

Basin-Scale Economic Impact Study: The SLV Digital Twin ROI

Version: 1.0 (Public Policy Brief)

Geography: San Luis Valley (Sub-districts 1–6)

1. The Regional Threat Profile (The Cost of Inaction)

The San Luis Valley agricultural economy is valued at approximately **\$400M–\$600M annually**, primarily driven by the potato and alfalfa sectors.

- **The "Clip" Risk:** Under current state mandates, if aquifer levels do not recover, mandatory shut-offs of up to 30% of irrigated acreage are possible.
- **Asset Devaluation:** A permanent loss of water rights represents a projected **\$1.1B collapse in regional real estate value**, threatening the tax base for local schools and emergency services.

2. FarmSense Intervention ROI

2.1 Direct Resource Savings

- **Energy Arbitrage:** By shifting 20% of pumping to off-peak utility hours (Trigger D), the region saves an estimated **\$4.2M annually** in electricity costs.
- **Nitrogen Efficiency:** Reducing "Atmospheric Tax" and leaching via Logic Trigger C saves growers an average of **\$22/acre** in wasted inputs.

2.2 Yield & Grade-Out Protection

- **Thermal Stress Mitigation:** Pre-emptive cooling pulses (Trigger B) are projected to reduce "Heat-Stress internal defects" in potatoes by **15%**, preserving the "Premium" market grade for an additional 12,000 acres.
- **Economic Value:** Estimated **\$9.5M in recovered revenue** across the "Commercial 5" pilot cohort.

3. Aquifer Longevity & Structural Stabilization

- **The "Ghost Water" Benefit:** By identifying subsidence early, the system prevents the permanent loss of pore space.
- **Legacy Metric:** Extending the "Irrigation Runway" by even 5 years via precision drawdown buys the region the necessary time for large-scale managed recharge projects to take effect.

4. The "Hydrological FICO" multiplier

As lenders adopt the FarmSense score, the "Risk Premium" on agricultural loans is expected

to decrease.

- **Projected Impact:** A 0.5% reduction in interest rates for "Sovereign Rated" farms injects **\$2.8M in liquidity** back into the local economy annually.

5. Conclusion: Social License to Operate

FarmSense is not just an efficiency tool; it is an **Economic Shield**. By digitizing the "Truth of the Basin," we move from a state of regulatory fear to a state of **Data-Backed Resilience**.