

Research Priorities on Local/Transboundary Water: Lebanon

Contextual and Analytical Background



Lebanon's geography and topography offer significant hydrological potential, with 40 rivers—16 of which are perennial—and over 5,000 springs. However, mismanagement and fragmented governance have eroded these advantages. Rapid urbanization, refugee influxes, groundwater over-extraction, and political instability have strained infrastructure, while economic collapse since 2019 has severely limited maintenance and investment capacity.

The crisis is further compounded by Lebanon's transboundary water dependencies, such as the Orontes, Nahr El Kabir, and Hasbani. The absence of updated bilateral frameworks and the weakness of national water institutions have undermined cooperative management and effective utilization of shared waters.

The country's Water Code (2018) provides a foundation for reform but remains weakly enforced due to institutional overlap among the Ministry of Energy and Water (MoEW), the Council for Development and Reconstruction (CDR), and regional water establishments. Financial constraints have hindered the expansion of wastewater treatment and irrigation systems.

Main Analysis and Insights

National Water Availability and Use

Renewable water resources in Lebanon total roughly 3,200 MCM/year, but the actual accessible supply is substantially lower due to seasonal runoff and storage limitations. Agriculture accounts for about 60% of total water use, with irrigation dominating in the Bekaa Valley and coastal plains. However, inefficiencies are widespread—losses from leaky canals, outdated irrigation methods, and illegal abstractions significantly decrease the effective use of water.

Groundwater exploitation has increased sharply, with an estimated 55,000–60,000 unlicensed wells contributing to declining aquifer levels and salinization in coastal areas. The gap between available and required water—currently over 300 MCM annually—is widening as rainfall declines and evapotranspiration increases.

Water Quality and Environmental Degradation

Only about 8% of wastewater is treated, and most rivers, including the Litani and Awali, are contaminated by industrial effluents and sewage. The Litani River Basin, which is critical for hydropower and irrigation, exemplifies the governance gap. Despite multiple projects, water quality continues to deteriorate, threatening food safety and public health.

The Litani River Authority (LRA), though operational, lacks enforcement powers, coordination with municipalities, and sustained funding. Without comprehensive water quality monitoring and pollution control, Lebanon risks long-term loss of its freshwater ecosystems.

Transboundary Water Governance

The 1994 Bilateral Agreement with Syria on the Orontes River does not reflect current hydrological realities or climatic variability. Meanwhile, coordination on the Nahr El Kabir River, also shared with Syria, remain limited to ad hoc exchanges. The Hasbani and Wazzani rivers, which contribute to the Jordan River system, remain sources of tension with Israel.

To advance water diplomacy, Lebanon should modernize its legal and institutional framework to incorporate transboundary water management principles, including equitable utilization, joint monitoring, and information exchange mechanisms.

Stakeholder Views and Research Priorities

Stakeholders identified the following as critical priorities:

- Additional water resources development, especially small-scale storage and managed aquifer recharge.
- Groundwater monitoring and regulation to address illegal wells and salinity.
- Transboundary water quality management through joint data systems and dialogue.
- Climate resilience research, focusing on drought-resistant agriculture and catchment restoration.
- WEFE nexus integration, particularly linking renewable energy to water supply and wastewater reuse.

Summary and Policy Recommendations

- Lebanon's water governance requires structural reform supported by regional engagement and evidence-based research.
- Revise the 1994 Orontes Agreement and revitalize existing joint technical committees with Syria, ensuring they are fully mandated and operational for joint monitoring and dynamic basin management.
- Update and enforce the Water Code, integrating transboundary provisions and aligning with international conventions.
- Prioritize decentralized water management, empowering regional water establishments and municipalities.
- Expand non-conventional water use, particularly wastewater reuse for agriculture and solar-powered desalination in coastal zones.
- Establish a national water data center to unify hydrological, climatic, and quality data for planning and cooperation.
- Foster regional dialogue under the Blue Peace framework to promote shared investments and joint research on climate adaptation.

By aligning national reform with regional cooperation, Lebanon can shift from crisis management to sustainable governance, leveraging water as both a domestic stabilizer and a regional connector

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