



Highlights second period of the project

The Concerted Sharing Project made considerable progress during its second year (31 December 2013 to 31 December 2014). The highlights and achievements can be grouped into the following three categories:

I. Database Construction and Update

The construction of the database was completed, and it is now functioning as a strong empirical basis for the calibration of the water economy model. Each partner country delivered extensive data during this period on water use, water demand and natural flow regimes.

Several basin-wide inventories were prepared, resulting in a unique harmonised database describing the water economy of 48 districts located in the five riparian states of the JRB. Data was collected in two-weekly time steps using the year 2010 as reference, and is available to all partners. To our knowledge this is the first time that such a detailed joint database has been compiled.

On the supply side climatic maps were prepared for the area based on updated climatic data on precipitation, temperature and evapo-transpiration over the last two decades. Detailed data are now also available for extraction rates from aquifers and volumes of produced and treated wastewater. Data and observations on natural flow (surface, rivers, percolation) complete the supply side database. A proposal to include the groundwater supply was finalised at the end of 2014.

On the demand side water use data and assessments have been classified into four principal economic sectors: agriculture, industry, municipal and domestic. For the agricultural sector detailed information was collected on cropping patterns distributed over rainfed, irrigated and protected areas. Along with updated

information from satellite images, this was used to prepare a land use/land cover map. Density maps for various livestock species were updated and also used as a reference variable for estimating densities of non-mapped species. Human population density maps were also updated. By October 2014 the project management had deemed the level of data availability to be sufficient for organising the pre-calibration phase of the water economy model. The project could thus forego the planned additional data collection round in 2015.

II. Data Processing and Management

Data processing and harmonisation was conducted under the supervision of SOW-VU. It commenced in April 2014, after the first data collection round was completed. The term 'data herding' was coined for this transfer and organisation of collected data in a spatiotemporal platform suitable for the pre-calibration of the regional water economy model. Two software systems were deployed for this:

(i) The GAMS modelling system: a dedicated software for mathematical programming and optimisation of complex large-scale modelling applications; being used for data processing and allocation in the four dimensions (space, time, layer and substance) of the water economy model.

(ii) GRCP standalone software (Gridding Regression Classification and Polling) for data harmonisation: aggregates grid information to the spatial entities of the water economy model and visualises spatial patterns; linked to the GAMS program via an interface constructed for that purpose.

The data are structured in an operational database that is fully controlled by the GAMS program. All

assessments being fully formalised in GAMS, the harmonisation process is verifiable and replicable. It also facilitates communication between project partners. The GRCP interface helps visualise the spatiotemporal patterns of local water surpluses and deficits, thereby allowing for redistribution: both spatially (by transferring water to lower lying entities) and temporally to next periods.

In August 2014 the project organised a two-week workshop on spatial data management at the SOW-VU in Amsterdam, in which all project partner institutes participated. Workshop participants refreshed and sharpened their skills in GAMS operations and received introductory training on GRCP software. The meeting was also used to exchange opinions regarding the use of water resources in the JRB, and communication was considerably enhanced by the daily social interaction between partners. Based on a detailed evaluation of collected data during the workshop, partners agreed to add an extra month of data collection to fill identified gaps, which was completed by October 2014. Furthermore a collective decision was made to update the land use map with field observations from Jordan

and the Palestinian territories, and to undertake joint research on the impact of large infrastructural waterworks on the JRB.

III. Expanded Framework towards a Full Welfare Model

The second release of the paper 'Regional water economy model for the Jordan river basin' by Professor Keyzer (2014) was updated on mathematical specifications of the flow calibration procedure of the water economy model. The updated version was released and distributed to all project partners.

The third release of the paper was completed, expanding the theoretical framework from water use and availability to economic welfare optimisation. This release details the contribution of water to the economy and addresses the representation of demographic changes and variability in weather conditions. It also shows how hygienic and environmental standards pursued by households and government agencies may be unattainable. The last part of the paper deals with policy aspects including water pricing and welfare improvement reforms.

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The project 'Towards Concerted Sharing' is sponsored by the Swedish International Development Cooperation Agency (Sida).



Co-sponsors and participants:

