SIWA OASIS WATER REVITALIZATION, EGYPT

Restoration of qanat heritage for desert survival

The Siwa Oasis project illustrates how reviving ancient qanats (foggaras) can secure water in hyper-arid settings while restoring cultural identity. Community elders, youth, and women contributed to revitalization alongside UNESCO and Egyptian agencies, blending ancestral know-how with institutional support. This reduced aquifer stress, revived heritage rituals, and enhanced resilience through cost-effective alternatives to mechanized wells.

Water governance has shaped Siwa's identity for over 3,000 years. Qanats and springs were central to agricultural festivals, spring-cleaning rituals, and sacred practices linked to fairness and reciprocity (Fakhry, 1990). The Siwa Oasis, home to ~30,000 people in Egypt's Western Desert near the Libyan border, receives less than 10 mm of rainfall annually. Historically, its survival depended on springs and qanats, but by the late 20th century many had collapsed, forcing reliance on mechanized wells that accelerated salinization and groundwater decline (Abdulaziz & Faid, 2015; Elnazer et al., 2023). Revitalizing qanats thus reaffirmed both local cultural heritage and historical continuity.

TRADITIONAL KNOWLEDGE OF THE COMMUNITY

- **Hydrological knowledge:** Locating aquifer outlets, maintaining slope gradients by eye, and aligning underground tunnels for flow efficiency.
- **Governance rules:** Codified equitable water allocation, enforced by councils of elders to ensure sustainability.
- **Maintenance practices:** Seasonal faenas (communal work days) cleaned tunnels and repaired stone linings, linking technical upkeep with ritual renewal.
- **Intergenerational transmission:** Elders taught younger members to measure gradients, while women and youth participated in water festivals and monitoring, embedding stewardship in daily life (Amara, 2010; Kamal, 2019).

KEY CULTURAL HERITAGE AND INTEGRATE TRADITIONAL KNOWLEDGE IN PROJECT DESIGN

- Community leadership: Elders prioritized which springs and qanats to restore, ensuring cultural acceptance.
- Technical hybridization: Rehabilitation used traditional stone and plastering techniques, supported by selective mechanized excavation.
- Institutional integration: UNESCO partnered with Egyptian agencies to embed the project within national water and heritage policies, aligning with the 2003 UNESCO Convention on Intangible Cultural Heritage.
- Capacity building: Training programs passed qanat construction skills to youth, supported by Egypt's Law No. 4 of 1994 on Environmental Protection, ensuring continuity within a modern legal framework (UNESCO, 2003; Law No. 4, 1994).

LESSONS LEARNED

- Reviving heritage systems enhances resilience in hyper-arid settings.
- Embedding rituals and governance norms sustains social legitimacy and continuity.
- Training youth secures the future of intangible heritage.
- Heritage-based water projects provide ecological, cultural, and economic co-benefits simultaneously.