METHODOLOGY & TECHNICAL SPECIFICATION

GFO Structural Risk Index

A proprietary composite index of global food system structural vulnerability

Version	Published	Data basis	Next update
v1.3	April 2026	USDA WASDE-670, April 9 2026	May 12 2026 (WASDE-671)

SECTION 1

Purpose and scope

The GFO Structural Risk Index (SRI) is a monthly composite index that measures the structural vulnerability of the global food supply system. It is designed to give export promotion agencies, commodity traders, agricultural investors, and senior food industry operators a single, citable reference figure that synthesises the underlying buffer capacity of the global commodity system across four staple categories.

The SRI is not a price index. It is not a forecasting model. It does not predict food crises. Its function is narrower and more defensible: it measures how much structural cushion the global system currently holds relative to its own recent history, and it flags when that cushion is contracting into territory associated with historical disruption events.

Scope The SRI covers world aggregate commodity data as published in the USDA Production, Supply and Distribution (PSD) database. It does not disaggregate by country, region, or trade corridor. Country-level analysis is published separately in GFO signal posts and deep-dive reports.

SECTION 2

Index construction

2.1 Core formula

The SRI is built from four commodity-specific stocks-to-use ratios, each drawn from the USDA PSD world aggregate for that commodity. A stocks-to-use ratio measures ending stocks as a proportion of domestic consumption — the larger the ratio, the more buffer the system holds.

Formul Commodity STU ratio = Ending Stocks (MMT) ÷ Domestic Consumption (MMT)

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Each of the four commodity STU ratios is then normalised against the full historical series (January 2018 – present) to produce a value between 0 and 100. A normalised reading of 100 represents the tightest supply conditions on record; a reading of 0 represents the most ample. The four normalised readings are then combined into the composite SRI using a fixed weighting scheme.

2.2 Commodity weights

The weighting scheme reflects each commodity's contribution to global human caloric supply, as reported by FAO (FAOSTAT Food Balance Sheets, 2022 reference year). The weights are fixed and reviewed annually.

Commodity	SRI weight	Rationale	USDA PSD series
Coarse grains (incl. corn)	35%	Largest caloric share; primary animal feed base	World coarse grains: total use / ending stocks
Wheat	30%	Primary human food grain; highest direct caloric exposure	World wheat: domestic consumption / ending stocks
Rice	20%	Dominant staple in Asia, Sub-Saharan Africa, MENA	World rice: domestic consumption / ending stocks
Soybeans	15%	Critical feed and oil feedstock; indirect caloric vector	World oilseeds (soybean): total use / ending stocks

2.3 Normalisation

Each commodity STU ratio is normalised using the min-max method against the full historical series from January 2018. The normalisation inverts the ratio so that a higher SRI reading corresponds to higher structural risk (i.e. lower stock buffers).

Normalisation Normalised score = 100 × (max(STU) − STU_t) ÷ (max(STU) − min(STU)) Where max and min are taken across the full Jan 2018–present series. A low STU ratio (tight stocks) produces a high normalised score (elevated risk).

2.4 Composite SRI

The composite SRI is the weighted average of the four normalised commodity scores:

Composite SRI = (Coarse grains score × 0.35) + (Wheat score × 0.30) + (Rice score × 0.20) + (Soybean score × 0.15)

The composite ranges from 0 to 100. It is published monthly, updated on the day of each USDA WASDE release, and carries a stated data basis identifying the WASDE number and release date.

SECTION 3

Alert thresholds

Three alert bands are defined against the historical series. Thresholds are calibrated against the four documented disruption events in the backtest (Section 5) and reviewed annually.

Band	SRI range	Interpretation	Historical precedent
Normal	0 – 39.9	Ample buffers; system well within historical comfort range	Pre-2019 baseline; Jan 2018 floor: 34.2
Elevated	40.0 – 59.9	Buffers contracting; heightened sensitivity to supply shocks	COVID-19 entry: ~43 (Apr 2020); current Apr 2026: 57.1
High Risk	60.0 – 74.9	Significant structural stress; historical price spikes associated	El Niño/Red Sea peak: ~68 (Oct 2023)
Critical	75.0 – 100	Extreme vulnerability; associated with acute food system disruption	Ukraine shock peak: 81.9 (Mar 2022)

SECTION 4

GFO Signal Pressure Score

The SRI is a backward-looking quantitative reading anchored to published USDA PSD data. It cannot incorporate intelligence that has not yet been reflected in the USDA's official revision cycle. To address this limitation, GFO publishes a separate forward-looking qualifier alongside the SRI: the Signal Pressure Score (SPS).

4.1 Definition

The SPS is a qualitative directional indicator, expressed as a net score from −5 to +5, that summarises the balance of GFO's current weekly signals relative to their likely impact on the next WASDE revision. A positive SPS indicates that live signals are likely to push the SRI higher in the next monthly update; a negative SPS indicates likely downward revision.

4.2 Scoring protocol

Each active GFO signal is assessed for its directional impact on one or more of the four SRI commodity components. Signals rated ▲▲▲ Structural Shift carry a weight of 1.0; ▲▲

Emerging Trend carry 0.6; ▲ Early Signal carry 0.3. The SPS is the net sum of risk-additive signals minus risk-subtractive signals, capped at ±5.

Signal strength	Direction	SPS weight	Example — Apr 2026
▲▲▲ Structural Shift	Risk+	+1.0	Hormuz fertiliser disruption (Supply)
▲▲ Emerging Trend	Risk+	+0.6	US HRW drought stress (Climate)
▲ Early Signal	Risk+	+0.3	Brazil soy / US fracture (Trade)
▲ Early Signal	Risk−	−0.3	Wheat stocks 5-yr high (Price)

The SPS is published alongside the SRI as a separate figure. It does not modify the SRI. It is explicitly labelled as a forward-looking qualitative overlay and should be treated as an analytical signal, not a data-driven revision.

Apr 2026 SPS SRI (WASDE-anchored): 55.2 | SPS: +1.9 | SRI (signal-adjusted display): 57.1 The signal-adjusted display figure is the SRI plus the SPS contribution, shown for interpretive convenience. Only the WASDE-anchored SRI should be cited in external publications.

SECTION 5

Backtest: four historical disruption events

The SRI has been backtested against four documented global food system disruption events within the Jan 2018–Apr 2026 series. All four events produced SRI readings above the Elevated threshold (40.0) at or before the point of peak market stress.

Event	SRI at event onset	SRI peak	Peak date	Components most affected
African Swine Fever — China	38.9 (Apr 2019)	46.1 (Oct 2020)	Oct 2020	Coarse grains (feed demand surge)
COVID-19 supply disruption	41.3 (Jan 2020)	50.3 (Oct 2021)	Oct 2021	Wheat, rice (panic buying, export restrictions)
Ukraine invasion / Black Sea closure	53.8 (Jan 2022)	81.9 (Mar 2022)	Mar 2022	Wheat (primary), coarse grains
El Niño / Red Sea disruption	54.3 (Oct 2023)	68.1 (Jul 2023)	Jul 2023	Rice (El Niño), wheat (Red Sea routing)

In all four cases the SRI was already in the Elevated band before market prices reached their peak stress point. This supports the index's utility as an early-warning indicator, though it does not constitute a predictive claim. The SRI measures structural conditions; price and trade outcomes are determined by additional factors outside the index's scope.

SECTION 6

Current reading — April 2026

The April 2026 reading is based on USDA WASDE-670, released April 9, 2026.

Commodity	Ending stocks	Consumption	STU ratio	Normalised score	Weighted contribution
Coarse grains	294.8 MMT	1,238 MMT	23.8%	64.2	22.5 pts (35%)
Wheat	283.1 MMT	820.1 MMT	34.5%	41.8	12.5 pts (30%)
Rice	192.3 MMT	540.6 MMT	35.6%	55.1	11.0 pts (20%)
Soybeans	124.8 MMT	506.0 MMT	24.7%	60.3	9.0 pts (15%)
				Composite SRI	55.2 (WASDE-anchored)

SPS Apr 2026 Active signal pressure: +1.9 pts (net). Risk-additive signals: Hormuz fertiliser disruption (▲▲▲ SUPPLY, +1.0), HPAI scale and EU spillover risk (▲▲▲ BIOSECURITY, +0.5), US HRW drought (▲▲ CLIMATE, +0.36), Brazil soy dominance (▲ TRADE, +0.18). Risk-subtractive: Wheat 5-yr high stocks (▲ PRICE, −0.09). Signal-adjusted display: 57.1.

SECTION 7

Limitations and appropriate use

The following limitations apply to all uses of the SRI and should be disclosed in any external citation.

- The SRI is a structural buffer index, not a price forecast. A high SRI reading indicates reduced systemic resilience; it does not predict that prices will rise or that a crisis will occur.
- The index is limited to four commodity categories. It does not cover edible oils, sugar, dairy, meat, or protein commodities independently. Risks specific to non-covered categories are not reflected.
- The index relies on USDA PSD data, which is subject to revision. The SRI is updated monthly on the date of each WASDE release; interim readings between WASDE releases should not be interpolated.
- Normalisation against the Jan 2018–present series means the index is sensitive to the composition of the historical window. Events pre-dating 2018 are not captured in the baseline. As the series extends, historical min/max values will shift and past readings will be revised.
- The Signal Pressure Score is a qualitative overlay produced by GFO analysts. It carries subjective judgment and should be clearly labelled as such in any citation.

– The index does not account for distribution, infrastructure, or access constraints. A high global buffer reading does not preclude acute local food insecurity.

SECTION 8

Citation standard

External citations of the SRI should include the following elements: the index name in full, the reading value, the date of the WASDE data basis, and the version number of this methodology document.

Recommended citation format	GFO Structural Risk Index: 55.2 (Elevated). Data basis: USDA WASDE-670, April 9 2026. Methodology: Global Food Observatory SRI Methodology v1.3 (April 2026), globalfoodobservatory.com/sri-methodology.

For questions regarding the index methodology, contact Global Food Observatory at globalfoodobservatory.com.

Global Food Observatory · globalfoodobservatory.com · SRI Methodology v1.3 · April 2026