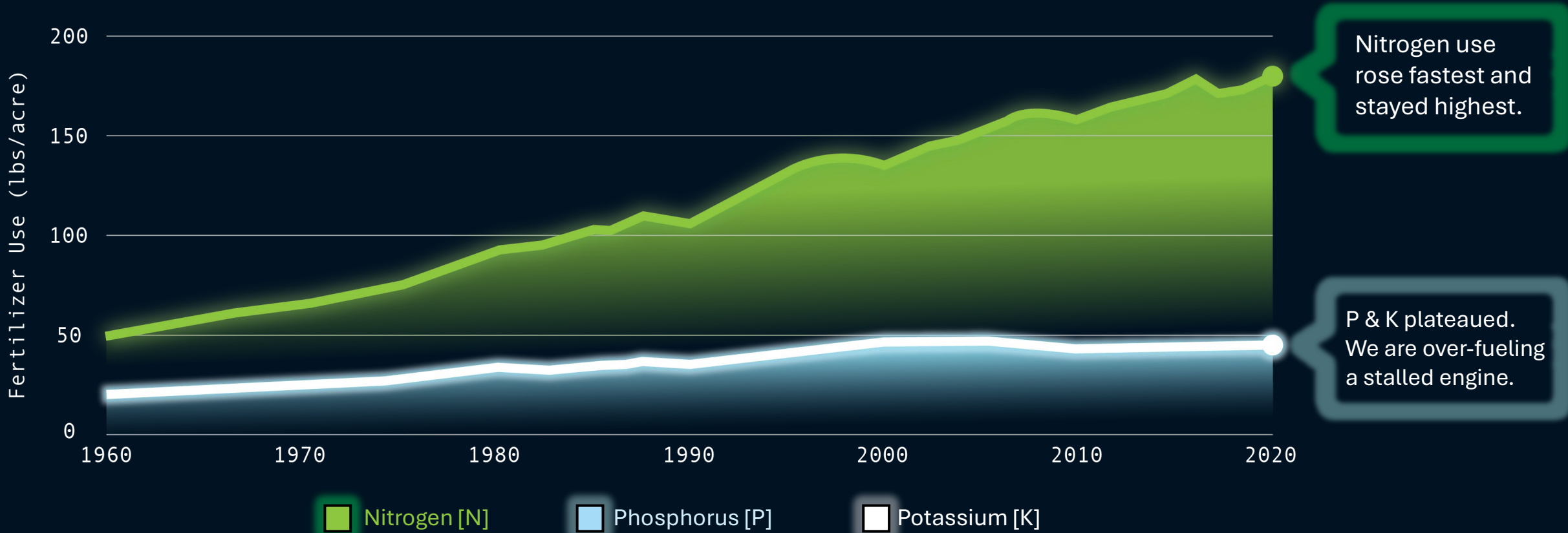


Kalb Farm - South Africa

NPK use in the US

The "Efficiency Paradox": Inputs have skyrocketed, but returns are diminishing.



ROI PROBABILITY MATRIX: PHOSPHORUS

SOIL TEST CATEGORY	BROADCAST P ROI%	STARTER/BAND P ROI%
VERY LOW	50-75%	60-80%
LOW	30-55%	40-65%
OPTIMUM	10-25%	20-40%
HIGH	0-10%	5-15%
VERY HIGH	0-5%	0-10%

Source: Data derived from ISU response probabilities and 2026 break-even costs

EFFICIENCY GAP. Banding maintains viable ROI probability here, while Broadcast drops off due to volume cost.

ROI PROBABILITY MATRIX: POTASSIUM

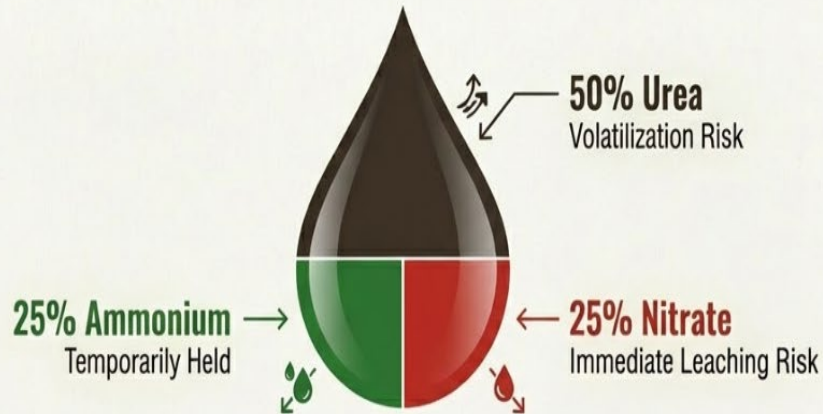
SOIL TEST CATEGORY	BROADCAST K ROI%	STARTER/BAND K ROI%
VERY LOW	50–75%	55–80%
LOW	30–55%	35–60%
OPTIMUM	10–30%	15–35%
HIGH	0–10%	0–15%
VERY HIGH	0–5%	0–10%

Probabilities anchored to ISU response data. Broadcast K adjusted downward slightly for soybean chloride risk.

If Only ~30–50% of Applied Fertilizer N Gets Into the Plant, Where Does the Rest Come From?

– University of Illinois

FERTILIZER SOURCE AUDIT: UAN (32%)



Typical Recovery (fNUE):	31% – 46%
Actual Uptake (from 185 lbs applied):	57 – 85 lbs entering the plant.

Risk Profile

Leaching: 25% of UAN is nitrate (NO_3^-), which is instantly mobile and leachable in wet soils.

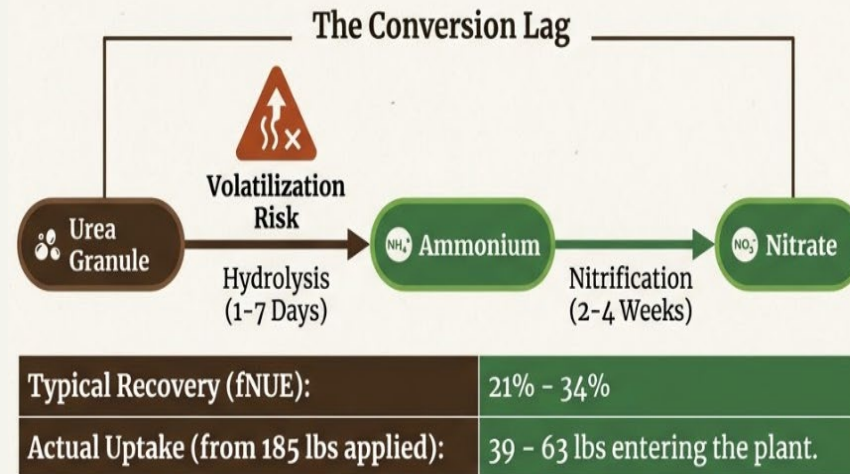
Immobilization: Microbes consume ammonium/urea to break down carbon residue.



PRODUCER NOTE

UAN offers a faster “front-end” response than urea because of the immediate nitrate fraction, but that same fraction is your biggest liability in a wet spring. It pushes the risk meter toward leaching.

FERTILIZER SOURCE AUDIT: UREA (46-0-0)



Risk Profile

- **Volatilization:** Surface applications can lose 10-30% of N as ammonia gas within days if not incorporated.
- **Conversion Lag:** Must hydrolyze to ammonium, then nitrify. Slower conversion exposes it to microbial tie-up.

PRODUCER NOTE

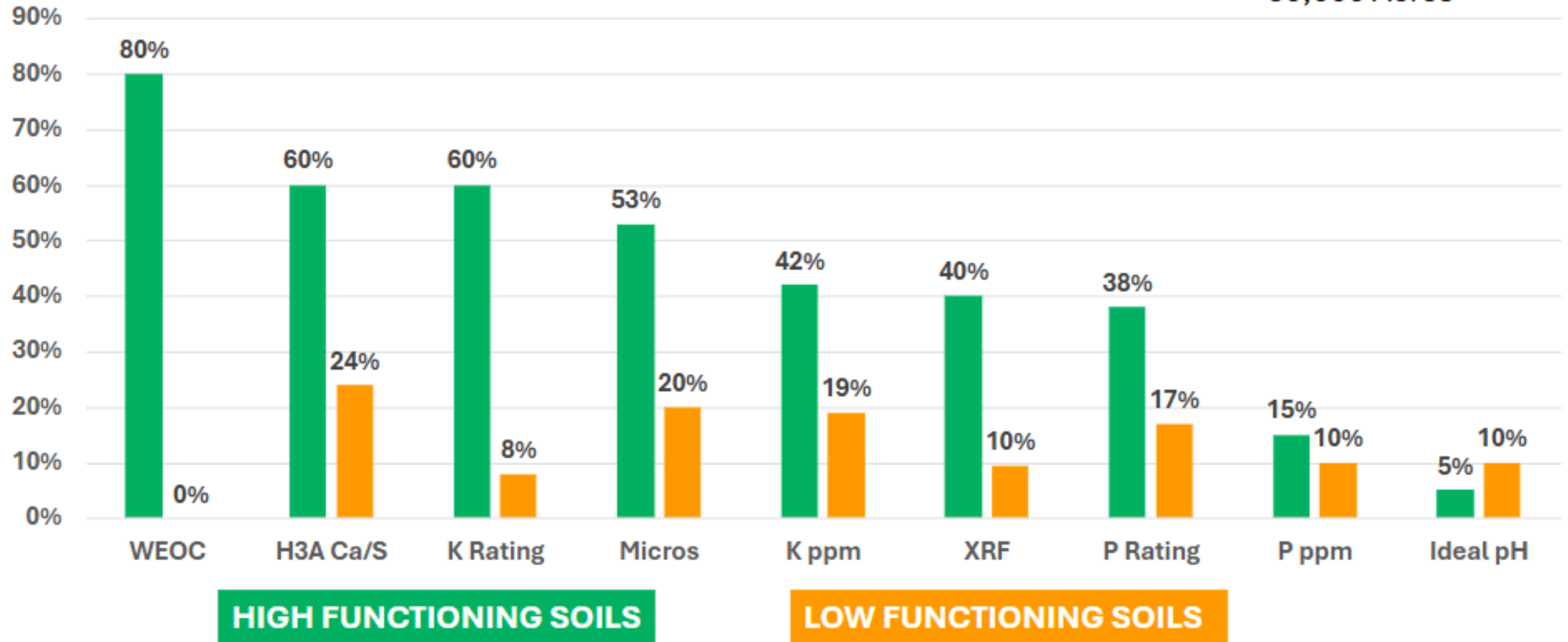


Urea has the lowest efficiency when broadcast on the surface. Without incorporation (mechanical or rain), you are essentially paying to fertilize the atmosphere. If you can't incorporate, use inhibitors.

What Matters Most

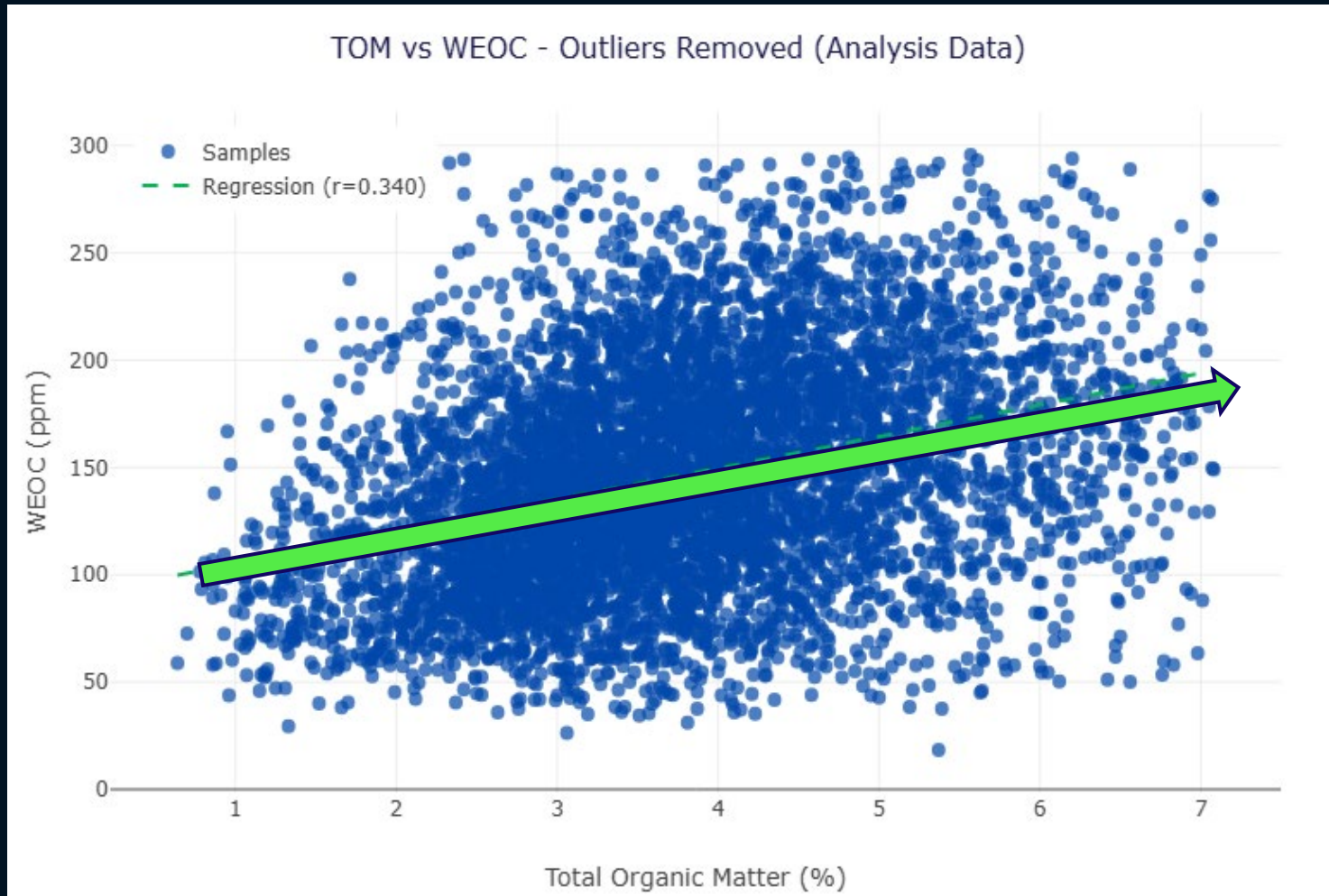
Probability of a YLD Correlation

50,000 Acres



The Metrics Being Used Are Outdated

62,588
samples



Organic Matter does not predict WEOC and in return we have been focused on the wrong metrics



2021 JEEPS
SECTIONAL CHAMPIONS
SOFTBALL









535 bu/acre

33.63 ton/hectare



425.8 bu/acre

26.77 ton/hectare





