

**REGULATING THE RATIONAL USE OF WATER IN ENTREPRENEURIAL
ACTIVITY THROUGH TAXATION**

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Abstract

Water scarcity poses a critical challenge to sustainable entrepreneurial activity, particularly in water-intensive sectors like agriculture, manufacturing, and energy production. This article examines the role of taxation as a regulatory mechanism to promote the rational use of water resources in business operations. By analyzing existing fiscal instruments—such as water abstraction fees, effluent charges, and progressive tariffs—we evaluate their effectiveness in incentivizing efficiency, reducing waste, and aligning private incentives with public environmental goals.

Drawing on case studies from water-stressed regions (e.g., Central Asia and arid Middle Eastern economies), the study reveals that poorly designed taxes often fail to curb overuse due to regressive structures, enforcement gaps, and evasion. We propose a refined tax framework incorporating volumetric pricing, tiered penalties for excess consumption, and rebates for innovative conservation technologies. Econometric modeling demonstrates that such targeted taxation could yield 15-25% reductions in industrial water demand without stifling economic growth.

Ultimately, integrating taxation with complementary policies like subsidies for recycling and real-time monitoring enhances enforceability and equity. This approach not only safeguards vital resources but also fosters green entrepreneurship, offering policymakers a blueprint for balancing development with ecological imperatives. (Word count: 198)

Key words

Water resource management, Environmental taxation, Progressive tariffs, Fiscal policy.

Introduction. Freshwater—the lifeblood of economies and ecosystems—is under unprecedented strain. Global water demand is widely projected to rise by roughly 55% by 2050, driven largely by manufacturing and energy generation, with agriculture remaining the dominant user in many regions. In water-scarce regions like Central Asia—shaped by the Aral Sea catastrophe and persistent stress on transboundary rivers—this pressure is not theoretical; it is structural and compounding.

In Uzbekistan, water use is overwhelmingly irrigation-centered: agriculture accounts for about 90–91% of consumption, while industry represents a much smaller national share—roughly 1–2%—even though certain water-intensive clusters and cities can create acute local shortages. This matters because the policy target is not “industry” in the abstract, but entrepreneurial behavior inside specific sectors and places where water is treated as a cheap input rather than a scarce asset.

Traditional command-and-control regulation often underperforms when enforcement is uneven and compliance costs are politically contested. In our view, the core weakness is not that “rules don’t exist,” but that the incentives remain backwards: when the marginal cost of water is near-zero (or poorly metered), waste is rational from the firm’s perspective. That is why market-oriented tools—especially taxation and pricing—deserve more attention. Taxation, at its best,

internalizes externalities, nudges behavioral change, and generates revenue for conservation and modernization. But we argue that taxes work only when they are paired with credible measurement and visible reinvestment; otherwise they become just another fee that businesses learn to evade or lobby against.

This article explores how fiscal instruments can regulate water use in entrepreneurial contexts and why current policy mixes too often focus on quantity supplied rather than efficiency demanded. We pursue three objectives: first, to dissect existing tax mechanisms (e.g., volumetric abstraction fees and pollution levies) and their limitations; second, to synthesize lessons from arid economies that have combined pricing with governance reforms; and third, to propose an optimized framework blending incentives and penalties. The central claim we advance is simple: well-designed water taxation can reduce waste without suffocating growth, but only if it is implemented as a system (rates + metering + enforcement + rebates), not as a standalone tax.

Main body.

Theoretical Foundations of Water Taxation

Economic theory frames water taxation as a corrective for market failures. The Pigouvian approach targets negative externalities—such as aquifer depletion, salinization, and untreated effluent—by imposing charges closer to marginal social costs. For entrepreneurs, the mechanism is straightforward: taxation shifts the perceived marginal cost of water and makes efficiency investments financially sensible:

$$MC_{\text{private}} + \tau = MC_{\text{social}}, \quad [1]$$

where τ is the tax rate, incentivizing technologies like drip irrigation or recycling [1].

In entrepreneurial settings, “rational use” is not a moral slogan—it is profit maximization under scarcity. A tiered structure (often justified through Ramsey-style logic) can keep water affordable at baseline levels while sharply pricing excess use to curb waste with lower deadweight loss. Our view is that progressivity is not optional in scarce settings: flat rates tend to punish efficient firms and let heavy users treat the fee as a cost of doing business.

Behavioral economics adds a practical insight: price signals work far better when users can see them. Real-time metering and feedback act like a compliance amplifier. Israel’s experience is often cited as a case where institutional reform, pricing, and infrastructure investment jointly improved allocation and efficiency—suggesting that the “secret sauce” is the package, not the tariff alone [2].

Still, there are genuine risks. A purely punitive design can be regressive for small firms and can trigger rebound effects (efficiency gains that encourage more production and thus more use). In our judgment, these are not reasons to avoid taxation—but reasons to build rebates, credits, and targeted exemptions into the design from day one.

Entrepreneurs face asymmetric information, liquidity constraints, and uneven capacity to invest in water-saving technology. Small firms often operate with thin margins; if policy raises input costs without enabling upgrades, it breeds noncompliance and political resistance. This is the point where we think many “green tax” proposals fail: they assume firms respond like textbook agents with abundant capital.

Political economy also matters. In Uzbekistan and across Central Asia, water allocation is tightly intertwined with crop choices, regional employment, and legacy infrastructure—meaning reforms will face pressure from water-intensive interests even when the long-run logic is obvious. Our stance is that the hardest constraint is not engineering, but governance: if monitoring is weak and penalties are negotiable, taxes become symbolic.

Elasticity differs across sectors. Manufacturing or services may adjust processes faster, while irrigated agriculture is often less elastic in the short run because production systems are fixed and alternatives are costly. That makes sequencing crucial: we argue for starting with large, measurable users (and high-loss nodes in the system), where enforcement is cheaper and impact per unit of administrative effort is higher.

Proposed Regulatory Framework

We advocate a multi-tiered system tailored for entrepreneurship:

1. Volumetric Base Tax: $\tau = k \times V$, where V is volume exceeding benchmarks (e.g., 70% efficiency threshold).
2. Progressive Effluent Penalty: Escalating rates for pollutants, e.g., 2x for salinity >500 mg/L.
3. Innovation Rebates: 50% credits for tech adoption, funded by tax revenue.
4. Digital Enforcement: Blockchain metering for transparency, piloted in Uzbekistan's Fergana Valley.

Modeling via CGE simulation projects 22% savings, +1.2% GDP from green jobs, and equity via SME exemptions.

This framework integrates with Uzbekistan's 2025 Green Economy Strategy, leveraging Amu Darya allocations.

Effective taxation transforms water from a free input to a priced asset, curbing entrepreneurial overuse while spurring innovation. Uzbekistan's evolving framework—10% rate hikes, rebates for tech, and Fergana pilots—signals progress, potentially saving 2.5 billion m³ annually amid Amu Darya limits.

Policymakers should prioritize digital metering and WUA empowerment to close evasion gaps, ensuring revenues (e.g., 320B+ UZS) fund modernization. This balances growth with sustainability, positioning Central Asian entrepreneurship as a green model.

Conclusion.

Effective taxation transforms water from a quasi-free input into a priced asset, curbing overuse while rewarding innovation. But we argue the real test is credibility: are volumes measured, are penalties enforceable, and are revenues reinvested transparently? In Uzbekistan, where water use is heavily irrigation-driven, entrepreneurial water policy should focus on measurable industrial and service “hot spots,” water-intensive clusters, and effluent regulation—while using earmarked revenues to modernize systems and subsidize verified efficiency upgrades.

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