

## **The Urban Water Economy of Quetta: Pricing, Scarcity, and Groundwater Depletion**

Quetta's water crisis has deepened into a structural economic challenge. Satellite-based hydrological studies show constant and severe declines in the valley's groundwater levels from 2002 to 2023, with little natural recharge occurring in most locations. Land subsidence has been recorded in parts of the city a visible sign that the aquifer is being physically damaged from over-extraction. These scientific findings match what residents experience daily: falling tube-well yields, widespread tanker dependence, and declining water quality. The core issue is simple demand exceeds the aquifer's capacity, and current institutions are not designed for scarcity.

The economic roots of this crisis lie in the common-pool resource nature of groundwater. When extraction is unregulated and unmetered, each individual has an incentive to pump as much as possible before the water table sinks further a classic "tragedy of the commons." The private benefit of extraction is captured by the user, while the social cost future scarcity, rising pumping costs, and loss of recharge potential is borne collectively. This misalignment of incentives results in overuse, inefficiency, and inequity. The current tanker market has further deepened inequality: those who can afford deliveries bypass shortages, while poorer households pay more per litre or face long gaps in access.

This brings us to the sensitive question: Can water be priced and if so, how without causing public outrage? The answer lies in admitting that pricing does not mean making water expensive for the poor. Economic theory distinguishes between lifeline consumption (basic human needs) and excess consumption (high-use households, commercial entities, tanker suppliers). The justification is grounded in equity and efficiency: price signals should discourage wasteful extraction only beyond essential needs. Many developing cities have successfully used increasing-block tariffs, where the first block is free or heavily subsidized, ensuring the poor are protected, while higher consumption is priced progressively to reflect scarcity. This ensures fairness while slowing depletion.

But pricing alone is insufficient. Effective reform begins with information and governance: well registration, minimal metering, and transparent groundwater monitoring. Without data, no pricing or regulation can be credible. Once transparent information exists, policies such as limited extraction permits for large commercial pump operators or tanker suppliers become feasible. These approaches draw on Pigouvian principles the idea that users who impose higher social costs (e.g., excessive extraction) should internalize part of that cost. The revenues from such Supply-and-Demand based pricing can be reinvested into recharge projects, leak reduction, and subsidies for vulnerable households, creating a self-financing, socially protective system.

Supply-side and demand-side reforms must complement governance changes. Managed aquifer recharge through check dams, infiltration basins, and stormwater capture provides long-term

replenishment at relatively low cost. Demand-management solutions water-efficient fixtures, greywater reuse, drip irrigation for peri-urban farms reduce pressure on the aquifer. Economic evaluations consistently show that these scattered, low-cost interventions offer better cost–benefit ratios than large-scale engineering projects, particularly in arid regions like Balochistan where additional surface water is limited.

The path forward for Quetta is therefore not a single policy but a portfolio: protect lifeline water, send scarcity signals for high consumption, regulate large extractors, invest in recharge, and build a transparent data system. The purpose of pricing is not to burden households it is to align private incentives with the city’s long-term survival. Without these adjustments, continued over-extraction risks irreversible aquifer collapse and ever-widening inequality. Managing water as both a human right and an economic resource is the only sustainable path for Quetta’s future