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Processed food and its role in nutritious and sustainable diets

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Executive summary

A balanced and diverse mix of vegetables, fruits, pulses, nuts, seeds, wholegrains and proteins should be at the heart of healthy and sustainable diets. However, these foods are not always accessible to everyone, which is a major concern for public health. Food processing, which is an essential element of food systems around the world, has the potential to help mitigate nutrition insecurity and overcome the environmental challenges of nourishing the global population sustainably. To do so, the formulations of processed foods must become more nutrition-sensitive and undergo optimization to reduce environmental impacts. This paper, which is rooted in scientific evidence, contributes to discussions on delivering healthy and sustainable diets to all and the role that processed food can play in supporting this goal.

The widespread consumption of processed foods is a significant trend in peoples' diets globally and is likely to accelerate in the coming years. Today, food processing provides many people with access to safe and nutritious food. It is a tool for curbing food and nutrient loss and waste, increasing food affordability, diversifying diets, and scaling up sustainable production practices.[1] Processing helps build resilience into complex food systems. Advances in processing technologies will help nourish increasingly urbanized populations. There is an opportunity today to channel and shape the future of processed foods, leveraging processing for the benefits it provides while moving away from the formulations, portion sizes and consumption patterns that are damaging to public health and the environment.

The topic of processed food can be complicated and contentious; the collective understanding of the role of processed foods in relation to human and environmental health continues to evolve with developments in research, technology, policy-making, and consumer choice and behavior. The association between the excessive consumption of foods high in sugar, sodium, saturated fat and trans-fats with increased risk of obesity and non-communicable diseases is well established scientifically and is not under debate. Scientific research has not provided evidence that the processing of foods per se leads to a further increase in this risk.

This paper suggests that the final composition of the food, the portions consumed, and the frequency of consumption are, together, a better indication of the health impacts of food than the degree of processing. This is an important distinction that warrants consideration by governments, academics and other stakeholders. Focusing on nutritional composition encourages food companies to improve the healthfulness of the products they sell. Industry, governments and other stakeholders can help establish favorable enabling environments for processed foods and shift populations towards healthier and more sustainable eating habits overall.

In short, this paper explores:

- What food processing is, how it works, and why it is necessary;
- How food processing and processed foods can contribute to healthy and sustainable diets, including global priorities laid out in the Sustainable Development Goals and advanced by the 2021 United Nations Food Systems Summit. These include ensuring access to safe and nutritious foods for all; promoting shifts to healthy and sustainable consumption patterns; boosting nature-positive and equitable production practices; and building resilience to vulnerabilities, shocks and stress across food systems;

- Existing challenges related to processed foods in the context of public health and sustainability;
- Opportunities for food industry leadership that governments, academia, and civil society can accelerate jointly.

The companies involved in creating this paper share WBCSD's Vision 2050, calling for a world in which food systems address the combined challenges of the climate crisis, nature loss and mounting inequality through "a regenerative and equitable food system producing healthy, safe and nutritious food for all." This vision will require business to contribute to ensuring that everyone has access to nutritious and affordable food; sustainable production restores and safeguards nature; people consume food sustainably; and value chains are prosperous, equitable and free from human rights abuses. This vision is also the foundation of WBCSD's strategy for 2022 to 2027, designed to step up business action for system transformation.

Introduction

The United Nations (UN) Secretary-General convened a global summit in September 2021 dedicated to making food systems healthier, safer, more sustainable, more equitable and more resilient. The UN Food Systems Summit put a global spotlight on the need to shift how humanity produces and consumes food, seeking to make food systems serve everyone. Halfway through the UN Decade of Action on Nutrition and with nine years left to achieve the Sustainable Development Goals (SDGs), the summit highlighted how reforming food systems touches on all 17 SDGs and requires leadership and action across all sectors, from governments and companies, to scientists, farmers and local populations. Within the context of this summit, the term "food system" refers to "the constellation of activities involved in producing, processing, transporting and consuming food."[2] People everywhere depend on food systems, yet these systems are vulnerable and, in many cases, they generate or accelerate problems like climate change and biodiversity loss, the prevalence of malnutrition and non-communicable diseases, and societal inequities.

Food processing, innovation and formulation will play an important role in helping the Food Systems Summit and its many stakeholders achieve their goals in the years ahead. Processed foods are core to many of the word's food systems and the consumption of processed foods is a large and growing global trend. Food processing is one of the key levers identified in WBCSD's Food and Agriculture Roadmap – the implementation plan for the CEO Guide to Food System Transformation, aiming to generate and democratize healthy and sustainable eating patterns.[3] The Healthy and Sustainable Diets Chapter of the Roadmap puts forward a set of transformational targets, action areas and solutions for the food and agriculture sector to provide healthy, accessible, enjoyable food for all, produced in a socially responsible manner within planetary boundaries. The first action area the chapter identifies is to "Adjust menus, product portfolio mixes, and product formulations to improve nutrition and sustainability and reduce food waste." It identifies several opportunities for business leadership on processed foods, including reformulation, innovation in processing and packaging technologies, and sustainable sourcing practices.

In this document we describe what processed food is and how it plays an integral role in today's food systems through the provision of accessible, affordable and nutritious foods, reducing food waste and ensuring food safety and resilience. We discuss how processed foods can contribute to nutritious and varied diets by integrating or complementing fruits, vegetables, whole grains, pulses and other

healthy foods. We acknowledge that it is necessary to improve the nutritional quality of many processed foods to support public health goals and describe the need for urgent changes to limit salt, sugar, saturated fat and trans-fat levels in foods and to increase the content of nutrient-rich plants, fiber and healthy fats.

The global rise in diet-related diseases requires all stakeholders, including the food and beverage industry, to make changes.[4] Companies should be open to changing the foods they offer by increasing the proportion of their portfolios belonging to food categories to encourage from a public health and sustainability standpoint. They can do this by investing in innovation and reformulation (including fortification); providing nutrition information; facilitating consumer food literacy with transparent, clear and evidence-based information; employing responsible marketing practices, especially marketing to children; offering recipe ideas; promoting portion control; using less plastic; offering better recycling options; building sustainable and equitable supply chains; and more. At the end of this paper, we put forward opportunities for how governments and other stakeholders can help with these transitions, including by establishing science-based public health goals that all food systems stakeholders can work to achieve together.

Our intention is for this paper to contribute to and build on the existing discourse on the topic of food processing and processed foods, bring forward a common view from industry leaders on the important roles that processed foods play in food systems, and identify the changes needed for processed food to serve humanity and the planet in the future. Members of the food industry and WBCSD staff co-wrote the paper and academics, civil society organizations, nutritionists and industry associations have reviewed it.

A note on terminology:

Throughout this document we use the term "food processing" to refer to food and ingredient processing and "processed foods" to refer to food and ingredients that have undergone processing. We provide further clarity on the definition of processed food below.

We also note that food processing and food formulation are distinct concepts, though at times people confuse one for the other. Processing, as outlined below, refers to the operations used to transform raw foods and ingredients into new food forms. Formulation refers to the product design or the recipe used to make the food products.

What is food processing?

Food processing is a broad concept that includes anything done to food when preparing, preserving, cleaning, cooking, or storing it.[5] Throughout evolution, people have actively sought ways to improve food availability and digestibility. After washing, the use of fire for cooking was among the first processing techniques widely used, which improved access to the energy and nutrients in food. Along with the development of agriculture, humans have invented a wide range of techniques to increase food availability by ensuring safety and improving conservation and storage, transportation stability, palatability, digestibility and convenience, which have contributed to the success of the human species. From ancient to modern times, food processing has been essential to helping humanity thrive.[6]

Almost all foods require processing to some degree to be palatable (e.g., grains), safe (e.g., pasteurized milk) or available year-round in the location where consumers demand them (e.g., canned, dried and frozen fruits and vegetables). Today, food processing happens at different scales

and in diverse environments – by individuals and families in their own kitchens, by street vendors in food carts, by chefs in restaurants and other food service establishments, by farmer communities to prevent waste and surplus crops, and by food and ingredient manufacturers in factories.

The transformation of raw materials into food products often mimics the process of home cooking but at a much larger scale.[7] Food processing consists of various operations aimed at transforming a raw food or ingredient or a combination of raw foods and ingredients into a new food form with improved properties.[8] These operations include:

- Physical treatments (e.g., washing, peeling, cutting, slicing, bleaching, mashing, blending, centrifugation, homogenization, extrusion) that improve digestibility, stability, appearance, attractiveness and palatability, and remove undesired contaminants (e.g., stem, leaves, dirt);
- Thermal treatments (e.g., refrigeration, pasteurization, sterilization, microwaving, cooking, freezing, drying) that improve safety, texture, digestibility, preservation;[9,10]
- Chemical treatments (e.g., acidification, enzymatic hydrolysis, smoking), which can change color, taste, texture, safety;
- Biological treatments (e.g., fermentation), which provide new properties such as acidification, flavoring, sparkling.

Food processing can be only one step (e.g., centrifugation to separate cream from milk into raw milk; heating at 72°C for 15 seconds to pasteurize a fruit juice) or can combine multiple steps depending on the complexity of the recipe (e.g., blending, fermentation, forming and baking to make bread). Processing can also create ingredients to combine later into foods such as soups, sauces, gravies, breads, beverages, snacks, ready-to-eat bars, cereals, alternative protein foods (such as plant protein-based beverages and meat alternatives) and meal entrees. Processing that requires multiple steps and the combination of multiple ingredients tends to yield foods viewed as “highly processed” or “ultra-processed” depending on the classification system.[11]

Food additives are components of processing in certain cases, although not all processed foods contain additives. They can maintain or improve food safety, nutritional quality, freshness, taste, texture or appearance.[12] Traditionally, the main “additives” used for food preservation and safety were salt, sugar and fat. The food industry uses additional additives today in the amounts needed to exhibit specific functional characteristics within the limits of relevant legislation. Although national, regional and global food safety authorities (e.g., the joint Food and Agriculture Organization of the UN/World Health Organization Expert Committee on Food Additives) regularly assess and approve food additives, many companies are minimizing their quantities to answer consumer expectations for simplicity.

In short, most foods are processed to some degree. Some stakeholders seek to distinguish between foods that are “lightly processed” or “minimally processed” and those that are “highly processed” or “ultra-processed.”[13,14] The level of processing of some foods and beverages may modify their sensory characteristics to extend their useful life or make them appropriate for consumption, as well as affect their nutritional value, aspect and shape. In this paper, we suggest that that the final composition of the food, the portions consumed, and the frequency of consumption are, together, a better indication of the health impacts of food than the degree of processing. We find that food processing offers advantages to consumers, including shelf stability, variety and convenience, improved retention and bioavailability of nutrients, flavors and colors, lower energy and water requirements, reduced waste generation, and reduced need for chemical processing aids.[15,16] Importantly, the industry has fine-tuned its work for optimum safety, consistency and efficiency while also meeting regulatory standards.

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The role of food processing in delivering healthy, sustainable and equitable food systems

As a result of advances in food processing, many consumers today have access to the broadest variety of safe, affordable and nutritious foods in human history. While there are opportunities for continued improvements in processing practices and dietary habits, processed foods can help support positive shifts in the food system. The overarching aspiration is to create a world in which "a regenerative and equitable food system producing healthy, safe and nutritious food for all" is the norm.[17] People should have sufficient health and food literacy and be exposed to food environments that enable them to adopt healthy and sustainable eating patterns. Food processing can contribute to this vision. In the section below, we discuss the role of processed foods relative to four important food system transformation pathways.[18]

Ensuring access to safe and nutritious food for all

A key contribution of food processing to society is to increase and broaden access to safe and nutritious foods for people around the world. Food processing technologies act to prolong the shelf life of food and allow for increased transportation range and wider food distribution. Processing enables safe access to a wide variety of foods by populations far from production sites. It helps to manage the availability of foods throughout the year, allowing supply to buffer the impact of both natural and human-made disruptions that, together with economies of scale, increase the affordability and accessibility of food for many people.[19]

Processing can help preserve nutrients and improve their bioavailability, introduce ingredients with demonstrated health benefits, reduce allergens, and remove contaminants. For example, processing can enhance health by improving the accessibility of beneficial bioactives in foods, such as lycopene, improving the digestibility of proteins (mitigating allergenicity), creating resistant starch, and destroying the anti-nutritional factors present in many pulses and legumes.[20,21] It is also possible to fortify processed foods with vitamins, minerals, protein and fiber to address population needs and reduce nutrient deficiency risks. Optimized factory processing, unlike home cooking, prevents the production of acrylamide and other process or neoformed contaminants, and retains nutrients. Food processing can remove contaminants found in nature such as aflatoxins, which are among the most harmful fungal secondary metabolites.[22]

By design, some processed foods save lives and reduce the burden of disease. For example, allergen-free foods, such as those produced without gluten, support the dietary needs of people with gluten sensitivities or allergies. Medical nutrition can help people in various states of disease access important nutrients for healing, growth and development. Processed foods can also enable people to integrate more fresh foods into their diets. For example, prepared sauces and seasoning mixes can help consumers bring vegetables, pulses, whole grains and other nutritious ingredients to their plates in a tasty and convenient way.

Depending on the nutritional needs and consumption patterns of the individual, the increased nutrient bioavailability often found in processed foods can have beneficial (e.g., better access to vitamins or micronutrients) or deleterious (e.g., increases in the proportion of sugars and salt content) effects. While processing has the capacity to improve food nutrition and safety, many processed foods contain amounts of nutrients that dietary guidelines recommend limiting, such as

saturated fat, trans-fat, added sugar, and salt.[23] Dietary guidelines recommend the consumption of indulgent or treat foods containing these ingredients, either home-made or processed, in moderation.[24] Along with governments, the food industry has an important role to play in helping to promote and support healthy eating habits through innovation and reformulation, as well as through responsible marketing practices.

Finally, food processing has the potential to increase food affordability and accessibility more broadly. There is a link between vulnerability to food insecurity and socio-economic and socio-cultural factors, education level and other demographic attributes that influence food and nutrition status. For example, studies have linked socioeconomic disparities in diet quality to the higher cost of the healthy diets lower income consumers see as acceptable but are out of their reach.[25] The food and agriculture industry can position healthy processed foods as a smart option for certain consumer groups, making them appealing and desirable. Processing can bolster food security by partially alleviating the higher costs of fresh foods by reducing losses of "ugly" or slightly damaged produce, increasing storability, and preserving critical nutrients, making improved nutrition accessible to and affordable for more people.[26]

Shifting to healthy and sustainable consumption patterns

The United Nations expects the global population to reach 10 billion in 2050, at which point approximately 70% of people will live in cities – up from 55% in 2018.[27] This shift of people to urban areas will have a significant impact on what and how people eat. The food system loses or wastes one third of the food produced along the value chain,[28] with households generating more than half of all food waste.[29,30] This presents enormous inefficiency and ethical challenges in the face of hunger, the growing population, climate change, biodiversity loss and natural resource scarcity. The food system must become much more efficient and more circular. The application of new advances in processing,[31,32] innovation in post-harvest storage solutions, recovery of by-products,[33] repurposing of food waste materials,[34] creation of new biocomposites,[35] and advances in packaging technology[36,37] can reduce some of this waste.

In addition to reducing waste, it is necessary to further change consumption patterns to improve public health and sustainability. Food companies and public health leaders can work together to shift consumer behavior and create healthier and more sustainable food environments, especially in key settings such as schools, workplaces and healthcare facilities. Together they can increase consumer food literacy and inspire consumers to embrace healthier and more sustainable diets by providing transparent and clear information (e.g., through labeling[38]), mitigating overconsumption (e.g., with guidance on portion size), and implementing responsible marketing and promotion practices. Food manufacturers can facilitate greater dietary diversity as well by providing access to healthy and affordable food year-round and introducing consumers to foods they may not have tried before, building awareness and interest in alternative nutritious food choices. Aligning processing plans with dietary guidelines can also help embed these shifts in everyday consumer habits.[39]

Boosting nature-positive and equitable production practices

The volume and scale of food processing can help accelerate sustainable, regenerative and climate-friendly value chains. When companies develop and process food products, they should prioritize fair and sustainable sourcing protocols. Through such practices, the food industry can help drive the widespread implementation of sustainable and equitable production. The food and agriculture

industry should leverage regenerative agriculture, which aims to improve the environmental and the social impacts of food production, to bring diverse, nutritious food to market.[40] Food manufacturers can bolster further regenerative farming model innovation and implementation by integrating diverse foods grown using regenerative practices across their portfolios.

In addition, reducing animal-based food intake in countries with high consumption and partly replacing this protein with sustainable and healthy plant-based protein options has significant potential for positive environmental impacts – especially on climate, land and biodiversity – and health outcomes.[41,42] Achieving this goal will require action from food companies on two levers.[43] First, food processing is key to the creation of appealing, tasty, convenient, affordable and nutrient-dense plant-based options. This includes making plant-based proteins accessible and convenient, such as the canning of beans. Second, the food sector must orient consumer demand and choice towards these alternatives.

Finally, sourcing practices should support farmer and rural worker livelihoods. Those who produce most of the world's food tend to be malnourished and living in poverty. Consequently, farmers and rural workers are moving away from farming and into urban areas in search of a better quality of life. Private sector engagement in these communities to find solutions that strengthen their resilience and reward their efforts is critical to successful food system transformation. This requires continual progress as growers, food manufacturers and retailers work together to provide consumers with sustainable, equitable and healthy choices, within legal and regulatory frameworks that facilitate coordinated and responsible actions along the food value chain.

Building resilience to vulnerabilities, shocks and stress throughout food systems

Processing and storing are important means of reducing the risk of hunger and malnutrition in vulnerable locations, such as regions in conflict or threatened by natural disasters, providing food security in uncertain conditions. Processing and storing help to manage the availability of foods throughout the year and allow supply to buffer the impact of both natural and human-made disruptions, bringing safe and healthy food to vulnerable people.[44,45] As climate change continues to disrupt and destabilize natural processes, drought, fires, flooding and other disasters are increasingly likely to affect the global food system. New technologies that bring processing closer to production points may help improve the system's resilience.

Processed foods are essential during times of crisis due to their ability to significantly outlast fresh foods, allowing people to remain sheltered and avoid unsafe conditions. The COVID-19 pandemic illustrates this point well – in certain regions people turned to shelf-stable foods to avoid crowded markets and potential exposure to the virus. The pandemic also impacted food supplies in many countries and it is possible that the prevalence of hunger may have been greater at various points during the pandemic if processed foods had not been available due to supply chain disruptions.

At the same time, COVID-19 has highlighted the importance of metabolic health in relation to disease outcomes. Patients with metabolic syndrome, obesity, diabetes and other diet-related non-communicable diseases have been most susceptible to COVID-19 infection, morbidity and mortality.[46] With metabolic diseases largely linked to diets high in salt, added sugar, and saturated and trans-fats, COVID-19 has demonstrated to many people the importance of healthy eating patterns in relation to overall health, well-being and resilience, and highlighted the disparities in access to healthy diets among certain segments of the population.

What does science say about processed foods, nutrition and health?

There is powerful evidence that nutrition plays a role in many diseases and conditions, as well as in healthy growth and development.[47,48] The World Health Organization (WHO) provides guidance for healthy diets based on nutrition science.[49] Nutrient-dense foods are an important component of healthy diets, including a diverse mix of vegetables, fruits, pulses, nuts, seeds, wholegrains and proteins, all of which can be components of processed foods. There is also sound evidence that diets high in added sugar, salt, saturated fat and trans-fat can lead to higher risk of non-communicable diseases.

There is a growing body of work on the topic of ultra-processed foods (e.g., industrially made breads, vegetable sauces, ice creams, sugar-sweetened beverages) as well as the association between the consumption of ultra-processed foods and non-communicable diseases. A single, universally agreed upon definition of ultra-processed foods does not exist and there is considerable variability in examples of foods within this category.[50] The Food and Agriculture Organization (FAO) uses the following definition: "Ultra-processed foods are formulations of ingredients, mostly of exclusive industrial use, typically created by series of industrial techniques and processes."[51]

The research conducted so far does not establish causation between the consumption of foods categorized as ultra-processed and the emergence of non-communicable diseases. Nevertheless, some studies raise legitimate concerns. For example, a randomized controlled trial has indicated that people are more likely to over-consume foods classified as ultra-processed, leading to weight gain; but the large number of limitations indicated by the authors means it is necessary to do much more research to be able to attribute causation confidently.[52,53] Non-experimental data also suggests that ultra-processed foods have contributed to the obesity epidemic. A limitation of observational studies is that they cannot adjust for all potential confounding factors (e.g., access to food, income, physical activity). Observational studies are also unable to indicate if a particular type or degree of processing is driving the adverse associations between ultra-processed food consumption and health, or if it is related to the higher fat, salt or sugar content, the energy density, or the energy intake rate of the diets assessed.

What role can business play to support healthy, sustainable, nutrient-dense diets?

The food industry has a critical role to play in shifting formulation and processing approaches, as well as marketing practices and consumer education, in support of public health goals. The food industry applies the latest scientific consensus and evidence to the food products brought to market by adhering to Codex Alimentarius,[54] including through foods reformulated to improve their nutritional quality and by following regulations related to non-nutritive ingredients. This reflects the science that is available to guide business. As new science emerges, business leaders are committed to applying it to the products they develop and promote.

Focusing on the nutritional composition of foods encourages food companies to improve the healthfulness of the products they sell. There is a lot that business can do to support the widespread

availability and adoption of healthy and sustainable eating patterns and to formulate foods in ways that drives progress on positive public health outcomes. For example:

1. **Food reformulation:** Reformulation can significantly improve the nutritional value of processed foods. All companies, large and small, should consider the use of reformulation to improve the nutritional quality and metabolic impacts of their products and portfolios. They should also simplify recipes to facilitate consumer understanding of ingredient lists. Importantly, foods categorized as processed and ultra-processed can vary significantly in healthfulness and energy density.[55,56] This variability suggests that it is possible to modify such foods to help consumers improve the overall quality of their diets. Companies should apply reformulation improvements across the product portfolio and implement them equitably around the world.
2. **Product portfolio evolution:** Product portfolios should be moving in a direction that promotes and prioritizes health and sustainability. Companies should be open to changing the foods they offer by increasing the proportion of their portfolios belonging to food categories to encourage from a public health and sustainability standpoint.[57]
3. **Food matrix:** The opportunity for joint action across industry to develop processing techniques that deliver functionality (e.g., safety, shelf life) while keeping the food matrix more intact than is common practice today is an important area for continued development. Such research would help the industry better understand the role of texture and eating rate on health outcomes.
4. **Transparency:** The food industry should foster trust among consumers through improvements in transparency and the public disclosure of relevant information to support consumer awareness and decision-making, including listing ingredients in consumer-friendly language, easy-to understand nutrition information, guidance on portion size, etc.[58]
5. **Food environments:** The food industry should support the creation of food environments that encourage healthy and sustainable food choices among consumers, including how they promote and market food to consumers, especially children.

The food industry is interested in further developments in science to guide future work. The final part of this paper presents some key research questions. Continued research will support the evolution of the industry over time by offering new insights into what it should prioritize in innovation and reformulation. Scientific consensus will continue to guide the industry to bring nutritious and sustainable foods to consumers.

Calling for multi-stakeholder leadership

Industry has a responsibility and critical role in bringing healthy and sustainable foods to consumers around the world. However, it cannot do this alone. Coordinated and science-based collaboration across and among government agencies, as well as with civil society, academia and other stakeholders, is also critical to achieving the change at scale that will make a difference for public health and environmental outcomes. We outline several recommendations below on how governments can take a leadership role in supporting the development and uptake of healthy and sustainable processed foods. Overall, government leaders should employ “food systems thinking” to consider impacts on people and planetary health as they design new policies and dietary recommendations.

- **Co-developing public information and education campaigns**: Public information campaigns need to support good nutrition and healthy diets and lifestyles. Governments can partner with experts in marketing to promote and encourage sustainable and healthy diets. They should base such campaigns on evidence and tailor them to different groups of people based on levels of education, health needs and cultural factors.[59] Company marketing practices should also align with public health campaigns and messages.
- **Implementing data-driven policy-making on nutrition**: Policy-making using dietary intake data to identify nutrients to encourage and to limit across population sub-groups and measuring the impact of nutrition policies should become the norm. This would help to evaluate if the intended health benefits have been achieved and enable policy-makers to correct course if appropriate.
- **Building a supportive enabling environment:** Government leaders can help by incentivizing reformulation and innovation to improve nutritional profiles, such as by removing regulatory hurdles to fortifying foods. Similarly, governments can develop public policies that support companies in increasing the nutrient density of foods. No one company or sector can solve these challenges alone – it requires greater collaboration across sectors, including government and industry, to create level playing fields and achieve lasting change.
- **Establishing science-based dietary guidelines:** Use scientific evidence to develop international and country-specific dietary guidelines and recommendations that integrate nutrition and sustainability components. Modeling is also important in promoting the most sustainable use of various commodities, understanding nutrient contributions from local foods and products in diverse dietary patterns and life stages, and providing advice on discretionary foods.

Members of the Committee on World Food Security (CFS) have endorsed the first-ever Voluntary Guidelines on Food Systems and Nutrition,[60] aiming to support countries and others in their efforts to eradicate all forms of hunger and malnutrition by using a comprehensive food systems approach rooted in science. This serves as strong evidence of the potential of global coordination and consensus on this topic, developed through an inclusive, multi-stakeholder process.

With governments setting science-based policies, non-governmental organizations facilitating educational campaigns and providing consumer representation, academics advising on scientific consensus and running effectiveness studies, and the food industry providing the products and, with retailers, promoting healthier and more sustainable options, the whole system can drive positive, lasting changes in dietary patterns.

Opportunities for future research and collaboration

In view of the importance of processing food to feed the world in a safe, nutritious and sustainable way, there are several areas that require further research on the role of processed foods in healthy and sustainable diets. The outcomes of such research would help food industry leaders prioritize reformulation and innovation needs, and production, sourcing and distribution methods in the best possible way for the planet and human health outcomes. Industry is prepared to partner with academic experts to explore the topics outlined below.

1. **Understanding the relationship between processing approaches and public health outcomes:**
    - Study the role of processed foods in relation to nutrient density of the diet and increasing the intake of recommended foods. A few studies show that calorie- and nutrient-dense foods exist across different levels of processing, suggesting that it is

necessary to base food choices and dietary recommendations primarily on energy or nutrient density rather than processing classification.[61]

- Study the relationship between food processing (and types of processing) and the feeling of satiety. Some research suggests that levels of processing and the associated texture or mouthfeel could be an indication of eating rate and overeating due to a (lack of) satiety feeling.[62] This requires further research to understand the implications and potential applications of these findings.
- Research into whether certain processing or processed food attributes lead to the association with negative health outcomes seen in some observational studies or if the associations are linked with excess consumption of added sugars, salt or fat.
- Research into nutrient availability of home-cooked versus factory-produced foods to assess where processing retains nutrients and to understand where to make improvements. Such research could also guide more relevant or tailored messaging to consumers, such as on adding salt and sugar to food prepared at home.
- Research into nutritious ingredients of the future to reduce allergenicity, enable the replacement ingredients of public health concern with health-benefitting alternatives, and improve consumer acceptance of new, nutritionally beneficial ingredients and products.

2. **Understanding the relationship between processing and environmental outcomes:**
    - Study the differences in environmental impact of industrial food preparation compared to home cooking. Some suggest that by centralizing and professionalizing (parts of) processing at scale the environmental impact is lower than that of home cooking. While some studies exist, there is a need for further studies in diverse contexts.[63]
    - Investigate packaging innovations to extend the shelf life of processed foods (to reduce food waste), while reducing the environmental burden of plastics.
    - Balancing planetary impacts with food safety, convenience, taste and experiences that can come from eating processed foods is not a straightforward calculation. It requires further research to better understand these interrelationships and help food system stakeholders make the best decisions in full understanding of the trade-offs.

What's next?

Food processing plays a vital role in ensuring healthy, sustainable and equitable food systems now and into the future. Yet tremendous opportunities for improvements, growth and leadership remain for human health and sustainability across the food and agriculture industry, and specifically in the realm of food formulation and processing. The food industry is pleased to bring solutions to the table and to collaborate with government, academia, civil society and consumers to help ensure all people have access to safe, nutritious and sustainable food. The industry must leverage food processing for its benefits to society at large and adapt it to address the deleterious public health outcomes that have emerged as eating patterns have become less healthy and less sustainable over the past decades.

Looking ahead to 2022 and beyond, WBCSD and its members will convene a series of multi-stakeholder dialogues to continue exploring opportunities for collaboration, innovation, reformulation and progress to foster the contribution of processed foods to providing safe, nutritious and sustainable food to all. We will synthesize the outcomes of these dialogues into actionable recommendations and concrete steps to help the industry drive the needed improvements in product formulations and marketing practices, to overcome some of the divisions among different stakeholder groups, and to continue working to achieve the goals of the 2021 UN Food Systems Summit and 2030 Agenda. The food industry is prepared to step up to drive lasting, positive impacts on human and planetary health.

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Disclaimer

This report is released in the name of WBCSD. Like other reports, it is the result of collaborative efforts by WBCSD staff, experts and executives from member companies. Drafts were reviewed by a wide range of members, ensuring that the document broadly represents the majority view of WBCSD members. It does not mean, however, that every member company of WBCSD agrees with every word. Please note that the data published in the report are as of November 2021.

About the World Business Council for Sustainable Development

WBCSD is the premier global, CEO-led community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net zero, nature positive, and more equitable future.

We do this by engaging executives and sustainability leaders from business and elsewhere to share practical insights on the obstacles and opportunities we currently face in tackling the integrated climate, nature and inequality sustainability challenge; by co-developing "how-to" CEO-guides from these insights; by providing science-based target guidance including standards and protocols; and by developing tools and platforms to help leading businesses in sustainability drive integrated actions to tackle climate, nature and inequality challenges across sectors and geographical regions. Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD $8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. Since 1995, WBCSD has been uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues. Together, we are the leading voice of business for sustainability, united by our vision of creating a world in which 9+ billion people are living well, within planetary boundaries, by mid-century.

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Credits

Endnotes

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