



MENUS *of* CHANGE[®]

The Business of Healthy, Sustainable, Delicious Food Choices

2019 ANNUAL REPORT



HARVARD
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SCHOOL OF PUBLIC HEALTH
Department of Nutrition



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I. MENUS OF CHANGE IN 2019

Welcome to the 7th *Menus of Change*[®] *Annual Report*. This report provides you and your colleagues with briefings on areas where your decisions about menus, recipes, and ingredient selection will have the greatest impact on our health, our planet, and our businesses. It also documents a remarkable, positive change resulting from the work of so many chefs and foodservice industry professionals to improve what we eat, including focusing more creativity toward developing new and delicious plant-forward choices for the dining public.

The first six years of the Menus of Change initiative have passed quickly, as we have worked to engage, inform, and guide the culinary profession and foodservice industry in the business of serving healthy, sustainable, delicious food. The initiative, a partnership of The Culinary Institute of America and Harvard T.H. Chan School of Public Health—Department of Nutrition, does the essential, difficult, and unprecedented work of integrating the latest findings from both nutrition and environmental science into a single set of recommendations to help foodservice and culinary professionals make better choices. Chief among these is the obligation to move away from the longstanding emphasis of red meat and other animal proteins on our plates.

Since 2013, this report and initiative have helped the industry rethink the role of protein on our menus. A few years, flips, and blends later—and with the involvement of several culinary and business leaders—the efforts of the many chefs and foodservice operators who have taken up the goals of Menus of Change are now beginning to reshape the American diet.

In less than a decade, the culinary profession and the foodservice industry have rallied around a new vision of plant-forward dining. It is now a focus of menu development and culinary innovation in restaurants and other foodservice operations of all sizes, formats, and price points, from fine dining to student dining and from full service to quick service. In 2019,

in further efforts to move this vision ahead, the CIA launched the Global Plant-Forward Culinary Summit, which focuses on culinary strategies around plant-forward cooking and takes place in Napa each spring.

This annual report is a core part of the Menus of Change mission. It seeks to advance a long-term, practical vision that integrates optimal nutrition, environmental stewardship and restoration, and social responsibility within the foodservice industry. It includes a guide to the key issues that the foodservice community faces, as well as recommendations for improving business performance. The report's Dashboard shows the progress the industry has made, with indicators that can help businesses evaluate their own efforts in the areas that matter most. For culinary professionals, R&D teams, and senior-level strategic marketing managers, a comprehensive set of principles guides menu development and design.

Overall, as the 2019 Menus of Change Dashboard shows, restaurant and foodservice leaders are making steady progress in their efforts to offer Americans better food choices, while also wrestling with increasingly complex risks from climate change, water scarcity, lack of visibility into supply chains, and other environmental factors that make our supply chain more brittle and less predictable. Our industry has shown great innovation in accomplishing this shift, and, importantly, consumers have shown great appetite for such innovation.

The CIA and Harvard Chan School invite businesses to use this report to measure their progress and to navigate new and complex challenges. Not all culinary professionals and foodservice companies will take the same path forward. But more and more have a similar goal: to be successful in the businesses of serving healthy, sustainable, delicious food.

Onward!





II. EXECUTIVE SUMMARY: A TASTE OF WHAT'S AHEAD

Originally intended as a B2B term, “plant-forward” is an umbrella term that includes vegetarian and vegan approaches just as much as it does flexitarian or plant-rich omnivore in order to encourage broad adoption by foodservice operators and culinary professionals. The term has also spread to consumer media and, as you’ll read in this report and no doubt have witnessed for yourselves, “vegan,” “vegetarian,” “plant-based,” and “plant-forward” have all moved from the fringes of dining culture to the mainstream over the last two years, hitting nearly every major trend list in the process. Of course, it is important that chefs and operators not think of vegetable-centric, plant-forward menus as a hot trend, but rather, as a new normal. We must all do our part to ensure that plant-forward has staying power.

Each of the 24 Menus of Change Principles of Healthy, Sustainable Menus was designed with this staying power in mind, focusing on what should be the new evergreens driving our menus. Even as we add more produce on our plates, we must continue to lower our use of salt and added sugar, to serve more kinds of seafood more often, and to reduce portions, for example. And if we’ve learned anything about what it looks like to advance plant-forward menus on the ground, it’s that the principle “Lead with Menu Messaging Around Flavor” is perhaps more relevant than ever before. So too is “Leverage Globally Inspired, Plant-Forward Culinary Strategies.” So remember: even the best highways don’t cover the entire map.

Against this background, the EAT Foundation, with support from the Wellcome Trust, convened an international group of experts in nutrition, agriculture, environment, and policy to identify a pathway to feeding 10 billion people in 2050 a diet that is both healthy and sustainable. The subsequent report, published in the *Lancet* in January 2019, outlines a

healthy reference diet that can be described as a *plant-forward* or *flexitarian diet*, and includes generous amounts of whole grains, fruits, and vegetables. (See page 11 for more on the *EAT-Lancet* report and its implications for healthy, sustainable diets). Significantly, the work of this expert commission for the first time provides quantitative references to complement the qualitative principles that the Menus of Change initiative has championed in the past seven years. It also defines planetary boundaries for a sustainable food system, such as limits for greenhouse gas production, land use, and nitrogen and phosphorus fertilizer application that underscore the urgency of our work.

The centerpiece of the Menus of Change report is a concise analysis of 12 issues at the intersection of public health, the environment, and the business of food. These issue briefs synthesize the latest health and environmental data to provide a clear picture of the industry’s challenges and opportunities, as well as practical next steps for foodservice operations. The report assigns each issue an annual score that rates the industry’s efforts in these critical areas.

If the 2018 dashboard reflected pivotal progress in nearly all indicators, the 2019 report acknowledges that change can require sustained effort before seeing a large payoff. Scores for the majority of the essays in the report held steadfast in the past year, albeit with progress noted for fruit and vegetable consumption. Additionally, while the score for protein consumption did not change, the vast amount of attention, innovation, and investment happening in this sector is cause for hope that consequential shifts are on the horizon. Similarly, increased attention on animal welfare and antibiotics issues makes it likely that we will see continued progress in these arenas in the near future.

1. Fruit and Vegetable Consumption

While consumptive data does not yet show an increase in fruit and vegetable consumption, interest among trend-leading chefs, large non-commercial foodservice operators, and their customers in plant-forward menus—including fruits and vegetables—is surging. On the supply side, it is feasible to increase U.S. fruit and vegetable production if the demand is there and the price is adequate. Vegetarian, vegan, and plant-forward dishes generally have become more common across all foodservice sectors in response to consumer demand. With younger generations accelerating this trend, we hope to see measurable increased consumption data around fruits and vegetables in future years, indicating widespread change in American food choices.

2. Protein

Americans continue to consume more protein than needed, from all types of sources. Additionally, despite a long-term downward trend in meat consumption, data indicates that in recent years, Americans are increasing their intake of both red meat and poultry. This is true even as new studies add to existing evidence that shifts in eating habits toward more plant-based proteins, fruits, and vegetables can reduce the risk of certain chronic diseases, greenhouse gas emissions, and the burden on water and energy resources. Amidst this landscape, plant-based and alternative proteins have become increasingly accessible and adopted into a multitude of foodservice segments; *Fast Company* went so far as to predict that “2019 will be the year alt-meat goes mainstream.”

3. Animal Welfare and Agricultural Drug Use

Most of the largest U.S. restaurant, hospitality, and foodservice companies have now met or are well on their way to meeting their commitments to reduce or eliminate antibiotic use in their supply chains in the next few years. Most of these commitments are in the poultry sector, which continues to respond to consumer demand more robustly than the swine and dairy industries, where the ongoing use of low-dose antibiotics for prophylaxis is a problem. However, McDonald’s announcement in early 2019 that it would measure and reduce antibiotics in its beef supply, as well as Bon Appétit Management Company’s update to its antibiotic policy to include its seafood supply portend more changes throughout the industry.

In any industry, in any point in time, change is to be expected. But never before has the pace of change in the foodservice industry been so rapid. Consumer demands for transparency and traceability are becoming more and more granular, and the time for food companies to respond is becoming shorter and shorter. So the outcropping of innovation, from business models to protein sources, and the many rigorous sourcing, menuing, operational, and investor initiatives, are all commendable. And yet, there remain critical areas where the foodservice industry must act much, much faster.

Overall, the industry is moving in the right direction: 11 of 12 issues received a score ranging from three (holding steady) to four (making good progress). Unfortunately, the industry took a step back with regards to climate change and supply chain resiliency and transparency, and the continued lack of substantive action in the industry to address water scarcity has kept that issue stalled at a score of two. All in all, however, momentum is building in our industry to drive greater innovation, investments, and education around health and sustainability imperatives.



OUR VISION



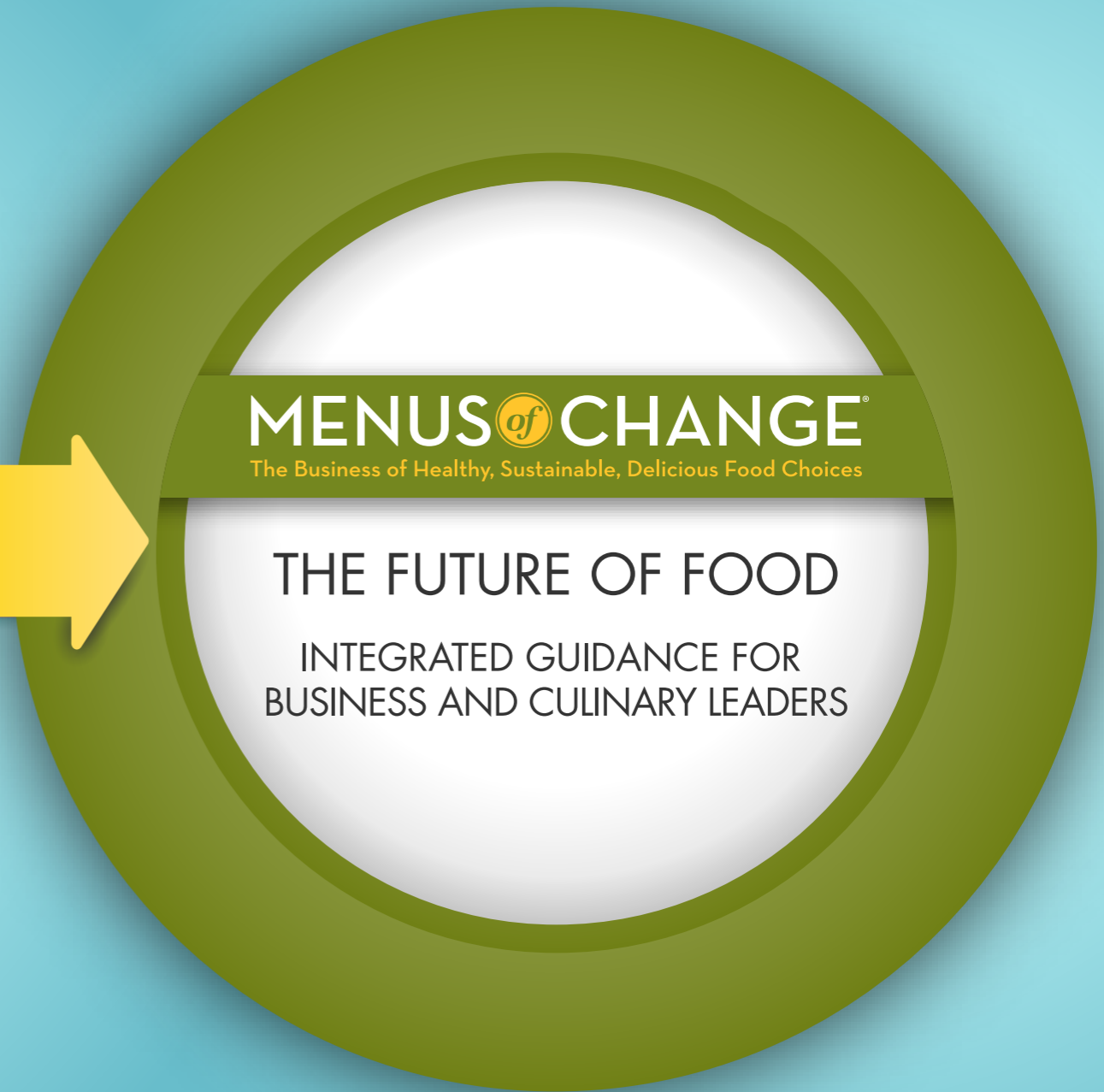
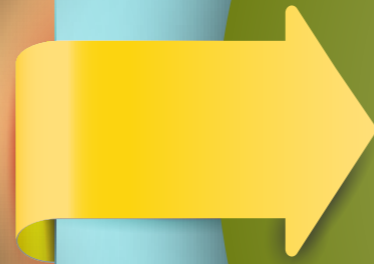
OUR VISION



HEALTHY, SUSTAINABLE,
AND DELICIOUS



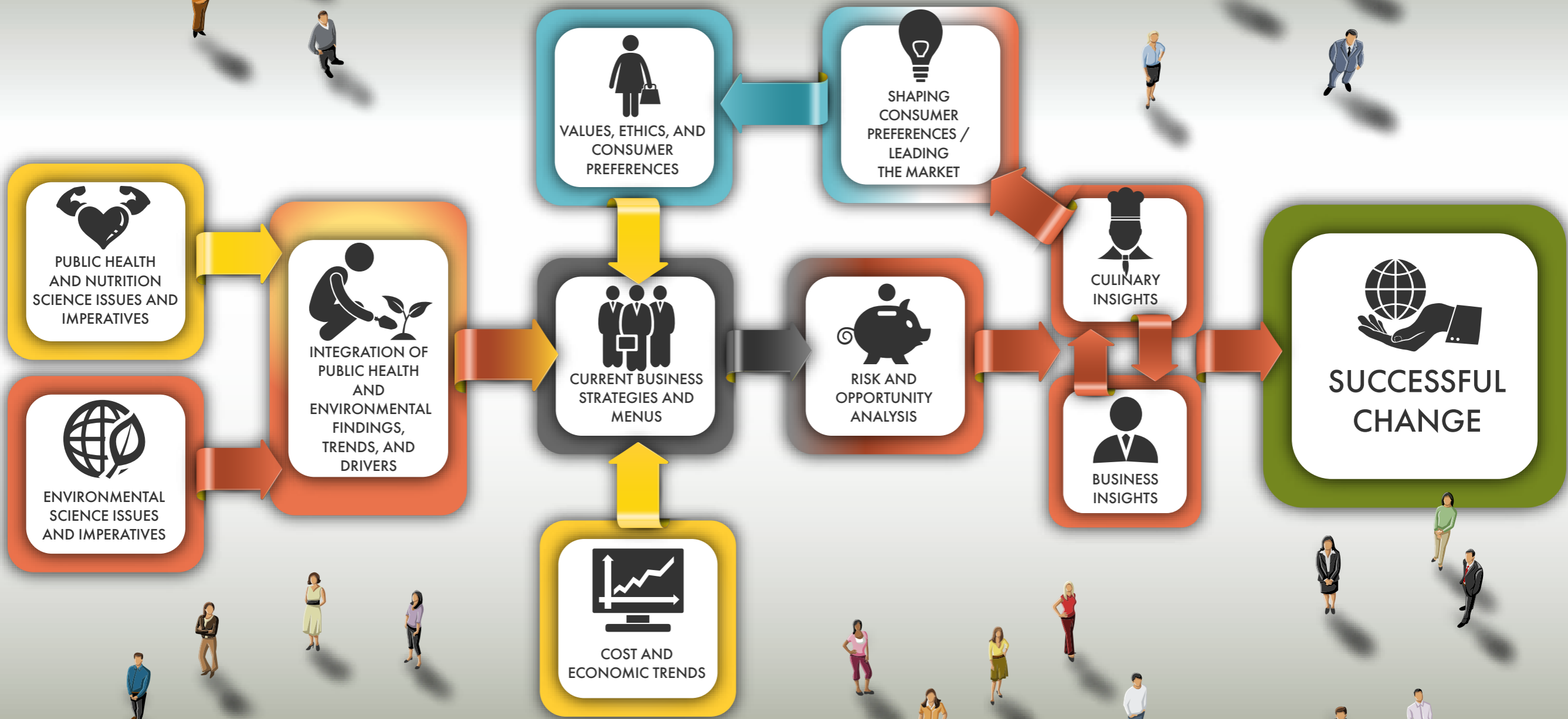
BUSINESS MODELS
AND STRATEGIES



MENUS *of* CHANGE
The Business of Healthy, Sustainable, Delicious Food Choices

THE FUTURE OF FOOD
INTEGRATED GUIDANCE FOR
BUSINESS AND CULINARY LEADERS

GPS: A MODEL FOR CHANGE



STATE OF THE PLATE

How are we doing? Sometimes it's hard to tell. The Menu of Change Dashboard on the next page provides a snapshot of the foodservice industry's progress to improve nutrition, sustainability, and profitability. Its scores on critical issues that affect the foodservice industry are updated annually to show where progress is being made. It also creates a set of standards that are designed to be used by businesses to judge their own efforts on health and sustainability.

Dashboard Score Key

The score assigned to each issue indicates progress or lack thereof in the foodservice industry and/or culinary profession over the last 12 months, as follows:

- 
- 1: SIGNIFICANT PROGRESS**
 - 2: GOOD PROGRESS, WITH ROOM FOR MORE**
 - 3. NO SIGNIFICANT PROGRESS**
 - 4. GETTING BETTER, BUT FAR FROM WHERE IT NEEDS TO BE**
 - 5. SIGNIFICANT DECLINE OR REGRESS**

METHODOLOGY

The scores were developed based on the expert opinions of the members of the Menu of Change Scientific and Technical Advisory Council, who considered new research findings and trend data as well as innovations and changes in business practices and policies. The information was then reviewed by members of the Menu of Change Business Leadership Council to ensure it reflected new industry initiatives and practices.



ISSUE	SCORES					JUSTIFICATION
	2019	2018	2017	2016	2015	
SUPPLY CHAIN RESILIENCY AND TRANSPARENCY						Food products over the past year showed widespread economic fraud and misrepresentation, and reliance on a complex web of food providers and difficulties in traceability posed strong challenges to the stability and resiliency of the supply chain.
CHANGES IN FOOD INDUSTRY INVESTMENT STANDARDS						As investors increasingly engage with publicly traded companies on sustainability, food and restaurant businesses need to be especially responsive to and aware of a widening, often bundled set of concerns, including human rights policies and risks, plastic waste, and climate change.
LOCAL AND REGIONAL FOOD SYSTEMS						Many operators remain committed to local and regional sourcing of produce and perishables, including for globally inspired dishes. While some chefs forge ahead with innovative and exclusively local concepts with onsite gardens, others still have room for improvement in supporting local and regional farms.
LAND USE AND FARMING PRACTICES						The need for increased crop diversity and regenerative agricultural practices is just starting to gain traction in the foodservice sector, but there continues to be little substantial effort in changing how farms and rangelands are used in the U.S. on a large scale.
ANIMAL WELFARE AND DRUG USE						Antibiotic use in industrial food animal production is declining rapidly in the poultry industry but remains a problem in swine, beef, and dairy production. Consumer and regulatory pressures continue to push operators to reduce inappropriate use of antibiotics and to improve overall animal welfare standards.
DIET QUALITY AND HEALTH						The foodservice industry is increasing its range of healthier plant-forward menu options. Chefs are also driving change in meals for children, in schools and in restaurants, though more work needs to be done in improving nutritional quality of meals and food literacy among children through hands-on cooking.
PORTION SIZE AND CALORIC INTAKE						The calorie menu labeling legislation, now in effect, has encouraged recipe and portion size reformulation, but strategic calorie reduction and a focus on nutrient density, quality, and flavor across all foodservice meals is still needed.
PROTEIN CONSUMPTION AND PRODUCTION						The foodservice industry continues to offer more plant-forward menu options highlighting plant-based protein, with alternative meat products becoming mainstream and lab-grown cultured meats arriving on the horizon.
FRUIT AND VEGETABLE CONSUMPTION AND PRODUCTION						Interest among trend-leading chefs, large non-commercial foodservice operators, and their customers in plant-forward menus—including fruits and vegetables—is surging. With younger generations accelerating this trend, we hope to see measurable increased consumption data around fruits and vegetables in future years.
FISH, SEAFOOD, AND OCEANS						Americans eat most of their fish and seafood away from home but only eat half as much as they should. Transformation of U.S. fisheries makes eating locally also generally more sustainable. Chefs and the restaurant industry can play a lead role in helping Americans eat more fish and do so responsibly.
WATER SUSTAINABILITY						From recipe design to equipment to food sourcing (including a greater emphasis on plant-based ingredients), the foodservice industry has many opportunities to adopt innovative solutions to reduce the water footprint of its menus and within its operations.
CLIMATE CHANGE						The restaurant industry and culinary professionals are driving important trends in plant-forward menu innovation but much more needs to be done more quickly and on a larger scale to set targets and track progress toward reduced GHG emissions within operations and across the entire food supply chain.

U.S., already in a long decline since the 1970s, is four times the global average. It's more than twice the average in the European Union and approximately 50 percent more than Canada. All together, Americans eat more meat per person than individuals in any other country.

The target amount of dairy foods, equivalent to about one serving a day, is modestly lower than the current U.S. intake of 1.6 servings per day. The overall evidence does not support reduced fracture risk when consuming higher amounts of dairy, which has been the main argument for higher intakes; this target also meets the World Health Organization's standard for adequate calcium intake.

“The foodservice industry must play a leadership role by creating aspirational plant-forward meals that are flavorful, widely available, and affordable.”

There are large health advantages to shifting to this plant-forward or flexitarian dietary pattern. Three different approaches were used by the commission to estimate the impact of shifting from current diets worldwide to the healthy reference diet, and all three approaches suggested that about 11 million premature deaths could be prevented annually—about 20 to 25 percent of all deaths. Multiple lines of evidence support important health benefits from shifting from diets

that are high in red meat and dairy foods to those that emphasize nuts, beans, and soy products as major protein sources. A traditional nutrient analysis shows many improvements compared to the amounts most people currently consume, although if animal-based foods are reduced below the target diet, vitamin B-12 supplements or fortification may be needed. Controlled feeding studies show that largely replacing red meat with plant-based protein sources will lower the risk of cardiovascular disease, and long-term epidemiologic studies indicate substantially lower rates of cardiovascular disease, diabetes, and other adverse health outcomes.

The commission also calculated the environmental impacts by 2050 if we continue on the current path of high intake of animal-based foods and a global population of 10 billion people. Not surprisingly, we will far exceed planetary boundaries for greenhouse gas production, land use, and other limits. *Adoption of the target diet alone would cut greenhouse gas production in half.* However, improvements in agriculture and large reductions in food waste will also be needed to stay within all planetary boundaries. Therefore, a possible path to healthy and sustainable diets does exist, but it will require major changes in the foods we eat and how we produce these foods.

RIGOROUS METHODS, FLEXIBLE INTERPRETATIONS:

To define a healthy reference diet for calculating environmental impacts, the commission drew on all available evidence from controlled feeding studies, long-term epidemiologic studies, and the small number of applicable randomized trials. Because of inevitable uncertainties about exact amounts and the recognition that humans are adaptable, ranges of intakes and exchanges were also provided (see Table 1, right). This flexibility also allows this dietary pattern to be adapted to different cultures and geographic regions around the world.

Making this great transformation will require the efforts of everyone—policymakers, businesses and institutions across the entire food chain, and individual consumers. Efforts on both the demand and production sides are needed. The foodservice industry must play a leadership role by creating aspirational plant-forward meals that are flavorful, widely available, and affordable.

Fortunately, chefs and foodservice operators—in the U.S. and around the world—are increasingly taking up this challenge, and designing menus that are at once delicious, healthy, and sustainable. Successful innovation in industry business models along with concurrent plant-forward trends in consumer preferences, especially among younger generations, suggest that these goals, though ambitious and highly disruptive, are ultimately achievable. Now what we need is a rapid acceleration of these efforts—and the scaling of the kind of creativity we are already witnessing.

The stakes are high, as the world we pass on to future generations depends on our ability to make this transformation.

	Macronutrient intake (possible range), g/day	Caloric intake, kcal/day
Whole grains*		
Rice, wheat, corn, and other†	232 (total grains 0–60% of energy)	811
Tubers or starchy vegetables		
Potatoes and cassava	50 (0–100)	39
Vegetables		
All vegetables	300 (200–600)	..
Dark green vegetables	100	23
Red and orange vegetables	100	30
Other vegetables	100	25
Fruits		
All fruit	200 (100–300)	126
Dairy foods		
Whole milk or derivative equivalents (eg, cheese)	250 (0–500)	153
Protein sources‡		
Beef and lamb	7 (0–14)	15
Pork	7 (0–14)	15
Chicken and other poultry	29 (0–58)	62
Eggs	13 (0–25)	19
Fish§	28 (0–100)	40
Legumes		
Dry beans, lentils, and peas*	50 (0–100)	172
Soy foods	25 (0–50)	112
Peanuts	25 (0–75)	142
Tree nuts	25	149
Added fats		
Palm oil	6-8 (0–6-8)	60
Unsaturated oils¶	40 (20–80)	354
Dairy fats (included in milk)	0	0
Lard or tallow	5 (0–5)	36
Added sugars		
All sweeteners	31 (0–31)	120

*For an individual, an optimal energy intake to maintain a healthy weight will depend on body size and level of physical activity. Processing of foods such as partial hydrogenation of oils, refining of grains, and addition of salt and preservatives can substantially affect health but is not addressed in this table. *Wheat, rice, dry beans, and lentils are dry, raw. †Mix and amount of grains can vary to maintain isocaloric intake. ‡Beef and lamb are exchangeable with pork and vice versa. Chicken and other poultry is exchangeable with eggs, fish, or plant protein sources. Legumes, peanuts, tree nuts, seeds, and soy are interchangeable. §Seafood consist of fish and shellfish (eg, mussels and shrimps) and originate from both capture and from farming. Although seafood is a highly diverse group that contains both animals and plants, the focus of this report is solely on animals. ¶Unsaturated oils are 20% each of olive, soybean, rapeseed, sunflower, and peanut oil. ||Some lard or tallow are optional in instances when pigs or cattle are consumed.*

Table 1: Healthy reference diet, with possible ranges, for an intake of 2500 kcal/day (courtesy EAT-Lancet Commission on Food, Planet, Health)



IV. DEFINING PLANT-FORWARD: GUIDANCE FOR OUR INDUSTRY

PLANT-FORWARD

A style of cooking and eating that *emphasizes and celebrates*, but is not limited to, plant-based foods—including fruits and vegetables (produce); whole grains; beans, other legumes (pulses), and soy foods; nuts and seeds; plant oils; and herbs and spices—and that reflects evidence-based principles of health and sustainability.

WHAT'S IN A NAME?

To help you communicate to your industry colleagues, the media, and, as needed, your customers the distinctions between different menu strategies that leverage vegetables, fruits, nuts, legumes, whole grains, and plant proteins in leading roles, we've settled on some naming protocols.

- ☛ **Plant-Forward:** Please see definition on the right. “Plant-forward” is a big-tent concept for dietary and food system transformation that includes a whole range of healthier, more sustainable culinary approaches—from those that contain poultry, fish, dairy, and/or small amounts of meat to vegetarian and vegan offerings.
- ☛ **Plant-Based:** Used to refer to ingredients and foods themselves, i.e., fruits and vegetables (produce); whole grains; beans, other legumes (pulses), and soy foods; nuts and seeds; plant oils; and herbs and spices. Different from “plant-forward,” which refers to the style of cooking and eating that emphasizes and celebrates these foods, but is not limited to them.
- ☛ **Vegetarian:** Dishes or dietary patterns that do not contain meat, poultry, or fish but may, or may not, contain dairy, eggs, and/or honey, and individuals who do not eat meat, poultry, or fish but may, or may not, eat dairy, eggs, and/or honey.
- ☛ **Vegan:** Dishes or dietary patterns that do not contain any ingredients that came from animals, and individuals who do not eat any ingredients that came from animals.
- ☛ **Flexitarian:** Dietary patterns that are more focused on plant-sourced foods and much less reliant on meat—often following, for some or many meals, a vegetarian model—but that may occasionally include meat, as well as some poultry, fish, or dairy foods. Such plant-forward menus or food choices might also be called “plant-rich” or “more plant-based.”

HEALTHY, SUSTAINABLE, PLANT-FORWARD FOOD CHOICES

This distilled guidance about the future of our food choices, for individuals and professionals, is an outgrowth of multiple, joint leadership initiatives of The Culinary Institute of America and the Department of Nutrition at Harvard T.H. Chan School of Public Health, including Menus of Change; Healthy Kitchens, Healthy Lives®; Teaching Kitchen Collaborative; and Worlds of Healthy Flavors. It reflects the best current scientific evidence supporting optimal, healthy, and sustainable dietary patterns while addressing vital imperatives to achieve short- and long-term global food security.

Healthy, sustainable, plant-forward food choices—when informed by culinary insight—can transform palates and spur next-generation innovation, as is evident in the success of new menu, restaurant, and retail product concepts thriving in the marketplace. In short, this is a practical, achievable vision for a delicious future. For more information, please read the Principles of Healthy, Sustainable Menus at menusofchange.org.

Plant-forward is primarily envisioned as a B2B term, not a way to describe dishes on menus. For that, operators are encouraged to lead with descriptors that convey flavor, quality, deliciousness, sense of place, ties with local producers, seasonality, culinary adventure, cultural contexts or heritage, fun, and/or innovation or invention—according to their distinct restaurant or foodservice concept.

HEALTHY, SUSTAINABLE, PLANT-FORWARD FOOD CHOICES ARE THOSE THAT:

- Feature minimally processed, slow-metabolizing plant-based foods: fruits and vegetables (produce); whole grains; beans, other legumes (pulses), and soy foods; nuts and seeds; healthy plant oils; and herbs and spices.
- Place animal-based foods in a reduced or optional role, with a special emphasis on decreasing purchases of red meat and minimizing foods sourced from animals raised with the routine, non-therapeutic use of antibiotics. These choices prioritize fish and poultry among animal-based proteins, with dairy options and eggs playing a supporting role (if desired).
- Might include vegetarian and vegan choices.
- Highlight the value of fresh, seasonal, locally produced foods; minimize sugary beverages and added sugars and sweeteners; and reduce sodium and unhealthy additives.
- Emphasize healthy dietary patterns and a rich diversity of whole foods versus an undue focus on specific nutrients and percentages; avoid excess quantities of calories but first ensure calorie quality.
- Celebrate cultural diversity, personal needs and preferences, and the unapologetic elevation of deliciousness, including room in our diets for foods of special occasions.
- Begin with transparent ingredient sourcing that supports sustainable farming methods and fisheries.
- Through food purchasing patterns, encourage innovation and sustainable practices in retail food and restaurant concepts and business models to advance public health, social well-being, and our food system.





V: THE QSR-CIA PLANT- FORWARD FAST CASUAL WATCH LIST

As the plant-forward food movement flourishes, these are the fast-casual concepts taking it mainstream.

By Nicole Duncan

To complement our recent partnership with the EAT Foundation in highlighting noteworthy independent restaurant chefs around the world who are leading in plant-forward menu innovation—the Plant-Forward Global 50—the CIA recently teamed up with *QSR* magazine to bring greater attention to the incredible diversity and creativity around plant-forward concept and menu design in the American fast casual sector. We are pleased to reprint, on pages 15-22 of this year's *Menus of Change Annual Report*, the results of this collaboration, originally published in the May edition of *QSR*.

The limited-service restaurant industry is known for its fast-paced evolution and fads that come and go. Some trends, though, have lasting power, and none represent a sea change quite like the shift toward plant-forward eating, which has evolved from a fringe category to an industry craze shaping the future of foodservice.

The movement carries a sense of urgency, as the world faces a triple threat of increased food scarcity, nutrition-based health epidemics, and environmental degradation. A recent report by the *EAT-Lancet* Commission puts forth a plan to address all three of these issues and sustainably feed an estimated global population of 10 billion by 2050. While the approach is multifaceted, it all begins with food, namely a shift to diets and production rooted in vegetables, fruits, whole grains, and plant proteins.

Through educational resources and thought leadership, The Culinary Institute of America (CIA) is helping to define the plant-forward movement for the restaurant industry; its events, including the Global Plant-Forward Culinary Summit (May 1–3 in Napa, California) and *Menus of Change* (June 18–20 in Hyde Park, New York) provide a framework upon which the industry can build a more plant-friendly future. And *QSR* is thrilled to partner with the CIA in that endeavor, particularly as it relates to the fast-casual industry. After all, fast casual is the perfect meeting point of culinary innovation and scalable operations, and it has the power to bring plant-forward meals to the masses.

In this first-ever *QSR-CIA Plant-Forward Fast Casual Watch List*, we set out to curate a catalog of fast-casual players that are blossoming alongside the plant-forward movement. Some are exclusively vegan, while others include animal products on their menus. A few specialize in fusion bowls, and others re-imagine fast-food classics. What they all do, no matter their size, home base, or cuisine, is make plants the stars of their menus, not just relegating them to a supporting role.

We think these brands have the potential to redefine plant-forward eating for the future. After all, the plant-forward movement may have sprouted from a seed into a sapling, but it's still got a long way to grow.



BETTINA STERN (ABOVE, RIGHT) AND SUZANNE SIMON RECENTLY OPENED THE SECOND LOCATION OF CHAIA TACOS, WHICH SERVES 100 PERCENT VEGETARIAN, NUT-FREE FARE.

THE ORIGINAL CHAIA TACOS IN DC'S GEORGETOWN NEIGHBORHOOD SERVED BEER AND WINE, WHILE THE RECENTLY OPENED, LARGER LOCATION HAS ADDED CRAFT COCKTAILS.

CHAIA TACOS

HQ: Washington, D.C. Units: 2

With the possible exception of burgers, few categories are as beloved in the fast-casual space as tacos. The versatile carrier has moved far beyond its Mexican roots to cradle everything from Korean bulgogi to chicken tikka masala. But despite this outpouring of innovation and affection, tacos have remained largely a carnivore's delight.

That's not the case at Chaia Tacos, where the tacos are the proverbial meat of the menu; all dishes are vegetarian, and all but one item—the Creamy Kale and Potato taco—can be made vegan. The restaurant is also entirely nut-free, and the only gluten-containing item is the craft beer on tap.

"All of those [attributes] make it easy to come if you have dietary restrictions, but we don't think of ourselves as a dietary-restriction place. We just hit those modes," says Bettina Stern, who cofounded the concept with Suzanne Simon in 2015. "We're making it easier to have those yummy, delicious, healthier, more sustainable menu items at the ready. ... They are the most luxurious items on the plate."

At a glance, Chaia's menu could be easily mistaken for that of a more upscale, sit-down establishment. Seasonal, locally sourced vegetables reveal their diverse nature, whether hearty in tacos like the Braised Mushroom, or refreshing as in the Citrus-Roasted Beets taco or the Sautéed Green Cabbage taco with watermelon relish. Aside from tacos, the menu includes a Roasted Celery Root Tlayuda entrée (black beans, feta, pickled apple, and pipián atop a duo of crisped tostados) and a Carrot Kohlrabi Slaw with sweet and spicy vinaigrette, jalapeño, and fresh herbs.

Given such enticing options, it's no wonder that omnivores comprise a solid 80 percent of Chaia's patronage, by Stern's estimation. That widespread popularity proves the brand need not proselytize the inherent virtue of veggies to win a loyal following—something that Stern and Simon, both working

mothers, can appreciate. "We're just putting vegetables on your plate. We're making them really delicious and hoping that they'll convert those veggie-scared people who don't know how to cook vegetables at their yummiest," Stern says. "But we're definitely not trying to tell you what to do."

The two spent years serving veggie tacos at a D.C.-area farmers market before opening their first brick-and-mortar Chaia in Georgetown. This January, store No. 2 made its debut in a space about twice the size of the original; Stern hopes the bright atmosphere and extra room encourage guests to linger.

The second location also marks a significant upgrade in Chaia's beverage program. While craft beer and wine were mainstays at the original, the new spot serves a signature margarita, as well as an Apple Shrub Toddy and Ruby Paloma (mezcal, grapefruit, lime, and ginger agave).

Up next, Chaia has locked down a deal for a kiosk in an upcoming food hall right in the heart of D.C. —a throwback of sorts to its early days at the farmers market.

Stern would like to take the brand nationwide but is still wrestling with what that expansion plan would look like. The founders have taken an especially careful approach to their business, leading Stern to question whether it could ever work in a franchise model.

Nevertheless, she sees potential for a concept like Chaia even in a market as pricey as New York City or one as saturated in vegetarian fare as California.

"I think our concept would go over really well there, because you've already got people who are eating a plant-forward diet. ... The only concern about going to California—the veggie-and-fruit basket of the country—is that there is definitely more competition," Stern says. "But I don't believe there is anybody doing what we are doing."

CHAIA TACOS



MULBERRY & VINE

MULBERRY & VINE

HQ: New York Units: 5

The plant-forward scene is alive and well in the Big Apple thanks to innovative concepts like Mulberry & Vine, which welcomes consumers of all diet stripes. The veg-heavy plates and bowls are packed with veggies dressed in global flavors, from lemony Shaved Brussels with fennel and dates to Sesame Scallion Tofu and Miso-Maple Acorn Squash.

LITTLE BEET

HQ: New York Units: 10

This New York City-based concept used recipes from chef and cofounder Franklin Becker as a jumping-off point for its menu of gluten- (and “guiltin”-) free fare. The vegetarian and vegan options are a step above the competition; think BBQ Jackfruit, Sesame Avocado with yuzu vinaigrette, spirulina-studded rice, and turmeric almonds.

SALATA

HQ: Houston Units: 86

While Salata’s build-your-own menu includes chicken, seafood, and cheese, the vast majority is plant-based, with a wide variety of veggies, lettuces, fruits, nuts, and alternative proteins. Already this year the brand has debuted a new store prototype and hired its first-ever development officer, signaling more growth ahead.

FLOWER CHILD

HQ: Phoenix Units: 19

Flower Child entered the dining scene in 2014 with some serious firepower. Not only is it under the auspices of acclaimed restaurateur Sam Fox, but it also benefited from the culinary blueprint of former sister brand, True Food Kitchen. In that same spirit, the fast casual’s menu follows the anti-inflammatory food pyramid, which emphasizes vegetables, legumes, and whole grains over animal products.

MARK AND MARY ANN BEAUCHAMP WERE WELL AHEAD OF THE PLANT-FORWARD EATING CURVE, HAVING OPENED CAFE YUMM! IN THE 1990S. FOR MORE THAN 20 YEARS, CAFE YUMM! HAS EXPANDED WITHIN OREGON AND WASHINGTON, BUT NOW THE CHAIN IS LOOKING FARTHER AFIELD WITH A MULTIUNIT DEAL ALREADY UNDERWAY IN IDAHO.



CAFÉ YUMM!

HQ: Eugene, Oregon Units: 23

If a customer asks whether Café Yumm! serves animal proteins, the answer may very well be, “No, ma’am.” Or at least that’s the pun cofounder Mark Beauchamp will answer with, “ma’am” in this case being short for “mammals.” The Pacific Northwest chain does have poultry on the menu, but it’s hardly the focus. Instead, Café Yumm! puts veggies front and center, starting with its signature bowls. A hearty base of rice and beans is bolstered by global flavors—mostly of the pan-Asian persuasion—



CAFÉ YUMM!

and guests have the option to build their own from the ground up. Wraps, sandwiches, bento boxes, soups, and salads round out the menu. As Beauchamp points out, dishes like the Turkey Reuben and Cheese Quesadilla serve as reassuring touch points for those less familiar with plant-forward dining or the bowl format.

“Some first-time guests are relieved to see a sandwich on our menu. By the second or third visit, they’ll try a Yumm! Bowl [or] something more uniquely Café Yumm!,” Beauchamp says. For him and wife/cofounder Mary Ann, the menu harkens back to ancient culinary traditions found the world over.

“Tofu and tempeh are nourishing, traditional staples in many cultures, even if they sound like they came from 1960s Berkeley,” Beauchamp says, adding that rice is a staple in nearly every culture. “Plant-based [eating] has been around for a while, but it wasn’t called that. You were vegetarian or you weren’t.”

Even in bringing back a very old style of eating, the Beauchamps were well ahead of the plant-forward craze. Prior to Café Yumm!, the pair had opened another restaurant, Wild Rose, where Mary Ann regularly changed the menu, experimenting with different dishes and flavors from her eclectic culinary roots (she was born in Japan, grew up partially in Italy, and worked under chefs of various nationalities).

In 1997, the Beauchamps transitioned the business to Café Yumm to infuse it with a bit more consistency. Since then, it’s grown to 20-plus locations between Oregon and Washington. Last fall, Boise, Idaho, welcomed its first Café Yumm! store, with more to follow as part of a multi-unit deal.

Broadening consumer tastes could certainly bolster future growth, plus the Beauchamps have another ace up their sleeve. The company’s signature Yumm! Sauce is available in 160 grocery stores across the West Coast, and the company also fulfills mail orders for fans in all 50 states. The insights gleaned from the CPG side of the business may prove invaluable in deciding where to next plant a flag.

This cluster strategy, Beauchamp points out, is also how Howard Schultz jumpstarted Starbucks’ path to omnipresence back when it was a petite company shipping small-batch coffee across the country.

NEXT LEVEL BURGER

HQ: Bend, Oregon Units: 8

The husband-and-wife duo behind “America’s first 100 percent plant-based burger joint” has designs to take it to the, um, next level with 1,000 locations nationwide. Even more impressive than the brand’s vegan take on burger classics is the range of options: a dozen different burgers and milkshakes; seven styles of fries; four hot dogs; and three salads.

PANERA BREAD

HQ: St. Louis Units: 2,000+

This founding member of the fast-casual movement may have built its reputation on traditional bakery and café fare, but in recent years Panera has demonstrated that even a wide-scale chain can pivot further toward plants. Its selection of broth bowls includes three vegan varieties utilizing proteins like edamame, quinoa, and soba noodles, as well as greens and vegetables.

AMY’S DRIVE THRU

HQ: Santa Rosa, California Units: 1

Nearly 30 years after Amy’s Kitchen debuted its microwavable meals, the company spun out a proprietary drive-thru concept. Amy’s slings vegetarian versions of drive-thru staples like burgers, pizza, and burritos, as well as mac ‘n’ cheese, salads, and soups. Its second location is expected to open in July.

COPPER BRANCH

HQ: Montréal, Québec Units: 56

This growing franchise hails from our neighbor to the north but has ambitious plans for U.S. expansion, beginning with New York City. The versatile menu most closely resembles a classic fast casual like Panera Bread, with a selection of sandwiches, soups, bowls, breakfast fare, coffee, smoothies, and more—but all of it is plant-based.

SWEETGREEN

HQ: Los Angeles Units: 91

It’s not a stretch to say that the build-your-own better-salad category can be traced back to this D.C.-born, now-California-based concept. A dozen years in, Sweetgreen continues to push the envelope with tech and its selection of seasonal, sustainably sourced ingredients. Acclaimed chef Dan Barber even helped them serve a rare variety of squash last fall.

CHOO LAAH INDIAN BBQ

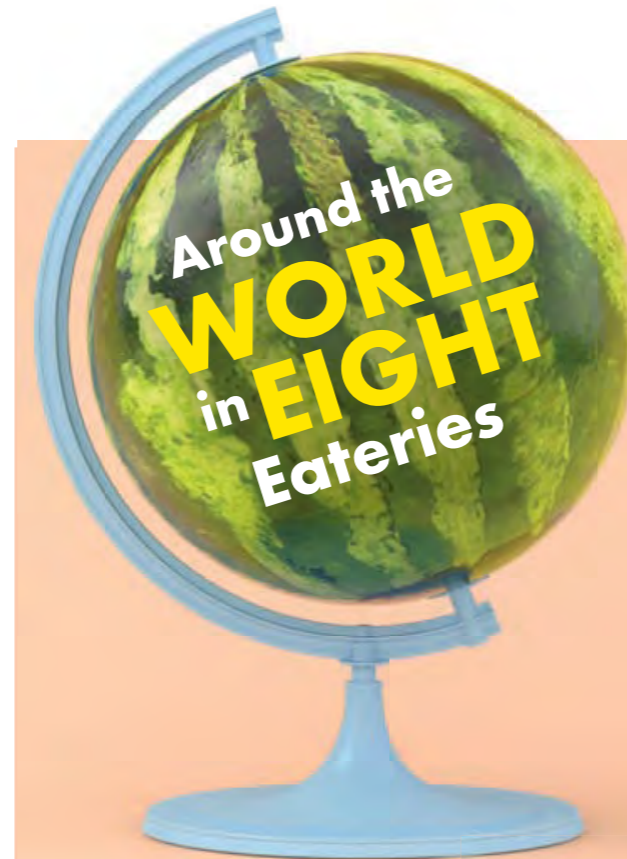
HQ: Pittsburgh Units: 5

This Midwest micro-chain proves the demand for global cuisines—especially those with a vegetarian slant—has expanded beyond coastal metropolises. Founded in Pittsburgh, Choolaah allows guests to customize their Indian bowls with paneer, veggie croquette, tofu, and roasted veggies.

CHOPT

HQ: New York Units: 58

Amid the glut of fast-casual stars, Chopt distinguishes itself with a rotating selection of Destination Salads to highlight various global flavors. While a fair number of its signature dishes do include animal proteins, guests have the option to customize or build their own from the bottom up, with a slew of veggies and plant proteins like chickpeas, falafel, and tofu.



Despite an abundance of fertile farmland, the U.S. leans heavily on meats and other animal-based foods. Other cultures have a rich history of plant-forward diets, and as more consumers become open to global cuisines and unexpected flavor profiles, the world of veg-forward dining expands into infinite possibilities.

MEDITERRANEAN

Encompassing a multitude of nations on the Mediterranean Sea, the dishes vary but often feature ingredients like tomatoes, onions, chickpeas, apricots, and olive oil.



- | | | |
|-----------------------------------|------------------------------------|------------------------|
| 1. Crazy Pita | 4. SAJJ Mediterranean | 7. Taim Falafel |
| 2. Mamoun’s | 5. Shouk | 8. Yalla Mediterranean |
| 3. Pita Mediterranean Street Food | 6. Spitz Mediterranean Street Food | |

INDIAN

Regional specialties shine throughout the subcontinent, but as a whole Indian fare embraces bright spices and plant-forward entrées, often eschewing animal proteins.



- | | | |
|-----------------------|-----------------|-------------------------|
| 1. Curry Up Now | 4. RASA | 7. Tarka Indian Kitchen |
| 2. Kasa Indian Eatery | 5. Saucy Bombay | 8. Tikkaway |
| 3. Naan Stop | 6. Spice 6 | |

EAST ASIAN

From Thai and Vietnamese to Korean and Japanese, East Asian cuisine capitalizes on a vast array of veggies, as well as traditionally prepared ingredients like tofu and kimchi.



- | | |
|-------------------------|-------------------|
| 1. Báhn Shop | 5. Korilla BBQ |
| 2. Bon Me | 6. Mr Bing |
| 3. Brightwok Kitchen | 7. Onigilly |
| 4. Crushcraft Thai Eats | 8. Zao Asian Cafe |

BACKGROUND: ISTOCKPHOTO / SMALL SMILES; MEDITERRANEAN FOOD: ISTOCKPHOTO / RUDIGORBO; INDIAN FOOD: ISTOCKPHOTO / SUBODHSAHE; EAST ASIAN: ISTOCKPHOTO / THESOMEIRL

CAVA

HQ: Washington, D.C. Units: 80

CAVA synthesizes the build-your-own-bowl model with Mediterranean flavors—and to great fanfare. The brand is planting flags across the country while driving a side CPG business of its proprietary dips and spreads, all of which are vegetarian. At the restaurants, hummus, tzatziki, falafel, and sriracha Greek yogurt help satiate herbivores.

LOCALI

HQ: Los Angeles Units: 4

The burgeoning West Coast brand marries deli classics to vegan sensibilities as seamlessly as it does a quick-service restaurant to grab-and-go bodega model. Beyond an assortment of panini, salads, and Notorious Badass Breakfast Sandwiches, Locali also whips up chia bowls, frozen yogurt, and “beauty smoothies.”



THE PLANT CAFE ORGANIC

THE PLANT CAFE ORGANIC

HQ: San Francisco Units: 5

California produce meets Asian flavor at this organic-only micro-chain. Eschewing the ubiquitous build-your-own format, the Plant Cafe Organic instead opts for a wide selection of signature dishes, hitting various dayparts and proving once and for all that plant-forward dining goes beyond lunch salads.

GRABBAGREEN

HQ: Phoenix Units: 26

This franchise, founded by two concerned moms, has grown into suburbs across the country. Its mission? To make healthier eating more accessible for families and middle-class consumers. Chock full of veggies, the selection at Grabbagreen is rooted in bowls and wraps but also includes soups, smoothies, elixirs, and a kids menu, to boot.

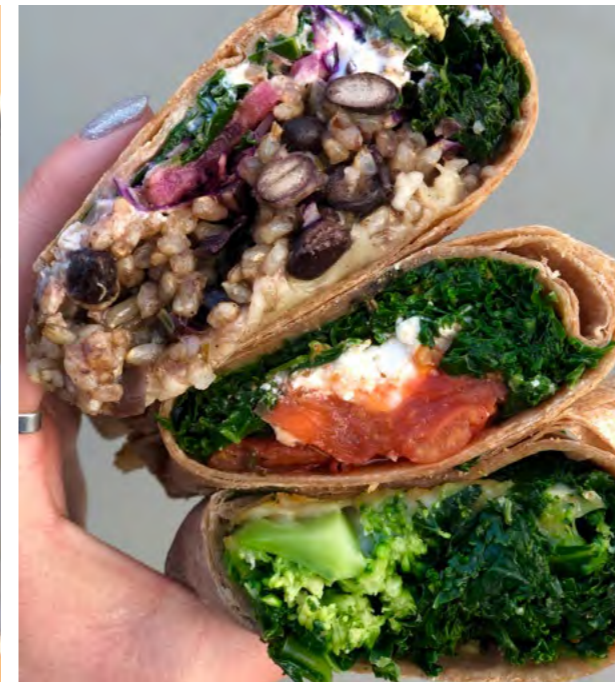
LIVE ALIVE

HQ: Boston Units: 4

Under the direction of chef Leah Dubois, Life Alive showcases “ther-apeutic” veg-forward foods in bowls, salads, and wraps. The beverage selection



LIVE ALIVE



is equally extensive, with functional smoothies, juices, shots, and even lattes from house-made coconut crème. Although Live Alive has yet to expand beyond the Boston area, it has managed to attract the attention—and investment—from Panera Bread founder Ron Shaich.

BY CHLOE

HQ: New York Units: 13

Veganism has always been a lifestyle choice, but by CHLOE manages to turn it into a lifestyle aspiration. The veg-only restaurant applies poppy design elements to its restaurants, menus, and social media accounts. To that end, the brand is targeting trendy neighborhoods in big cities like New York, Philadelphia, and Los Angeles.

PUTTING THE LIST TOGETHER

In any field, the identification of leadership and innovation is not an exact science.

For this Watch List, we asked a series of questions: Is this concept significantly elevating fruits and vegetables? How about plant protein? Is it creating more choices



around vegetarian, vegan, and “veg-centric” options? What about highlighting the potential for meat and poultry to be a supporting player on menus instead of always needing to be the star? Does the concept leverage healthy traditions of world cuisines to create deliciousness with plant-based ingredients? Is there a nudge toward whole grains, healthy plant oils, and whole foods that are minimally processed? Is there an effort to support seasonality and advocate for sustainable production methods? Who is implementing at least a handful of the Menu of Change Principles of Healthy, Sustainable Menus?

With this list, The Culinary Institute of America and QSR hope to shine a light on the many talented innovators who have taken up the plant-forward challenge—as captured by these questions—and are bringing their customers the next-generation flavors they desire. Please write to us at plants@qsr magazine.com to let us know what you think—and which brands we might have missed.

For more inspiration on plant-forward, please visit the CIA’s www.plantforwardkitchen.org and www.menusofchange.org websites.

HIPCITYVEG

HQ: Philadelphia Units: 5

Nicole Marquis is on a mission to build a more sustainable foodservice future, but don't expect her to promote HipCityVeg from that perspective. Instead, the all-vegan restaurant ensnares customers with a menu that yokes plant-forward dining to fast-food classics.

"I want to show people that they can have their favorite foods without any animal products, be totally satisfied, and have it all come from plants," Marquis says.

HipCityVeg's selection of salads obviously falls on the more healthful side of the spectrum, but even indulgences like burgers, sandwiches, shakes, and fries have an inherent health halo when compared to animal-based counterparts.

While many plant-focused fast casuuls have jumped on the veggie-burger bandwagon, HipCityVeg differentiates itself from the competition through its expansive Chick'n section. The micro-chain sources soy-based Gardein products and then uses its own proprietary seasonings to blacken the meat alternative for its Chipotle Fajita, grill it for the Disco Chick'n, or fry it for the Lil' Golden Nuggets (the last of which is a fun throwback to Marquis' childhood; she grew up loving fast-food chicken tenders).

And despite some initial customer confusion over what exactly Chick'n is (actual chicken? Chicken alternative?), the Crispy HipCity Ranch is a best-seller. The other two top performers are the BFG Smoothie and the sweet potato fries.

But the success of this menu category comes at a price—and a hefty one at that. "It's a premium product that's expensive to source," Marquis

says. "It's not like chicken or beef where you have so many options and can benefit from economies of scale."

Expansion for HipCityVeg could help offset those costs in the future. The company has grown to four Philadelphia locations since it first opened in 2012. It made its D.C. debut four years later and has a second spot in the works for 2019. This year also marks the urban-chic brand's first foray into the 'burbs, with deals in two bedroom communities on the outskirts of Philadelphia.

Marquis knows that moving forward, customer education will be vital to Hip-CityVeg's success, especially in new markets where word of mouth will be nonexistent at the start. "We can't rely on our home-turf advantage," she says. Including photos of various menu items is one straightforward way the brand bridges the gap for first-time guests and those unfamiliar with vegan fare.

Still, the winds of change are blowing in Marquis' favor, as more consumers come around to the idea of plant-forward foods.

"In 2012, a Google analytics poll showed 'veganism' had a negative connotation. Terms associated with vegan were things like trend, substitute, extreme, animal cruelty, or food restrictions," Marquis says. "Today, it's associated with more positive terminology like healthy, vegetable, lifestyle, and organic."

TENDER GREENS

HQ: Culver City, California Units: 31

By CEO Denyelle Bruno's own admission, Tender Greens is on a mission to indelibly change consumer dining habits in a way that is better for both themselves and for the planet. The brand doesn't shy away from animal proteins, but options like the Happy Vegan salad and falafel sandwich satisfy the plant crowd.

TOCAYA ORGANICA

HQ: Los Angeles Units: 80

Limited service has no shortage of build-your-own Mexican players, but Tocaya has an edge on the competition, borrowing culinary inspiration from full-service sister, Toca Madera. To wit, veg proteins are elevated to a new level in the form of adobo tofu and vegan picadillo, while the selection of queso includes a vegan take on mozzarella and chipotle jack.

VEGGIE GRILL

HQ: Los Angeles Units: 33

One of the first fast casuuls to stake a claim in plant-forward food, Veggie Grill is bringing its West Coast-winning fare eastward. The chain opened its first Chicago shop in early 2018 and has designs on Boston and New York before the year is out.

SINCE OPENING HIPCITYVEG IN 2012, FOUNDER NICOLE MARQUIS (BELOW) HAS WATCHED CONSUMERS BECOME MORE OPEN TO PLANT-BASED EATING.



HIPCITYVEG



CLOVER FOOD LAB

CLOVER FOOD LAB

HQ: Boston Units: 12

The care taken at each location of this Boston-area concept is palpable. Clover has a special story behind each shop (including two Whole Foods outposts) and updates the menus every day at each. The menu encompasses unique offerings such as vegan barbecue, a veggie mezze platter, and Moroccan Carrot Salad.

GOLDIE

HQ: Philadelphia Units: 3

When a James Beard Award-winning chef turns his attention to the fast-casual space—and the vegan category at that—it signals a sea change for the industry. Michael Solomonov of Zahav brings a streamlined menu of Israeli-inspired falafel, with classic Middle Eastern condiments like harissa and amba, as well as Tehina Shakes in flavors such as Turkish Coffee and Mint Chocolate.



JOE & THE JUICE

JOE & THE JUICE

HQ: Copenhagen Units: 288 worldwide (60 U.S.)

This Danish brand brings a robust selection of juices—featuring unorthodox ingredients like butternut squash and elderflower—as well as breakfast-leaning fare, “Joegurts,” and wellness shots to the traditional coffeehouse paradigm. With nearly two dozen locations in New York City and even more in California, Joe & The Juice could follow in the footsteps of other ubiquitous European brands like Pret a Manger. And don’t miss its crispy, toasted Danish whole-wheat, panini-style sandwich bread.

BEEFSTEAK

HQ: Washington, D.C. Units: 4

Inspired by his own dietary improvements, acclaimed chef José Andrés opened this build-your-own concept where vegetables are the stars of the show. Beefsteak’s expansion into college campuses and hospitals further drives home its commitment to the healthy life.

FRESHII

HQ: Toronto Units: 300+

Founded in 2005, this Canadian franchise has aggressively worked its way south with hundreds of U.S. locations, as well as other international outposts. While not an exclusively plant-forward concept, Freshii’s build-your-own model packs in the greens and includes vegetarian and vegan options.



GOLDIE

WHEN FAST FOOD MET VEGGIE

The plant movement is spreading beyond niche independents and micro-chains and onto the menus of some of the biggest names in limited service.



- Just two months ago, **Chipotle (1)** unveiled its Plant-Powered Lifestyle Bowls with both vegetarian and vegan iterations.
- In February, **Panda Express (2)** announced its Eggplant Tofu and Chow Mein dishes, as well as its steamed rice and Super Green sides would be 100 percent plant-based after having cooked the items in chicken broth.
- **Carl’s Jr. (3)** teamed up with Beyond Meat to create a vegan version of its Famous Star Burger in January.
- After collaborating with Impossible Foods for six months, **White Castle (4)** began serving Impossible Sliders system-wide last fall.
- **Taco Bell (5)** kicked off 2019 with a new emphasis on its veg-friendly offerings; it’s testing a menu dedicated exclusively to vegetarian options.
- In 2017, **Sonic Drive-In (6)** became the first major chain to combine ground beef and mushrooms in a blended burger called the Signature Slinger.
- **Burger King** just announced that it is testing an Impossible Whopper in St. Louis, becoming the first national quick-service chain to feature the Impossible Burger.



CORELIFE EATERY

HQ: Syracuse, New York Units: 52

It may be a misnomer to call CoreLife Eatery the next-generation Panera Bread—for starters, the former has nary a bagel, muffin, or scone on its menu—but the two do share certain similarities. Both caught the coattails of bigger trends, bringing them from the big cities to smaller, oft-overlooked markets. For Panera that was bakery/café fare. For CoreLife Eatery, it's veg-packed bowls that capitalize on the functional-foods movement.

“We do have some synergies with Panera, but whereas it has a broad fan base, we have loyal enthusiasts,” says CoreLife Eatery president Scott Davis.

He speaks from personal experience; Davis was on the ground level when Panera first started and spent nearly 30 years driving the brand forward in various roles, the most recent of which was chief concept and innovation officer. He joined the CoreLife Eatery team in 2016, just about a year after the initial store opened in Syracuse, New York. Since then, growth has skyrocketed to span more than 50 locations across 11 states.

The menu is vast, with two dozen signature bowls, as well as the option for guests to build their own entrées in either bowl or plate format. The ingredients aren't strictly vegan or even vegetarian, for that matter; tuna, chicken, and steak are among the protein options, but so are roasted tofu, edamame, avocado, quinoa, and other satiating plant-based options. Although the Southwest Grilled Chicken and Purple Rice is the No. 1-selling item, the vegetarian Mediterranean green bowl with house-made falafel, hummus, shredded kale, tomatoes, and feta is among the top five performers.

This wide array of choices not only elevates CoreLife Eatery's culinary profile, but it also eliminates veto votes. Customers of all stripes—from paleo and keto to vegan and vegetarian—can find options within their dietary restrictions.

“Instead of pushing any one style of eating, we emphasize overall healthfulness. We consider ourselves to be diet-agnostic,” Davis says. For

example, the brand holds 21-day challenges wherein guests are encouraged to clean up their eating for three weeks by eliminating ingredients like added sugar, hydrogenated oils, and gluten. Over the course of the challenge, CoreLife Eatery emails participants nutrition information; one message may discuss the paleo lifestyle, while another delves into plant-forward eating. Ultimately, the brand provides the facts but then leaves it to customers to decide.

Consumer trust and community inroads have been vital in fueling growth and introducing new markets to CoreLife Eatery's veg-filled offerings. “Our goal is to build credibility with the wellness influencers in a community. Before we open a location in a new market, we have local marketers pay visits to the gyms, yoga studios, and other fitness brands to let them know what we offer and how committed we are to making a positive difference through our food,” Davis says. “After a new location is open, we will host events at the eatery like yoga classes. For us, it's a way to extend the brand beyond the four walls and beyond what a fast casual can be.”

BEYOND SUSHI

HQ: New York Units: 6

Vegan sushi is a thing now thanks to Beyond Sushi, which founder Guy Vaknin now plans to expand to the West Coast (along with a hybrid service model that includes some table-service locations). In October, the radical concept proved its mettle on an episode of “Shark Tank,” walking away with a \$1.5 million investment.

WHOLE HEART PROVISIONS

HQ: Boston Units: 3

Chef Rebecca Arnold teamed up with James DiSabatino, founder of food truck/fast casual Roxy's Grilled Cheese, to create Whole Heart Provisions. Similar to Beefsteak, this Boston-born fast casual puts the veggies front and center with global flair.

Nicole Duncan is the senior editor of Food News Media. Contact her at nicole@foodnewsmedia.com.

CORELIFE EATERY'S MENU DOES INCLUDE A NUMBER OF ANIMAL-BASED PROTEINS, BUT THE CONCEPT PACKS IN THE VEGGIES WHILE OFFERING VEGETARIANS AND VEGANS NO SHORTAGE OF OPTIONS.



CORELIFE EATERY



VI: BUSINESS IMPERATIVES: THE CHANGING CALCULUS ON COSTS, RISKS, AND OPPORTUNITIES

This section provides insights and advice on innovation, investment, and supply chain resiliency to help culinary professionals and the industry move more quickly in the right direction. Over the past year, there have been many signs of improvement in food traceability and safety, while disease outbreaks and food fraud continued to weigh on the food supply. New research revealed that more than half of all food poisoning cases come from food made in restaurant environments. These findings emphasize the need for foodservice operators to take a holistic and proactive approach to doubling down on food safety. Also revealed recently were new cases of food fraud, from adulterated olive oil to mislabeled seafood.

On the upside, several demonstrations of public interest and governmental response to supply chain transparency issues suggest these concerns are being taken more seriously, and an array of emerging technologies may begin to offer operators better tools for tracking, verifying, and communicating issues of food safety and food fraud.

While vulnerabilities persist in the supply chains upon which the restaurant and foodservice industries rely to run their businesses, investment in the space continued over the past year at a healthy clip. Strong, steady growth in sustainable and responsible investment, known as SRI, has remained consistent among investors, as has consensus that stronger financial performance is tied to companies that commit more substantially to environmental, social, and governance (ESG) concerns. Transparency, the effects of climate change on the availability and reliability of ingredients, and workplace diversity all appear to be of particular importance to investors looking to increase their engagement with companies in the food and foodservice industries.

SUPPLY CHAIN RESILIENCY AND TRANSPARENCY

In the past year, we saw many issues with foodborne illnesses and a large number of food recalls due to confirmed or probable pathogen or allergen contamination. The case of romaine lettuce was telling and tragic. A dangerous strain of E. coli found in lettuce led to at least five confirmed deaths. Other large-scale food recalls involved Salmonella contaminations in JBS ground beef and Jennie O ground turkey. In the Jennie O case, one death was confirmed. A McCain Foods USA recall due to Salmonella and Listeria contamination involved more than a dozen food firms with products sold in Trader Joe's, Whole Foods, Walmart, Kroger, and Target stores across the country. In total, over 755 tons of food were recalled by just a handful of food providers. Food illness is increasing, as more illnesses have been linked to food transmission in recent years. The CDC estimates that 1 in 6 Americans experiences serious food illness in a given year and further estimates that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year. Known pathogens account for an estimated 14 million illnesses, 60,000 hospitalizations, and 1,800 deaths, leaving a great deal of the specifics of food pathogen contamination unknown. Foodborne illnesses also cause a great disruption to the economy, estimated by the CDC to be more than \$55 billion per year in the U.S.

The scale of these recalls shows the immense challenge ahead of us. Contaminated food makes it into the food supply before being fully tested or vetted. Once in processing facilities, the pathogens grow and contaminate many times more food, making solving the problem harder and more expensive. In response to the romaine lettuce outbreak and concerns about reaching consumers before they eat contaminated food, the CDC is working with Walmart to develop a blockchain approach to track every head of lettuce.

Consumers continue to demand more information about food sourcing, environmental stewardship, and impact in food selection. Farm to food processes, such as vertical farming, urban farming, and water reuse, are among the most important trends in food marketing. Consumers want to know more about how their food was produced, including information on origin,

environmental practices, the role of genetic engineering, and the presence of specific chemicals and antibiotics. More transparency will be demanded by consumers in the future.

The many food recalls listed by the U.S. Food and Drug Administration in 2018 show some concerning patterns that speak to the state of food supply chain transparency.

- 1. Outsourcing and Sourcing:** Many processed food items are made by contractor firms that also source processed ingredients, unknown to the customer. For instance, Ukrop's announced a recall of its deli sandwiches, due to a Listeria contamination at its ham provider, Johnston County Hams of Smithfield. To Ukrop's credit, they also recalled all items produced on the same equipment during the suspected contamination from the ham. Of course, this led to far more food being recalled, even items that contained no ham, showing how highly centralized food processing facilities can actually contribute to the spread of foodborne illness, due to the sharing of facilities. This case, and others like it, are a reminder that our food supply is increasingly complex, integrated, and subject to product sourcing and replacement without full vetting or testing. Foodborne illness threats increase as the contaminated food passes through processing facilities.
- 2. Large and Small Processors:** Both large and small food processing firms are impacted by food recalls. This is important to keep in mind, as small firms may be perceived as healthier or more focused on their craft and perhaps more aware of what goes into their products. Often small food producers utilize the same large industry food facilities, which are more economical. Diligence in testing and concern for brand bias is especially necessary.
- 3. Pathogens:** E. coli, Listeria, and Salmonella remain common pathogens in food recalls. There is good science in how to control each, but also a clear reminder that diligence, testing, and knowledge of food ingredients are still very much needed. Understanding the sourcing, handling, and pathway of food items will be critical in avoiding foodborne disease.
- 4. Allergens:** Known allergens are appearing in unexpected food items. Milk, soy, egg, tree nuts, peanuts, and wheat appear unexpectedly in beverages, desserts, processed food, and ready-to-eat dishes. For those highly sensitive to such allergens,

counting on food labels can be dangerous. More must be done to incentivize suppliers and processors to report allergens. The fact that there is such blatant allergen mislabeling suggests food fraud. That is to say, ingredients are being deliberately omitted in a manner to manipulate and mislead the buyers and ultimately the end consumer. More economical tests for allergens before food ingredients enter the food supply chain are needed.

The U.S. Food and Drug Administration has provided a new and powerful resource to help consumers manage food recall risks. In September of 2018, now former FDA Commissioner Scott Gottlieb announced the agency would begin publicly disclosing retail locations that may have sold or distributed recalled food. This helps consumers tremendously, especially in prepared foods and sliced fruits, which may be prepared on-site. Previously, the FDA kept such information confidential. This change in disclosure will put pressure on retail locations to demand more information from suppliers. It may also force retailers to take a more aggressive role in food safety and food supply chain transparency. With viral social media postings and cameras on every phone, the poor food safety practices of a restaurant are easily shared with the world. Some of the greatest food safety risks come from poor worker hygiene, bringing even more focus on food operators and worker conditions. Customers appreciate food safety grades and warnings at restaurants, but with over 99.9 percent of restaurants earning an "A" grade, many people are left wondering if safety grades are enough.



SCORE: 3

Food products over the past year showed widespread economic fraud and misrepresentation, which contributed to food allergens entering the food supply, as well as challenges in detecting and combatting pathogens, like food bacteria. Furthermore, reliance on a complex web of food providers and difficulties in traceability posed strong challenges to the stability and resiliency of the supply chain. Food traceability is a growing priority for consumers, regulators, preparers, and food producers, especially as new criteria such as gluten-free, non-GMO, and antibiotic-free have become increasingly important to consumers.

IN SUMMARY:

- Food-borne illnesses are highly tied to large-scale food processors.
- Food fraud remains an issue and contributes to the mislabeling of allergens in food.
- Stronger economic incentives are needed to reward food suppliers and restaurants to demand more detail on food sourcing and transparency in food reporting.



CHANGES IN FOOD INDUSTRY INVESTOR STANDARDS

The U.S. economy continued to strengthen over the past year, as consumers, businesses, and investors enjoyed low unemployment, growth in gross domestic product (GDP), and, for the most part, a strong stock market. Food and agriculture sectors, however, were hampered by several challenges. Extreme weather, wildfires, and labor and farmworker disruptions buffeted the country's agriculture, energy, and distribution industries. The Trump administration's embrace of protectionist policies resulted in retaliatory tariffs on major U.S. agricultural goods, such as soybeans, pork, and wine. The longest government shutdown in U.S. history, starting in late December 2018, put additional strain on farmers, particularly those who depend on government payments to offset hardship from tariffs.

will have better financial performance than their less responsible peers over time is now widely recognized as valid and valuable. As of last year, U.S. investors employ ESG analysis in \$11.6 trillion—an increase of 44 percent over 2016. All told, 81 percent of institutional investors now have a “sustainability mandate.”

In addition to greater ESG investment overall, more mainstream investment firms like Blackrock and Vanguard Group are engaging in shareholder advocacy, voting their proxies in favor of select proposals that support transparency and sustainability. Investors dedicated to ESG are also stepping up advocacy through the number of shareholder resolutions filed. Membership in the Principles for Responsible Investment (PRI) group of investors continued to grow, and globally, investors were increasingly likely to support environmental and socially themed shareholder resolutions (see chart below).

Another ESG driver includes investment commitments to support the Sustainable Development Goals (SDGs), a global framework for advancing human development by 2030, replacing the Millennium Development Goals. The 17 goals include broad targets, such as eliminating poverty and hunger or achieving better work conditions and gender equity.

by environmental or governance issues. Capitalizing on the momentum provided by the SDGs, the Investor Alliance for Human Rights launched in 2018 to exert multi-year pressure on a variety of corporate human rights issues, such as forced labor and land use. The Alliance represents more than \$2 trillion in assets under management. In addition, civil society organizations are leveraging investor pressure by aggregating sustainability data on key industries. For example, in its 2018 report, “Ripe for Change: End Human Suffering in Supermarket Supply Chains,” Oxfam conducted hundreds of interviews with farmers and producers in supply chains of supermarkets in five countries. It found that a majority of these food producers faced food insecurity themselves. Moreover, the Know the Chain benchmarking organization released a 2018 report that scored food and beverage companies on seven criteria related to human rights reporting and implementation. The report found that most companies have taken steps to address human rights governance—by adopting a code of conduct and supplier standards, for example—but implementation and traceability within the supply chain remain weak. To fully grasp the impact that changing investment standards are having and can have on advancing health and sustainability imperatives, it's valuable to understand this larger, evolving picture of how various issues and advocacy concerns are being bundled.

In addition to ongoing concerns with environmental issues such as climate change and water risk, plastic packaging waste is increasingly a topic that garnered investor concern over the past year. For example, 25 investors representing more than \$1 trillion in assets under management asked Pepsi, Unilever, Procter & Gamble, and Nestlé SA to cut their use of plastic packaging. Investors foresee increased pressure on branded companies, as civil society organizations step up pressure. The global coalition Break Free from Plastic published a 2018 audit of over 187,000 samples of plastic cleaned up by volunteers in 42 countries, and then tagged by brand. They concluded that the “top three companies alone (Coca-Cola, PepsiCo, and Nestlé) accounted for 14 percent of the branded plastic pollution found worldwide.” These findings translate to real risk for laggard companies, and a significant upside for those that innovate their way to better packaging. A study by investment firm Schroders concluded the “[s]oft drinks companies who fail to innovate on packaging could see margin fall by 5 percent but leading Household and Personal Care companies could see improvements of 2 percent.”

For food and beverage companies, this trend of greater investor engagement is challenging but will certainly continue.

Finally, investors are taking note of innovation trends in the food sector, which continues to be something of a pet project of tech investors. The rise of electric, autonomous vehicles is paving the way for cheaper, faster delivery of meals and groceries. These investors continue to be fascinated by alternatives to animal protein and meat alternatives made with a variety of plant-based ingredients. Venture capitalists continue to support start-ups in functional, medicinal food and edible cannabis products. Mainstream investors have yet to fully unpack the risks and opportunities afforded by the cannabis market, as most companies are not large enough to be publicly traded.

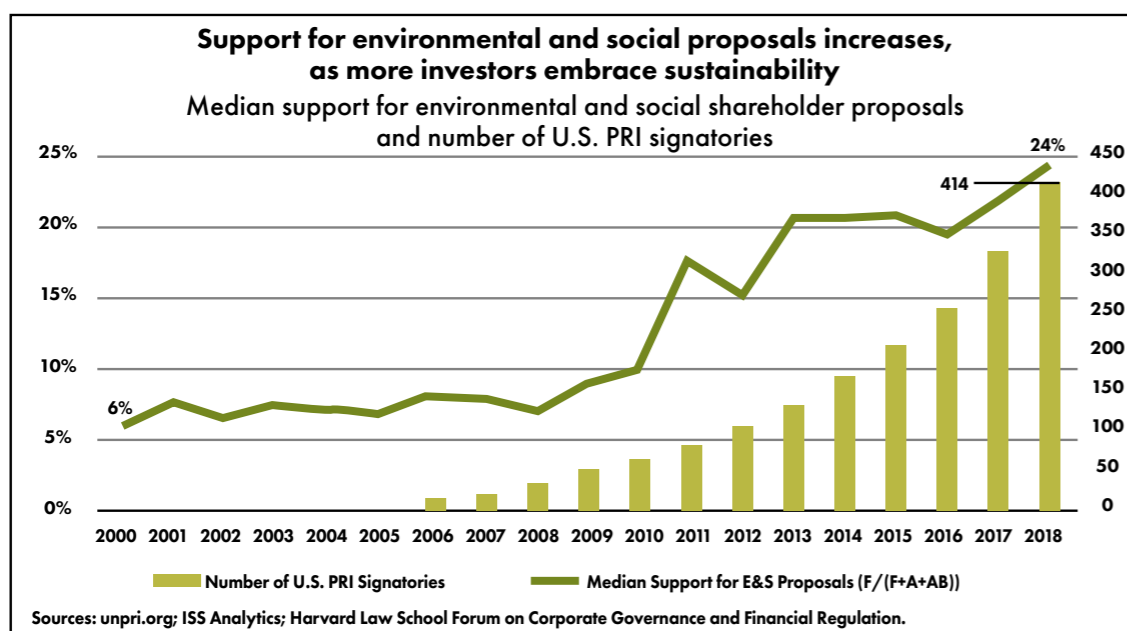


SCORE: 4

As social, political, and environmental uncertainty increase in the U.S. and abroad, investors seek businesses that incorporate sound sustainability strategies and risk management. As more institutional and individual investors increase their engagement with publicly traded companies on sustainability, food and restaurant businesses will need to be especially responsive to and aware of a widening, often bundled set of concerns for investors, including human rights policies and risks, plastic waste, and climate change.

IN SUMMARY:

- Although investors and food companies have enjoyed a buoyant economy, uncertainty around climate and extreme weather, trade policy, and political stability pose significant financial risk to operations.
- Interest in sustainable investing by institutions and individuals remains extremely strong, and even mainstream investors are engaging companies through dialogue and voting proxies in support of shareholder proposals that advance environmental, social, and governance (ESG) benefits. Companies should expect this trend to continue.
- As more institutional and individual investors increase their engagement with publicly traded companies on sustainability, food and restaurant businesses will need to be especially responsive to and aware of a widening, often bundled set of concerns for investors, including human rights and supply chain issues, plastic waste, and climate change.



One investor trend that has remained consistent over the past decade is the strong, steady growth in sustainable and responsible investment (SRI). In the U.S., SRI grew to \$12 trillion in assets under management at the start of 2018—an increase of 38 percent over 2016 levels. The investment thesis that companies with better environmental, social, and governance (ESG) commitments

A host of firms are now linking ESG products to SDG goals, such as Blackrock's iShares MSCI Global Impact ETF, and the role of private sector finance is seen as critical to the success of SDGs.

Investor focus on SDGs has elevated social issues in the business context—such as gender equity or human rights in food ingredient supply chains—that had formerly been overshadowed



VII. NUTRITION, HEALTH, SUSTAINABILITY, AND FOOD ETHICS

The issue briefs in this section highlight the essential role of chefs and foodservice providers in leading with flavor to help build preference for eating patterns known to support human and environmental health.

Across the board, a tremendous amount of positive change has occurred throughout the industry over the past year. To name a few, these positive trends include: expanded sourcing from nearby growers, in turn connecting consumers to their regional food systems; new and ongoing commitments to serve chicken raised without medically important antibiotics; more proactive effort to ensure more humane practices for raising poultry; leveraging strategies for healthier menu R&D such as greater reliance on healthy fats and herbs and spices and less emphasis on red meat and salt; and considerable innovation by way of offering more delicious, plant-forward menu options (including using more fruits and vegetables in total, and making the ones that are offered even more appealing than the alternatives).

Much room for improvement remains in several other important arenas of nutrition, sustainability, and food ethics, such as: greater attention to consumers' desire for smaller portion sizes; further pressure to address the use of low-dose antibiotics in the swine and dairy industries; more concerted efforts to shift menus to support seasonal sourcing, organic products when possible, more regionally appropriate crops, and greater flexibility based on the availability of certain ingredients; more varieties of fish and seafood being served more often, to help Americans enjoy the higher intake that would benefit their health while sourcing responsibly to ensure sustainable supplies of fish and seafood for years to come; and, as in years past, much more robust and urgent attention to global water security.

LOCAL AND REGIONAL FOOD SYSTEMS

Chefs sourcing ingredients for their restaurants from within local and regional food systems began in earnest with the New American cuisine movement of the late 1970s and early '80s, led by pioneers such as Alice Waters, Jeremiah Tower, and Cindy Pawlcyn. What started as a mostly fine-dining movement has become customary for restaurants and foodservice operations of all sorts, styles, and volumes across the country, from large cities to small towns. Recent data from New England estimates that 21 percent of gross food sales by distributors are local foods, with colleges, K-12 school food services, and hospitals spending 21 percent, 16 percent, and 5 percent of their budgets respectively on local foods. This illustrates the enormous potential of using institutional purchasing power to support local and regional farms. A great majority of operations combine local and broadline sourcing, though some restaurants source exclusively locally, and a more intrepid few have taken this practice even further with “hyperlocal” onsite gardens.

Over the past year, nine of the top 20 food trends on the National Restaurant Association's *What's Hot: 2018 Culinary Forecast* were related to various aspects of global cuisines, while the top 10 concept trends are still firmly located within local and sustainable sourcing (including food waste reduction). Fifty-one percent of all local sales are still fruit, vegetables, and nuts, while far-flung commodity and large-scale producers provide most of the rest. In other words, operators may be using unique spices and ingredients sourced from abroad for their globally inspired dishes, but they are nonetheless still committed to local and seasonal produce and perishables, and incorporate those regardless of cuisine. There is also a growing interest in capitalizing on underutilized, local seafood—such as those promoted in Maine's Out of the Blue Program through their regional culinary partners.

More seasonal menus, however, remain the purview of only a limited number of commercial restaurants, despite the fact that limited time offers (LTOs) provide an appealing, ready-made structure through which to promote seasonality. There also may be opportunities in freezing, canning, and other preservation methods to further promote local and regional food (and especially fruits and vegetables) out of season. While pickling and fermentation have

become en vogue in top restaurants, this and other season-extending methods have yet to infiltrate commercial operations at scale with significant impact.

There are three simple questions to ask to gauge the extent and potential of local and regional food systems beyond 2019:

- Is there sufficient food quantity and diversity in various regions of the U.S. to feed its population?
- Is there enough land available?
- How would this shift fit with the most recent trends in the culinary and foodservice industry?

To the first two questions, the answer is: maybe, depending. Researchers found that the state of New York could feed 34 percent of its population from in-state production (with significant shifts in production to meet needs). However, they also found that across New England from 2001 to 2009, only about 16 percent of food consumed was produced in the region. Others did a national analysis of local potential. They reported that, using a 100-mile foodshed model, the available agricultural land could, on average nationally, produce 88 to 92 percent of the local population's food needs depending on dietary pattern (more meat = lower potential). There are still no studies that project forward in time and account for population growth, land development, or potential climate change or water scarcity impacts in various regions. Also, none of the studies account for urban agriculture potential or indoor production potential. While vertical farming purports to reduce the supply chain and extend the diversity of regional food systems, its energy use presents a conundrum for large-scale distribution given the primacy of global warming among the panoply of environmental issues. In almost all local regions, it is clear that the diversity of agriculture and various forms of indoor production would need to change substantially for regional food systems across the U.S. to become a reality.

Is “local” always more environmentally friendly and good for business? Given the data, it's difficult to determine precisely the positive environmental differences between those farms supplying local markets and those supplying broader markets. How food is grown sometimes is a more significant factor than where it is grown. A recent study that compared Direct-to-Consumer (DTC) producers vs non-DTC producers found there is a greater proportion of DTC producers who are certified organic, though only five percent of the DTC farms are classified as organic. DTC producers are also more likely to use manure as a fertilizer source.

While data is somewhat limited, there are examples where local in the off-season makes tremendous sense. For example, a study found that winter hoophouse production of lettuce in Michigan had one-fifth the carbon footprint compared to sourcing from California (due to the carbon cost of transportation). If heat is added, the balance flips; if production is moved completely indoors, others have shown the footprint is much higher. Regional food systems also have the potential to play an important role in planetary boundary management, with such strategies as efficiently recycling nitrogen and phosphorus. (See the recent *EAT-Lancet* Commission report for more on planetary boundaries, food, and the 21st century.)

Another recent report provides a take on this question of economic sustainability. In 2012, there were in excess of \$6.1 billion in local sales—55 percent of which is from intermediated channels (i.e., indirect to consumers). Most of these sales, in dollar value, occur with farms having gross sales of over \$350,000 (the transition size between small and mid-size farms). Between 2006 to 2007 and 2012 to 2014 there was a 180 percent increase in farmers markets, but a 288 percent increase in food hubs and a 430 percent increase in local sourcing by school districts. Farms selling locally with intermediated market sales—for instance, through a food hub or other similar distributor type—tended to get larger, and as farms grew larger, they tended to be more viable (i.e., net positive cash flow in both 2007 and 2012). This insight implies that the types of channels restaurants and foodservice operations typically source from are important in helping farms grow in size and maintain profitability. Also, the latest national food hub survey illustrates that from 2013 to 2017 the percentage of food hubs selling to distributors, colleges/universities, and restaurants/caterers/corporate caterers has grown from 24 to 36 percent, from 27 to 43 percent, and from 58 to 76 percent, respectively.

In short, restaurants and foodservice leaders play an important role in enabling local and regional farms to scale up and be profitable. They also appear important as clients for food hubs as they age and develop. While many of the annual crops are grown even in the northern latitudes, doing so could prove difficult in the off-season and for perennial crops (most of which are now imported or sourced from the Southwest and West).

While the age of naming the farmer behind each item in every dish on a menu is mostly behind us, restaurants and foodservice operations often choose to list all of their local purveyors in one section of their menu, on a board on a wall, or on their website, all of which are effective ways to communicate with their diners and help them further support those purveyors at markets or

directly on farms; more operations can follow that path. The next stage of communication and consumer education should be around the environmental and economic impacts of tapping into a local food system. The two are more complex elements for chefs to explain and diners to understand than creating a personal connection between producers and consumers, but they will go further in helping diners understand the business structure behind a restaurant or foodservice operation and its impact on food costs.

Consumer expectations and demand have contributed to continued growth in all phases of away-from-home dining opportunities with local and regional sourcing, particularly in the fast-casual sector. Established companies will need to reduce their reliance on far-flung commodity markets and suppliers in order to stay competitive.



SCORE: 4

Operators remain committed to local and regional sourcing of produce and perishables, even as they use those for an ever-greater array of globally inspired dishes. While some chefs forge ahead with innovative and exclusively local concepts with onsite gardens, others still have room for improvement in supporting local and regional farms.

IN SUMMARY:

- Currently, across the U.S. there is great potential to re-regionalize a high proportion of our food system. The land base relative to population exists for this to become a reality. However, there is still a need for an analysis that projects forward relative to population growth, climate change, and water availability.
- Local and regional sourcing seems to be continuing to mature and is now blended with a move toward global cuisines.
- Innovative and hyper-local concepts continue to rise in popularity, but larger operators can still improve their local and regional food sourcing and their use of season-extending food preservation techniques.

LAND USE AND FARMING PRACTICES

Several questions arise when considering the relationships between food, land use, and farming practices. In particular, what foods are grown and raised, and in what amounts and proportions? How does agriculture production compare to what is needed for a healthy diet such as the goal of the Harvard Alternative Healthy Eating Index? And is land used to produce food managed in ways that protect and restore soil quality?

In the U.S., we currently have enough farmland and rangelands to produce the food needed for healthy diets for all Americans. However, this capacity is threatened by soil degradation, climate change, and demands on land for other uses (including products not contributing to healthy diets). Aligning production with needs and expanding practices that build soil quality can improve food security and potentially bring other benefits, including climate change solutions. However, realizing such shifts will require new policies and programs that support farmers in transitioning practices, including through technical assistance, financial support, and market development.

Today, we have 655 million acres of grassland and rangeland and 392 million acres of cropland, largely used for feed (e.g., corn, soybeans, hay) and wheat. Current production doesn't include sufficient fruits and vegetables for healthy diets, and on average our consumption patterns are also far from those needed to promote optimal health. A recent report showed current U.S. agricultural land can support the dietary needs of 130 percent to 261 percent of the current U.S. population depending on dietary patterns. The major determinant is how much meat and dairy products the typical American eats. These require relatively more land to produce but also can take advantage of the western rangelands and perennial pastures, which can support cattle and other ruminants.

National carrying capacity is an important prerequisite to a sustainable food system, but says nothing about where in the U.S.—within a watershed, or on a farm—it could be most beneficial to produce foods to optimize for various attributes (e.g., managing phosphorus, nitrogen, and carbon cycles; water resources; and

biodiversity). Also, how food is produced is vital to sustaining soil and water, which agriculture relies on. Building on the *2018 Menu of Change Annual Report*, several strategies could improve the U.S. picture with respect to land and farming practices:

- Decrease meat production and consumption overall, and particularly grain-fed livestock production as currently practiced. Soil erosion and nutrient runoff could be reduced dramatically if highly erodible land were taken out of row crop (feed) production and planted into perennial crops (e.g., pasture grasses and legumes), and improving grassland management can in some cases increase carbon sequestration. Switching to animal foods from pasture-based or agroecological operations can address some sustainability challenges, but needs to be combined with substantial reductions in consumption.
- Encourage a more regional and seasonal diet and drive demand away from (and reduce production of) foods that are wildly out-of-step with local ecosystems—for example, water-intensive crops from drier parts of the country (e.g., romaine lettuce in the American Southwest).
- Source products produced using best practices—especially organic and regenerative practices such as cover cropping, planting perennials, and diverse crop rotations. These methods can, under some circumstances, improve soil quality and other ecosystem services. In some cases, such practices lead to lower yields per acre, which means that other strategies must be employed, such as reducing food waste and shifting consumption patterns.
- Leverage technology where possible to optimize achieving and measuring sustainability outcomes on scales from fields to farms to agroecological landscapes. For example, precision farming methods, precision conservation techniques, and remote sensing (including drones) can be used to reduce expensive and damaging overuse of fertilizers, and to design farms that promote biodiversity while protecting bottom lines.

Chefs across industry sectors continue to champion the farm-to-table movement, getting directly involved in what is grown on the farm and under what conditions. Chef Dan Barber's Row 7 seed company takes this even one step further by cultivating and selling seeds that can be easily grown around the country, produce delicious and nutritious produce,

and do so in ways that increase seed diversity, accessibility, and affordability. In 2018, sweetgreen bought into the Row 7 experiment by gifting its farmers the company's kiginut squash seeds, and bought the resulting squash to be featured in its seasonal salad a few months later.

Regenerative agriculture is starting to make inroads in the CPG sector, and may become a harbinger for chefs and operators to meet consumer demand in restaurant and foodservice settings. Patagonia Provisions took a significant step with this in introducing its Long Root Ale, brewed with Kernza®, and in May of 2018, Annie's Homegrown introduced limited-edition lines of its Mac & Cheese and Bunny Grahams, made with organic ingredients grown using regenerative farming practices. Prominent New York chefs gathered later that same year to launch a campaign called "Food Forever," in partnership with the global seed-saving organization the Crop Trust, to educate eaters about the importance of crop diversity. These chefs are at the forefront of showcasing lesser-known crop varieties and perennial grains in flavorful, nutrient-dense dishes that have potential for revival.

These examples currently remain outliers, however; only a handful of restaurants have entered into the regenerative agriculture space (and those that have are almost exclusively on the higher end), and there continues to be little substantial effort by the restaurant industry or major companies to engage in changing how farm and rangeland is used in the United States.

Chefs need to work on two fronts to ensure that their menus feature products grown according to the most sustainable farming practices. First, they need to communicate regularly with both their local farmers and their national and global purveyors to understand their practices and in turn request and select items that are least damaging (and even beneficial in the case of regenerative agricultural methods) to the environment. Second, they need to share this dialogue with their consumers.

Not all diners will want to know how their food is produced, but the more they understand about sustainable farming practices, the more they can apply the same decision-making process used by restaurant chefs to their purchasing practices for at-home consumption.



SCORE: 3

The need for increased crop diversity and regenerative agricultural practices is just starting to gain traction in the foodservice sector, but there continues to be little substantial effort to engage in changing how farm and rangeland is used in the U.S. on a large scale.

IN SUMMARY:

- U.S. agricultural lands are capable of producing sufficient healthful food for a large population; how large is primarily dependent on meat consumption and competing land uses such as corn ethanol production.
- Thoughtful changes in production patterns and adoption of management practices that improve soil quality could build farm resilience and bring other benefits, but new policies and programs are needed to support farmers in transitioning their operations.
- The need for increased crop diversity and regenerative agricultural practices is just starting to gain traction in the foodservice sector, but there is still much room for improvement.



ANIMAL WELFARE AND AGRICULTURAL DRUG USE

Over the past year, concerns about farm animal welfare largely continued in the same vein as they had in the previous year, with standards enforced mostly through voluntary programs undertaken by industry and animal welfare organizations, rather than by government. These standards vary from certification program to certification program, with a good deal of difference in approaches and rigor. Standards created by industry are typically weaker than those developed by animal welfare advocacy groups. The stricter standards include Animal Welfare Certified, Certified Humane, and Global Animal Partnership.

The most significant recent legislative action affecting animal welfare was California Proposition 12, the Farm Animal Confinement Initiative, which was passed in November 2018. It establishes minimum space requirements based on square feet for calves raised for veal, breeding pigs, and egg-laying hens, and it bans the sale of veal from calves, pork from breeding pigs, and eggs from hens when the animals are confined to areas below minimum square-foot requirements.

Predictably, the measure was opposed by the California Egg Producers and the National Pork Producers, but surprisingly, animal welfare organizations were split: the Humane Society of the United States supported the initiative, calling it “the most transformational step forward of all time in regards to animal protections,” while PETA (People for the Ethical Treatment of Animals) said Proposition 12 was a “regressive law that will keep hens in abhorrent conditions.” Time will tell who is correct. But already it’s clear that the issue resonates with the public: the measure was approved by voters 62 percent to 37 percent.

Quite related to standards for raising food animals is the rapid rise of diseases and infections that are resistant to antibiotics. It continues as one of the three slow-motion disasters threatening global public health, along with climate change and the rise in chronic noncommunicable diseases. Given societal concern about the development of antibiotic resistance in farm animals by virtue of antibiotic

use to mask pathogenic housing conditions and for growth promotion, one can guardedly hope that the severe confinement systems may be somewhat mitigated. The UN Secretary General established an interagency working group to coordinate efforts to combat antimicrobial resistance (AMR). The group reported in late October 2018 on progress of policies to reduce antibiotic use in food animal production and plan to release a final report in 2019.

All indications are that antibiotic use in animal production is still increasing, but varies greatly between countries, reflecting the effectiveness of policies and the influence of business commitments and consumer demand.

The U.S. poultry industry has responded to consumer demand more robustly than the swine and dairy industries, where the continued use of low-dose antibiotics for prophylaxis is a problem. Sanderson Farms, the third largest poultry producer, announced in November 2018 that it will stop using antibiotics of importance in human medicine on March 1, 2019 (gentamicin in its hatcheries and virginiamycin in its feed). Although years behind its competitors Purdue, Pilgrim’s Pride, and Tyson in pledging to end use of non-therapeutic antibiotics, this move is welcome as better late than never.

Commitments by suppliers have begun to appear in the data. In December 2018, the U.S. Food and Drug Administration (FDA) released the annual summary report of antibiotics sold or distributed in 2017 for use in food animals. The good news is that antimicrobial sales decreased by 33 percent between 2016 and 2017, and sales of medically important antimicrobials decreased by 43 percent from the peak year of 2015. The 2017 summary report also was the first to reflect data submitted after full implementation of Guidance for Industry (GFI) #213 prohibiting all production uses of medically important antibiotics (used for growth promotion, feed efficiency, and disease prophylaxis).

Reductions in sales of tetracyclines, the leading antibiotic in domestic sales at 3,535,701 kg in 2017, illustrates the improvement in antibiotic stewardship. Sales decreased by 40 percent from 2016 through 2017. Domestic sales of medically important antimicrobials approved for use in industrial food animal production that are sold over the counter decreased from 8,000,326 kg to 271,280 kg from 2016 through 2017, a decrease of 96.6 percent, following full implementation of GFI #213. These sales data are only a proxy for actual use in different food animal species, though. In the year ahead, actual animal use data will become available and promises to shed a spotlight on the differences between the poultry and the swine industries.

Importantly, inappropriate use of antibiotics in food animal production is not the only risk for antibiotic resistance in the food supply. *The Florida Phoenix* reported that the Trump administration has approved spraying streptomycin and oxytetracycline on almost a half-million acres of Florida citrus in an effort to control the disease citrus greening. The antibiotics will have to be applied regularly over the years to keep the trees alive and producing fruit before they finally die of the disease. This will release enormous quantities of medically important antibiotics into the air, water, and soil.

As noted in previous Menus of Change reports, most of the largest U.S. restaurants and foodservice companies have committed to reducing or eliminating antibiotic use in their poultry supply chains, and several have already reached their goals, including KFC, which announced in January 2019 that 100 percent of its chicken is now raised without antibiotics important to human medicine. But few companies have committed to following suit in their beef supply, let alone other sources of animal-based protein, largely due to the expense of necessary animal welfare interventions to achieve this goal (counterpart interventions for the poultry industry have proved easier to implement). The beef industry accounts for far more of the usage of medically important antibiotics when compared to chicken, but *Consumer Reports* gave all but three of the top 25 burger chains failing grades for the use of antibiotics in their beef supply, and only two—BurgerFi and Shake Shack—received A grades.

In late 2018 and early 2019, however, McDonald’s publicly committed to monitoring and reducing the amount of antibiotics administered to its beef supply, and Bon Appétit Management Company revamped its responsible antibiotics policy to include seafood purchases. These significant announcements by leading industry players potentially signal a shift for the industry as a whole.

With respect to broader animal welfare standards, pressure from regulation (as with California’s Proposition 12, mentioned above) and non-profit groups continue to call for greater transparency on policies, practices, and progress, despite pledges to, for instance, move toward cage-free eggs and eliminate gestation crates for pregnant sows. Notably, late in 2018, seven major food companies—Nestlé, Unilever, Ikea Food Services, Aramark, Compass Group, Elior Group, and Sodexo—joined forces to form the Global Coalition for Animal Welfare (GCAW). As one of the first global food industry-led groups, the GCAW is working on a collective action agenda to accelerate progress on key welfare issues throughout the global food supply chain.

Chefs and foodservice operators can play a vital role by sourcing their animal products from producers who raise their animals without the use of low-dose antibiotics for growth promotion or disease prevention. Fish and seafood should be included in any antibiotic reduction policies. Operators also need to carefully monitor progress in their supply chains and ask for regular updates on changes that suppliers are making to achieve long-term commitments to reduce antibiotic use and to improve overall animal welfare standards.



SCORE: 4

Antibiotic use in industrial food animal production is declining rapidly in the poultry industry but remains a problem in swine, beef, and dairy production. Consumer and regulatory pressures continue to push operators to reduce inappropriate use of antibiotics and to improve overall animal welfare standards.

IN SUMMARY:

- Passage of California Proposition 12, the Farm Animal Confinement Initiative, established minimum space requirements for confined animals (veal crates, battery cages, gestation crates) and banned the sale of animal products raised in violation of these standards. Given the size of California’s food economy, this will influence the rest of production agriculture.
- The negative impact of antibiotic use in industrial food animal production on the global problem of antimicrobial resistance is now well-established, and reducing unnecessary antibiotic use is a priority for the UN and WHO.
- Internal and external pressures continue to push high-volume operators to reduce the use of medically important antibiotics in their supply chain. Much progress has been made in the poultry supply chain and more attention is being paid to the beef industry, though with little progress so far.

DIET QUALITY AND HEALTH

Dietary quality is an important determinant of weight gain and obesity, and a vast body of evidence shows that diet quality directly affects the risk of almost all important diseases independent of its effect on body weight. A previous report from the Centers for Disease Control and Prevention (CDC) suggested some reduction in obesity among young children, but the most recent data suggest that this was a statistical aberration, and the trends in obesity

among adolescents and adults have continued upwards. The prevalence of obesity in adults has now reached 40 percent, and about 70 percent are overweight or obese. A recent projection based on historical weight trajectories predicted that 57 percent of today's children will be obese by age 35. Although childhood obesity has appropriately received much attention, the health implications of weight gain among adults is also significant, as it accounts for about half of the excess obesity in the U.S. Weight gained by adults up to age 55 strongly predicts poorer health after age 55, including rates of cardiovascular disease, type 2 diabetes, various cancers, reduced quality of life, and overall mortality after age 55.



The cohorts of children who experienced large increases in obesity in their early years are now being affected by the expected consequences. For example, rates of six obesity-related cancers are increasing among young adults. These increases in obesity are also contributing to the continuing decline over the past three years in U.S. life expectancy. These findings highlight the need to redouble our efforts to control weight gain among both children and adults, and that failure to do so will have increasingly serious personal and societal consequences. Encouragingly, the large differences in obesity rates within the U.S. and across countries indicate that this epidemic is not inevitable.

The quality of foods and beverages in our diets plays a major role in the cause, and potentially the prevention, of excess obesity. The past year represented one significant milestone, as the U.S. Food and Drug Administration finally determined that partially hydrogenated fats no longer qualified as “generally regarded as safe,” or “GRAS.” This announcement effectively banned industrially produced trans fat in the U.S. Although by this time the large majority of trans fat had already been removed from the food supply, this was still an important development in terms of improving Americans’ diet quality.

DEFINING DIET QUALITY

The indicators of diet quality the Menu of Change initiative has used for tracking trends have been selected because they reproducibly predict risks of major diseases in multiple, large prospective studies. These indicators are discussed in more detail and with additional references on the Harvard T.H. Chan School of Public Health website, Nutrition Source. They are intakes of:

1. **Vegetables** (not including potatoes as they do not provide the same health benefits)
2. **Whole Fruits**
3. **Whole Grains** (especially more intact, or cut, versus milled whole grains, to replace refined grains and potatoes, which are both rapidly converted to glucose and absorbed, elevating blood sugar)
4. **Nuts and Legumes**, including soy-based foods
5. **Fish**
6. **Plant Oils** (rich in polyunsaturated and monounsaturated fats)

In practice, increasing polyunsaturated fat means using plant oils (i.e., liquid at room temperature) instead of butter, lard, or tropical oils (e.g., palm, palm kernel, and coconut oils) wherever possible. These plant oils also contain healthful monounsaturated fats. Because of widespread promotion of coconut oil as a health-promoting fat, the American Heart Association released a review of available evidence. This review emphasized the lack of evidence on long-term health consequences, but clear evidence suggested

that coconut oil has adverse effects on blood cholesterol fractions when compared with liquid plant oils high in polyunsaturated fat. Limited use of butter or coconut oil when their special flavor is important is reasonable, but those options are best not used as a primary cooking fat.

7. **Trans Fats** (now eliminated)
8. **Red and Processed Meat** (to be substantially reduced)
9. **Sugar-sweetened Beverages** (to be substantially reduced)
10. **Sodium** (salt added in processing and cooking, to be substantially reduced)

Sodium reduction deserves special attention because it is the only indicator of diet quality that has been moving in the wrong direction. Unprocessed foods contain very little sodium, and foodservice operators (along with food manufacturers) play a major role in determining the amount of sodium consumed by the public.

Our indicators of diet quality do not include dairy foods as they are not essential and are not clearly related to risk of major health outcomes, including fractures. Consumption of cheese has been increasing dramatically over the last several decades in the U.S., becoming almost routine in salads and sandwiches. Cheese provides large amounts of sodium along with less healthy fats and many calories. Consuming smaller amounts of cheese and finding alternative ways to add flavor and variety to these foods—such as using nuts, nut butters, and seeds—are desirable.

Concerns have been raised that plastics or microplastics and synthetic endocrine disruptors in the environment are contributing to obesity, cancer, and other health risks. At this time we have little evidence on the long-term health consequences of these exposures, and we do not necessarily need an explanation for the obesity epidemic because it would be expected given the poor diet quality, general overconsumption of food, and low levels of physical activity in the U.S. population. Nevertheless, while research is ongoing, prudence supports limiting these exposures.

Overall, evidence accumulated over the last several decades strongly supports plant-forward

food choices, meaning a style of cooking and eating that emphasizes and celebrates, but is not limited to, plant-based foods—including fruits and vegetables (produce); whole grains; beans, legumes (pulses), and soy foods; nuts and seeds; plant oils; and herbs and spices—and that reflects evidence-based principles of health and sustainability. This pattern was examined directly in a recent analysis using a plant-based dietary index that gives one point for each serving of healthy plant-based foods, and a negative point for each serving of animal-sourced foods. Among more than 200,000 men and women followed for up to 26 years, a higher plant-based score was linearly related to lower risk of coronary heart disease, consistent with earlier findings for type 2 diabetes.

The findings from the large study on plant-based diets are consistent with a recent meta-analysis in which replacement of red meat with healthy plant protein sources—such as nuts, legumes, and soy foods—improved blood cholesterol fractions. The recent *EAT-Lancet* Commission report used three different approaches to evaluate the expected outcomes of adopting a healthy, plant-forward eating pattern. The report found that a shift to this flexitarian diet globally could potentially prevent approximately 11 million premature deaths per year. Furthermore, this shift is particularly needed in countries such as the United States, given the vast room for improvement in average dietary quality. Of the 190 countries evaluated, those in

the Mediterranean region and Southeast Asia had the highest dietary quality scores, while the U.S. was in the middle range, scoring close to 50 on a scale of 100.

The foodservice industry is offering and promoting an ever greater array of healthier menu options and strategies in response to more health- and sustainability-conscious consumers who are interested in plant-forward eating. As discussed in the Portion Size and Caloric Intake issue brief (page 32), the calorie menu labeling legislation that went into effect in May 2018 has driven some restaurants to reformulate dishes and reconsider portion sizes, but there is still considerable room for improved nutritional quality of meals and the use of “stealth health” tactics to nudge consumer choices.

Chefs are also driving change when it comes to improving meals for children, both in schools and in restaurants. While the USDA issued revisions to existing policies that allowed for some flexibility in the application of school nutrition standards, many schools are committed to staying with the original standards, and school meals still meet much higher nutrition standards than restaurant meals. The School Nutrition Association’s State of School Nutrition 2018 report highlights significant participation by schools nationwide in a variety of initiatives to promote healthier food choices. For example: of responding districts, 68 percent offer salad bars, 56 percent offer vegetarian meals, 14 percent offer vegan meal options, 60 percent offer

locally sourced fruits and vegetables, 48 percent have implemented farm-to-school initiatives, and 18 percent have chef partnerships (with an additional 20 percent considering or planning on doing this). The majority of these percentages have increased from the 2016 survey. All public schools in New York City will also adopt Meatless Mondays starting this fall, following a successful pilot program.

Many restaurants have been working on upgrading the nutritional quality of their kids’ menu both through voluntary industry efforts such as the Kids LiveWell program and through the emergence of state law mandates. A recent Tufts University study found that, while the quick service restaurants it evaluated increased the number of healthier sides and beverages on their children’s menus from 2004 to 2015, still fewer than 20 percent of meal bundles include those healthier items by default. California recently addressed this issue with the passage of SB 1192, which requires all restaurants (including independent and chain operations) to make the default beverage in its children’s meals water, sparkling water, flavored water, unflavored milk, or a nondairy milk alternative. Policies and regulation across the country will vary, however, and with weakened federal leadership on this topic, voluntary industry efforts are critical for both public health and business impact.

Chefs are also stepping off the line to engage adults and kids in the educational process about food production and preparation. This

movement is being supported by the Teaching Kitchen Collaborative, which has grown from 26 organizations in 2016 to 41 organizations across 16 states and three countries in 2019. Working with a local organization offering such classes—or helping to start them—is a relatively simple way through which chefs and operators can help improve the health of their community thanks to their skills. That can also include demonstrating healthier dishes in schools as a way to make students want to eat them when they are offered at the cafeteria.

In foodservice operations, including school foodservice, chefs can most effectively improve the diet quality of their customers by adopting healthier practices themselves. Beyond adding craveable plant-forward dishes to their menu, this means reducing the amount of red meat they serve, relying on herbs and spices rather than solely on salt for flavor, and cooking with healthier fats. Those strategies can be as explicit or implicit as they’d like, depending on their clientele, but must be part of their menu design.



SCORE: 3.5

The foodservice industry is increasing its range of healthier plant-forward menu options in response to more health-conscious consumers. Chefs are also driving change in meals for children, both in school and in restaurants, though more work needs to be done in improving nutritional quality of meals and food literacy among children through hands-on cooking.

IN SUMMARY:

- Diet quality in the U.S. remains low and is helping to fuel an unrelenting epidemic of overweight and obesity.
- In general, healthy plant-forward diets will provide improved health and well-being.
- The foodservice industry as a whole is offering more nutritionally balanced and plant-forward menu items; chefs also play an increasingly important role in influencing childhood nutrition through improving school food and kids meals and offering hands-on food education.

PALEO AND KETOGENIC DIETS: HEALTHY? UNHEALTHY? IT DEPENDS?

High among current popular weight loss diets are those that severely restrict carbohydrates, including Paleo, ketogenic, Atkins, and other variants. There are some good reasons for their attractiveness. Carbohydrates are not essential nutrients, and most of the carbohydrates in modern diets are refined sources of starch, sugar, and foods that have been bred for high carbohydrate content like industrial corn and potatoes in the U.S. These foods have low nutritional value and the high amounts of rapidly metabolized carbohydrates make weight control difficult and contribute to risks of diabetes and heart disease. Some of these diets, such as the Paleo diet, also exclude additives like salt and other preservatives, which can be desirable. Also, a ketogenic state has been useful for treating some medical conditions, such as some types of seizures.

However, the restrictive nature of these diets, some of which exclude dairy foods and whole grains, can potentially result in low intakes of desirable or essential nutrients. Most importantly, the health

implications of restricting carbohydrates depend heavily on the foods that replace those calories. Many of these diets emphasize high consumption of red meat—which has been related to higher risk of many negative health outcomes when compared to most other major protein sources—and dairy fat or coconut oil, which are highly saturated and not optimal sources of fat for routine use. Importantly, most studies of these diets have been for one year or less and we don’t have data on their long-term health effects. Further, the environmental consequences of high consumption of red meat and animal-based foods are major, and such diets are not sustainable if widely adopted.

That said, if a low carbohydrate eating pattern is desired, this is possible with primarily plant-sourced foods, or even a vegan diet, by using nuts, seeds, soy foods, and some legumes as the main protein sources, unsaturated plant oils, generous amounts of non-starchy vegetables, and possibly modest amounts of intact whole grains. Such a diet can be healthy and environmentally sustainable. For further details, see <https://www.hsph.harvard.edu/nutritionsource/healthy-weight/diet-reviews/paleo-diet/>.

PORTION SIZE AND CALORIC INTAKE

The conventional approach to weight control is focused on calorie balance, with advice to “eat less, and move more.” Yet an astoundingly small proportion of people with excessive weight (more than two thirds of the U.S. adult population) can maintain significant weight loss over the long term, despite the simplicity of this advice.

One explanation for this failure is a combination of low willpower and our “toxic” obesogenic environment. Surrounded by inexpensive, high-calorie foods ubiquitously available in large portion sizes, many people are unable to exert self-control, so they mindlessly overeat and gain weight. Without doubt, the portions Americans eat have increased dramatically in the last half-century. For this reason, a major focus of public health in obesity prevention has been reducing and redefining portion size, as exemplified by the “100 calorie pack.”

However, a focus on calories alone disregards a fundamental scientific fact demonstrated repeatedly in the research laboratory: Body weight is determined more by biology than willpower over the long term. When people cut back on calories, they will initially lose weight. But the body fights back, with rising hunger and slowing metabolism.

Certainly, genetic make-up helps to explain individual differences in predisposition to obesity. But our genes haven’t changed in recent decades, as obesity prevalence has skyrocketed. Beyond calorie abundance and more sedentary lifestyles, the quality of the food supply has changed, brought on largely by the excessive focus on reducing dietary fat. During the low-fat craze of the last 40 years, the American public was told to eat fats sparingly and instead fill up on carbohydrates. Responding to this call, the packaged foods industry marketed tens of thousands of reformulated food products that substituted fat with refined starches and added sugars. But these highly processed carbohydrates have exceptionally low satiety value (see sidebar on the next page) and adversely affect metabolism. Fortunately, the public shows evidence of backing away from these simplistic, “all carbs good, all fats bad” message.

New research suggests that the *type* of calories consumed may also affect the number of calories burned. With a reduction in processed carbohydrates, metabolism may run faster, helping to maintain a healthy weight without needing to restrict calorie intake as severely.

The 2015 Dietary Guidelines Advisory Committee found that fat in the diet, despite its high calorie content, does not uniquely lead to weight gain, and that some high-fat foods are highly protective against diabetes and other chronic diseases.

Increasing the portion size and serving frequency of minimally processed carbohydrates (vegetables, fruits, legumes) and healthful fats (nuts, avocados, oil-based salad dressings), will displace less healthful foods, improve diet quality, and protect against chronic disease. In addition, high-quality plant-based proteins (nuts, legumes, soy products) and seafood have a special role in promoting satiety and balancing the metabolic effects of carbohydrates. Conversely, increasing the portion size of refined starchy foods (e.g., most extruded breakfast cereals, white bread, white rice, fries) and added or “free” sugars (e.g., sugar-sweetened beverages, highly sweetened desserts) erodes diet quality and leads to obesity and chronic disease.

The restaurant and foodservice sectors account for more than 30 percent of all calories sold in the U.S. While the packaged food and beverage industries have been working to reduce portion sizes and calorie counts thanks to consumer and legislative pressure, restaurant operators still have much to do to reduce calories and increase calorie quality in menu offerings. The calorie menu labeling legislation that went into effect in May 2018 has encouraged many operators to reformulate dishes and reconsider portion sizes, although its impact on consumer behavior is still being measured and this legislation does not apply to a large number of smaller chains or individually owned restaurants.

Interestingly, a multi-country study published in 2018 by Tufts University researchers found that 94 percent of full-service meals and 72 percent of fast food meals across five countries, including the U.S., contained 600 calories or more, and that fast food restaurant meals contained 33 percent fewer calories than meals from full-service restaurants (though it should be noted that fast food, or “quick-serve,” meals are typically designed as smaller portions and that many customers of these restaurants often order or share multiple portions).



While much of the blame for high-caloric, oversized portions is placed on fast food outlets, this research demonstrates the need for progress in strategic calorie reduction across all foodservice meals.

Innovative fast casual concepts such as Dig Inn, By Chloe, sweetgreen, Salad and Go, and others have found success in building convenient, healthier, high-quality alternatives into their DNA from inception, forcing legacy brands to introduce similar innovations into their menus. Americans' growing snacking habits and interest in spicy foods, as well as fermentation and pickling preparations (whose intensity inherently calls for limited consumption), also present opportunities for thoughtful menu innovation around smaller portions which nonetheless deliver on flavor, nutrient density, and satiety. The restaurant industry is starting to shift away from an older paradigm of big portions of varying quality food, and has learned the hard way that only reducing calories, without enhancing the quality of the calories that remain, is a strategy destined to fail in terms of health and sustainability.

Flavor and aesthetics are two key tools that chefs can use to move diners toward healthier habits when it comes to righting portion size

and balancing the right kind of calories. Chefs can hesitate to reduce portion sizes because customers often then complain that the value of the meal is not good (a perception of too little food for too much money). Ensuring that the healthier components on the plate are packed with flavor will help diners feel satiated, while clever plating practices can minimize perception issues around size. These “stealth health” tactics, along with creative and appealing—even decadent-sounding—menu names and descriptions, will help nudge diners in a healthier direction without them even realizing it.



SCORE: 3.5

The calorie menu labeling legislation, now in effect, has encouraged recipe and portion size reformulation, but strategic calorie reduction and a focus on nutrient density, quality, and flavor across all foodservice meals is still needed.

IN SUMMARY:

- All calories are not alike. The belief that they are has produced misguided attempts to modify the food supply and led to confusion about what to do within the culinary profession and the foodservice industry. Simply lowering the total calories in a meal by reducing fat content will not produce benefit if that meal is less satisfying and physiologically satiating and thus leads to subsequent overeating.
- To increase consumption of minimally processed carbohydrates, healthful fats, and high-quality proteins, changes in national policy that focus on decreasing prices of these foods relative to commodities are needed. Culinary strategies are also needed from the foodservice industry to make these options more available on menus and served in a variety of delicious ways.
- The calorie menu labeling legislation, now in effect, has encouraged many operators to reformulate dishes and reconsider portion sizes, but strategic calorie reduction and a focus on nutrient density, quality, and flavor across all foodservice meals is still needed.

IN A WORD: SATIETY

According to the “energy balance” view of weight control, an eight-ounce sugary soda at 100 calories would be better for your weight than a one-ounce serving of nuts at almost 200 calories. Of course, common sense and definitive research say that’s not so. Foods with the same calorie content can have markedly different effects on hormones, metabolism, and even microbiomes (microbes in the gut) in ways that influence how long we feel full after eating. The sugary beverage might give you a quick rush of energy, but it will leave you hungry again and prone to overeating soon. In contrast, the nuts will elicit strong satiety—that long-lasting sense of fullness after eating. Even though fat has about twice the calories per gram of carbohydrate, high-fat foods typically produce greater satiety per calorie than processed carbohydrates. Some of the most calorie-dense foods in existence (e.g., nuts, olive oil, dark chocolate) are consistently associated with lower body weight than refined grains, potato products, and concentrated sugars. They are also demonstrably healthier for the heart. All calories are *not* alike to the body.

Often repeated phrases in the public health community and media such as “balance energy intake with energy expenditure” and “there are no bad foods” do not reflect current science. These arguments distract us from focusing on the paramount importance of *diet quality* as a key determinant of long-term caloric intake and metabolic health for each of us individually—and ultimately as a key determinant of many of the largest food, health, and environmental challenges for all of us collectively.





PROTEIN CONSUMPTION AND PRODUCTION

The average American adult man consumes 75 percent more protein than is required; for American women, it's 50 percent more. Animal-based foods like meat, fish, poultry, eggs, and dairy account for approximately 70 to 85 percent of this dietary protein. Yet, plant-based foods such as nuts, seeds, beans, peas, legumes, grains, and cereals are also important sources of high-quality protein. The amount and types of protein consumed can have significant effects on the environment and the risk of chronic diseases and premature death. Culinary and foodservice professionals have an important role to play in leading and inspiring a balance of protein sources on Americans' plates that is healthier for both people and planet.

Although red meat consumption in the U.S. had been declining steadily for decades, increases have been seen again in recent years. Red meat consumption (after adjusting for losses) was 33 kg per capita in 2016 and poultry was 27 kg. Other data suggests further increases in 2017 and 2018. *This puts the U.S. among the highest meat consumers globally.* In recent decades, meat consumption has increased sharply worldwide, especially in developing countries. That said, there are important distinctions between red meat and poultry in terms of both environmental and human health effects, as well as between meat and other protein sources.

ENVIRONMENTAL IMPACTS

Animal-based foods contribute disproportionately to the total environmental costs of food production. The main reasons for these impacts are enteric emissions from the digestive activities of ruminant animals such as beef and milk cows, emissions to air and water from manure management, and the growing of crops to

produce animal feed. Thirty-eight percent of the U.S. corn crop, which uses more land than any other crop, goes to feeding livestock. Feed conversion efficiencies, or how effective an animal is at converting feed into edible meat, vary greatly by species: By one estimate, it takes 36 calories of feed to produce one consumed calorie of beef. This ratio is 11:1 for pork, 9:1 for poultry meat, and about 6:1 for eggs and dairy, and sometimes lower than 2:1 for fish and insects. These differences, combined with methane emissions from ruminants, explain the variability in greenhouse gas emissions (GHGE) from animal protein sources seen in the figure on page 37; beef and lamb show notably higher impacts.

Production methods certainly influence the environmental impact of animal-based foods, but the type of protein chosen matters more. Popular alternatives must be fully assessed before being lauded as solutions. For example, pasture-based beef production can have many local environmental advantages over grain-fed beef, such as reduced water use and nutrient losses, and greater ecosystem biodiversity. Yet, often the GHGE associated with grass-fed beef are higher than grain-fed. Under some conditions and production methods, significant carbon sequestration under intensively managed pastures can be achieved, which may offset other GHGE, but this cannot be assumed. In summary, the GHGE of beef can be high, whether grain-fed or even when grass-fed, and dual-purpose systems, producing both milk and beef, may offer lower burdens per unit of food produced.

In the end, switching production methods alone will not be enough: We need to first serve much less beef, and then seek a premium product such as sustainably produced grass-fed, which may carry a higher price point, reflecting higher costs (a "less meat, better meat" strategy which, in principle, could allow food costs to remain constant). Greatly reducing the feeding of grain to cattle and instead relying on their ability to utilize grass and forages to produce both milk and meat can have many benefits, but it will need to be accompanied by large reductions in the quantity of beef produced *and* consumed. Future

technical advances are expected to improve the environmental efficiency of food production, but analysts project that these improvements will be insufficient to reach GHGE reduction goals, meaning shifts in eating habits are needed to reach such targets.

HEALTH IMPACTS

Red meat consumption also has significant impacts on human health. The science is clear that regular consumption of red meat contributes to higher risk of chronic diseases and premature death. Diets that include substantial amounts of red meat and products made from these meats increase risk of diabetes, heart disease, and some cancers. Nearly one in 10 premature deaths could be prevented in the U.S. if American adults were to cut their current red meat consumption to less than half a serving per day.

In 2015, the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) announced that processed meats such as hot dogs, bacon, and sausages should be classified as carcinogenic (Group 1) to humans for colorectal cancer, and unprocessed red meats should be classified as “probably carcinogenic” (Group 2A). It was estimated that a 50-gram portion (1.8 ounces) of processed meat eaten daily increases the risk of colorectal cancer by 18 percent. Red and processed meats have already been associated with type 2 diabetes, cardiovascular disease, and other chronic diseases; an increased cancer risk further underscores the need for consumers to reduce their consumption of meats, especially processed meats. While the 2015-2020 USDA Dietary Guidelines emphasize the role of overall healthy dietary patterns in reducing risk of chronic diseases, it does not single out the harmful effects of processed meats on health outcomes. It is unclear whether this issue will be addressed in the 2020-2025 Dietary Guidelines.

On the flip side, there is increasing evidence to support the notion that replacing animal protein with plant protein can help prevent chronic diseases. In a large study from eight European countries, higher intake of animal protein was associated with an increased risk of developing type 2 diabetes, whereas plant protein was not associated with risk. In a recent analysis of

131,342 participants from the Nurses’ Health Study and Health Professionals’ Follow-Up Study who were followed for two to three decades, higher intake of animal protein, particularly red and processed meats, was associated with increased risk of death from cardiovascular disease. They also found that substituting plant protein for animal protein, especially that from red and processed meat, was associated with lower risk of death from cardiovascular disease.

The health effects of protein sources depend on comparison or reference foods. Compared to red meat, eggs and dairy products have less adverse health impacts. Although a recent study found a positive relationship between egg consumption and risk of cardiovascular disease, previous large cohort studies have consistently found that moderate consumption of eggs (up to one egg per day) was not associated with risk of heart disease or stroke in generally healthy individuals. Consumption of dairy products may affect human health in complicated ways, depending on the types of dairy products. Total dairy consumption has little benefit on body weight, diabetes, and cardiovascular disease, although there is some evidence that higher consumption of fermented dairy products (especially yogurt) is associated with lower risk of weight gain and type 2 diabetes. It is worth noting that although eggs and dairy are better protein sources than red meat, replacing eggs or dairy with plant protein sources such as nuts and legumes are likely to confer additional health benefits.

On average, Americans consume approximately 81 g of protein per day, of which approximately 85 percent is animal protein. In one possible scenario, even a 25 percent decrease in protein intake combined with a 25 percent shift from animal food to plant protein (from an 85:15 ratio to a 60:40 ratio) would better align with the current science around dietary guidance to improve human and planetary health.

Carbohydrate restriction continues to be promoted as an effective strategy for weight loss and chronic disease prevention. A recent meta-analysis indicated that the health effects of low-carbohydrate diets depend on food sources of protein and fat. Specifically, a lower-carbohydrate diet characterized by high amounts of animal fat or protein was associated with increased mortality,

but a lower-carbohydrate diet with high amounts of plant-based fat and protein was associated with lower mortality. This study underscores the importance of consuming plant vs. animal sources of protein and fat in promoting longevity.

DIETARY CHANGE

Eating out more and eating meat less have gone hand in hand for more than a decade, as consumers continue to spend more food dollars on meals prepared by culinary professionals while red meat consumption has largely declined over time.

While animal-based proteins at the center of the plate remains the norm on most menus, the foodservice industry is helping to move the American diet in a healthier direction by offering more plant-based or plant-forward dishes. According to Mintel research, the number of new-to-market U.S. food and drink products that mentioned “plant-based” grew 268 percent between 2012 and 2018. Nielsen data commissioned by the Plant Based Foods Association show that sales of plant-based foods grew by 20 percent in the year ending in June 2018 compared to a 2 percent increase in all food sales in 2018, and up from an 8 percent increase in plant-based foods in 2017. Among the biggest 100 U.S. chain restaurants (including fast food, fast casual, and full service), 55 percent now offer at least one plant-based entree, according to the Good Food Institute’s 2019 restaurant scorecard, which also found that the word “vegan” now appears on 11 percent of menus. While this analysis did not include independent restaurants and smaller chains, it is clear to even a casual observer of such trends that menus across restaurants around the country and larger institutional foodservice segments are featuring more plant-forward offerings. The emergence of political pressure further supports this evolution, most recently from the bill that now former California Governor Jerry Brown signed into law in September 2018 requiring hospitals, healthcare facilities, and prisons in that state to offer plant-based options at every meal.

Fast Company went so far as to predict that “2019 will be the year alt-meat goes mainstream.” The Impossible Burger, now available in more than 5,000 locations in the U.S., including at fast food chains like White Castle, got an upgrade to the “Impossible Burger 2.0”, a gluten-free version

that utilizes soy instead of wheat, at the start of 2019. Similarly, Beyond Meat launched its next generation Beyond Burger at Carl’s Jr. and A&W, and claims that it has sold more than 25 million burgers worldwide, with its products carried in over 32,000 grocery stores.

The next step beyond these plant-based meat (and seafood) options is the emergence of lab-grown, or cultured, meat and seafood. Although we are likely years away from lab-grown animal protein being widely available and accessible for consumer use—with price and scalability currently standing as key barriers—that industry will have significant public health and environmental implications. Policies and regulations yet to be developed will also determine its progress. Similar to the dairy industry’s failed attempts to restrict the use of “milk” as applied to nut and other non-dairy beverages, beef and farming industry groups are currently lobbying legislators to regulate the term “meat” in ways that could prohibit lab-grown and plant-based products being labeled as such. Regardless, all signs point toward continued growth of and consumer interest in more plant-based and plant-forward menu options that both purveyors and foodservice operators seem happy to accommodate.

The prevalence of alternative “meat” products in the marketplace has outpaced the research on their environmental and health impacts, but mounting evidence is positive. For example, a 2018 study found that the Beyond Burger generates 90 percent less greenhouse gas emissions, has 99 percent less impact on water scarcity, and has 93 percent less impact on land use than a burger made from U.S. beef. Contrary to common misconceptions, for most people with reasonably varied and diverse diets, there is negligible difference in overall protein quality between a mostly plant-based and a more animal-based diet.

We have also seen numerous studies exploring the environmental and human health effects of dietary change and the potential for diet shifts as a climate mitigation strategy. There is clear consensus that reducing animal-based foods in the diet can result in lowered environmental impact. These patterns can be seen among self-selected diets in the U.S. Using the nationally

representative dietary recall data, researchers examined the linkages between diet, health, and environmental impact. Individuals' diets were ranked based on the GHGE associated with their production. Compared to those with high dietary GHGE, those in the lowest emission group consumed more than twice as much plant protein foods and less than half as much animal protein foods, and also ate more poultry and less red meat. The lowest GHGE diets (bottom quintile) included more vitamin E, folate, and dietary fiber, and less sodium and saturated fat than the highest GHGE diets. However, there was a higher content of calcium, vitamin D, and potassium in the highest GHGE diets. Shifting the diets in the highest quintile to diets with an average carbon footprint would bring the U.S. 10 percent closer to emissions reduction targets. This means that diet shift can play an important role in climate action at city and state levels, and culinary professionals can greatly influence this cultural shift. But according to a new study funded by the federal beef checkoff program, consumers who value nutrition and the environment tend to purchase less beef, so as these concerns grow, we might anticipate lower demand for red meat.

Chefs and foodservice operators should focus on two key impacts they can have on consumers' attitudes when it comes to proteins, through their menus—both in the design they conceptualize and the language they use. They should reduce their reliance on red meat and instead feature more plant-based dishes, including offering smaller meat portions accompanied by craveable and flavorful whole grains, legumes, and vegetables. On the menu itself, chefs should then describe dishes more holistically rather than always featuring the animal protein first, which contributes to an unbalanced perception of its importance. By using descriptions that make meat and plants equally enticing, they can create dishes that are healthier whether their diners notice it or not. Chefs also need to help consumers understand that proteins are present in most whole foods. Instead of using protein as a synonym for meat—whether it is during culinary demonstrations or on fast-casual menus where customers pick from a variety of options—chefs

should instead use the term “animal protein” when they refer to such a thing. Additionally, when appropriate, chefs can speak of “plant-based protein”—a simple vocabulary shift that may go a long way.



SCORE: 3.5

The foodservice industry continues to offer more plant-forward menu options highlighting plant-based protein, with alternative meat products becoming mainstream and lab-grown cultured meats arriving on the horizon.

IN SUMMARY:

- High meat consumption, particularly red meat, has harmful effects on both human health and the environment.
- New studies add to existing evidence that shifts in eating habits toward more plant-based proteins, fruits, and vegetables can reduce the risk of certain chronic diseases, greenhouse gas emissions, and the burden on water and energy resources.
- While animal-based proteins at the center of the plate remains the norm on most menus, the foodservice industry is helping to move the American diet in a healthier direction by offering more plant-forward dishes, with alternative meats becoming mainstream and lab-grown, cultured meats arriving on the horizon as well as more dishes where meat or other animal protein plays only a minor or supporting role.



RELATIVE GREENHOUSE-GAS EMISSIONS ASSOCIATED WITH SOME COMMON PROTEIN SOURCES

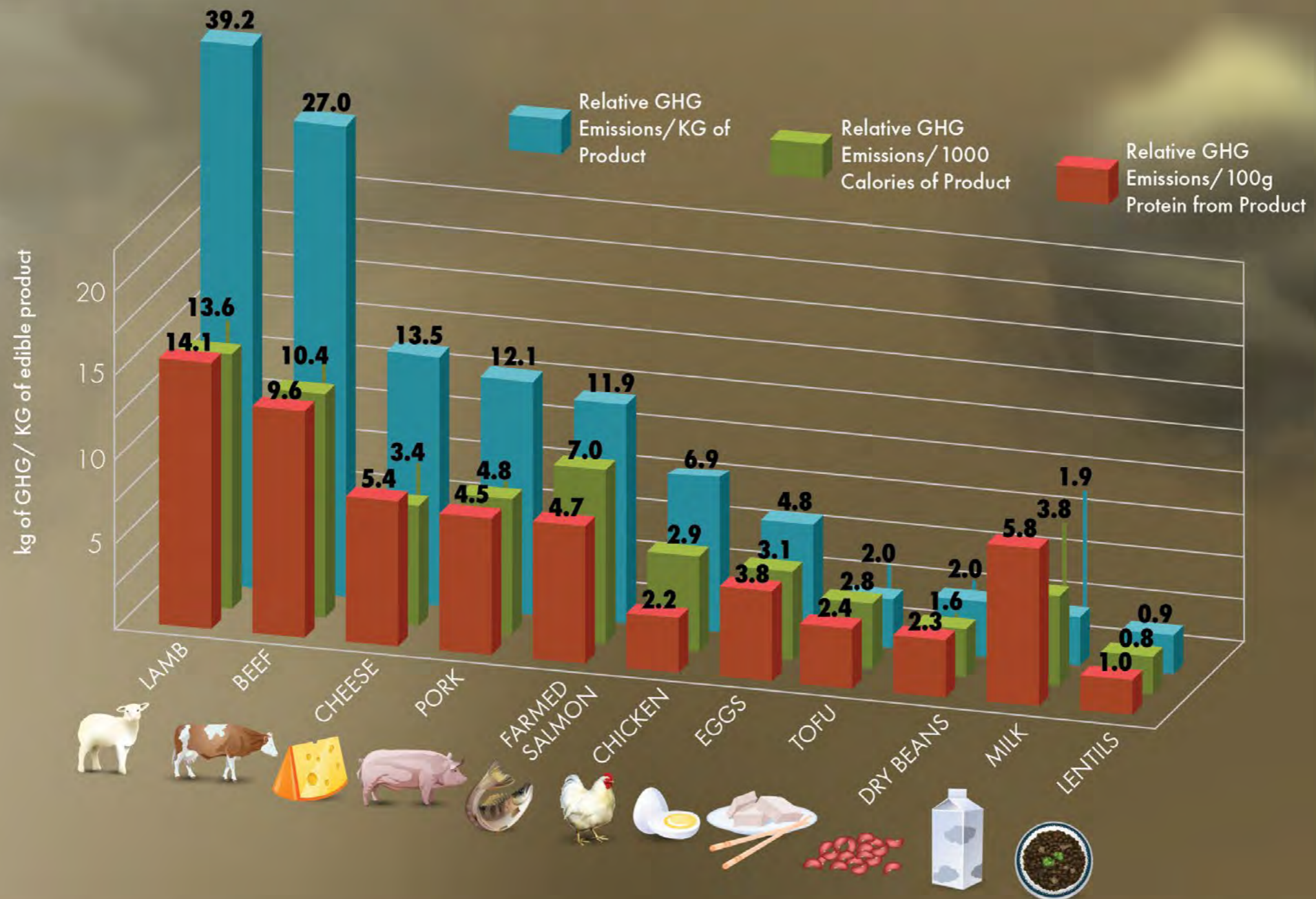


Illustration of the greenhouse-gas emissions associated with several common protein sources and is a good indicator of environmental impact including energy and chemical use, soil management, and mechanical irrigation. Both public health and the environment will improve if restaurants decrease the amount of red meat on menus and replace it with alternative protein sources.

***Calorie Reference:** USDA National Nutrient Database for Standard Reference, Release 25: Energy (kcal) Content of Selected Foods per Common Measures, <https://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/SR25/nutrlist/sr25a208.pdf>
****Protein Reference:** USDA National Nutrient Database for Standard Reference, Release 25: Energy (kcal) Content of Selected Foods per Common Measures, <https://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/SR25/nutrlist/sr25a203.pdf>

FRUIT AND VEGETABLE CONSUMPTION AND PRODUCTION

Increasing fruit and vegetable consumption is great for our health. The fruit and vegetable sectors have both been leaders in engaging environmentally aware consumers, with offerings that are certified organic, locally produced, low in greenhouse gases, or some combination of these qualities.

However, our interest in eating more fruits and vegetables is not yet showing up in the hard numbers reflecting the current total national consumption and production. This sobering fact has appeared consistently across multiple sources.

Per capita food supply data from the Economic Research Service of the U.S. Department of Agriculture (USDA) describes how much food is available from production and net imports. In 2016, the most recent data available, the American food supply offered a per capita annual total (in fresh-weight equivalent, after adjustment for losses in distribution and preparation) of 165 pounds of vegetables and 117 pounds of fruit, in both cases barely higher than the previous year. A decade earlier, the corresponding per capita annual total was much higher, at 173 pounds of vegetables and 130 pounds of fruit, so long-term trends have not been favorable. The downward trend from 2006 to 2016 is observed whether or not one uses USDA's loss-adjusted estimates to account for food waste. Also, the downward trend in vegetables is observed even if one excludes potatoes from chips, dehydrated products, or frozen (such as for fries). According to a study of multiple rounds of the National Health and Nutrition Examination Survey (NHANES) from 2003 to 2014, Americans made many improvements in the healthfulness of their food intake—more whole grains, less sugar-sweetened beverages, and a higher total diet score, for example—but no significant improvement in daily consumption of fruits and vegetables. The study found that fruit and vegetable intake was somewhat higher for high-income people than

for lower-income people and participants in the Supplemental Nutrition Assistance Program (SNAP), but that all income strata fell short of recommendations. The NHANES data are used in the federal government's "Healthy People 2020" monitoring, which likewise shows no progress toward meeting goals for fruits and vegetables.

Though one frequently hears that prices or U.S. agricultural production constraints are to blame, neither of these potential barriers provides a fully persuasive explanation. For potatoes, the largest vegetable by volume, U.S. production rose from 2005 to 2015, but exports also increased, so per capita availability for consumers fell. The total land area assigned to other fruit and vegetable crops is smaller and not increasing much. In the Census of Agriculture, conducted once every five years, U.S. cropland harvested rose by 5 million acres from 2012 to 2017 (an increase of 1.6 percent). During this time, land in vegetable production fell by 0.2 million acres (a decline of about 5 percent).



Simultaneously, farmland for soybeans, which are heavily used in meat production, grew by 14 million acres (an increase of 18 percent). All things considered, demand constraints rather than supply constraints are most limiting for U.S. fruit and vegetable consumption.

Restaurants and the non-commercial foodservice sector both respond to and influence patterns in food supply and demand. In their 2018 forecast of food and beverage trends for restaurants, the consultants Baum and Whiteman listed "the rapid consumer shift to 'plant-based' foods" as the #1 trend of that year. The National Restaurant Association's 2019 Culinary Forecast ("What's Hot") noted, "Plant-based and veggie-centric foods are no longer just for vegetarians," and

ranked veggie-centric/vegetable-forward cuisine number 8 out of 140 trends, thanks in large part to chefs experimenting with new techniques to make vegetables enticing and worthy of the center of the plate. And increasingly, food media celebrate dishes where vegetables substitute in for animal-based protein—jackfruit for barbecue, rutabagas for pork belly, carrots for hot dogs—for their ingenuity rather than decrying them for what they are not.

Fast casual operations have dominated the plant-forward space, and in recognition of this movement, QSR magazine, in collaboration with the CIA, released a plant-forward watch list in its May issue (see page 15). Even legacy fast food brands, such as Taco Bell, Carl's Jr., and White Castle have made bold moves this past year to appeal to more vegan and vegetarian consumers with separate menus and sophisticated plant-based meat burgers, as well as flexitarians who use these designations as a shorthand for health and sustainability. Amidst the volatile meal kit and food delivery space, services such as Thistle and Purple Carrot continue to see further market potential in focusing their offerings on vegan, vegetarian, and flexitarian consumers. Large non-commercial foodservice providers, including Compass, Sodexo, Aramark, and Guckenheimer, are also increasing their plant-forward offerings and internal staff trainings in response to customer demand.

At a high level, chefs and foodservice operators have two simple ways to influence consumers' attitudes around fruits and vegetables: use more of them, and make them more appealing. It's no longer enough to offer only one vegetarian entrée consisting of pasta or roasted vegetables, or an afterthought fruit salad for dessert. Vegetables have begun driving single menus and entire operations, from fine dining to fast casual, showing their wide creative and entrepreneurial potential. Consumers seeking to eat more fruits and vegetables generally know about these restaurant concepts; it is likely that they will continue to proliferate, since the trend is far from peaking, and in the process these establishments may grow diners' interest in a wide variety of preparations and ingredients. In operations that are not labeled veg-centric (which is still the vast majority), chefs should look for inspiration among those menus and seek to create dishes tailored to their customer base that nonetheless use a wider range of produce in more exciting preparations. As demonstrated by research from Stanford University and the World Resource Institute's

Better Buying Lab, attention to menu labeling that offers the same amount of details when it comes to vegetables as to other types of dishes or components will also contribute to diners selecting them because they feel equally special; spices, condiments, and cooking techniques are all elements that can be added to vegetables' descriptions to make them more enticing. Beyond adding more vegetable dishes on menus and more vegetables as a garnish around an animal protein, chefs can also use blended dishes, from burgers (beef with mushroom) to mashes (potatoes with cauliflower) to cake (chocolate with beet), to enable diners to eat more fruits and vegetables in every dish. The dessert flip concept, using more fruit and smaller portions of indulgent favorites, offers an opportunity to hit upon all of these key points and can further reinforce Menus of Change principles by ensuring that these come from local and seasonal sources. With any plant-forward dish, well-crafted descriptor language on menus is essential.



SCORE: 4

Interest among trend-leading chefs, large non-commercial foodservice operators, and their customers in plant-forward menus—including fruits and vegetables—is surging. With younger generations accelerating this trend, we hope to see measurable increased consumption data around fruits and vegetables in future years indicating widespread change in American food choices.

IN SUMMARY:

- Food supply data and food intake data both show little change in consumption of fruits and vegetables. The federal government's "Healthy People 2020" monitoring report found no recent progress toward meeting goals for fruits and vegetables.
- On the supply side, it is feasible to increase U.S. fruit and vegetable production, if the demand is there and the price is adequate.
- Vegetarian, vegan, and plant-forward dishes generally have become more common across all foodservice sectors in response to consumer demand, setting up possible future shifts in broad, mainstream food choices.



FISH, SEAFOOD, AND OCEANS

Globally, over three billion people depend on wild and farmed fish as a major source of protein. Nearly one in five—1.39 billion people—are vulnerable because they rely on inadequately managed wild fisheries for a large fraction of their essential omega-3 fatty acids and vitamin B12. And another 11 percent of the world's population—845 million people—are at risk of health impacts from losing irreplaceable micronutrients like zinc, iron, and vitamin A.

Dietary recommendations suggest that Americans eat two to three 4-ounce servings of seafood per week, which means that Americans should on average eat 26 to 39 pounds of seafood per year. In fact, we average far less, consuming 16 pounds per person per year (as of the latest data from 2017, although that number increased more than 6 percent from 2016). The top seafood items remained constant, including, in descending order, shrimp, salmon, tuna, tilapia, and Alaska pollock—with the top three accounting for more than 50 percent of all U.S. seafood consumption. However, there may be signs that Americans' tastes are beginning to diversify, as consumption of the top 10 items declined from 90 percent to 84 percent in one year.

The U.S. produces considerably less seafood, wild and farmed, than we currently consume—let alone what we should be eating. This creates the much-debated “seafood trade deficit,” currently in excess of \$14 billion, which results in more than 90 percent of American-consumed seafood coming from imports. It's worth noting, however, that the U.S. also exports large amounts of seafood—much of it processed overseas—which is then reimported in a wide variety of forms.

Experts believe that big changes are in store for this global seafood value chain, as China and India become bigger consumers. China is the world's largest wild and farmed seafood producer, the biggest exporter, the largest processor, and one of the biggest importers. A model from the Food and Agriculture Organization of the United Nations (FAO) suggests that by 2030, China could become

a net seafood importer, if the Chinese middle class behaves as social scientists expect, creating big demands and competition for finished seafood products that currently are consumed in the U.S., Japan, and Europe.

SUSTAINABILITY IN WILD FISHERIES

Globally, wild marine fish production has stagnated for nearly 30 years, at about 80 million metric tons (MMT) per year, despite huge increases in total fishing fleet size, and in fishing location and depth. According to FAO, the availability of “underfished” stocks continues to decrease, to 7 percent as of 2016. Few, if any, new fishable resources are being discovered each year; the only really new wild fisheries would be in the Arctic Ocean, opening as waters warm and ice melts. It is important to note that improved wild fishery performance will require both reduced global warming emissions and enhanced cooperation among nations as fish populations move poleward in response to warming. Some nations near the tropics will inevitably lose fish production potential.

The tremendous opportunity for enhanced wild production is being demonstrated in real time in the United States, where policy commitments over the last two decades have turned around U.S. wild fisheries, to approaching near complete sustainability. Today, 45 wild fish “stocks,” once overfished, have been completely rebuilt to healthy levels, and most of the rest are rebuilding rapidly. One good example is the Pacific West Coast groundfish trawl fishery (which catches nearly 100 species of fish that live on or near the seafloor), declared a federal disaster in 2000. Since that time, the use of new and effective management tools, and better science, has rebuilt all but two of those species, many decades ahead of schedule, and the others are nearly there. This fishery is now yielding 17 million newly sustainable meals of seafood each year. In fact, one of the remaining problems there is finding markets for this abundant and sustainable seafood. New marketing programs like “Positively Groundfish” are emerging to educate restaurants and retailers about these now-plentiful species.

In addition, the movement for sustainable wild fisheries is spreading around the globe. Good examples are available for fisheries of all kinds, from large industrial fisheries in the U.S., Europe, Oceania, and elsewhere to smaller-scale, artisanal fisheries in Belize, Indonesia, the Philippines, and elsewhere.

AQUACULTURE

Though the relative rate of increase has slowed slightly, farming seafood continues to increase faster than other types of meat production, recently surpassing global wild marine fish production in volume. When plants are included, the world produced 110 MMT of cultured seafood in 2016. Nearly 90 percent of that production occurs in Asia, and about two thirds of global production occurs inland. The vast majority of aquaculture feeds comes from a combination of terrestrial agricultural and wild-harvest fishery sources; fish meal from small pelagic fishes remains important, but continues a gentle but long-term decline. The rapid increase in aquaculture creates added pressure to expand terrestrial crops, with all of the potential side effects on water use and water quality, and also added competition for existing agricultural commodities. Considerable work is underway to develop new feed sources including insects, microalgae, and even microbial synthesis. By contrast, aquaculture production (made up mostly of oysters, clams, catfish, and salmon) is relatively small in the U.S.—especially in comparison to wild fisheries—though the U.S. government continues to advocate increases in offshore finfish aquaculture. The emphasis by sustainability advocates has been on minimizing excessive nutrients that are added to the environment, being efficient in the use of resources for feed, minimizing and eliminating the use of antibiotics, and ensuring that seafood animals are farmed in areas that are biologically appropriate.

TRACEABILITY

Many of the remaining problems in the seafood industry come from a lack of traceability, regardless of source. Thus, the quest for fully traceable seafood from boat or farm to plate remains a high priority. The U.S. began the Seafood Import Monitoring Program (SIMP) in 2018. This is a risk-based approach where key traceability data will be reported for 12 species. SIMP is attempting to force the collection of

vessel information in an effort to curb Illegal, Unreported, and Unregulated (IUU) fishing. IUU fishing runs counter to good management, and often relies on unregistered or forced labor. SIMP is not a labeling program, but it will make it easier for the culinary industry to create boat-to-plate messaging, while ensuring that harmful practices are reduced or eliminated from their supply chains for some of the most common types of seafood.

PLASTICS

One important caveat looms, related to filter feeders and, for that matter, all wild and farmed seafood: the prevalence of micro- and nano-plastic fragments moving pervasively through global food webs. Scientific and media reports of high levels in particular seafood species are not yet accompanied by a full understanding of the risks they might pose. A concerted effort is needed to consolidate and amplify knowledge on this front.

CHEFS AND SUSTAINABLE SEAFOOD

The sustainable seafood movement has been an important partner with the U.S. conservation movement in achieving the turnaround in wild fisheries, working hard together for two decades to lessen the environmental impacts of the way seafood products are produced from wild fisheries.

Chefs have been actively involved in this movement by advocating for the use of sustainable and lesser utilized species, and by creating linkages from the boats and the farms to the plates; a notable example is the Chefs Collaborative. Chefs and other food industry stakeholders have been actively advocating for sustainable wild fisheries through campaigns like “Share The Gulf” and #ChefsForFish. They were key players in the efforts in 2018 that prevented the U.S. Congress from undermining its foundational fisheries management law, the Magnuson Stevens Act. The James Beard Foundation also launched its restaurant-focused “Smart Catch” sustainable seafood program, which already includes more than 400 qualified restaurant leaders and chefs whose menus have met or exceeded 80 percent sustainability, with additional restaurants committed to attaining this goal. As a leader among QSRs, McDonald’s

continues to highlight its Marine Stewardship Council (MSC)-certified Alaskan pollock Filet-O-Fish sandwich, and rolled out an educational card game in 2018 for children to think more consciously about fishing. As is the case for the meat industry, demand for plant-based and even lab-grown seafood products appears to be on the rise.

For all of the work over the last two decades, there is still a great deal of advancement that remains to be accomplished. Issues such as the use of slave and indentured labor continue to be problematic in many places in the industry, and new initiatives continue to be developed. Two examples are the Monterey Framework for Socially Responsible Seafood, led by Conservation International, and the Roadmap for Improving Seafood Ethics (RISE), just released by Fishwise. Additionally, the sustainable seafood movement was dealt a blow in 2018 when an Associated Press investigation alleged that acclaimed seafood distributor Sea-to-Table knowingly sold seafood that was not local, wild, sustainable, and traceable, per its guarantee.

Eating seafood is a central part of the culinary experience for many Americans, especially those who live or vacation near the coast—as most do. Moreover, Americans eat most of their seafood away from home, which offers opportunities for culinary professionals to provide diners with delicious and diverse menu choices, highlighting both sustainable local fish and seafood from around the world that is sustainability sourced, including underutilized species that might otherwise be wasted. Seafood is already the most traded commodity globally, making high-quality and sustainable options available to chefs year-round, even taking the products’ carbon footprints into account.

Chefs have a large role to play in helping the general public expand their knowledge. This starts by chefs diversifying their seafood offerings with sustainability, variety, and affordability in mind. This requires research and recipe development that they should consider an investment in the future of their menus, to be able to continue offering fish and seafood 10 or 20 years down the road. Then, they must explain to their customers how a particular variety relates to something they know, whether in texture or

optimum mode of preparation, to take away the fear of ordering or purchasing something new. Training staff in foodservice operations to provide this information to diners in engaging ways can be a helpful approach toward enhancing the impact of the industry’s efforts around menuing and sourcing sustainable seafood.



SCORE: 3

Americans eat most of their fish and seafood away from home but only eat half as much as they should. Making responsible choices is difficult, although transformation of U.S. fisheries makes eating locally also generally more sustainable, and that movement is beginning to spread around the globe. Chefs and the restaurant industry can play a lead role in helping Americans eat more fish and do so responsibly, but there’s much work ahead and new approaches are needed.

IN SUMMARY:

- Know and trust your supplier, and be engaged. You should be confident the product you purchase meets your sustainability and traceability requirements. Ask questions of your suppliers, and comment while certification organizations are revising their standards.
- Americans eat most of their fish and seafood away from home but only eat half as much as they should. Making responsible choices is difficult, although transformation of U.S. fisheries makes eating locally also generally more sustainable, and that movement is beginning to spread around the globe. Chefs and the restaurant industry can play a lead role in helping American eat more fish and do so responsibly, but there’s much work ahead and new approaches are needed.
- Sustainable seafood should be a major pillar around which food businesses and institutions build their operations and strategic plans.

WATER SUSTAINABILITY

Nearly half of global gross domestic product (GDP), more than half of the global population, and 40 percent of grain production could be at risk due to water stress by 2050. That's according to estimates from the International Food Policy Research Institute. Water stress is driven by increasing competition over water in drainage basins, meaning between different agricultural water needs, and between increasing water needs for growing cities, for agriculture, and for the environment. That stress is aggravated by climate change and by land use change that increases risks for droughts and extreme weather events.

Agricultural irrigation is by far the largest user of water. Around 70 percent of all water withdrawn for human uses from rivers and aquifers goes to irrigation, while industry uses about 20 percent and households use a bit less than 10 percent. Although most of this water is from renewable runoff to rivers, a rapidly increasing share is from non-renewable groundwater extraction. Irrigated agriculture is important for production; it provides 40 percent of global agricultural production, despite covering less than 20 percent of global cropland.

The way we eat—both dietary patterns and how we grow our food—dramatically impacts how much water each person requires. While every person consumes around 2 to 4 liters every day as drinking water, and uses around 200 liters of water daily for household purposes, we need between 2,000 and 5,000 liters per person per day for the diet we consume. All told, overall water consumption for food production has doubled between 1960 and today.

Animal-based foods can be particularly water-intensive. Dietary shifts can therefore be important for reducing water needs from agriculture, especially where it depends on irrigation. It is clear that in general, more plant-forward diets have substantially lower water footprints than a diet heavy in animal-based food. However, a diet that is good for health—either following the U.S. dietary guidelines, or based on the *EAT-Lancet* Commission's model of a healthy diet—doesn't in itself result in substantial reductions in water use. Beef that primarily feed on rainfed grasslands will have a

relatively low water footprint, while beef that are fed irrigated crops or grazed on irrigated pastures can have a very high water footprint. Some of the plant-based alternatives being suggested in place of unhealthy foods can actually be quite demanding on the water supply. For example, the *EAT-Lancet* Commission suggests that, globally, we double production and consumption of nuts, despite current production practices in many regions requiring very high amounts of water. Fruits, vegetables, and legumes similarly have low water use efficiencies and thus demand relatively high amounts of water. Therefore, it is very important to improve production practices and find the most suitable geographic locations for production of these crops.

Along the same lines, several papers in the past year have emphasized that the necessary water savings can only be accomplished if we see a combination of drastic reductions in food loss and waste, improvements in production practices, and increased consumption of plant-based foods. This means the foodservice industry has a critical role to play in reducing food loss and waste and in sourcing food from production methods that maintain sustainability of water resources.

These changes are particularly important in light of the need to increase water use for food production if we are to healthfully feed a world of 10 billion people by 2050. Doing so will require dramatic increases in fruits, nuts, legumes, and vegetables. Achieving this increase is a substantial challenge, especially given that as much as two thirds of the world's population will live in water-stressed countries by 2025. Special attention should be given to the rapidly growing use of nonrenewable groundwater, especially in the central and western United States and in other parts of the world such as India, China, and Pakistan.

The way water flows through the landscapes can be seen as the “bloodstream of the biosphere,” connecting local places to distant areas. By altering land cover through deforestation, which reduces evaporation, or changing soil properties to reduce infiltration, agriculture can substantially alter this bloodstream. Management of water across the full hydrological cycle is thus as important as managing water withdrawals. Food production can also pollute and further stress water resources. Fertilizer and manure can run off into surface waters and leach into groundwater. Better management practices—

including planted buffers and management efforts for nutrients, manure, and drainage—can substantially reduce water pollution. Few states (such as California) actively manage fertilizer and manure discharge not only to surface water but also to groundwater. This makes it even more important to see efforts by foodservice companies to purchase from farmers and ranchers who take voluntary steps to conserve and protect water resources.

Climate change and growing food demands will be challenging for water resources management, while potentially reducing protein and nutrient quality of cereals and overall productivity. Climate change poses increasing risks by shifting agricultural production zones and exacerbating flooding, drought, and increased fire frequency. Growing conditions will become more challenging. Water demands for many major food staples will increase due to both increased temperatures and changes in precipitation patterns and amounts.

Opportunities to adopt innovative solutions to reduce the water footprint of menus and operations abound across the foodservice industry. The progress chefs and foodservice providers have made toward decreasing red meat and increasing more plant-forward menu options has significant implications for improving water sustainability among many other benefits mentioned elsewhere in this report (see pages 34, 38, 42). Additionally, greater understanding of beneficial agricultural and land management practices can help chefs choose more sustainable suppliers (see page 28).

The severe and unprecedented drought crisis in Cape Town, South Africa peaked in 2018, bringing attention to the increasing threat of water scarcity around the world and highlighting the role that restaurants can play in reducing water usage and educating consumers on the topic. Chef Luke Dale-Roberts, owner of three Cape Town restaurants, garnered media attention for his bold strides to restrict water use, including limiting laundry usage, reconfiguring menus to use as little water as possible, and taking away 90 percent of the chinaware by instead plating meals on a hand-crafted picture frame-like plate with an interchangeable card for each course. The concepts of waterless recipes, using less water thanks to water-efficient equipment and strategically designed kitchen operations, and featuring crops grown in seawater on menus are gaining more traction within the foodservice

industry as threats of droughts and water scarcity continue to impact more geographical locations worldwide.

Food waste in particular represents a significant potential for reduced water usage through the “virtual water” waste embedded in food's water footprint. While “ugly produce” along with “nose-to-tail” and “root-to-stem” culinary strategies have captured popular attention, the foodservice industry may realize even larger water sustainability impacts by increasing its role in diverse local, regional, and global partnerships with agricultural and food suppliers to help reduce water—including groundwater—risks in agricultural production and move toward sustainable farming practices.



SCORE: 2

As threats of droughts and water scarcity continue to grow worldwide, the concept of reducing the water footprint of menu items and in kitchen operations is only starting to gain traction in the U.S. foodservice industry.

IN SUMMARY:

- Food production requires substantial amounts of water and climate change is further aggravating water scarcity; thus, changes in diet, cutting food loss and waste, and sourcing from farmers who practice water-saving techniques are important.
- Because some of the food items that comprise a healthier diet—such as legumes, nuts, fruits, and vegetables—may have a high water use, best practices in sustainable farming should be encouraged.
- From waterless recipes to water-saving equipment to water-smart food sourcing including a greater emphasis on plant-based ingredients, the foodservice industry has many opportunities to adopt innovative solutions to reduce the water footprint of its menus and within its operations.

CLIMATE CHANGE

Climate change and water scarcity are among the greatest threats to the \$800 billion U.S. foodservice industry and the nation's food system overall. Over the next few decades, forecasts indicate temperatures will continue to rise, precipitation patterns will change, extreme weather events will become more frequent and intense, and many regions will experience a decline in freshwater availability. This increases risks for food production. Most countries in the world have committed to the Paris Agreement on limiting climate change to stay below 2 degrees Celsius of warming. In the fall of 2018, the Intergovernmental Panel on Climate Change (IPCC) warned of the enormous risks of increasing global warming beyond 1.5 degrees. Scientists also warned that the combination of global warming and degradation of ecosystems on land (where agriculture is the dominant driver) could make the planet turn into a "Hot House Earth," with temperatures 4 to 5 degrees warmer than today.

2018 turned out to be the fourth warmest year since scientists started measuring temperatures, and the severity of extreme events around the world were reported frequently. Yet, global greenhouse gas (GHG) emissions rose by at least 1.6 percent last year, after three years of plateauing emissions.

Without major changes in the way we farm and fish, these factors combined will make growing conditions more challenging for a wide variety of crops, and farming and ranching far less predictable. As a result, foodservice professionals should be prepared for supply chain disruptions, heightened risks of foodborne contamination, and more uncertainty in the availability, price, and nutrient content of food. Elevated carbon dioxide concentrations also lead to a decline in the iron and zinc content of legumes and certain grains, for example. Interestingly, one of the past year's most talked-about papers on climate change and agriculture exemplified some of these risks in terms of beer: due to projected climate impacts on barley production, beer consumption might fall by up to 30 percent in several countries (including Belgium, Canada, and the Czech Republic), and by up to 14 percent in the U.S. Beer prices would double in the Czech Republic and quadruple in Poland. Leaders in the foodservice industry must start building resilience in order to deal with these potential risks.

The food and foodservice industries also have a critical role to play in addressing the climate crises. Food systems are both a major source of greenhouse gas emissions and a driver of land use change in ways that can further aggravate climate change. Several papers in 2018 emphasized the

disproportional impact that red meat in particular and animal production in general have on climate change. Impacts of the lowest-impact animal products typically exceed those of vegetable substitutes. Ruminant meat—beef, lamb, mutton, and goat—has been repeatedly shown to be the most GHG-intensive food group, on the order of 20 to 150 times more so than plant-based foods, and the most demanding of land and energy. It has been estimated that a dietary shift away from the current overemphasis on animal-based products in the U.S.—where per capita meat consumption is three times the world average—could reduce national food emissions 61 to 73 percent.

If global meat and dairy consumption continues to rise as projected, the GHG emissions from food production alone will surpass the threshold for keeping temperature rise at or below 2 degrees Celsius. The *EAT-Lancet* Commission recently estimated that limiting red meat consumption to 4 ounces per person per week would keep us within these thresholds.

The foodservice industry needs also to think carefully about the connection between climate change and fish and seafood. While several researchers have analyzed fossil fuel use in fisheries, the sector and its impact is often neglected in analyses on food and climate change. However, emissions from the global fishing industry grew by 28 percent between 1990 and 2011, with little coinciding increase in production (average emissions per ton caught grew by 21 percent). Growth in emissions was driven primarily by increased harvests from fuel-intensive crustacean fisheries.

Shifting toward plant-forward cuisines is thus a necessary and urgent intervention for meeting sustainability goals, a message that has been echoed repeatedly in the scientific literature.

Beyond a dietary shift, we also urgently need to reduce fossil fuel use across the supply chain. Food professionals should therefore substantially limit or even avoid products that require significant air travel and heating from fossil fuel sources. Another big culprit is food loss and waste. Through the UN Global Sustainable Development Goals, there is a global agreement to cut food loss and waste by 50 percent by 2030. While the foods most wasted per calorie are fats, oils, grains, and sweeteners, the food with highest total wasted greenhouse gas emissions are red meats and dairy. In the U.S., 28 percent of all greenhouse gas emissions from the food system goes to food waste.

Amidst seemingly conflicting information from different sources, it can be challenging for foodservice professionals to identify the most

sustainable culinary choices. As a general rule, plant-based foods should be prioritized; shellfish and insects can probably be used liberally; and other animal products should be used sparingly as a flavor enhancer, a less frequent side dish, or for the very infrequent, larger portion for special occasions. There are sound ecological reasons to favor animal foods from pasture that are based on agro-ecological operations, over their industrially produced counterparts, but serving "better" meat and dairy needs to come along with substantial reductions in the amounts served.

Internal and external pressure is pushing the foodservice industry to revise their operations to address climate change. Environmental non-profits and investor groups continue to call on large-scale foodservice players to reduce their greenhouse gas emissions and water use, and some restaurants are also taking this mantle on voluntarily. Zero Foodprint, a non-profit founded by Anthony Myint of Mission Chinese Food in San Francisco, worked with 178 restaurants around the world to go carbon-neutral for Earth Day in 2018 by addressing operational efficiencies, by redesigning menus, and through carbon offset purchases. The World Resources Institute also recently launched the Cool Food Pledge, convening large-scale institutional dining facilities that are collectively responsible for 60 million meals annually to voluntarily target reducing the GHG emissions associated with the food they provide by 25 percent by 2030 relative to 2015.

While the restaurant industry's efforts in serving less red meat and making public commitments to measure and reduce environmental impact from their operations are helping to address climate change overall, the industry has made little progress in managing its own near-term risks, including increased volatility in food availability and price triggered by more extreme and less predictable weather and long-term droughts. Needed improvements in supply chain transparency (page 24) will help restaurant operators better understand where their ingredients come from, and operational practices relevant to local and regional food systems (page 27), and land and farming practices (including sourcing from farms that effectively sequester carbon; page 28) can also inform menu decisions to avoid risk and reduce emissions and fossil fuel use in operations.

As leaders of the plant-forward direction for American food choices, chefs and foodservice professionals need to create a culture of craveability around produce and healthy, plant-based foods, shifting from a perception of deprivation to one of pleasure. Creativity in the restaurant and non-commercial foodservice sectors is increasingly showing the way by offering more, not fewer,

choices and presenting a multitude of pathways toward "plant-forward": embedding culturally based flavors from the Mediterranean and Asia to Latin America; dazzling diners with small plates of fresh, farm-to-table creations; constructing whole-grain-and-produce-based bowls with meat or other animal protein as a 1- or 2-ounce topping; and marrying reduced portions of animal protein with savory preparations of legumes (pulses), nuts, and/or seeds. Just as a good investment advisor suggests building the components of a sound retirement portfolio across a whole range of sectors and strategies, innovative restaurants are now demonstrating the promise of diversifying menu categories and concepts beyond the old, simply bifurcated "regular" meat and vegetarian/vegan options.



SCORE: 3

The restaurant industry and culinary professionals are driving important trends in plant-forward menu innovation, but much more needs to be done more quickly and on a larger scale to set targets and track progress toward reduced GHG emissions within operations and across the entire food supply chain.

IN SUMMARY:

- There is an urgent need to address climate change and the foodservice sector can help by shifting toward plant-forward cuisines, avoiding products that require significant air travel and heating from fossil fuel sources, and cutting food waste.
- Foodservice professionals should be prepared for future supply chain disruptions, heightened risks of foodborne contamination, and more uncertainty in the availability, price, and nutrient content of food due to climate change.
- The restaurant industry and culinary professionals are driving important trends in plant-forward menu innovation, but much more needs to be done more quickly and on a larger scale to set targets and track progress toward reduced GHG emissions within operations and across the entire food supply chain.



Photo: Stanford University



Visit moccollaborative.org to learn more about the Menus of Change University Research Collaborative's vision, mission, membership, and key impact areas, and to take advantage of a wealth of free resources for both foodservice and academic audiences.

VIII: MENUS OF CHANGE AND THE NEXT GENERATION: THE RESEARCH AGENDA

By Jean-Xavier Guinard, PhD, Professor of Sensory Science, University of California, Davis and Chair, Research Working Group, Menus of Change University Research Collaborative; and Ghislaine Challamel, MS, Research Program Manager, R&DE Stanford Dining and Menus of Change University Research Collaborative

The Menus of Change University Research Collaborative (MCURC) is a network of university-based scholars, foodservice business leaders, and executive chefs collaborating on research and education in support of culinary-centric, evidence-based food system innovation within and beyond universities. This initiative leverages the unique position of universities to advance lifelong food choices among students—who are influencers and will soon be adult decision-makers, parents, and business and community leaders—by connecting a diversity of insights from academic researchers, dining operators, and sustainability and nutrition managers. The Collaborative's Research Working Group gathers a dynamic mix of academic perspectives—from sensory science and dietetics to sustainable food systems and behavioral economics—to advance a groundbreaking research agenda. By using campus dining halls as living laboratories for behavior change, this research agenda includes discovering the most effective operational and marketing strategies for implementing the 24 Menus of Change Principles of Healthy, Sustainable Menus, along with a matrix of related pathways for shifting diets to healthier, more sustainable, plant-forward patterns of eating.

One of the Research Working Group's greatest achievements of the past two years, the DISH Study (which stands for Delicious Impressions Support Healthy eating), is currently under review for publication. The study evaluated the impact of taste-centric menu labeling on students' food choices and consumption of vegetarian dishes. An executive summary and toolkit to help foodservice leaders leverage the valuable findings of this paper will be available once the research is published.

The Collaborative's research agenda currently focuses on behavioral research around sustainability, with one study seeking to understand students' intentions to reduce food waste in university dining halls, and another study looking at the impact of a one-unit seminar course addressing the carbon footprint of food choices. A third research project

consists of a national food waste survey of college and university operations, to identify the most successful and cost-effective food waste reduction strategies that can be shared with and adopted by other institutions to reduce collective institutional waste and identify common challenges and barriers that colleges and universities face in mitigating food waste.

The Research Working Group has also developed a portfolio of "seed studies" that are low-resource, rapidly prototyped research projects that help gather preliminary data on student understanding of key nutrition and sustainability topics. Following the 2017 "Faith in Fat" study—in which we evaluated student mindsets about the relationship between healthy food and the presence of fat—we conducted a "Love it or Lose it" intervention in 2018 to evaluate students' knowledge of the healthfulness of various fat-containing foods served in the dining halls. The same concept has been implemented in 2019, scaling research initiatives from our members.

In collaboration with the MCURC Chefs Committee, we are conducting a third type of experiment, called Coordinated Tasting Tables. These interactive events are primarily used by dining operators to engage with students, let them discover new ingredients or dishes, and educate them on nutrition and/or sustainability challenges. MCURC researchers have taken the Tasting Tables a step further by gathering data from students on perceptions of specific recipes, categories of food, and overall food literacy. This data is extremely valuable both for informing dining services' future business strategy and for academic faculty members' advancement of knowledge with respect to food-related decision science and habit formation.

The Menus of Change University Research Collaborative's research agenda stands to benefit the food industry at large, as we are unearthing insights that all food professionals can apply in their operations, wherever they sit—K-12, fast food chains, contract foodservice, etc.—to advance healthy, sustainable, delicious food choices.



IX. PRINCIPLES OF HEALTHY, SUSTAINABLE MENUS

Consumers say they want food that is healthy, sustainable, and ethically sourced, but figuring out which foods to eat is often not easy. As a result, the dining public is looking to chefs and food industry leaders to help them make the “right” choices. Culinary professionals are responding. But giving people what they want isn’t always easy either. Some diners believe that foods advertised as “farm to table” or certified with sustainability labels are also healthier. While customers don’t always purchase what they say they want, these trends are profoundly changing the landscape of the foodservice business.

The **Principles of Healthy, Sustainable Menus** represent unique guidance for the foodservice industry. They incorporate findings from nutrition and environmental science perspectives on optimal food choices, trends in consumer preferences, and impacts of projected demographic shifts in order to provide culinary insight and menu strategies that build on promising innovation already occurring in the sector.

The principles anticipate that fast-moving, mid- and long-term global trends—from continued population growth and increasing resource shortages to commodity price spikes and food security issues—will increasingly reframe how we think about food and foodservice in the United States. They also consider that the rise in diet-related chronic diseases suggests that many of today’s food and foodservice business models cannot remain unchanged for the long term. They outline pivotal culinary strategies designed to increase the odds that customers will reward pioneering and innovative restaurants and other industry operations with their business.

In short, the Menus of Change Principles offer a guide to optimal menu design and innovations for future culinary development to promote the foodservice industry’s abundant creativity and entrepreneurial dynamism in support of a future of tremendous opportunity.

Collectively, these principles and strategies also speak to our most vulnerable members of society. Chefs who are inspired by the possibility of delicious, healthy, and sustainable foods are working to make these flavors more accessible across America, in K-12 schools, in hospitals, and in low-income neighborhoods. Without the benefit of culinary expertise and insight, a focus on inexpensive ingredients can often be a recipe for failure, whether the customer is a child or an adult, middle-class or economically disadvantaged, healthy or sick.

Finally, the Menus of Change Principles have not been chiseled in stone; rather, they are designed to be part of an interactive, cooperative, and evolving process. As science progresses, trends shift, and new opportunities and challenges come to light, we will revisit and revise this document annually. Please join the conversation at the annual Menus of Change Leadership Summit or online to help us further strengthen this essential guidance for the foodservice sector. You can reach us at info@menusofchange.org.

For additional guidance on sustainability and nutrition science-based dietary advice, consult the CIA-Harvard Chan School Menus of Change website, menusofchange.org, and Harvard Chan School’s Nutrition Source website, nutritionsource.org, which includes additional CIA-Harvard Chan School integrated dietary information and culinary strategies.

OUR APPROACH: DIVERSITY OF STRATEGIES

Any approach to providing guidance on nutrition, the environment, and culinary insight to business leaders must recognize that America’s \$800 billion foodservice industry is as diverse as it is large and omnipresent in our culture. Customers, quite apart from their interest in health, sustainability, or food ethics, look to different kinds of operations to fill a variety of needs and interests. Appetites and preferences vary, depending on whether the meal is a workplace lunch, a mid-week dinner with the family, a snack on the run, or a celebratory occasion. What a diner or a family chooses to eat and order in a single instance is

less important for their health and the environment than the aggregate pattern over days and weeks. Chefs and the foodservice industry have an enormous opportunity to embrace change, while still preserving a wide range of options for an American public that often wants someone else to do the cooking. These principles and strategies, together with the *Menus of Change Annual Report*, are intended to support innovation on the part of operators and entrepreneurs wherever they are positioned in the industry, and help connect them with their aspirations and their unique views of imperatives and opportunities.

PRINCIPLES

OF HEALTHY, SUSTAINABLE MENUS

MENUS OF CHANGE
The Business of Healthy, Sustainable, Delicious Food Choices



HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH
Department of Nutrition

BE **TRANSPARENT** ABOUT SOURCING AND PREPARATION

BUY



REWARD BETTER AGRICULTURAL PRACTICES

LEVERAGE **GLOBALLY INSPIRED, PLANT-FORWARD** CULINARY STRATEGIES



FOCUS ON **WHOLE, MINIMALLY PROCESSED** FOODS

GROW EVERYDAY OPTIONS, WHILE HONORING SPECIAL OCCASION TRADITIONS

LEAD WITH **MENU MESSAGING AROUND FLAVOR**

REDUCE PORTIONS, EMPHASIZING CALORIE QUALITY OVER QUANTITY

CELEBRATE CULTURAL DIVERSITY & DISCOVERY

DESIGN HEALTH AND SUSTAINABILITY INTO OPERATIONS AND DINING SPACES



MAKE **WHOLE, INTACT GRAINS** THE NEW NORM
LIMIT POTATOES

MOVE LEGUMES AND NUTS TO THE CENTER OF THE PLATE



CHOOSE **HEALTHIER OILS**



GO **"GOOD FAT,"** NOT **"LOW FAT"**

SERVE MORE KINDS OF **SEAFOOD, MORE OFTEN**



REIMAGINE DAIRY IN A SUPPORTING ROLE



GROW EVERYDAY OPTIONS, WHILE HONORING SPECIAL OCCASION TRADITIONS

LEAD WITH **MENU MESSAGING AROUND FLAVOR**

REDUCE PORTIONS, EMPHASIZING CALORIE QUALITY OVER QUANTITY

CELEBRATE CULTURAL DIVERSITY & DISCOVERY

DESIGN HEALTH AND SUSTAINABILITY INTO OPERATIONS AND DINING SPACES

USE **POULTRY AND EGGS** IN MODERATION

REDUCE **ADDED SUGAR**



SERVE **LESS RED MEAT, LESS OFTEN**

SUBSTANTIALLY REDUCE SUGARY BEVERAGES; INNOVATE REPLACEMENTS

DRINK HEALTHY: FROM WATER, COFFEE, AND TEA TO (WITH CAVEATS) BEVERAGE ALCOHOL



PRINCIPLES

OF HEALTHY, SUSTAINABLE MENUS

1. Be transparent about sourcing and preparation.

Providing customers with abundant information about food production methods, sourcing strategies, calorie and nutrient values, labor practices, animal welfare, and environmental impacts is a necessity in our technology-driven and networked era. Consumer engagement is driven by the rise in food safety and fraud alerts, a growing interest in sustainability and food ethics, and a hyper-connectivity that yields instant access to information such as impending crop failures or the latest farm-labor conditions across global supply chains. Consumers can learn about what they eat regardless of what chefs and businesses share. Given that, foodservice operators can build trust by learning about environmental and social issues in the food system and sharing information about their own practices. Identifying the farms that grow key ingredients, for example, is a strategy that creates value and brand identity and one that is quickly becoming a standard practice. Going further and explaining how food is produced and the rationale for sourcing decisions are the next steps, while limiting or restricting information on hot-button consumer issues such as calories, trans fats, genetically modified ingredients, or processing methods are approaches not likely to survive over the long term. Operators who do not adjust business models and strategies to anticipate the impacts of this accelerating trend risk disappointing the dining public and having to play costly catch-up as such issues assume greater urgency with the public.

2. Buy fresh and seasonal, local and global.

For chefs, peak-of-season fruits and vegetables can help create unbeatable flavors—and marketing opportunities. When designing menus, draw ideas and inspiration from local farmers and their crops during your growing season as well as the varieties and growing seasons of more distant regions. The advantages of local sourcing include working

with smaller producers who may be more willing to experiment with varieties that bring interest and greater flavor to the table. A focus on local foods also can play an important role in building community by encouraging school children, retailers, media, and others to learn how to grow food, steward the land, and adopt healthier eating habits. But designing menus to draw on in-season fruits and vegetables from more distant farms also is a key strategy for bringing fresh flavors to menus throughout the year.

3. Reward better agricultural practices.

Sourcing sustainably grown foods is complex, but there is one important rule of thumb: the environmental cost of food is largely determined by how it is produced. The best farms and ranches protect and restore natural systems through effective management practices, such as choosing crops well-suited for their local growing conditions, minimizing use of synthetic pesticides and fertilizers, and avoiding the use of groundwater for irrigation. Better-managed farms sometimes qualify for organic or other sustainable-farming certifications. But many—including smaller farms—simply adopt better practices. One such practice is livestock raised without the routine use of antibiotics. Another such practice is minimizing on-farm food loss, through measures such as technological innovations for harvesting and collaborations between producers and others along the supply chain to improve processing, packing, storage, and transport. In total, food loss and waste accounts for an estimated 8 percent of total greenhouse global emissions; reducing it is considered one of the top solutions for reversing global warming. The most powerful strategies for supporting better farms include aligning menus to emphasize fresh foods during the peak of their local growing season and shifting purchases toward farms that have responsible management programs.

MENU CONCEPTS AND GENERAL OPERATIONS





4. Leverage globally inspired, plant-forward culinary strategies. Scientific research suggests that the most effective way to help diners make healthy, sustainable food choices is to shift our collective diets to mostly plant-based foods. Growing plants for food generally has less of a negative impact on the environment than raising livestock, as livestock have to eat lots of plants to produce a smaller amount of food. In fact, no other single decision in the professional kitchen—or in the boardrooms of foodservice companies—can compare in terms of the benefits of advancing global environmental sustainability. From the well-researched Mediterranean diet to the cuisines of Asia and Latin America, traditional food cultures offer a myriad of flavor strategies to support innovation around healthy, delicious, even craveable cooking that rebalances ratios between foods from animal and plant sources.

5. Focus on whole, minimally processed foods. In general, consumers and chefs should first focus on whole, minimally processed foods. Such foods are typically higher in micronutrient value and less likely to contain high levels of added sugars, saturated or trans fats, and sodium. (Indeed, nearly three-quarters of the sodium in the U.S. food supply is estimated to come from processed foods.) Whole, minimally processed foods are also typically slowly metabolized, preventing sharp increases in blood sugar that over time may lead to insulin resistance.

That said, some minimally processed foods—low-sodium tomato paste, wine, nut butters, frozen fruits and vegetables, mayonnaise, dark chocolate, canned low-sodium beans, 100 percent whole-grain crackers, fresh-cut vegetables, spice mixtures, yogurt, reduced sodium sauces, many kinds of canned fish and shellfish, among other things—can be incorporated into healthy meals. Processing can also be used to extend the season of local and sustainably grown produce and to make use of cosmetically imperfect foods, especially produce.

6. Grow everyday options, while honoring special occasion traditions. The foodservice industry historically developed around special occasion dining. Today's industry, however, is increasingly responsible for providing everyday food choices to a substantial segment of the U.S. population. From a health and environmental perspective, there will always be room in the

industry for indulgence and special occasion foods. However, the real opportunity in menu and concept development is the expansion of everyday food and menu choices that embrace current nutrition and environmental science, as well as emerging consumer values about how food is produced.

7. Lead with menu messaging around flavor. To sell healthy and sustainable food choices, lead with messages about flavor, rather than actively marketing health attributes. Research shows that taste trumps nearly all, even if customers want chefs, on some level, to help them avoid foods that increase their risk of chronic disease. Additional research shows that labeling a healthy menu option as healthy can decrease the likelihood of a diner choosing it, whereas using indulgent or flavor-focused descriptions can actually increase the appeal of that same dish. The best approach to menu messaging is to emphasize deliciousness. Messages that chefs care and are paying attention to how and from whom they are sourcing their ingredients—such as by naming specific farms and growing practices (e.g., organic)—can also enhance perceptions of healthier food choices (if, in fact, these choices are healthier—i.e., that they are also consistent with guidance for optimal nutrition).

8. Reduce portions, emphasizing calorie quality over quantity. Moderating portion size is one of the biggest steps foodservice operators can take toward reversing obesity trends and reducing related chronic disease impacts. Defaults are important. This is different from offering multiple portion sizes, as many diners “trade up” to bigger portions, which they see as offering greater value. Consider menu concepts that change the value proposition for customers from an overemphasis on quantity to a focus on flavor, nutrient quality, culinary adventure, new menu formats, and the total culinary and dining experience (thereby mitigating potential downward pressure on check averages). Reducing portion size is essential to reducing plate waste. This is of critical importance because wasting food means wasting valuable resources—from water, energy, and fertilizer to billions of dollars each year. Calorie quality is also especially important. Dishes should feature slow-metabolizing whole grains; plant proteins including nuts, seeds, and legumes; and healthy oils that promote lasting satiety and create great flavors.

9. Celebrate cultural diversity and discovery. Our respect for cultural diversity and the savoring and preservation of family traditions and centuries-old food cultures are as vital as our public health and environmental sustainability. Fortunately, these imperatives can, in fact, be a key to success in implementing the Principles of Healthy, Sustainable Menus. Chefs collaborating with nutrition experts and public policy leaders need to reimagine the role of less healthy, culturally based food traditions by limiting portion size, rebalancing ingredient proportions, or offering them less often. At the same time, many chefs are reporting greater success from introducing new, healthier, and more sustainable menu items instead of reconfiguring existing items. Emerging demographic changes and greater global connectivity are making the American palate more adventurous, giving foodservice leaders a long-term opportunity for creative menu R&D.

10. Design health and sustainability into operations and dining spaces. Food and menu design are not the only ways to advance health and sustainability in foodservice. Choices that affect the way restaurants and other foodservice operations are designed, built, and operated are also important. These include imagining kitchens that support the optimal preparation of fresh, healthy foods and selecting energy- and water-efficient equipment and environmentally friendly building materials. When designing operations and dining spaces for health and sustainability, consider ways to reduce food waste. Best practices include: measuring and tracking waste through smart scales (which can also reduce overproduction), precise inventory management, building the reuse of previously unused ingredients into cycle menus, and trayless dining in all-you-care-to-eat settings. Operators who implement food waste reduction initiatives are likely to see remarkably high returns on their investment. In addition, behavioral economics studies have shown that dining room operations and foodservice eating spaces also deserve more attention: design, setup, service, and communication strategies can all lead consumers toward healthier, more sustainable choices.

PRINCIPLES

OF HEALTHY, SUSTAINABLE MENUS

FOODS AND INGREDIENTS

1. Think produce first. Focus on fruits and vegetables first—with great diversity across all meals and snacks. Recognize that customers aren't eating nearly enough produce—they should be filling half their plates. Consider also that far too much produce goes uneaten because it's considered misshapen or blemished; purchasing "imperfect" foods, including fruits and vegetables, and making use of byproducts can go a long way toward supporting circular economies, which are based on regenerative utilization of natural resources as opposed to merely extraction. Menus should feature green leafy vegetables and a mix of colorful fruits and vegetables daily. Fruit is best consumed whole or cut, fresh and in season, or frozen and preserved without added sugar or salt. Fruit juice often contains healthy micronutrients, but it also packs a large amount of fast-metabolizing sugar and should be limited to one small glass per day. Dried, unsweetened fruit is also a good choice; though it contains natural sugars, it also contains fiber, which can mitigate negative blood sugar response.

2. Make whole, intact grains the new norm. Menus should offer and highlight slow-metabolizing, whole, and intact grains, such as 100 percent whole-grain bread, brown rice, and whole-grain/higher protein pasta. Use white flour and other refined carbohydrates sparingly, as their impacts on health are similar to those of sugar and saturated fats. Ideally, new menu items should emphasize whole, intact, or cut—not milled—cooked grains, from wheat berries and oats to quinoa, which can be used creatively in



salads, soups, side dishes, breakfast dishes, and more. In baking, blend milled whole grains with intact or cut whole grains to achieve good results. For sandwich menus, equally appealing whole-grain bread options should always be available, and, if possible, served as the default option.

3. Limit potatoes. Potatoes have rapid metabolizing impacts on blood sugar, which is of special concern as they are regularly used as a starch to fill plates. Chefs can limit their use of potatoes by combining small portions of them with other, non-starchy vegetables, or featuring them as an occasional vegetable, as they do green beans, broccoli, carrots, and peppers. Chefs should also consider healthier alternatives including sweet potatoes, which are rich in beta-carotene and other vitamins, and healthier side dishes that highlight fruits, vegetables, whole grains, legumes, and nuts.

4. Move nuts and legumes to the center of the plate. Nuts and legumes are full of flavor, contain plant protein, and are associated with increased satiety. Nuts contain beneficial fats, while legume crops contain fiber and slowly metabolized carbohydrates. Legumes also are renowned for helping to replace nitrogen in the soil and produce impressive quantities of protein per acre. Nuts (including nut butters, flours, and milks) and legumes (including soy foods and legume flours) are an excellent replacement for animal protein. They also are a marketable way to serve and leverage smaller amounts of meat and animal proteins.

5. Choose healthier oils. Using plant oils and other ingredients that contain unsaturated fats, such as canola, soy, peanut, and olive oils, as well as featuring fish, nuts, seeds, avocados, and whole grains, are simple ways to create healthier menus. Research shows that reducing saturated fat is good for health if replaced with "good" fats, especially polyunsaturated fats, instead of refined carbohydrates such as white bread, white rice, mashed potatoes, and sugary drinks. High-flavor fats and oils that contain more saturated fat—including butter, cream, lard, and coconut oil—can have a place in healthy

cooking if used only occasionally in limited, strategic applications. Trans fats from partially hydrogenated vegetable oils, now labeled a "metabolic poison" by leading medical scientists, have no place in foodservice kitchens.

6. Go "good fat," not "low fat." Current nutrition science reverses the mistaken belief that we need to limit all fat. Moderate and even high levels of beneficial fats in the diet—from (most) non-hydrogenated plant oils, nuts, nut butters, avocados, and fish—are associated with optimal nutrition and healthy weight. Beneficial fats paired with an abundance of vegetables, whole grains, legumes, and nuts can give our diets a baseline of slow-metabolizing, healthy foods, which are associated with increased satiety. A more liberal usage of healthy fats, offering the potential to deliver high-impact flavors, might represent the difference between consumers liking—or not liking—healthier and more environmentally friendly foods. Even small, occasional servings of deep-fried foods and condiments are appropriate offerings if operators use healthy, non-hydrogenated oils, and avoid potatoes, breading, and other refined carbohydrates in favor of fish, vegetables, legumes, and legume flour. Research confirms that the vast majority of people report better adherence to a moderate- or higher-fat, healthy diet.

7. Serve more kinds of seafood, more often. Seafood is an important part of a healthy diet, and most Americans don't eat the recommended one to two servings per week of fatty fish, which contain higher levels of health-promoting omega-3s. However, the focus on just a few species is emptying parts of our oceans of popular types of seafood such as cod and tuna and now also fish like menhaden that are a key ingredient in feed for some types of farm-raised fish. Scientific studies have found that the benefits of eating seafood greatly outweigh the risks and that removing or reducing seafood from the diet can have negative effects on health. Serving more kinds of seafood more often from responsibly managed sources is the priority. Chefs can have a positive impact on the environment and public health by expanding their understanding of how

to source and use a greater variety of responsibly managed and underutilized wild-caught and farm-raised fish and shellfish.

Serving small fish like sardines and anchovies, as well as clams, oysters, mussels, mollusks, and other low-trophic species (meaning lower on the food chain) are also good choices for our health and the environment.

8. Reimagine dairy in a supporting role. While there is tremendous innovation underway to improve dairy production and its impact on the environment, the nutrition science on dairy is still unsettled and evolving. Current research suggests that it seems prudent for individuals to limit milk and dairy to one to two servings per day. Chefs should leverage the flavor of cheese (high in saturated fat and sodium) in smaller amounts and minimize the use of butter. Yogurt (without added sugar) is a good choice for professional kitchens, as its consumption is associated with healthy weight.

9. Use poultry and eggs in moderation. Antibiotic-free chicken and other poultry in moderation is a good choice for healthier protein with a far lower environmental footprint than red meat. Chefs should avoid or minimize the use of processed poultry products, which are high in sodium, often as a result of sodium pumps and brining. Eggs in moderation—an average of one per day—can be part of a healthy diet for most people. Creative menu items that mix whole eggs and egg whites for omelets, and eggs with vegetables, are ideal.

10. Serve less red meat, less often. Red meat—beef, pork, and lamb—can be enjoyed occasionally and in small amounts. Choose products from animals raised without the routine use of antibiotics, and that have been grass-fed or primarily pastured. Current guidance from nutrition research recommends consuming a maximum of one to two 3-ounce servings of red meat per week. Chefs and menu developers can rethink how meat is used by featuring it in smaller, supporting roles to healthier plant-based choices, and experimenting with meat as a condiment. From at least some environmental

perspectives (e.g., GHGE, feed efficiency ratio), pork is the better choice among red meats (though not distinguishable from a nutritional perspective). This is in part because growing copious quantities of corn only to feed it to cows is itself a form of food waste. Saturated fat is one health concern associated with red-meat consumption, but it's not the only issue. Chefs should strive to limit bacon and other processed and cured meats, which are associated with even higher incidence of chronic disease and some cancers than unprocessed red meats. Many diners choose to splurge on red meat when they eat out, and for many there will always be an appropriate place for meat-centered dishes. But chefs can help to shift eating patterns by building a sense of theater and value in menu concepts that don't rely so heavily on a starring role for animal protein. For example, they might offer delicious meat/vegetable and meat/legume blends, or smaller tasting portions of red meat as part of vegetable-rich, small-plate formats.

11. Reduce added sugar. Consumers crave sugar, and the foodservice industry responds by selling processed foods and sweets that are loaded with it. But sugar's role in spiking blood-sugar levels and increasing rates of type 2 diabetes and other chronic diseases means that professional kitchens should substantially restrict its use. Various strategies include: choosing processed foods with little or no added sugar; favoring healthy oils over sugar in products such as salad dressings; featuring smaller portions of dessert augmented with fruit; and substituting whole, cut, and dried fruit for sugar in recipes. There is nothing wrong with an occasional dessert; but pastry chefs and dessert specialists need to take up the challenge to create sweets centered on whole grains, nuts, dark chocolate, coffee, fruit, healthy oils, yogurt, small amounts of other low-fat dairy and eggs, and, as appropriate, small amounts of beverage alcohol—with the addition of only small to minimal amounts of sugar and refined carbohydrates. Fresh thinking about dessert menu language and positioning is also needed, as illustrated by such concepts as the Three Pleasures: a challenge to restaurants to create a delicious dessert using only dark chocolate, nuts, and fresh-cut or dried fruit.

12. Cut the salt; rethink flavor development from the ground up. The foodservice and food-manufacturing sectors have long been too reliant on salt to do the heavy lifting to create high flavor impact and customer satisfaction. Single items, such as a sandwich or entrée, might contain more than 2,500 milligrams of sodium, well above the current maximum recommended intake of 1,500 milligrams to 2,300 milligrams for the entire day. Chefs should focus on a range of other strategies

to deliver flavor, including: sourcing the best-quality, highest-flavor produce; working with spices, herbs, citrus, and other aromatics; and employing healthy sauces, seasonings, and other flavor-building techniques from around the world. Many chefs are finding success in focusing their innovation where they have the highest aggregation of sodium (e.g., processed meats, cheese, and bread) in a single menu item. Others are making progress in implementing an across-the-board incremental 10 to 20 percent sodium reduction in their preparations. Still others are focusing on collaborating with manufacturing partners to reduce sodium by using alternative strategies to create desired flavors and textures.

13. Substantially reduce sugary beverages; innovate replacements. A drastic reduction in sugary beverages represents one of the biggest opportunities for foodservice operators to help reverse the global obesity and diabetes epidemics. Sugary beverages add no nutritional value and contribute negligible satiety. Yet they are a prime source of extra calories in the diet and a principal contributor to the development of type 2 diabetes, heart disease, and other chronic conditions.

Smaller portion sizes and less frequent consumption are steps in the right direction, but nowhere in foodservice is there a greater need for creative, “disruptive” innovation than in the challenge to replace current soda and sugary beverage formulations with more healthful options. Operators should diligently research, support, and promote the products of entrepreneurs and emerging and established brands that are rapidly developing beverage solutions in this important area. Diet sodas and other diet beverages, though lower in calories, may reinforce an aggregate preference for sweet flavors, potentially driving down the appeal of vegetables and other healthy foods. As such, they should be consumed in smaller portions less frequently.

14. Drink healthy: from water, coffee, and tea to (with caveats) beverage alcohol. Water is the best choice to serve your customers, either plain or with the addition of cut-up fruit, herbs and aromatics, or other natural flavors—but no sugar. Served plain, coffee and tea are calorie-free beverages containing antioxidants, flavonoids, and other biologically active substances that may be good for health. Wine, beer, and other beverage alcohol present a more complicated story of benefits for many individuals, with some offsetting risks. Current nutrition guidance suggests a maximum of two drinks per day for men, and one drink per day for women.





X. OPERATIONALIZING MENUS OF CHANGE: CASE STUDIES FROM CIA CONSULTING

Implementing the 24 Menus of Changes Principles offers both opportunities and challenges for operations, from deciding which principle(s) to tackle first to obtaining employee buy-in to transforming layouts and menus. CIA Consulting helps numerous institutions and companies every year operationalize the principles; here are three examples from their work.

GO FOR GREEN: THE U.S. AIR FORCE'S COLOR-CODED SYSTEM FOR BALANCE AND NUTRITION

Human Performance Optimization is serious business at the United States Department of Defense (DoD), where Bill Spencer is Chief of the Air Force Food & Beverage Division. The DoD launched its joint-branch Go For Green (G4G) initiative in 2008, with a stoplight color-coded rating system (green, yellow, red) to indicate the health and performance level of menu, snack, and entrée items, and which should be eaten more or less often. Rankings are based on nutrition research and designed for the “unique environment of the military community.”

When the U.S. Air Force began roll-out planning for G4G 2.0 in 2017, it sought to enhance performance by making its airmen not only feel good, but feel good about it. This meant responding to increasing requests for vegetarian, gluten-free, and whole grain dishes and making them delicious as well.

In late 2017, the Air Force contracted with the CIA to 1) Review and revise G4G 1.0 recipes for compliance with G4G 2.0 standards, 2) Create a 28-day cycle menu with existing, revised, and new recipes, and 3) Introduce the new menus at Dining Facilities (DFACs) at six bases in the United States, Europe, and Japan.

Early in the process, specific target areas to support rollout were identified as staff training, purchasing, and fresh produce. DFACs are



generally laid out into main food hot lines and snack lines serving all dayparts, with a salad bar at lunch and dinner and fruit and cereal bar at breakfast. In response to Spencer's goal of providing an overall balanced nutritional perspective, all three components received Menus of Change makeover recommendations featuring reengineered recipes plus 96 new CIA dishes.

The first stage of the project saw the salad bar relaunched as the Pure Food Bar, featuring a rotating daily selection of whole grain salads, plant-based protein items, and other flavorful, healthy and satisfying ingredients such as California Vegetable Slaw; Roasted Vegetable Salad with Pesto; Quinoa and Bean salad; and Jerk-, Curry-, and Thai-flavored Chicken. An abbreviated version called the Breakfast Pure Food Bar was used to upgrade the morning fruit and cereal bar, and featured a variety of fresh fruits, several low-fat yogurts, homemade granola, toasted nuts and seeds, natural almond butter, ground cinnamon and nutmeg, honey, and a Swiss Bircher Muesli.

To ensure a successful rollout to six bases in the U.S., Germany, and Japan, the CIA created a comprehensive G4G 2.0 Implementation Course Guide Book detailing the plan, daily prep lists, recipes, glossary, food placement maps, and marketing materials. CIA partners trained airmen on the new standards, requisite culinary skills, daily bar setup and execution, and bulk production of stocks, dressings, salads, and mixes.

Thanks to the interest the Pure Food Bar generated among diners, elements such as vegetable and grain cookery have begun to infiltrate the other DFAC platforms.

SODIUM REDUCTION: A COMMUNITY EFFORT FOR THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC HEALTH

Sodium is a significant health issue both in Los Angeles County and nationwide. On average, Americans ingest 48 percent more sodium than recommended, with about two thirds consumed via processed foods. Excess sodium in the diet contributes to high blood pressure—a medical issue for 28 percent of LA County’s population and a prime risk factor for heart disease and stroke, two of the leading causes of death.

Michelle Wood, program manager of food policy and procurement at the Los Angeles County Department of Public Health (DPH), manages the Sodium Reduction and Communities Program—funded by a grant from the Centers for Disease Control and Prevention (CDC) in Atlanta—for Los Angeles County and Southern California. Her stakeholders range from hospitals, colleges and universities, restaurants, and senior living to distributed meal programs, county offices, courthouses, and detention centers. They vary by segment, as well as size, facilities, staff capabilities, and customer needs.



To be effective across such a diverse constituency, Wood needed to build multi-sectoral collaboration, with shared vision. Wood enlisted the CIA to help develop a robust, integrated platform of instructional, operational, and support materials under the brand Eat Your Best, with the tagline “Less Salt. More Plants.” The associated photos, color schemes, and key messages all focused on deliciousness. The 2018 Eat Your Best launch also presented a compelling business case for reducing sodium through increased plant menuing.

In addition to self-guided marketing, assessment, and planning tools, DPH also began to offer custom evaluation and planning support for select operators, wrapping the “good for you” message inside a “good for your business” package which offered services such as sales data analysis, FOH and BOH scans, key informant interviews and patron surveys, and recipe and menu assessments.

At the heart of Eat Your Best is the “Salad Bar Toolkit,” which features a 12-step guide to enhancing salad bars through eye appeal, more interesting ingredients, trending flavors and textures, speed scratch preparation, and basic technical skills such as knife cuts and cooking techniques. Since processed ingredients are major sources of sodium, the Toolkit focuses on substituting canned product for fresh fruits, grains, and vegetables.

The Salad Bar Toolkit was put to the test at the University of California, Los Angeles’ Café Med, located on the Health Sciences campus and operated by Aramark. Following implementation, there was a 35 percent reduction of processed foods on the salad bar and a 167 percent increase in the number fresh of vegetable offerings.

So far, 25 institutions in LA County—including Children’s Hospital Los Angeles, UCLA Cafe Med, San Diego State University, City of Hope National Medical Center, and their contractors Sodexo, Compass, and Aramark—have either signed or made verbal commitments to reduce sodium while improving food quality. With collective buy-in underway, Wood is now looking at creating “collective impact.” Her first target is the supply chain, where promising discussions are already underway with distributors.



DPH EAT YOUR BEST SALAD BAR TOOLKIT

CULTURAL DIVERSITY IS THE KEY TO CHANGES AT PRINCETON UNIVERSITY CAMPUS DINING

When Smitha Haneef, assistant vice president of university services, arrived at Princeton in 2014, she and her team identified a gap between the existing foodservice program and the broader community's diversity goals, and quickly devised a plan to bring both in sync, helped by the Menus of Change principle that calls for celebrating cultural diversity and discovery.

Princeton's 300-strong food team serves 18,000 meals daily through eight residence halls, 15 retail outlets, seven athletic concessions, and a multi-faceted catering program. To meet the diversity challenge, the process followed a chain of distinct but integrated imperatives.

- ✓ **Seek outside partners.** In addition to the peer resources available through Princeton's membership in the Menus of Change University Research Collaborative (MCURC), the university also worked with CIA Consulting, which conducted sensory training around a key MOC tactic known as the Dessert Flip, in which portion sizes are reduced in favor of more concentrated flavors, and healthier ingredients such as fresh fruit take on a greater share of the dish than ice cream, whipped cream, and other more indulgent items. These exercises provided a critical shared understanding and vocabulary around flavor dynamics and—most importantly—deliciousness.

The CIA also joined Princeton's Culinary Council's regular monthly meetings, coached recipe- and menu-development sessions in Campus Dining's Innovation Kitchen, and helped coordinate communications plans among stakeholders.

Get internal buy-in. Celebrating diversity inherently celebrates inclusion—which is also a key principle of successful change management. Haneef ensured that the Culinary Council, which would serve as

an informal steering committee as well as a cross-departmental communications platform, had representation from all Campus Dining units and both culinary and non-culinary disciplines. Non-culinary titles included purchasing members who tracked down potentially hard-to-source new ingredients while keeping the overall list of SKUs and their costs under control. Representation also included members of the union's bargaining unit, while line staff were invited to guided tastings to give feedback and become an extension of the marketing effort.

- ✓ **Test ideas at smaller scale.** Prior to engaging with the CIA, Princeton's Campus Dining team created some early wins by partnering with student organizations to host cultural heritage dinners, including African American, Asian Pacific, Latin, and Native American events—many of which became part of larger celebrations of global cultures. These tests uncovered challenges while they were still manageable, such as sourcing authentic gourds, Pima wheat, and tepary beans for the Native American menus. Along with the greater emphasis on plants dictated by these cuisines, several other wellness initiatives—such as a Crafted Burger made with 30 percent mushrooms—were rolled out campus-wide.

- ✓ **Develop a clear and transparent plan.** After the initial feedback, Princeton and the CIA mapped out next steps using a Critical Control Points (CCP) strategy to pinpoint the parts of a complex system that have the greatest effect on overall success. With an established presence on campus, but with strong upside for improvement, campus catering was the next business unit selected for a more thorough overhaul.

Favorites such as barbecue, steak, and chicken menus received fresh new global options such as chipotle miso grilled tofu, ginger-and-soy marinated grilled hanger steak with sautéed bok choy and black rice, and chicken breasts with a choice of Latin,

American, or Korean rubs and marinades. New themed events such as Brazilian Barbecue, Pan-Asian Buffet, and Seafood Chorizo Paella Buffet were also added.

Now into their second full year, the results are trending positive: catering occasions have increased by 6 percent and total customer count by 20 percent.

- ✓ **Gather and pursue additional learnings.** The catering initiative not only validated the importance of diversity, flavor, and plant-forward menuing, but it also spun off several additional takeaways. For instance, the team realized that their new focus on

roasting vegetables for flavor and nutrition also resulted in water savings. Other waste-reduction tactics now include roasting and grinding of whole lemons as a base for a roasted citrus sandwich spread, and the use of trimmings to make savory cakes. Stealth health tricks include replacing sugar with fresh fruit in recipes and launching a line of agua frescas for day-long hydration.

These learnings are now being incorporated into the retail dining concepts at the Frist Campus Center at Princeton, and Haneef is also committed to involving Princeton's research faculty in studying the program's long-term benefits.



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