

The Future of Water in the Middle East: The Scenario Exercise of the GLOWA Jordan River Project

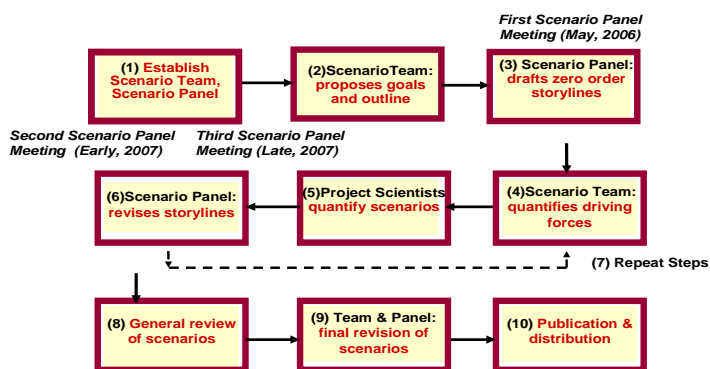
B. Lübker-Alcama, J. Onigkeit, J. Alcama, R. Schaldach, J. Koch, M. Köchy, L. Menzel, A. Heckl, P. Alpert, S. Krichak and the members of the GLOWA JR Scenario Panel



1. Background

The GLOWA Jordan River Project used an innovative procedure called the **Story and Simulation (SAS)** approach to carry out a two and a half-year long scenario exercise dealing with the future water situation of the Jordan River region under climate change conditions up to 2050. SAS is an iterative, stakeholder-driven procedure that ensures the engagement of stakeholders together with project scientists in the scenario building and analysis. The aim of this approach is to integrate narrative information provided by stakeholders and quantitative information provided by scientific models in a systematic and transparent way.

2. Procedure



3. Scenario Panel Meetings

At the core of the SAS procedure are a set of scenario panel meetings guided by professional moderators. Active participants in the GLOWA Jordan River scenario development were stakeholders and scientists from Israel, Jordan and the Palestinian Authority. Stakeholders included representatives from various water-related agencies and ministries as well as representatives of NGOs in the region.

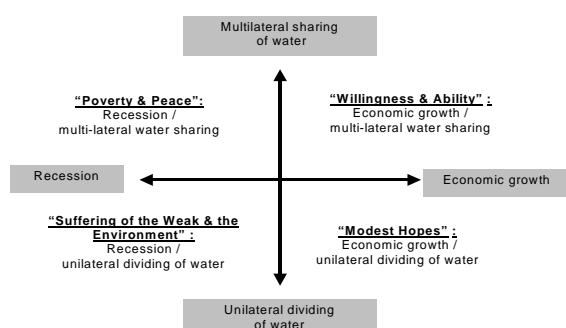


4. Results -- Regional Development Scenarios

The scenario exercise began with a Scenario Panel meeting during which a preliminary set of four scenarios was identified and drafted, and the scientific models available in the project were introduced. During the Second Scenario Panel meeting these scenarios were further developed, their storylines written and some first quantitative model results were presented. During the third and last Scenario Panel meeting, the four storylines were harmonized by balancing scenario elements, regional information, level of detail, and inner logic. Furthermore, gaps in information about driving factors were filled in, modeling results were incorporated, and the end state (2050) and intermediate state (2025/2030) of the scenarios were elaborated.

The end product was four "regional development" scenarios under global and regional change which include qualitative storylines as well as quantitative modeling results. These scenarios provide a valuable background for testing specific water planning and management strategies for the region. According to stakeholders, the scenario exercise provided new insights, such as the non-preparedness of the region for climate change, as well as the realization that stability in the region alone is not enough to solve its water issues.

The 4 GLOWA Jordan River regional development scenarios



4a. Qualitative scenarios - storylines

The end of the Poverty & Peace Storyline

...
2050

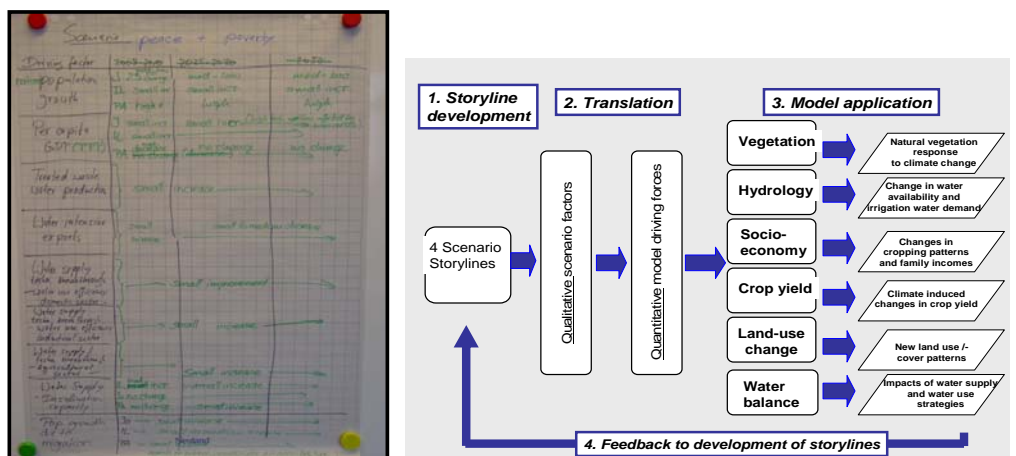
Immigration to the region eventually slows and this lessens the pressure on municipal water supply. The overall economic situation is still poor so that industrial water demands only modestly increase. Nevertheless, water continues to be diverted from agriculture to satisfy the slowly increasing needs of municipal and industrial water users.

Political stability over the past decades has led to a slow but steady spread of technology throughout the region. This also includes technology for treating wastewater and eventually construction begins again on new wastewater treatment plants so that wastewater treatment capacity slowly increases and covers a larger and larger percentage of water users. Water quality in the region slowly improves.

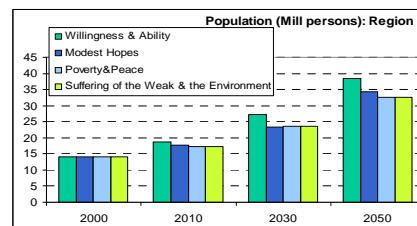
The impacts of climate change become more noticeable especially in reduced yields of key crops. To cope with these impacts, states cooperate more intensively on new irrigation projects. Also, new and relatively inexpensive desalination facilities are being built in Jordan and Israel. The cooperative projects remain fairly small-scale and are dependent on financial support from outside the region.

4b. Linking qualitative & quantitative scenarios

Description of qualitative development of the major driving forces for the "Poverty & Peace" scenario

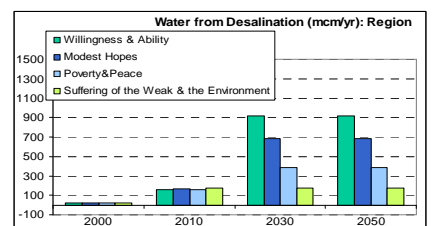


4c. Quantitative scenarios – model input and output

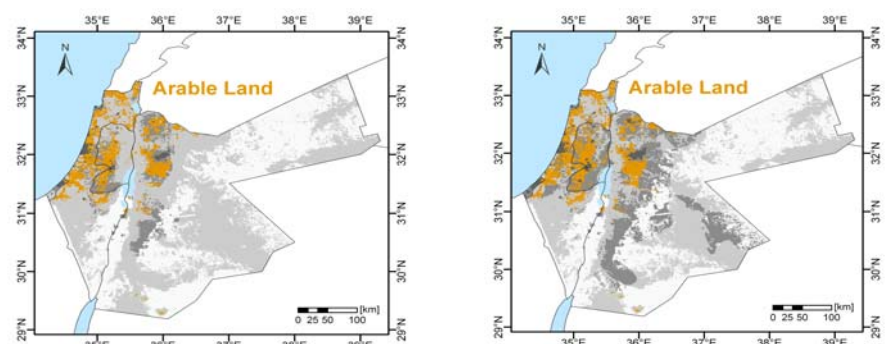


Source: Stakeholder estimates, Onigkeit (2008)

Examples of model inputs: scenario drivers

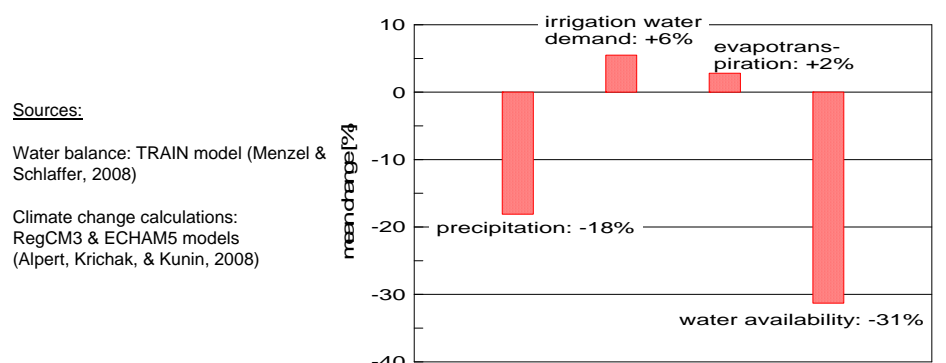


Example of model output: Change in arable land between 2005 and 2050 in the Poverty & Peace scenario



Source: LandSHIFT model; Schaldach and Koch (2008)

Example of model output: Change in climate and water availability in the Lower Jordan Valley region between current conditions and 2041-2050, IPCC A1b scenario



Sources:

Water balance: TRAIN model (Menzel & Schläffer, 2008)

Climate change calculations: RegCM3 & ECHAM5 models (Alpert, Krichak, & Kunin, 2008)