Fact Sheet

German Lebanese Technical Cooperation Project Protection of Jeita Spring

Water Balance for the Jeita Spring Catchment using WEAP

Protection of Jeita Spring

I. WEAP

- Water Evaluation and Planning.
- Developed by the Stockholm Environment Institute (SEI).
- Non-commercial software.
- Conceptual model.
- Catchment-based input/output.
- Hydrological budget.
- Modelling of natural and anthropogenic supply & demand.

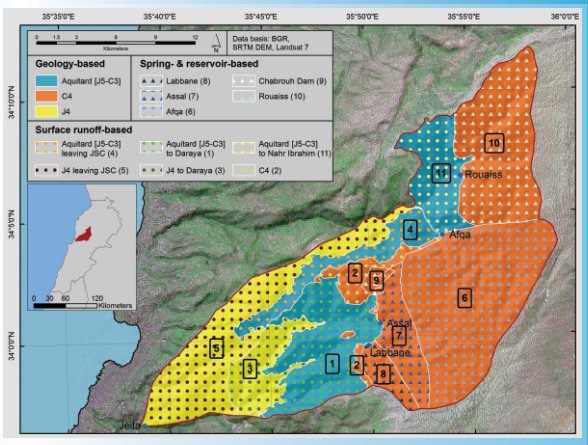
WEAP SEI STOCKHOLM ENVIRONMENT INSTITUTE

II. Problem Statement

- Jeita supplies app. 70% of Beirut's drinking water.
- Karstification of aquifers leads to short residence time of groundwater (GW).
- High seasonal variation of Jeita's discharge.
- Low discharge in summer & autumn leads to water shortages in Beirut.
- In winter, high rates of surface runoff (R) that leave the catchment unused.
- Runoff can be caught and stored in proposed dams.
- National Water Sector Strategy (2010) recognizes dams as important supply management options.
- Lack of data leads to challenges in the establishment of hydrological budgets.

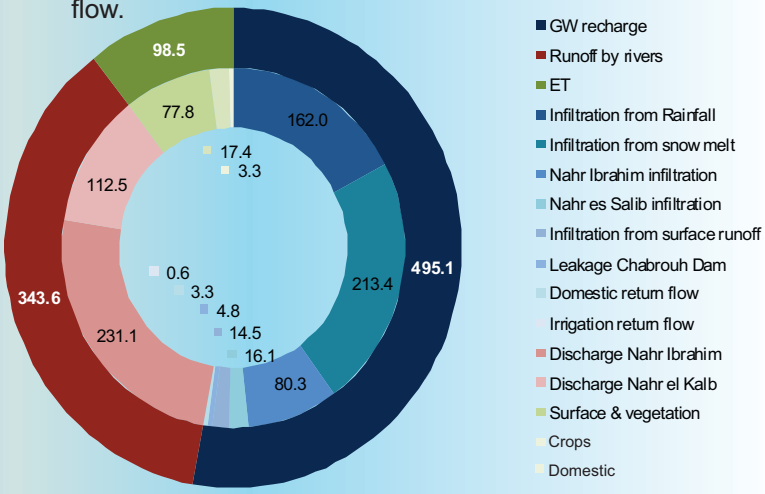
III. WEAP Model

- GW catchment size: 406 km^2.
- Range of altitude: 60 m asl. (Jeita) and 2,626 m asl. (Mt Sannine).
- Total population ranges between 127,000 in summer and 103,000 in winter.
- Landuse & landcover classes:
  1. Scarce vegetation;
  2. Woodland;
  3. Agriculture;
  4. Sealed surfaces;
  5. Ponds & lakes.
- Water users:
  1. Farmers;
  2. Households;
  3. Ecosystem.
- Irrigation efficiency: 75%.
- Division of the Jeita catchment into 11 sub-catchments.
- 11 catchment nodes.
- 9 groundwater nodes.
- 8 flow requirements, modeling spring discharge.
- 6 demand sides, incl. wastewater return flow.



IV. Results

- P: 619 MCM/a (406 MCM rain; 213 MCM snow).
- Direct R: 167.5 MCM/a.
- Irrigation demand: 17.4 MCM/a.
- Domestic demand: 6.6 MCM/a.
- Jeita discharge: 172.4 MCM/a:
  - 53 MCM from direct GW recharge J4;
  - 96 MCM from river infiltration;
  - 15 MCM from runoff-infiltration;
  - 6 MCM from aquitard leakage;
  - 2 MCM from domestic return flow.
- Sources of Jeita:
  - 17.6% aquitard;
  - 30.7% J4;
  - 51.7% C4.
- Recharge potential for all proposed dams: 211 MCM/a.
- Hydropower potential for all proposed dams: 38 MkWh/a.



V. Recommendations

- Investments in data collection (spring- & river discharge, groundwater level).
- Creation of a central inter-ministerial data base.
- Frequent update and review of stored data.
- Investments in hydrogeological expertise.
- Apply WEAP on the decision making level.
- Improvement of water supply and conveyance needed.
- Decrease share of unused water within the Jeita catchment.
- Investments in dams within the catchment.
- Use dams as additional supply for the domestic sector between August and November.
- Generation of hydropower.
- Managed aquifer recharge (MAR) in Ibrahim valley towards the J4.
- Save water in daily life.

Council for Development & Reconstruction (CDR)
Water Establishment Beirut & Mount Lebanon (WE-BML)
Ministry of Energy & Water (MoEW)

BGR Federal Institute for Geosciences & Natural Resources

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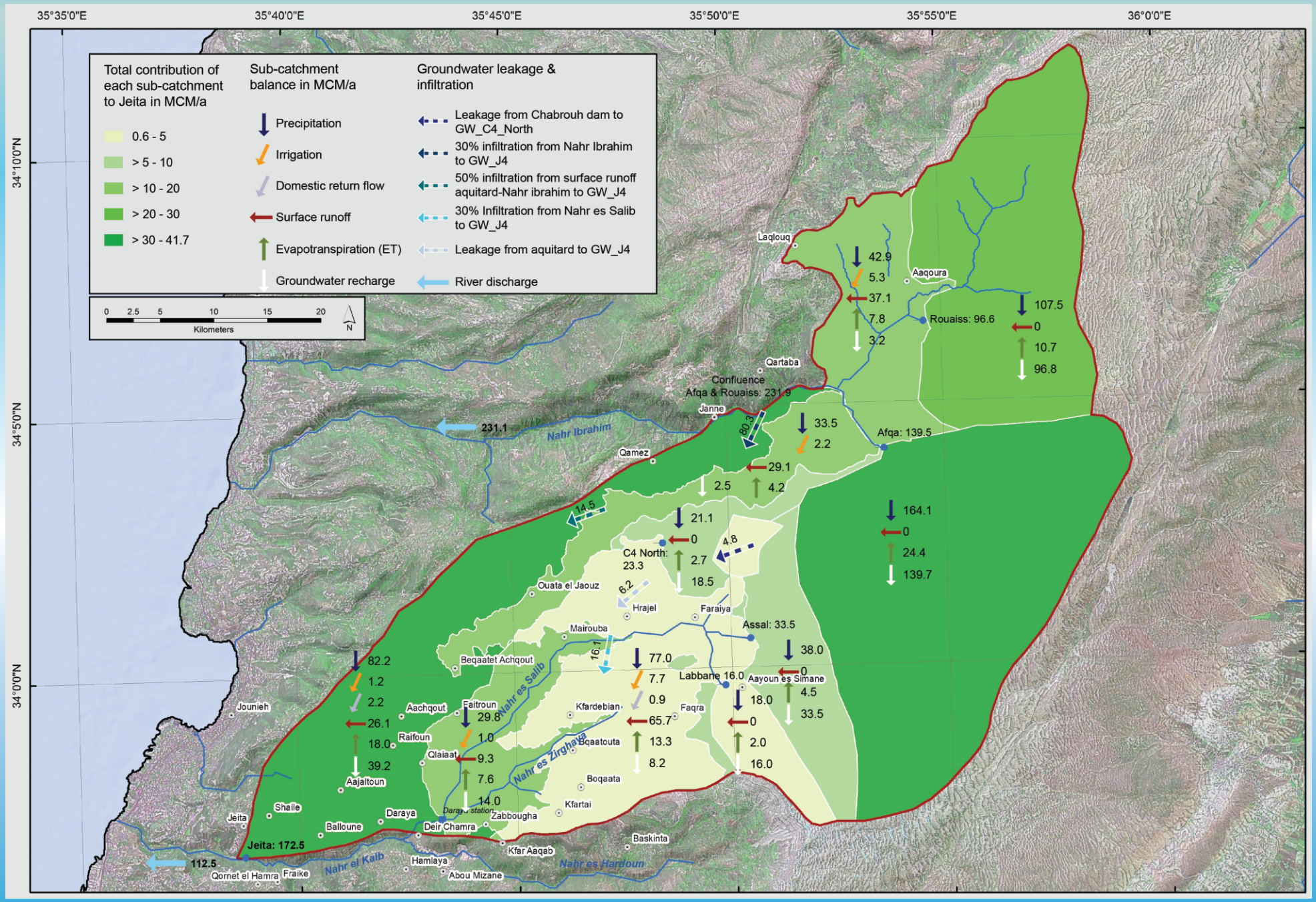

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