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INNOVATION INSTITUTE**

Q3

Insight Report

FOOD RETAIL &
DISTRIBUTION

2025



01

Executive Summary

Introduction

In the third quarter of 2025, each of the six working groups of the Food and Nutrition Innovation Council (FNIC) convened with a focus on food retail and distribution. Each group heard from field experts and engaged in discussions around challenges, tensions, and opportunities within their working group domain as it relates to retail and distribution.

This report captures insights from the six FNIC working group meetings held in Q3. It highlights where the groups converge on core themes and how the diversity of knowledge among members surfaces tensions and agreement. It also offers opportunities to explore these tensions through collaborative work. The purpose of this report is not only to inform, but to equip FNIC members with both strategic guidance and concrete concepts—enabling them to drive equitable and nutrition-driven transformation within their organizations and across the food system.

**FNIC
Working Groups**

- Bioactives**
- Biotech & Novel Ingredients**
- Food as Health**
- Precision Nutrition**
- Nutrition Security**
- Sustainable Nutrition**

High-Level Findings

◆ **Trust, transparency, and clarity are now prerequisites for progress across the food system.**

Consumers, communities, retailers, and partners cannot adopt what they do not understand or believe in. As products, evidence systems, and technologies become more complex, trust depends on clear claims, transparent data, responsible use of AI and personalization, and culturally grounded experiences. Without this foundation, even strong solutions will struggle to gain traction.

◆ **Innovation will only scale when evidence, infrastructure, and economics are aligned.**

Across fresh food operations, novel ingredients, precision platforms, and regional supply chains, the reports show that scientific advances outpace the systems needed to support them. Reliable infrastructure, usable evidence frameworks, and viable cost structures determine what can reach the market and who can participate. Strengthening these enablers is essential for moving promising ideas from pilot to durable impact.

◆ **Real progress requires navigating trade-offs and designing for diverse contexts, not chasing one-size-fits-all solutions.**

Nutrition, sustainability, affordability, cultural relevance, and operational feasibility cannot all be optimized at once. The working groups demonstrate that performance varies by place, population, product format, and system design, and that resilience comes from layering local, regional, and national approaches. Leaders who acknowledge these trade-offs and design with context in mind create solutions that are more adaptive, equitable, and realistic.

Key Tensions

Rigor vs. Usability

Evidence systems are becoming more precise and complex, but the outputs are often difficult for decision-makers to interpret and apply.

Standardization vs. Contextual Relevance

Efforts to create common metrics and frameworks can obscure critical differences across products, populations, and settings, reducing the usefulness of the information.

Innovation Speed vs. Infrastructure Readiness

Emerging models in fresh food, personalization, and novel ingredients are advancing faster than the physical, digital, and regulatory systems required to support them at scale.

Key Tensions (continued)

Autonomy vs. Guidance

People need both agency and support, and systems that over-direct or under-guide them risk undermining trust, adoption, and equity.

Uniformity vs. Adaptability

Standardized menus, national distribution models, and single scoring systems simplify operations but reduce the resilience and flexibility needed to navigate diverse and changing conditions.

Core Themes* at a Glance

Theme	Why It Matters
Trust as the Foundation of the Modern Food System	No solution optimizes all goals at once. Leaders who recognize and navigate trade-offs—and build resilience across local, regional, and national layers—create more adaptive, realistic strategies.
Evidence, Measurement & Translation Bottlenecks	Leaders rely on evidence, but current systems often produce data that is hard to compare or use. Improving how evidence is generated and communicated enables clearer decisions and more effective action.
Infrastructure as the Limiting Factor	Fresh food models, personalization, and novel ingredients cannot scale without supportive physical, digital, and regulatory infrastructure. Strengthening these foundations increases reliability and resilience.

*Core themes were derived from the six working group meetings.

Core Themes* at a Glance (continued)

Theme	Why It Matters
Human Behavior, Culture & Communication Shape Adoption	Even strong solutions fail when they ignore how people make decisions or relate to food. Designing for culture, clarity, and behavioral realities drives adoption and sustained impact.
Economics & Viability Drive What Scales	Cost structures and incentives determine who can participate and which innovations reach the market. Addressing economic constraints is critical for equity, access, and long-term viability.
Trade-Offs, Complexity & Layered Resilience Define the System	No solution optimizes all goals at once. Leaders who recognize and navigate trade-offs—and build resilience across local, regional, and national layers—create more adaptive, realistic strategies.

**Core themes were derived from the six working group meetings.*

Together, these six themes offer a clear view of the forces shaping food and nutrition innovation today. They show how trust, evidence, infrastructure, human behavior, economics, and system complexity intersect and how progress depends on aligning these elements rather than addressing them in isolation. By understanding these interdependencies and navigating the trade-offs they create, leaders can design solutions that are more resilient, more equitable, and more likely to achieve meaningful impact across the food system.

Q3 Speakers



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Blonk



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Jose Barbosa
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The content of this report is an interpretation of conversations occurring between members of the Food & Nutrition Innovation Council and guest speakers. It does not necessarily represent the views of any one member of the Council, or those of the Food and Nutrition Innovation Institute, the Friedman School of Nutrition Science & Policy, or Tufts University.

Q3 Insight Report: Food Retail & Distribution

Introduction

Food retail and distribution are defining arenas for food system innovation, where consumer expectations, operational constraints, and emerging technologies converge. As the places where products, people, and supply chains meet, food retail and distribution channels shape not only what food reaches consumers, but how it's delivered, communicated, and experienced. This quarter, FNIC working groups examined these dynamics across fresh-food operations, digital personalization, regional supply, sustainability measurement, novel ingredients, and community access models, revealing both the complexity of today's food environment and the opportunities for systems-level improvement.

Signals Shaping the Food System

Healthfulness is one of the top three purchase drivers, behind taste and price

According to the 2024 IFIC Food & Health Survey, taste and price continue to be the primary drivers of what consumers choose to eat or buy. However, as income level increases, the influence of healthfulness increases dramatically, with 75% of those with the highest income reporting it's a key driver. In 2024, healthfulness surpassed price as a driver for those with a household income over \$100,000.¹

Consumers are willing to pay a premium for healthier foods

Research suggests that many consumers are willing to pay a price premium for healthier foods.²

Online grocery is now mainstream and still growing.

In 2022, about 1 in 5 U.S. grocery shoppers reported buying groceries online in the past month, and by 2025, roughly 6 in 10 U.S. households had placed at least one online grocery order in the past year. This shift is reshaping how consumers discover products, how digital trust and transparency are built, and how distribution and fulfillment systems must evolve to meet rising expectations for speed, accuracy, and seamless service.^{3,4}

Food and nutrition insecurity remain at elevated levels.

In 2023, 18 million households were food insecure at some point during the year, which is statistically significantly higher than 2022.⁵ Persistent affordability and access gaps increase pressure on retailers, distributors, and institutions to deliver solutions that are nutritionally meaningful, economically viable, and operationally scalable.

While each group explored this quarter's theme through distinct lenses, clear patterns emerged across the conversations. This report synthesizes those threads into the key themes, tensions, and opportunities. Together, they reveal not just where innovation is happening, but what it will take for new ideas to scale credibly, equitably, and with lasting impact.

03

Core Themes



Each of the following cross-cutting themes contains key insights, tensions and challenges, and opportunities for action designed to spark the partnerships and collaboration required to reshape the food system.

01 Trust as the Foundation of the Modern Food System

Trust sits at the center of every food system interaction, shaping how consumers choose, how retailers curate, how innovators signal value, and how communities engage. Across the working groups, trust surfaced not as a single issue but as a structural requirement, woven through ingredient integrity, evidence standards, data practices, dignity-centered design, and transparent communication. Whether the context is bioactive stability, novel ingredient claims, AI-driven personalization, or community nutrition access, trust determines whether innovations are understood, adopted, and sustained. This theme captures the conditions under which trust is built, the tensions that undermine it, and the opportunities to design systems that earn and preserve it.

Key Insights

01. Trust is a system-wide prerequisite.

Across all working groups, trust emerged as the enabling condition for progress, whether the goal is driving bioactive efficacy, scaling fresh food systems, advancing precision nutrition, or strengthening community food access. People trust systems that behave reliably: ingredients that remain stable, claims that

reflect real evidence, programs that uphold dignity, and data systems that respect autonomy. *Trust is not built through information density but through consistency of performance across touchpoints.* When trust is present, innovation has room to land; when it is absent, even high-quality solutions struggle to gain traction.

02. Scientific and technical complexity requires translation to sustain trust.

Insights from Bioactives, Biotech & Novel Ingredients, and Sustainable Nutrition all underscored the communication challenge: complex stability data, ingredient identities, functional units, and lifecycle analysis (LCA) methods often exceed what consumers, retailers, and community partners can interpret. Precision Nutrition adds another layer: data science and AI systems require explainability for users to engage with confidence. Nutrition Security shows that trust at the community level relies on familiarity, agency, and cultural alignment, not abstract data. When translation fails, confusion can grow alongside skepticism.

03. Dignity, autonomy, and transparency deepen relational trust.

Nutrition Security, Food as Health, and Precision Nutrition reinforce that trust is not only technical- it is relational. People trust systems that respect privacy, honor cultural identity, elevate autonomy, and provide clarity around how choices are shaped. In community food environments, dignity-based practices counteract stigma and strengthen participation. In digital environments, transparent data pathways and controllable personalization settings empower users. Trust is strengthened when systems communicate not just what they do, but why and how.

Tensions & Challenges

Accuracy vs. Comprehension

A central tension across the reports is the widening gap between scientific sophistication and stakeholder understanding. Innovations in bioactives, biotechnology, sustainability metrics, and AI-driven personalization all generate increasingly granular data, yet the people who must use this information rely on simple heuristics, label cues, and lived experience. When evidence becomes too complex to interpret, it becomes less credible in practice. Leaders must grapple with the reality that precision without clarity can erode the very trust it is meant to build.

Tensions & Challenges

Transparency vs. Differentiation

Many of the strongest trust-building practices, such as harmonized standards, shared data ecosystems, identity verification tools, and open methodologies, ask organizations to reveal information traditionally held as competitive advantage. Companies must navigate the strategic tension between participating in system-wide transparency efforts and maintaining differentiation in the marketplace. This tension is cultural as much as operational, shaping how far each actor is willing to go in contributing to public trust infrastructure.

Opportunities

Develop shared frameworks that make trust legible.

There is a significant opportunity to build cross-sector frameworks that clarify how evidence is generated, how claims are substantiated, how sustainability scores are constructed, and how data is used in personalization systems. These frameworks can create common language across regulators, retailers, producers, and communities, reducing confusion and strengthening confidence. Consistent approaches to communication can help leaders avoid fragmentation while still enabling innovation.

Strengthen verification systems that reinforce credibility.

Stability testing, identity authentication, primary-data pathways for sustainability tools, and transparent data governance models offer tangible ways to operationalize trust. These systems make quality and integrity visible, not just asserted. When paired with dignity-centered food environments and explainable AI tools, verification systems become part of a broader “trust infrastructure” that supports resilience across the food system. Leaders can move from trust as an abstract aspiration to trust as a measurable, investable asset.

02 Evidence, Measurement & Translation Bottlenecks



Across the reports, the ability to generate, interpret, and translate evidence emerged as one of the most significant bottlenecks facing the food and nutrition ecosystem. Whether the subject is nutrient stability, ingredient equivalence, sustainability metrics, community program outcomes, or AI-enabled personalization, leaders

consistently confront systems that produce data faster than they can harmonize or communicate it. Evidence is abundant but uneven; measurement methods vary across domains; and translation practices rarely meet the needs of consumers, retailers, communities, or regulators. This theme explores how evidence is created, how it is contested, and how it must evolve to support clarity, comparability, and trust across the food system.

Key Insights

01. Measurement choices fundamentally shape the story.

The Sustainable Nutrition group highlighted how functional units—per kilogram, per calorie, per nutrient density, or nutrient-equivalent units—dramatically shift sustainability conclusions. These methodological differences are not technical footnotes but narrative drivers, determining which foods appear more climate-efficient or nutrient-dense. Similar dynamics surface in Bioactives and Biotechnology & Novel Ingredients, where evidence does not transfer cleanly across formats or extraction methods, making it difficult to compare products or claims. The choice of denominator, matrix, or method shapes how leaders understand impact, and inconsistency across systems creates competing truths that may confuse food system actors and undermine coherent action.

02. Evidence rarely travels across contexts without distortion.

Bioactives and Biotechnology & Novel Ingredients both emphasized that scientific evidence is highly matrix-dependent: stability in capsules does not guarantee stability in gummies; an extract's clinical evidence does not apply to a distillate; and a biotech-derived molecule is not equivalent to an agricultural form without

rigorous verification. Precision Nutrition revealed an analogous challenge in data science: population-level evidence cannot be used to justify personalized claims, and individual signals cannot be generalized to populations. In community settings, Nutrition Security highlighted how outcomes like dignity, participation, resilience, and belonging, which are central to program success, are often unmeasured, leaving leaders with partial pictures of impact. Evidence that fails to match the context in which it is used can become misleading rather than informative.

03. Translation is as important as the evidence itself.

Across the working groups, leaders repeatedly emphasized that evidence loses impact when it cannot be expressed in a form people can understand or use. Sustainability scoring systems overwhelm consumers with methodological complexity; bioactive and biotech claims rely on ingredient distinctions few people recognize; and precision nutrition platforms require clarity around data use, autonomy, and intent. In community contexts, Nutrition Security highlighted a different but related challenge: many of the outcomes that matter most, such as dignity, choice, cultural fit, participation, and regional resilience, are not captured by traditional food system metrics at all. When evidence frameworks overlook or obscure what communities and organizations value, they fail to inform decisions, weakening confidence and slowing adoption.

Tensions & Challenges

Rigor vs. Usability

Stronger evidence systems, such as more detailed LCAs, more granular stability data, more precise personalization algorithms, often generate outputs that are too complex for real-world application. Consumers rely on intuitive signals, not multi-layered datasets. Leaders face the challenge of preserving scientific rigor while making evidence functional and accessible. As methods evolve, so does the risk of widening the gap between what can be measured and what can be meaningfully used.

Standardization vs. Contextual Relevance

Across the groups, there is pressure to create unified standards for sustainability metrics, clinical evidence, ingredient equivalence, community nutrition outcomes, and digital data practices. Yet strict standardization can obscure the nuances that matter most: matrix effects in bioactives, regional variability in supply chains, cultural relevance in community settings, or personal goals in precision nutrition. The tension lies in balancing the need for comparable metrics with the need for context, specificity, and cultural or operational fit.

Opportunities

Develop harmonized measurement principles that improve comparability without erasing nuance.

A major opportunity lies in creating cross-sector principles, rather than one-size-fits-all standards, for how evidence is generated, interpreted, and reported. This includes transparent rules for selecting functional units, clear pathways for validating ingredient equivalence, shared definitions for outcome domains in community nutrition programs, and aligned terminology for emerging ingredient technologies. Principles can provide consistency while still allowing methods to adapt to context, reducing confusion without flattening complexity.

Build translation systems that make evidence actionable for different audiences.

Leaders can invest in translation frameworks that distill complex evidence into intuitive formats: consumer-facing sustainability layers that pair simple icons with QR-linked depth; retailer- and clinician-ready substantiation packets for novel ingredients; behavioral user experience standards for precision nutrition interfaces; and community-friendly dashboards that capture dignity, participation, and resilience alongside traditional nutrition outcomes. Effective translation does not oversimplify, but rather it scaffolds understanding across diverse users and implementers, making evidence more impactful.

Strengthen pre-competitive evidence ecosystems.

There is an emerging opportunity to develop shared repositories for data that no single actor can build alone: stability and identity libraries; primary-data governance models for sustainability; interoperability layers for health, retail, and behavioral data; and standardized evaluation tools for community programs. These systems lower evidence burdens, reduce duplication, and create a common foundation for claims, communication, and decision-making. They allow organizations to innovate on top of shared truth rather than competing on incompatible versions of it.

03

Infrastructure as the Limiting Factor

Across all six working groups, infrastructure surfaced as the quiet but decisive determinant of what innovations can succeed, scale, or sustain impact. Whether the goal is making fresh food reliably available, commercializing novel ingredients, supporting small regional producers, enabling precision nutrition, or improving sustainability measurement, leaders repeatedly emphasized that *the physical, digital, regulatory, and compliance systems underlying the food landscape are not yet built for the ambitions being placed on them*. This theme highlights the structural constraints that hold back progress and the pathways for redesigning infrastructure to support a more resilient, equitable, and evidence-driven food system.



Key Insights

01. Operational infrastructure determines the feasibility of fresh, health-forward food at scale.

The Food as Health group made clear that delivering fresh, nutrient-dense, clean-label food at scale is far more an operational challenge than a culinary or nutritional one. Cold chain systems, localized production capabilities, forecasting models, and distribution networks must all work in synchronized precision to achieve quality, affordability, and reliability. Operators noted that no two regions behave the same, demand patterns vary, and small deviations in production or logistics can undermine both margin and trust. Innovation in menu design or ingredient quality cannot succeed without the infrastructure to reliably execute it across sites, seasons, and supply environments.

02. Digital and data infrastructure shape the future of personalization and evidence.

Precision Nutrition emphasized that personalization is only as powerful as the digital systems that make it interoperable. Retailer data, clinician data, behavioral insights, product metadata, and AI models all operate in fragmented silos, limiting the promise of individualized food guidance. Similarly, Sustainable Nutrition showed that sustainability insights depend on primary data, supplier onboarding systems, and transparent data governance, none of which exist at scale. Without new digital infrastructure, the evidence needed to drive precision, sustainability, or claims integrity remains incomplete and inconsistently accessible across the value chain.

03. Compliance and verification systems constrain or enable regional resilience.

The Nutrition Security group emphasized that national food safety and certification frameworks designed for large-scale operations place disproportionate burdens on small farms and regional producers. These uniform systems require time, cost, and documentation levels that many smaller growers cannot absorb, limiting their ability to access institutional markets and reducing local supply diversity. At the same time, the Bioactives and Biotechnology & Novel Ingredients groups highlighted a different but related challenge: the growing need for stronger verification systems, such as stability testing, identity authentication, manufacturing consistency, and equivalence standards, to ensure product integrity and regulatory confidence. Together, these perspectives show that verification is increasingly essential across the food system, but when systems are not right-sized to the actors involved, they become barriers to participation. This mismatch can restrict regional infrastructure growth, weaken resilience, and slow innovation.



Tensions & Challenges

Innovation Speed vs. Infrastructure Readiness

Many emerging innovations, such as advances in bioactive stability and verification, novel biotech-derived formulations, precision nutrition engines, fresh-food-forward retail models, are operating on top of legacy infrastructure not designed to support them. As a result, leaders face a structural tension: the science and technology exist, but the logistics, digital systems, compliance frameworks, and local supply networks lag behind. This imbalance can create fragility, delay adoption, and misalign expectations around speed and scalability.

Standardization vs. Local Adaptability

Safety, sustainability, digital, and distribution infrastructures were largely built for national or global consistency. Yet many of the solutions needed, such as local sourcing, community-led access models, culturally tailored food environments, depend on regional flexibility and small-scale participation. The system struggles to balance uniformity and inclusivity, treating variation as a risk rather than an asset. This tension prevents smaller actors from entering the system.

Opportunities

Build regional and right-sized infrastructure that supports both scale and resilience.

There is a critical opportunity to design infrastructure that meets the needs of small and mid-size producers without compromising food safety or reliability. This includes shared cold-chain hubs, cooperative distribution centers, pooled safety audits, and regional compliance support models. Such infrastructure would help retailers, institutions, and community programs to source locally while maintaining consistency, thereby strengthening regional resilience and diversifying supply.

Opportunities (continued)

Create interoperable digital systems that connect evidence, personalization, and sustainability.

Leaders across Precision Nutrition and Sustainable Nutrition called for integrated data layers that can link product metadata, clinical data, behavioral signals, sustainability attributes, and retail inventories. Investing in shared taxonomies, interoperability standards, and transparent data governance would unlock new possibilities for precision guidance, claims validation, and real-time impact assessment. Digital infrastructure becomes a foundation for more personalized, measurable, and trustworthy food experiences.



04

Human Behavior, Culture & Communication Shape Adoption

Across the working groups, leaders consistently emphasized that food system innovation does not move on the strength of science alone. It moves through culture, cognition, identity, and lived experience. Whether the goal is shifting consumer choices, supporting healthy workplace environments, designing culturally relevant food access models, or communicating the value of novel ingredients and sustainable practices, human behavior consistently determines what is used, trusted, and repeated. This theme highlights the psychological and cultural dynamics that govern real-world adoption and the communication systems required to translate science into choices people can understand and embrace.

Key Insights

01. People rely on recognition, not reasoning, when making food decisions.

The Precision Nutrition and Food as Health conversations underscored that consumers rarely engage in analytical evaluation during everyday food choices. Shoppers lean on heuristics, such as visual cues, familiar language, color signals, product placement, and cultural associations. Even complex, health-forward offerings succeed only when they reduce cognitive load. In community settings, Nutrition Security found the same pattern: simplicity, clarity, and familiarity increase dignity and participation. Across contexts, behavior is shaped not by scientific explanation but by how intuitively a system or product matches how people navigate their environments.

02. Cultural relevance and lived experience determine whether health-forward solutions stick.

Food as Health and Nutrition Security groups emphasized that cultural identity, psychological safety, and community norms heavily influence adoption. Health-forward menus may fall flat when they do not reflect comfort foods or cultural preferences; community programs lose engagement when they impose unfamiliar foods or remove choice; and precision tools fail when they disregard family dynamics or budget constraints. Leaders highlighted that cultural resonance is not an optional enhancement, but rather it is a structural requirement for sustained behavior change.

03. Communication systems must carry both simplicity and depth.

Both the Sustainable Nutrition and Biotechnology & Novel Ingredient groups showed that consumers need clear, intuitive signals, while regulators, retailers, and practitioners require access to deeper evidence layers. The solution is not to simplify the science but to scaffold the messaging: front-of-pack cues or narrative storytelling that links to deeper, more technical explanations. The Bioactives group underscored a similar communication gap: ingredient forms behave differently in the body, and stability data determine whether a product delivers on its promise, yet these distinctions are invisible to consumers. Without clear explanation, science-based products get lost amid generic marketing claims. Effective communication systems make complexity navigable rather than invisible.

Tensions & Challenges

Simplicity vs. Accuracy

Across the working group meetings, it was clear that leaders face the challenge of honoring scientific nuance while communicating in ways that do not overwhelm their audience. Over-simplification can mislead; too much detail can confuse or disengage. This tension is especially visible in sustainability scoring, ingredient claims, and precision nutrition user experience design, where users need just enough information to build confidence without carrying the cognitive burden of full datasets.

Tensions & Challenges (continued)

Autonomy vs. Guidance

Precision Nutrition and Nutrition Security groups highlighted the need to support personal autonomy while offering meaningful guidance. Too much prescriptive direction, whether through AI systems, menu design, or nutrition programs, can feel intrusive or paternalistic, eroding agency. Too little guidance leaves people unsupported in environments designed to favor convenience or default options. Balancing both is central to building trust and fostering sustainable behavior change.

Opportunities

Build multi-layer communication architectures that translate complexity without oversimplifying it.

Effective communication must do more than present intuitive cues; it must also organize scientific complexity into formats that different audiences can navigate at different depths. This requires a coordinated architecture: simple, recognition-based signals for everyday decisions; culturally grounded narratives that reflect identity and belonging; and deeper, evidence-rich layers accessible through digital tools for clinicians, operators, or consumers who want to go further. Designing these systems demands not just better messaging but interoperable data pathways, clear substantiation frameworks, and aligned interpretation tools across retail, healthcare, and community settings. *Communication becomes an infrastructure investment, not just an output*, enabling people to act confidently without losing the integrity of the underlying science.

Develop culturally resonant, dignity-centered food environments.

Leaders can design workplace, retail, and community food spaces that reflect comfort foods, cultural traditions, and a sense of belonging. This includes co-designed menus, choice-first community models, and environments that remove stigma and elevate agency. These approaches emerged strongly from Food as Health and Nutrition Security discussions, underscoring that dignity and cultural fit are not peripheral, but rather they are critical infrastructure for engagement.

05 Economics & Viability Drive What Scales



Economic viability surfaced across all six working groups as a defining constraint, and enabler, of innovation. Fresh food operations, novel ingredient commercialization, precision nutrition platforms, community nutrition programs, and sustainability measurement tools all face cost structures that can limit adoption, narrow access, or strain operating models. Leaders stressed that meaningful impact requires aligning health-forward ambitions with the economic realities of producers, retailers, operators, and consumers. This theme explores how cost, margin, affordability, and investment shape what becomes possible in the food and nutrition ecosystem.

Key Insights

01. Health-forward food models face structural cost pressures that limit scalability.

The Food as Health working group detailed how fresh, clean-label, or nutrient-dense foods require more labor, more forecasting precision, shorter shelf lives, and higher production demands, all of which raise costs. Operators struggle to maintain margins while delivering the quality and consistency consumers expect. Similarly, the Nutrition Security group emphasized that affordability remains the primary barrier to access for low-income households, where even small price differences drive purchasing behavior. Without economic strategies that bridge cost and accessibility, health-forward offerings struggle to move from aspiration to everyday reality.

02. Evidence and compliance requirements add meaningful costs as new solutions enter the system.

The Bioactives and Biotechnology & Novel Ingredients working groups highlighted that producing high-quality, evidence-backed, and identity-authenticated ingredients requires investments in stability testing, analytical validation, and regulatory readiness. The Sustainable Nutrition group noted that primary data

collection for LCAs imposes significant costs on suppliers, especially small or resource-constrained ones who lack the infrastructure to gather and report the required data. These investments are essential for trust and transparency, but they can also create financial pressures that slow adoption or limit the ability of smaller suppliers to meet emerging evidence expectations.

03. Economic incentives shape participation across the value chain.

Precision Nutrition discussions underscored that personalization platforms will not scale unless they deliver measurable return on investment for retailers, payers, and operators. The Nutrition Security group shared that it is challenging for small farms to participate in institutional markets without incentives that offset compliance and distribution costs. Across the working groups, leaders emphasized that even highly nutritious or scientifically validated solutions cannot scale unless the underlying economics work. Cost structures, alongside the quality of the science, influence who can enter, compete, and sustain operations within the food system.

Tensions & Challenges

Mission vs. Margin

Organizations seeking to deliver health-forward, sustainable, or personalized solutions often confront the realities of food production and distribution economics. Healthier menus increase labor and ingredient costs; sustainable formulations can raise procurement expenses; and novel ingredient processes require technical investment before margins improve. This tension is especially visible in contexts serving price-sensitive populations, where health ambitions collide directly with affordability constraints.

Short-term cost pressures vs. Long-term system value

The benefits of improved health outcomes, reduced chronic disease costs, regional resilience, and consumer trust accrue over time, but the expenses associated with evidence generation, infrastructure, and compliance are immediate. Leaders must navigate the challenge of justifying long-term returns in environments driven by quarterly budgets, competitive pricing, and tight operating margins. This structural tension often slows adoption even when the long-term value is clear.

Opportunities

Develop cross-sector incentive models that align economic value with health and sustainability outcomes.

There is an opportunity to build blended financing mechanisms, pay-for-outcomes models, and retailer+payer partnerships that recognize the downstream value of healthier diets and sustainable choices. These models can offset the near-term costs of fresh food programs, precision nutrition platforms, and compliant regional sourcing, creating economic pathways that reward long-term system benefits.

Lower evidence and compliance barriers through shared systems.

Shared stability libraries, cooperative safety audits, pooled LCA data capture, and common equivalence frameworks can reduce duplicative costs and make it easier for suppliers and manufacturers of all sizes to participate. These systems help distribute the financial burden of rigorous evidence generation while improving quality and comparability across the value chain. By reducing the cost of participation, these efforts expand innovation and equity simultaneously.

06

Trade-Offs, Complexity & Layered Resilience Define the System

The working groups collectively reveal a food system defined by inherent trade-offs across nutrition, sustainability, affordability, cultural relevance, operational feasibility, and regulatory fit. No single solution optimizes every metric, and attempts to simplify complexity often obscure the dynamics that matter most. Leaders emphasized that meaningful progress requires acknowledging and navigating these trade-offs rather than seeking perfect solutions. This theme explores how system complexity shapes decision-making and how resilience emerges when multiple levels of the system- local, regional, and national- reinforce one another through more adaptive and transparent approaches.



Key Insights

01. No food, ingredient, or intervention optimizes across all domains.

Sustainable Nutrition discussions made it clear that foods vary in nutrient density, climate impact, water use, cultural fit, and cost, and improvements in one domain often create trade-offs in another. The Bioactives and Biotechnology & Novel Ingredients groups showed that ingredient formats vary in stability, bioavailability, and regulatory complexity. Food as Health speakers showed that maintaining fresh-food quality at scale introduces significant operational trade-offs, even when consumer-facing models prioritize convenience. The Nutrition Security group underscored the tension between local identity and national distribution reliability. Leaders across the ecosystem must navigate these multidimensional trade-offs with realism and transparency.

02. Functional performance depends on matching solutions to the contexts they were designed for.

Across the working groups, leaders noted that many failures arise not from weak ideas, but from applying evidence and models outside the conditions they were built for. The Bioactives group highlighted that stability and efficacy shift dramatically across matrices, yet evidence is often generalized as if it were interchangeable. Sustainable Nutrition speakers showed that LCA outcomes depend more on production systems than on geography alone, challenging common assumptions about local being a better, more sustainable choice. The Nutrition Security group demonstrated that local and regional supply chains operate under different constraints and strengths than national models. Small and mid-sized farms face disproportionate compliance burdens that limit their ability to participate, while regional systems offer adaptability and community alignment that large-scale distribution can't replicate. Precision Nutrition discussions underscored that personalization succeeds only when individual variation, digital literacy, and data access are taken into account. Together, these insights show that misalignment between solutions and the contexts they operate in, not the solutions themselves, is an important source of friction in the food system.

03. Resilience emerges from diversity, not uniformity.

Both Nutrition Security and Sustainable Nutrition groups pointed to the strength of layered systems- local, regional, and national- that can flex under different pressures. Diversity in sourcing, menu design, food cultures, ingredient technologies, and evidence systems creates adaptive capacity. When systems rely on a single model, whether globalized supply chains, standardized menus, or uniform scoring, they lose flexibility and struggle to adapt when conditions change.



Tensions & Challenges

Optimization vs. Realism

Leaders face pressure to present solutions as universally beneficial, yet the evidence shows that most interventions offer partial wins. Optimizing for sustainability may reduce affordability; optimizing for personalization may reduce equity; optimizing for cultural relevance may reduce operational efficiency. *The tension lies in resisting the desire to simplify and instead navigating complexity with intellectual honesty and practical judgment.*

Uniformity vs. Adaptability

Systems built for national consistency, such as regulations, scoring tools, safety frameworks, and supply networks, can struggle to incorporate the variability required for cultural fit, regional sourcing, and personalized guidance. Excessive uniformity can limit innovation, but excessive variability undermines trust and comparability. Balancing the two is a core leadership challenge.

Opportunities

Develop decision frameworks that surface and clarify relevant trade-offs.

Across the working groups, leaders emphasized that trade-offs vary by context: nutritional value, environmental impact, affordability, cultural relevance, operational feasibility, and regulatory fit do not appear in every decision, nor do they carry equal weight. There is a meaningful opportunity to create tools that help leaders identify which trade-offs are most relevant in a given setting and make those tensions explicit rather than implicit. Such frameworks can support more transparent, context-aware decisions and reduce the pressure to present single-metric solutions as universally definitive.

Opportunities (continued)

Invest in layered, multi-scale supply and service models.

Local, regional, and national systems each bring different strengths, such as freshness, adaptability, cost efficiency, and consistency. By blending these layers, organizations can build supply chains and programs that flex under changing conditions. This approach can enhance cultural relevance and operational reliability while improving overall system resilience and reducing reliance on any single model.



Conclusion

The six working groups collectively reveal a food system at an inflection point—one that is rapidly expanding in scientific sophistication, technological capability, and operational ambition, yet still constrained by the basic structures required to translate potential into outcomes. Across domains as diverse as bioactive stability, novel ingredient production, fresh-food operations, precision nutrition, community nutrition security, and sustainability measurement, leaders emphasized the same underlying truth: *the next era of food innovation will be defined not only by what we can create, but by what our systems are capable of supporting.*

The themes in this report highlight both the opportunities and the demands of that transition. Trust has become a structural prerequisite for progress as consumers, communities, and institutions navigate increasingly complex food environments. Evidence systems must evolve to reflect real-world variability while remaining usable and comparable. Infrastructure—physical, digital, regulatory, and cultural—must be redesigned to support fresh-food systems, emerging technologies, regional supply networks, and the data flows required for precision and transparency. And across every setting, behavior, culture, and communication shape what is actually adopted, not just what is possible on paper.

The economic realities that shape participation, affordability, and viability remain some of the strongest determinants of impact. Innovations that meet scientific or operational standards still face the practical limits of cost, pricing dynamics, and budget constraints—especially in contexts serving populations for whom even small price changes shift behavior. And underlying it all is the system-wide need to navigate trade-offs with greater honesty and adaptive capacity: *no single metric, ingredient, food, or model will optimize for nutrition, sustainability, equity, cultural fit, and economic feasibility simultaneously.*

For food system and nutrition leaders, this moment offers a clear call to action. Progress will require investing not only in products or programs, but in the infrastructures, governance models, evidence systems, and cultural competencies that make innovation durable. It will require shifting from isolated advancements to coordinated architectures: shared frameworks for transparency, right-sized verification systems, interoperable data pathways, blended economic models, and multi-layer communication systems that honor both scientific rigor and human experience.

The food system is moving toward a future where personalization, sustainability, fresh-food access, regional resilience, and science-driven functionality will coexist and co-evolve. Achieving that future depends on designing systems that are as trustworthy, adaptable, and diverse as the people and communities they are meant to serve.

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