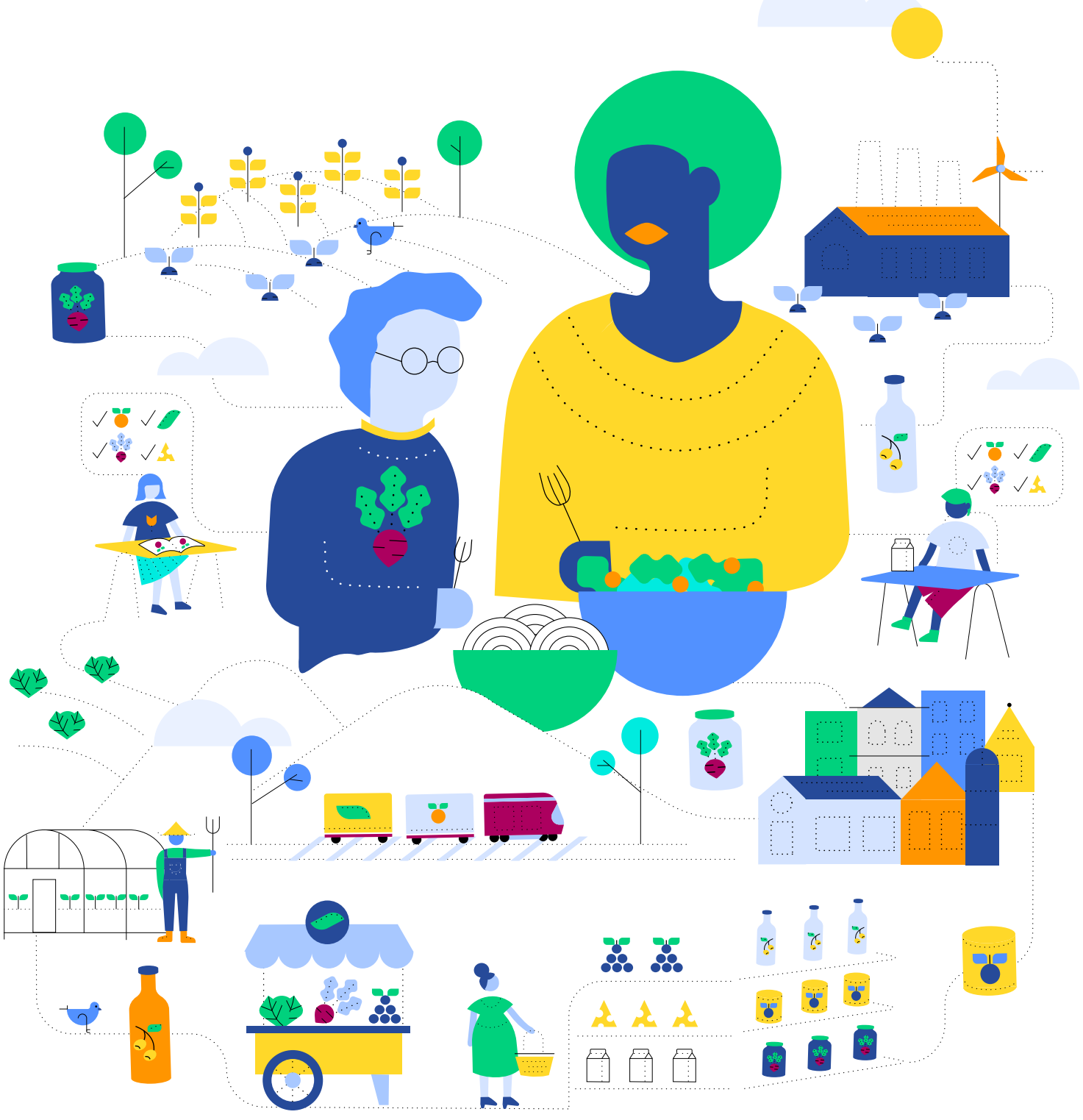
In collaboration
with Accenture

WORLD ECONOMIC FORUM

Transforming the Global Food System for Human Health and Resilience

INSIGHT REPORT

DECEMBER 2023



Images: Getty Images

Contents

Preface

Post World War II, the global food system focused on producing safe, inexpensive, high-calorie food for the world's growing population. While extreme hunger has decreased, countries now contend with divergent but related health crises. Worldwide, over 800 million people are experiencing food insecurity,[1] resulting in 9 million deaths per year, as of 2021.[2] At the same time, 1.9 billion are overweight or living with obesity,[3] with diet-related chronic diseases contributing to 11 million deaths per year, as of 2017.[4] Conditions related to excess body weight now kill more people than hunger,[5] and heart disease is the leading cause of death. Obesity rates have nearly tripled since 1980, and the incidences of diet-related non-communicable diseases (NCDs) such as heart disease, high blood pressure, diabetes and cancer have more than doubled in the same time.[6] Poor nutrition is a primary driver. As of 2023, 17 million people die each year due to poor diets, more than double the total deaths since the onset of the COVID-19 pandemic (7 million).[7] What's more, 78% of COVID-19 hospitalizations and deaths were linked to diet-related NCDs such as obesity, type 2 diabetes and high blood pressure.[8]

In addition to the threat to human health, the dominant food system is also threatening the planet. Agriculture contributes 25% to 42% – or about a third – of all global greenhouse gas (GHG) emissions.[9] The expansion of agricultural land drives deforestation, with more than 41 million trees cut down daily.[10] Conventional farming practices compromise soil fertility and productivity, resulting in the loss of 12 million hectares of arable land annually.[11] The total externalities linked to poor nutrition, including costs to human life, environmental sustainability and economic loss, are currently nearly $20 trillion, more than double the direct cost of global food consumption.[12]

The global food system no longer meets the world's health or sustainability needs and must rapidly evolve. Facilitated in collaboration with Accenture, the New Frontiers of Nutrition initiative convenes a diverse set of stakeholders to accelerate progress towards improved global nutrition, sustainable diets and greater human health resiliency.

Foreword

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Established by the World Economic Forum, Accenture and its partners, the New Frontiers of Nutrition initiative aims to advance human health through the power of nutrition and global food system transformation. This collaborative initiative is part of the Centre for Health and Healthcare's pillar focused on Improving Health and Well-being. It brings together public, private and community-based stakeholders to expand the **availability, access and adoption** of nutritious food choices.

Mission: Transform lives through the power of nutrition.

Vision: Make nutritious food choices widely available, accessible and adopted at scale. This positive societal shift will enable people to lead happier, healthier and more productive lives.

Goals: Support the transition to a pattern of global food consumption that promotes both environmental sustainability and the enduring health of the human population. This initiative focuses on identifying key pathways to significantly enhance the availability, access and adoption of nutritious food choices:

- Forge partnerships with industry leaders and research institutions to drive collective public-private action towards a sustainable and nutritious food system
- Identify principles and measurements to sustain long-term positive nutritional outcomes for consumers and the environment
- Make use of innovation and technology to make nutritious and healthier options the default for consumers
- Develop the case for alternative economic models across the food and health value chains
- Incentivize cultural diversity, recognizing and infusing a range of regional dietary practices and preferences into our overarching work.

This report, written in collaboration with Accenture, provides foundational guidance to activate all stakeholders in the existing and emerging food and health ecosystems, articulating key strategies that advance nutrition, strengthen the direct ties between food and health and align food system transformation with global sustainable development imperatives.

Amid the COVID-19 pandemic, the World Economic Forum established Industry Action Groups to identify focus areas to drive positive industry transformation as the world prepared to restart. For leaders in consumer industries, one of the top priorities was the pressing need to address the lack of systemic resilience in human health. Throughout the COVID-19 pandemic, it was clear that diseases such as obesity, hypertension and diabetes, among other diet-related chronic diseases, were significantly increasing the risk of hospitalization and death.

In response to the request from the Industry Action Group, the Future of Consumption Platform initiated a dialogue series on nutrition in 2021, formalizing a multistakeholder community committed to healthier and more sustainable diets. The New Frontiers of Nutrition initiative was formally launched in 2022 with the publication of its initial community paper. The initiative continues to collaborate with the Forum's Food Systems initiative. In early 2023, the New Frontiers of Nutrition's Expert Advisory Group and Steering Committee completed the Consultative Brief on Nutrition, aligning on key nutrition principles that guide this report.

In this report, the New Frontiers of Nutrition initiative and its partners have established foundational guidance to activate all stakeholders in the existing and emerging food and health ecosystems, articulating key strategies that advance nutrition, strengthen the direct ties between food and health, and align food system transformation with global sustainable development imperatives. It is our responsibility to change the present to guarantee a brighter future. We invite you to join this diverse set of stakeholders to accelerate progress towards improved global nutrition, sustainable diets, and greater human health resiliency.

Executive summary

Modern nutritional science began just over 100 years ago, with a focus on addressing specific deficiencies linked to diseases such as scurvy, rickets and pernicious anaemia.[13] While successful in its narrow scope, this single nutrient-focused approach does not address all aspects of human health. Based on scientific consensus, this report recommends increasing the availability, access and adoption of a diet characterized by the consumption of minimally processed, plant-forward, fibre- and bioactive-rich foods, while considering cultural characteristics. To achieve this, the New Frontiers of Nutrition initiative coordinates efforts across stakeholders globally to accelerate the broad adoption of nutritious food choices at scale by 2035.

Desired outcomes

- **Availability:** Incentivize producers, manufacturers and retailers to provide healthy and nutritious foods at scale
- **Access:** Develop systems to deliver healthy and nutritious foods to communities at an affordable and accessible price point
- **Adoption:** Support consumers by making nutritious choices the easiest, simplest and tastiest purchase

Creating a health-centred food system

After conducting primary and secondary research, the initiative and its stakeholders identified over 70 interventions, which were refined and grouped into five strategic levers. The paper concludes with two Action Platforms that frame the initiative's next phase of work. These areas were selected on the basis of their feasibility and impact, considering the strengths of the World Economic Forum and its partners. These interventions target industrialized food production at scale, focusing on players who unlock systemic change. Although some levers activate individual consumer choice, all players in the ecosystem, from food producers and manufacturers to distributors, retailers and regulators, must support and encourage a deliberate shift that enables people to make positive nutritional choices. Section 3 walks through the critical needs behind each lever, in addition to the largest barriers.

The strategic levers:

1. Grow and manufacture diverse, nutrient-dense food
2. Reformulate unhealthy processed food
3. Make nutritious food more affordable and accessible
4. Create a retail environment that makes nutritious choices the default
5. Amplify the consumer connection between food and health.

Action platforms for change

The New Frontiers of Nutrition initiative has subsequently aligned with key partners and community members to short-list two action platforms for public-private collaboration:

1. Portfolio Innovation and Measurement
2. Frontier Business Models

Progress against these focus areas will be tracked and reported in a future publication.

Introduction

New Frontiers of Nutrition unites experts and leaders to tackle key nutritional challenges and opportunities.

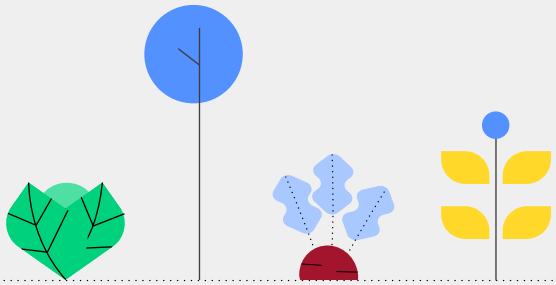
The New Frontiers of Nutrition began as a discussion series, bringing together industry experts, academics, policy-makers and food industry leaders to align on the greatest opportunities for and barriers to advancing better nutritional outcomes. The New Frontiers of Nutrition initiative assembled a foundational understanding of the case for change and developed a perspective on the dietary principles critical to improving human health and resiliency.

Section 2 outlines how current consumption habits are undermining global public health and climate resilience. Section 3 traces the evolution of nutritional science, concluding with an aligned perspective on how diet can support holistic human health. Section 4 details how the food system can enable all consumers to access diverse and nutritious food. More than 70 interventions were put forth by community stakeholders. Through three prioritization phases, these interventions were evaluated for feasibility and impact, resulting in the five strategic levers presented in this report. Finally, section 5 lays out two action platforms to mobilize future collaboration. In Portfolio Innovation and Measurement and Frontier Business Models, the Forum, this initiative's Steering Committee and its partners are strongest positioned to affect system change.

FIGURE 1 **The approach to date**

Vision

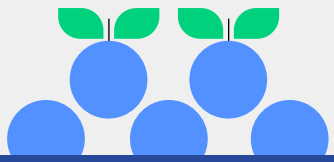
By 2035, nutritious food choices are widely available, accessible and adopted at scale. This positive societal shift is enabling people to lead happier, healthier and more productive lives.



Five strategic levers

To enact the Forum's vision and definition of quality nutrition for all stakeholders

Grow and manufacture diverse, nutrient-dense food	Reformulate unhealthy, processed food	Make nutritious food more affordable and accessible	Create a retail environment that makes nutritious choices the default	Amplify consumer connection between food and health



Two action platforms

The Forum recommends the two most impactful agendas for collaboration

Portfolio Innovation and Measurement	Frontier Business Models

1 The case for change

Hidden costs of food on health and the environment are more than double the cost of global food consumption.

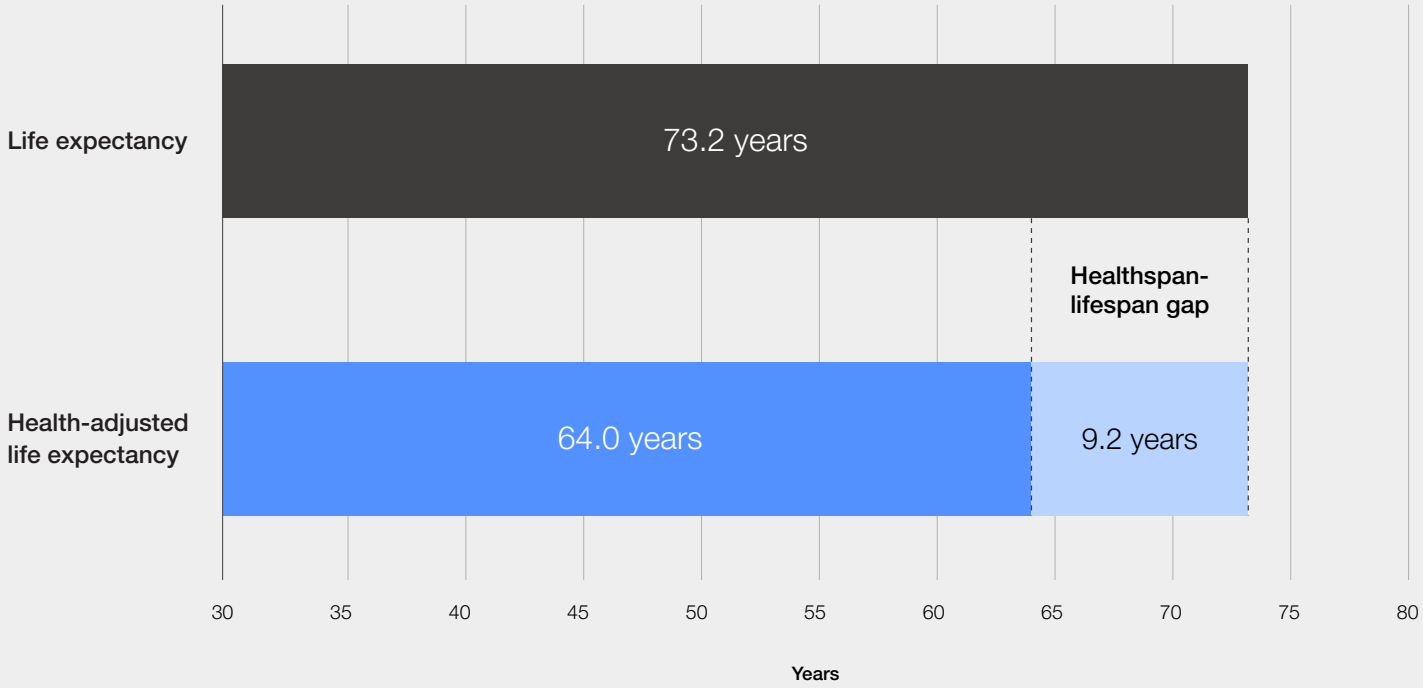
The need to transform global food systems – to make them economically viable, environmentally sustainable and nationally secure – is well understood. What has received less attention in recent discussions is the impact of the food system on human health. It took a pandemic to underscore the connection between nutrition and human resilience. Today, obesity and its associated chronic diseases have surpassed hunger as the leading cause of death, with poor diets as one of the highest contributing factors.[14] As it stands, the costs of poor nutrition, including economic, health and environmental impacts, are double the cost of global food consumption.[15] While many point to personal responsibility for dietary decisions, the global trajectory of diet-related diseases underscores an inequitable, unhealthy and unsustainable food system.

Diet is the single most important driver of health

In the 21st century, people are living longer but increasingly less healthy lives. Life expectancy globally has lengthened from 61 to 73 years;[16] however, the incidences of non-communicable diseases (NCDs) such as heart disease, diabetes and cancer have almost doubled over the last 30 years, with especially high growth in middle- and low-income countries.[17] Thus, while lifespan has increased, health span, or the length of a healthy life, has broadly deteriorated,[18] and nutrition is at the centre of this rapid fall.

Globally, conditions related to excess body weight now kill more people than hunger.[19] It's estimated that more than 39% of adults and 18% of children worldwide are overweight or obese.[20] Per a WHO report, obesity is directly linked to dietary patterns throughout the life cycle. Children are increasingly exposed to ultra-processed, energy-dense, nutrient-poor foods, which are cheap and readily available.[21] A host of modern practices including the increased availability of unhealthy foods as well as a general lack of awareness and limited nutrition education significantly increases the likelihood of a child struggling with obesity.[22]

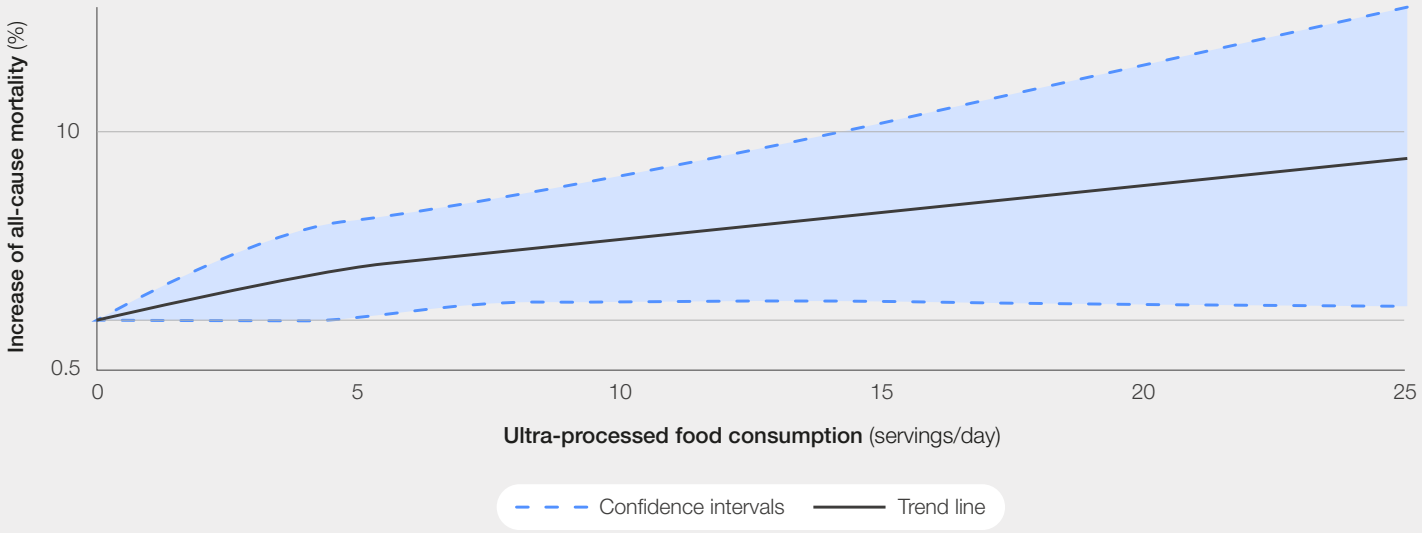
FIGURE 2 **Healthspan-lifespan gap**



Poor diet kills more people than COVID-19

About 17 million people are dying each year due to poor diets, more than double the total COVID-19 deaths since the beginning of the pandemic (7 million).[23] In fact, 78% of severe hospitalizations for COVID-19 are for individuals with diet-related NCDs such as obesity, type 2 diabetes and high blood pressure.[24] Globally, heart disease is now the leading cause of death, and rates have continued to increase in middle- and low-income countries despite overall mortality declines in high-income countries.[25] According to WHO, people with body mass indices (BMI) indicative of obesity account for 44% of diabetes cases, 23% of ischemic heart disease cases and 7% to 41% of various cancers.[26] Poor diet also contributes to dyslipidaemia (abnormally elevated cholesterol or fats in the blood), stroke, kidney disease, certain cancers and fatty liver, among other conditions.

FIGURE 3 | **Ultra-processed food consumption linked to mortality**

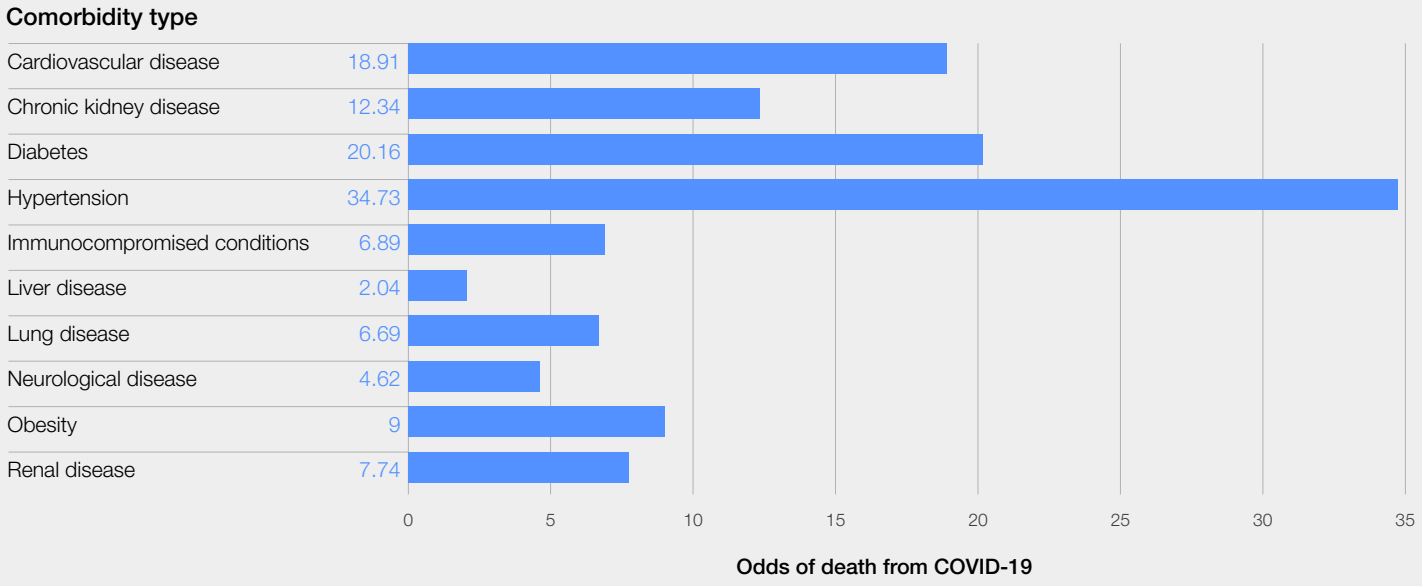


The "double burden" of malnutrition

While overall levels of poverty are declining, today, one in three people experience some form of malnutrition.[27] Though most indicators focus on undernutrition, malnutrition is also defined by a lack of vitamins, minerals, fibre and other key micronutrients. For example, a recent survey across 25 European countries found that more than 21% of the adult population lacked sufficient vitamin D, folic acid, calcium, selenium, iodine and vitamin C.[28] Additionally, between 11% and 20% of adults didn't consume enough copper and vitamin B12, which contribute to the health of the immune, nervous and cardiovascular systems and key metabolic processes, respectively.[29] In the United States, adults consume, on average, 50% less fibre than USDA recommendations.[30]

More than two billion people also experience a phenomenon known as "hidden hunger", a combination of multiple micronutrient deficiencies (particularly iron, zinc, iodine and vitamin A) and obesity.[31] Hidden hunger is a result of consuming an energy-dense but nutrient-poor diet, a condition which is particularly pronounced in low- and middle-income countries, where reliance on low-cost food staples remains high.[32] This results in a "double burden" of malnutrition, and governments must construct policy that simultaneously addresses obesity and related chronic diseases as well as stunting, wasting and undernutrition.[33] The same pattern is true for food production. Intensified agriculture is fit for short-term high yield and calorific value, yet the output carries few complex and diverse nutrients. The dwindling quantity and quality of nutrients in food communicates the soil's dwindling nutrient levels.

FIGURE 4 | **Diet-related NCDs related to COVID-19 deaths**



Diet affects the most vulnerable communities

In absolute numbers, more obese people live in low- and middle-income countries than in high-income countries.[34] In fact, 62% of the obese population now lives in the developing world.[35] The problem has become most acute in the developing nations of the Middle East and North Africa, where more than 58% of adult men and 65% of adult women are overweight or obese.[36] Within the developed world, obesity is most prevalent among low-income communities. The State of Obesity 2022 reported that Black and Latino populations have the highest rates of obesity in the United States, followed closely by rural communities.[37] Similarly, in 2022, more than 33% of adults who earned less than $15,000 per year were obese, compared with 25.4% who earned at least $50,000 per year.[38] In the communities least able to afford healthier diets, the long-term cost burdens remain the heaviest.

BOX 1 **Obesity stats**

30% of people are obese globally

62% of people with obesity live in developing countries

Diet-related NCDs could cost $47 trillion annually by 2030

Sources: WHO, Annual Reviews, Institute for Global Health Sciences

Physical health is mental health

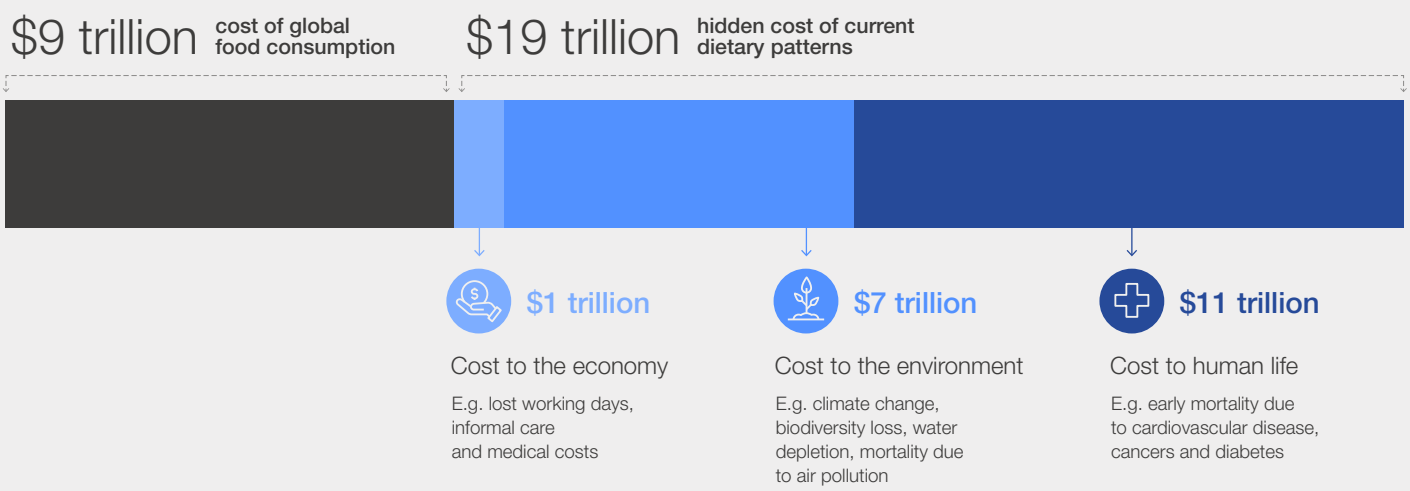
Poor nutrition is also linked with an increased risk of common mental health conditions. The field of nutritional psychiatry studies the numerous and complex physiological impacts of diet, such as inflammation, oxidative stress and mitochondrial dysfunction.[39] While still focused on pre-clinical studies, evidence is mounting that diets high in ultra-processed food consumption are linked to a higher risk of depression, among other mental health conditions.[40] Depression, by itself, costs the global economy an estimated $1 trillion per year in lost work productivity.[41]

Measuring the current and hidden costs of today's food

Globally, unhealthy diets result in decisive economic headwinds. Studies estimate that the annual cost of global food consumption is $9 trillion, while the hidden costs accrued from damage to human health, the environment and the economy are more than two times greater.[42] In Japan, almost 20% of indirect household emissions come from food consumption, as of 2015.

Treating an increased incidence of cardiovascular disease, cancer, diabetes and associated disorders, coupled with productivity costs from lost working days, totalled an estimated $12 trillion.[43] Another $7 trillion accrued from the worldwide environmental damages caused by producing food, including biodiversity loss and water depletion.[44] While governments struggle to fund public health agendas, national food systems are deepening the financial burden.

FIGURE 5 **Hidden costs of the global food system**



The current food system's hidden cost to human health, the economy and the environment

$19.8 trillion

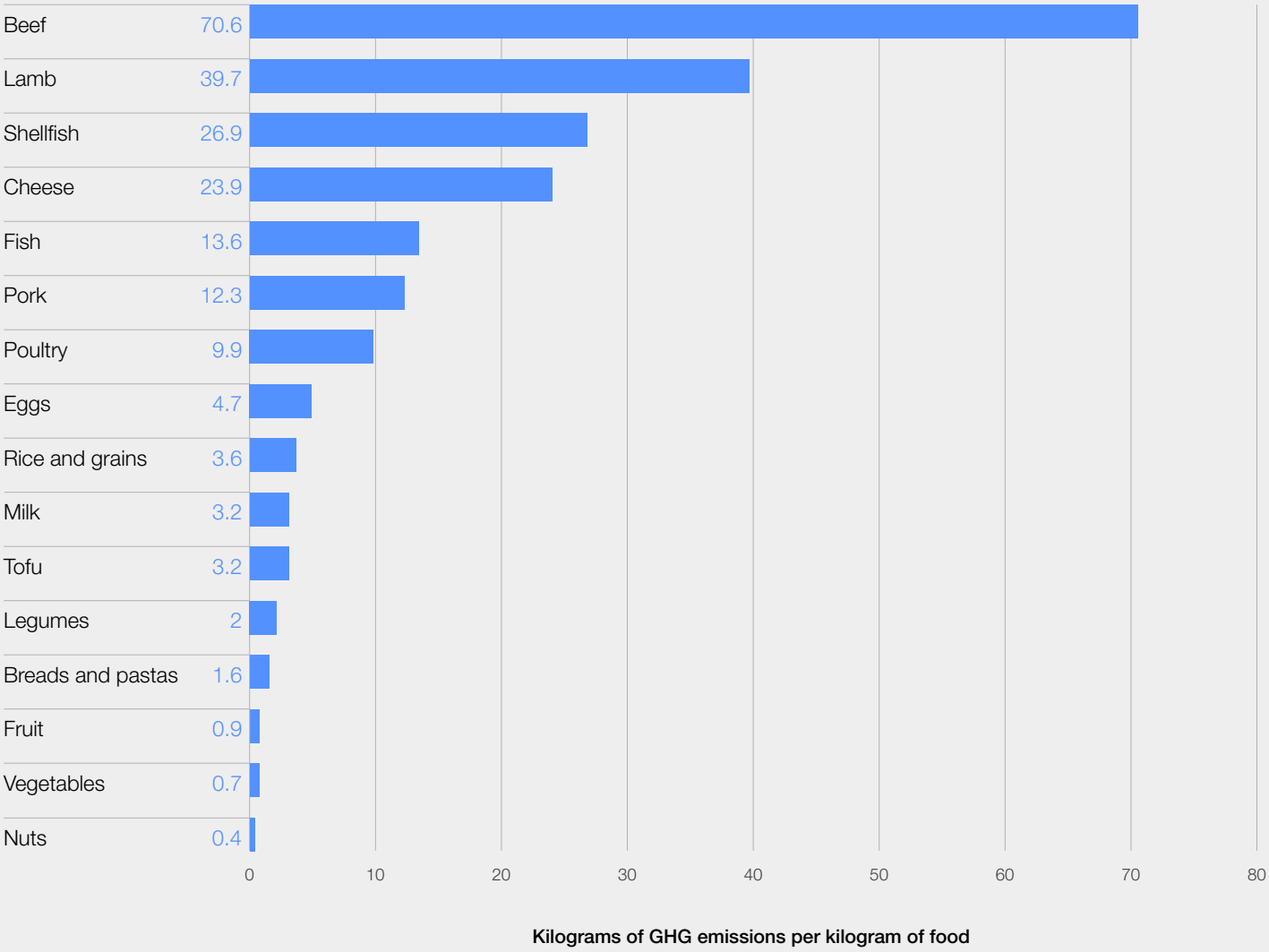
The food system and climate change

The current agricultural system relies on unsustainable production methods, prioritizing short-term extraction over the long-term destruction of the climate, biodiversity, water and soil. By maximizing the growth of limited, often resource-intensive crop varieties, agricultural communities actively degrade the very systems that could protect their future livelihoods. Through practices such as livestock farming and synthetic fertilizer use, the agricultural sector contributes to about 25% to 42% – or about a third – of all global greenhouse gas (GHG) emissions,[45] with cows and other ruminant animals contributing about half of these emissions.[46] The expansion of agricultural land is also a leading driver of deforestation, with more than 41 million trees cut down per day, resulting in the release of large amounts of carbon dioxide, a reduction of carbon sinks and the devastation of vital ecosystems.[47] Moreover, agricultural intensification and monoculture fields lead to biodiversity loss, affecting critical pollinators and disrupting broad ecosystem functions.

Conventional farming practices also compromise soil fertility and agricultural productivity, resulting in the loss of an estimated 12 million hectares of arable land per year.[48] While the loss of arable land can have negative impacts on food security, the loss of nutrient-rich topsoil, organic matter and soil micronutrients reduces the nutritional content of crops themselves, in addition to depleting resources for nearby ecosystems. Reliance on extensive irrigation puts stress on limited freshwater resources, with water scarcity representing one of the largest geopolitical threats of the 21st century and affecting 40% of the world's population.[49] Chemical inputs such as glyphosate and other chemical pesticides further strain freshwater resources and pollute aquatic ecosystems. The sector also generates significant biomaterial waste and emits air pollutants, impacting human and animal health. Addressing these challenges requires a shift towards sustainable agricultural practices, emphasizing regenerative agriculture, organic farming and improved land and water management to mitigate environmental and climate impacts while ensuring long-term food security and ecological resilience.

> Reliance on extensive irrigation puts stress on limited freshwater resources, with water scarcity representing one of the largest geopolitical threats of the 21st century.

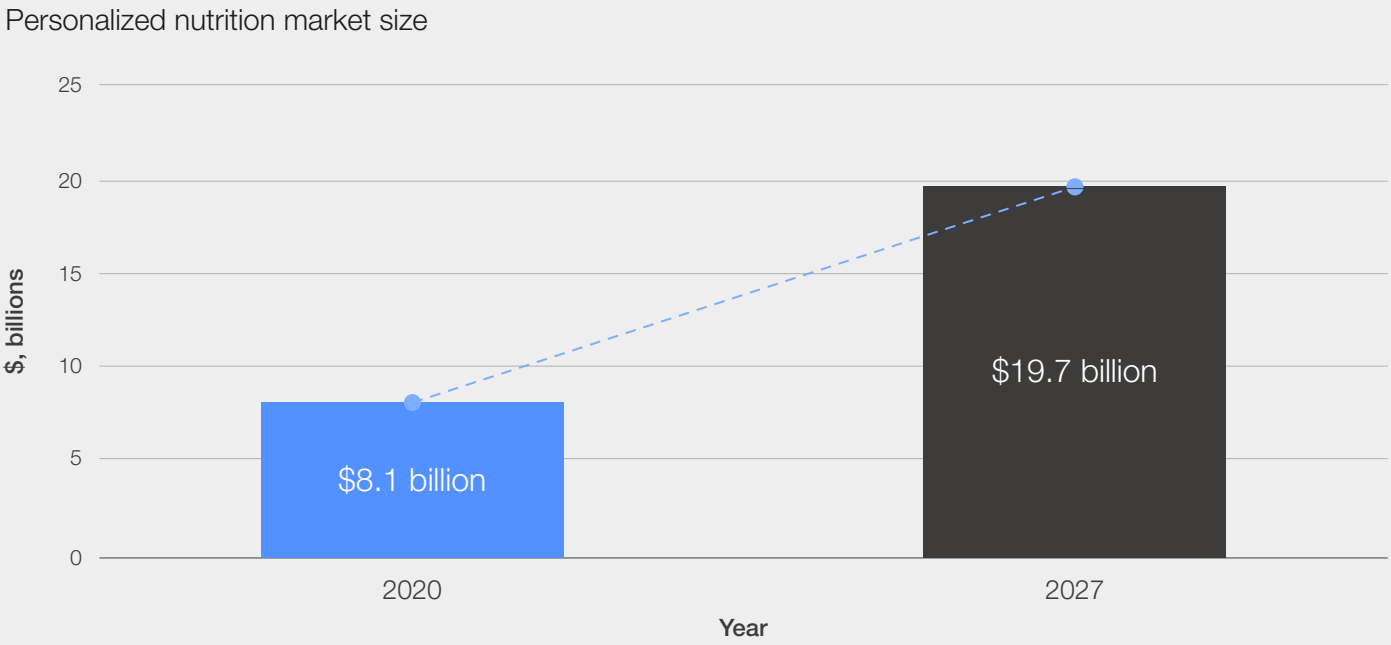
FIGURE 6 | **GHG emissions per kilogram of food**



Early indicators of progress

While changes in the global food system have been instrumental in reducing hunger, the global increase in diet-related chronic diseases is daunting. However, there are signs that change for the better is possible. Interest in health and wellness is on the rise, with the personalized nutrition market growing from $8.1 billion in 2020 to an expected $19.7 billion in 2027.[57] Companies are increasingly evaluating their operations and value chains to meet sustainability goals and move towards positive food systems transformation. In 2022, Unilever and Nestlé began reporting on the nutritional profiles of their portfolio, benchmarking their offerings to several national Nutrient Profile Models (NPM).[51,52] Retailers like Tesco are also making measurable commitments to increase their sales of nutritious food.[53] Consumer interest in physical and mental health has been steadily increasing and was further accelerated during COVID-19, with 62% of consumers describing health as a higher priority than before the pandemic.[54]

FIGURE 7 | **Graph of economic value creation, personalized nutrition**



Society faces a choice

While food and diet are typically characterized as consumer-driven choices, these issues represent interrelated, systemic challenges which society at large must change. The food system and all its players must evolve collectively to meet the needs of people and the planet. Inaction commits the global community to preventable death, disease, ecosystem destruction and the long-term effects of climate change. In the following sections, the New Frontiers of Nutrition community unites complex industry players in a health-centric food system. Foundational tenets of nutrition underpin a series of interventions, discussed in sections 2 and 3, aimed at accelerating the transition to a healthier, more equitable and resilient food system for all.

2 The foundations of good nutrition

It all starts in the soil: exploring nutrition, metabolic health and the gut-brain axis

Since its founding, nutritional science has historically focused on combatting nutrient deficiencies and diseases. However, the modern food landscape has given rise to more perilous consumption patterns, with a surge in diet-related chronic illnesses.[55] This section delves into the intricate systems that contribute to overall well-being, starting with metabolic health and the crucial role of nutrition in cellular processes. The interplay between gut health, brain function and the influence of nutrition on various bodily organs and systems is also explored. Recognizing the complexity of addressing nutritional needs across regions and cultures, this section goes beyond recommending specific foods and embraces healthy dietary principles that form a comprehensive framework for achieving better overall health.

2.1 History of nutritional science

A 2018 study found that the current assortment of foods sold in 230,000 different US grocery stores was 71% ultra-processed.

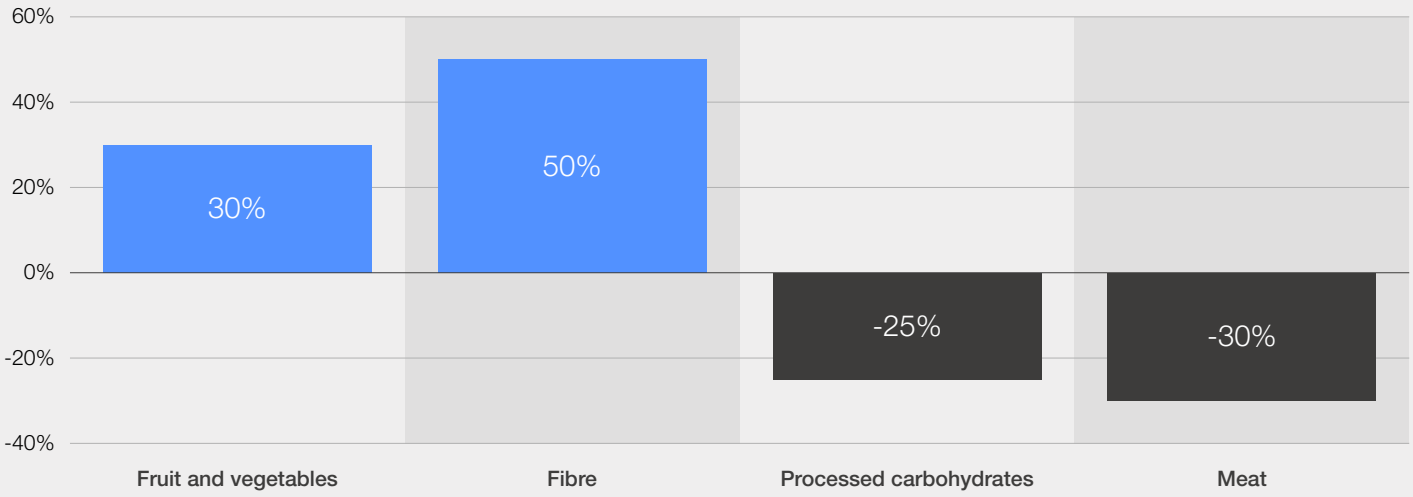
Modern nutritional science emerged out of a desire to prevent and treat serious illnesses and conditions. While various known deficiencies date back to the 17th century, in 1912 scientists isolated vitamin B1 (thiamine) from rice bran to cure beriberi, one of the first treatments for a specific nutrient deficiency.[56] Other vitamin and mineral discoveries followed, combatting diseases such as scurvy, rickets and pernicious anaemia. In response, the emerging food processing industry of the 20th century began fortifying products with some of these key vitamins and minerals.[57] Food scientists developed more nutrient-dense infant formulas, having recently isolated protein as a promoter of plant, animal and human growth.[58] Protein-energy malnutrition, such as kwashiorkor and marasmus, was targeted and treated by supplementation schemes throughout the developing world.[59]

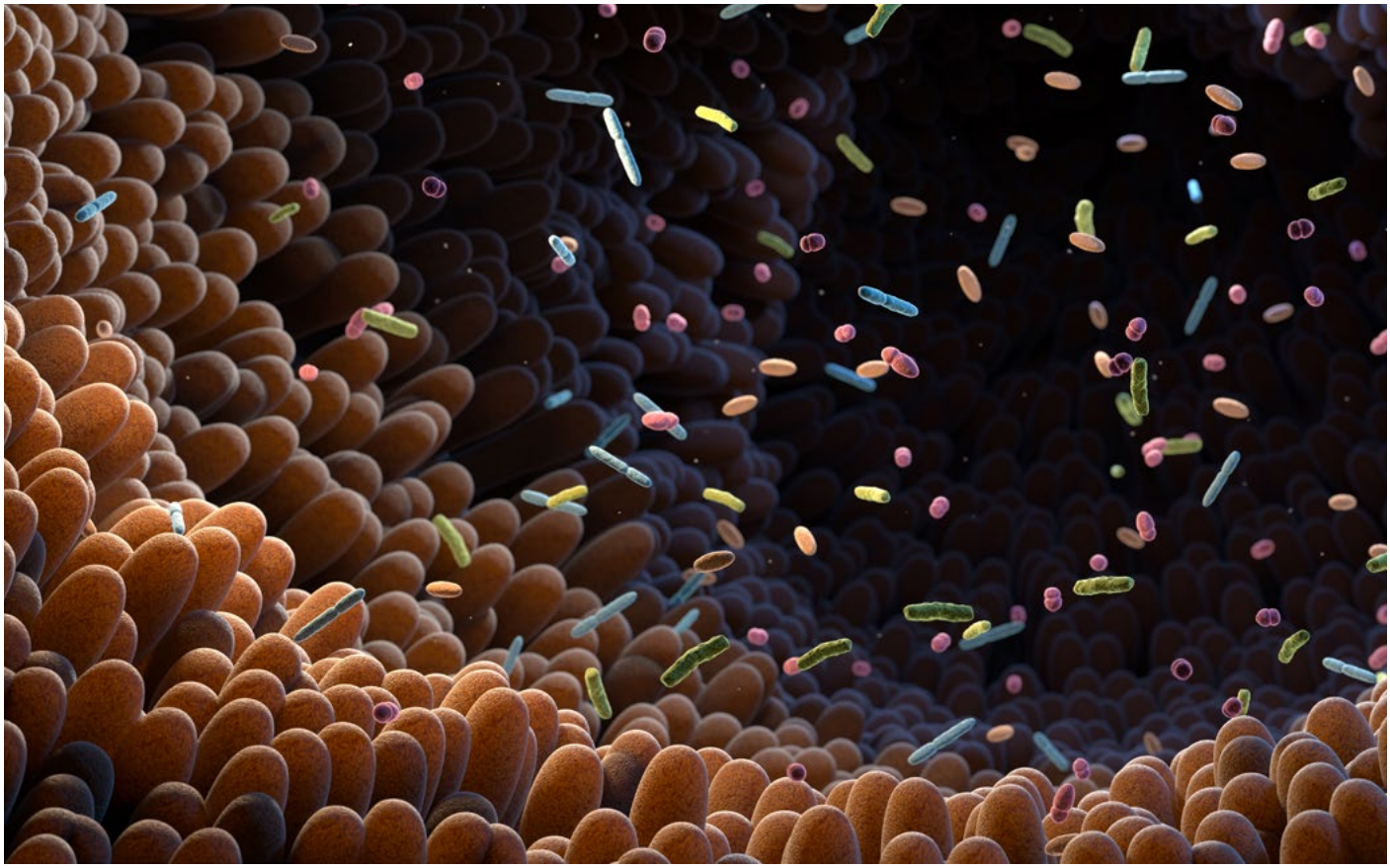
Specific nutrient-based approaches have since dominated dietary research, guidelines and food policy. Significant food system changes in the latter half of the 20th century, however, exposed gaps in this approach. Following World War II, increased production and consumption of mass-produced, highly processed foods created a more complex and hazardous food landscape.[60] This was accompanied by lifestyle changes facilitated by "activity-saving technologies", thereby accelerating a sharp rise in diet-related chronic disorders and diseases.[61]

In response to consumer concerns and policy recommendations, food corporations reformulated many of their products to reduce caloric content, total fat, saturated fat or sugar. However, in many cases, these changes did not meaningfully improve the overall nutritional quality of those products. In fact, a 2018 study found that the current assortment of foods sold in 230,000 different US grocery stores was 71% ultra-processed.[62] In order to improve existing food offerings, the following section outlines the leading perspectives on nutrition today, with a particular focus on holistic health indicators.

FIGURE 8 **Net percentage changes required to Western diets**

Necessary changes to the Western diet to meet health, climate and nature commitments





2.2 Nutritional science today

The metabolic system

Metabolic health provides a useful starting point in understanding food's impact on whole-body health. Metabolic health refers to the proper functioning of the body's metabolic processes, which convert food into energy to run cellular processes essential to the proper functioning of the human body.[63]

These processes begin with digestion in the gut, where the body converts foods into usable components and waste. Ultimately, the chemical processes to generate energy from glucose occur within mitochondria, microscopic energy-burning "factories" inside each cell.[64] Poor nutrition can damage cells and disturb these conversions, resulting in infection, disease, inflammation, cellular stress and toxins being present in the body.[65]

Good metabolic health can be characterized by different biomarkers. For example, tests would indicate proper insulin release and response, which regulates the body's ability to process glucose, protein and fatty acids. The absence of visceral (intra-abdominal and intra-organ) fat, normal blood pressure, normal levels of blood lipids and lipoproteins, low levels of systemic inflammation and low levels of vascular plaque also point to well-functioning metabolic systems.[66] Conversely, individuals who are metabolically unhealthy often have multiple abnormalities of these pathways. In some cases, an individual might be said to have "metabolic syndrome", a condition determined by having three or more of the following risk factors: abdominal obesity, hypertension, impaired fasting glucose, high triglyceride levels and low HDL cholesterol.[67] While genetics predict baseline risk in many of these conditions, they remain highly correlated with poor diet, among other lifestyle factors.

The gut

Nutrition is crucial not just for gut health, but also through the gut's profound impact on the rest of the body. The gut represents one of the body's largest contact areas with the outside world.[68] Gut health plays a crucial role in promoting effective digestion and absorption of food, water, vitamins, minerals and bioactive compounds.[69] Furthermore, the gut microbiota – trillions of symbiotic microorganisms that live within our digestive tract – have multiple effects on neuro-endocrine systems, which regulate hormones, nutrient absorption, stress response, anxiety, the immune system and memory function.[70] Many individuals with chronic inflammatory conditions are more susceptible to other diseases and bacterial infections,[71] and the antibiotics used for treatment can further damage gut microbiota and thus exacerbate diet-related chronic diseases.[72]

> The diversity and composition of an individual's gut microbiota impacts brain chemistry and, thus, every system in the body, making it a key research focus to drive holistic health outcomes.

The gut-brain axis

The link between nutrition and brain function also remains critical to healthy development and cognition. The brain only weighs about three pounds, but it accounts for about 20% of the body's total daily energy usage.[73] Besides emotional and intellectual processing, the brain controls a complex interplay of signals to regulate health. This "gut-brain axis" has far-reaching effects across all bodily systems.[74]

Furthermore, the gut itself can significantly influence brain and mental health. Indeed, a large body of evidence now implicates the gut in modulating cognitive function and neuropsychiatric disorders.[75] Many researchers believe that the gut-brain axis could inform new food-as-medicine interventions for many types of mental and physical illnesses across the lifecycle. The diversity and composition of an individual's gut microbiota impacts brain chemistry and, thus, every system in the body, making it a key research focus to drive holistic health outcomes.

The soil-gut connection

Soil is a major inoculant and provider of beneficial gut microorganisms. There are noted functional similarities between the soil rhizosphere and the human intestine. In fact, soil and the human gut contain approximately the same number of active microorganisms. However, urbanized societies have seen a large reduction in contact with soil, and communities worldwide have experienced a concomitant drop in gut microbiome diversity. The combination of convenience lifestyles, modern agricultural practices (including monocropping and increased use of pesticides) and poor diets has led to a gut microbiome that is only 10% as diverse as soil.[76] The long-term vitality of plants, animals and people depends on the presence and diversity of microorganisms, and one of its primary sources is directly through soil.

2.3 A diet that meets the needs of human health

To maintain the health of all bodily systems, humans need to consume a diet of diverse, minimally processed, nutrient-rich whole foods.[77] This diet should connect to traditional foodways, with cuisines based on powerful cultural foundations. The best available research indicates that it is the diversity of fresh foods (as opposed to a specific basket of products) that promotes healthier and longer lives, and diets that emphasize locally available and familiar ingredients are more likely to be adopted.[78] Though consumers play a role in making food choices, the burden is on the food system and all its component players to enable all people to achieve a diverse and nutritious diet.

The following section discusses the changes this transformation entails and the most powerful levers for the food system to succeed.

3 Cultivating a healthy and sustainable food system

Every player in the value chain can support food system transformation, but critical barriers still hinder positive change.

Five strategic levers of food system transformation

When human and planetary health are the foundation of the entire ecosystem of food production, every stakeholder, from producers and manufacturers to retailers, communities, governments and consumers, has a role to play. Figure 9 below depicts a food future that is resilient, self-reliant and sustainable. This north star represents the ideal food system, which sustains people and the environment in balance. The following sections outline five strategic levers for change, detailing the extensive structural barriers to progress, in addition to critical actions needed for system-scale transformation. While the challenges described are as multifaceted as their solutions, this report focuses on collective problems requiring cross-industry collaboration. The strategies identified thus skew heavily towards industrialized food production, targeting players that can scale systemic change.

FIGURE 9 **Cultivating a healthy and sustainable food system**

3.1 Grow and manufacture diverse, nutrient-dense food

Critical need

Monoculture crops currently dominate modern food production. Of the more than 7,000 edible plant species, four crops, including corn, wheat, soybeans and rice, provide over half of all calories consumed worldwide.[79] While high-yield agriculture has greatly reduced global hunger, at least half of all children under five years old experience micronutrient deficiencies, such as inadequate vitamins, minerals and fibre.[80] Though fortification schemes have reduced micronutrient insecurity, other absent bioactive chemicals in unprocessed foods have a significant impact on microbiome health, immune system health and nutrient absorption.[81]

Monocropping also undermines farmers' future livelihoods through long-term soil degradation.[82] Intensive agricultural practices can significantly reduce topsoil fertility, organic material and soil micronutrients, which in turn reduces the nutritional value of crops grown.[83] Through a combination of agriculture, pollution and climate change, arable land has decreased by 33% in the last 40 years.[84] Growing singular, unrotated crops also increases the risk of blight and pest damage. Between 2015 and 2022, agricultural risk insurance in the United States nearly doubled from $6 billion to $12 billion, and in 2030, global expenditures are expected to triple, costing $1.7 trillion.[85] Soil degradation and associated insurance costs will only increase with further changes to climate.[86] These costs do not account for critical losses in biodiversity and the destruction of delicate ecosystems, keeping much of the world's carbon in check.

While financial risk can motivate farmers to diversify their planting strategies, only broad international collaboration will enable regenerative agricultural practices at scale. Private and public organizations must incentivize diverse food production that prioritizes human health and ecosystem resilience, all while stabilizing food security.

Critical barriers

Tariffs and subsidies make unhealthy food artificially affordable and highly profitable

Existing crop subsidies often prioritize commodity crops over healthier alternatives. Today, 94% of US subsidies go to six crops (corn, wheat, soy, cotton, rice and peanuts).[87] According to the UN, 87% of annual global subsidies ($470 billion) create price distortions for consumers, in addition to causing environmental and socially harmful practices.[88] Tariffs supporting domestic production or export expansion can also significantly distort the cost of food for citizens. Although these strategies support economic stability, they often render imported healthy products unaffordable.

❝ Policy-makers can balance the over-subsidization of staple crops by introducing incentives for a diverse range of products, achieving both food and nutrition security.

Industrial monocropping dominates existing farming technology across the value chain

Industrial farming infrastructure, from combine harvesters and storage facilities to distribution networks and processing machinery, is heavily optimized for existing high-yield commodity crops. For farmers to profitably grow diverse foods, significant investment in transport and manufacturing infrastructure is required, in addition to technological innovation to reach a profitable scale.

Restorative agriculture has high upfront costs and a slow return on investment

Farmers need to make significant upfront investments in equipment and education to scale more diverse crop production. While access to financing such as grants and low-interest loans can smooth the transition, farmers may hesitate to invest in practices with a slow return on investment, especially if they face short-term financial pressures to remain solvent.

Critical actions

Incentivize sustainable and healthy agriculture

Policy-makers can balance the over-subsidization of staple crops by introducing incentives for a diverse range of products, including fruits and vegetables, thereby achieving both food and nutrition security. This could include price minimums for healthier foods, extended governmental and institutional procurement, preferential import/export taxation and status, and graduated subsidies that reward more diverse portfolios and better soil maintenance and ecosystem conservation.

Unify and adopt international regulatory standards

Regulatory standards remain a key enabler of food system transformation. As food producers adopt new production strategies such as controlled environment agriculture, their work becomes more capital intensive. This change necessitates a shift in regulatory policy, including tariffs on imported machinery, food safety assessment standards and building permitting. For example, although the Dutch have developed some of the most advanced greenhouse technology in the world,[89] few countries can put them to use because of high import tariffs, undeveloped building codes and mismatched energy regulations. By borrowing from the most advanced regulatory standards, national governments can leapfrog many stages of the traditional regulatory development process.

Develop blended finance instruments for agricultural innovation

Farmers beginning their restorative agricultural transition require increased capital to purchase new equipment, bridge seasonal cash flows and shift their crop strategy. Blended finance methods encourage private lenders to invest in high-impact projects backed by public entities and philanthropic organizations. These tiered capital structures mitigate risk, adding additional leverage through grants or other public financing vehicles.

3.2 Reformulate unhealthy processed food

Critical need

Processed foods are cheap and shelf-stable, providing an affordable and secure source of calories. However, many food products contain excess amounts of sugar, salt and fat, and they lack vitamins, minerals, fibre or nutrients necessary for human health. As they provide essential calories for the world's most vulnerable populations, these foods stabilize the global food system. However, excessive consumption of processed foods is also directly correlated to increased rates of diabetes and heart disease, which pose lifelong risks to low-income communities.[90] These foods are also often less sustainable, reliant on mass-produced monocrop, using fertilizers and chemical pesticides, or contain ingredients sourced from every corner of the world. The global food industry must now match its mastery of scale with the development of nutritious formulations.

Food processing exists on a spectrum from minimally processed products such as hummus or olive oil to ultra-processed foods such as packaged cookies and cakes. Ultra-processed foods represent over 50% of calories consumed in developed countries, while they constitute roughly 40% of calories consumed globally.[91] As recommended by the New Frontiers for Nutrition Steering Committee, efforts should target the most widely consumed products to have the biggest impact. Companies may create completely new products, reformulate existing offerings, or improve the stability of non-processed foods (e.g. dried, packaged apple slices). Leading manufacturers can also source ingredients that are organic, grown regeneratively and carbon-positive, matching gains in human health with environmental remediation.

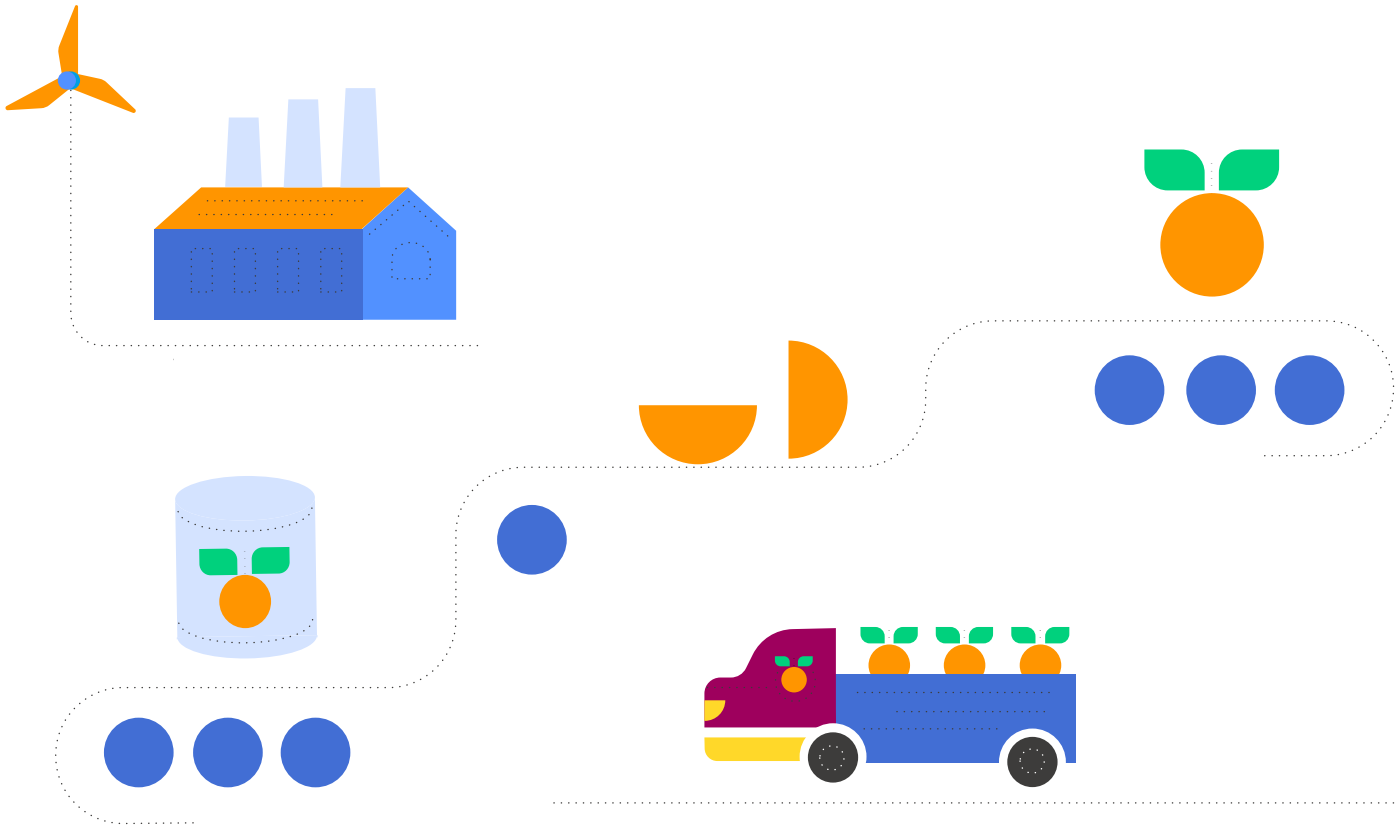
Critical barriers

Cost and convenience are primary concerns for consumers

For most consumers, convenience is their top value in shopping (95%), with cost ranking second in importance (75%).[92] Processed foods are often significantly cheaper, more readily available and faster to prepare and consume than their whole-food alternatives. Healthy and sustainable food options cannot compete if they remain more time-intensive and out of budget for most consumers.

Shelf life and food safety considerations are paramount

Processed foods are inherently more shelf stable and microbiologically safe than whole foods by design. Equally, developing healthy processed foods that maintain shelf life and food safety standards can present significant technical and formulation challenges. Many existing technologies have been heavily optimized to create unhealthy, low-cost, highly palatable processed foods. Thus, research and innovation investments have not yet progressed to sufficient maturity to level the playing field for new food products and market players.



Food manufacturers risk unilateral action

With profit margins low across most consumer-packaged goods, manufacturers avoid product reformulations that could be costly to implement, jeopardizing razor-thin customer loyalty or market standing. Many portfolio managers have experienced customer loss to only a minor reformulation and thus remain unlikely to sidestep competitors without broader industry or regulatory support.

Critical actions

Support portfolio evolution through public-private research initiatives

Collaborative research efforts between public institutions, industry stakeholders and academic institutions can accelerate innovation in food processing, with a particular focus on ingredient sourcing, low-carbon formulations and developments in biotechnology and precision fermentation. By spreading the risk of failure and easing potential regulatory support, these initiatives incentivize pre-competitive partnerships, in addition to redirecting venture and private capital.

Make healthy processing standards the default

Industry players need to standardize the measurement of nutritional outcomes across products and portfolios to increase accountability. Unified metrics provide a clearer benchmark of current offerings' scientific nutritional value, in addition to helping investors evaluate the potential risk or exposure as the societal need for more nutritious food continues to increase. For instance, the UK's HFSS regulation (high in fat, salt, or sugar) will shed light on the impact of such regulations on product portfolios and public health.[93] Governments can also ban the use of unhealthy, synthetic ingredients or those known to cause significant environmental destruction.

Create unified, transparent and simplified nutritional labelling

Standardized front-of-package labelling systems, such as traffic light labels or nutrient scoring systems, can highlight key nutrients such as sugar, fat and salt, allowing consumers to quickly compare options and make informed decisions. To disincentivize unhealthy formulations, regulators can expand transparent labelling requirements for specific additives and preservatives while enforcing strict definitions for terms such as "natural", "multi-grain", "low-fat" and "real fruit". These labels should also incorporate product sustainability, and digital technologies such as blockchain, smartphone apps or QR codes can improve ingredient traceability and the scan-ability of detailed information.

3.3 Make nutritious food more affordable and accessible

Critical need

Globally, 381 million people cannot afford the most basic energy-sufficient diet,[94] while approximately 3.14 billion people (42% of the global population) could not afford a healthy diet in 2021.[95] In the lowest-income countries, healthy diets are out of reach for as much as 90% of the population.[96] Within the developed world, healthy food costs, on average, $1.50 more per person per day, or about $550 a year ($2,200 for a family of four).[97] In the UK, healthier foods are nearly three times more expensive calorie for calorie than less healthy foods.[98] By contrast, low-income households in the US spend less than one-third of high-income households each year. Families cannot afford the higher costs, and food represents a disproportionate share (36%) of their disposable income.[99] With neither the time nor money to spend purchasing and preparing healthy food, low-income families are often left with the cheapest, most convenient and most unhealthy option.

Access to affordable, nutritious, sustainable, local and seasonal food is a fundamental determinant of public health and plays a pivotal role in preventing diet-related diseases. In fact, communities that do not have access to affordable, healthy food options are significantly more likely to suffer from NCDs such as cardiovascular disease, obesity and micronutrient deficiencies, disparities which they have fewer resources to treat.[100] Addressing key barriers to affordability can aid in reducing poverty and malnutrition within the most vulnerable communities while also strengthening society's overall resilience to a number of infectious diseases, including COVID-19.

> Communities that do not have access to affordable, healthy food options are significantly more likely to suffer from NCDs such as cardiovascular disease, obesity and micronutrient deficiencies.

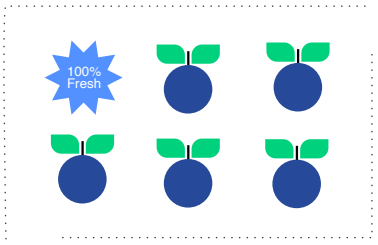
Critical barriers

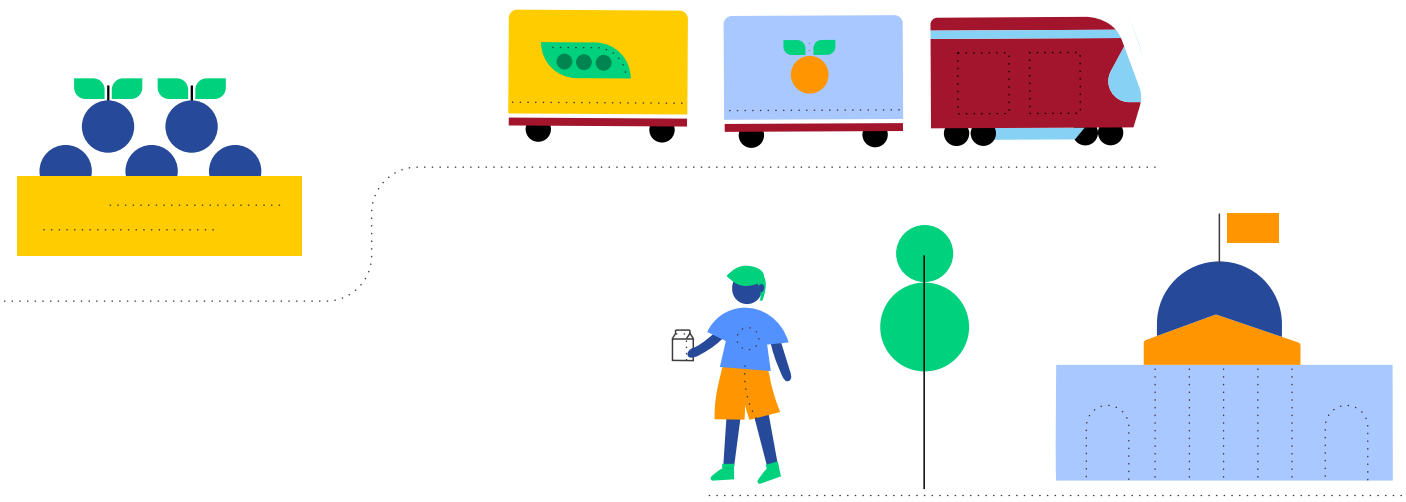
Unhealthy food is artificially inexpensive

The lack of incentives for healthy products and the subsidization of unhealthy staples contribute to higher prices for healthy food options. While artificially reducing certain food costs, these imbalances also cheapen manufacturers' use of unhealthy ingredients such as corn syrup and palm oil in food products. Additionally, the negative environmental impacts of large-scale agriculture, including greenhouse gas emissions and soil degradation, are not reflected in current prices, distorting the true cost of food in the future.

Small-scale production results in fewer economies of scale

Smaller-scale production and distribution can result in higher costs due to limited economies of scale. Compared to larger-scale operations with optimized value chains, healthier foods can remain prohibitively expensive. Moreover, a lack of collective incentives and bargaining power among small-scale farmers and producers can further hinder the affordability and accessibility of nutritious foods. These individuals often face challenges in negotiating favourable contracts or accessing distribution networks, making it difficult for them to compete with larger players in the market.





Healthy food is more susceptible to waste and spoilage

Unprocessed and whole foods have higher spoilage rates from field to home, driving up costs in storage, distribution and retail. According to the Food and Agriculture Organization (FAO), around one-third of all food produced for human consumption is lost or wasted globally.[101] The costs associated with transporting and distributing healthy food can also be higher than processed and unhealthy alternatives. For example, transporting healthy, perishable products in a temperature-controlled truck can cost almost 40% more than transporting a shelf-stable, processed product.[102]

Critical actions

Lower the price burden for consumers

Governments can subsidize healthy, biodiverse crops or tax them at the point of sale to incentivize healthier food choices. Taxation can be applied to organizations that produce unhealthy products (as is currently done with alcohol and cigarettes in many countries), levying the true costs of their products for downstream health systems. For example, in 2014, the Navajo Nation passed a 2% tax on unhealthy food and used the revenue to fund community-directed health initiatives.[103]

Create collective investment through cooperatives and trade groups

Grower-led cooperatives and trade groups can significantly spread the costs of smaller-scale farming through collaboration across purchasing, processing, distribution and marketing. Local food hubs can also manage the aggregation, distribution and advertisement of source-identified food products, making it easier for farmers to offer their products to wholesale customers.[104] Often, cost reductions pass from producer to distributor and retailer, finally reaching end consumers.

Invest in agri-tech solutions

Investing in agricultural technology solutions such as precision farming, controlled environment agriculture, automated irrigation systems, robotic harvesters and smart logistics can increase productivity, reduce waste and enhance the nutritional quality of crops grown closer to communities.[105] With higher guaranteed yields and lower distribution costs, healthy food can become affordable in communities traditionally underserved by retail.

3.4 Create a retail environment that makes nutritious choices the default

Critical need

On the other side of affordability, research shows that food context, where food is available, who can access food and consumer messaging around food, strongly predicts consumer purchasing patterns. Globally, low-income communities struggle with variations on a similar theme – healthy food is inaccessible and underrepresented in local stores. Concepts of nutritional access remain significantly more studied in Anglophone countries. In the United Kingdom, an estimated 1.2 million people live in a food desert, defined as a lack of healthy food within a transit-oriented geographic area.[106] This disproportionally affects poor, elderly and disabled people, as they cannot afford or are physically unable to travel to larger supermarkets.[107] In the United States, 12.8% of the population (nearly 39.5 million people) live in both low-income and low-food access neighbourhoods.[108]

Though there are flaws in the current methodology, including accounting for how (preferred store, online) and where (close to work, near family) low-income residents prefer to buy food, what is clear is that many communities experience an overrepresentation of highly processed and fast-food options, living in what is called a "food swamp". The growth of packaged foods is five times higher in lower- and middle-income countries compared to developed countries.[109] In fact, the growth of unhealthy food consumption (110%) and soft drinks (70%) between 2007 and 2012 was highest in India.[110] In recent research conducted in Mexico City, the results indicate that excessive access and exposure to unhealthy foods may be a greater concern than food deserts in obesity prevention initiatives.[111] Indeed, the American Heart Association found that the presence of a food swamp is a stronger predictor of obesity rates than the absence of full-service grocery stores.[112] By reimagining food distribution and retail, communities can increasingly access convenient, healthy food, forming long-term habits based on newly designed purchasing environments.

Critical barriers

Grocery stores have low market incentives for low-income communities

Most grocery stores that offer healthy, fresh produce have a profit margin of only around 1-3%, leaving a small spread between profitability and loss.[113] Considering the lower demand (or perception of lower demand) in low-income communities, larger stores often move to areas already better served by retail and transit. Furthermore, many zoning restrictions affect the establishment of grocery stores or fresh food retailers, particularly in underserved neighbourhoods.

Healthy options can be inconvenient

The relative inconvenience of healthy, seasonal, sustainable options can discourage consumers from choosing nutritious alternatives, especially in today's fast-paced life. Whole foods often require more preparation time relative to packaged foods and may need refrigeration or cooking that is unavailable in offices or homes. This barrier is deepened when individuals possess limited culinary skills or have become distanced from traditional food preparation methods.

Studies have shown that school gardening increases children's knowledge of edible plants and sets them up with a life-long preference for vegetables.

Retailers optimize for what sells, not what is healthiest

Limited shelf space allocated to healthy foods in grocery stores hinders their visibility and availability. Retailers prioritize products with higher profit margins or stronger consumer demand, resulting in less prominent placement for nutritious options. Additionally, slotting fees or other types of pay-to-play systems can inhibit the sale of small-scale, local and sustainable players.[114] Without obvious marketing or in-store nutritional information, healthy products remain unsold and often contribute to higher wastage costs, given their perishability.

Critical actions

Develop more convenient healthy food channels

New retail food channels such as digital ordering platforms and micro delivery can provide convenient and accessible avenues for consumers to access nutritious groceries. With greater personalization and potential for educational engagement, e-retail can provide a faster and more health-curated consumer journey. Food producers can offer more ready-to-eat meals, snacks and on-the-go options that provide both convenience and nutritional value.

Reimagine retail layouts

In partnership with food distributors and producers, retail grocers can reimagine their retail layouts and product mix in favour of sustainable and health-promoting foods. Consumer behavioural science suggests that placing healthy food in high-traffic areas could change purchasing patterns. According to a 2021 University of Southampton study, strategically positioning water at check-outs and fruits and vegetables at store entrances led to an additional sale of 10,000 servings of produce, with a decreased sale of 1,500 servings of non-health-promoting foods per store per week.[115] Selling a wider variety of fruits and vegetables may also create a positive feedback loop, resulting in better economies of scale, less spoilage, more crop diversity and thus a healthier and more sustainable product mix. Grocers such as Kroger are deploying digital nutrition applications as well as dietitians in-store to teach food preparation and storage techniques, which have resulted in healthier and more sustainable food choices in addition to increased customer trips and store loyalty.[116]

Use institutional procurement to drive demand

Public-facing institutions such as hospitals, schools, military bases, prisons and even corporate catering can significantly drive market demand for healthy food by their collective purchasing power. While institutions such as schools and hospitals have added educational capabilities, the sheer scale of many institutions can shape ingredient and supplier specifications, significantly shifting industry priorities or cost per item. Furthermore, these institutions are potentially critical sites for food growth and distribution given their campus, such as real estate. For example, studies have shown that school gardening increases children's knowledge of edible plants and sets them up with a life-long preference for vegetables.[117] Additionally, prisons that offer more nutritious meals have seen up to a 30% reduction in inmate violence.[118]

3.5 Amplify consumer connection between food and health

Critical need

Diet is often framed as being highly individualized, as the responsibility of those making a personal choice. This perspective largely ignores the exogenous factors that shape the availability of choice, including access, information transparency and social cues. According to the WHO, between 50% and 90% of food marketing promotes unhealthy dietary practices.[119] Children are particularly susceptible to traditional marketing through special campaigns, including competitions, collectables, celebrity endorsers and cartoon characters.[120] Habits formed from a young age are often sticky and hard to change, resulting in lifelong unhealthy patterns. What's more, large food and beverage companies are increasingly targeting the marketing of unhealthy aspirational products towards low-income consumers.[121]

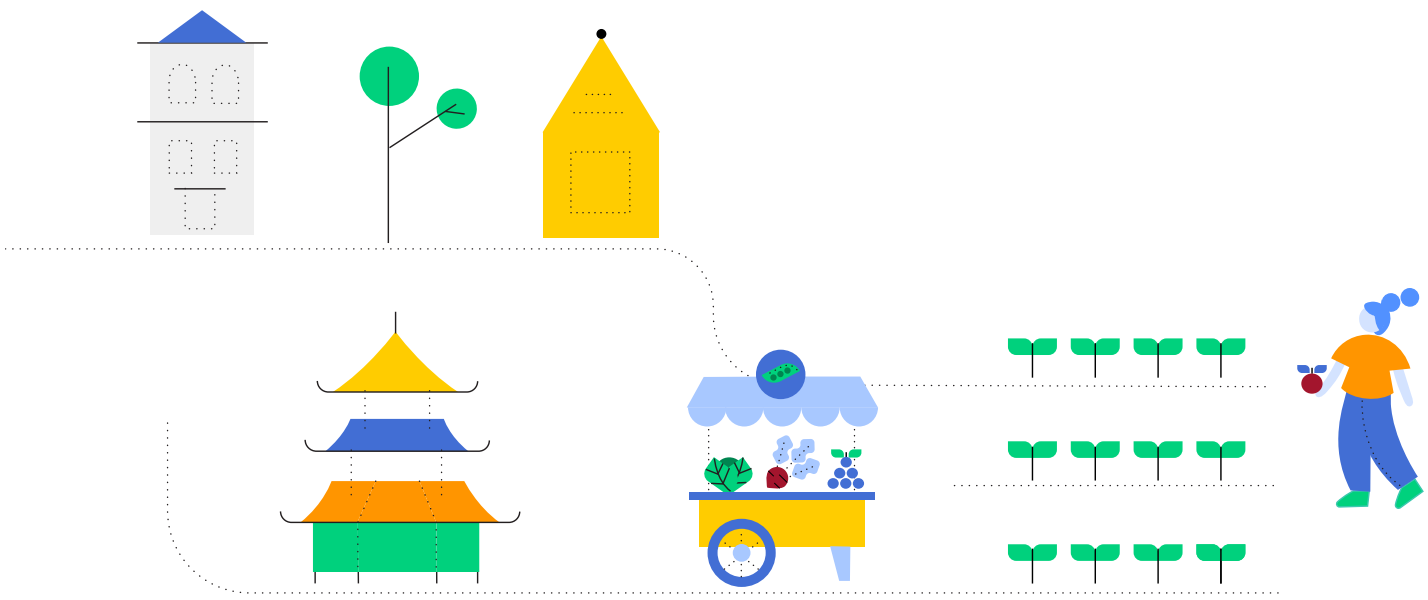
For many consumers, front-of-packaging labelling is confusing, with claims that distract from a product's less healthful qualities. Although 60% of US consumers stated that they wanted to eat healthier, only 9% of survey respondents accurately identified the healthy option among a group of products.[122] In fact, 13% selected the least healthy option, largely being swayed by labels such as "contains whole grains", "naturally flavoured", or "100 calories".[123]

People's food choices are also highly dependent on social norms and various familial and cultural factors. In fact, several studies have shown that over 60% of people are significantly influenced by peers in choosing what to eat, including coworkers, friends and family. Only 16% of people remain steadfast in their own dietary choices.[124] Other studies have shown new influences, with significant impacts of social media on dietary choices, especially among children and adolescents.[125] This translates directly into health outcomes, as a person's chance of becoming obese increased by 57% if a friend became obese, by 40% if a sibling became obese and by 37% if a spouse became obese.[126] While clinicians often recommend behaviour modifications (e.g. "reduce the amount of saturated fat"), psychologist Daniel Kahneman recommends "automatic" or "system 1" interventions that incorporate environmental or contextual cues to create long-term, routinized behaviour change (e.g. how people naturally put their seatbelt on without thinking when getting into a car).[127] To support consumers in making healthy personal dietary choices, interventions must support people to build new habits within their already contextualized daily lives.

Critical barriers

Consumer information is conflicting and untrustworthy

The aggressive marketing and advertising of unhealthy foods, particularly targeted at vulnerable populations, can overshadow efforts to promote healthier options. In the United States, $14 billion is spent every year on food marketing, 80% of



Promoting healthier food choices through targeted campaigns and education can encourage consumers to make informed decisions.

which promotes fast food, sugary drinks, candy and unhealthy snacks.[128] This represents an asymmetry in the information consumers are provided about unhealthy versus healthy products. While back-of-packaging labels are nationally mandated and require basic information, including calories and ingredients, front-of-packaging labels such as "low sodium" or "heart-healthy" often overemphasize the good qualities of a product while ignoring harmful properties. "Eco-labels" and carbon claims are equally varied in accuracy and quality, and research suggests consumers may be more confused than motivated by sustainability claims.[129]

Food pathways are rooted in cultural and culinary traditions

Personal taste preferences can be a significant barrier to changing consumers' dietary habits, and resistance to unfamiliar or less palatable healthy foods is well noted. Historically, many traditional foodways promoted diverse, whole foods based on the necessity of seasonal availability. However, what is traditional or aspirational has shifted as economies develop, and newly wealthy communities often opt for more "modern" food products.[130] Higher incomes also allow for more food consumed away from home, and Western-style fast foods have become a symbol of new-found disposable income.[131] Studies reveal that a substantial majority of measured restaurant meals, around 92%, contain excessive calories for a single meal.[132] In some cases, convenience itself has become a cultural attribute. In recent history, the expectation that everything can be ordered, delivered and consumed without friction sets high expectations for food preparation and delivery times.

Food habits are hardwired and hard to change

Consumers make food choices based on a wide variety of influences, not purely on accessibility, price, or nutritional value. While it's clear that network effects, socioeconomic status and lifestyle play a key role in driving dietary choices, the underlying psychological mechanisms are unclear or differ widely for different individuals.[133] Behaviour change interventions are often well intentioned but deeply ineffective when evaluated for impact. Multidisciplinary research must be conducted to better understand habit formation and the role of public and private industry in driving these decisions.

Critical actions

Develop marketing standards which protect consumers

By implementing regulations and guidelines on food marketing practices, authorities can help protect consumers from deceptive or harmful information claims. These standards can include advertising restrictions for high-sugar, high-fat, or high-sodium products, in addition to strictly regulating health and nutritional claims. Simultaneously, promoting healthier food choices through targeted campaigns and education can encourage consumers to make informed decisions.

Make healthy and sustainable options a celebration or don't talk about it at all

Restaurants, bodegas, gas stations and other convenience stores and micro-retailers strongly influence consumer choices. Healthy and sustainable menu options can be developed with the same irresistibility and marketable creativity as unhealthy options. With the extreme popularity of stunt food products such as Starbucks Unicorn Latte and Taco Bell's Dorito shell, developing equally joyful products that happen to be healthy allows consumers to experience the same celebratory euphoria. The lower-impact option can also become the default order. For example, several coffee shops in the US and UK have quietly made oat milk the standard, and customers must request dairy milk if they would like to swap.[134]

Build community networks

Given the relatively imperfect targeting of traditional marketing techniques and distrust of traditional media, engaging local, authentic leaders to implement programmes is crucial to supporting better dietary choices. While schools and universities can provide hands-on education, religious and community organizations can support the normalization of healthy dietary choices and capitalize on powerful network effects. Additionally, initiatives such as community gardens, community-supported agriculture and seasonal farmers markets can help communities feel connected to what they eat. Large organizations will benefit greatly by partnering with highly localized influencers at the community level.

4 Action platforms to drive change

Transparency, innovation and new collaborative business models are needed to accelerate progress.

The community has identified two action platforms to focus on during the next phase of work. These platforms were selected based on the Forum and its partners' positioning to drive public-private partnership, uniting collaboration on nutrition, climate and human health.

Across each platform, the community will engage in three key phases of work:

Discover

- Understand the existing landscape of successful initiatives within the action platform space and advance existing momentum where possible
- Understand the barriers and incentives
- Conduct impact analysis of potential areas for improvement

Design

- Determine long-term goals and objectives
- Set success criteria to measure progress
- Map relevant partner relationships and contributors

Deliver

- Assemble public-private partners to progress against each long-term goal
- As progress is achieved, track progress against success criteria

4.1 Action platform 1
Portfolio Innovation and Measurement

> Health-led and sustainability-led food innovation continues to grow, driven by consumers' interest in health and well-being.

Objectives

Incentivize and equip the global food industry to evaluate their product portfolios for health and nutrition and arm investors with insights to appraise the risk and value of food companies.

This platform will progress change through several actions:

1. Increased collaboration between public and private food, health and climate organizations, driving healthier and sustainable product innovation and formulation
2. Time-bound commitments from food producers to significantly improve the nutritional value and environmental impact of their product portfolios
3. Industry-wide alignment on common definitions and metrics for nutritional labelling and product claims – refining the more than 100 current scoring systems
4. Increased transparency in multi-channel food product labelling to provide accessible, comprehensive nutrition information to consumers
5. Industry-wide integration of nutrition factors into environmental, social and governance measuring and reporting
6. Industry co-developed, pre-competitive guidelines for reformulating processed foods, targeting reductions in salt, sugar, unhealthy fats and additives, and the significant increase of essential nutrients.

Action case

Nutrition-led reformulation is a collective challenge. At a corporate level, food producers such as Nestlé and Unilever have already seen the value of reporting the health quality of their portfolios and have launched transparency initiatives to demonstrate the nutritional value of their portfolios.[135,136] Additionally, while consumption remains high, the growth of processed foods has slowed in developed economies.[137] Concurrently, health-led and sustainability-led food innovation continues to grow, driven by consumers' interest in health and well-being.[138]

This action platform will demonstrate the commercial and sustainability advantage of nutrition-led innovation and reformulation alongside the necessary decarbonization and restoration efforts across industry. Potential benefits include:

- Increased brand reputation and consumer trust
- Ability to authentically demonstrate social impact by contributing to a healthier society
- Growth in market demand for healthy processed foods
- Improved margins for healthy foods due to economies of scale
- Additional "springboards" for innovation and differentiation
- Enhanced regulatory compliance and avoidance of penalties for health and nutrition non-compliance
- Reduced financial risks from legal liabilities and health-related costs associated with unhealthy products
- Improved public health and well-being outcomes
- Reduced health risks and associated costs related to diet-related diseases

Critical stakeholders

To advance portfolio innovation and measurement, a representative set of stakeholders from industry, government, advocacy and commitment organizations will be convened:

- Manufactured food producers
- Retailers
- Financial regulators
- Nutritional guideline regulators
- Advocacy and industry commitment organizations
- International organizations

4.2 Action platform 2
Frontier Business Models

> Both public and private healthcare payers are the greatest potential beneficiaries of nutrition-driven food system transformation.

Overall objective

Establish and promote new business models that use nutrition to improve overall health and wellbeing, especially focusing on those that capitalize on innovative technologies.

From controlled environment agriculture to precision fermentation to direct-to-consumer meal prep kits and food-as-medicine interventions, there are several burgeoning technologies, product offerings and business models that support better nutrition across the value chain. Even small-scale community-supported agriculture cooperatives present beneficial models for farmers and consumers. This action platform will accelerate the development and maturation of business models through public-private action, supporting human health through the power of nutrition.

In the initial phase, this action platform will focus on supporting food-as-medicine both as a treatment for chronic diseases as well as an overarching philosophy. The platform will engage researchers and health payers to support the case for serving nutritious food to various populations, calculating potential values such as health outcomes and cost savings. Ultimately, this will build into advocating for incentivized institutions to cover food and nutrition interventions as a benefit, empowering doctors and care providers to prescribe dietary plans tailored to individual patient needs.

This platform will progress change through several actions:

1. Identifying effective interventions to prevent and treat chronic diseases through diet and nutrition
2. Aligning with leading experts and institutions to research nutritional treatment applications that demonstrate cost savings for payers
3. Encouraging payers to cover certain healthy food and nutrition interventions as part of supplementary healthcare benefits
4. Increasing early detection and treatment of nutrient deficiencies and chronic diseases, improving tailored nutritional solutions
5. Facilitating the integration of food-as-medicine interventions into healthcare systems and institutional settings as a part of the medical spend
6. Supporting the growth of food companies and retailers that prioritize health-promoting products
7. Integrating sustainable, regenerative, local and seasonal sourcing, driving food-as-medicine as a broader philosophy that champions sustainable food production and its relationship to human health and nutrition

Action case

Fundamentally, the healthcare and food value chains are inextricably linked. Poor diet is a direct driver of chronic diseases and healthcare spending, consuming, for example, 85% of US healthcare costs and affecting 50% of the population, as of 2020.[139] Therefore, both public and private healthcare payers are the greatest potential beneficiaries of nutrition-driven food system transformation, in addition to their unique positioning to incentivize healthy behaviours in the long term.

Health payers stand to gain from implementing food-as-medicine solutions through:

- Lower long-term healthcare costs due to fewer diet-related illnesses and chronic diseases
- Reduced costs for prescription drugs and medical procedures
- Increased competitive advantage due to offering health-promoting food options and wellness programmes
- Reduced future risks associated with liability claims related to diet-related illnesses
- Cost-competitiveness over time through increased savings and thus, premium costs
- Enhanced public image and brand reputation for supporting healthy, sustainable lifestyles

Critical stakeholders

To advance new business models, a representative set of the below stakeholders from industry, government, academia and international organizations will be convened:

- Healthcare payers and providers
- Food producers
- Industrial caterers and food providers
- Government healthcare payers
- Academia
- International organizations

4.3 Adjacent initiatives

While this paper is focused on portfolio innovation and measurement and supporting frontier business models, there are many other platforms for change supported by the Forum and its partners.

For one, the World Economic Forum Food Systems Initiative has spent 15 years advancing multistakeholder partnerships to advance food system sustainability and food security across the value chain. This multisectoral initiative accelerates system transformation by supporting, strengthening and scaling inclusive regional and country-led action while advancing global knowledge, insight and policy. The New Frontiers of Nutrition initiative plans to work in concert with the Forum's Food Systems Initiative and other health and healthcare platform initiatives to bring a focus on nutrition as a key determinant of a successful, integrated health strategy.

This report would be remiss without acknowledging some of the critical interventions outside the influence of the World Economic Forum. Global NGOs, as well as leading organizations such as the WHO, FAO and UN, among others, are all pursuing various nutrition-focused initiatives that drive towards similar or complementary goals of food system transformation and societal resilience. Changing zoning to fix food deserts or intangible areas of focus, such as culture change, is highly valuable in driving nutritious food choices at scale, but it requires a local perspective and design. There are also thousands of regional and local grassroots organizations that support population-level nutrition goals, ranging from soup kitchens to community gardens to consumer advocacy organizations. While the Forum is not well positioned to engage at this hyper-local level, partnerships with trusted advocates remain critical to advancing larger policy change.

5 Moving forward

To safeguard human and planetary health the imperative for action is unequivocal.

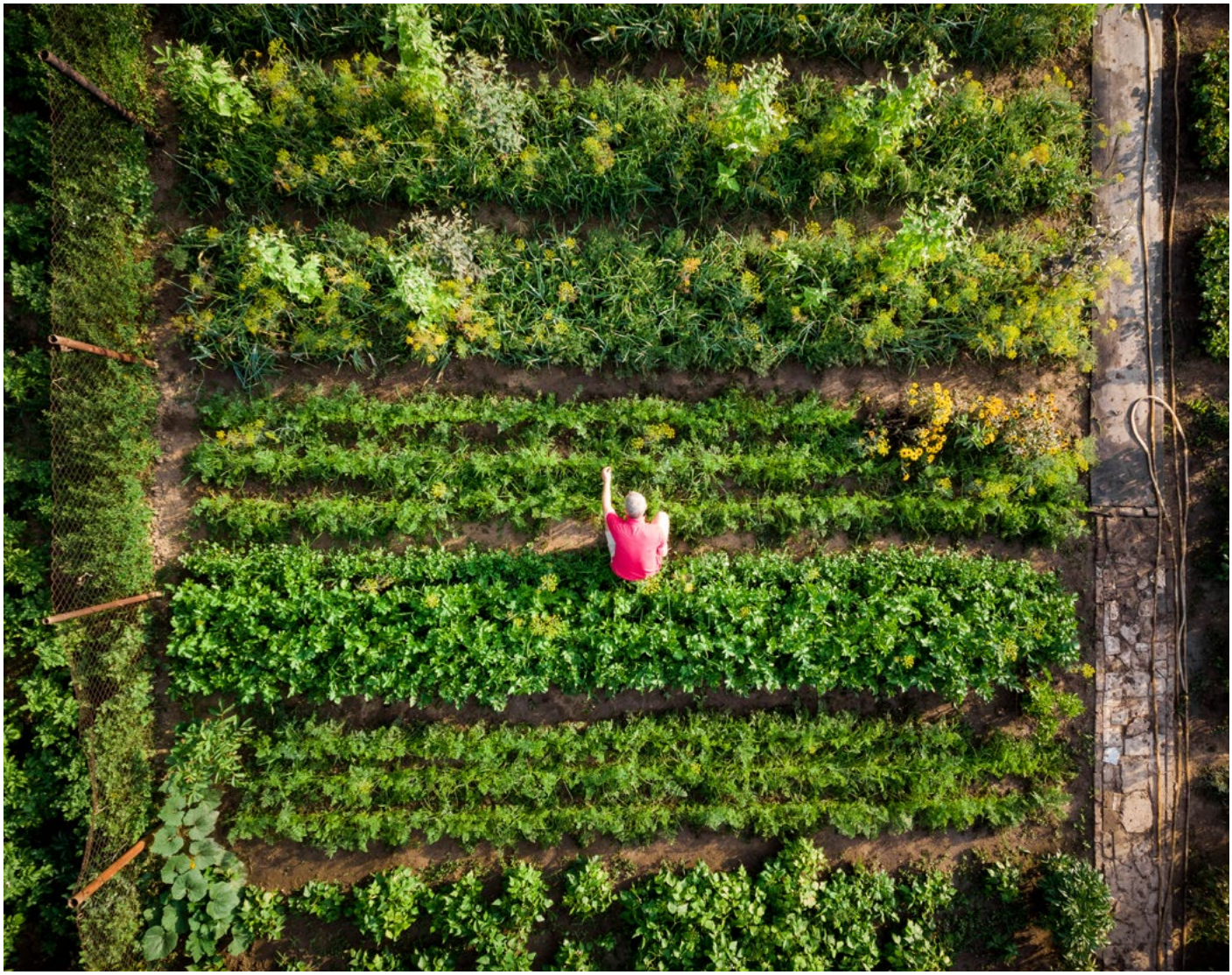
> Advancing nutrition as a global priority is critical to promoting the health and well-being of individuals and communities.

In one possible future scenario, if current trends in the food system are not radically adjusted, human health and resilience will continue to erode as the nutritional quality of diets declines. In this future, pharmaceutical drugs will keep people alive despite poorer health overall and ever-rising economic costs while ignoring the most important driver of health: food.

In another potential scenario, in which nutrition and corresponding innovation and transformation are prioritized in alignment with sustainability strategies and goals, increasing numbers of people and eventually, entire populations, will eat more nutritionally sound and sustainable diets. This change will result in healthier and more resilient populations, both physically and mentally. All stakeholders must make this choice now by prioritizing human health in public policy and business sustainability strategies.

Advancing nutrition as a global priority is critical to promoting the health and well-being of individuals and communities. It is also critical to promoting the health and well-being of the planet. Yet, the race to net zero and to limit global warming to less than 2°C will not be won by focusing exclusively on environmental sustainability. Planetary and human health are deeply intertwined and must work in symbiosis – with strategies, solutions and actions designed to support mutual benefit. Leaders in the public and private sectors must prioritize both objectives to drive a more comprehensive and effective transformation of the food system.

To achieve this goal, it is necessary to mobilize stakeholders from various sectors, including government, investors, consumer industries, healthcare, education and others, to collaborate in advancing nutrition as a key global priority. By working together, stakeholders can work across multiple value chains simultaneously to address poor structural incentives and barriers to accessing healthy, affordable food and support grassroots efforts to promote education and awareness of healthy eating habits. Additionally, by aligning food procurement policies with existing nutrition guidelines, public-facing institutions can improve health outcomes and create a stronger demand for healthier food options. Moving forward, stakeholders can create new value opportunities in nutrition, health and wellness. Together, the Forum and its partners can work to forge continued collaboration and investment in nutrition initiatives to create a more equitable and sustainable food system and achieve better health outcomes for all.



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