Reimagining Global Food System Resilience update

Reflections on World Agri-Tech and Future Food Tech London & San Francisco, Davos, COP 30, and other global events



October 2026

KPMG. Make the Difference

Why food system resilience matters more than ever

Over the next 25 years, the global food system could face its most dramatic period of change in its 13,000-year history.

In recent years, the resilience of supplies of food and fiber products has become an intensifying risk. For consumer and retail organizations, the assumption that biologically sourced raw materials – the inputs to food, beauty, clothing and household goods and many more – will always be available and affordable when needed, can no longer be taken for granted.

- **Since the COVID pandemic,** procurement risk for consumer and retail businesses has grown significantly. Supply chain constraints, a higher frequency of intense climate events, geopolitical instability, migration pressures, and competition for land and water have impacted yields and swelled the cost of growing. Farmers are finding it harder to generate viable returns, leading many to question whether to continue at all.
- **Much like energy systems,** food systems underpin society's orderly functioning. Risks from their disruption extend far beyond consumer and retail businesses: when food availability is restricted or costs increase sharply, a natural human response is to prioritize feeding families and individuals as a necessity, which can quickly undermine the stability of economies and organizations.
- **Today, many companies** are already responding to the productivity impacts that arise from the health consequences associated with modern diets. Across the world, employees in varying functions and sectors are living with food-related, non-communicable diseases – from obesity and heart disease to diabetes and cancer – that organizations are absorbing in productivity losses and healthcare costs. It is here that current food systems show most significant commercial impact on organizations.



USD$3.5 trillion

The estimated annual cost to the global economy of food-related illness through workforce productivity losses and healthcare expenditure.

Source: Reimagining Global Food System Resilience, KPMG International, 2025

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Global food systems are under pressure

Multiple forces are simultaneously impacting global food systems, intensifying pressure on farmers, investors and organizations.



30% of emissions[3] | 7.2% of climate funding[4]

The mismatch between agri-food's contribution to climate change and its access to transition capital; a significant challenge for the industry.



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From hunger and food waste to chronic underfunding, data across the global food system shows a complex ecosystem under striking levels of stress. These are borne not from isolated pressures, but a set of reinforcing tensions that magnify impact on the very system they're meant to provide.

- **Over 820 million people** experience hunger and food insecurity on a regular basis, yet 30% of all food grown is wasted – the equivalent of 1.3 billion tons of food annually.[1]
- **Agri-food accounts for approximately 30%** of global greenhouse gas emissions[1] yet crop yields are projected to decline between 11-24% by 2100 as a direct consequence of climate change.[1]
- **Food systems have already caused** breaches in five of the nine planetary boundaries scientists use to define a safe operating space for humanity – estimated to be responsible for 80% of global deforestation, 70% of freshwater withdrawals, and leaving 33% of soils moderately to highly degraded.[1]
- **Geopolitical shocks** and the resulting restrictions on trade and transportation have materially increased input costs, putting sustained pressure on food commodity prices. Up to 30% of farmers are considering exiting the industry, while farmer suicide rates ubiquitously exceed national averages.[5]
- **The highly distributed ownership structure** of the industry – a mix of smallholders, family farms, co-operatives and mid-market businesses – limits the scale needed to access affordable finance.
- **The rapid growth of GLP-1 pharmaceuticals** is expected to reach 50-100 million people within the next five years, adding further complexity to food-related illness and death.[2]

Sources:

1. Reimagining Global Food System Resilience, KPMG International, 2025
2. An introduction to the GLP-1 economy: impacts for Consumer & Retail companies, March 2026
3. Food and Agriculture Organization of the United Nations, 2025, FAO, Greenhouse gas emissions from agrifood, Reproduced with permission.
4. Climate Policy Initiative, 2025, ClimateShot Investor Coalition (CLIC)
5. How to keep the world's farmers farming

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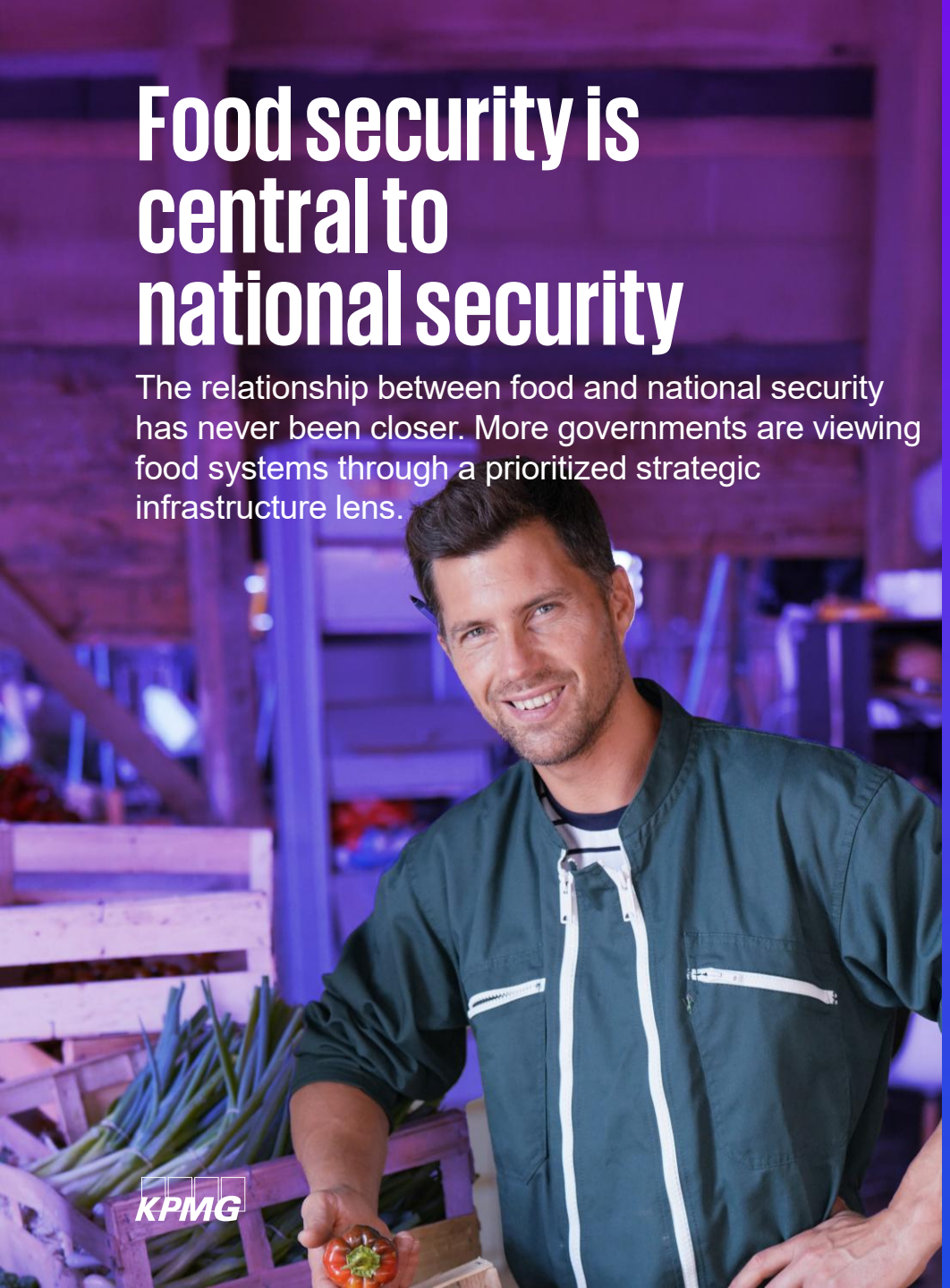

Food security is central to national security

The relationship between food and national security has never been closer. More governments are viewing food systems through a prioritized strategic infrastructure lens.

Food systems are increasingly being viewed by societies as strategically important components of national infrastructure. Since the pandemic, many governments have also reassessed the role of food in national security – on par with defense, health and core utilities – and are reshaping policies accordingly.

- **Many governments are actively treating food systems** as resilience-critical, driving changes in regulatory settings, introducing requirements for redundancy in key supply chains, and setting evolving expectations on major market players regarding both the availability and price of food. Procurement policy is being used to support local food system participants and strengthen domestic supply chains.
- **The geopolitical environment continues to deepen analysts' concerns that food systems could become deliberately weaponized. As a result, businesses are increasingly focused on the physical security of their supply chains, including the steps needed to protect the integrity of both raw materials and end products.**
- **Against this backdrop,** lowest-cost and just-in-time models should be reassessed for resilience to prevail through diversified sourcing, onshoring, substitute product capability and secure production technologies – all of which are shifting rapidly from competitive advantage to regulatory expectation.
- **Boards should be** actively reviewing organizational fragility and stress-testing the steps required to engineer resilience into operations as a strategic priority.

The board question for 2026+

Food security is no longer a risk category confined to food companies. Today, any organization dependent on stable supply chains, functioning markets and a productive workforce has a material stake in how resilient food systems become – and how governments choose to regulate them.

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The pillars of a resilient food system

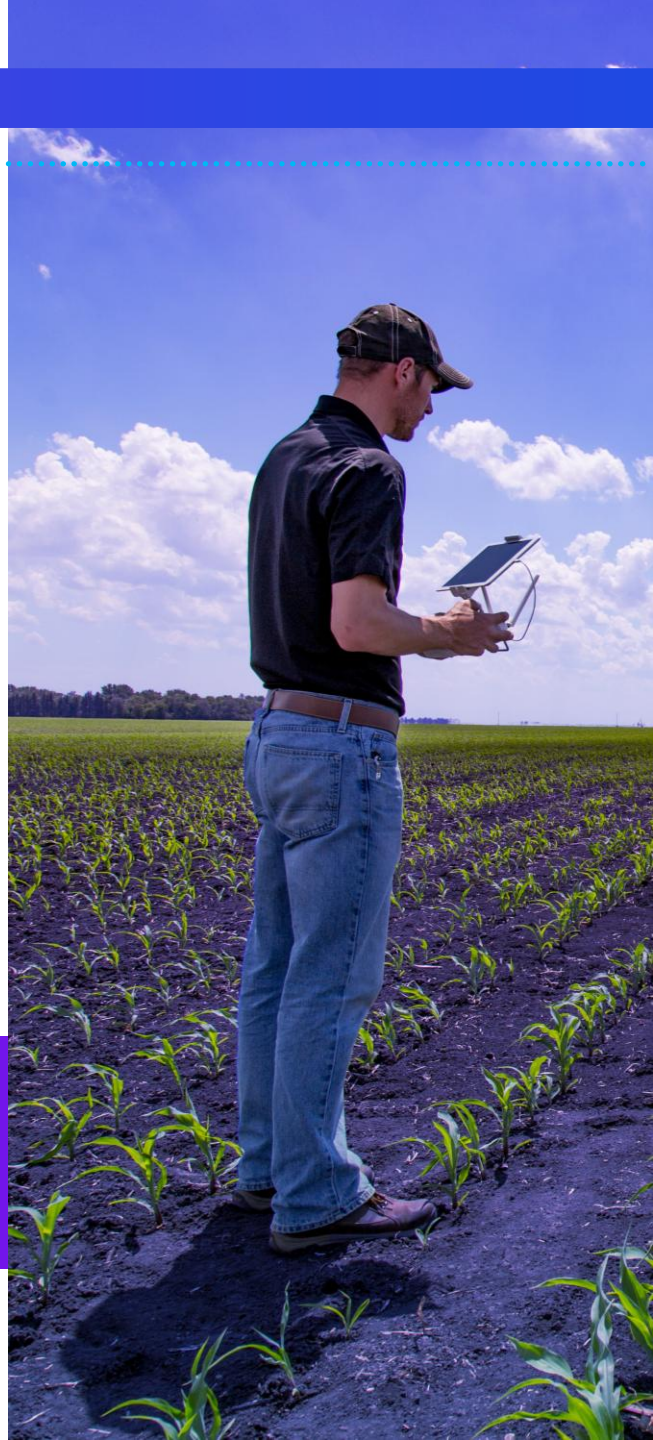
Resilience across food systems is built on three interconnected conditions: collaboration, trust and profitability. None can succeed alone.

A resilient food system delivers in multiple dimensions: sufficient food volume, necessary nutritional quality, sustainable sourcing, equitable access, and products that are affordable across all income levels. To thrive, it should build its foundations on three pillars:

Profitability provides greater certainty of continued production, the opportunity to invest in innovation and the ability to attract the necessary talent to enable growth. A resilient food system should allow all participants, from farmer to retailer, to operate economically viable businesses. Central to this proposition is the continued adoption of technology to ensure sustainable profitability over the long term.

Collaboration within the industry and across adjacent sectors attracts investment, brings new participants into the system and accelerates technology development. It is through these collaborative approaches that the greatest opportunity to enhance resilience across the entire value chain can be realized.

Trust in the activities and outcomes across a value chain – built through consistent measurement and transparent reporting – provides all stakeholders, including consumers, confidence in the safety, sustainability and quality that a food system is delivering.



What this means for organizations

As food system pressures intensify, businesses are reshaping portfolios, building new economic models and rethinking supply chains. This creates demand for expertise across deals and M&A, digital transformation, sustainable finance structures and risk management – whether an organization sits inside or adjacent to the food system.

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AI is helping to redefine what's possible across food systems

The potential use cases are extensive but realizing them depends on the intentional deployment of trusted AI solutions.



Trust is a human thing

Historic trust issues between technology providers and farmers, limited data availability and the real-world complexity of linking digital systems with biological processes mean that AI can only deliver on its food system potential where human interactions are designed as carefully as the technology itself.

Across every discussion at this year's events, AI's potential to transform food systems was as prevalent as the gap between its potential and current implementation. Data and AI tools are now critical keys to unlocking resilient food systems, but it is the human dimension – farmer trust and the ability to connect biological insight with digital output – that will likely determine whether the promise of AI can be fully realized.

- **Digital twins that model** entire farming systems are enabling innovators and producers to trial changes before implementing them on-the-ground, de-risking investment decisions and accelerating the uptake of new technology in production environments.
- **From animal wearables and field robots** to drones and environmental sensors, an expanding toolset is generating real-time farm data to improve on-farm decision making, optimizing input use and reducing costs while securing productivity.
- **Compressing traditional plant breeding** timeline by decades through the stimulation of germplasm crosses, AI is accelerating the path to commercially viable crop varieties the market will require. Precision fermentation experiments are witnessing similar acceleration with AI, shortening the time to scale high-value ingredient molecules.
- **High-resolution satellite imaging** is opening credit markets to previously 'unbankable' farmers by giving lenders a reliable basis for decision-making. Similarly, the same capabilities deliver highly localized climate risk management products directly to farmers with no previous access.

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The biological revolution is accelerating

Biology is becoming a core driver of productivity across food systems as smart use of biological solutions helps to unlock unrealized potential in legacy production systems.

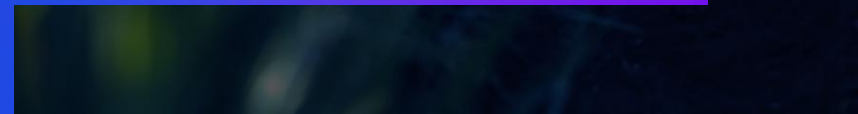
From microbials and bio-stimulants to advanced enzyme solutions, new generation biological technologies are moving from laboratories into commercial products. The rationale is well-established: environmental and soil health alongside operational efficiencies and higher-value outputs. A common challenge remains regulatory regimes designed and implemented in a different era.

- **Biological solutions** are reaching the market but being utilized at meaningful scale remains challenging. Regulatory approval mechanisms are largely built on legacy frameworks designed for chemical-based products; poorly suited to the nature and pace of biological innovation.
- **There was a consistent call from innovators** across this year's events: biological products need tailored regulatory pathways, not chemical product frameworks applied by default. Proposed approaches include regulating the innovation process rather than the individual products it generates, allowing beneficial products to reach farmers at speed.
- **Even as the tools** surrounding it improve, biology itself remains a proverbial black box. AI can help shorten breeding cycles, but how short those cycles become remains an open question. Climate change adds further complexity, as shifting conditions and impacts on both pest and disease dynamics make future-focused product selection considerably more difficult.
- **A clear view of what the future production environment** looks like is increasingly being used to direct predictive technology towards simulating crops and biological inputs needed over the next 20 to 30 years.



The cost of regulatory lag

When approval pathways for biological products are the same as those designed for synthetic chemicals, beneficial innovations wait years longer than needed to deliver. A call for fit-for-purpose regulatory frameworks is a call for systems that reflect the science of biological products, reducing cost and approval time.



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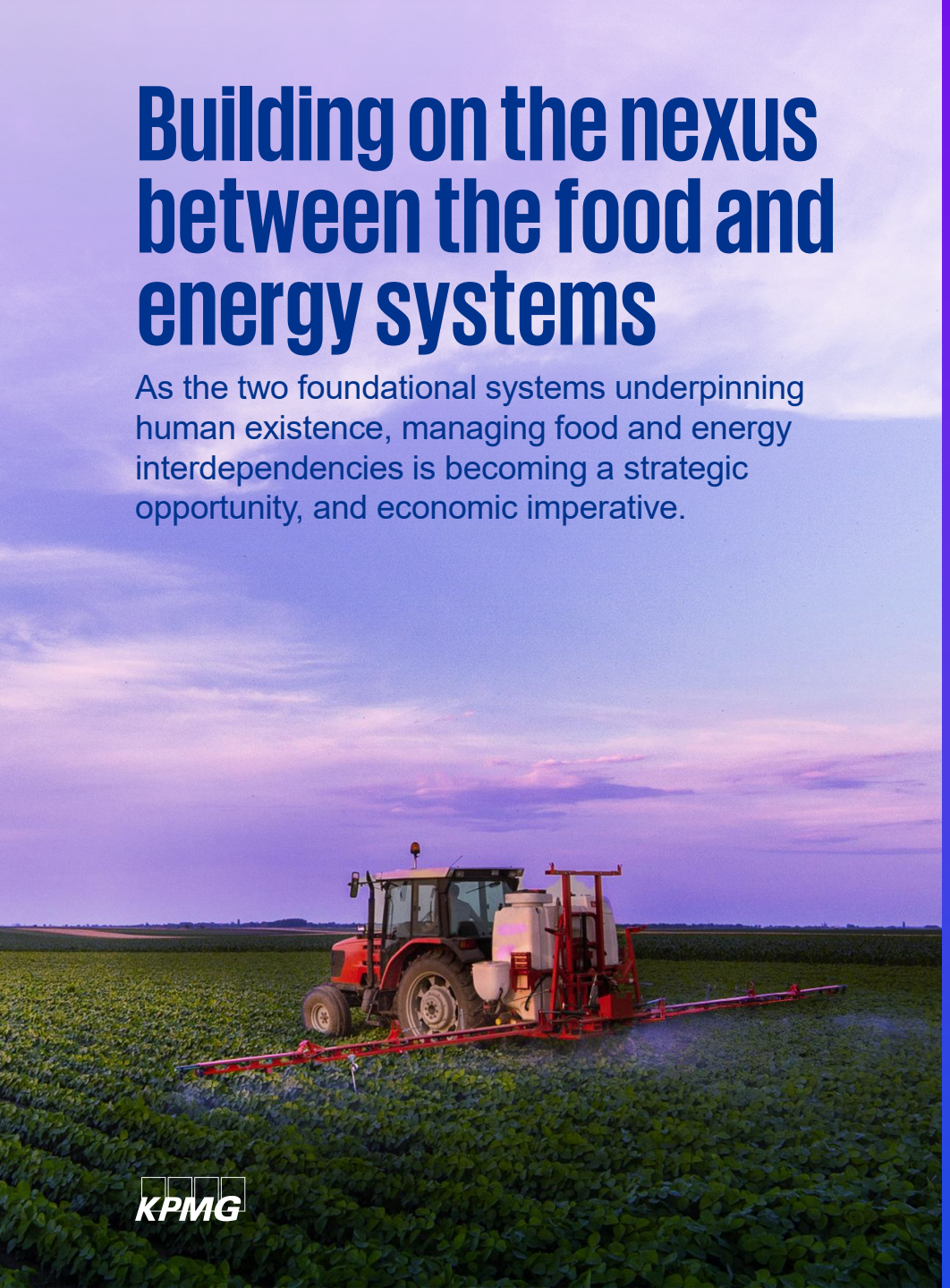
Building on the nexus between the food and energy systems

As the two foundational systems underpinning human existence, managing food and energy interdependencies is becoming a strategic opportunity, and economic imperative.



The Sustainable Development Goals (SDGs) recognize access to safe food, reliable energy, clean water and other basic rights as fundamental needs. Delivering on these rights becomes significantly harder when food and energy systems are managed in silo. Climate change and geopolitical instability are making integrated, system-level thinking an urgent practical requirement – and in doing so, creating new opportunities to enhance interconnected resilience.

- **Food resilience depends on farmers** to continue farming, which requires them to operate economically sustainable businesses; increasingly difficult as input costs (particularly energy and fertilizer) rise and political pressures constrain food prices. Energy activities inside the farm gate – from biofuel feedstocks and anaerobic digestion to solar and wind – reveal new opportunities to diversify farm income and strengthen economic sustainability, while simultaneously decarbonizing energy supplies and distributing generation capacity into rural areas.
- **Agri-food's underrepresentation in climate transition funding** is, in part, a structural problem of how decarbonization actions are packaged. On-farm energy activities offer a route to address this, providing understandable, investable proposals that create tangible economic benefits for farmers and a compelling case to climate finance providers.
- **Geopolitical conflicts** in the Gulf and beyond have highlighted the consequences of energy market disruption on food systems. Fertilizer pricing, long-term crop yields, trade flows and regional conflict dynamics are all acutely sensitive to oil and gas price movements, further reinforcing why energy and food security must be treated as connected policy domains.

30%

The approximate amount of the world's total end-use energy consumption attributed to the global agri-food sector.

Source: Food and Agriculture Organization of the United Nations, 2021, IRENA and FAO, Renewable energy for agri-food systems, Reproduced with permission.

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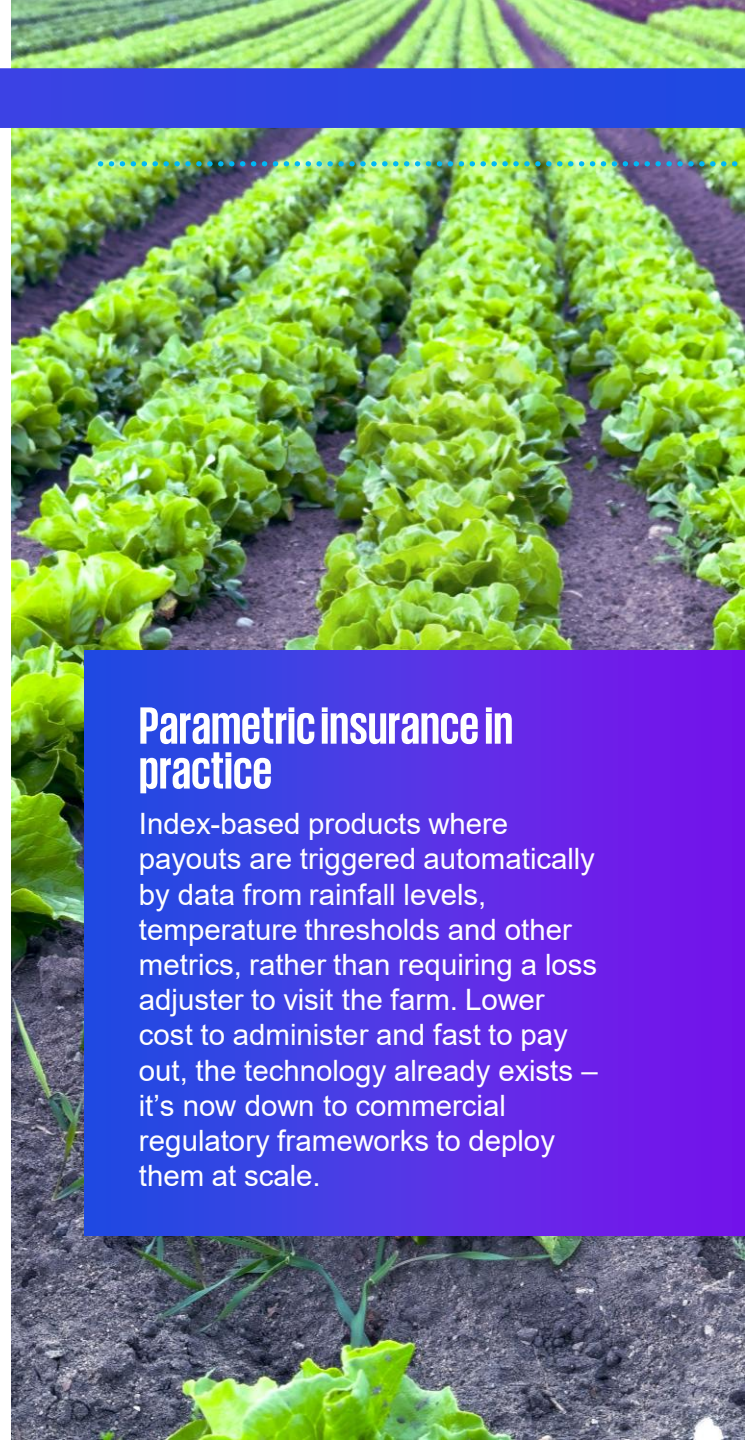
Tackling risk, taking on the limitations

Every growing season is a financial gamble against climate, price and trade uncertainty. The insurance and risk management tools available to most remain inadequate for the exposure they carry.

Broadening the availability of risk management tools for farmers has been one of the most consistent and urgent themes across events over the past year. Food system resilience depends on farmers continuing to produce, which depends on them being able to manage the climate, price and trade risk they face every season.

- Most farmers have few commercial insurance options, if any, which reflects the inherent volatility of food and fiber production alongside a persistent lack of granular data for underwriting purposes, both of which result in prohibitive policy costs. Government subsidy programs have been used as a substitute for commercial risk management to provide some level of income protection, but such legacy programs were never designed for the scale or nature of risk farmers face today; even fewer have been updated to reflect it.
- Without affordable, fit-for-purpose risk management and insurance solutions, farmers may increasingly consider alternative land uses that offer greater income confidence. In almost all cases, those alternatives will not involve growing food, and no amount of agricultural technology can compensate for the productive capacity lost when experienced farmers exit.
- Parametric insurance solutions represent a promising route to addressing this gap at scale, with a strong case for governments to review the design and continued relevance of existing subsidy and support programs. It is here that they can begin to address the realities of meeting the actual risk management needs of farmers and the markets they supply.



Parametric insurance in practice

Index-based products where payouts are triggered automatically by data from rainfall levels, temperature thresholds and other metrics, rather than requiring a loss adjuster to visit the farm. Lower cost to administer and fast to pay out, the technology already exists – it's now down to commercial regulatory frameworks to deploy them at scale.

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Capital has become selective and risk driven

The agri-food investment boom has passed. Valuations are down and expectations on business owners to secure finance is rising, sharply[1].



Despite the critical role food plays in every society, the sector is capital constrained due to its highly distributed ownership structure. A landscape of listed corporations, co-operatives, family business, start-ups and partnerships means many organizations lack the access to the finance required to invest in innovation and growth at the pace of the challenges they face.

- **Top tier operators generate strong returns,** yet for the majority, ambition is largely focused on survival. In a high-cost operating environment, that typically means reducing inputs and deferring spend on maintenance and innovation, which store significant long-term consequences for productivity and returns. Farm succession remains a pressing issue across many markets, with ageing operators wanting to exit but potential successors lacking the sufficient capital to be able to step in and take on the business.
- **Biological volatility** makes agri-food a difficult lending and investment proposition. Investors who are willing to engage do so with businesses actively mitigating that volatility through innovation. However, funding decisions may be largely dictated by confidence in the leadership team, not just the underlying idea quality.
- **The absence of large-scale exits** from agricultural and food-tech businesses has caused generalist VCs to step back from the sector. For specialist and corporate capital, scale potential is critical as businesses must prove how they intend to capture substantial share of a proven, sizable market. Whether AI-driven or product innovation-led, tech businesses operating in the sector should be explicit about how their solution improves the consumer experience. Specifically, Consumer Packaged Goods (CPGs) companies are looking for innovation that is commercially proven and **already scaled, prior to investment.**

Securing capital: what investors want to see

Scale potential. A proven market. A credible path to commercial traction. Management teams with a demonstrated ability to execute under pressure.

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Sources:

1. Global Agri Food Tech Takeaways

Scaling innovation into outcomes

Technology alone does not scale. The cultural and economic constraints on adoption now require innovators to think beyond products, rethinking their go-to-market models.

Innovation in food systems is not generating the step changes in productivity, food quality or health outcomes that the level of innovation might suggest. Progress to scale and commercialize is running significantly slower than in most comparable sectors, indicating more structural challenges, rather than incidental reasons.

- **Innovations in the food system** are often point solutions to specific challenges that do not integrate easily with existing production systems. That integration failure increases the cost and risk of adoption, slowing uptake and poorly translating outcomes from pilot conditions into replications at scale.
- **The average farmer has fewer than 40 growing seasons** to build financial security. Any change to a production system carries genuine risk, especially if it threatens the success of a single season. Without confidence that an innovation will deliver a measurable return, the economically rational farmer's decision is to defer adoption until the benefit is proven. To counteract this, innovators and supply chain partners need to actively share in the risk of adoption through outcome-based models, shared risk agreements or proven integration pathways.
- **Where farmers view their businesses through a whole-system lens,** innovators should do the same. Products designed to integrate seamlessly with existing technologies, such as exchanging data through open APIs and reducing friction at the point of adoption, can reach scale significantly faster than point solutions that require a farmer to restructure operations to accommodate a new tool.



The 40-season constraint

A farmer typically has less than 40 seasons to guarantee their family's financial wellbeing. Every change decision is made within that framing. Innovators who understand this – and build it into how they structure risk-sharing and go-to-market – can create more proactive partnerships for future shared growth.

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Consumer shifts are reshaping demand

As eating habits evolve and product functionality expectations increase, affordability remains the dominant purchase driver.



The GLP-1 consumer shift

These consumers typically eat fewer calories, require different nutritional profiles and interact with food differently. With up to 100 million people consuming this way in the next five years, building a GLP-1 strategy into product development roadmaps will be increasingly critical.

Increasingly framed as a health intervention over a mere consumer product, food is being reshaped in perspective as consumer shifts reshape its demand. Organizations across the food sector are actively building health functionality into their core portfolios, but the tension between health aspiration and price sensitivity remains unresolved, and likely will for some time.

- **The focus on health attributes** within food portfolios has intensified, with specific attention on compatibility with the dietary needs of GLP-1 pharmaceutical users. With 50 to 100 million people projected to be using GLP-1 drugs within the next five years[1], it's a material and growing segment that food businesses cannot afford to ignore, in relation to both commercial and reputational impact.
- **Affordability remains the critical constraint of** healthier diets. Consumers may well consistently state a preference for healthier, more sustainable food – but at the point of purchase, price and convenience continue to be the dominant decision factors. Health or sustainability-driven product strategies that fail to engage seriously with price will likely have limited impact at scale.
- **From reducing sugar, fat and salt** while increasing fiber and protein, to simplifying ingredient lists and improving processing transparency, reformulation of existing products remains the primary strategy. Ultra-processed foods face mounting regulatory and reputational risks, redirecting the sector towards cleaner, simpler products.
- **Outcome-driven consumption,** including wearable tech and health trackers, is moving from concept to commercial reality. Helping consumers translate personalized data into product choices should be an opportunity food businesses embrace to avoid displacement of emerging consumer relationships.

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Sources:

1. An introduction to the GLP-1 economy: impacts for Consumer & Retail companies, March 2026

How KPMG supports food system resilience

As the pressures reshaping global food systems create urgent and complex demands for organizations across every sector, KPMG brings together strategic, financial, technological and regulatory capability to help businesses anticipate and respond to change.

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The global food system spans across every border and business; its transformation requires strategy, finance, technology, operations and regulation. KPMG firms work with organizations, investors and government to build capability across the following disciplines:

Strategy and deals: Supporting organizations to anticipate and respond to disruption driven by climate change, geopolitical shifts, evolving consumer behavior and emerging technology. From portfolio reshaping and M&A strategy to partnerships and restructuring, we help our client reposition for a transformed food system.

Technology and digital transformation: Developing and implementing AI and technology roadmaps that build and deepen capability across food value chains, from farm to consumer.

Capital and finance innovation: Working with investors, development banks and agribusinesses to structure sustainable finance models that support long-term resilience across global food systems, unlocking sector-specific investments.

Sustainable and secure supply chain transformation: Designing and implementing supply chains that deliver economic resilience, minimizing environmental footprint and providing the traceability and security that governments, retailers and consumers increasingly demand.

Global tax strategy and trade advisory: As tax and trade strategies become further ingrained in food system resilience, we help organizations navigate complex international tax and trade regimes, respond to shifting tariff environments and optimize available incentives.



To find out more, please access our paper 'Reimagining global food system resilience'



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