The CT US Cotton Production YoY Signal: Top-Exporter Supply Anchor for Cotton

Why USDA PSD US cotton production year-over-year delivers a strongly significant 36-year directional pattern on Cotton forward 60-day returns via the top-exporter supply channel.

David Stendahl · Market Lab Analytics · November 6, 2026

The signal with the limits stated upfront

Three things the reader must know before the rest of this brief lands.

First, the full-distribution daily Spearman information coefficient against Cotton forward 60-day returns is plus 0.112 at p-value 1.5e-26 on a sample of 8,953 daily observations spanning 1990 through 2026. Strongly significant on the 36-year window.

Second, Phase +1 (Production Declining inverted bullish) delivers plus 0.48 percentage points above baseline across 4,134 trading days (46.2 percent of sample) and Phase −1 (Production Rising) delivers minus 0.43 percentage points below baseline across 3,566 days (39.8 percent). 0.91 pp directional spread with clean monotone phase pattern.

Third, the non-overlap independence test at 60-day sampling is not independently significant. Across 150 independent samples the Spearman is plus 0.087 with p-value 0.29. Spread is modest at 0.91 pp; the signal is a slow-moving systemic supply anchor rather than a short-horizon trigger.

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The thesis: US production as the top-exporter supply anchor

The United States is the world's largest cotton exporter and the second-largest producer (after China). USDA Production Supply and Distribution data tracks US cotton production year-over-year with multi-decade history as part of the Cotton World Markets and Trade semiannual report.

Shifts in US production translate directly to global supply balance given the dominant US export share. Even though China grows more cotton, most Chinese cotton is consumed domestically; US cotton overwhelmingly reaches global markets. Declining US production tightens the exportable global supply and supports Cotton futures; rising production loosens the balance.

The signal takes USDA PSD US cotton production YoY, z-scores on a rolling window, inverts (production decline reads positive composite), and tanh-bounds. State thresholds plus or minus 0.2

(moderate) and plus or minus 0.5 (extreme). Phase +1 at composite above +0.3, phase −1 below −0.3. Target: ICE US Cotton No. 2 first-nearby back-adjusted close.

Historical window: USDA PSD cotton series from 1960; engine runs from 1990 onward with 504-bar warmup.

What the firings have actually done

Computed over 8,953 daily observations post-warmup from 1990 onward. The baseline Cotton forward 60-day return is mean plus 0.97 percent and median plus 0.15 percent across the live-window sample.

> **Baseline Cotton forward 60-day return:** mean plus 0.97 percent / median plus 0.15 percent across the live-window sample.
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> **Daily Spearman IC (fwd 60d):** plus 0.112, p-value 1.5e-26, N equals 8,953. Strongly significant.
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> **Non-overlap IC (60-day step):** plus 0.087, p-value 0.29, N equals 150. Sign-consistent but not independently significant.
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> **Phase-conditional forward 60-day Cotton returns:** Phase +1 (Production Declining, 4,134 days / 46.2 pct): plus 1.45 percent, edge plus 0.48 pp. Phase 0 (On Trend, 1,253 days / 14.0 pct): plus 0.61 percent, edge minus 0.36 pp. Phase −1 (Production Rising, 3,566 days / 39.8 pct): plus 0.54 percent, edge minus 0.43 pp.
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> 0.91 pp directional spread between Phase +1 and Phase −1 with clean monotone phase pattern.

Three findings. The daily IC is strongly significant on the 36-year window. The monotone phase pattern cleanly separates Production Declining from Production Rising with a 0.91 pp spread that is modest but reliable. The sample distribution is roughly symmetric between extreme buckets (46.2 percent and 39.8 percent).

Three cases that frame how to read the signal

The canonical anchors are the 2022-2023 Texas-driven US production collapse, the 2015-2016 US production pullback, and the 2018-2019 cycle-low period.

Case 1: The 2022-2023 Texas-driven US production collapse

Production Declining firing anchored the 2022-2023 Cotton rally after the Texas megadrought collapsed US cotton production. USDA PSD revised US production down materially through the 2022-23 marketing year as Texas (roughly 40 percent of US production) saw abandonment rates spike. Composite held in Phase +1 territory through the rally. Cotton rallied materially from the lower-100s to above 150 cents per pound consistent with the Phase +1 edge.

Case 2: The 2015-2016 US production pullback

Production Declining firing in mid-2015 as US cotton production fell year-over-year on reduced acreage after cycle-low pricing in 2014-15. Composite held in Phase +1 territory. Cotton returns were modest through the regime as benign weather partially offset the acreage decline, but the directional signal remained consistent with the Phase +1 edge.

Case 3: The 2018-2019 cycle-low period

Production Rising firing through 2018-2019 as US cotton production expanded on favorable growing conditions and increased acreage responding to prior-year price strength. Composite held in Phase –1 territory through the cycle-low pricing regime. Cotton underperformed through the period consistent with the Phase –1 edge; rising US supply pressured global balance.

How to use this signal today

Composite is currently reading plus 0.336 in the Production Declining band. The HEALTHY phase began October 2026, 24 trading days ago. USDA PSD US cotton production has run below prior-year levels through 2026 consistent with supply-tightening regime.

Pair with the following for stacked conviction: US Cotton Belt DSCI (short-lead US weather, Z100008), India Vidarbha plus Gujarat GRACE (India supply), Xinjiang CHIRPS (China supply, Z3414), Baltic freight (global demand, Z96572), apparel inventory demand (downstream US demand, Z100400), and CFTC positioning (Z32350). This production signal gives the US systemic supply anchor; pair with short-lead weather and global supply for the full read.

Reader rule: Production Declining firings flag bullish supply-tightening regimes with Cotton strength historically following at 60-day horizon. Production Rising firings flag bearish regimes where US supply loosens global balance.

Methodology

Data source: USDA Foreign Agricultural Service Production Supply and Distribution database US cotton production series. Computation: year-over-year percent change, z-scored on a rolling window, inverted so production decline reads positive composite, tanh-bounded. State thresholds plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Phase +1 at composite above +0.3, phase –1 below –0.3. Target: ICE US Cotton No. 2 first-nearby back-adjusted close.

Historical window: USDA PSD cotton series from 1960; engine runs from 1990 onward with a 504-bar warmup for the rolling z-score. USDA publishes PSD data in the Cotton World Markets and Trade semiannual report with monthly WASDE updates for intermediate adjustments.

Validation computed on 8,953 post-warmup daily observations. Daily Spearman IC plus 0.112 at p-value 1.5e-26 across 8,953 observations, strongly significant on 36-year sample. Phase +1 per-day forward return plus 1.45 percent (plus 0.48 pp above plus 0.97 percent baseline). Phase –1 per-day forward return plus 0.54 percent (minus 0.43 pp below baseline). 0.91 pp directional spread. Non-overlap IC at 60-day sampling plus 0.087 at p-value 0.29 across 150 samples, sign-consistent but not independently significant.

What this signal does not cover

The signal does not cover non-US cotton production (see Z32312 India Vidarbha GRACE, Z32311 India Gujarat GRACE, Z3414 China Xinjiang CHIRPS). It does not capture short-lead US growing conditions (see Z100008 US Cotton Belt DSCI for weekly USDM-based read). It does not capture demand (see Z100400 apparel inventory, Z96572 Baltic freight). USDA PSD annual-plus-monthly-WASDE cadence limits sub-monthly resolution.

Disclaimer

This brief and the signal it describes are for informational purposes only and do not constitute investment, legal, tax, or trading advice. Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not been executed, the results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. The phase-conditional forward-return stats reported above are a full-sample unconditional measurement. Readers should consult a licensed financial professional before taking any trading action.

References

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