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Mapping and Reviving Ancestral Communal Pools (*Birket*) in Southern Lebanon: Survey Methods, Findings and Policy Pathways

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Abstract

This article presents a mixed-methods survey of 101 *birket* across 86 villages in southern Lebanon, combining historical cartography, satellite imagery and ground-truthing with oral histories. It details site typologies, spatial patterns, present condition (functioning/abandoned/destroyed) and contemporary uses, and it demonstrates how dispersed small reservoirs can complement centralized systems. A focused case study of the village of Marwaheen traces the pool's rehabilitation and associated gains in irrigated land and community engagement. Building on a resilience-based assessment (access/equity, adaptability, participation, ecological value, cultural relevance), the article identifies priority pools for restoration and translates results into practical policy pathways for municipal–NGO partnerships. The article offers openly reproducible mapping conventions and field templates to support future documentation without reliance on proprietary basemaps.

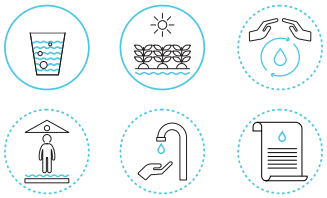
Policy Recommendations

- Rehabilitate approximately 30 priority *birket* (2025–2027) through municipal–NGO partnerships using light works (cleaning, repairs, relaunch).
- Establish village maintenance committees with simple seasonal calendars and basic safety rules.
- Keep monitoring light: one-page annual log (storage filled, irrigated area, maintenance day).
- Share open templates (bylaw, logbook, mapping sheet) so other villages can replicate quickly.

KEYWORDS

field survey
historical maps
oral history
decentralized storage
Southern Lebanon

WATER ICONS



CLIMATE

Csa: Hot-summer Mediterranean climate

< Fig. 1 Birket of Marwaheen (Source: Georges Gharios, 2022).

Introduction

Lebanon's water challenges are increasingly shaped by climate variability, uneven infrastructure and governance gaps. In southern Lebanon, many villages long relied on ancestral communal pools (*birket*)—small, distributed reservoirs that capture runoff and support seasonal irrigation, livestock and local ecologies. Yet despite their practical value, *birket* remain under-documented, inconsistently maintained and largely absent from contemporary planning tools. Reliable, reproducible evidence on where these pools are, what condition they are in and how communities still use them is scarce.

This article addresses that gap by presenting a mixed-methods survey of *birket* across 86 villages in Southern Lebanon, conducted in 2018–2019 with spot checks in 2022. The work combines historical cartography with ground-truthing and oral histories. To ensure open, reproducible mapping, this study has georeferenced nineteenth- and twentieth-century map sources and has applied a simple, repeatable field protocol to classify each site's status (functioning, abandoned, destroyed/filled, or repurposed), construction, approximate capacity, and use patterns.

The article does three things. First, it details the survey design – map sources, georeferencing workflow, field sheets and interview prompts – so other teams can replicate the method without proprietary tools. Second, it reports core findings: a typology of *birket*, spatial patterns, current status counts, contemporary uses and ecological signals. Third, it translates results into action through a case study of the village of Marwaheen, a concise resilience-based prioritization (equity, adaptability, participation, ecology, culture) and light-touch implementation steps suitable for municipal–NGO partnerships.

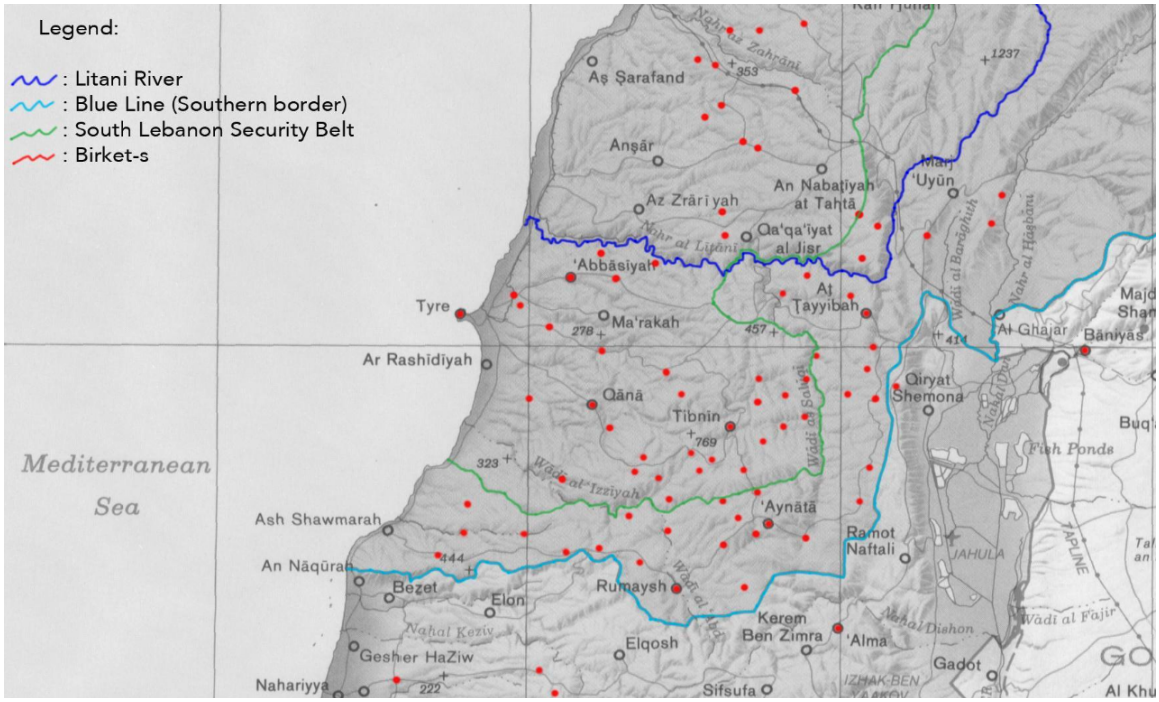
Methodology

This study focuses on a single, well-documented case. Marwaheen – a small border village heavily affected by occupation, displacement and agricultural decline – offers a clear arc from abandonment to community-led rehabilitation of its *birket*. The case assembles diverse evidence (project reports, student theses, interviews, field measurements, and satellite change analysis) and traces tangible outcomes for storage, cropping, and local governance. It thus bridges method and policy, illustrating how ancestral pools can be revived under real constraints and scaled to comparable villages.

1. Selection of Case Study: Marwaheen

The *birket* of Marwaheen was selected as a primary case study due to its unique trajectory from abandonment to restoration. Marwaheen is a small border village that suffered heavily during the Israeli occupation (1978–2000), particularly given its proximity to the former "Security Zone" (Shibli 2011). The village experienced extensive displacement, infrastructure damage and agricultural decline.

By 2009, the *birket* of Marwaheen, once the main water source for irrigation and livestock, had been abandoned for over three decades (CCECS 2011). Following the Israeli withdrawal in 2000 and a slow return of displaced populations, the municipality – supported by the American University of Beirut's Center for Civic Engagement and Community Service (CCECS) – initiated a pilot restoration project in 2009.



^ Fig. 2 Location of historical birket sites indicated by red dots (Source: Georges Gharios, 2017. Basemap from Central Intelligence Agency (CIA) 1976 map, public domain).

The project aimed to rehabilitate the *birket* as a means of securing supplementary water for vegetable farming and reviving community identity around ancestral practices. The methodology for analyzing this case included:

- Review of project reports from CCECS and final-year civil engineering student theses from the American University of Beirut (AUB);
- Interviews with municipal officials and farmers;
- On-site measurements of the rehabilitated pool and assessment of surrounding infrastructure (e.g., runoff channels, irrigation pipes);
- Comparison of pre- and post-restoration satellite imagery to quantify land-use change and crop expansion.

2. Analytical Framework

The research applied a resilience-based framework, using a set of criteria to assess the potential contribution of *birket* systems to climate adaptation and sustainable development. These criteria, adapted from global nature-based solutions and integrated water resources management indicators, included:

- Democratic access and equity (do all villagers have access to water?);
- Flexibility and adaptability (can the system cope with seasonal changes and drought?);
- Participatory governance (are users involved in decision-making and maintenance?);
- Ecological impact (does the system support biodiversity and groundwater recharge?);

- Cultural relevance and knowledge retention (is the practice consistent with local identity?).

In summary, the methodology adopted in this study bridges technical analysis with socio-cultural understanding. It underscores the importance of combining GIS-based documentation with community-led storytelling, thereby elevating the voices of rural actors and recognizing their role as knowledge holders and stewards of hydrosocial heritage. The case of Marwaheen exemplifies how such integrated approaches can yield practical, scalable and sustainable solutions rooted in the wisdom of place.

Findings

The comprehensive survey of 101 *birket* across 86 towns and villages in southern Lebanon yielded a layered understanding of their current condition, historical continuity and socio-ecological value (fig. 2). The findings, organized in three dimensions, point to both the fragility and resilience of these ancestral communal pools. While many have been abandoned or repurposed due to conflict, urban expansion or shifting livelihoods, others remain active and have been adapted to new uses.

1. Typology and Spatial Patterns

Analysis of the spatial data confirmed a historical continuity between pre-twentieth-century *birket* sites and present-day village layouts. Most *birket* were found in low-lying areas near the edge of built-up zones, often adjacent to farmland or on the downstream side of old village clusters. Their placement was strategic – maximizing runoff capture from rooftops, paths, and fields, while also ensuring ease of access for livestock and farming communities. Several *birket* were co-located with ancient springs (*ain*), forming a hybrid system that blended rainwater storage with spring capture. The survey identified two major types of *birket*:

- Intra-village pools: Typically smaller in volume (500–3,000 m³), these pools served daily domestic and livestock needs. They were constructed with stone masonry or clay and located near residential clusters or hawch (central courtyards). With urban sprawl, many now lie embedded within dense settlements.
- Peripheral or agricultural *birket*: Larger in scale (5,000–20,000 m³), often referred to local *birket* barriyeh or *birket* istina'iyeh, these were used to irrigate crops, cure tobacco and water herds. Constructed in fields or wadis (dry streambeds), they were either dug directly into soil or fortified with mud, clay or gypsum. Their locations often coincide with key agricultural corridors or pastures.

Of the 101 *birket* recorded:

- 32 were classified as functioning;
- 39 as abandoned or dysfunctional;
- 30 as destroyed, filled in or transformed for other uses.

The highest concentration of functioning *birket* was observed in villages that predominantly maintained an agricultural economy and had not undergone severe postwar urbanization, such as Kounine, Aita el-Chaab and Debel. By contrast, areas that experienced intensive bombardment or rapid population growth – like Bint Jbeil or Srifa – showed a marked decline in intact pools.

2. Use Patterns, Decline and Transformation

Traditionally, *birket* supported a diverse range of activities: irrigation, water for livestock, domestic use (washing clothes, dishes, wool and kitchen utensils), fishing and even limited recreational uses (children swimming or seasonal festivals). These uses were tightly linked to seasonal cycles and ritual maintenance activities, such as the collective de-silting conducted every autumn.

However, post-1990s developments – especially the extension of municipal water networks and the spread of household appliances – have reduced the domestic role of *birket* (Gharios 2022). The widespread use of washing machines and dishwashers has made the communal washing functions obsolete. Similarly, the sharp decline in herding practices, once a mainstay of village economies, has diminished the need for animal watering. In several cases, the surrounding community saw the *birket* as obsolete or even hazardous, prompting infill and conversion to public squares, playgrounds or parking lots. Yet not all *birket* have followed a trajectory of neglect. In 32 cases, the pools were still used primarily for:

- Irrigation, especially of water-intensive crops such as tomatoes, squash or leafy greens;
- Construction, with water tankers collecting from *birket* to supply nearby building sites;
- Tourism and recreation, where village councils or private actors have developed cafes, walkways or picnic zones around well-maintained pools.

The renewed interest in *birket* for tourism – though modest – has led to partial restorations in villages like Yaroun, Tibnine and Maroun el-Ras. These projects often start with

^ Fig. 3 Workers laying a steel-rod mesh with ready-mix concrete at the birket of Marwaheen (Source: American University of Beirut's Center for Civic Engagement and Community Service Report, 2013).

minor clean-up campaigns, followed by masonry repair, installation of fencing for safety, and aesthetic improvements such as murals and fountains. However, such initiatives are often short-lived or symbolic unless paired with a long-term water management or agricultural plan.

3. Resilience and Restoration Potential

The restoration of the *birket* of Marwaheen serves as a compelling example of how ancestral water infrastructure can be successfully revived and reintegrated into modern development efforts (fig. 3). The rehabilitation project more than doubled the pool's volume (from 12,770 m³ to 26,000 m³), introduced impermeable linings to prevent infiltration losses and added runoff channels to capture additional rainwater (Bou Lahdo et al. 2011). As a result, farming area in the village expanded by more than 100 per cent, according to the municipal records. The restored *birket* not only secured supplementary water during dry months but also fostered a renewed sense of community ownership and pride in local heritage (Gharios 2022).

Similar potential exists across southern Lebanon. Many abandoned *birket* are structurally intact or require only modest interventions (de-silting, reinforcement, perimeter walls or spillways) to become functional again. Because they are dispersed and small-scale in nature, they are well-suited to decentralized water management strategies, especially in areas underserved by national infrastructure.

The resilience of *birket* systems lies not merely in their physical robustness but in their embeddedness in local knowledge systems. Practices such as seasonal cleaning, consensus-based water distribution, and communal financing of maintenance reflect strong social capital. In fact, interviews in functioning *birket* communities revealed high levels of local awareness about rainfall variability, evaporation rates and soil permeability – suggesting that ecological monitoring was being conducted informally but effectively.

Moreover, *birket* contribute positively to micro-ecologies. Several restored pools were found to support frogs, fish and aquatic plants, indicating potential for biodiversity enhancement and habitat restoration. In arid months, they offer critical water refuges for birds and insects. The cultural landscapes surrounding the *birket* – with olive groves, terraced fields and grazing areas – also benefit from proximity to these water bodies, reinforcing synergies between ecological and cultural resilience.

Together, these findings collectively paint a picture of *birket* as dynamic, multifunctional systems capable of adaptation and renewal. Their decline is notably not inevitable but contingent on social valuation, institutional support and modest technical investment. Revitalizing these pools could serve as a powerful entry point for integrated rural development strategies that center locally grounded agency, heritage preservation and sustainable resource use.

Conclusion

This study shows that ancestral communal pools (*birket*) are not relics of a pre-modern water economy but enduring, community-managed, climate-responsive infrastructure. Combining historical cartography, field verification and oral histories, this study documented 101 *birket* across 86 localities – revealing both the breadth of this hydro-cultural tradition and the depth of its neglect. While many sites have been filled in or degraded, a significant share remains intact, functional or clearly poised for revival. Empirically, two typologies recur (intra-village and peripheral/agricultural), with functioning sites clustering where agriculture persists and local stewardship is strong. Field observations also point to ecological co-benefits – amphibians, birds, vegetated shallows – that extend the value of *birket* beyond storage alone. The Marwaheen case demonstrates feasibility under real constraints: modest rehabilitation expanded effective storage, supported crop diversification and reactivated communal governance.

Method matters. A light, reproducible protocol – maps, simple status classes, qualitative resilience criteria (equity, adaptability, participation, ecology, culture) and minimal monitoring – turns dispersed evidence into actionable priorities. Translating that evidence into practice is straightforward: targeted rehabilitation in high-potential villages, village maintenance committees with seasonal calendars and concise annual logs; in parallel, policy alignment through recognition of *birket* as decentralized, complementary storage in the next National

Water Sector Strategy, supported by education toolkits and a hydro-cultural registry. Taken together, these steps bridge centralized agendas and grassroots water cultures, advancing SDGs 6 (clean water and sanitation), 13 (climate action) and 15 (life on land) while anchoring adaptation in place-based knowledge and collective action.

Moving forward, the challenge lies in bridging the gap between centralized infrastructure agendas and grassroots water cultures. Policymakers, development agencies and academic institutions must actively support the mapping, protection and reintegration of *birket* systems into national strategies. Doing so offers a powerful, culturally resonant path toward water justice, rural sustainability and heritage-based resilience.

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Georges Gharios recently served as the National Programme Officer for Natural Sciences at UNESCO Beirut. He earned a PhD in water law from the University of Dundee, Scotland. As an agricultural engineer with substantial farming experience, his expertise spans water governance, traditional knowledge, the blue economy, biodiversity and the history and archaeology of water. He has a keen interest in the customs and practices of water conservation in Lebanon and water diplomacy across the Levant. Georges has served as a consultant for numerous international organizations and authored journal articles and presented at various conferences on the topic of water governance. He taught for five years at the American University of Technology in Halat, where his courses covered water law, water policy, water politics and soil sciences.

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