

GLOWA Jordan River

Scientific support for sustainable water management under global change in a highly water-stressed region

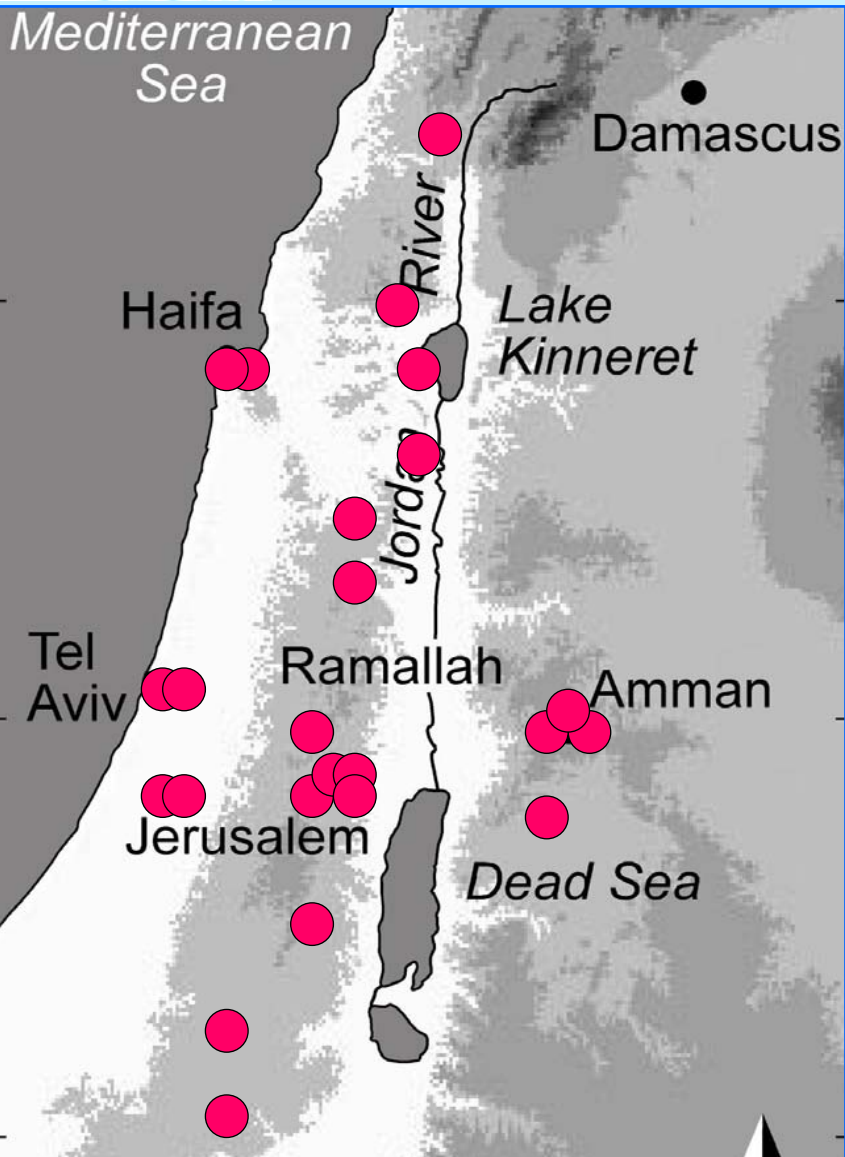
Katja Tielbörger and many others....





GLOWA

GLOWA Jordan River – the mandate



GLOWA Jordan River provides

- State-of-the art science
- Scientific support for sustainable management of trans-boundary resources
- Dialogue between science and stakeholders
- Integration and application through a decision-support-tool

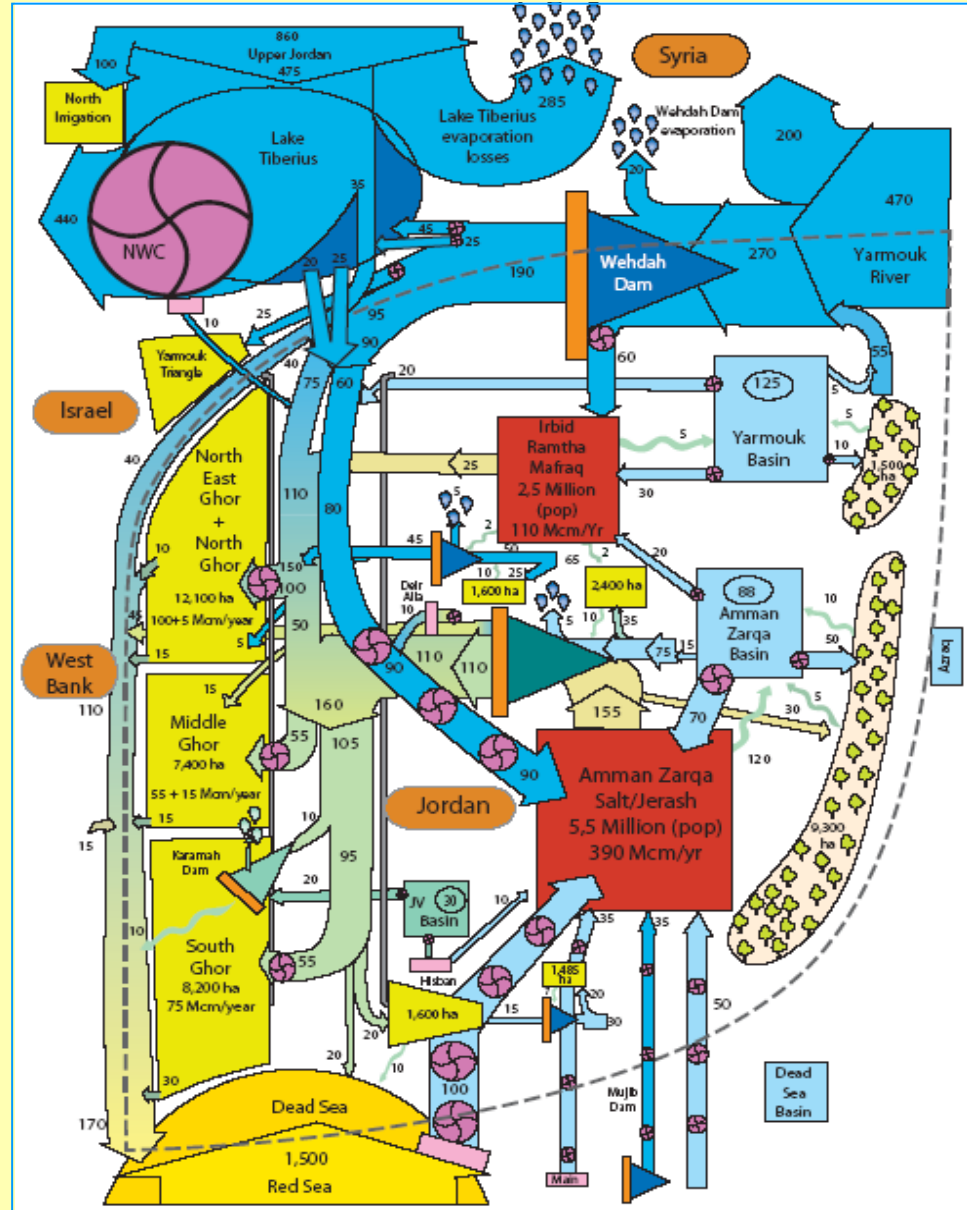
≈ 50 groups in D, IL, JO, PA



GLOWA JR- a need for integration

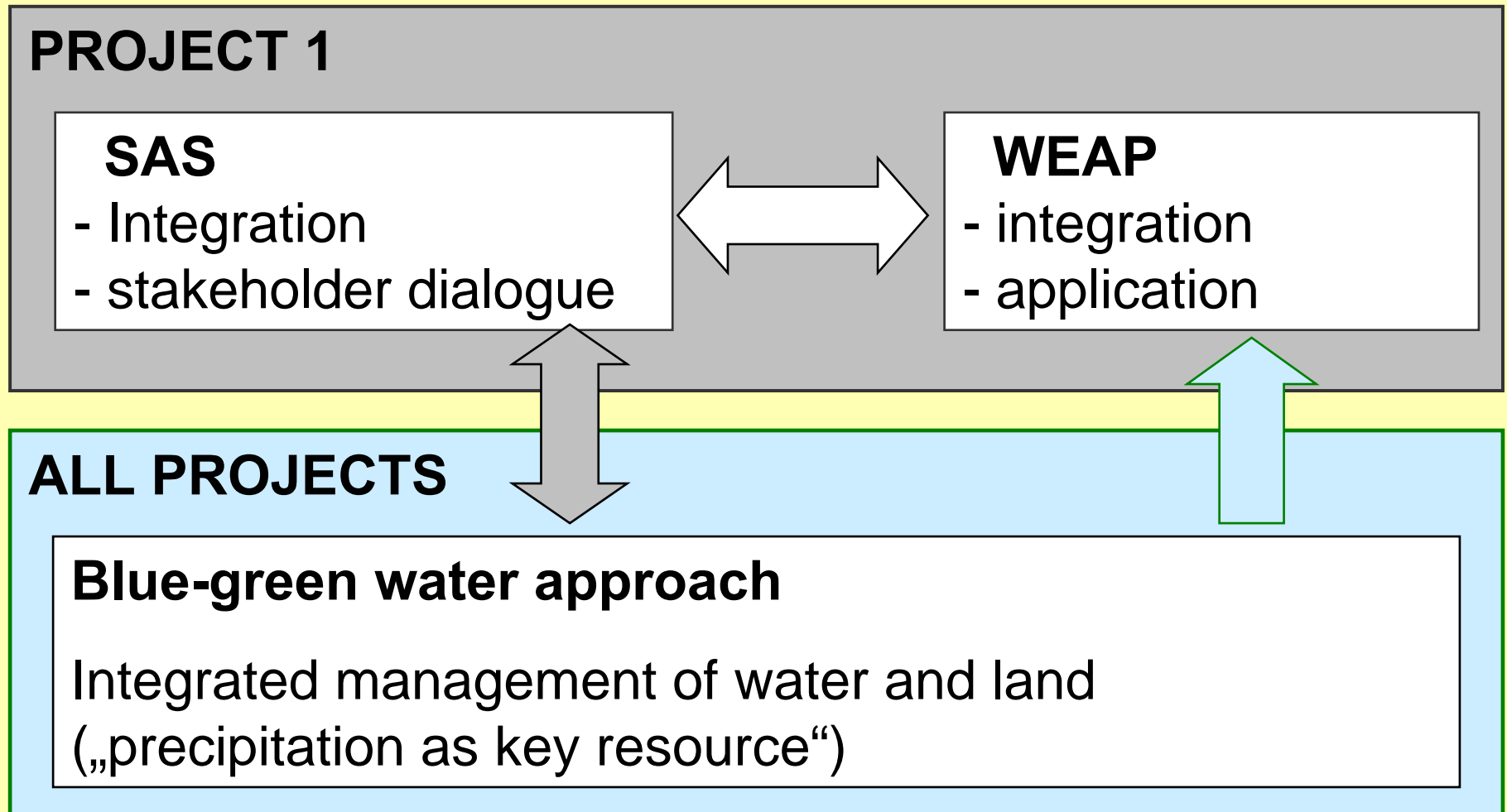
The Jordan River water resources

Jordan





Focus on INTEGRATION and APPLICATION



The study region is among the most water-stressed regions in the world: demand increases, supply decreases (climate change)

Challenges for integration

1) Heterogeneous data

	data		resolution	
	availability	accessibility	spatial	temporal
Israel	+++	---	+++	+++
Jordan	+-	+-	+-	+-
Pal. Auth.	--	+-	-	-

2) Expert knowledge provided in qualitative terms

A type of scenario exercise that ...

- ... includes both **qualitative** information (storylines) and **quantitative** information (model calculations) and combines their advantages;
- ... is an **iterative process** engaging both stakeholders and environmental modelers;
- ... is a useful tool for **synthesizing information/findings** from the GLOWA-Jordan River sub-projects in a form relevant to policymakers.

Who is involved?

SAS integrates activities

Scenario Panel: Stakeholders. Representatives from water & agriculture ministries of Israel, Jordan, and Palestinian Authority; NGOs; scientific advisors.

→ *Develop qualitative scenarios (“storylines”).*

Scenario Team: GLOWA Jordan River scientists (Uni. Kassel & Tübingen). → *Coordinate scenario exercise.*

Project Scientists: Partners from scientific sub-projects of the GLOWA Jordan River project. Support storyline development with modeling analyses.

→ *“Quantify” scenarios (modeling and other analyses)*

Moderator Team (“Prospex”).

→ *Facilitate Scenario Panel meetings.*

First Draft Scenario Storylines

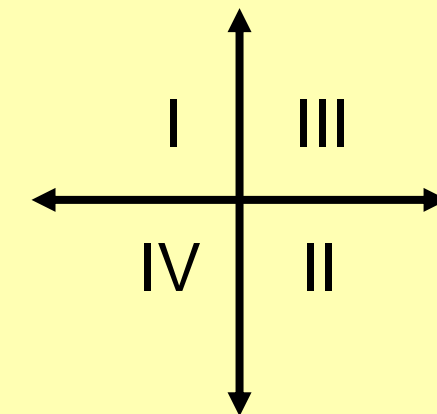
Finance & Pricing (Economic conditions)

Access to water & Allocation of water

Unilateral dividing –
limited supply

Recession

Continued
economic
growth

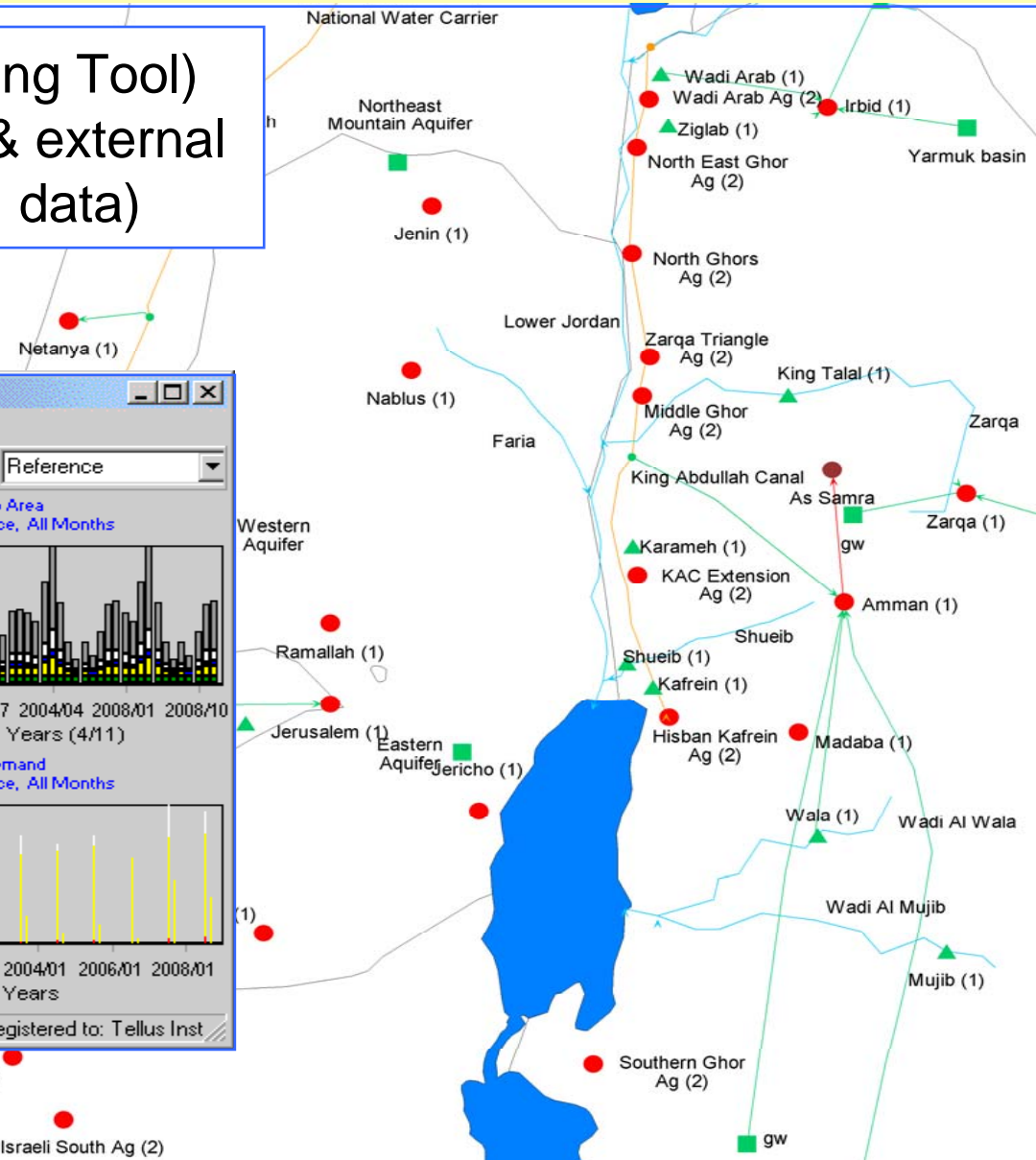
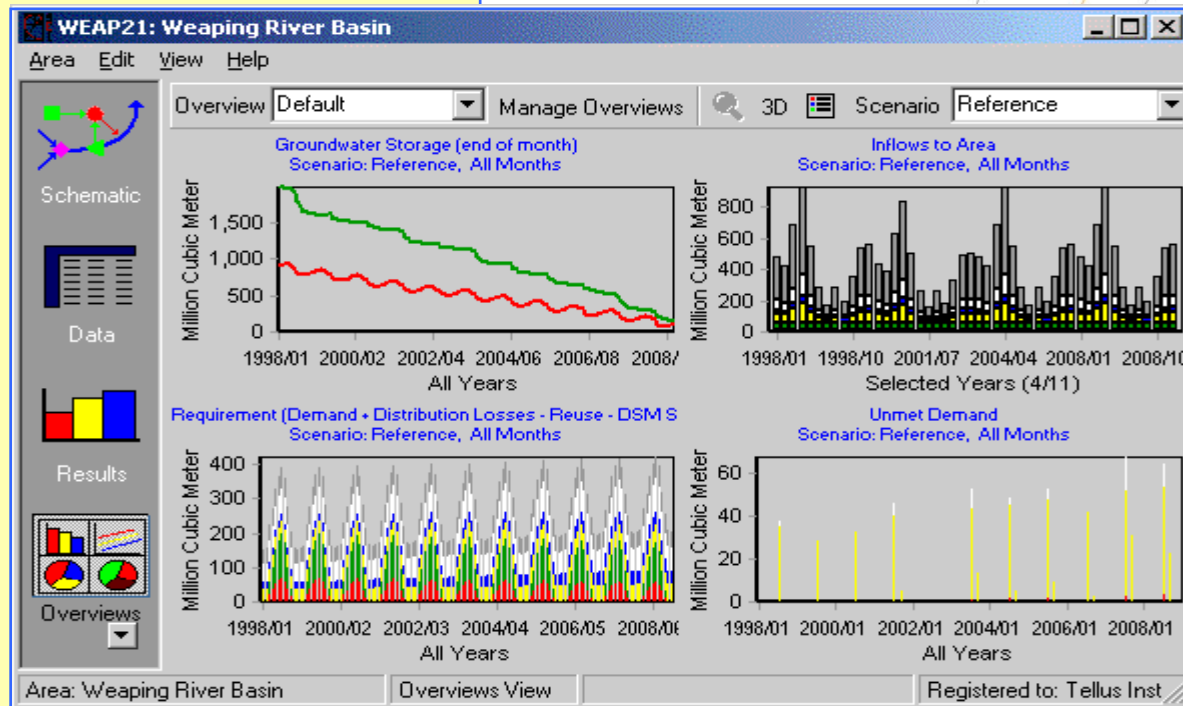


Multilateral sharing –
expanding supply

- Scenario I: Recession / unilateral dividing of water
- Scenario II: Economic growth / multi-lateral water sharing
- Scenario III: Economic growth / unilateral dividing of water
- Scenario IV: Recession / multi-lateral water sharing

Integration: decision support

WEAP (Water Evaluation And Planning Tool)
 - integrates GLOWA JR information & external data on supply and demand (spatial data)



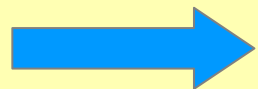
What is



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WEAP IS:

- a planning tool – not a complex scientific model
- fed with complex scientific results
- focussing on supply and demand
- application-oriented
- easy to learn and user-friendly

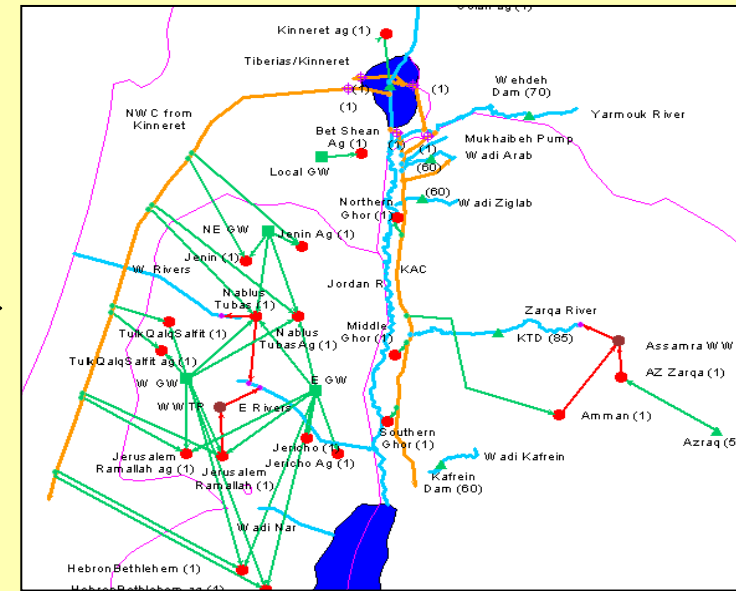
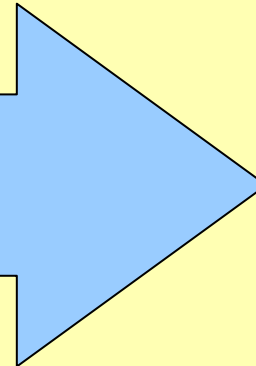
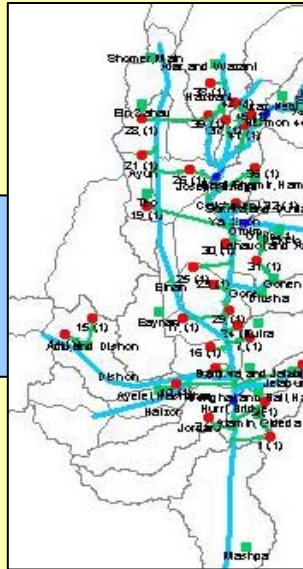
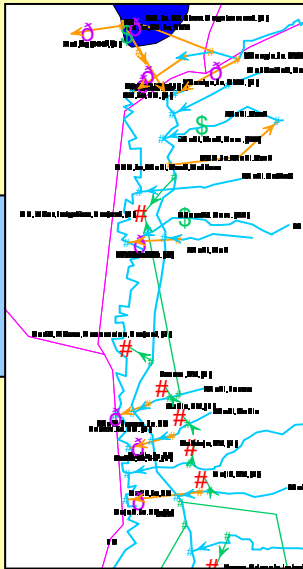
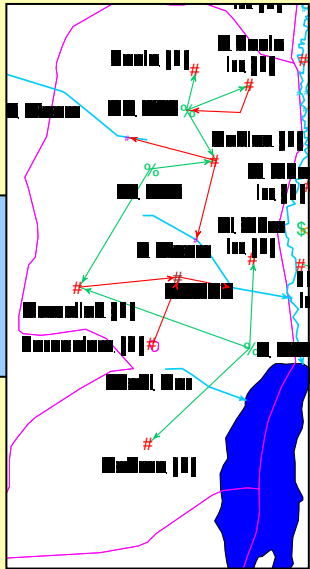


Practical tool for integrated water resource planning in the Jordan River region

Dealing with heterogeneous datasets

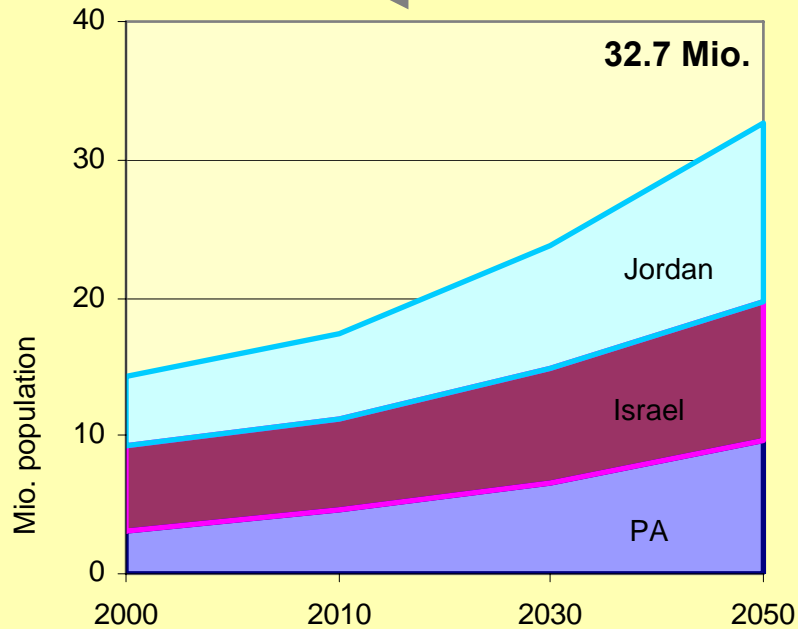
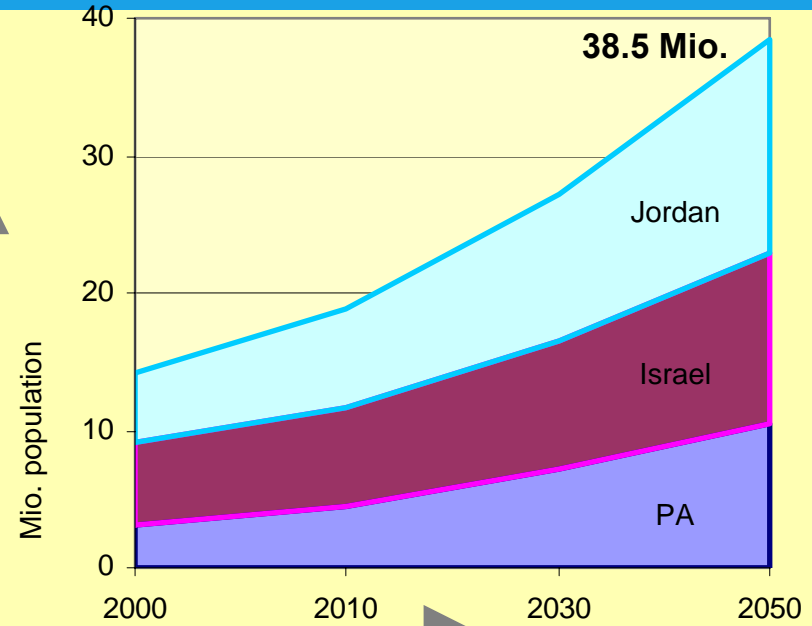
We develop 4 WEAP systems in a nested manner

- 1) West Bank WEAP (PA)
- 2) Jordan Valley WEAP (Jordan)
- 3) Upper Jordan River Catchment WEAP (Israel)
- 4) Regional WEAP (transboundary)



Integration – SAS scenarios

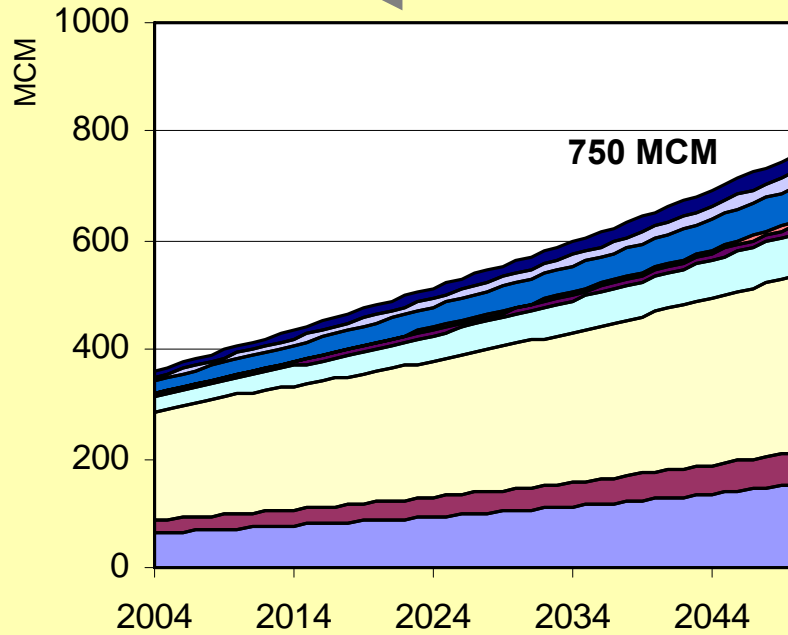
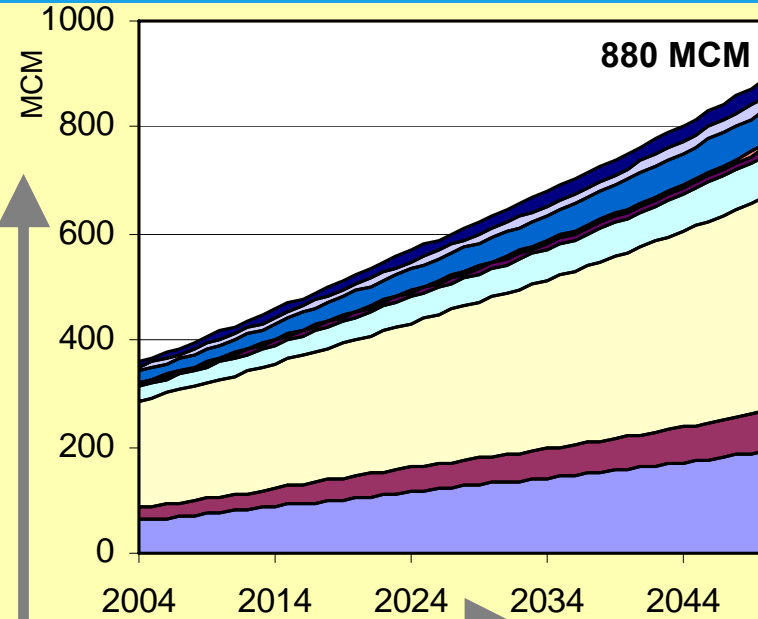
SAS driving force:
Population growth



Integration – SAS scenarios

Domestic water demand for population growth scenarios

generated by WEAP

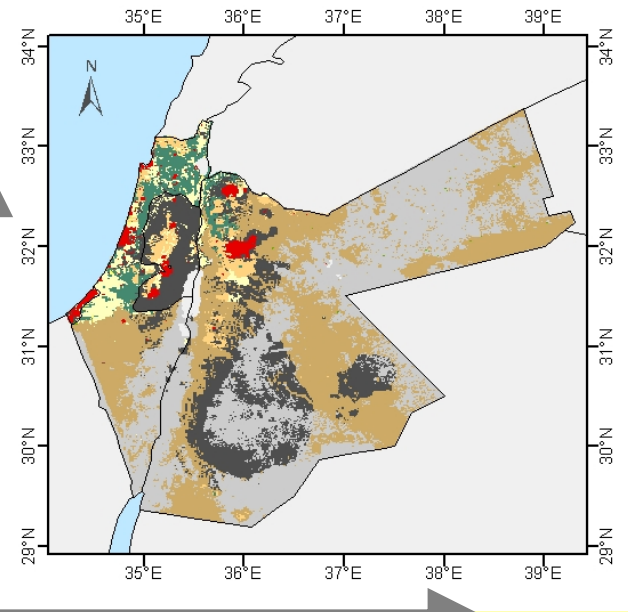
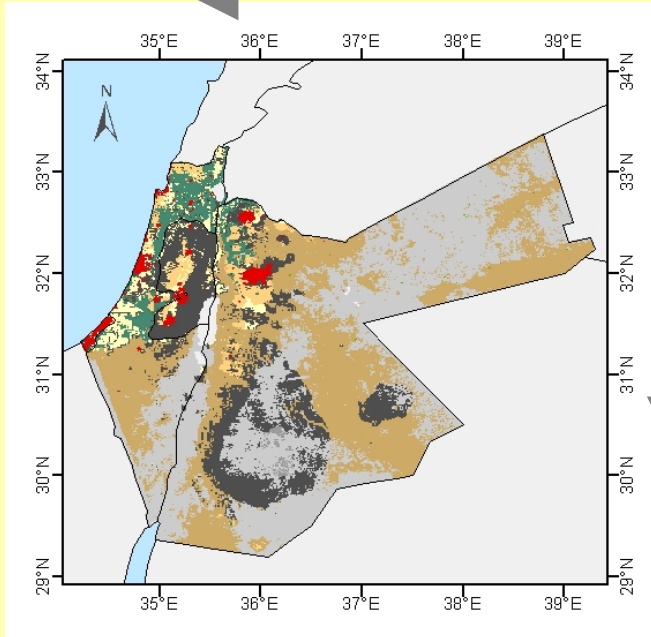


Colours refer to different municipalities

Integration – Land Use Scenarios

**LandSHIFT model:
Land use/Land cover**

**Weak &
Environment**



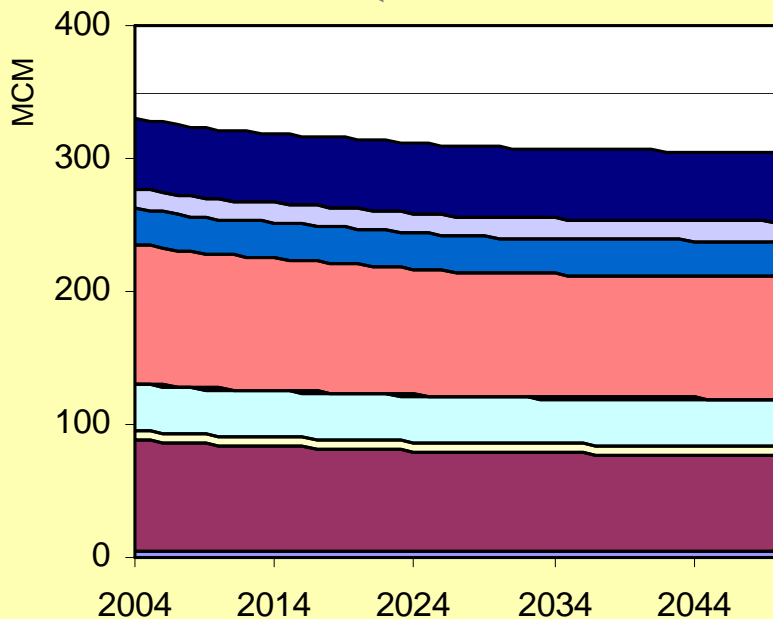
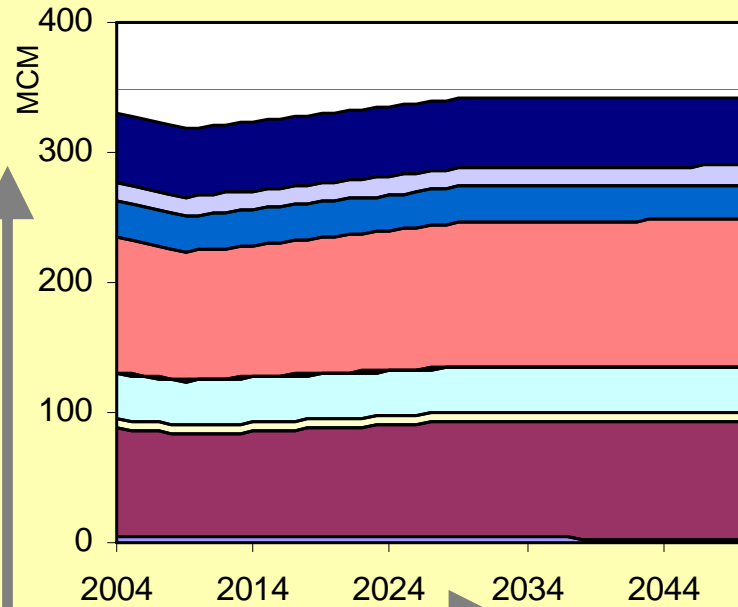
**Willingness
& Ability**

Integration - LandSHIFT

Agricultural water demand

only LandSHIFT scenarios
(category „crops“ and „other crops“)

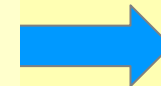
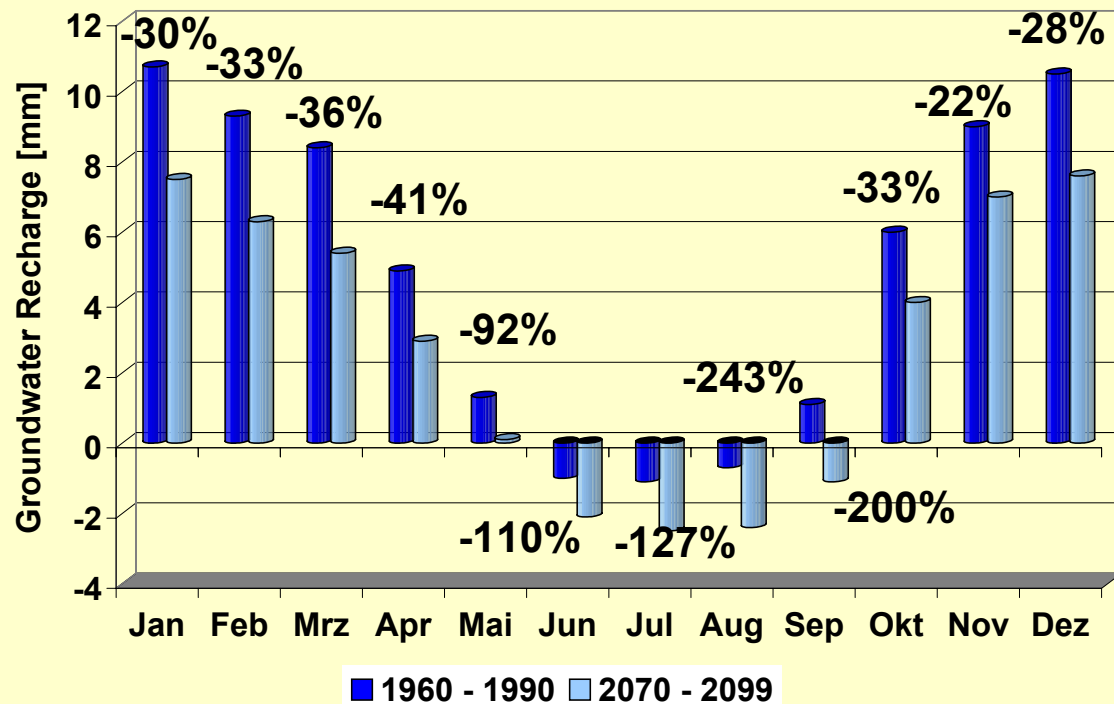
generated by WEAP



Colours refer to different agricultural areas

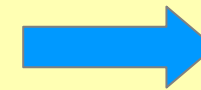
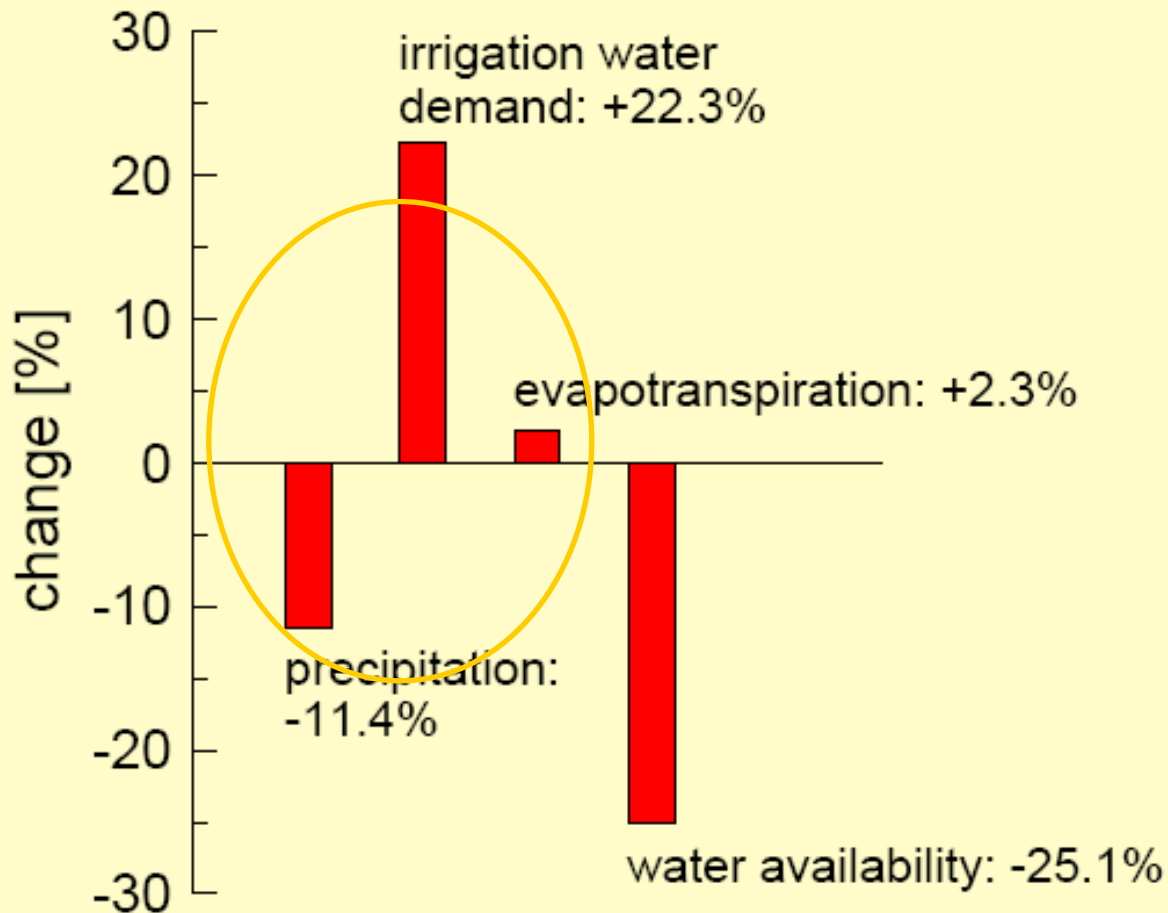
Climate change impacts on the Jordan River system

Example: Decrease in groundwater recharge



What is the effect of this decrease on the Jordan River Water System?

Climate change impact on irrigation water demand

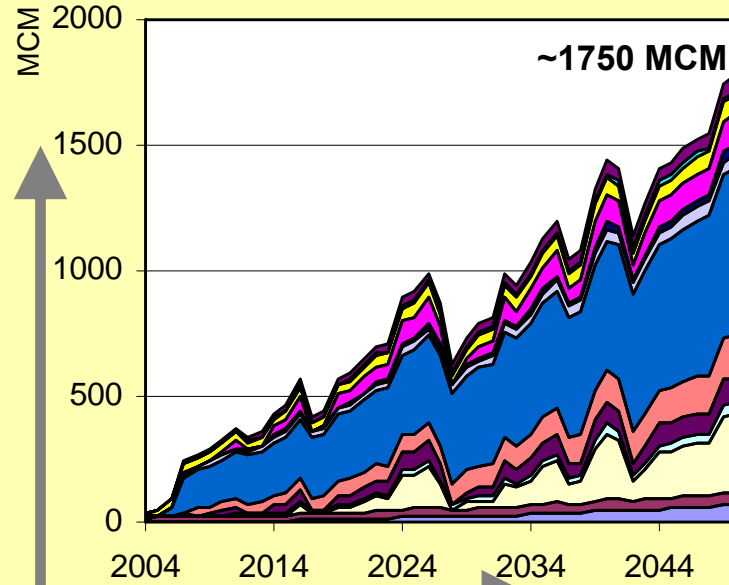


What is the impact of **increasing irrigation demand** due to **climate change** on water demand applying **changing land use** ?

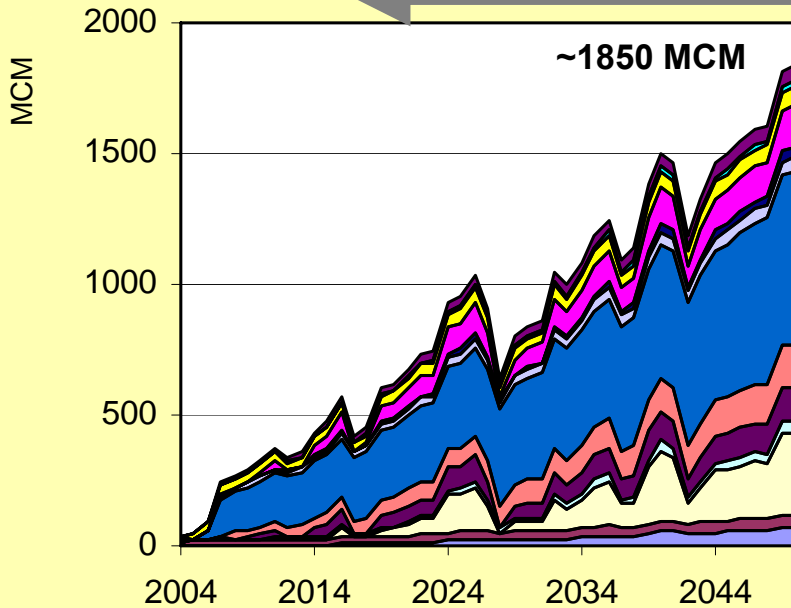
Integration – unmet demand

Demand – supply balance
(all demand sites)

Demand – supply = unmet demand



Willingness
& Ability



Weak &
Environment

huge unmet demand in any scenario

Colors refer to different demand sites

Summary- Integration tools

The combination of WEAP and SAS allows:

- integrating qualitative and quantitative information
- addressing the problem of heterogeneous datasets

evaluating cost & benefit of separate and combined management options

e.g: desalination and transfers
wastewater reuse
rainwater harvesting,
managed aquifer recharge
green water / land management

demand management:
options to increase efficiency
virtual water imports
increasing productivity
re-allocation of agricultural
land for recreation



THANK YOU!



Rainfed
agriculture in
the West Bank