One Inch of Rain. $44.2 Million in Agricultural Returns. Here's the Math.

Quantifying the Potential Economic Value of WETA Ionization Precipitation Enhancement in Texas

Background: Texas Water Scarcity and the Case for Action

Texas is in the midst of an accelerating water crisis. A record-dry winter in 2025-2026, followed by an early heatwave, has left regional water reserves critically below normal. The consequences are immediate: municipalities across Texas are confronting hard choices between conservation, rationing, and expensive infrastructure investments to secure long-term water supply. Against this backdrop, the economic case for precipitation enhancement has never been more urgent or more in need of rigorous quantification.

Dr. Jason L. Johnson of Texas A&M University's AgriLife Extension Service has provided that quantification. His March 2026 analysis, an update and substantial methodological improvement of his foundational 2014 study, applies rigorous benefit-cost analysis specifically to ground-based ionization precipitation enhancement technology across 37 Texas counties. Rain Enhancement Technologies (NASDAQ: RAIN), which deploys WETA (Weather Enhancement Technology Array) ionization systems at operational installations across the Western United States, commissioned this analysis to quantify the economic returns of ionization precipitation enhancement for Texas agricultural regions. It is the most rigorous economic framework ever applied to this technology, and its findings are directly relevant to water resource managers, policymakers, and agricultural stakeholders evaluating responses to the state's water emergency.

A Benefit-Cost Analysis for Texas Agricultural Regions

18.74:1
Highest 10-Year Benefit-Cost Ratio
Fisher County, Rolling Plains

$44.2M
Annual Direct Ag Benefit
Conservative case
1 additional inch

$360.5M
Discounted 10-Year Direct Ag Benefit
Across 37-county study area

Methodology

The analysis evaluates the Weather Enhancement Technology Array (WETA), a ground-based ionization system that enhances precipitation through high-voltage corona discharge, requiring no aircraft, no chemicals, and no ongoing operational costs beyond the initial capital investment. Each WETA unit serves approximately 230,400 acres, operates on less than 500 watts of solar power, and has a 15-year operational lifespan.

The economic framework uses **10-year discounted net present value (NPV)** methodology, applying a 4.1% discount rate consistent with the Office of Management and Budget's Circular A-94, the standard used to evaluate federal infrastructure investments. This approach is more conservative and more rigorous than the simple benefit-cost ratios used in earlier cloud seeding analyses and produces figures that are directly comparable to other major capital investment decisions.

Agricultural benefits are quantified across three categories: increased dryland crop revenues (corn, wheat, sorghum, and cotton), irrigation cost savings, and grazing land value improvements. Data sources include 2023-2025 USDA Farm Service Agency certified acreage reports, 2021-2024 Olympic average commodity prices from USDA National Agricultural Statistics Service, and 2025 Texas A&M AgriLife Extension crop enterprise budgets. Two scenarios are modeled: one additional inch of annual rainfall (conservative case) and a 10% increase in annual precipitation (upside case).

Key Findings

Statewide agricultural benefit: One additional inch of rainfall generates $44.2 million in annual agricultural benefit across the 37-county study area, producing $360.5 million in discounted 10-year economic value against a total WETA investment of $63.75 million (85 units). A 10% precipitation increase generates $98.9 million annually.

1-INCH CASE
+1 Additional Inch of Rainfall
Annual ag benefit: $44.2M
Avg. statewide payback: 1.44 years
Overall, 10-year BCR: 5.66:1
9 counties exceed 10-year BCR of 10:1

CONSERVATIVE CASE
+10% Annual Precipitation (~1–3 in)
Annual ag benefit: $98.9M
Avg. statewide payback: 0.64 years
22 of 37 counties recover investment under 1 year
Some counties pay back in under 3 months

UPSIDE CASE
+20% Annual Precipitation (~2–6 in)
Annual ag benefit: $197.9M
Avg. statewide payback: 0.32 years
All regions except Trans Pecos under 1 year
Fastest counties pay back in under 2 months

Return on investment: Nine of the 37 counties studied achieve 10-year Benefit-Cost Ratios exceeding 10:1 under the conservative one-inch scenario. The highest BCR is 18.74:1 in Fisher County. The overall 10-year BCR across all 37 counties is 5.66:1.

Payback periods: Under the conservative scenario, 11 counties recover their full WETA investment within two years. Nine counties recover their investment within one year. Under the 10% precipitation scenario, 22 of 37 counties recover their investment in under a year, with the fastest, Jones and Fisher counties, recovering in under six months.

Scalability: The benefit estimates are directly scalable. A half-inch of additional precipitation produces half the estimated benefits; two additional inches produce twice the benefits. This allows the framework to be paired with measured precipitation data from actual WETA deployments to produce documented, verifiable impact assessments.

Counties with 10-Year Benefit-Cost Ratios Exceeding 10:1 (Conservative Scenario)

County	Program	Investment	10-Year BCR	Payback (1 inch)
Fisher	RPWEP	$1.5M	**18.74:1**	0.44 years
Jones	RPWEP	$1.5M	**18.55:1**	0.44 years
Carson	PGWCD	$1.5M	**15.12:1**	0.54 years
Bee	STWMA	$750K	13.96:1	0.58 years
Nolan	RPWEP	$1.5M	13.81:1	0.59 years
Scurry	RPWEP	$1.5M	12.59:1	0.65 years
Haskell	RPWEP	$2.25M	11.94:1	0.68 years
Tom Green	WTWMA	$3.0M	11.08:1	0.74 years
Mitchell	RPWEP	$1.5M	10.45:1	0.78 years

BCRs calculated using 10-year discounted NPV at 4.1% discount rate (OMB Circular A-94). Conservative scenario = 1 additional inch of annual rainfall.

What This Analysis Does Not Count

Dr. Johnson applied conservative assumptions throughout. The following significant benefit categories are explicitly excluded from the analysis — meaning the figures above represent a floor, not a ceiling:

Agricultural benefits only:
Municipal water supply, reservoir and aquifer replenishment, recreational value, wildlife habitat improvement, and fire suppression benefits are not included.

Four crops only:
Dryland corn, wheat, sorghum, and cotton, irrigate acreage, and grazing lands were the only ag commodities in the analysis. Any other benefits were ignored.

15-year asset, 10-year analysis:
NPV calculation uses only 10 years of benefits, even though the life expectancy of each WETA unit is 15 years.

Year-round operation not fully captured:
Agronomic response rates reflect traditional March-October cloud seeding windows. WETA operates year-round, meaning winter precipitation benefits to cool season crops like wheat are underestimated.

Traditional aircraft-based cloud seeding programs have operated in Texas for decades. However, the economic case for cloud seeding has historically been difficult to quantify with precision. Operational costs recur annually, program coverage depends on weather windows and multi-county collaboration, and the inability to attribute specific precipitation events to seeding activity makes ROI measurement inherently uncertain. Ground-based WETA ionization systems, by contrast, enable precise monitoring of treatment areas and measurable attribution of precipitation changes, providing a clearer and more defensible basis for return-on-investment documentation.

Ground-based WETA ionization technology presents a structurally different investment proposition. The WETA model involves **a single upfront capital cost with no recurring operational expenses**, continuous 24-hour-a-day autonomous operation, and a coverage footprint that can be precisely targeted to specific watersheds, dryland acreage concentrations, or grazing land areas, without requiring multi-county coordination. For stakeholders who prefer a phased approach, a financing option spreading the investment over five equal annual payments improves the first-year **rate of return by 5x** compared to a full upfront investment, with the tradeoff of proportionally reduced rates of return in years 2 through 5 as the remaining balance is paid, and no change to the overall 10-year return calculations modeled in this analysis. Individual counties can invest independently and capture their own returns rather than depending on regional weather patterns to deliver precipitation to their specific area.

This structural difference is what makes a rigorous benefit-cost framework both possible and meaningful for the WETA model. Dr. Johnson's 2026 analysis is, to the authors' knowledge, the first independent economic study to apply discounted NPV methodology and county-level BCR analysis to ground-based ionization weather modification technology in the United States.

About the Study and Author

Dr. Jason L. Johnson is Associate Professor and Extension Economist at Texas A&M University. A fifth-generation rancher operating a 1,200-acre cattle operation in Jacksboro, Texas, he brings both academic rigor and firsthand agricultural experience to his economic analysis. Dr. Johnson authored the foundational 2014 benefit-cost framework for Texas weather modification programs and returned in 2026 to update that methodology specifically for ground-based ionization technology, incorporating current USDA acreage data, 2021-2024 commodity prices, and 2025 irrigation cost estimates.

The full study, including county-level data tables, methodology documentation, and complete BCR calculations for all 37 counties, is available upon request. Dr. Johnson is available for interviews through Rain Enhancement Technologies only

About Rain Enhancement Technologies

Rain Enhancement Technologies (NASDAQ: RAIN) develops, manufactures, and commercializes ionization precipitation generation technology that enhances rainfall and snowpack to address water scarcity challenges. The Company's WETA system is currently deployed at operational installations in Utah and Colorado, with performance data from the 2025-2026 winter season providing real-world validation of the technology's precipitation enhancement capability. RET's chemical-free, solar-powered technology requires no ongoing operational costs and is designed for continuous autonomous operation across diverse geographic and climatic conditions.

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