



Inventory of shared water resources in Western Asia

Findings on status, challenges and
cooperation

International Roundtable – Transboundary Water Resources Management in the
Southern Mediterranean

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Andreas Renck

BGR Principal Advisor / Project Coordinator

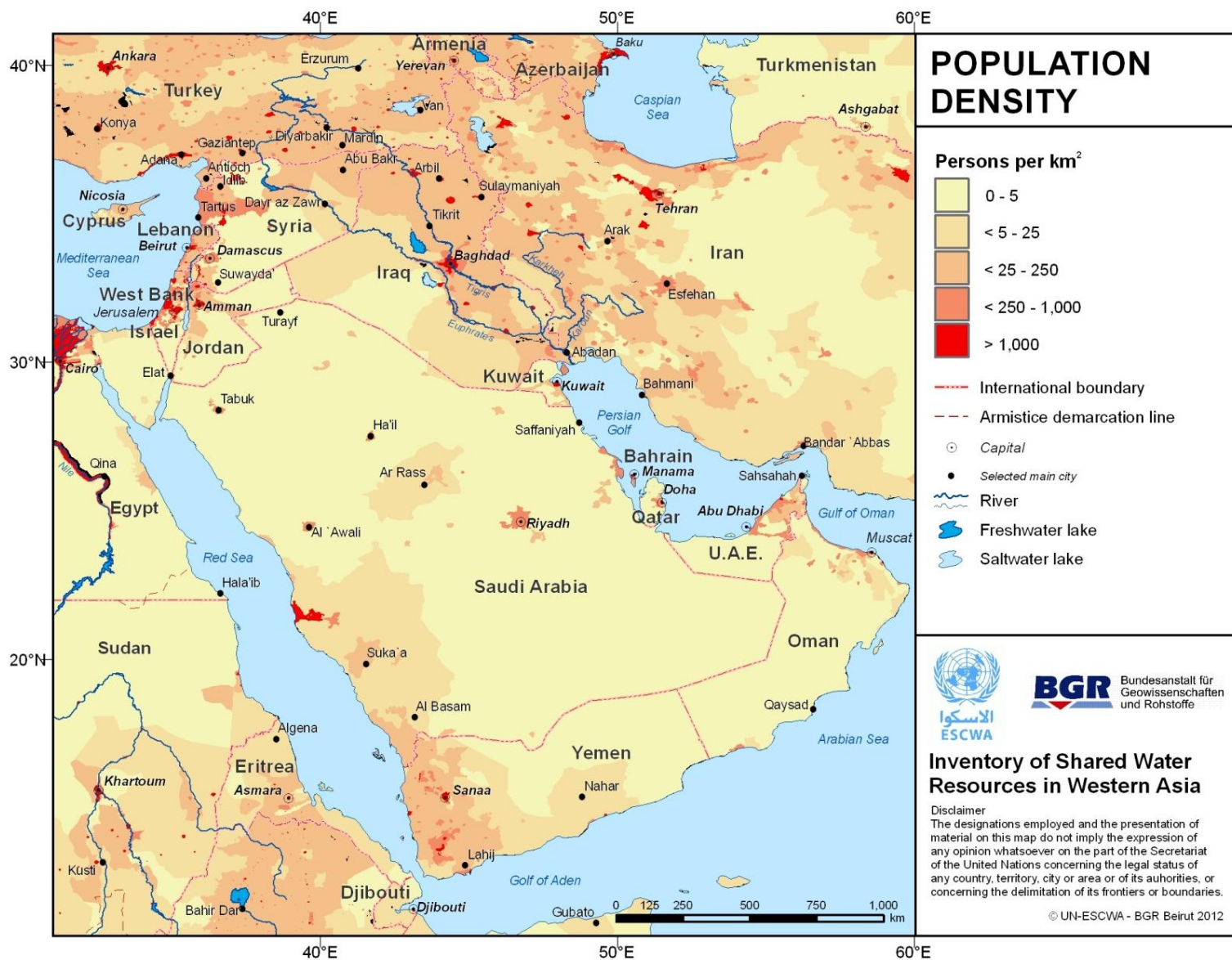
ESCWA-BGR Cooperation

Presentation

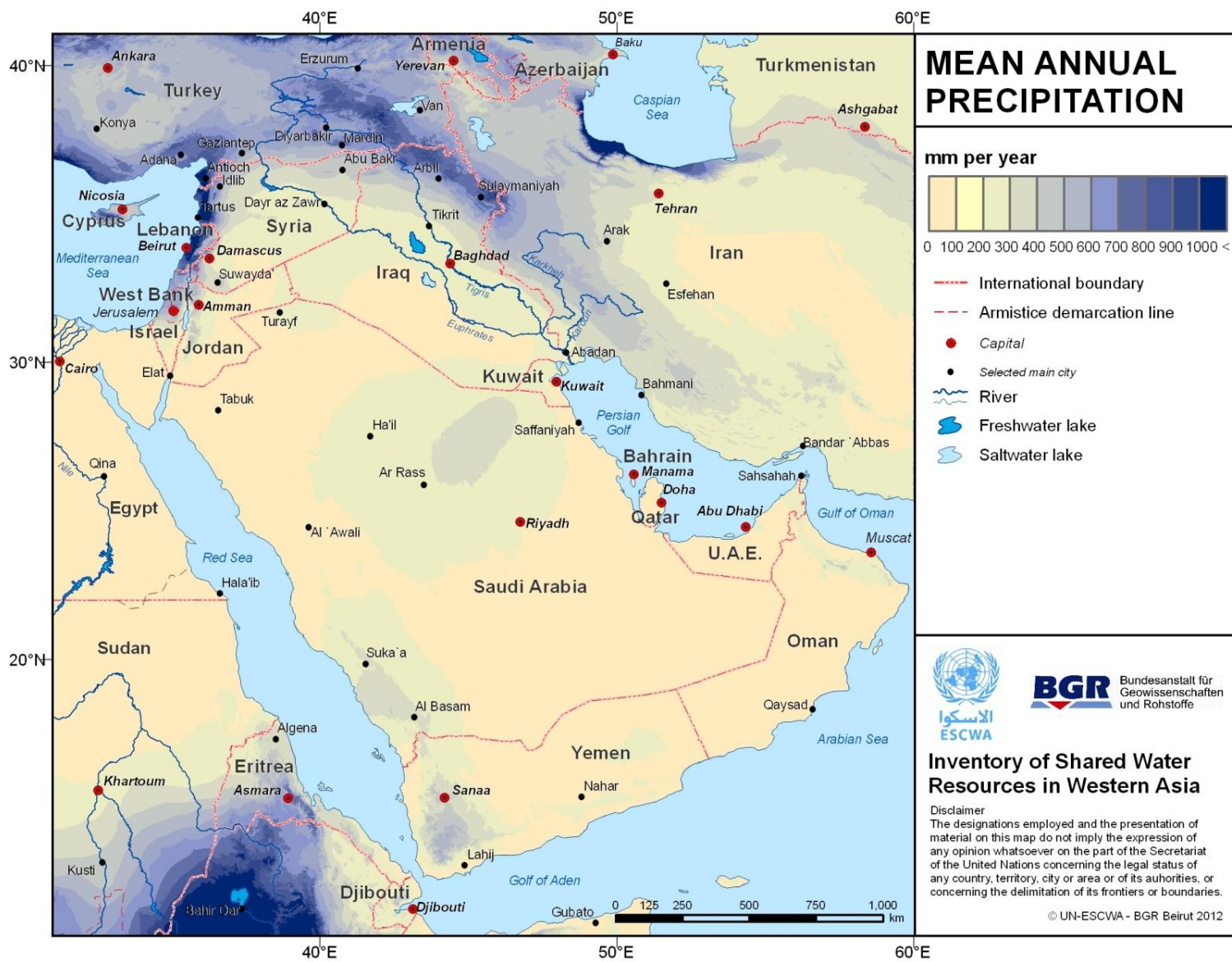
- Introduction to the Study Region
- The Inventory: Objectives, Process and Overview
- Added Value and Outlook



Region Profile: Population Density



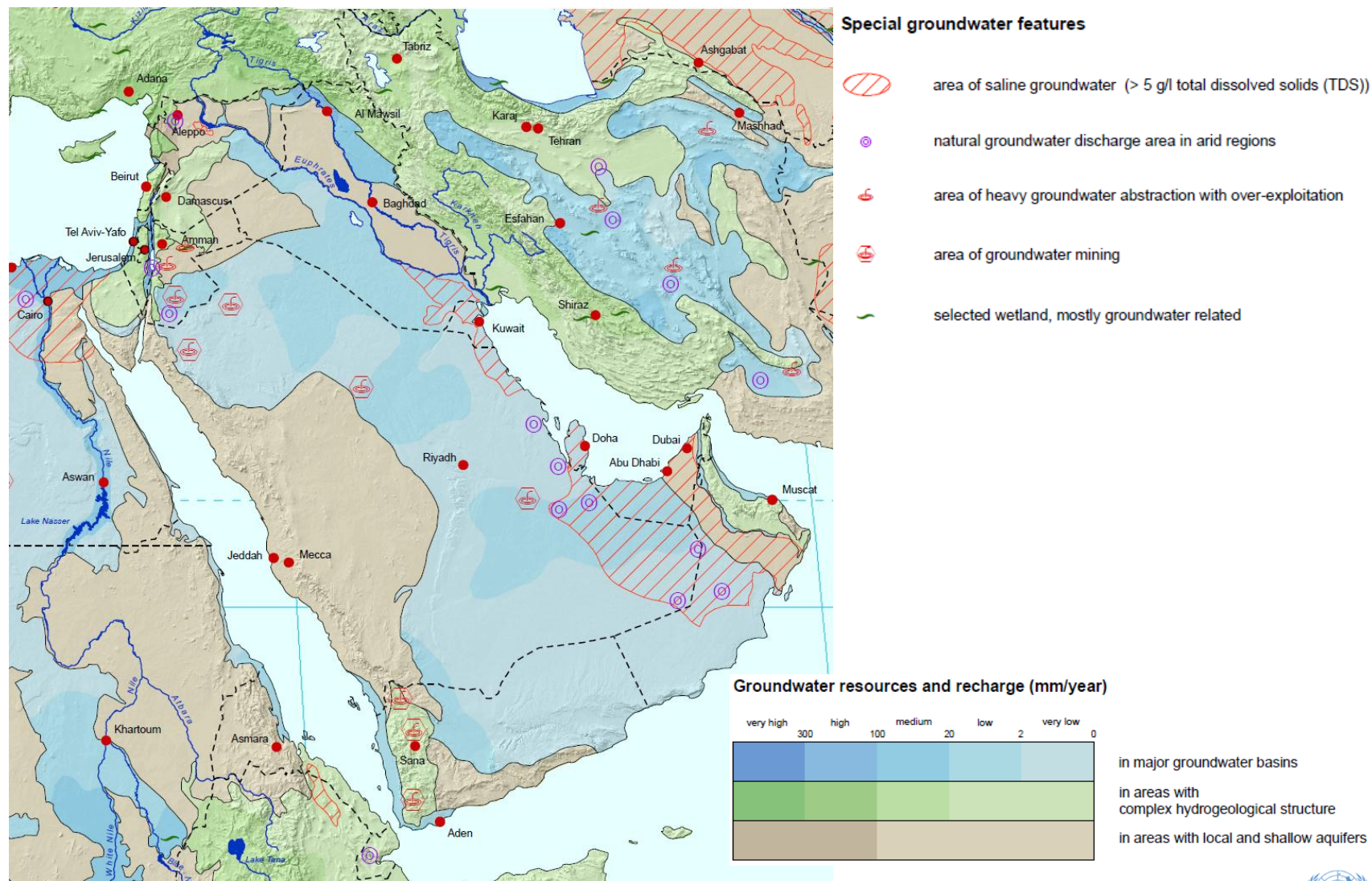
Region Profile: Water Availability



Inventory of Shared Water Resources in Western Asia

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Region Profile: Groundwater Resources



Regional Profile: Sector Challenges



- ◆ Natural water scarcity
- ◆ Growing population, unequally distributed
- ◆ Focus on agricultural development, limited industrialization
- ◆ Dominance of consumptive water uses (usually not measured)
- ◆ Over-exploitation of available blue water resources
- ◆ Dependence on non-conventional and marginal water resources
- ◆ Large investments in groundwater mining (deep aquifer exploitation)

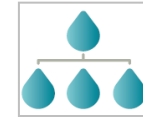
Regional Profile: Shared water resources

- Focus on shared river basins, especially popular cases of dispute.
- Water allocation is at the center of discussions
- Available information sources are outdated, incomplete, or limited to the national context.
- Groundwater systems are among the most extensive and productive in the world - but these 'hidden assets' have not been 'addressed' across borders.





Inventory: Synopsis



The Inventory is:

the first UN-led effort to take stock of the region's shared surface and groundwater resources in a comprehensive, systematic and standardized manner.

Objectives:

- **Identify**, and document the state of, shared water resources and their use
- Improve the **knowledge base** and facilitate information access
- Create awareness and stimulate **informed dialogue** within and between riparian countries
- Support **regional processes** towards improved dialogue and cooperation over shared water resources

Key Themes:

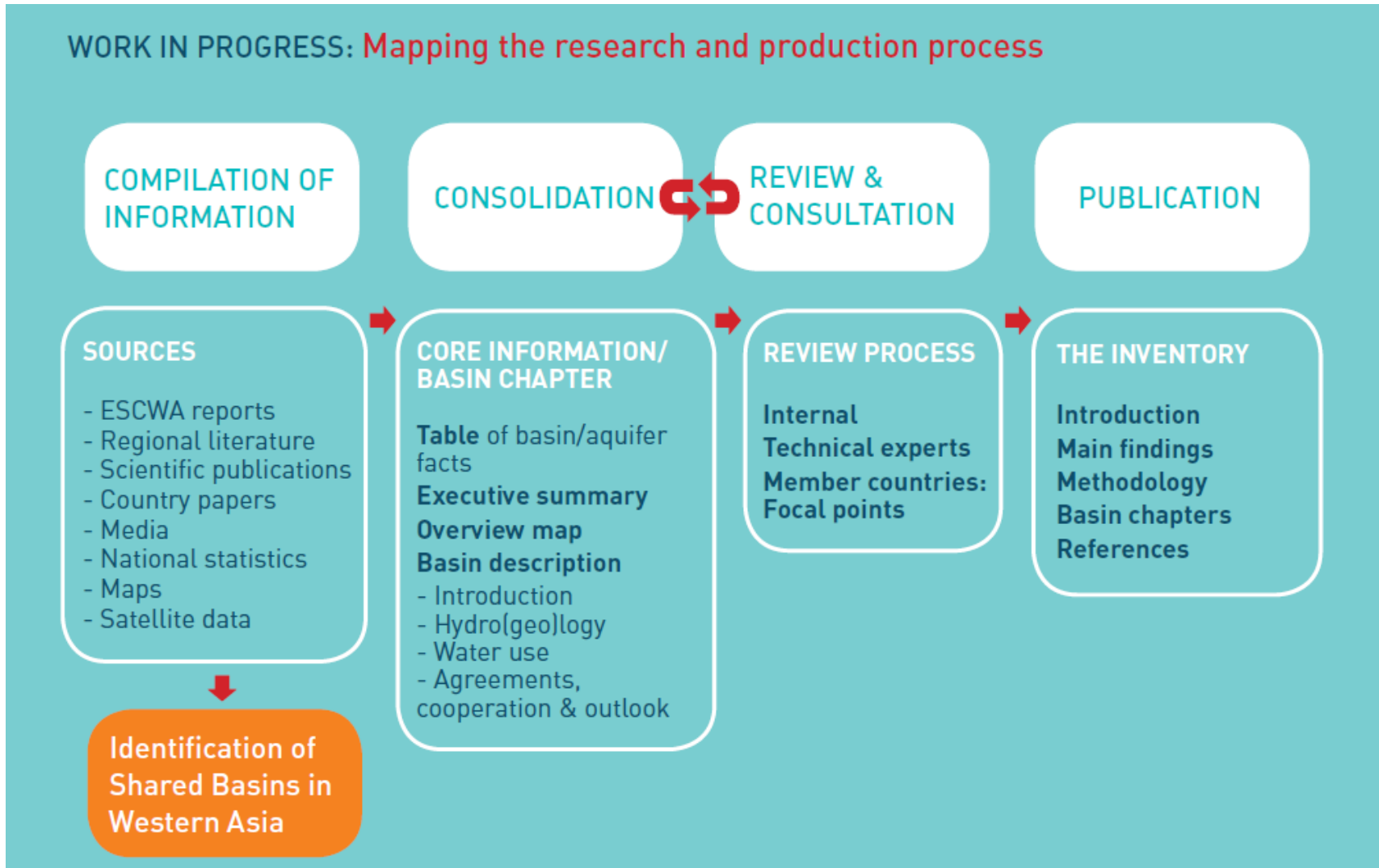
- hydrology, hydrogeology
- water resources development and use,
- agreements and cross-border management efforts.

الموارد المائية المشتركة

Euphrates River – Syrian Arab Republic

Inventory: Work Process

WORK IN PROGRESS: Mapping the research and production process



Inventory: Consultation with Countries

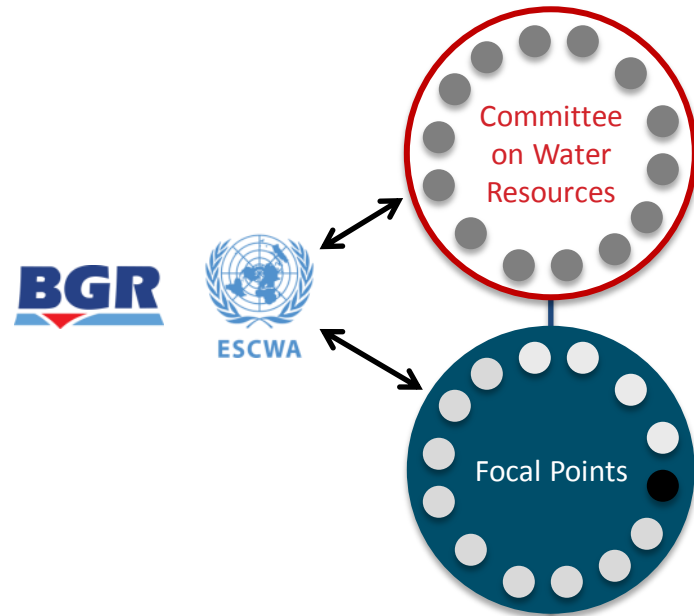
ESCWA Intergovernmental Committee on Water Resources

Backing the process since 2009

Inventory Working Group

formed in mid-2011

Bahrain, Egypt, Iraq, Jordan, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, UAE and Yemen



Approach:

- Basin Questionnaires based on **pre-screened information** (Oct 2011)
- Regional Consultative Meeting (Dec 2011)
- Individual missions and meetings (since Sep 2011)
- Commenting on chapters (on-going)

Shared River Basins

- Jordan River
- Orontes River
- Euphrates-Tigris-Shatt Al Arab
- El Kebir River
- Qweik River



Surface Water Overview

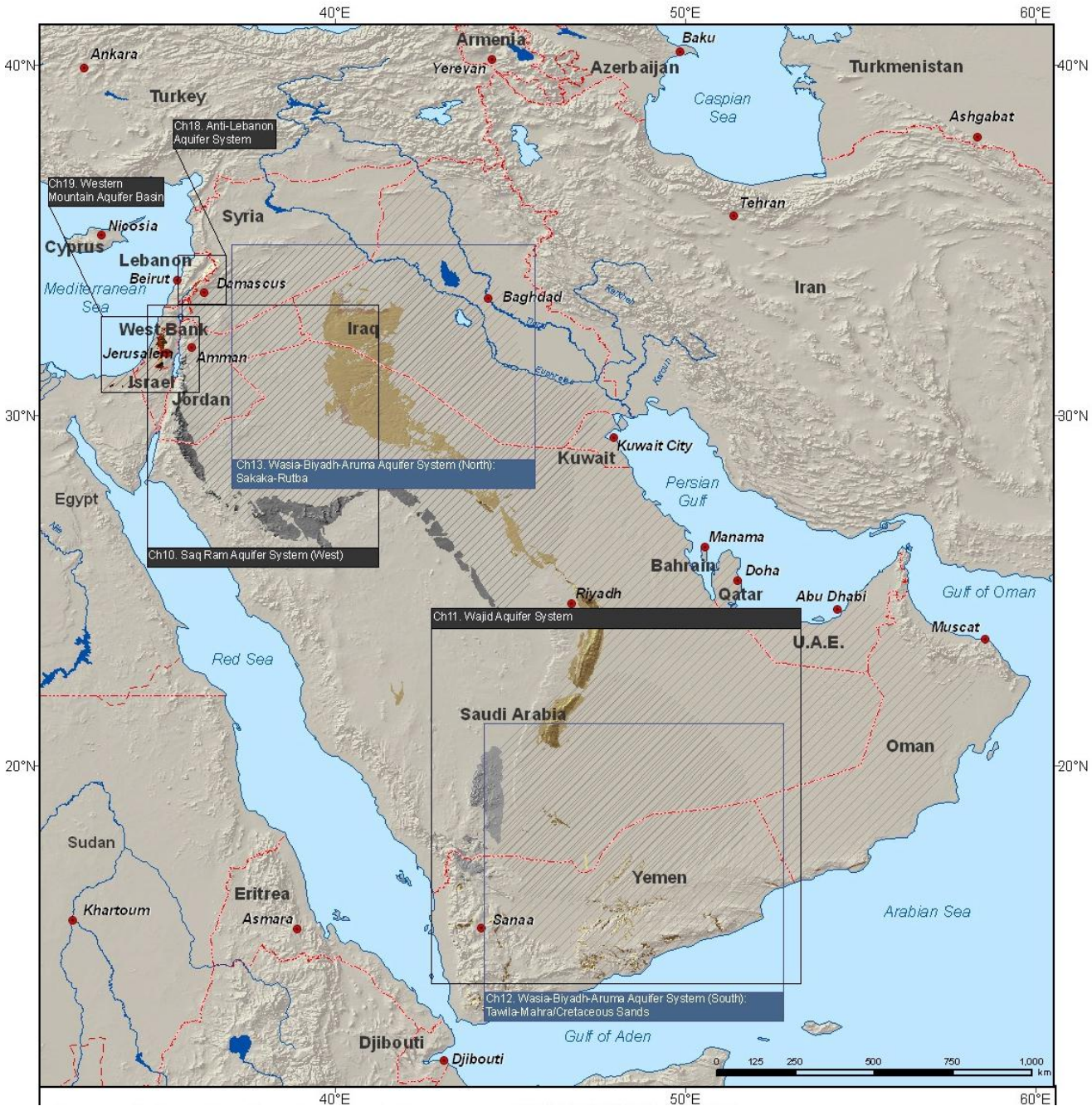
- International boundary
- - - Armistice demarcation line
- Capital city
- ~ River
- ▭ River basin boundary
- 🟦 Freshwater lake
- 🟩 Saltwater lake



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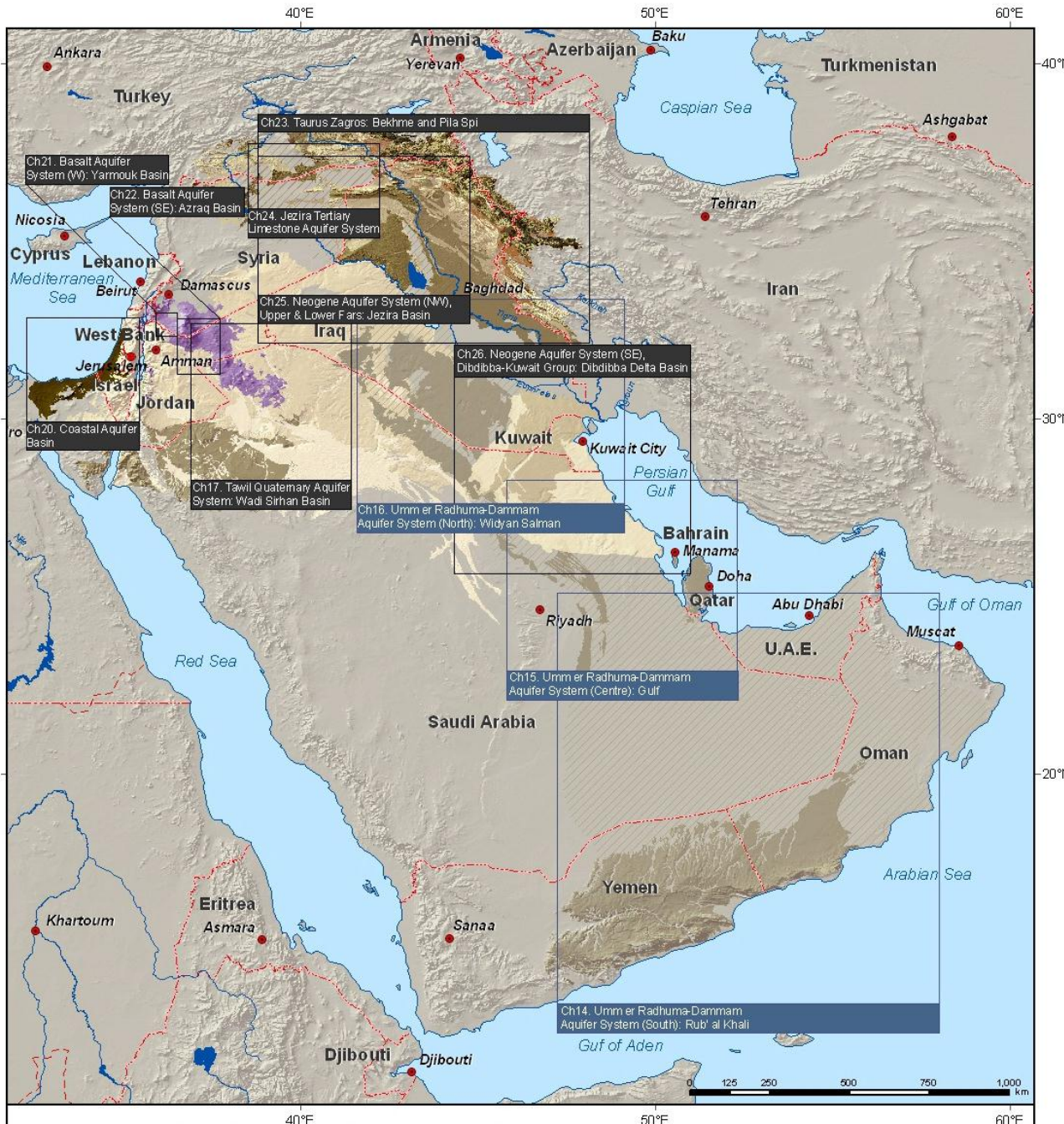




Shared Aquifer Systems

Mesozoic and Paleozoic Era

Shared Aquifer Systems Cenozoic Era





Added Value: Identification of shared aquifer systems

		ESCWA member countries												Non-ESCWA			
Shared Aquifer Systems		BAH	EGY	IRQ	JOR	KUW	LEB	OMA	PAL	QTR	SAU	SYR	UAE	YEM	IRN	ISR	TUR
ARABIAN PENINSULA	Saq Ram				●						●						
	Wajid										●			●			
	Wasia Biyadh Aruma (S): Tawila-Mahra / Cretaceous Sands										●			●			
	Wasia Biyadh Aruma (N): Sakaka-Rutba			●							●						
	U er R' Dammam (S): Rub' El Khali							●			●		●	●			
	U er R' Dammam (Center): Gulf	●								●	●						
	U er R' Dammam (N): Widyan-Salman			●		●					●						
	Tawil-Quaternary: Wadi Sirhan Basin				●						●						
THE MASHREK	Anti-Lebanon						●					●				●	
	Western Aquifer Basin		●						●							●	
	Coastal Aquifer Basin		●						●							●	
	Basalt (W): Yarmouk Basin				●							●					
	Basalt (SE): Azraq Basin				●							●					
MESOPOTAMIA	Taurus-Zagros			●											●		●
	Jezira Tertiary Limestone											●					●
	Neogene (NW) - Upper and Lower Fars: Jezira Basin			●								●					
	Neogene (SE) Dibdibba – Kuwait Group			●		●						●					



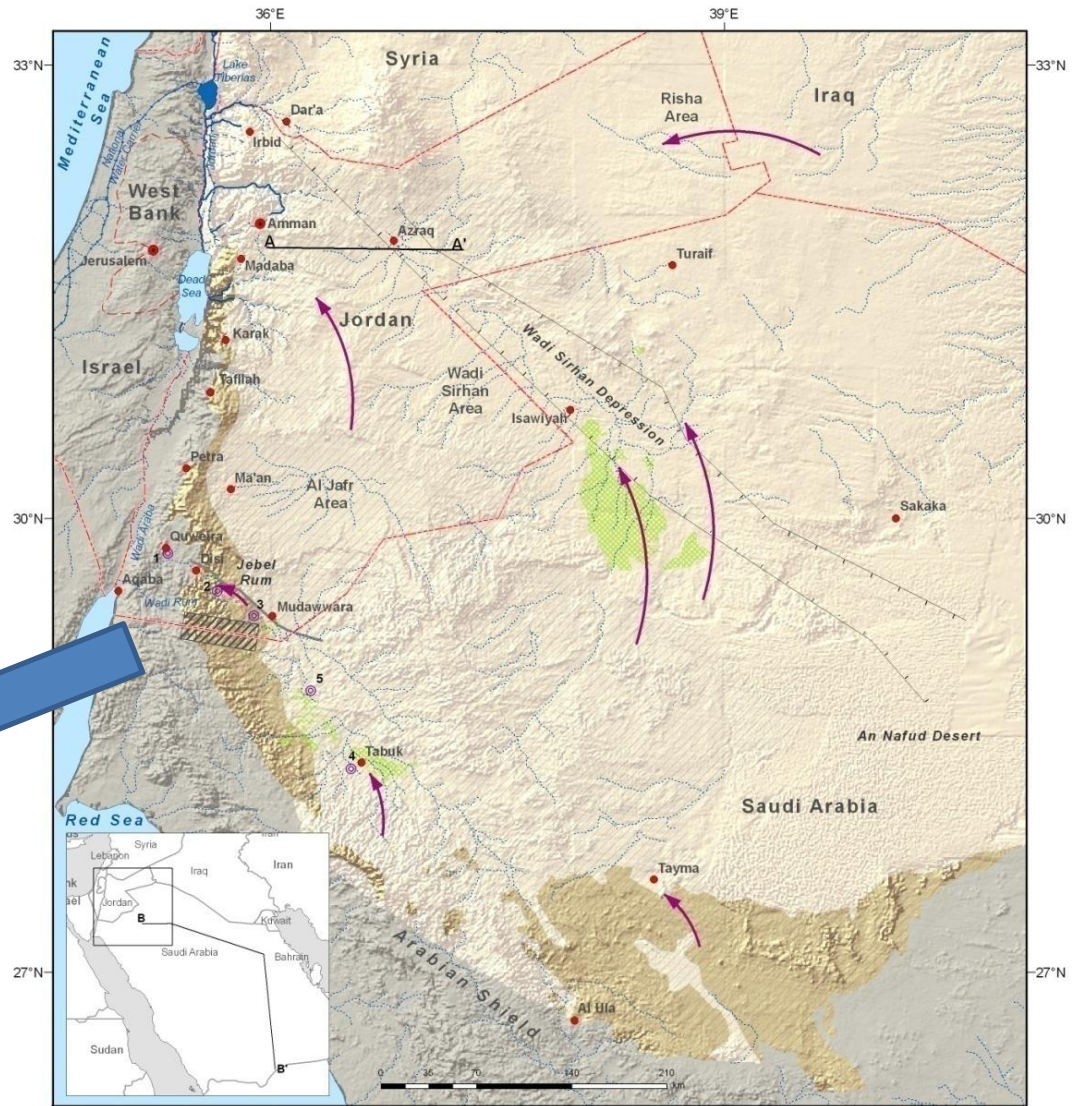
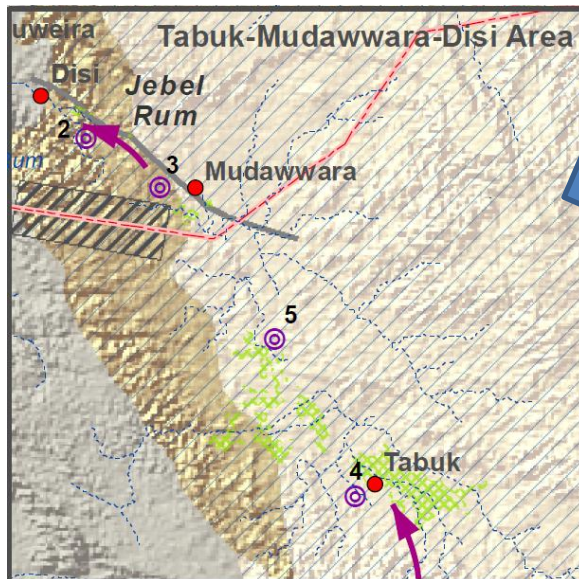
Added Value: Focus discussion on shared aquifer systems

Example:

Saq-Ram Aquifer System (West) – ‘Disi’

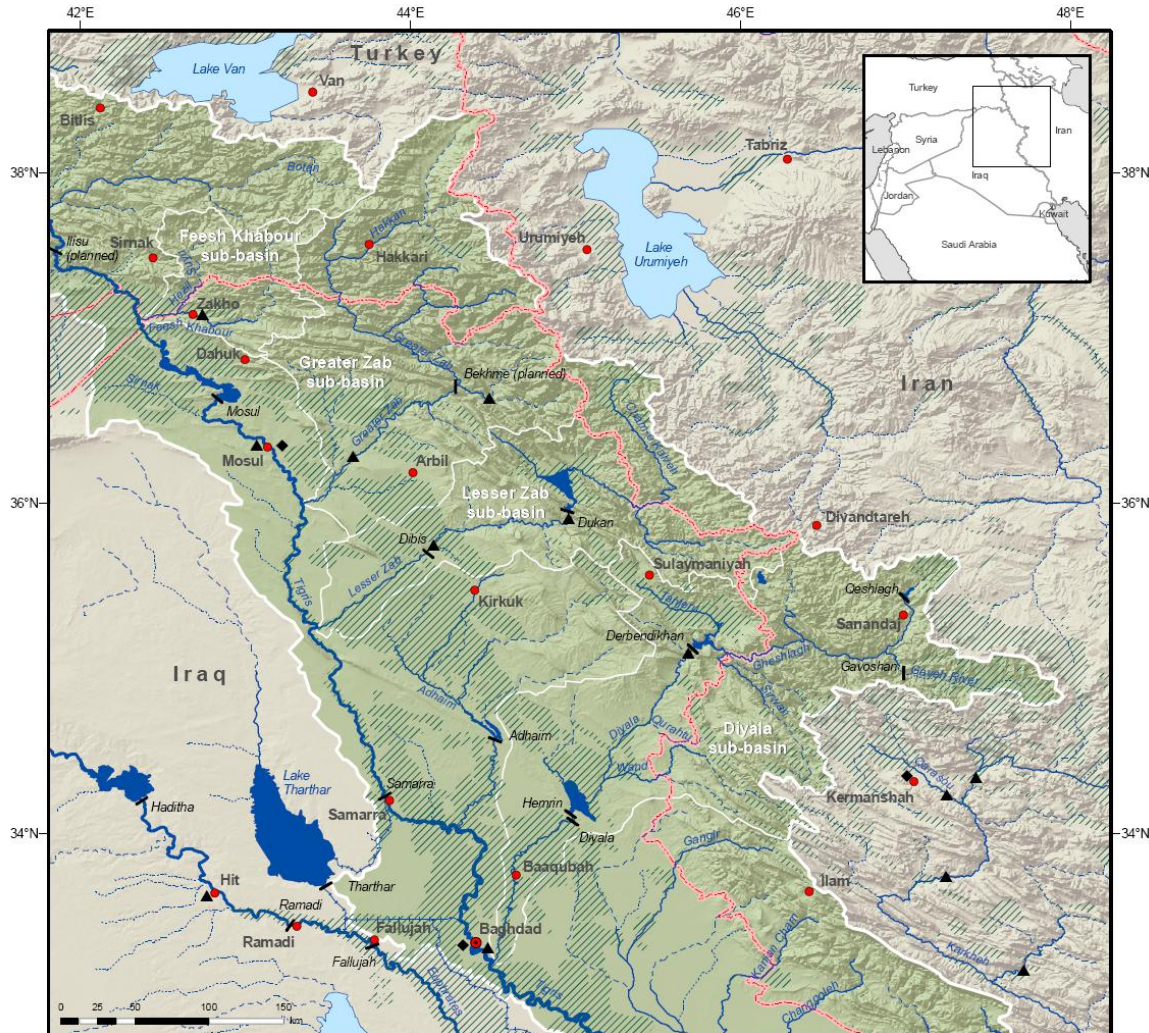
Aquifer

- approx. exploitability
- groundwater development





Added Value: Visualization in new maps



Example:

Map of **shared tributaries of the Tigris River**

- Sub-basin delineation
- Infrastructure
- agricultural development



Added Value: Hydrological baseline and trends

Example:

Discharge Variability: Orontes River

- visualize trend, drought years

Flow Regime: Euphrates River

- effect of river regulation

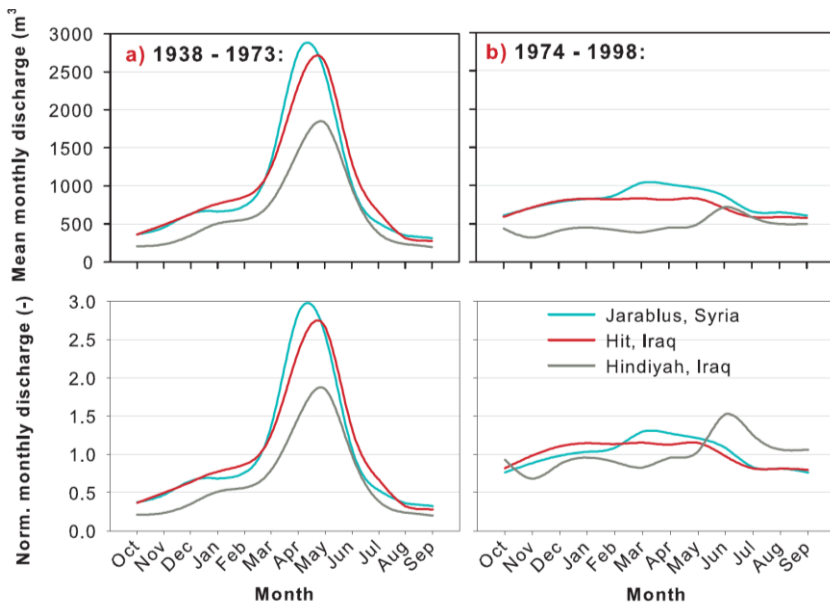


Figure 6. Mean monthly flow regime of the Euphrates River at different gauging stations for different time periods

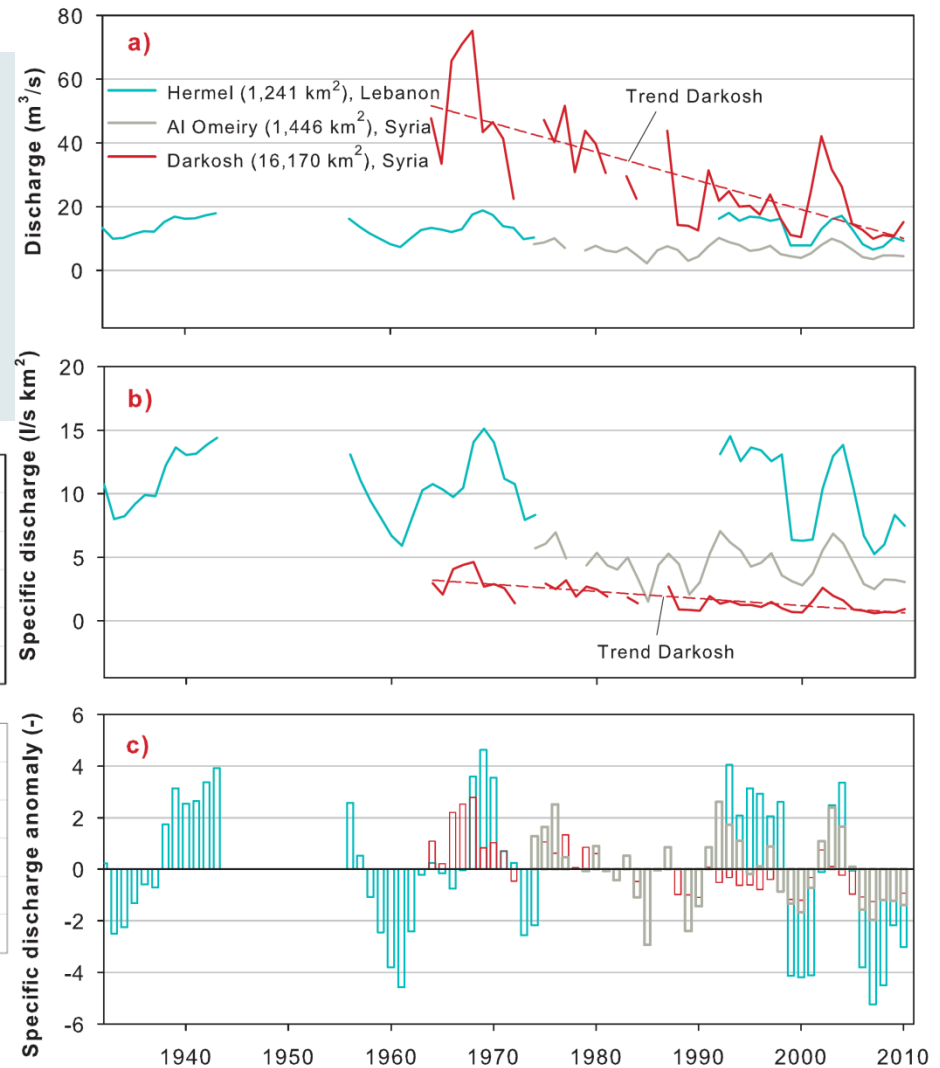
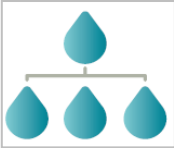


Figure 4. a) Mean annual discharge, b) specific mean annual discharge and c) discharge anomaly time series of the Orontes (1932-2010)

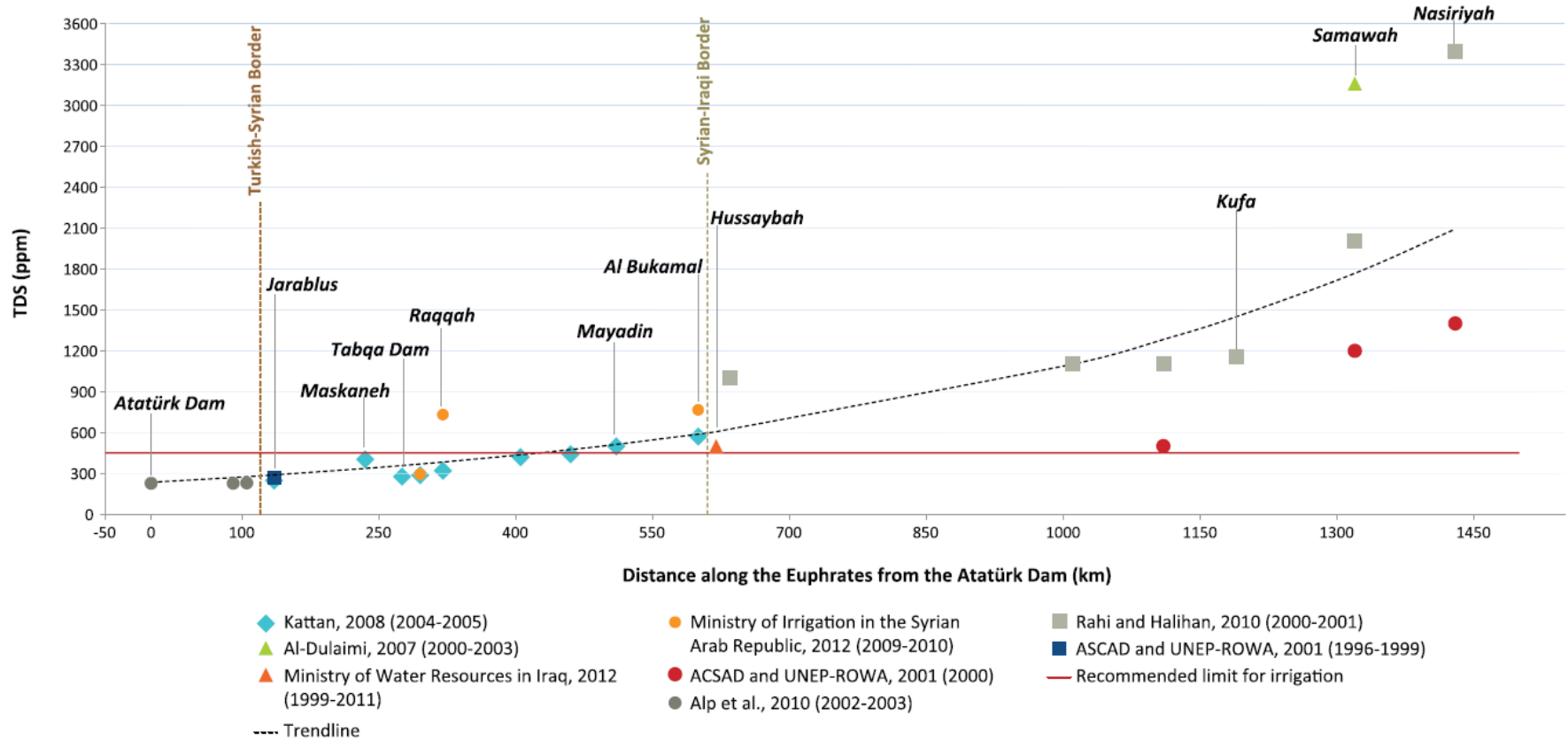


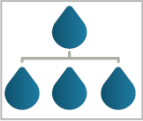
Added Value: Compilation of various data sources I

Example:
Water Quality Euphrates River

- National Data sets
- Scientific publications

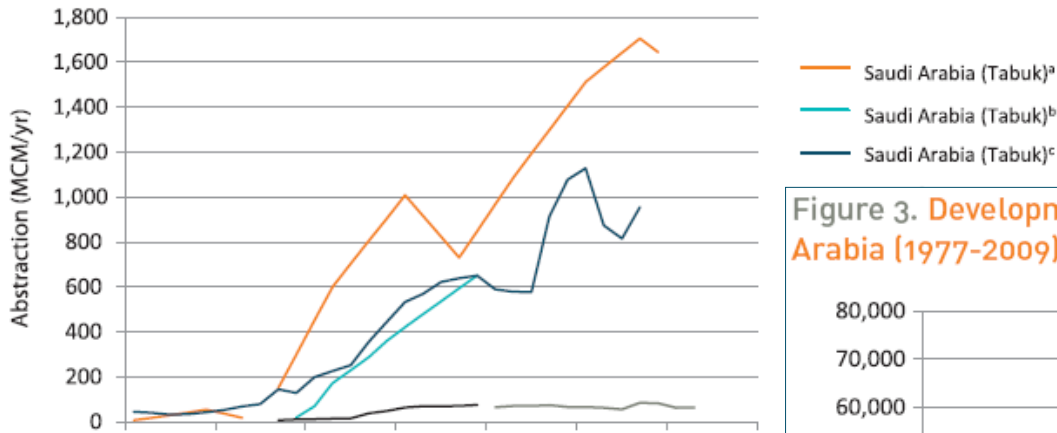
Figure 9. Salinity variations along the Euphrates River since 1996





Added Value: Compilation of various data sources II

Figure 2. Historical abstraction from the Saq-Ram Aquifer System (West) (1975-2007)



Example: **Water Use**

- Remote Sensing Studies
- Agricultural Statistics (proxy)
- National Sector data

Figure 7. Mean water use across sectors in the Orontes Basin in Syria (1992-2009)

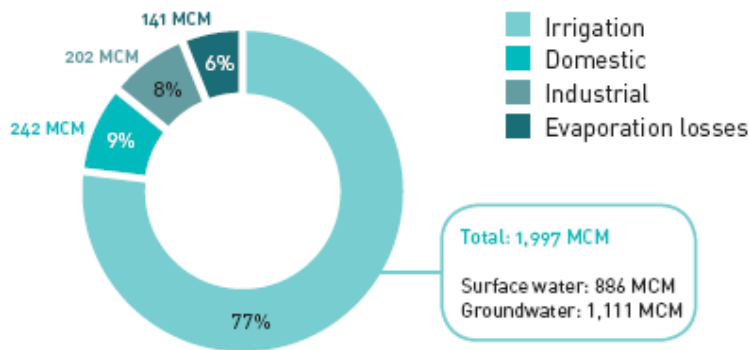
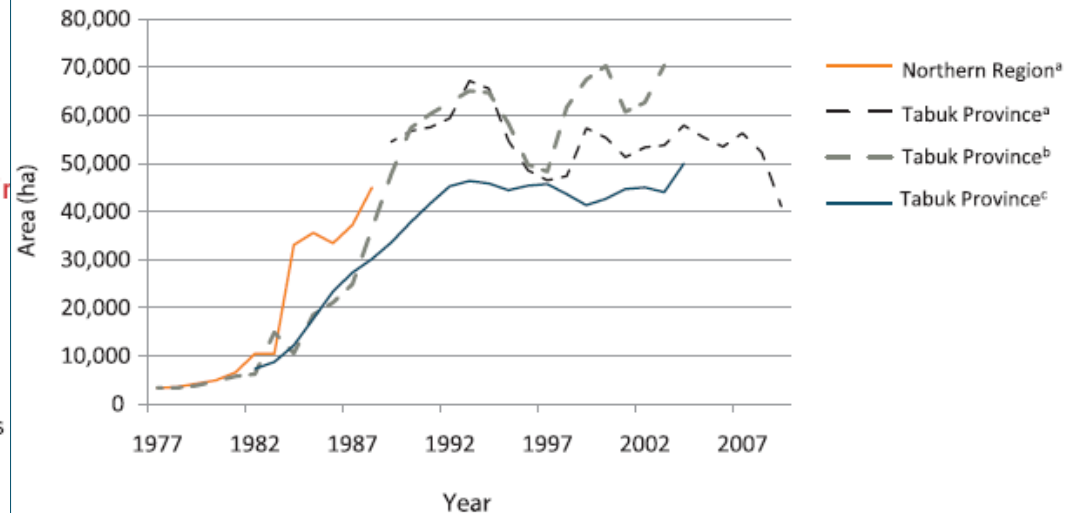
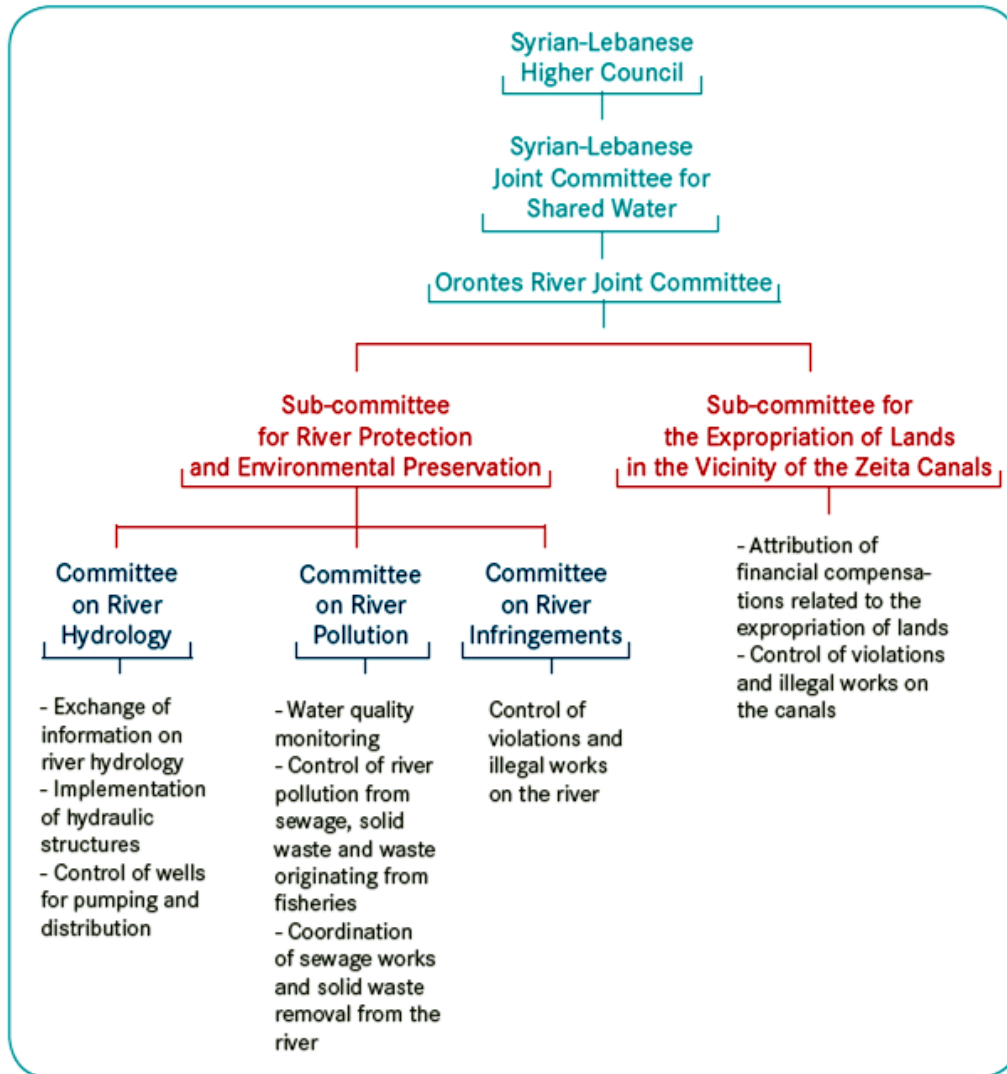


Figure 3. Development of total crop area in the Tabuk region of Saudi Arabia (1977-2009)





Added Value: Understanding existing cooperation



Source: Compiled by ESCWA-BGR based on data provided by Ministry of Energy and Water in Lebanon, 2011.

Example: Orontes River

Table 8. Water agreements on the Orontes River

YEAR	NAME	SIGNIFICANCE
1939	Final Protocol to Determine the Syria-Hatay Border Delimitation	The protocol and Afrin River. Although water is shared, that water is not shared.
1972	Agreement on Water Use	First bilateral agreement.
1991	Fraternity, Cooperation and Coordination Treaty	The treaty provides for the creation of two joint entities: the Orontes River Water Committee and the Hatay Water Committee.
1994	Agreement on the Distribution of the Orontes River Water Originating in Lebanese Territory	The agreement defines the sources of the Orontes River on an annual basis to receive water from Lebanon.
1997	Annex to the Agreement on the Distribution of Orontes River Water Originating in Lebanese Territory	The annex is intended to be excluded from the agreement. It covers infrastructure for the distribution of water.
2009	Turkish-Syrian Strategic Cooperation Council Agreement	At the High-level meeting, the two countries agreed on cooperation with special attention to the construction of the Orontes River and Turkey's infrastructure.

Source: Compiled by ESCWA-BGR based on data provided by Scheumann et al., 2010.

Inventory: Wrap-up

Conclusions from the Process

- Descriptive, scientific **baseline** for further dialogue on shared surface and groundwater resources is available
- Inter-active consultative process with countries has enhanced the value of the product
- The process itself has created awareness and stimulated dialogue
- Technical working group under the ESCWA Committee on Water Resources is in place.

Remaining Challenges

- Carry on momentum within and beyond the Working Group
- Further conceptual work in dealing with shared aquifer systems needed
- completion, validation and updating of baseline information
- Causal/analytical assessment (i.e. DPSIR)
- Horizontal expansion (i.e. new ESCWA members / North Africa)
- Integrating science into policy
- Enhance cooperation on the ground
- Move beyond water allocation



VISIT OUR WEBSITE

www.waterinventory.org

Thank you for your attention!

Andreas Renck

BGR Project Coordinator

Andreas.Renck@bgr.de

Tel +961 70 117 916

United Nations Economic and Social Commission for Western
Asia (ESCWA)

P.O. Box 11-8575

Beirut, Lebanon