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DRIVING INNOVATION: Impact of Emerging Tech In Seeds, Traits & Bio Solutions & How It Drives Investment

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HARNESSING THE STORM 2026 CPDA ADJUVANTS, INERTS & CROP PROTECTION CONFERENCE

WHY THIS DISCUSSION MATTERS NOW

Three forces converging into one field system

What used to be separate categories is now one performance conversation.

TRAITS & SEEDS

Resilience and efficiency are reshaping the seed stack

New traits now extend beyond protection into drought, heat, salinity, and system-level efficiency.

BIOLOGICALS & SOIL HEALTH

Biocontrol and microbiome tools are scaling

Soil health is moving from aspiration to measurable value — but consistency is still the gating factor.

BIOSTIMULANTS & NUTRITION

Targeted stress support is becoming more strategic

Biostimulants, micronutrients, and foliar tools win when they solve a defined problem inside the program.

Reliable field performance under stress

Implication: the winning innovation model is shifting from product optimization to system design.

From optimizing inputs individually to designing systems intentionally

Discovery still matters. Integration now decides adoption.

LEGACY MODEL

Categories are developed mostly in parallel.

- Traits
- Crop protection
- Biologicals
- Nutrition

Typical result: individual wins, but weak system fit and more handoffs to the field.

NEXT CHAPTER

One crop system is designed across the interfaces.

- Seed
- Soil
- **Integrated crop system**
- Spray
- Timing & data

Bottom line: discovery creates options; interfaces create commercial reality.

New traits beyond yield: reducing operational risks

Herbicide tolerance
Simplified programs then resistance reset complexity

Insect traits
Reduced pressure but changed management dynamics

Stacked systems
More combinations and higher stewardship demands

Resilience traits
Drought, heat, salinity, flood tolerance and efficiency

New traits made adjuvants and agrochemicals more critical and more specialized.

Traits are no longer just protecting yield – they are redesigning how crops interact with their environment.

Traits define potential – seed technology and delivery define performance.

At the moment that the seeds start to be treated, the success of a good crop season starts to be defined.

Colored seeds – to identify treatment

Seeds containing the plant protection products in the proper dosage/rate

Optimized sowing process

Safe application

Maintenance of seed physiological quality

The seed becomes a delivery platform

The seed stack now carries multiple jobs:

- Genetics / trait package
- Crop Protection
- Biologicals / inoculants
- Micronutrients / biostimulants
- Seed Coating Technologies

Bottlenecks to unlock next-generation seed treatment

- Application volume
- Slurry and formulation compatibility
- Scalable, reproducible application
- Regulatory (e.g. microplastic-free solutions)
- Seed safety & phytotoxicity control
- Incorporation of biologicals & stability

Biology is moving from promise to platform

The opportunity is real — but commercial adoption still depends on consistency, handling, and field repeatability.

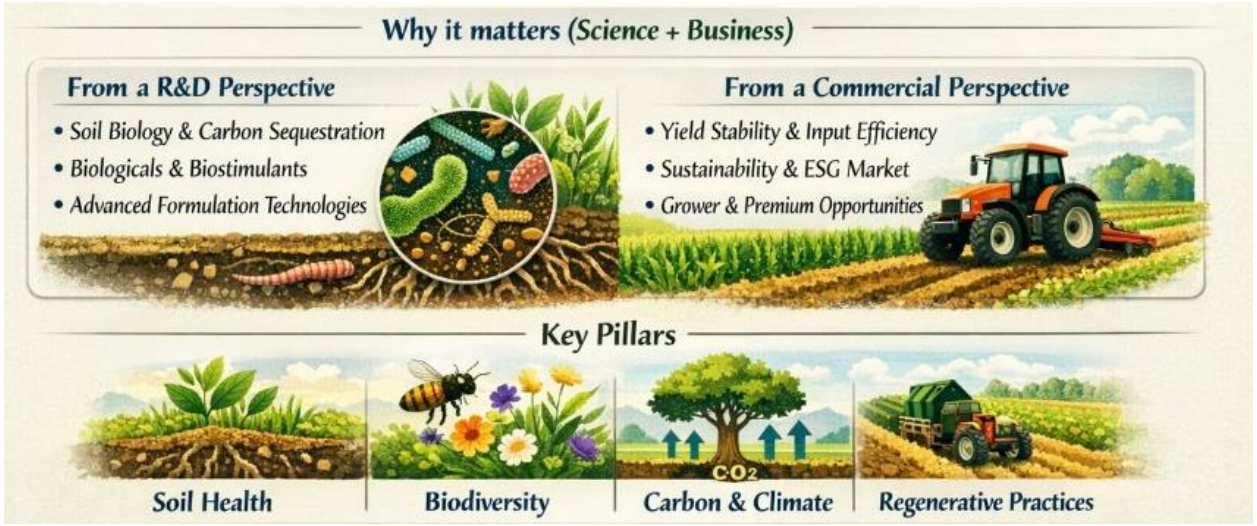
What is changing

- Biocontrol is expanding from niche solutions toward strategic crop systems.
- Soil health and the microbiome are moving closer to measurable yield and resilience discussions.
- Adjuvants and co-formulants are increasingly expected not only to improve spreading and wetting, but also to protect, enhance shelf life, and deliver living systems.

What still has to be solved

VIABILITY | COMPATIBILITY | STORAGE | REPEATABILITY

REGENERATIVE AGRICULTURE



Formulators increasingly become match-makers across microbes, soil, seed, and spray.

Soil is the new frontier

Advancing sustainable agriculture through soil microbiome innovation

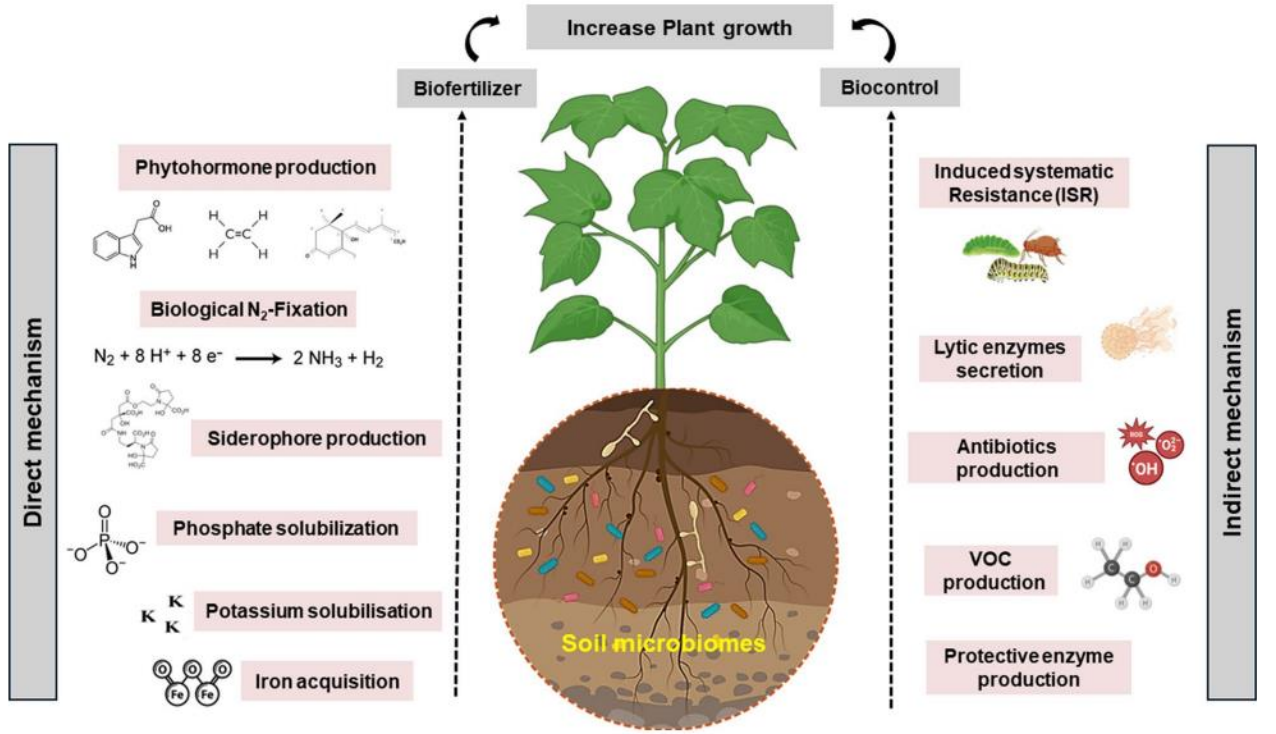
Key Technical challenges

- Stability and survival in Soil: pH changes, temperature, moisture, competition with native microbiome
- Effective Delivery to Rhizosphere: difficulty reaching root zones due to adsorption, limited mobility, and uneven soil distribution
- Field Reproducibility and Compatibility: variable biological efficacy in different soil and climate conditions

Future Perspectives:

Tailored microbial consortia, Bioformulations, Regenerative practices farming, Conservation and preservation of soil microbiome

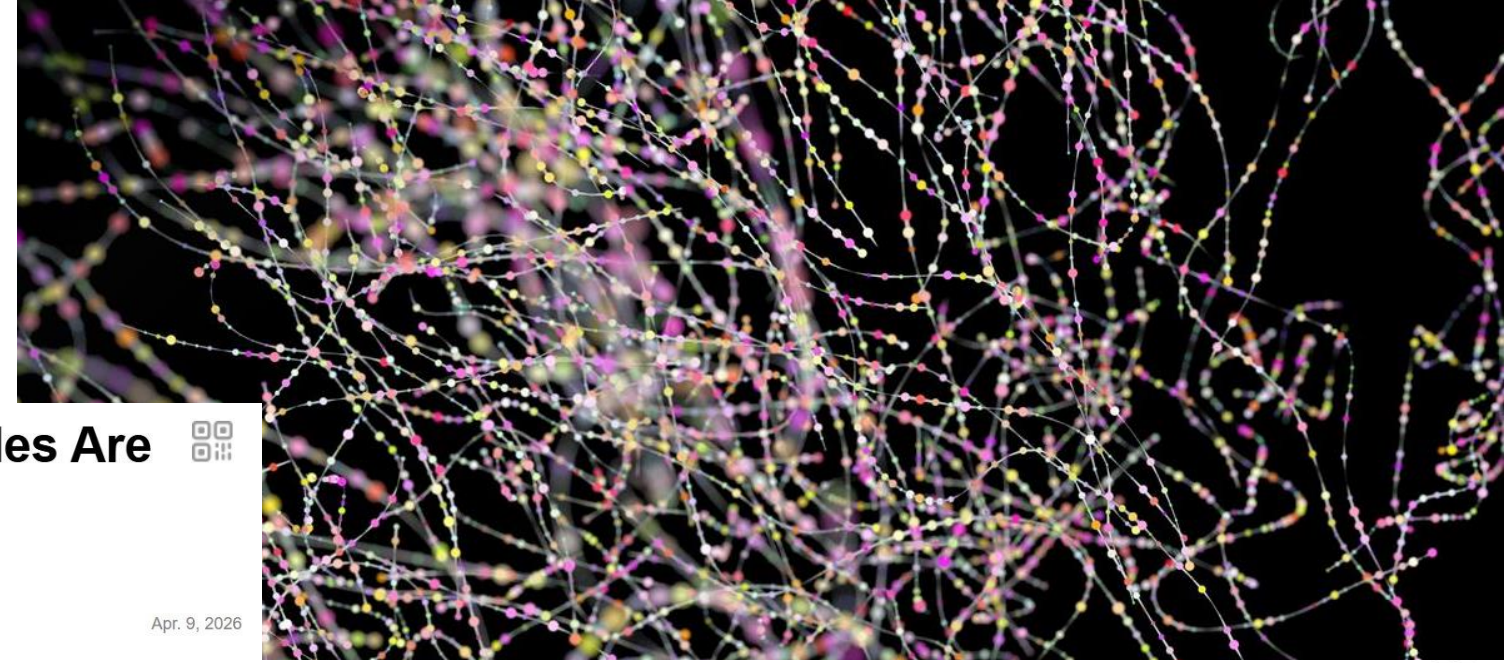
How soil microbiomes contribute to plant growth



https://doi.org/10.1007/s44279-025-00208-5

BIOLOGICALS, MICROBIOMES, AND SOIL HEALTH

New technologies bring new challenges — and new opportunities!



Beyond Proof-of-Concept: RNA Biopesticides Are Crossing the Triple Threshold of Efficacy, Regulation, and Cost CN

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Apr. 9, 2026

Delivery and Formulation: The Key to Unlocking Field Efficacy

Global agrigenomics market projected to reach USD 5.38 billion in 2026

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Feb. 25, 2026

From Innovation to Impact: The Real Challenge for Biologicals

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Mar. 25, 2026

The Hidden Layer: Formulation, Delivery, and Field Stability

Bioirrigation with bacteria boosts productivity by 25%

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Jun. 11, 2025

Soil Health & Regenerative Ag (North America)

14–15% CAGR

(2025–2035)

Driven by:

- Sustainability & ESG
- Carbon farming
- Yield resilience

Micropeptides pioneering the next generation of sustainable crop protection through AI-powered discovery CN

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Feb. 13, 2026

Big opportunity, fragile channel adoption

The bottleneck is not awareness — it is confidence in repeatable field performance.

BIOSTIMULANTS

Stress + efficiency

Solutions that improve abiotic stress tolerance and nutrient-use efficiency.2026 global market: approx. $5.5B.Growing, but buyers now expect proof, repeatability, and clear placement in the program.

BIONUTRITIONALS

Fix · mobilize · unlock

Microbial solutions that help supply, solubilize, or improve access to primary nutrients.High agronomic upside — but only if viability, compatibility, and placement hold.

CHANNEL REALITY

Scaling biologicals requires de-risking the channel

Distributors and retailers are seeing product fatigue. Vague plant-health claims are losing traction.The winners will be products that solve a defined problem and show clear ROI.

Channel decision ladder

1 ROI

2 Consistency

3 Program fit

Bottom line: the channel does not buy "biology" in the abstract — it buys proof, fit, and a recommendation it can stand behind.

COMMERCIAL REALITY

Confidence is often lost before efficacy is realized

From jug to acre, the product has to survive a four-step stress test.

From jug to acre, the stress test looks like this

1 Shelf-life sensitivity

Loss of viability in warehouse storage, heat exposure, or transit.

2 Tank-mix risk

Compatibility failures or biological kill when mixed with harsh fertilizers or synthetic chemistries.

3 Placement risk

Poor coating, spreading, or retention on seed, soil, or leaf reduces delivery to the target site.

4 Field survival risk

UV, heat, and desiccation can degrade or deactivate the biology soon after application.

Bottom line: great biology is not enough. If the product dies in the jug, fails in the tank, or breaks down in the field, the channel loses confidence first.

These are the same failure modes that show up most acutely where integrated systems get densest: on treated seed and in the tank mix.

COMPLEXITY HOTSPOTS

Complexity is concentrating in two interfaces: seed and spray

Every added component raises compatibility, sequence, and stewardship demands.

SEED STACK

What now rides on the treated seed

- Trait package
- Crop protection actives
- Biologicals / inoculants
- Micronutrients / biostimulants
- Flowability / plantability / dust-off

TANK-MIX STACK

What increasingly shares the same pass

- Crop protection actives
- Biologicals / biocontrols
- Micronutrients / foliar nutrition
- Biostimulants
- Adjuvants / conditioners / co-formulants

The more components we ask growers to combine, the more the interface chemistry starts deciding the outcome.

Where the next investment will go

Inerts, adjuvants, and co-formulants are moving from support roles to enabling systems.

Yesterday

Most investment concentrated in discovery, genetics, and active ingredients.

Necessary — but no longer sufficient for scale.

Stable carriers

Shelf life, viability, logistics, and easier handling

Compatibility systems

Buffers, compatibilizers, surfactants, and water conditioning

Seed delivery platforms

Coatings, inoculant protection, planter-box support, and plantability

Premix co-formulants

Systems that hold together as stacks get denser

Diagnostics & field proof

Data that converts trial promise into recommendation confidence

Placement guidance

Clarity on where, when, and how to use with fewer misses

Net effect: the next value pool sits at the interface between discovery, delivery, and recommendation confidence.

THE NEXT CHAPTER

The winners will not just discover better actives or better traits.

They will make integrated crop systems repeatable.

Where is convergence strongest today — at the seed, in the rhizosphere, in the tank, or in data-driven placement?

What fails fastest in emerging systems: shelf life, compatibility, placement, or proof?

Who should own system design commercially: seed company, biology company, nutrition company, or formulation partner?

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