ifa
INNOVATION HUB

where tech meets plant nutrition

FERTILIZER INNOVATION UNLEASHED

Catalyzing transformative action in plant nutrition

PURPOSE & OVERVIEW

Fertilizer Innovation unleashed - Catalyzing action in plant nutrition is a new annual publication from the IFA Innovation Hub, launched to provide a data-informed perspective on the most promising pathways for innovation across the global fertilizer and plant nutrition sector.

As the inaugural edition of this special publishing initiative, the 2026 report sets the baseline for an ongoing effort to equip CEOs, sustainability strategists, and innovation leaders with credible insights, quality data, and implementable frameworks needed to accelerate transformative change. In doing so, the report champions the power of sustainable innovation in the fertilizer industry as a driving force to feed a growing global population while protecting the natural systems on which agriculture and the world depend.

Fertilizer holds a distinct and foundational position within global agriculture - both as a critical enabler of food production and as a major lever for environmental impact.

Drawing on input from international experts and global industry leaders representing over a quarter of global production and trade, the report is divided into two key sections.

Part One It identifies five barriers to innovation currently constraining fertilizer industry innovation, and outlines actionable opportunities to unlock growth, investment, and transformative impact.

Part Two It introduces a first-of-its-kind Fertilizer Industry Innovation Benchmark, drawn from an extensive global survey. This data allows our members to draw peer-to-peer comparisons, while being updated annually to track trends, identify gaps, and signal shifts in industry momentum.

At a time when food security, climate change, and soil health have converged into a shared global challenge, this report offers a bold but practical agenda: to transform the fertilizer sector into a more agile, collaborative, and future-fit engine of agricultural resilience.

Jack Keeys
International Lead, IFA Innovation Hub

EXECUTIVE SUMMARY

Fertilizer Innovation Unleashed provides the first comprehensive industry-wide assessment of innovation performance across the global fertilizer and plant nutrition sector. The report highlights both the strategic importance of innovation and the structural challenges that shape its pace and impact.

Executives can use the benchmarking data in part two of this report to compare their business performance vs industry averages, and leverage this framework to track their performance year over year alongside the industry's progress.

The findings indicate a clear pattern: there is growing innovation momentum in the sector, but ambition is outpacing execution and measurable outcomes. While perceptions of innovation readiness are moderately strong, operational practices are less mature, and demonstrable progress remains limited. This gap suggests that although companies increasingly recognize innovation as essential to future competitiveness, many are still building the systems required to consistently translate ideas into scaled solutions.

The benchmark also highlights the significant variation between different businesses and their engagement with innovation, with most benchmark indicators having a quartile spread (difference between top 25% average and bottom 25% average) of **more than 30%**, and several, **greater than 50%**. This showcases the significant latent opportunity of raising innovation engagement across the industry through education, sharing examples and facilitating collaboration.

During our interviews and analysis, **five barriers emerge as critical constraints**:

- Limited access to field validation environments.
- Underutilized climate and food security investment capital.
- Challenges in corporate–startup collaboration.
- Difficulty attracting top-tier talent.
- Regulatory pathways not yet adapted to emerging technologies.

Addressing these barriers could unlock faster development and adoption of transformative innovations. At the same time, the sector holds some powerful structural advantages. Fertilizers underpin roughly half of global food production and sit at the intersection of food security, climate mitigation, and environmental stewardship.

The report concludes with an actionable agenda for industry leaders: **strengthen collaboration, expand innovation investment, and accelerate concept-to-field pathways**.

By doing so, the fertilizer sector can position itself as a central engine of sustainable agricultural transformation and further steps towards the industry vision of feeding the world sustainably.

> *"Innovation in plant nutrition can have a disproportionate potential to influence global outcomes – from improving nutrient use efficiency and climate outcomes to strengthening the resilience and nutritional value of food system."*

PART ONE

BREAKING THE BARRIERS

ACKNOWLEDGING STRUCTURAL REALITIES...

Innovation in fertilizer and plant nutrition operates within agricultural systems that are inherently complex and variable. While collaboration, investment and policy can address many barriers, several challenges are structural features of agriculture itself. Recognizing these realities helps ensure innovation strategies remain grounded in practical farming conditions.

Key structural challenges include:

- **Biological and environmental variability:** Nutrient responses differ widely across soils, climates and cropping systems.
- **Seasonal testing cycles:** Field trials typically occur once per growing season, slowing experimentation.
- **High standards for agronomic evidence:** Farmers and regulators require robust multi-year data before adoption.
- **Highly diverse farming systems:** Global agriculture spans millions of farms with differing geographies, cultures, crops, scales and practices.
- **Farmer risk sensitivity:** Adoption depends on clear economic and agronomic benefits.
- **Integration with existing systems:** Innovations must fit established fertilizer programs, traditional business models, equipment and advisory networks.

...WHILE RECOGNIZING THE STRUCTURAL ADVANTAGES

Despite these challenges, fertilizer and plant nutrition innovation benefits from powerful structural advantages. Few sectors sit at the intersection of food production, environmental stewardship, and global development at the scale of agriculture. As a result, innovation in plant nutrition can deliver far-reaching global impact.

Key structural advantages include:

- **Direct contribution to food security:** Fertilizers underpin half of global food production.
- **Universal demand:** Every person ultimately depends on agricultural productivity.
- **Environmental improvement potential:** Better nutrient use efficiency and biological inputs can reduce losses, lower environmental impact and improve soil health.
- **Climate mitigation opportunities:** Low-carbon fertilizers and improved nutrient management reduce emissions.
- **Land stewardship impact:** Farmers manage a significant share of global land and ecosystems.
- **Strong scientific foundations:** Advances draw on agronomy, soil science, microbiology and chemistry.

We now explore the Five Key Barriers recognized by industry experts, the impact that could be achieved if they are overcome, and what actions could unlock that potential.

1. UNLOCKING PATHWAYS TO PROOF-OF-CONCEPT AND FIELD VALIDATION

Key insight

For many early-stage innovators, validating new fertilizer and plant nutrition solutions remains slow, costly and operationally complex. Access to field trials, test infrastructure, and industry partners is often limited, making it difficult for startups to generate the real-world data needed to demonstrate performance, credibility and commercial potential.

Impact potential

Improving access to validation environments could significantly strengthen the industry's innovation pipeline. Faster and more affordable pathways to proof-of-concept would increase startup survival, accelerate product–market fit, and build the evidence base required to scale promising technologies across the fertilizer ecosystem.

Opportunity for action

Industry bodies, associations, and other non-governmental organizations: Develop a global "Innovation Sandbox"—a coordinated network of testbed farms and shared R&D infrastructure that provides streamlined access for startups and researchers. This could connect innovators with existing initiatives already operating in regional contexts, such as Ravensdown Agnition, the EIT Food Testbed Farm Network, and IFDC Innovation Centres.

Fertilizer companies: Create clear channels for innovators to pursue collaborative pilots aligned with strategic priorities and establish targets for trials and validation partnerships to expand the innovation pipeline.

Startups: Identify potential partners and align proposals with their strategic priorities, collaboration processes, and existing innovation programs to increase the likelihood of robust, credible field validation.

2. UNDERUTILIZED CLIMATE & FOOD SECURITY INNOVATION CAPITAL

Key insight

The international investment landscape has been particularly volatile in the past eight years, with sharp peaks in the 2021-22 venture boom, followed by a recent softening. However, globally available capital for high-impact agtech innovation remains significant, with levels at USD$4-5B annually,1 and as much as USD$40B in general climate-innovation capital. A greater part of this sum could be captured by plant nutrition startups, but unfortunately fertilizer industry innovators often struggle to access it. Investors frequently perceive the sector as complex, capital intensive and slow to scale. As a result, many promising technologies—particularly in hard-to-abate segments—remain underfunded and progress more slowly than their potential impact warrants. Increased investment in research and development from the sector, investors and co-financiers is crucial to creating meaningful advancement of the sector.

Impact potential

Improving access to capital could unlock a new wave of investment into nutrient use efficiency, low-carbon fertilizers, biologicals, and digital agronomy. Greater financial support would accelerate experimentation, scale promising technologies and attract a broader pool of investors into the plant nutrition ecosystem.

Opportunity for action

Industry bodies, associations, and other non-governmental organizations: Establish a plant-nutrition-focused industry innovation fund, acting as a blended finance vehicle to scale and mobilise private industry capital with public and philanthropic funding targeted toward early-stage startups.

Fertilizer companies: Engage as strategic co-investors or corporate venture partners to provide both capital and industry validation for promising technologies.

Startups: Position innovations within the broader climate and food security narrative, clearly articulating emissions reduction, resilience, and sustainability outcomes to attract mission-driven investors.

1: Agtech Navigator, "State of VC in agtech, Pitchbook" January 2026 link
2: Sightline Climate, $40.5b uptick driving '25 investment", January 2026 link

3. STRENGTHENING CORPORATE-STARTUP COLLABORATION

Key insight

Collaboration between fertilizer companies and startups is essential for innovation but often difficult to establish. Differences in timelines, procurement processes, intellectual property expectations, and risk tolerance can slow partnership formation, preventing potentially valuable collaborations from progressing.

Impact potential

More effective collaboration frameworks could significantly accelerate innovation development and adoption. Stronger partnerships allow startups to access scale, infrastructure and market channels, while enabling companies to tap into external innovation and emerging technologies.

Opportunity for action

Industry bodies, associations, and other non-governmental organizations: Facilitate and deliver initiatives which facilitate collaboration, refining and growing industry programs such as the IFA Innovation suite of an Innovation Directory, Cultivate Challenge, and Cultivating Tomorrow Conference.

Fertilizer companies: Create dedicated innovation partnership programs with defined timelines, clear evaluation criteria, and internal champions responsible for startup engagement. May also consider creating a corporate venture capital programs with a strategically aligned investment thesis.

Startups: Approach partnerships with a clear understanding of corporate decision-making structures and demonstrate how solutions align with strategic priorities and operational realities.

ravensdown

CASE STUDY: RAVENSDOWN

Ravensdown's spin-off, Agnition, represents a new model for accelerating plant nutrition innovation—moving beyond traditional corporate R&D into venture-led incubation and commercialization. Agnition partners with global startups and researchers, combining capital, technical expertise and direct access to Ravensdown's extensive farmer base to fast-track promising solutions toward market readiness.

At the core of this model is the Farm Innovation Network (FIN)—a coordinated, nationwide system of real-world farm trials. FIN connects innovators with progressive farmers across diverse geographies and production systems, enabling rapid, multi-site validation under commercial conditions. This structured testing generates robust agronomic data, iterative feedback and early farmer engagement.

Together, Agnition and FIN bridge the critical "validation-to-adoption" gap. By integrating venture development, field testing and farmer distribution, Ravensdown has created a scalable pathway to de-risk, refine, and deploy next-generation plant nutrition solutions at pace. Farm Innovation Network | Delivering the future on farm faster.

4. ATTRACTING THE NEXT GENERATION OF TALENT

Key insight

Despite its critical role in global food security and climate solutions, the fertilizer sector often lacks visibility as an exciting career pathway for scientists, engineers, and digital innovators. Competing sectors—such as clean energy, biotechnology, and artificial intelligence—tend to attract a larger share of emerging talent.

Impact potential

Strengthening the sector's talent pipeline would create outsized impact when it comes to idea generation and the delivery of innovation across nutrient use efficiency, biological solutions, digital agriculture, and climate-smart technologies. Whereas a more diverse and interdisciplinary workforce would also bring fresh perspectives, capabilities and greater resilience into the plant nutrition ecosystem.

Opportunity for action

Industry bodies, associations, and other non-governmental organizations: Launch a global "Nutrient Innovators" talent initiative, including internships, research fellowships, and partnerships with universities focused on plant science, agronomy, biotechnology and data science.

Fertilizer companies: Increase engagement with universities, research institutes and startup ecosystems to highlight career opportunities and showcase the sector's role in solving global sustainability challenges.

Startups: Leverage the mission-driven nature of sustainable agriculture to attract purpose-oriented talent seeking meaningful impact within climate and food systems.

5. MODERNIZING REGULATORY PATHWAYS FOR EMERGING TECHNOLOGIES

Key insight

Many regulatory frameworks governing fertilizers and plant nutrition products were designed for traditional mineral inputs. As a result, emerging innovations—such as biologicals, plant biostimulants, low-carbon fertilizers and digital decision-support tools—often face approval processes that are slow, complex or poorly aligned with their risk profiles. These legacy pathways can delay market entry and discourage investment in new technologies that could improve nutrient use efficiency, food security and environmental performance.

Impact potential

Faster, more proportionate approval systems would enable innovators to bring products to market more efficiently, allowing farmers to adopt new tools that improve nutrient management, reduce emissions and respond more rapidly to evolving climate and productivity challenges.

Policymakers and regulators

Introduce fast-track or tiered approval systems for low-risk innovations such as plant biostimulants, microbial fertilizing products and digital nutrient management tools, enabling faster adoption of sustainable solutions.

Opportunity for action

Industry bodies, associations, and other non-governmental organizations: Engage regulators and policymakers to design risk-based regulatory frameworks that better reflect the characteristics of emerging technologies, particularly biological and digital solutions.

Fertilizer companies: Support regulatory modernization through industry data, field validation, and participation in policy dialogues that demonstrate the safety and effectiveness of new technologies.

Startups: Engage early with regulatory experts and agencies to understand approval pathways, generate appropriate validation data, and align product development with evolving regulatory expectations.

PARTNER INSIGHTS: WBCSD

To explore external perspectives on innovation in the fertilizer sector, the International Fertilizer Association (IFA) interviewed Barbara Novak, Director at the Emissions Reduction Accelerator (ERA) for Ag and Food value chains at World Business Council for Sustainable Development (WBCSD), to capture insights on the fertilizer industry's role within the broader food system and identify lessons from other sectors undergoing sustainability transformation.

A central theme emerging from WBCSD's insights is the pivotal role of fertilizer in decarbonizing the full agricultural value chain and wider food industry. Fertilizers sit at the intersection of climate mitigation and adaptation - offering one of the most immediate and scalable levers to reduce Scope 3 emissions across food supply chains, while also strengthening resilience and unlocking business value.

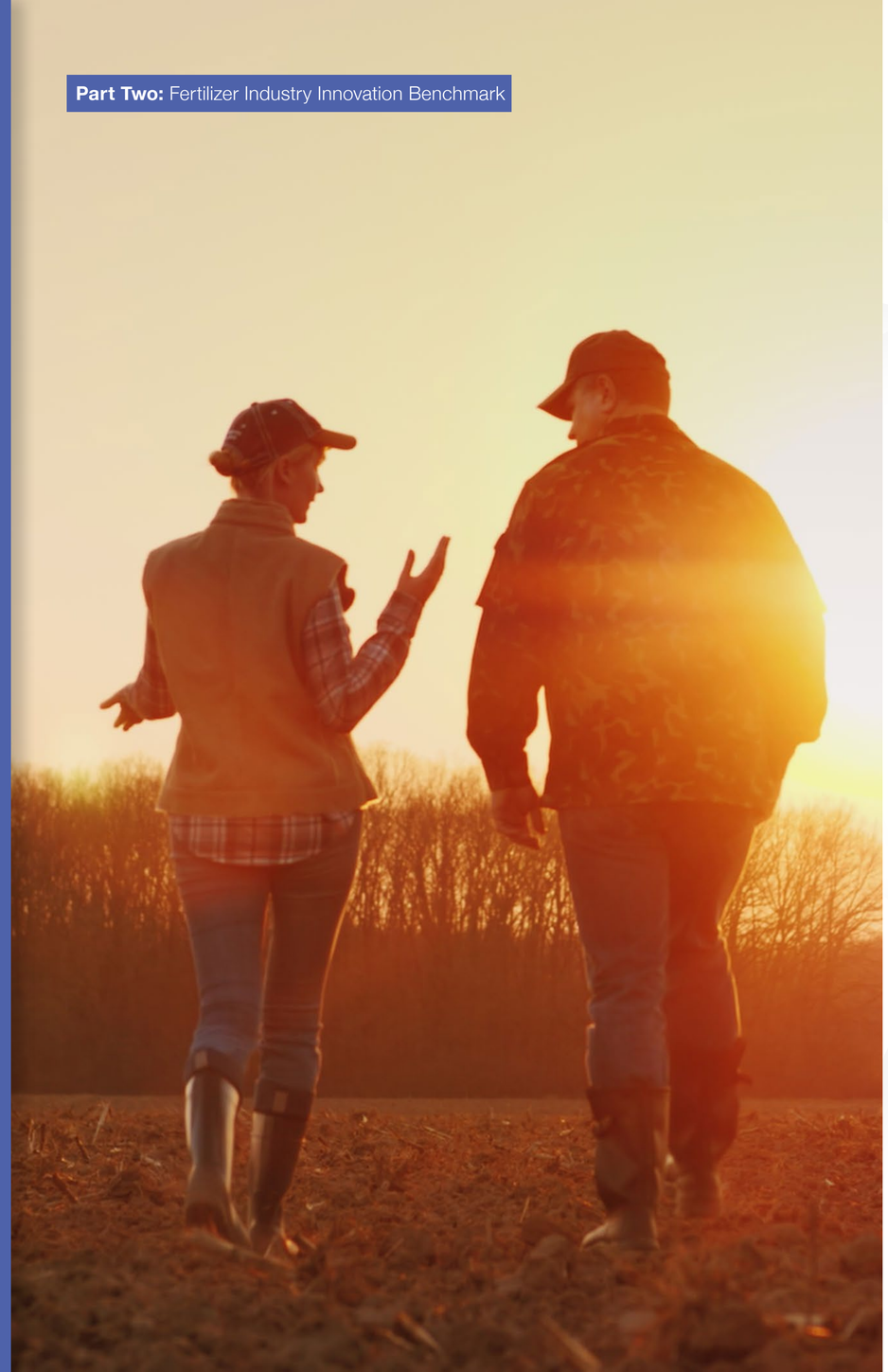
However, WBCSD highlighted the importance of coordinated, value chain–wide action to unlock fertilizer's full decarbonization potential. Through initiatives such as the Emission Reduction Accelerator (ERA), WBCSD is convening companies across sectors- from fertilizer producers to food manufacturers and retailers- to address Scope 3 emissions collectively through a full value chain approach. While many low-emission fertilizer solutions already exist, their adoption is constrained by misaligned incentives, cost structures, limited data transparency, and weak market signals. ERA aims to overcome these barriers by aligning stakeholders, strengthening enabling systems (including standards, policy, and innovation ecosystems), and fostering new forms of cross-sector collaboration. This systems-level approach is essential to scaling solutions effectively, accelerating the transition to low-carbon and resilient food systems and creating business value. Fertilizer companies are strongly encouraged to engage in and help shape this initiative.

Improvements in fertilizer production and nutrient use efficiency can deliver rapid gains not only in emissions reduction, but also in soil health, farm economics, and water quality and other regenerative agricultural outcomes. Improved fertilizer management and nutrient use efficiency is recognized as a key metric in leading regenerative agricultural frameworks and can be considered a first step in a broader journey with the wider industry. Finally, the discussion highlighted the importance of data transparency and harmonization through initiatives such as the Partnership for Carbon Transparency (PACT). PACT is a WBCSD flagship effort to bring consistency and credibility to how companies measure and share product carbon footprint (PCF) data across value chains. To effectively incentivize low-carbon fertilizers, a common methodology for measuring fertilizer PCF is essential, alongside a shared framework for transmitting this data within a value chain from manufacturers through to food companies. PACT represents a critical innovation in how data is structured and shared, enabling the cross-sector collaboration required to recognize and reward more sustainable practices at scale.

Together, these insights reinforce that fertilizer sits at the heart of a system-wide transformation- requiring coordinated action across industries, robust data frameworks, and aligned incentives to unlock its full potential. But by embracing this role, WBCSD sees the fertilizer sector as one of the key levers in transitioning towards decarbonized, resilient, and economically viable food systems.

PART TWO

FERTILIZER INDUSTRY INNOVATION BENCHMARK



BENCHMARK INTRODUCTION

To better understand how innovation is evolving across the fertilizer and plant nutrition sector, this report introduces an inaugural set of results for an industry innovation benchmarking initiative.

Drawing on extensive qualitative and quantitative input from senior innovation and sustainability executives across the industry—representing organizations responsible for over 25% of global fertilizer production and trade—the initiative captures critical insights into how companies are investing in, managing and scaling innovation.

The benchmarking framework is designed to serve two key purposes:

- **To track and measure the industry's innovation progress year over year.**
- **To enable individual organizations to assess their own innovation strategies and capabilities against an industry benchmark.**

Together, these insights provide a clearer picture of how the sector is advancing innovation to address the evolving challenges of food security, sustainability and climate resilience.

2026 Industry Innovation Scorecard

Perceptions	Practices	Progress
6.0	5.6	4.8

*Overall ratings scorecard developed with a weighted matrix across all relevant questions

BENCHMARK METHODOLOGY

The benchmarking analysis is based on a structured survey completed by senior innovation and sustainability leaders across the fertilizer industry.

Unless otherwise stated, responses were scored on a 1–10 scale (where 10 represents the highest rating). In some cases, the rating represents a % (1 = 10%, 5 = 50%, 10 = 100%). Individual questions were grouped into three core themes—Perceptions, Practices, and Progress—each producing an aggregated score out of 10 to enable comparison across organizations and to support year-to-year tracking of industry performance.

There are a range of respondents - from fertilizer producers and traders, to life-science companies with fertilizer activities. Calculations are made on a non-weighted average (each company regardless of scale has an equal representation).

For selected indicators, results are also presented by top and bottom quartiles, providing additional insight into the spread of responses across the industry and highlighting differences between leading and lagging organizations. Further analysis and deeper insights from this dataset will be released in the months following this report.

Overall ratings are an ‘average of the weighted averages’ across all relevant questions in a section. Non-quantitative questions were assigned a rating value (e.g. “improved significantly” = 8) to enable a more comprehensive score.

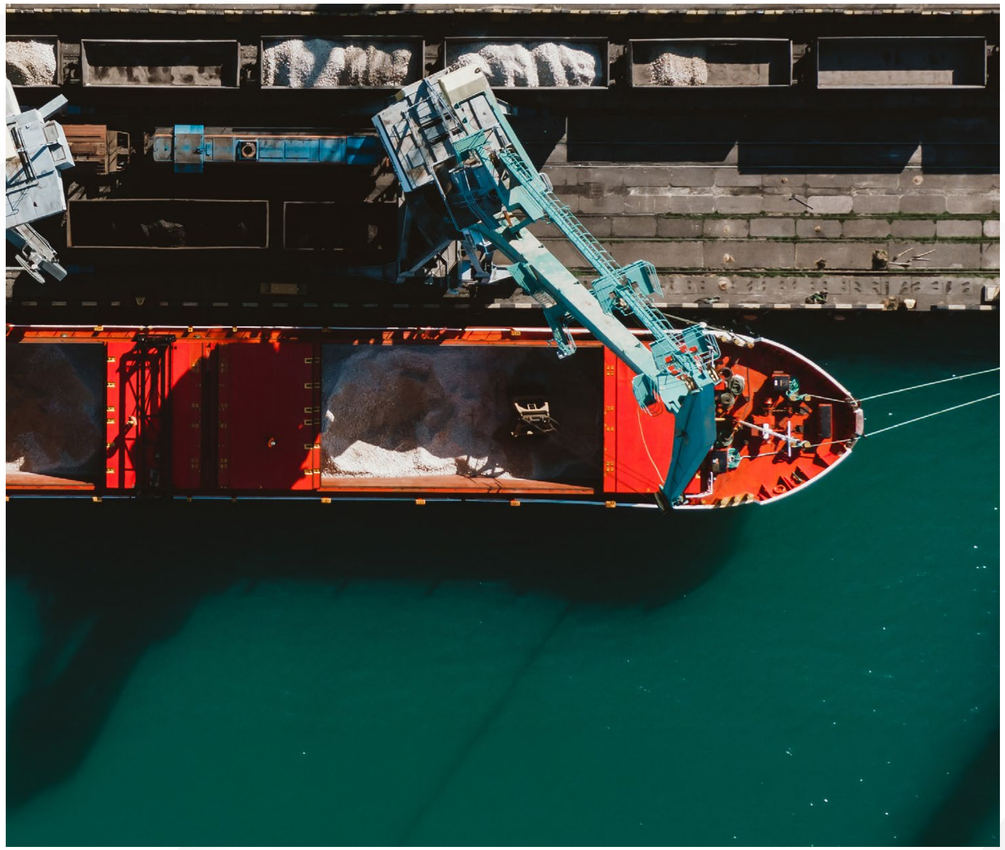
CHARACTERISTICS OF HIGHER-PERFORMING ORGANIZATIONS

Analysis of top-quartile results highlights several recurring characteristics associated with more advanced innovation performance.

Structured concept-to-field pathways
Higher-performing organizations are correlated with more defined mechanisms for advancing innovations from early-stage concepts to field validation. This includes clearer stage gate processes, stronger coordination between R&D and commercial functions, and more consistent access to trial environments.

Greater use of partnerships
Top-quartile companies report a higher proportion of innovation activity developed through partnerships. Engagement with startups, research institutions and other external collaborators enables access to complementary capabilities and supports the development and scaling of new solutions.

More active portfolio renewal
Leading organizations report a higher share of revenue generated from products and services introduced within the past three years, alongside stronger rates of progression from pilot to scale. This appears to reflect an increased ability to translate innovation activity into commercial outcomes.



Advancing use of digital and data-driven tools
While digital and AI adoption remains an emerging area across the sector, higher-performing organizations report more advanced use of data and digital tools in product development, agronomy, and decision support, indicating a direct contribution to improved efficiency and insight.

OVERALL RATING

6.0 / 10

INNOVATION BENCHMARK OVERVIEW: PERCEPTIONS (INDUSTRY-LEVEL)

Question Topics	Average	Top 25%	Bottom 25%	Quartile spread
How open is the sector to collaboration with startups, research institutions, and other partners?	6.9	8.4	5.2	3.2
How do you perceive the fertilizer sector's engagement in innovation has improved over the past 12 months?	6.8	8.5	5.4	3.1
How clear is the sector's strategic direction for advancing innovation?	6.3	8.0	4.5	3.5
How well is the fertilizer sector positioned to meet future global sustainability goals through innovation?	6.0	7.7	4.6	3.2
How visible is the impact of fertilizer sector innovation in global climate and food policy discussions?	6.0	8.4	3.3	5.1
How well does the sector attract top-tier talent (scientists, engineers, digital innovators)?	5.5	6.7	4.2	2.5
How would you rate the public perception of fertilizer as part of climate and food security solutions?	4.9	6.9	2.8	4.1

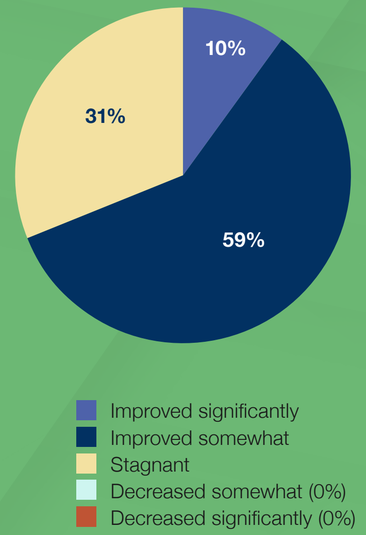
Overall perception: steady progress, but clear headroom for improvement

Industry respondents rated overall innovation perceptions at 6.0 out of 10, suggesting moderate confidence in the sector's innovation trajectory. While leaders recognize increasing engagement and collaboration, the results indicate that the fertilizer ecosystem still has meaningful opportunity to strengthen its strategic clarity, global positioning, and public narrative around innovation.

Collaboration and innovation engagement improving

The strongest scores relate to openness to collaboration (6.9) and perceptions that innovation engagement has improved over the past 12 months (6.8). This suggests a sector that is increasingly willing to partner with startups, research institutions, and external innovators. However, the spread indicates uneven progress, with some organizations moving significantly faster than others in embracing open innovation models.

How do you perceive the fertilizer sector's engagement in innovation has improved over the past 12 months?



PERCEPTIONS (INDUSTRY-LEVEL) (CONTINUED)

Strategic clarity remains uneven
The clarity of the sector's innovation direction was rated at 6.3, highlighting moderate alignment but also some uncertainty about long-term priorities. The relatively wide quartile spread suggests that while some companies align with the industry's defined innovation strategies, many are yet to see or connect with this emerging strategy.

Sustainability ambition recognized but not yet fully demonstrated
Scores for positioning to meet future sustainability goals (6.0) and visibility of innovation in global climate and food policy (6.0) with a large spread indicate that executives see the sector's impact is not yet positioned for aligned impact or full external visibility. Greater co-ordination and communication will be important to drive improvement

Talent and public perception remain critical gaps
The lowest scores highlight structural challenges. Talent attraction (5.5) and public perception of fertilizer's role in climate and food security (4.9) suggest the sector continues to struggle with external narrative and employer appeal—two factors that may increasingly shape its long-term innovation capacity.

INSIGHT

The results in this perceptions section indicate that to convert momentum into impact, the sector must define and communicate a clear, shared innovation strategy and priorities.

It should scale structured collaboration with startups and research partners, ensuring consistent adoption across companies. Targeted investment is required to attract and retain top talent. Finally, a coordinated global narrative must be built—demonstrating fertilizer's role in climate and food security—to strengthen external credibility, influence policy and accelerate market uptake of innovation.

OVERALL RATING

6.8 / 10

INNOVATION BENCHMARK OVERVIEW: PERCEPTIONS (COMPANY-LEVEL)

Question Topics	Average	Top 25%	Bottom 25%	Quartile spread
How open is your company to external collaboration?	7.9	9.2	5.9	3.3
How well is your company positioned to meet future global sustainability goals through innovation?	7.1	8.8	5.0	3.8
How clear and aligned with the sector is your company's strategic direction for advancing innovation?	7.1	8.4	4.9	3.5
How visible is the impact of your company's innovation in policy or industry discussions?	6.2	8.3	3.6	4.7
How well does your company attract top-tier talent?	6.0	7.6	3.6	4.0
How much pressure or demand is your company experiencing from farmers or customers for new sustainable solutions?	5.8	8.1	3.6	4.6

Company-Level Innovation Perceptions

Executives rate their own organizations more positively than the sector overall, with an average score of 6.8/10 compared to the industry's 6.0/10. The strongest result is openness to external collaboration (7.9), reinforcing the broader industry trend toward increased partnership with startups and research institutions. Companies also express relatively strong confidence in their strategic direction for innovation and positioning to meet sustainability goals (both 7.1)—notably higher than the industry-level perceptions in these areas.

However, similar challenges remain. Visibility of innovation impact (6.2) and ability to attract top talent (6.0) mirror the industry's concerns around external narrative and talent competitiveness. Large variation appears in perceived customer demand for sustainable solutions (5.8), suggesting that while some companies are experiencing strong market pull, others see slower signals from farmers or value chain partners.

OVERALL RATING

5.6 / 10

INNOVATION BENCHMARK OVERVIEW: PRACTICES

Question Topics	Average	Top 25%	Bottom 25%	Quartile spread
How aligned is your plant nutrition innovation strategy with farmer needs - incorporating farmer feedback into innovation design and deployment?	6.8	8.6	4.2	4.4
How do you rate the integration/connection of innovation activities across your company's departments (such as R&D, commercial, ESG)?	6.6	8.6	3.9	4.7
How do you rate the effectiveness of your company to move an idea from concept to field validation?	6.5	8.5	3.8	4.8
What percentage of your company's plant nutrition innovation activity is focused on sustainability or climate outcomes?	6.1	9.4	3.1	6.3
What percentage of your company's plant nutrition innovation spend is focused on farmer-facing solutions vs production efficiency?	6.1	8.6	3.3	5.3
How developed are your mechanisms to fund, test, and scale early-stage innovations (e.g., accelerators, procurement)?	5.1	8.3	1.9	6.4
What percentage of your company's plant nutrition innovation activity is developed through partnerships? (as opposed to in-house innovation only)	5.0	8.3	1.8	6.5
How would you rate the level of advancement your company has achieved in using digital or AI tools in plant nutrition innovation and fertilizer product development?	4.7	7.6	1.4	6.2
What proportion of your plant nutrition portfolio was launched in the past 3 years?	3.7	7.0	1.4	5.6

The Innovation Practices results reveal a noticeable drop from perception to execution, with an overall score of 5.6/10. While industry leaders broadly recognize the importance of innovation, these results suggest that translating ambition into structured, scalable practices remains a key challenge.

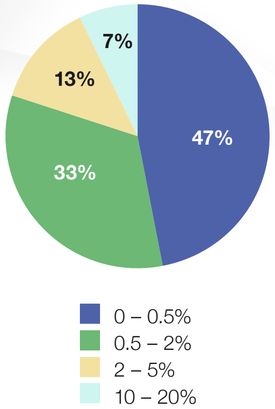
Alignment with farmers and internal integration showing moderate progress.

The strongest scores relate to farmer alignment in innovation strategy (6.8) and the integration of innovation across company departments (6.6). This indicates that many companies are increasingly incorporating farmer feedback and attempting to connect R&D, commercial and ESG priorities. However, broad spread suggests significant variation in how effectively organizations operationalize these connections.

Concept-to-field pathways improving but still uneven.

The ability to move innovations from concept to field validation scored 6.5, reflecting reasonable progress but also highlighting operational friction in scaling new technologies and while some organizations are creating well-developed pipelines, others still struggle to systematically test and deploy innovations.

What percentage of your annual revenues is allocated to R&D or innovation?



PRACTICES (CONTINUED)

Investment priorities have sustainability alignment.
Innovation portfolios show some emphasis on sustainability and climate outcomes (61%) and farmer-focused solutions (also 61%) with sustainability rating slightly higher as a priority than farmer-focused solutions for the top quartile. However, the large variation across companies (63% points in quartile spread) suggests that sustainability-led innovation strategies are highly varied across the industry.

Early-stage innovation systems remain underdeveloped.
Mechanisms to fund, test and scale early-stage innovation (5.1) and the use of partnerships to develop new solutions (5.0) both score relatively low. This highlights a structural gap in the industry's ability to systematically access external innovation and nurture new technologies.

Digital and portfolio renewal represent the weakest areas.
The lowest scores relate to digital and AI adoption in fertilizer innovation (4.7) and the share of products launched in the past three years (3.7), indicating that the pace of technological renewal remains limited in much of the sector.

Investment levels also remain relatively modest across the sector:
47% of companies allocate less than 0.5% of annual fertilizer and plant nutrition revenues to R&D or innovation, while only 7% report investing between 10–20%, highlighting the limited scale of dedicated innovation funding in much of the industry.

INSIGHT

The results in the practices section show that to translate intent into execution, the sector must operationalise end-to-end innovation systems–from ideation through to scaled field deployment–with clear ownership and metrics.

To improve these results, companies should consider standardising concept-to-field pipelines, embedding sustainability consistently across portfolios, and significantly increasing R&D investment. Structured mechanisms to source and scale external innovation are required, alongside accelerated adoption of digital and AI capabilities. Strengthening these foundations will enable faster product renewal, more consistent farmer impact, and scalable delivery of next-generation solutions.

OVERALL RATING

4.8 / 10

INNOVATION BENCHMARK: PROGRESS

Question Topics	Average	Top 25%	Bottom 25%	Quartile spread
What percentage of your plant nutrition innovation initiatives in the past year achieved their objectives?	54.6%	75.8%	25.6%	50.2% points
What percentage of revenue in the past 12 months has come from newer plant nutrition products or services? (developed in the past three years)	22.6%	45.6%	8.6%	37.0% points
What proportion of your company's plant nutrition innovation projects advance from pilot to scale each year?	31.9%	59.0%	6.7%	52.3% points
What percentage of farmers/customers have adopted your new plant nutrition innovations in the past three years?	34.6%	70.0%	7.5%	62.5% points

Despite growing recognition of the importance of innovation, reported industry progress remains modest, with an overall score of 4.8/10.

Survey responses suggest that while innovation activity is increasing, translating new ideas into measurable commercial and environmental outcomes remains a key challenge.

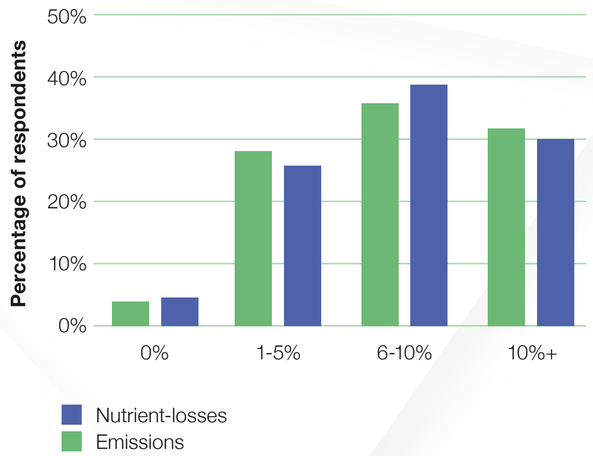
Implementation progress is gradual but uneven.
The majority of respondents indicated that innovation implementation has improved somewhat over the past 12 months, though relatively few reported significant improvement. On average, companies estimate that 54.6% of plant nutrition innovation initiatives achieved their objectives in the past year, suggesting moderate execution success but continued room for improvement.

Commercial impact from new products remains limited.
Respondents report that only 22.6% of revenues in the past 12 months were generated from plant nutrition products or services developed within the last three years, indicating that the pace of portfolio renewal remains relatively slow across much of the sector.

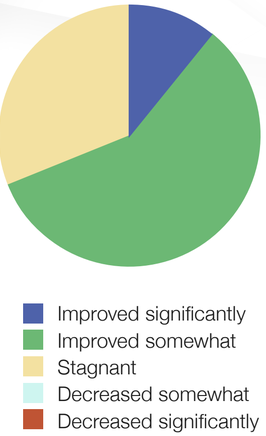
Scaling innovations continues to be a major hurdle.
Only 31.9% of plant nutrition innovation projects successfully move from pilot to scale each year, highlighting the operational and market barriers that often prevent promising technologies from reaching full commercial deployment.

Adoption across farming systems is still developing.
Companies estimate that approximately 34.6% of farmers or customers have adopted new plant nutrition innovations

By how much have you reduced emissions and nutrient-losses through innovation?



How is the industry's progress in implementation of new innovations over the past 12 months?



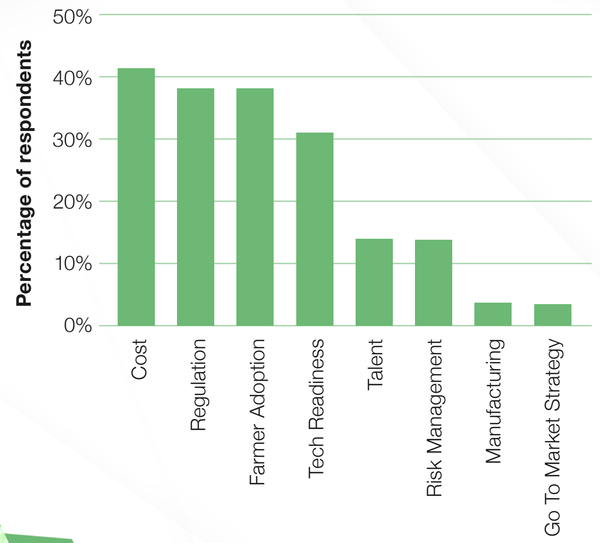
PROGRESS (CONTINUED)

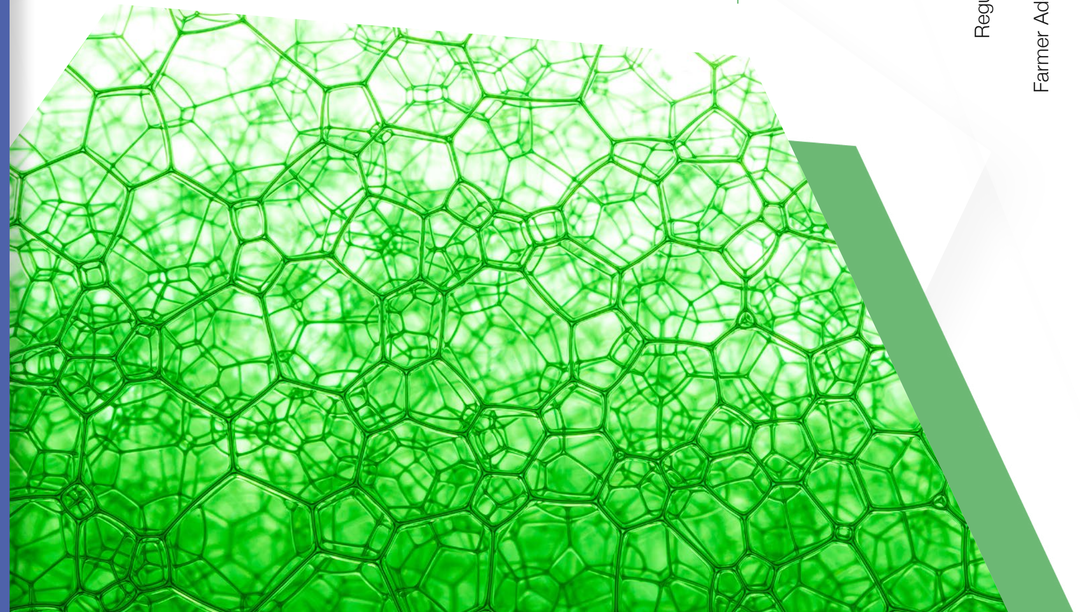
introduced within the past three years, reflecting the cautious adoption patterns typical of agricultural systems.

Encouragingly, many companies report meaningful environmental improvements, with a substantial share indicating reductions in emissions and nutrient losses in the range of 6–10% or more, demonstrating that innovation efforts are beginning to deliver tangible sustainability outcomes.

Structural barriers remain significant.
The most frequently cited constraints to scaling innovation were cost, regulatory complexity, farmer adoption and technical barriers.

What are the biggest barriers to scaling plant nutrition innovation in your company





INSIGHT

The 'progress' section showcases that to convert innovation activity into measurable impact, the sector must prioritize scaling and adoption.

This requires strengthening go-to-market pathways, reducing pilot-to-scale friction, and aligning incentives for farmer uptake. Companies should focus on accelerating portfolio renewal, embedding clear commercial and environmental KPIs, and addressing regulatory and cost barriers. Targeted support for deployment—not just development—will be critical to unlock higher success rates, faster adoption and tangible sustainability outcomes at scale.

EXECUTIVE ACTIONS: AN INNOVATION CHECKLIST

Based on the report's findings, executives should treat innovation not as a peripheral R&D activity, but as a core strategic capability linked to growth, resilience, sustainability, and long-term competitiveness.

The benchmark results indicate an opportunity for industry executives to increase the attention given to advancing innovation practices and progress.

The results also provide a base for both comparing individual company performance with industry averages, or year-on-year internal comparisons, enabling the identification of key opportunities for improvement.

For industry leaders seeking to strengthen their organization's innovation, the following ideas provide practical starting points for action:

EXECUTIVE ACTIONS: AN INNOVATION CHECKLIST

LEADERSHIP & GOVERNANCE

- ☐ **Set a clear innovation mandate** from the top with 3–5 enterprise priorities linked to growth, sustainability and farmer value.
- ☐ **Define a company-wide innovation scorecard** covering perceptions, practices, progress, to compare and track against industry and measure commercial outcomes.
- ☐ **Appoint a cross-functional innovation steering group** linking R&D, commercial, sustainability, regulatory and digital teams.

CAPITAL ALLOCATION, EXECUTION & SCALING

- ☐ **Increase innovation investment discipline** by ringfencing budget for plant nutrition innovation, pilots and external partnerships.
- ☐ **Establish a faster concept-to-field pathway** with stage gates, pilot targets and clear decision rights.
- ☐ **Expand access to field validation** through test farms, grower networks and shared trial infrastructure.
- ☐ **Put farmers at the center of innovation design** by embedding farmer feedback, economics, and adoption realities earlier in development.
- ☐ **Rebalance the portfolio toward future-fit solutions** including, among others, low-carbon products, biologicals, precision tools and nutrient use efficiency innovations.

ECOSYSTEM ENGAGEMENT & CAPABILITY DEVELOPMENT

- ☐ **Create a structured startup engagement model** with transparent entry points, timelines and partnership criteria.
- ☐ **Accelerate digital and AI capability in product development**, agronomy, customer insight and decision support.
- ☐ **Strengthen talent attraction and retention** by positioning innovation as mission-driven work at the heart of food, climate and nature.
- ☐ **Track pilot-to-scale conversion rigorously** and hold leadership accountable for moving successful innovations into market adoption.

IFA INNOVATION HUB

Our activities, initiative progress–and opportunities to engage in the Cultivate Challenge

The Cultivate Challenge

The IFA global startup competition highlighting industry priorities to entrepreneurs around the world in an annual program. With over 300 applications across two editions, 57 semi-finalists, and two cohorts of 12 finalists.

Startups can apply each year and receive a full package of benefits including participation in a 12-month growth and development program.

IFA corporate members can participate as strategic partners (re-opening late 2026 for the third edition), meeting with the startups, participating in workshops and judging; or as active observers, connecting with the startups and attending events.

Full Cultivate Challenge details are available online.

ifa INNOVATION HUB
where tech meets plant nutrition

The Cultivate Challenge

Cultivating Tomorrow Conference (CTC)

CTC is the only global gathering of 150+ participants that unites innovation, strategy and sustainability, with an exclusive focus on the fertilizer industry.

The fertilizer industry is transforming how it feeds the world. CTC brings together leaders in sustainability, innovation, corporate strategy, policy, and communications to turn ambition into action.

Across startup showcases, case-driven sessions, and peer exchange, CTC focuses on practical solutions that can be piloted, scaled and embedded, strengthening business performance, market credibility and stakeholder trust.

Full Cultivating Tomorrow Conference details are available online.

ifa CULTIVATING TOMORROW CONFERENCE
Innovation meets Sustainability

Cultivating Tomorrow

Innovation Directory

Connection and collaboration are crucial for delivering impact. The IFA Innovation Directory provides a database of over 85 profiles across plant nutrition startups, corporates, investors and research organizations—increasing the visibility of the sector's entrepreneurs.

Join the Directory or **Search the Directory**

Extension activities

The IFA Innovation Hub is also actively developing and delivering initiatives including:

Hackathons, including the Nutrient Use Efficiency Tracking Hackathon in collaboration with International Food and Agribusiness Management Association (IFAMA), University of Wageningen (WUR), Farmhack in Ireland, 18 June 2026.

Webinars, educational materials, philanthropic convenings, science innovation awards and more.

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