

"Are We Consuming Too Much Groundwater"

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Abstract: We study the optimality of human groundwater extraction from many of the world's 3,400 aquifers. Some prominent aquifers have declining levels because use exceeds recharge. We use remote sensing and administrative data to estimate a dynamic model of water extraction for each aquifer, recover the discount factor that rationalizes observed groundwater extraction, and compare it against normative and market benchmarks. We find that 65% to 81% of global aquifers are extracted too rapidly. Inefficient groundwater extraction creates over \$3 trillion in global present-value welfare costs—a large magnitude but only a few percent of the total present value we estimate for all aquifers globally. We calculate larger losses from policies that guarantee users constant indefinite water quantities or especially that fully discount future extraction.