# A new agreement on water access in the West Bank- What is at stake? An economy-wide cross-border-analysis

*Jonas Luckmann[1], Khalid Siddig[1], Johanes Agbahey[1]*

*[1] Humboldt-Universität zu Berlin*
*International Agricultural Trade and Development Group*
*Unter den Linden 6, 10099 Berlin*
*Corresponding author: Jonas Luckmann (luckmann@hu-berlin)*

## Abstract

This paper analysis the effects of increasing Palestinian access to shared groundwater aquifers with Israel. A water focused computable general equilibrium model is applied to the economies of the West Bank and Israel and two simulations are analyzed: First, the water abstraction rate of the Palestinian side is raised to the maximal allowance according to the current agreement on shared water resources between the two political entities, replacing more costly water imports from Israel. In a second simulation, a new agreement is implemented resulting in an equiproportionate access to shared aquifers. It is expected that the welfare gains from increased water access on the Palestinian side outweigh the losses to the Israeli economy, as the latter is less dependent on groundwater resources and has more substitution possibilities, including reclamation of wastewater and seawater desalination.

**Keywords:** water extractions, shared water resources, Palestine, Israel, Oslo II

## Background

The mountain groundwater aquifer shared with Israel constitute the main water source in the West Bank. The access to this resource is legally regulated by the Oslo II agreement signed in 1995, which despite being foreseen as an interim agreement for five years, is still in force today. The provisions according to this agreement are often criticized as inequitable, with the Palestinian side given an allowance of 118 million $m^3$/year and the option of developing another 78 million $m^3$/year, i.e. a total of 196 million $m^3$/year, whereas the Israeli side is allowed to extract 483 million $m^3$/year. Together these quantities would add up to match the long term average replenishment rate of this aquifer of about 677 million $m^3$/year, indicating the maximum annual extraction quantity for sustainable use. However, until today Palestinian Authorities were unable to fully exploit their allowance. In 2016 only 113 million $m^3$ were extracted, while additional 69 million $m^3$ of water had to be purchased from the Israeli water provider Mekorot (Palestinian Water Authority, 2017).

## Method

Against this background, this paper investigates the implications of an increased groundwater access to the West Bank by analyzing the economy-wide effects on the Palestinian economy. Because increasing

water supply to Palestine has implications to the Israeli economy, these effects are considered in this study as well. This will allow to evaluate the outcomes for the region as a whole. For this purpose, STAGE_W (Luckmann and McDonald, 2014), a water-focused computable general equilibrium model is calibrated to social accounting matrices of the West Bank and Israel, respectively. The model includes a detailed depiction of water supply and demand also considering alternative water sources, such as desalination and reclamation of wastewater, with differing cost-structures. In order to capture price discrimination and other water related policies applied by the entities investigated, the model includes different water related taxation instruments and water satellite accounts which allow for quantity restrictions. The model is run in a comparative-static setup and closures are set to represent a rather long-term perspective, after adjustments have taken place. Thus, production factors are set to be mobile between activities. Following the small country assumption world market prices are fixed and the exchange rate is set to be flexible. Government savings are fixed in order to avoid transferring welfare changes to future periods.

We analyze two scenarios: In the first, we assess the implications of raising the extraction rate of the Palestinian Authorities to its full allowance according to the Oslo II agreement and by this reducing the dependency on water supplied from Israel. In the second scenario, we investigate the possible gains from negotiating a new agreement with Israel resulting in a balanced supply of water from the shared aquifer to both political entities. This would mean raising the Palestinian entitlement to 330 million $m^3$/year and lowering it for Israel to the same quantity. In both cases a reciprocal negative shock is applied to the Israeli water sector. In the first scenario, the water-exports to the West Bank are cut and in the second scenario Israel's water supply is reduced by about 153 million $m^3$.

## Expected results

Both scenarios will increase the groundwater supply to the economy of the West Bank significantly, reducing its dependence on imported water from Israel, which is more costly. This will directly reduce production costs of water-intensive sectors, especially irrigated agriculture and potable water provision to households. Lower production costs and prices of agricultural commodities would in turn increase real income of households and thus lead to welfare gains in the West Bank.

On the other side, the shock will have negative implications for the Israeli side, where in the first scenario water exports and in the second scenario water supply is reduced. However, the effects will be smaller, as the shock is smaller for Israel in relative terms and the Israeli economy's dependence on groundwater is lower, with more substitution possibilities (e.g. desalination, wastewater reclamation) and a lower reliance on the water-intensive agricultural sector. Thus, overall regional welfare would increase.

## Sources

Luckmann, J. and S. McDonald, 2014. STAGE_W: an applied general equilibrium model with multiple types of water; technical documentation. Working Paper. Kommunikations-, Informations- und Medienzentrum der Universität Hohenheim Institute of Agricultural Policy and Agricultural Markets, urn:nbn:de:bsz:100-opus-9843.

Palestinian Water Authority, 2017. Water Information System. Available at: http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/water-E10-2016.html, Ramallah, Palestine.