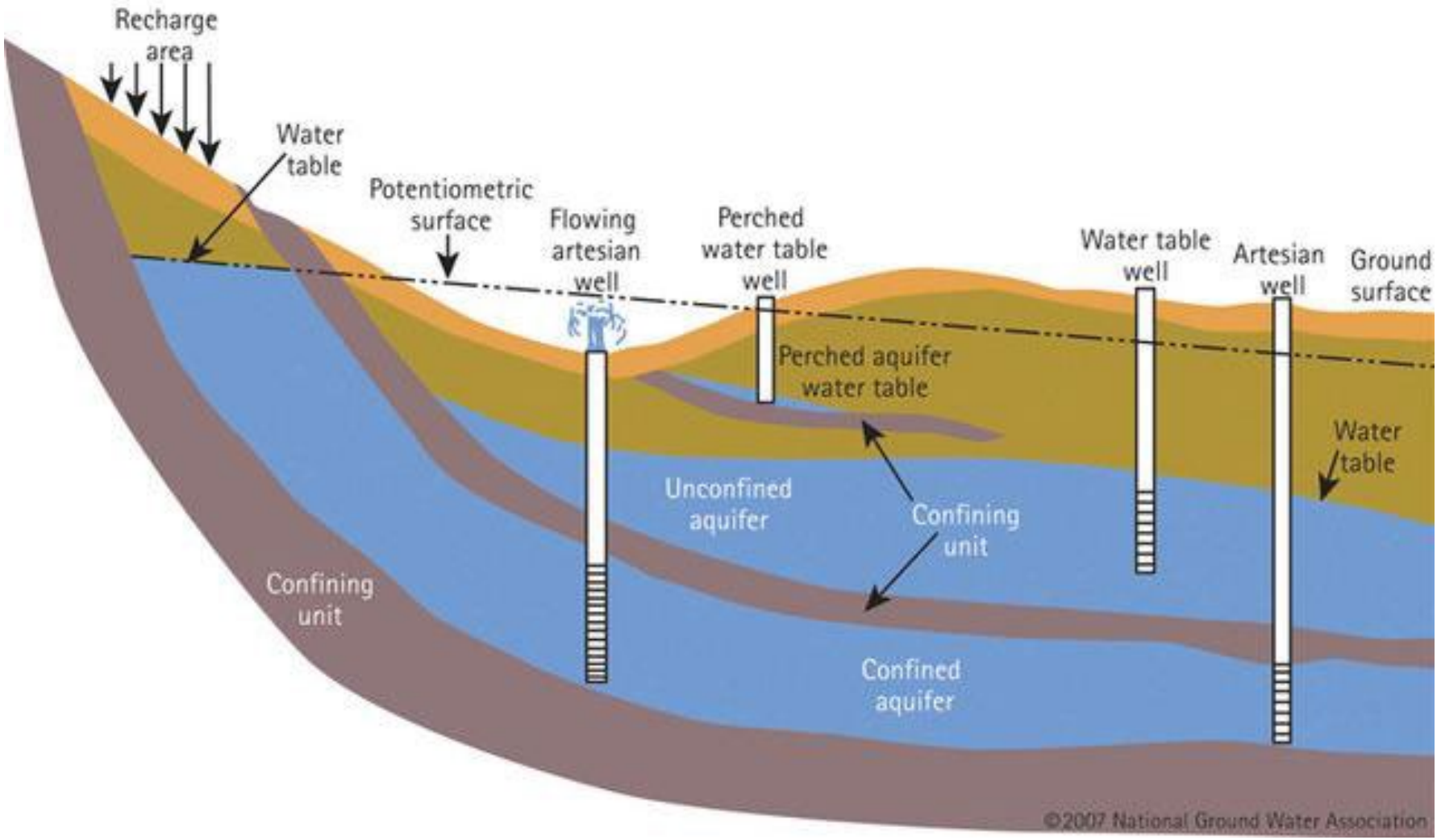
4: Decentralized grid: Solar Irrigation + Home enterprise

Groundwater is complex

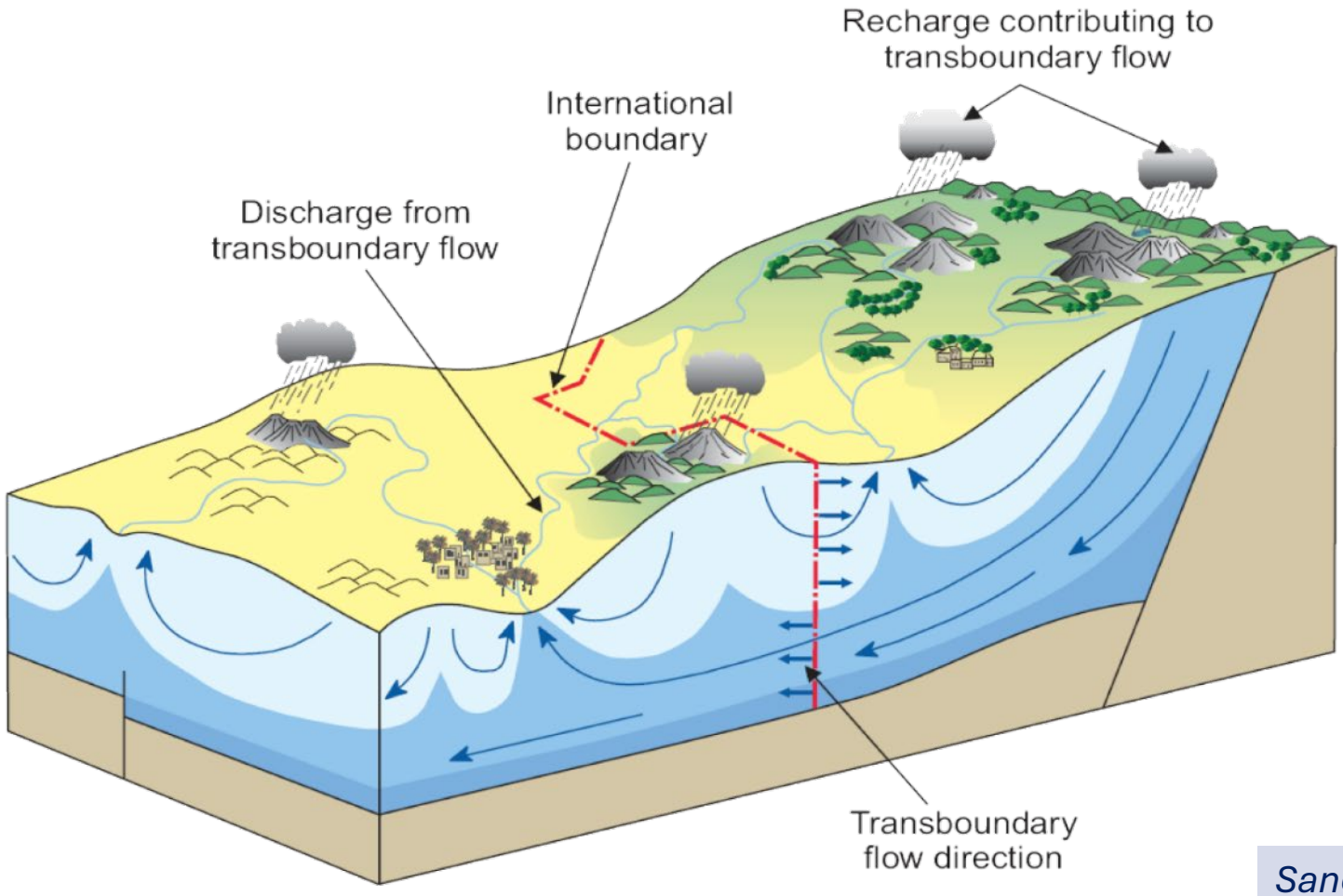


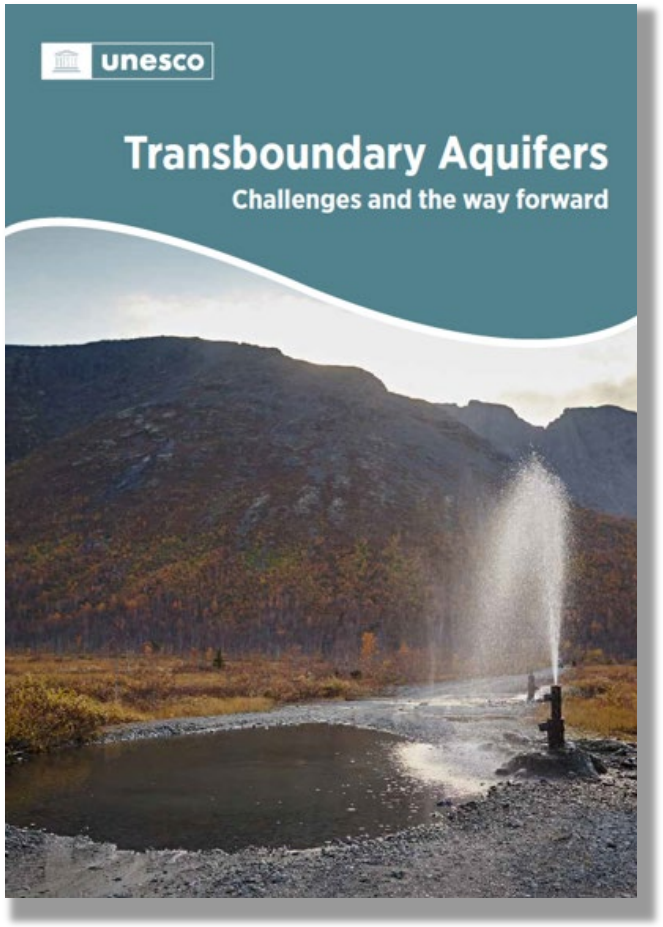
BGR and UNESCO (2008)

Groundwater is complex



Groundwater is transboundary

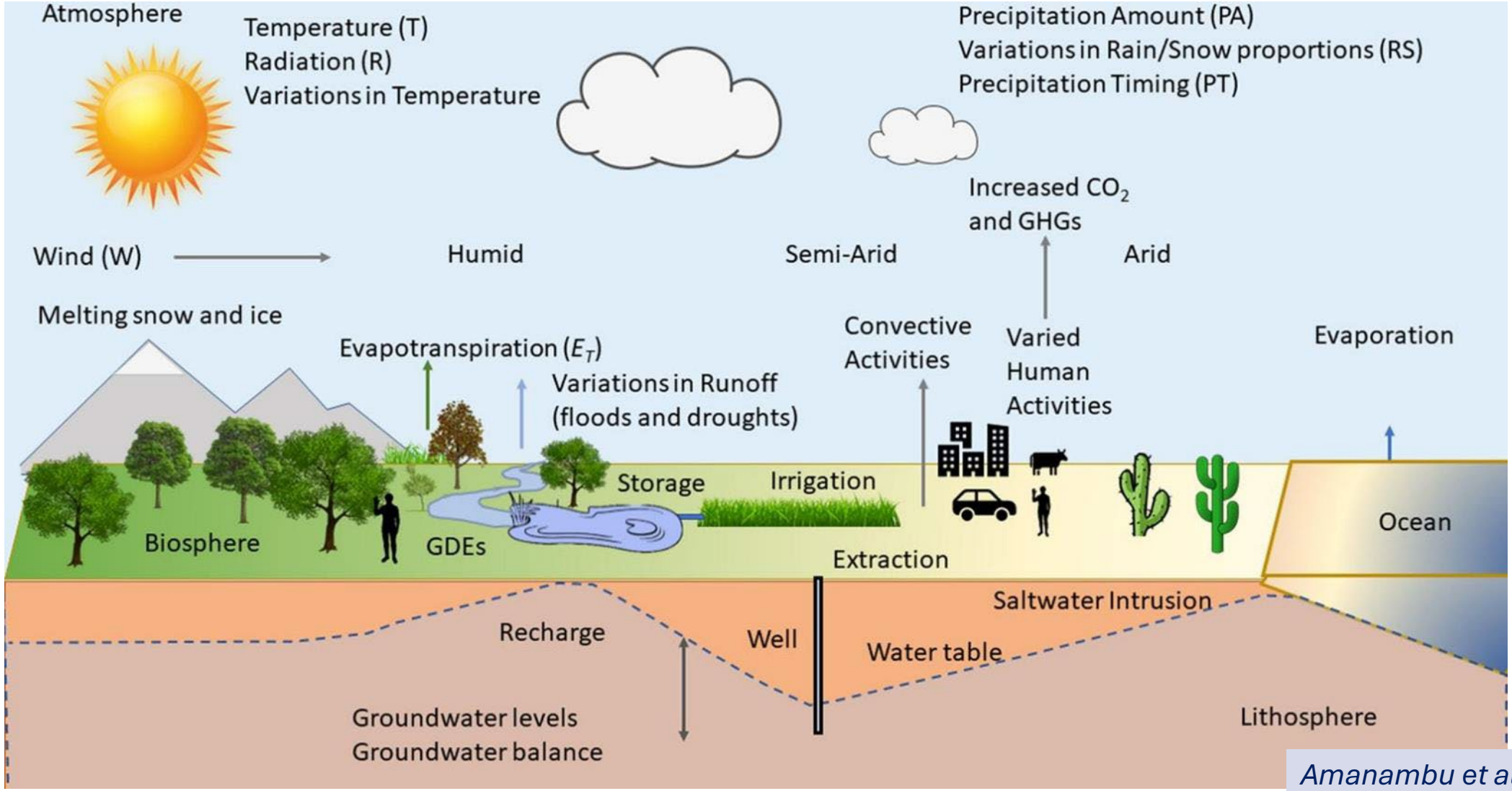




Sanchez et al. (2022)

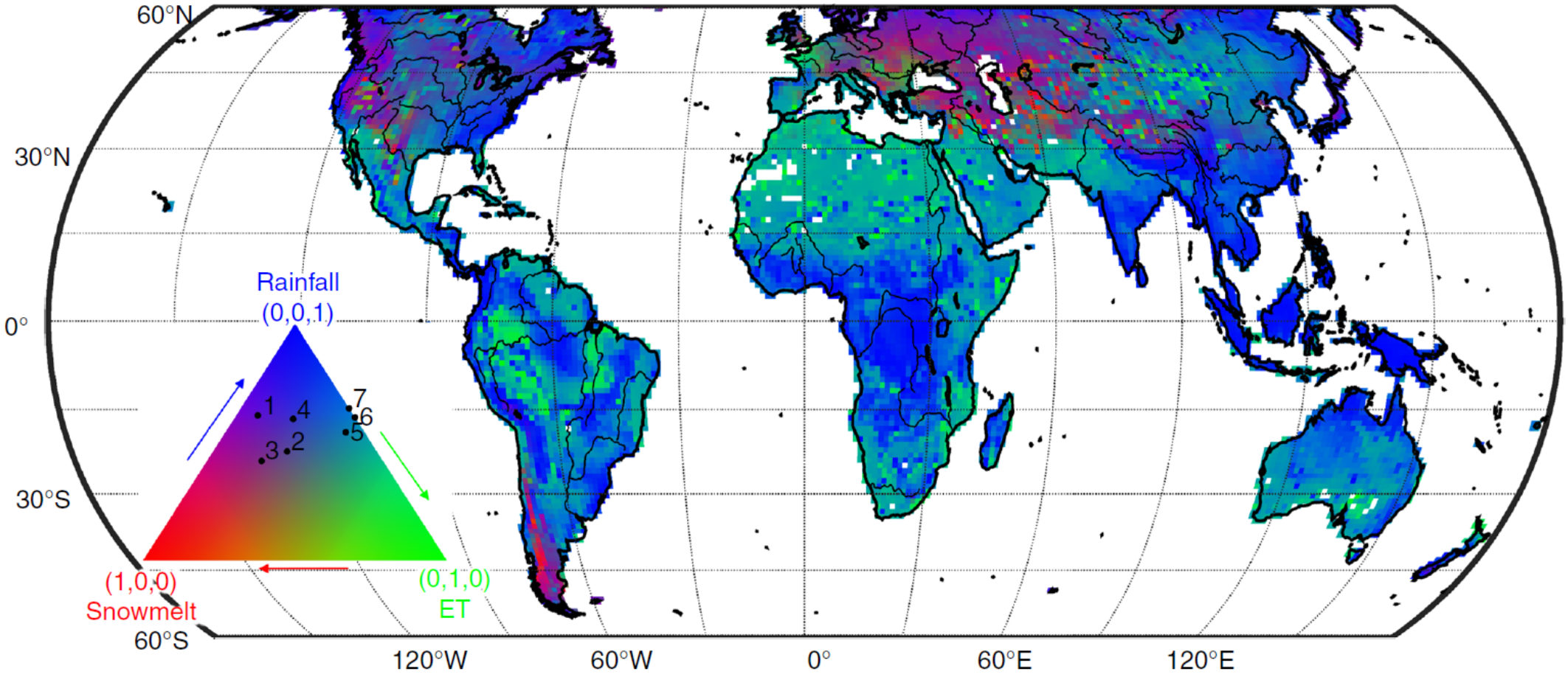
unesco

Groundwater and climate change



Amanambu et al. (2020)

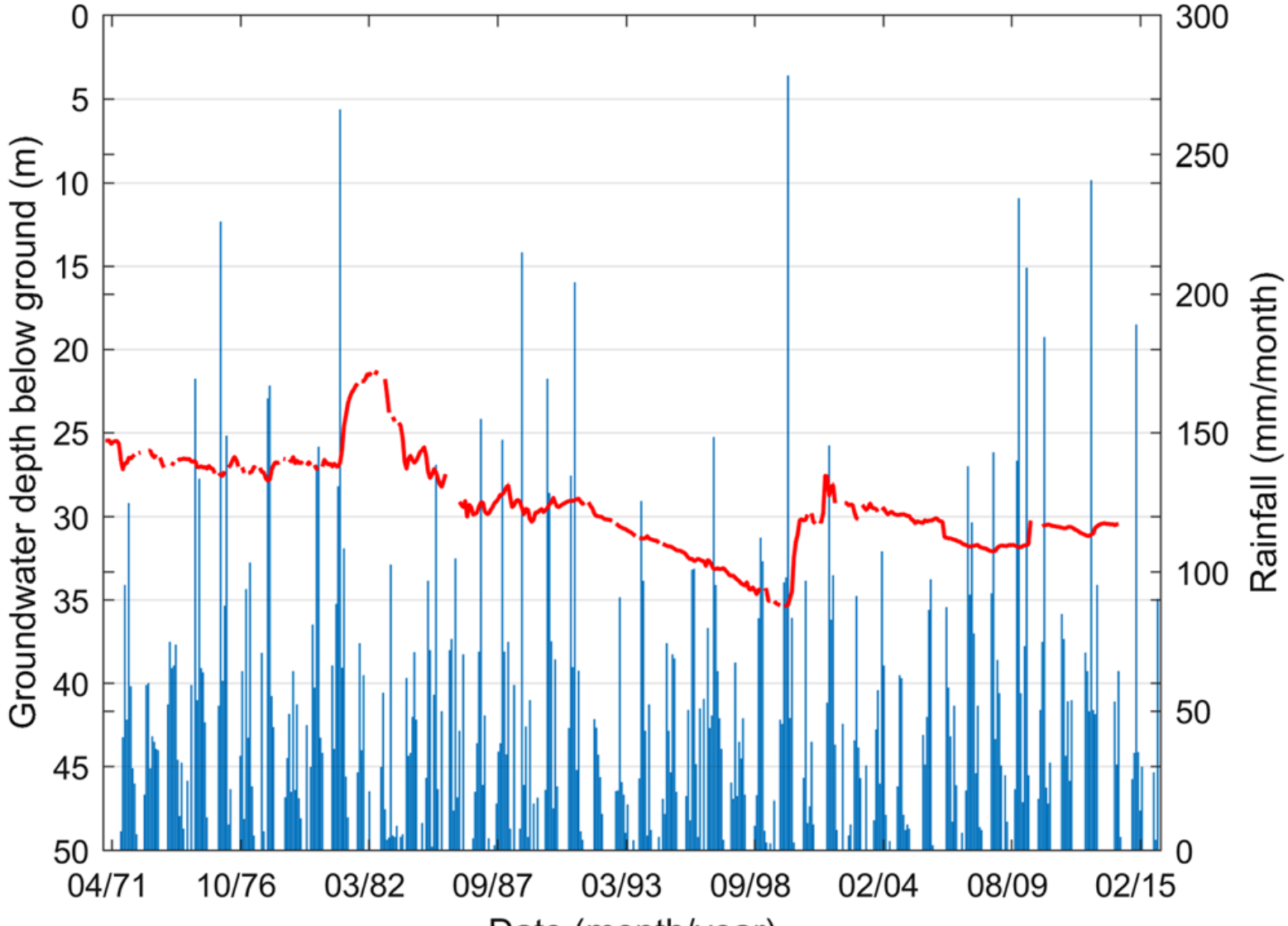
Groundwater and climate change



Climate factors influencing GW storage changes across the globe

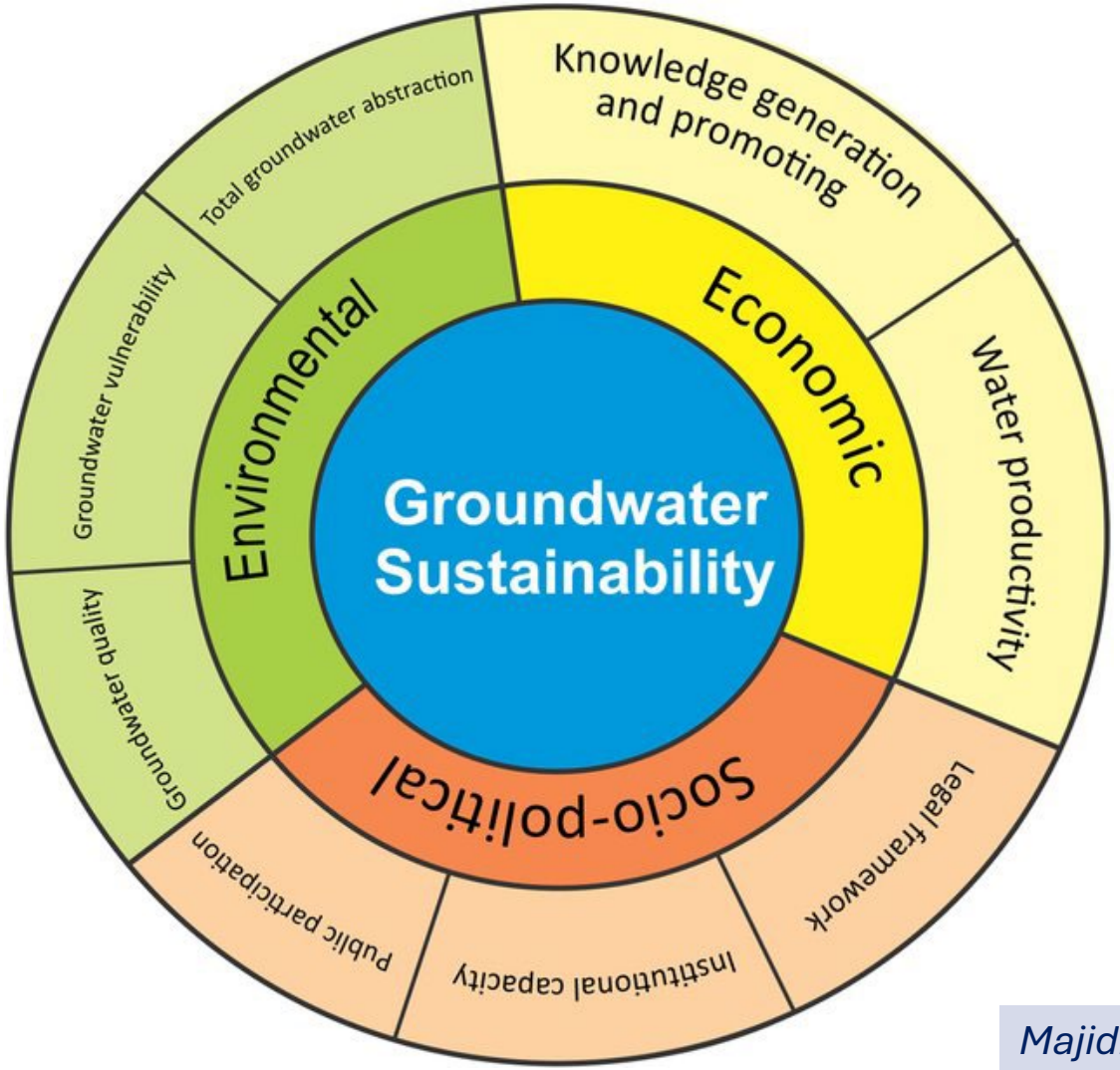
Wu et al. (2020)

Groundwater is the saviour – and long-term victim of climate change



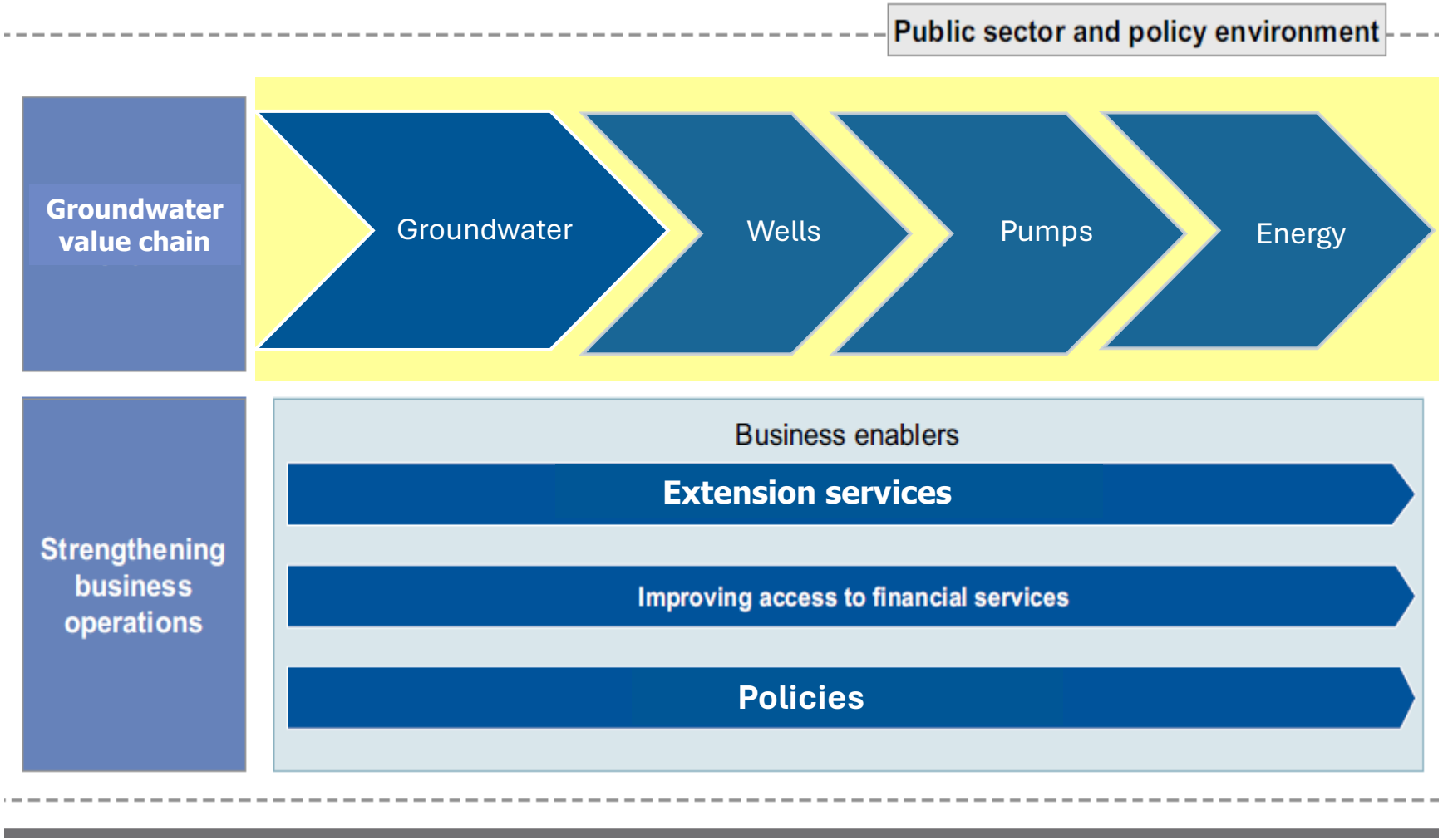
Ebrahim et al. (2019)

Groundwater governance components

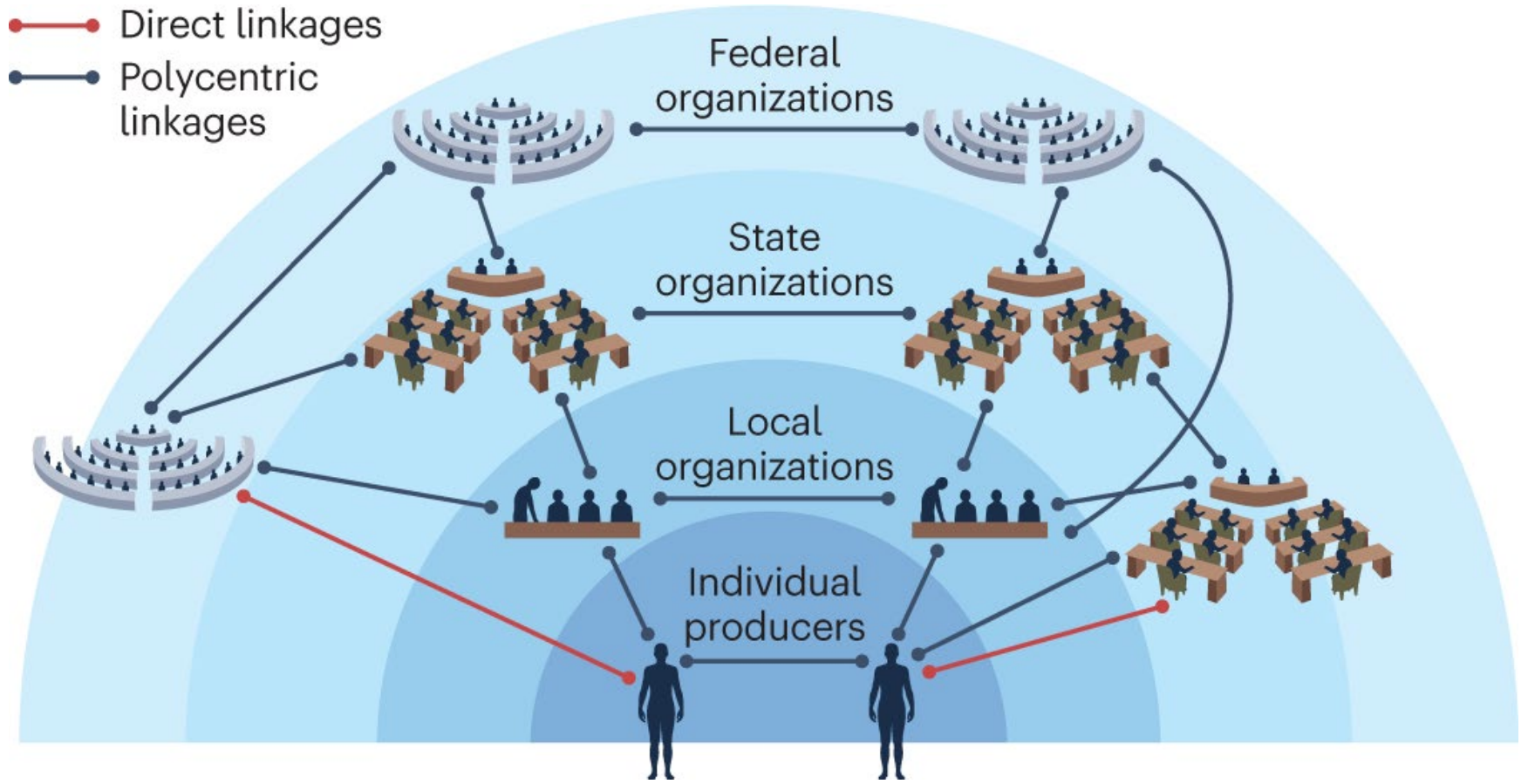


Majidipour et al. (2021)

The groundwater value chain

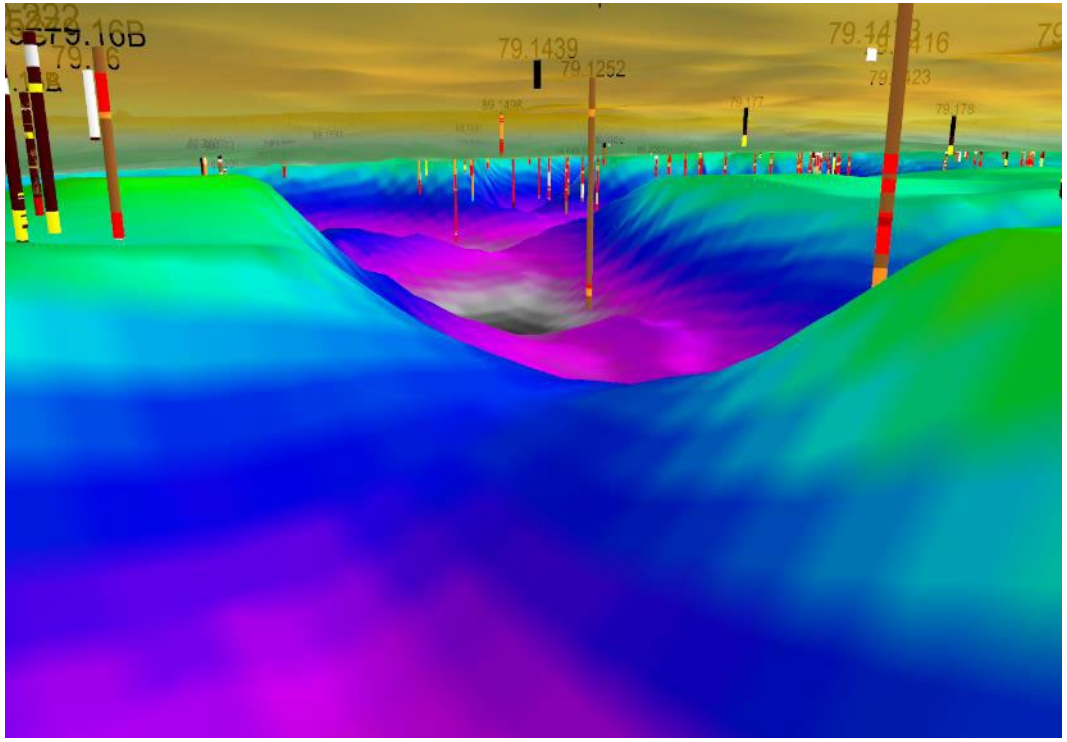


Horizontal and vertical coherence in GW mgt.



Schipanski et al. (2023)

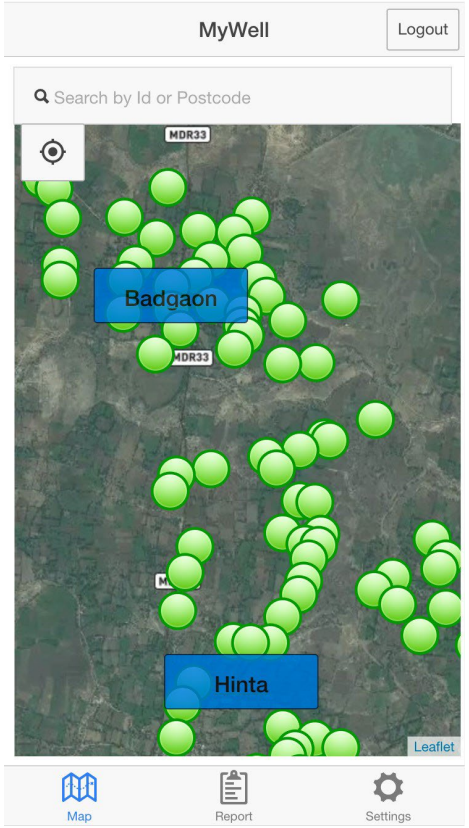
Big data, IoT, AI, machine learning

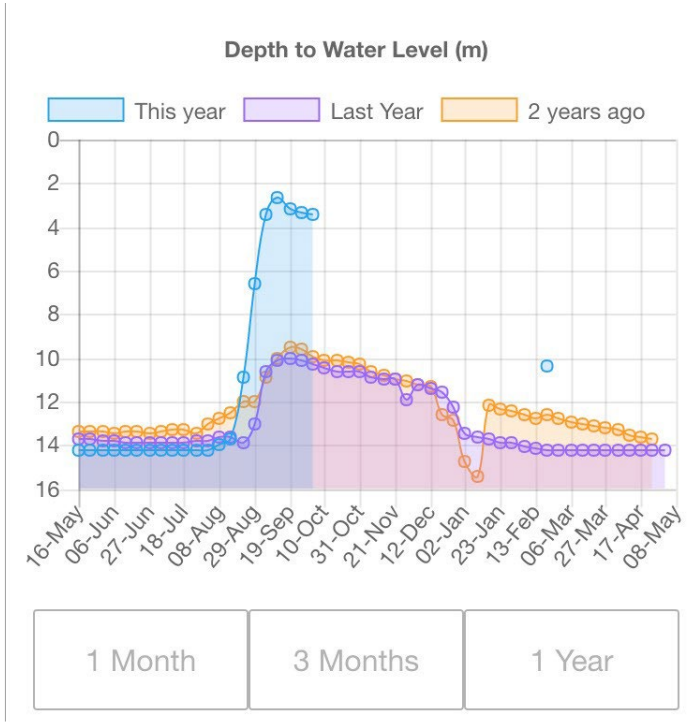


Courtesy: GEUS and SkyTEM

GRACE twin satellites

Citizen science and crowd sourcing





http://www.marvi.org.in/

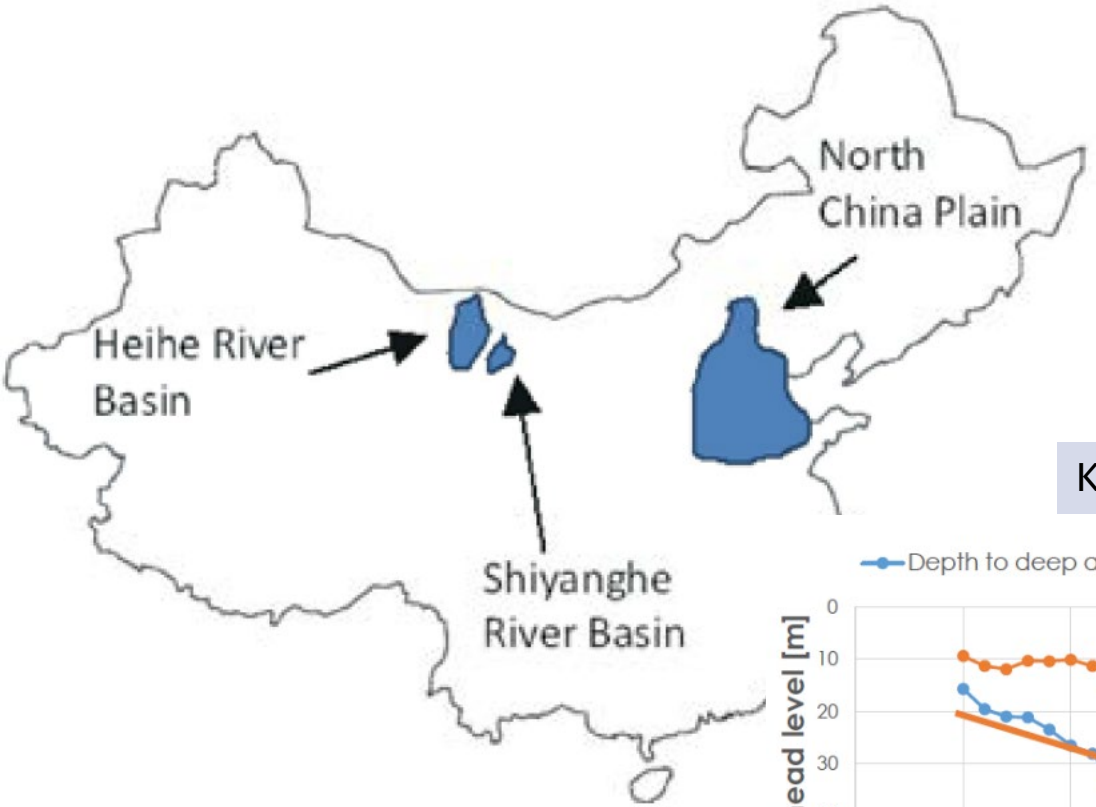
Southern Colorado case

‘It seems stupid to actually tax yourselves and cost yourself more money," Messick says. "But the big picture is you stay in business, you keep your community whole, and everybody gives a little.’

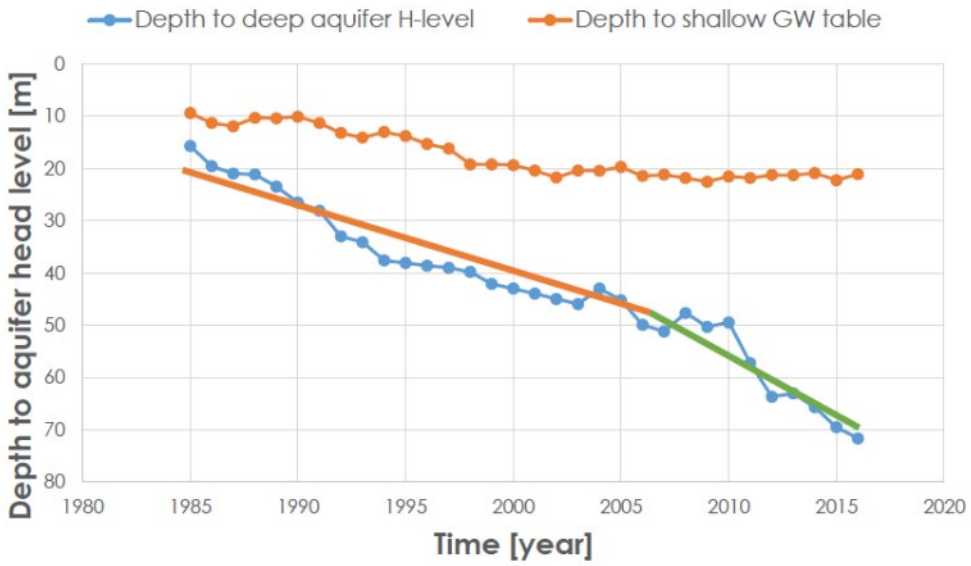
https://www.npr.org/sections/thesalt/2017/11/18/562912732/to-save-their-water-supply-colorado-farmers-taxed-themselves?t=1556724394170

Examples of solutions

Integrated approaches in China

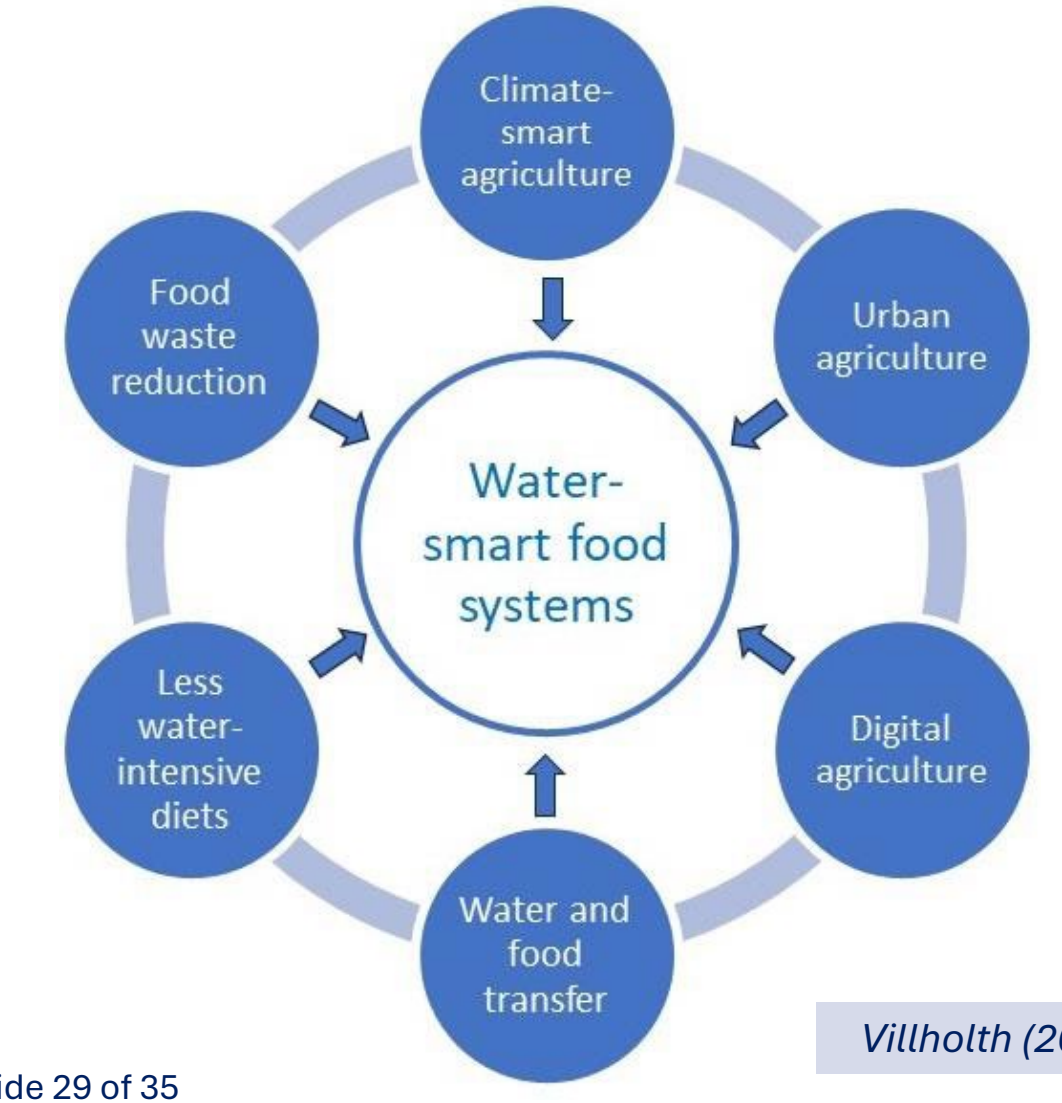


Kinzelbach et al. (2019)



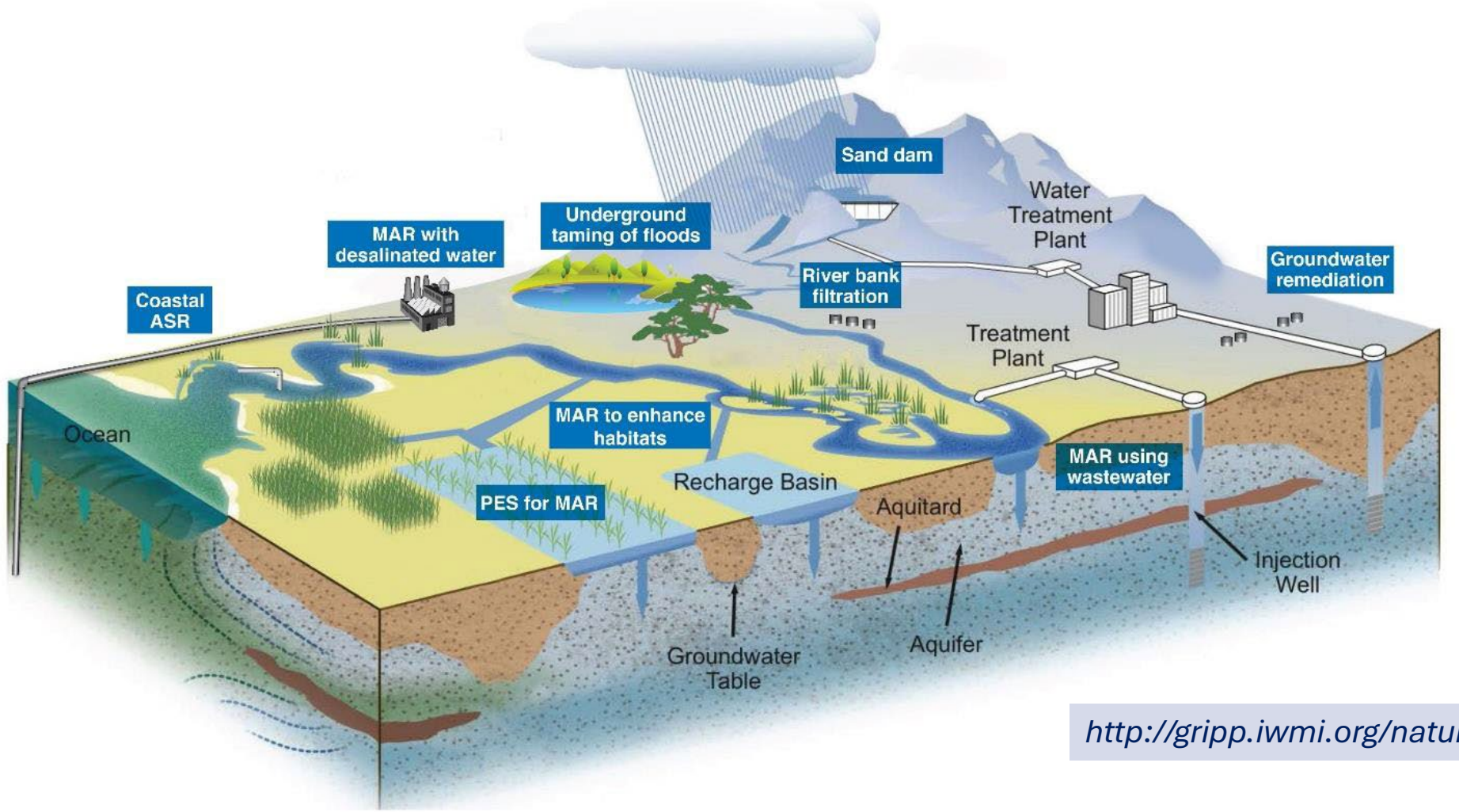
Aarnoudse and Bluemling (2017)

Entry points for a dialogue on sustainable GW use in agriculture



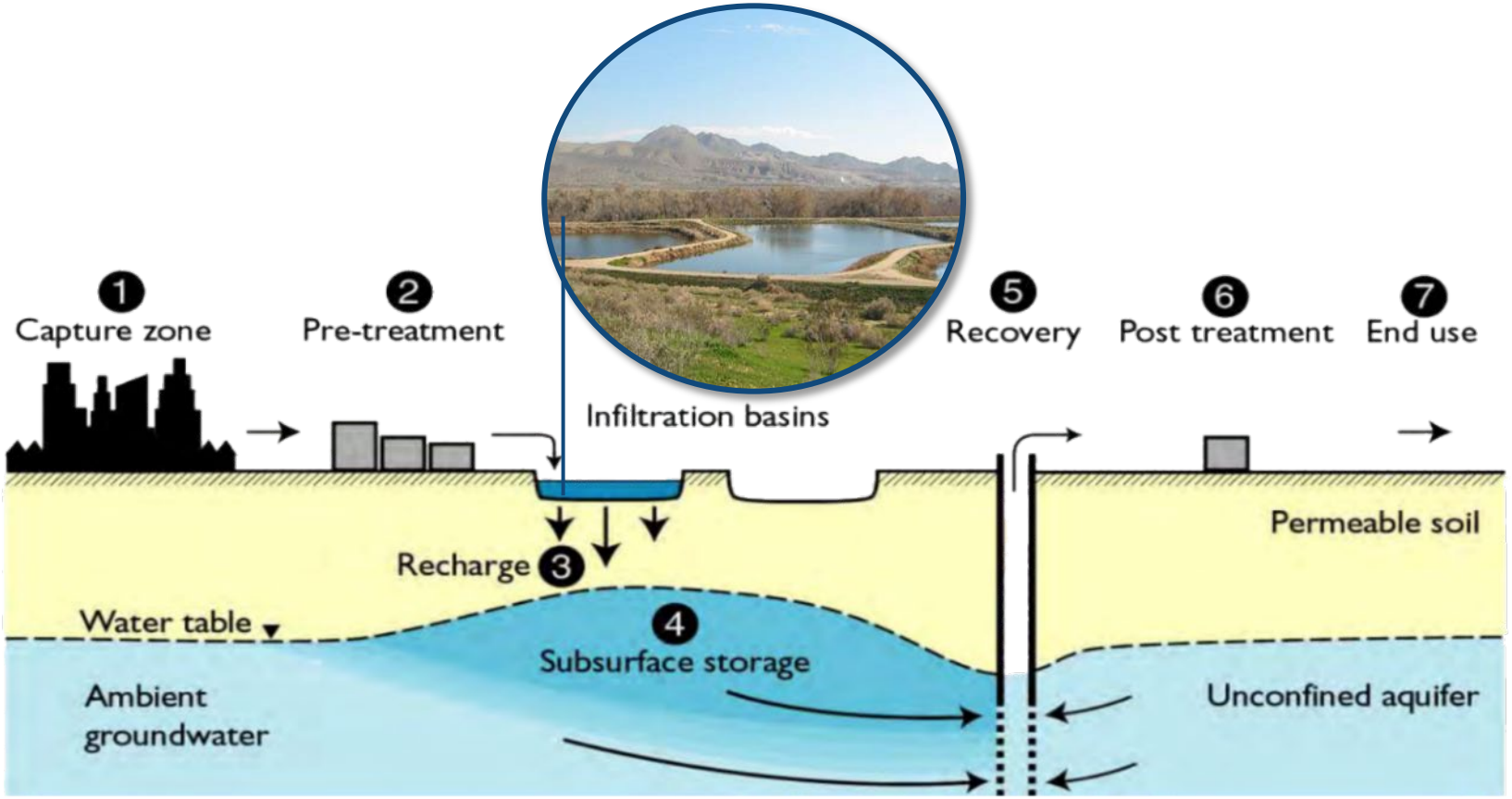
Villholth (2024)

Groundwater-based natural infrastructure

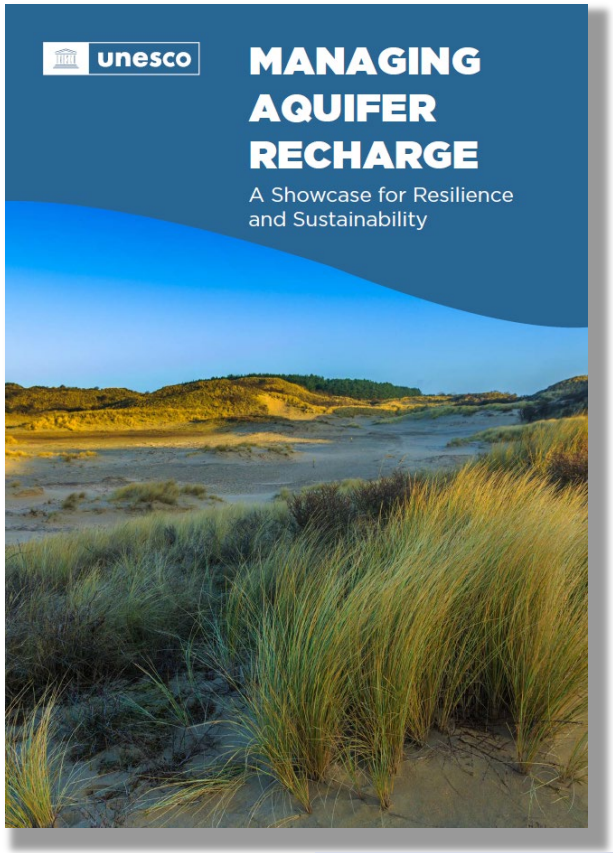


http://gripp.iwmi.org/natural-infrastructure/

Managed aquifer recharge (MAR)



Dillon et al. (2009)

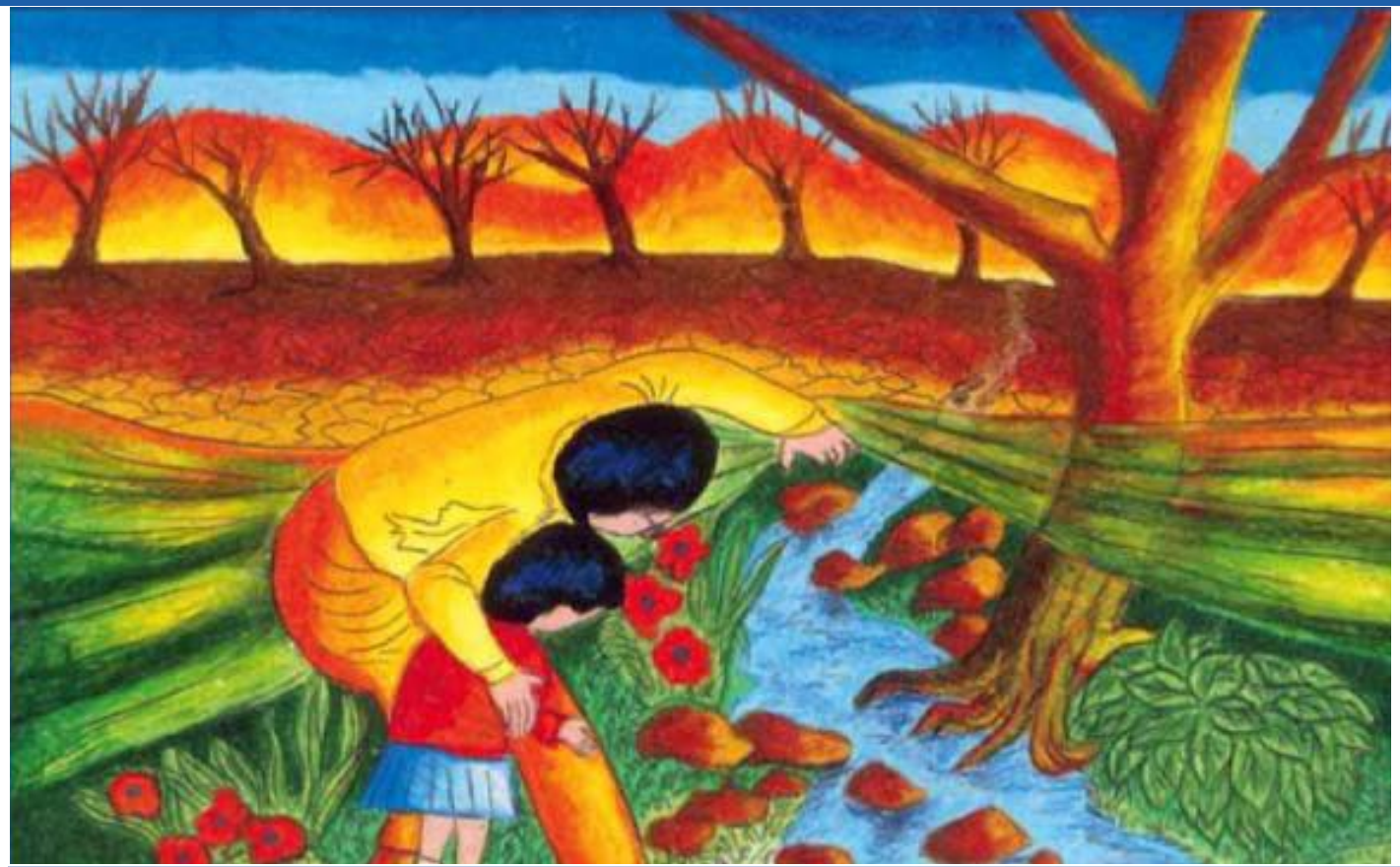


Zheng et al. (2021)

Concluding remarks

- Groundwater underpins most SDGs, but its deficient governance, leading to degradation of this resource, threatens life-supporting ecosystems and longterm benefits to humans.
- Bringing together knowledge, people, financing, and technologies to identify best cooperation pathways, solutions, investments and policies, will be cornerstone aspects of ensuring sustainable groundwater resources.
- Solutions need to be informed, integrated, long-term/strategic, preventative, adaptable, and multifarious.
- Groundwater needs to be strongly emphasized and advocated as part of global and local risk analysis, transboundary and international cooperation, and climate adaptation planning.
- Getting groundwater out of ‘the dark’ is key to good governance of groundwater.

Thank you for your attention



Karen G. Villholth
Water Cycle Innovation (WCI)
karen@watercycelinnovation.com
https://watercycleinnovation.com/

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Q&A

1) Clarification questions
2) Content questions
3) Comments

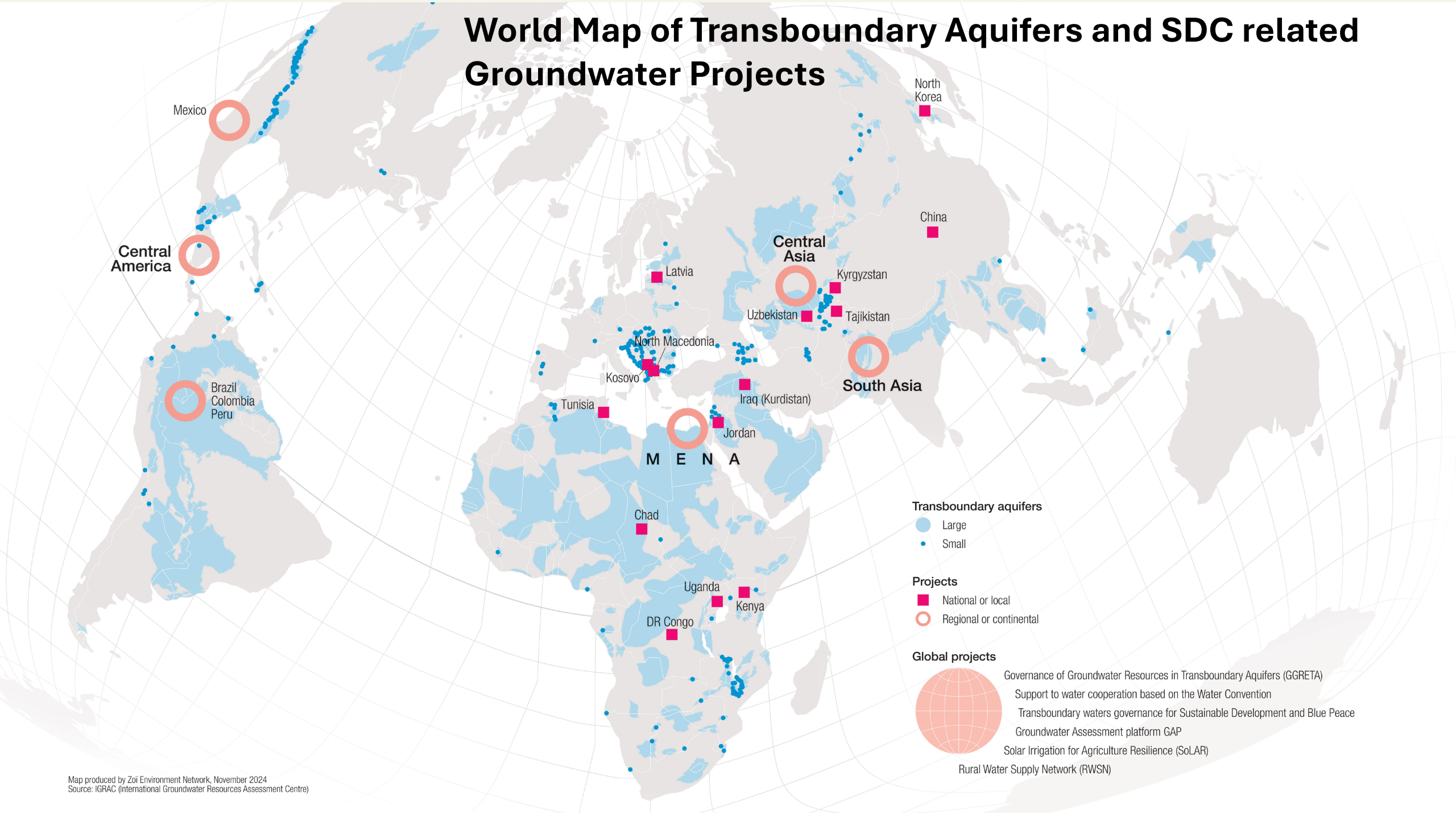
Option 1

Open your microphone and present yourself in 10 seconds ☺
(Name, affiliation and country your are currently based)
Ask your question / make your comment in 60 seconds ☺

Option 2

Write your question / comment in the chat
Add your name, affiliation and country your are currently based

World Map of Transboundary Aquifers and SDC related Groundwater Projects



Map produced by Zoï Environment Network, November 2024
Source: IGRAC (International Groundwater Resources Assessment Centre)

Zoom-in on selected projects

How does your project relate to the challenges and solutions that we heard of in the keynote?

- Groundwater Management Project in Central Asia
- Groundwater Management, Use and Protection Programme (GWP) in North Macedonia
- Groundwater Management Project in Tajikistan

Discuss in groups

you will be randomly assigned to a breakout room

- How can you relate to the challenges and solutions that have been addressed today? Provide examples from your work (learnings / challenges)

Reporting back

- How can you relate to the challenges and solutions that have been addressed today? Provide examples from your work (learnings / challenges)

Survey / evaluation of the event

Fill in the poll that opens on your Zoom screen

- How did you appreciate the overall webinar? scale from 1-10
- Are you interested to join for the journey's next destination? Y/N
- Do you have any suggestion? open

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Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Thank you for your participation!

For follow-up questions about this webinar, please contact florian.klingel@skat.ch

Join the RésEAU community to stay up to date about this Learning Journey and other news & activities: https://dgroups.org**/sdc/reseau**

This event has been recorded and will be made available on https://www.sdc-water.ch/