GLOWA Jordan River

Final Conference
Limassol, Cyprus, 2011

Jordan River

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GLOWA WEAP - Activities in Palestine

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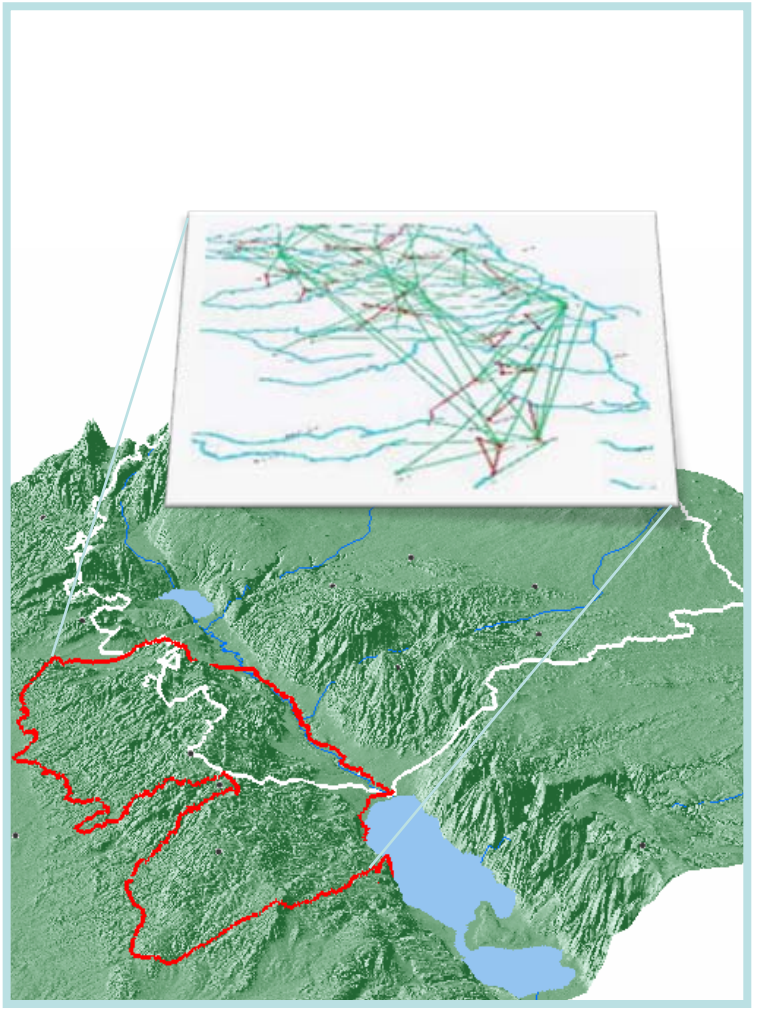
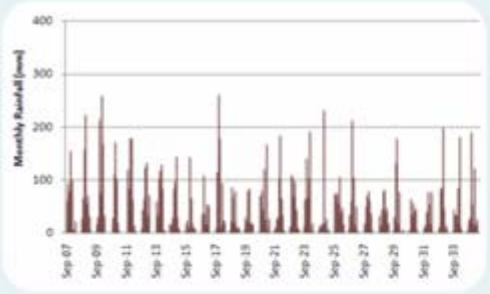
GLOWA WEAP-activities in the WB

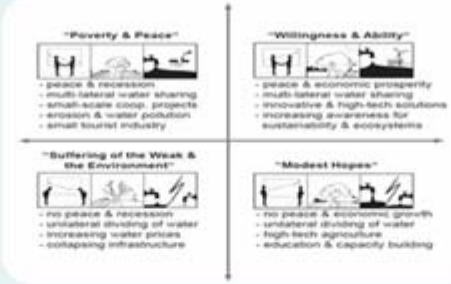
Overview

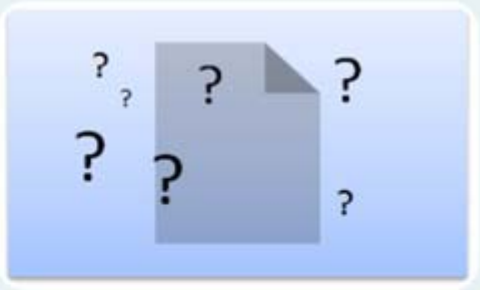
- The West Bank WEAP- different Scenarios
- WEAP-Modflow on the WAB
- WEAP Training workshops
- WEAP for Different Areas (Wadi Faria, Tulkarem Gov., JWU district)
- WEAP at the PWA; WEAP-MYWAS



Uncertainty under Global Change







Climate Change

- Climate change model outputs as input for WEAP-MODFLOW model
- ...

Socio-economic change

- Story and Simulation Scenarios (SAS)

Political change

- Uncertainty associated with results of Final Status Negotiations

Strategies implemented

Wastewater Treatment Plants	• Central Treatment Plants • Reuse Options
Rainwater Harvesting	• Locations • Methods and Techniques • Methods of Utilization
Utilization of Brackish water Springs	• Al-Fashkha Spring

Al-Fashkha Spring

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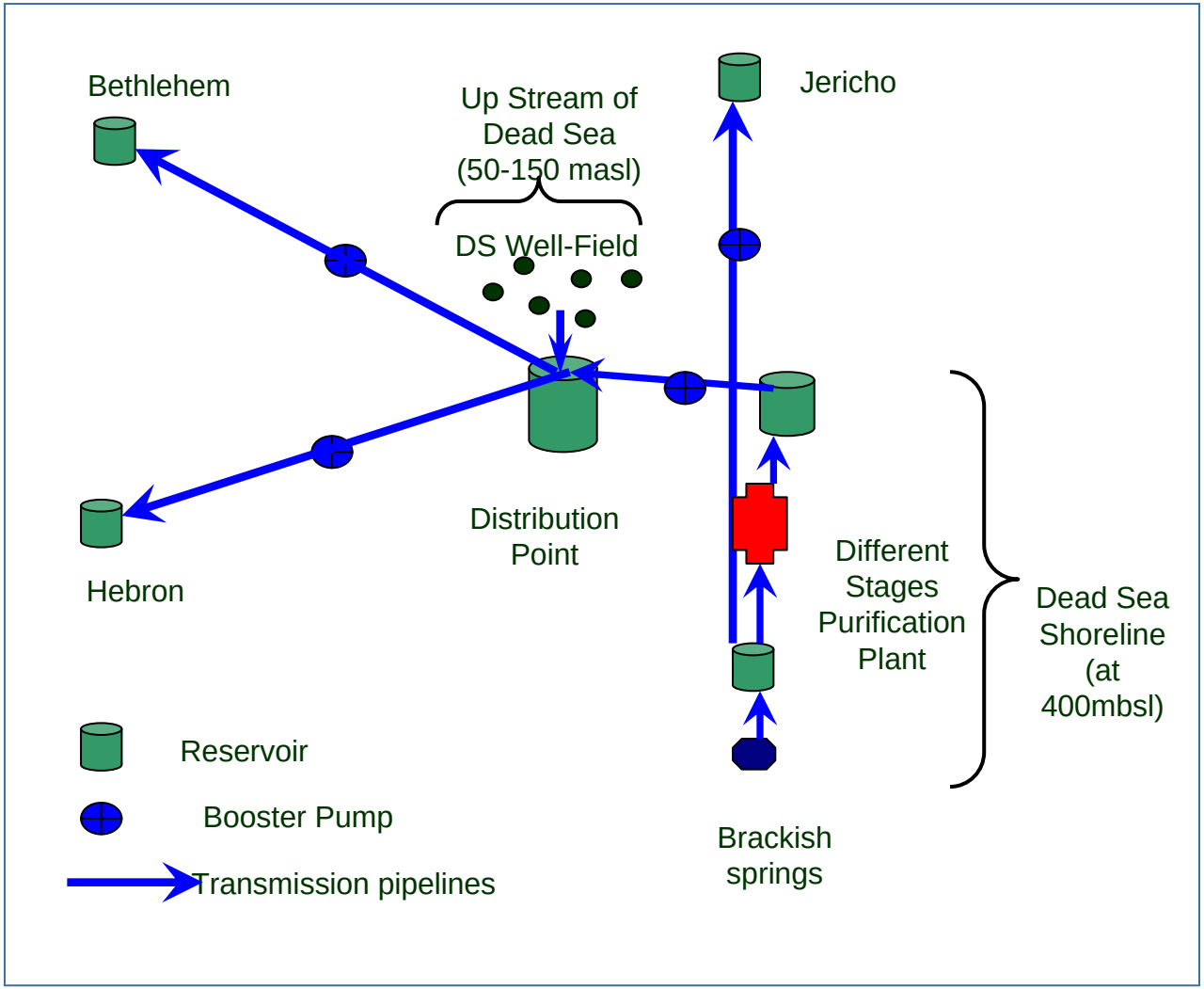
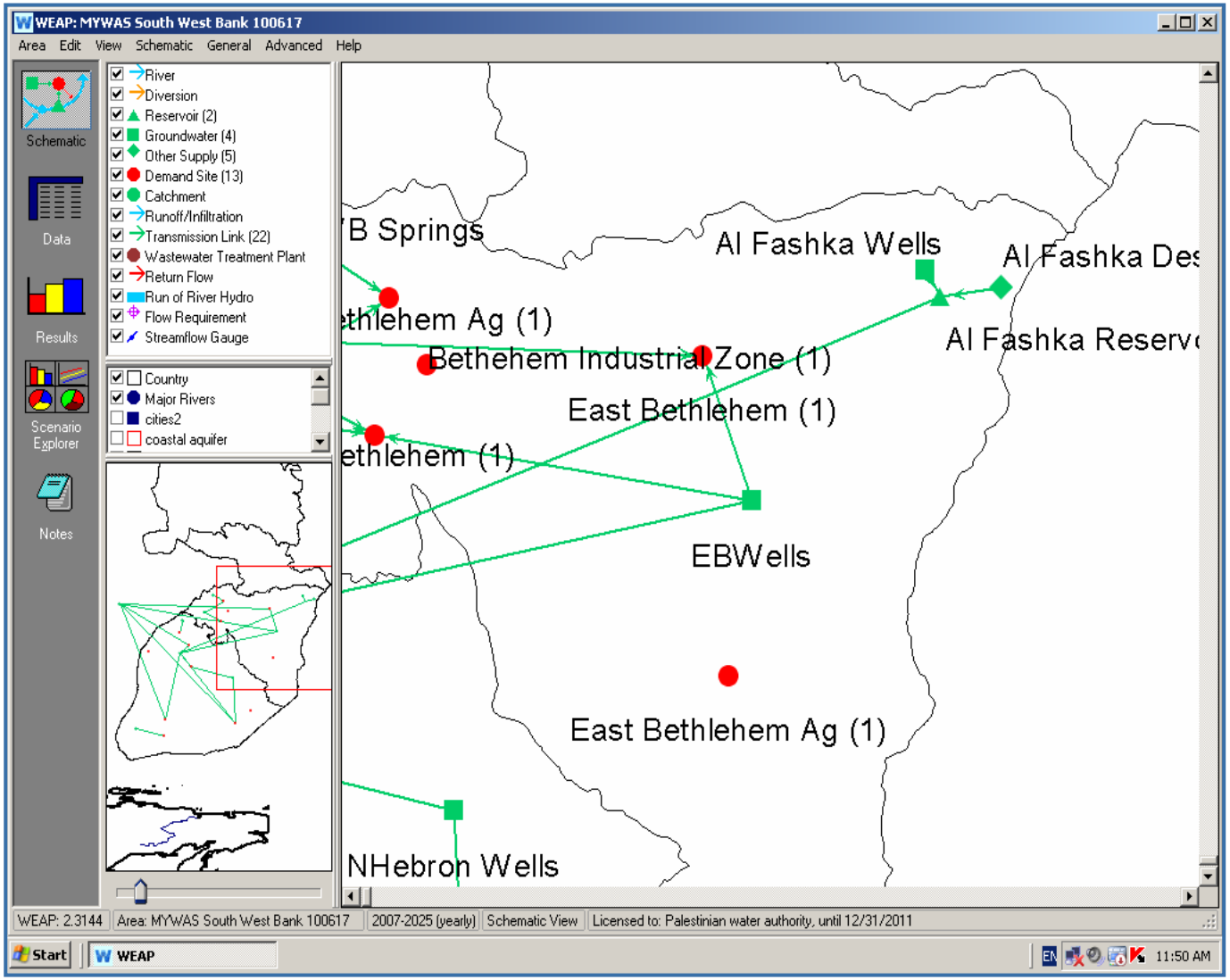
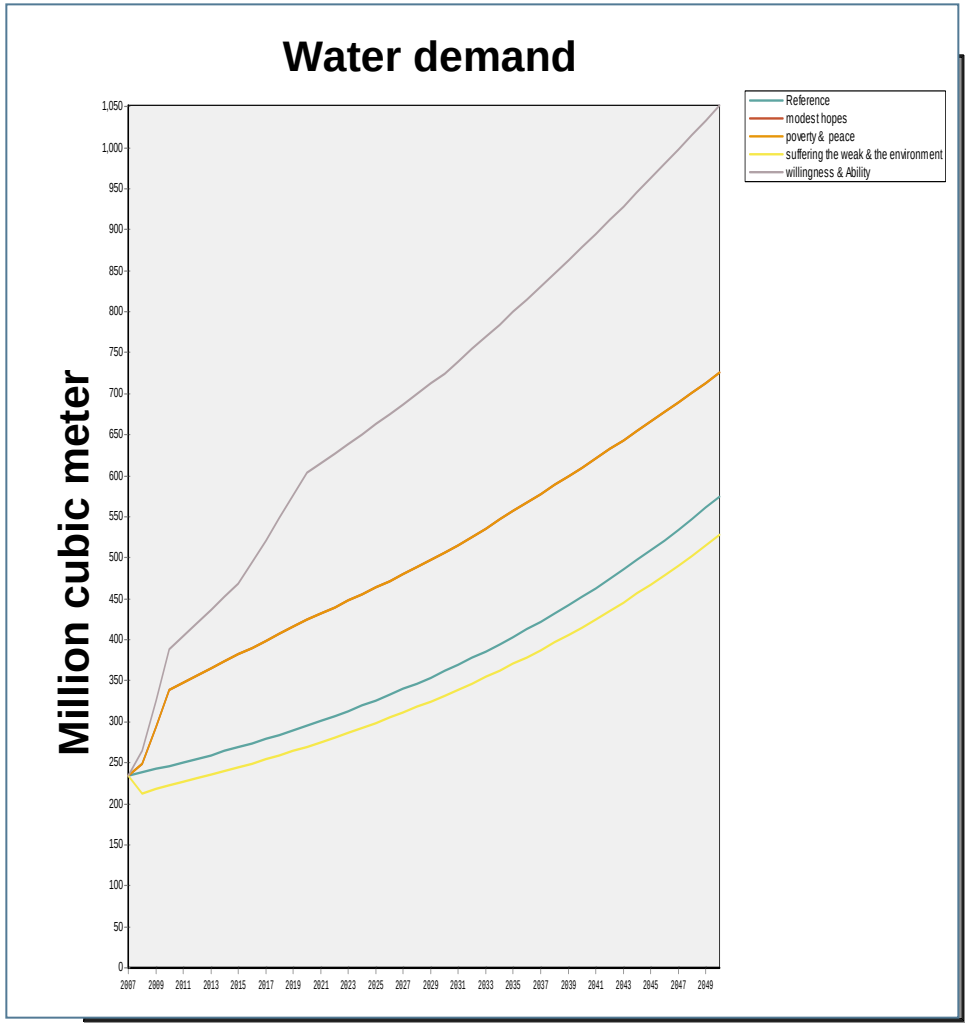


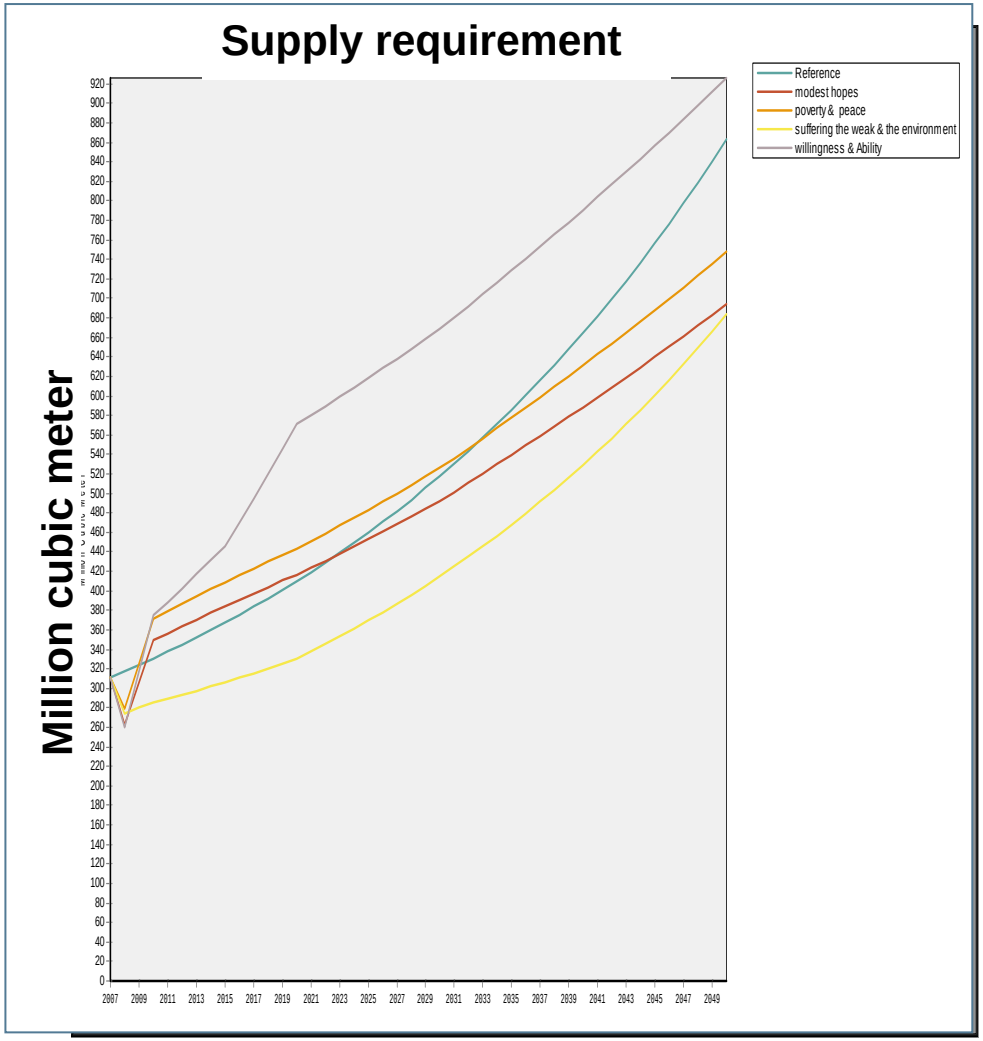

WEAP: MYWAS South West Bank 100617
Area Edit View Schematic General Advanced Help
Schematic
Data
Results
Scenario Explorer
Notes
River
Diversion
Reservoir (2)
Groundwater (4)
Other Supply (5)
Demand Site (13)
Catchment
Runoff/Infiltration
Transmission Link (22)
Wastewater Treatment Plant
Return Flow
Run of River Hydro
Flow Requirement
Streamflow Gauge
Country
Major Rivers
cities2
coastal aquifer
'B Springs
Al Fashka Wells
Al Fashka Des
ethlehem Ag (1)
Al Fashka Reserv
Bethehem Industrial Zone (1)
East Bethlehem (1)
ethlehem (1)
EBWells
East Bethlehem Ag (1)
NHebron Wells
WEAP: 2.3144
Area: MYWAS South West Bank 100617
2007-2025 (yearly)
Schematic View
Licensed to: Palestinian water authority, until 12/31/2011
Start
WEAP
11:50 AM

Results of New Water Model



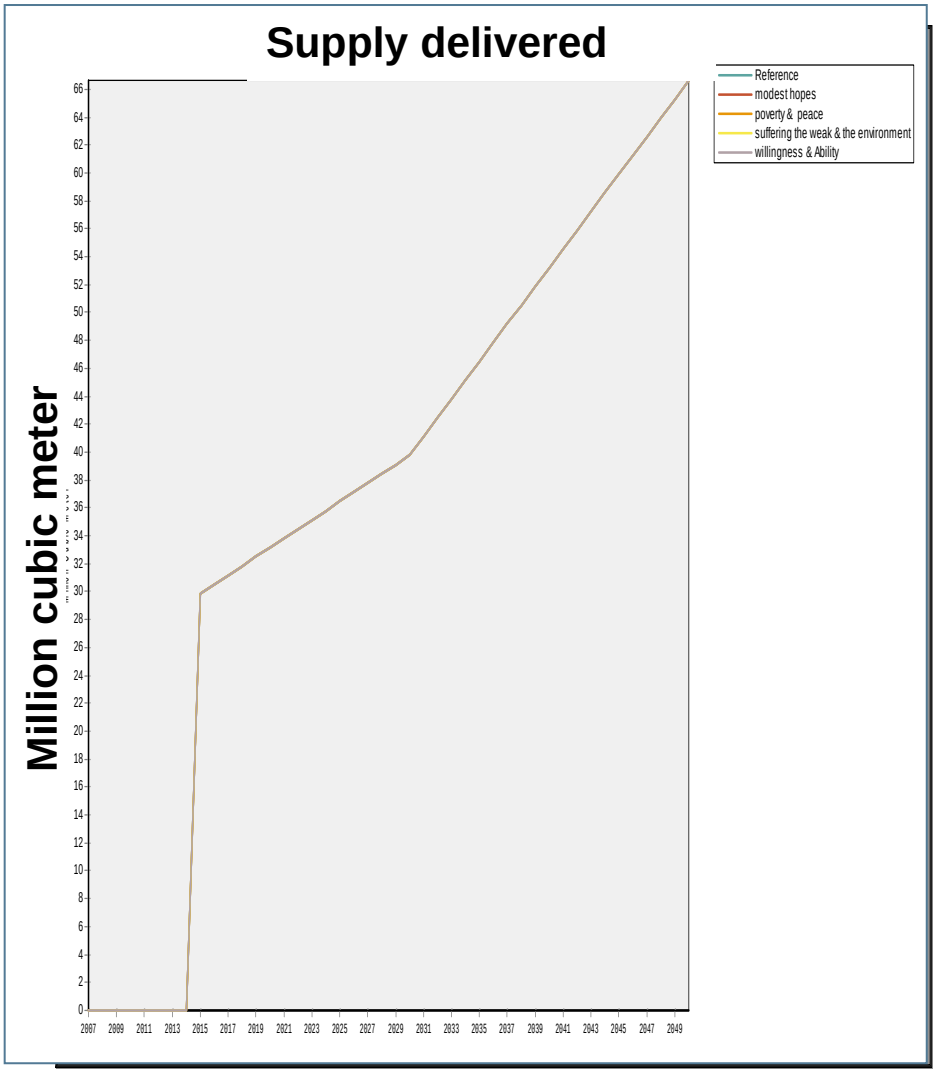
- Water Demand
- without including losses and including reuse (MCM)
- All Scenarios
- Branch Demand Sites
- Annual Total

Results of New Water Model



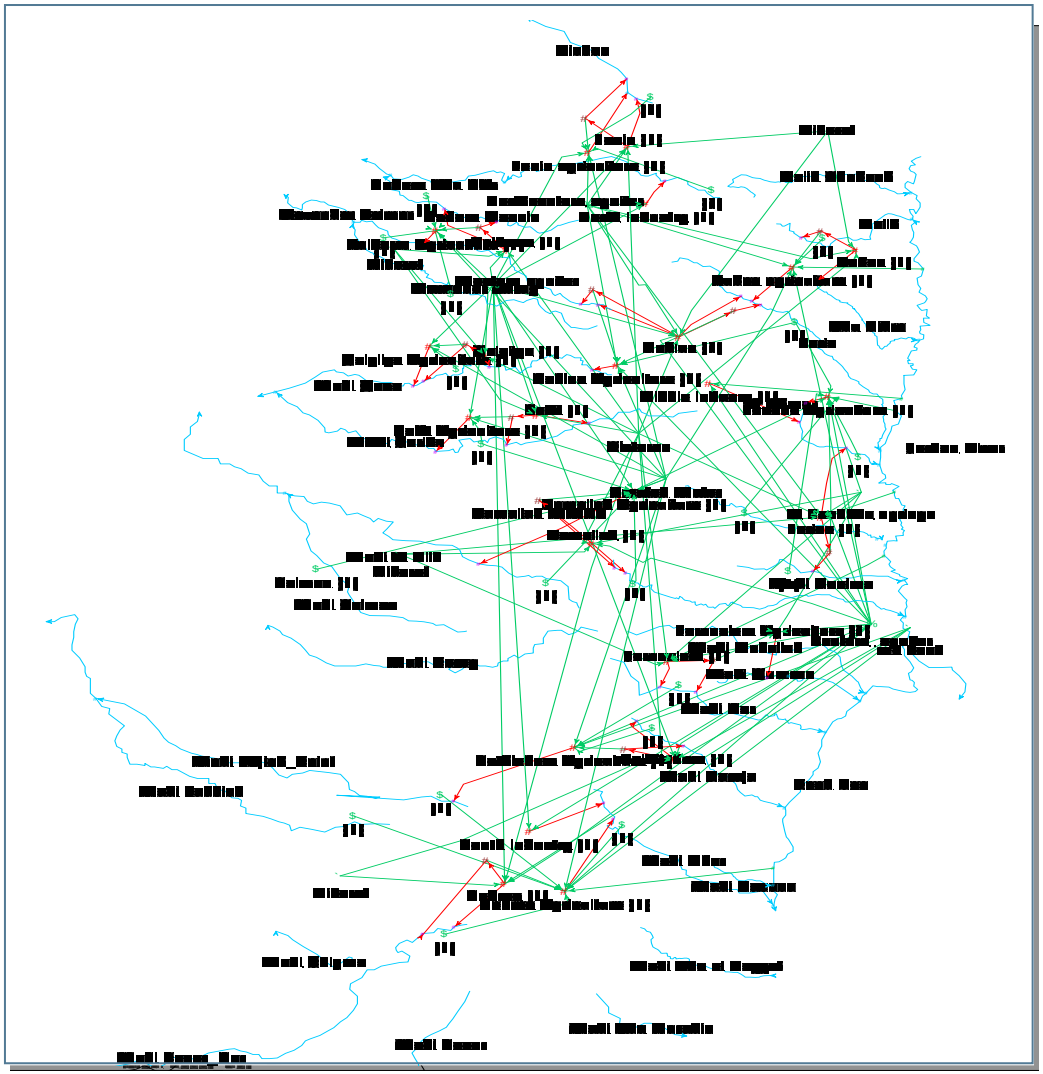
- Supply Requirement
- includes loss, reuse and DSM in MCM
- All Scenarios
- Branch: Demand Sites, All months, Annual Total

Results of New Water Model

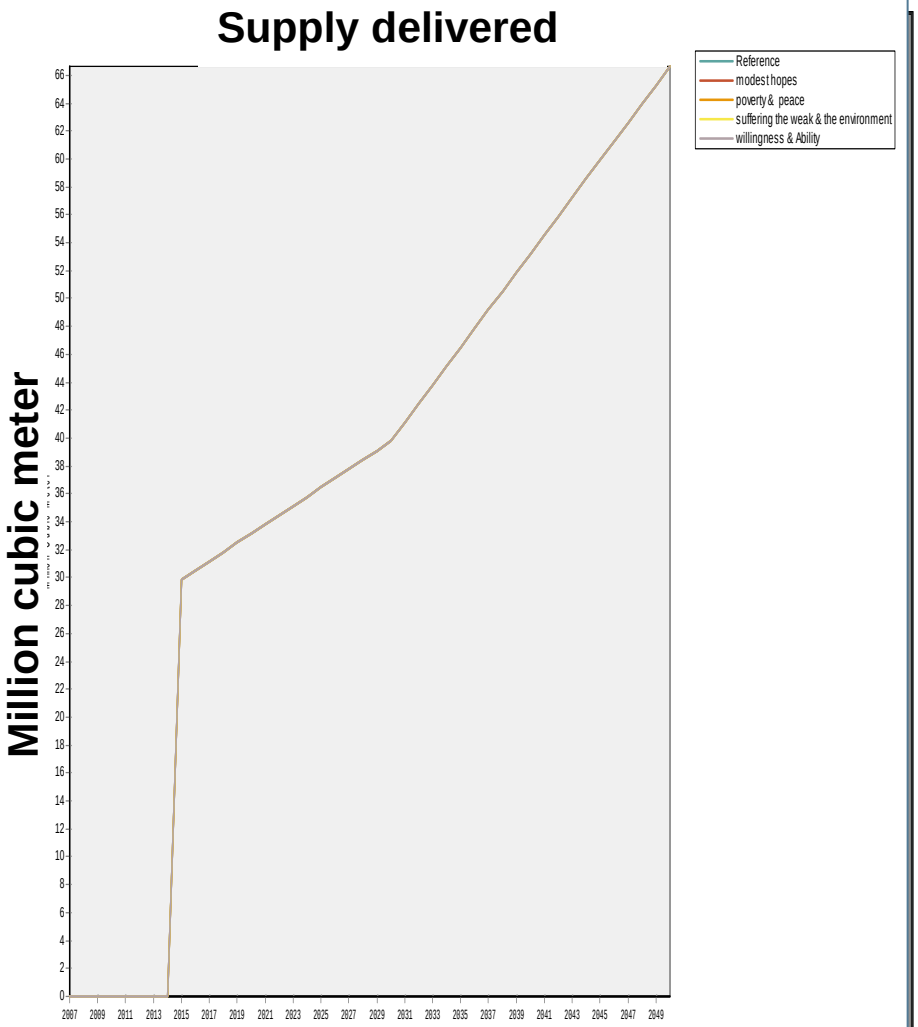


- Supply Delivered (MCM)
- All Scenarios
- Source: Red-Dead
- All Demand Sites, All months, Annual Total

Extreme Scenario Analysis

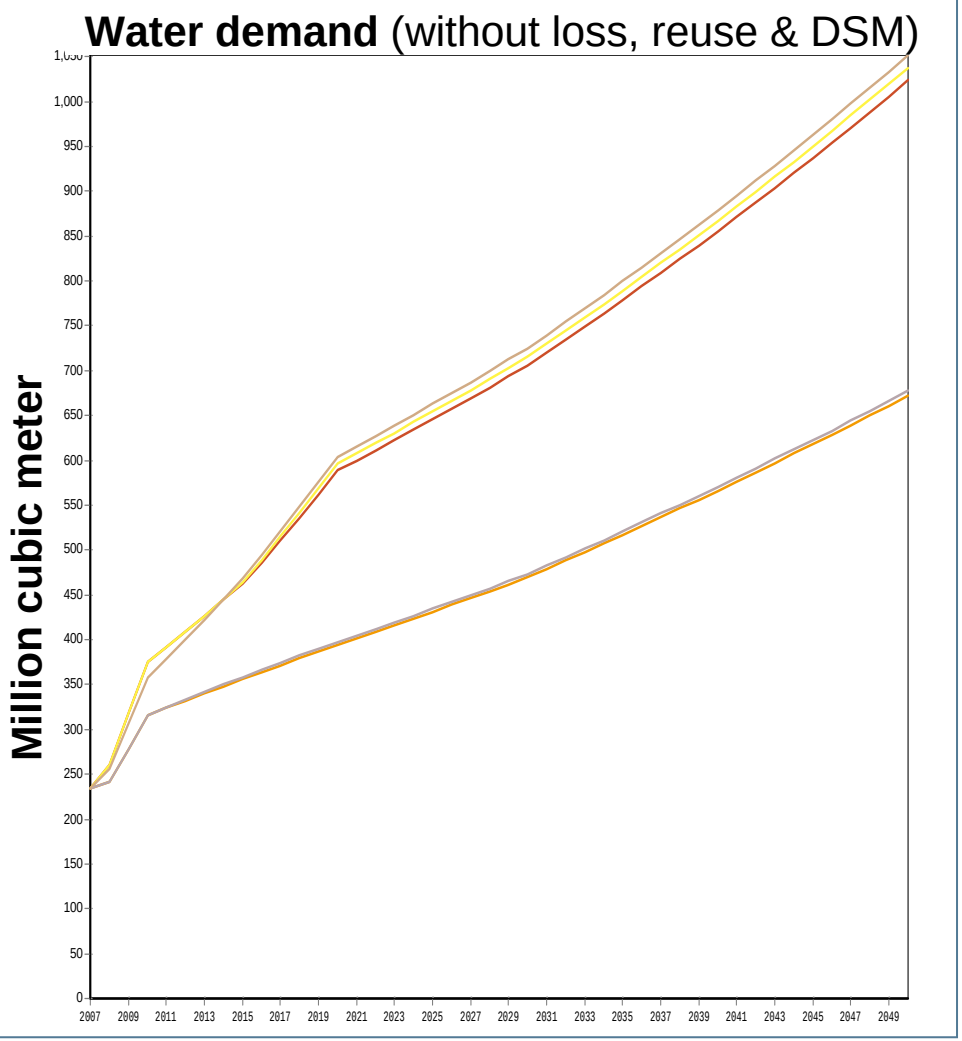


Extreme Scenario Analysis



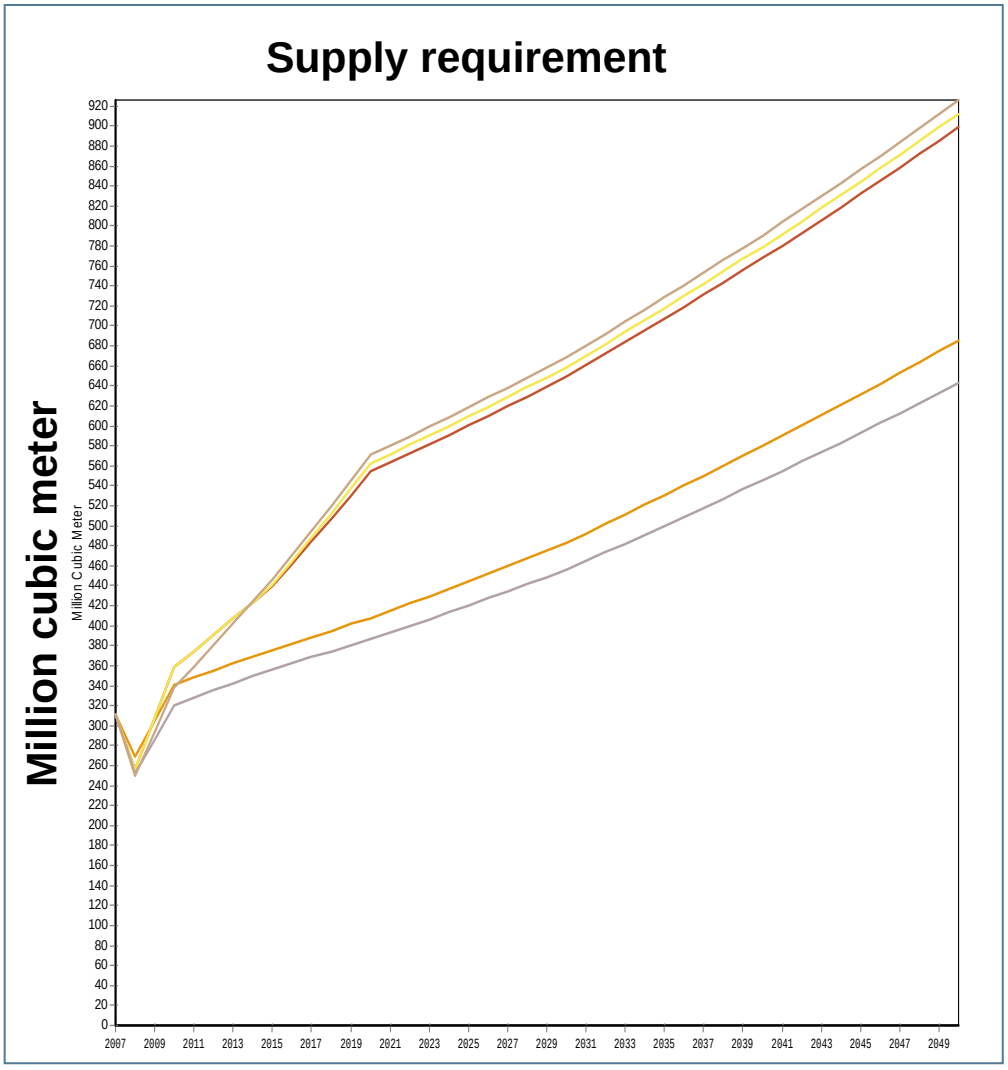
- Supply Delivered (Million Cubic Meter)
- All Scenarios
- Sources: Red-Dead, All Demand Sites, All months, Annual Total

Extreme Scenario Analysis



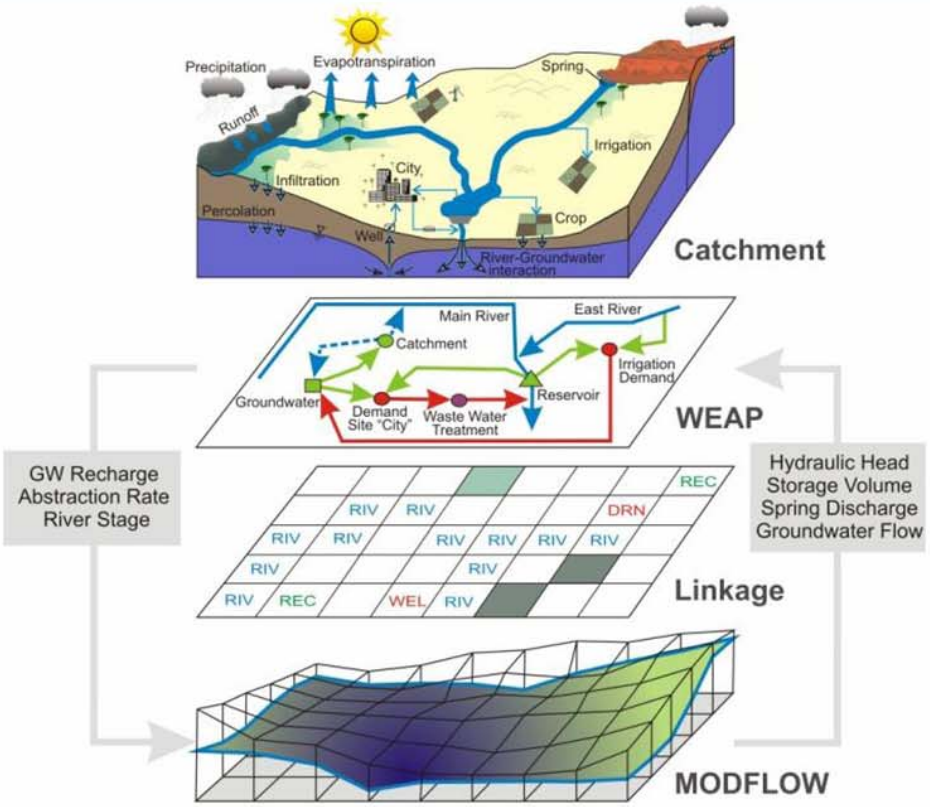
- Water demand (not including loss, reuse & DSM)
- All months:
  Changes between the different scenarios increase with years
- Sc1,Sc3 and Sc5 have the largest water demand of 375MCM in 2010 compared to a total of 1050MCM in 2050

Extreme Scenario Analysis

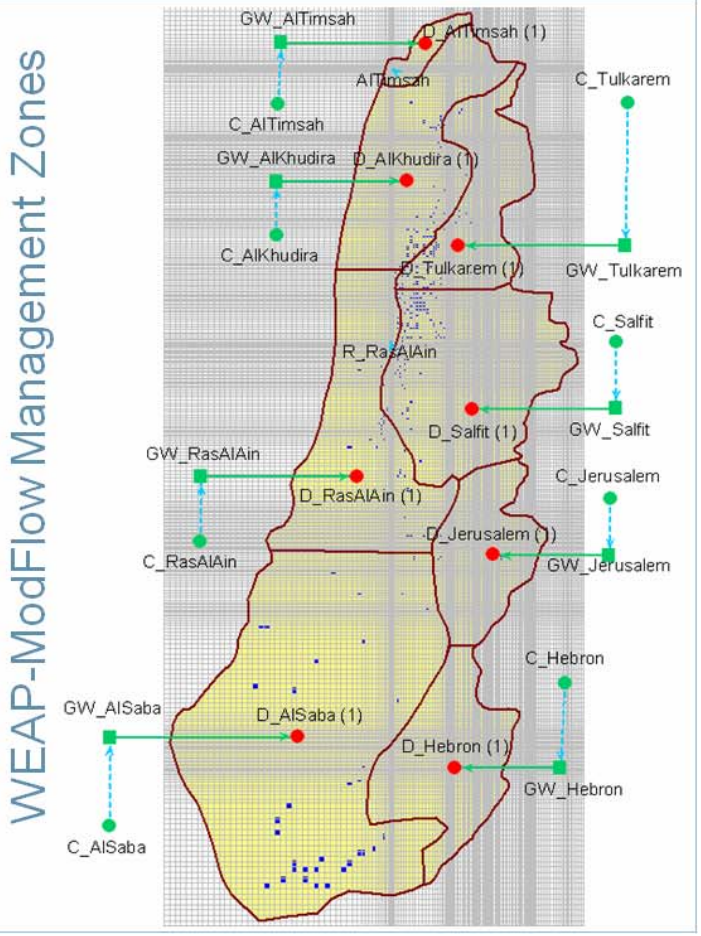


- Supply requirement
- Includes loss, reuse & DSM
- All months
- Higher water supply requirement for Sc5,Sc3,Sc1
- Need will reach a total of 926 MCM by 2050

WEAP-MODFLOW coupling



Schematic diagram of WEAP-MODFLOW coupling(1)



By Muath Abusaada, PHG, poster on his work can be found in the poster session

WEAP-MODFLOW coupling (M. Abusaada, PHG)

Scenarios

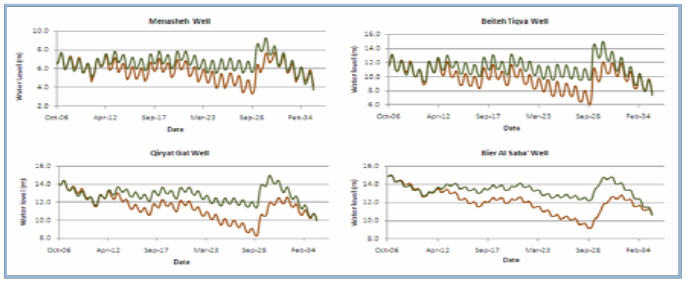
Pumping Scenarios

Rainfall Scenarios

Management Scenario

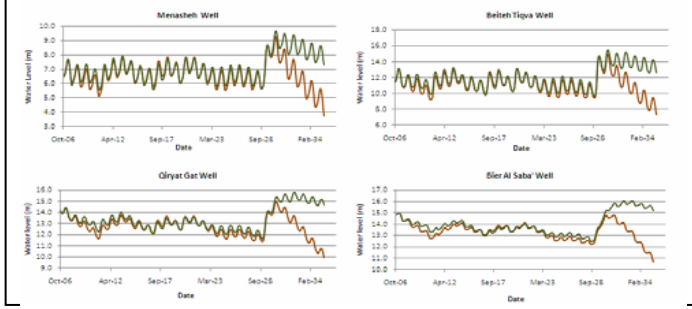
Management Options

24 Management options developed as combination of three scenarios and tested in WEAP-Modflow



Result CC:

Due to high aquifer response, WAB could be stressed in dry years (by plus 5 Mm^3/ yr)



Climate change adaptation:

Immediate: reduce av. pumping rate to 221 Mm^3/yr.

Stepwise Action: keep pumping rate to 7 yrs moving average (average pumping rate: 254 Mm^3/yr).

GLOWA WEAP-activities in the WB

Results

- **Desalination**
  - Al-Fashkha spring: supply of domestic water for Ramallah, Jericho & Jerusalem; and agricultural use in Jericho & Jerusalem
  - starting 2015, amounts of 20,50,70 MCM/year by 2030, 2050 respectively
- **RSDSC**
  - Supply of desalinated water to domestic and agricultural use in Hebron and Bethlehem
  - starting 2015, amounts of 30,40,70 MCM/year for 2030, 2050 respectively, with 0.7$/m³ variable cost

GLOWA WEAP-activities in the WB

Results

- Waste water reuse:
  - Introduced as amounts of daily capacity total
  - 30, 70, 274 MCM/year (2015,2030,2050)
  - for 12 waste water treatment plants distributed over the West Bank

Ongoing WEAP-activities in the WB

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WEAP-MYWAS (SAS scenarios and others for WEAP)

More WEAP-Modflow couplings

Two Msc students are currently using WEAP for their work.

NGO's and the use of WEAP