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FLAVOR FOOD HEALTH IMPROVE INNOVATION INTEGRATION  
NUTRITIOUS OPPORTUNITY PARTNERSHIP  
TOMORROW VISION  
HEALTH



# MENUS <sup>of</sup> CHANGE<sup>®</sup>

The Business of Healthy, Sustainable, Delicious Food Choices

## 2016 ANNUAL REPORT



**HARVARD**  
**T.H. CHAN**

SCHOOL OF PUBLIC HEALTH  
Department of Nutrition

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# I. MENUS OF CHANGE IN 2016

This past year, environmental and nutrition science and public policy converged right at the center of our plates.

The scientific advisory committee for the 2015 Dietary Guidelines for Americans (DGAs) released its final report on the state of the American diet and what we should be eating, the basis for official dietary guidelines that are revised every five years. The report raised awareness among both policy makers and the general public about the same nutrition and environmental science that underpins Menus of Change, citing both the health benefits of plant-forward dietary patterns such as the Mediterranean diet and also the environmental benefits of eating a larger share of plant-based foods.

Also, the committee provided definitive answers about whether Americans are eating enough protein—we get more than we need—and what is an appropriate limit for added sugar. Based on their findings, the latest DGAs note for the first time that many Americans eat too much red meat and that adults should consume less sugar each day than is found in a typical can of regular soda. The *2016 Menus of Change Annual Report* provides executive briefings on protein as well as strategies for reducing meat and sugar in your menus and operations. And the [menusofchange.org](http://menusofchange.org) website provides more information about how to “flip” the role of protein on the plate to deliver delicious, healthy, sustainable, and profitable results.

The committee also found that Americans should nearly double the amount of fish and seafood we eat. Diners choose to eat more of their fish and seafood in restaurants than in any other place, and responsibly sourcing the right types can be a complex matter. This year’s annual report provides an executive briefing on fish and seafood as well as guidance to help you choose wisely for your customers.

In Paris, the United Nations held its annual Conference of the Parties (COP), which brings the world’s nations together to find ways to address climate change and greenhouse gas emissions. Remarkably, this 21<sup>st</sup> meeting resulted in the first-ever global agreement on how to reduce greenhouse gas emissions and hold temperature

increases to only 2° C, just below the level that would trigger the most challenging changes in our weather, water availability, and sea levels. That agreement set goals that nations can only achieve this if we change the way we grow food and the foods we choose to eat, and also committed to a plan that will address the risks that climate change and water scarcity pose for food companies. This year’s report provides briefings on both water and climate issues as well as a set of **Principles of Healthy, Sustainable Menus** that can guide you in reducing the carbon footprint of the meals you serve.

Both the report of the DGAs scientific advisory committee and the COP21 agreement recognize the tremendous change needed in what we choose to serve and our customers choose to eat. As this year’s Dashboard shows, changes in what we are eating continue to shift in the right direction, but the pace of change is modest. And in the past year, the foodservice industry has begun to fully recognize the rising cost from climate change, water scarcity, lack of visibility into supply chains, and other environmental factors. While change has been slow in the past, the stage is now set for substantial improvements. Investors already are pricing in the value of companies that pay attention to environmental concerns and actively manage their supply chains—and they are expecting all companies to do the same.

The Menus of Change initiative, a partnership of The Culinary Institute of America and the Harvard T.H. Chan School of Public Health, aims to help you do just this. It 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 to make better choices and to successfully navigate the rapidly changing landscape.

This annual report is a part of that mission. It aims to advance a long-term, practical vision that integrates optimal nutrition, environmental stewardship and restoration, and social responsibility within the foodservice industry.

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 lead successful businesses serving healthy, sustainable, and delicious food.





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

IN THE PAST YEAR, TERMS LIKE “PLANT-BASED,” “PLANT-CENTRIC,” AND “VEGETABLE-FORWARD” ALL STARTED TO ENTER THE MAINSTREAM OF THE NATIONAL LEXICON.

One of the biggest recent trends is not only menus but entire restaurant concepts that put plants first. Some of the shift revolves around a celebration of produce itself, which can be seen in the crop of decidedly plant-centric cookbooks that have emerged from top chefs in the past year. April Bloomfield—best known for her cookbook *A Girl and Her Pig*, as well as her Michelin-starred restaurant The Spotted Pig—authored *A Girl and Her Greens*, revealing her love of produce. Michael Anthony of Gramercy Tavern released *V Is for Vegetable*, which Anthony has emphasized is not a vegetarian or vegan cookbook but inspiration for “vegetable cookery.” The book (which won a 2016 James Beard Foundation book award) aims to help consumers think about re-proportioning their eating habits, with meat as a sometimes accompaniment to a plate filled with vegetables.

These trends are especially inspiring in light of data from the U.S. Department of Agriculture (USDA) showing that three quarters of Americans fail to meet the daily recommendations for fruit intake, and the same is true of fourth fifths of Americans for vegetable intake. One major issue is the discrepancy in marketing budgets between healthy foods and unhealthy foods. On the bright side, the National Fruit and Vegetable Alliance’s 2015 report card found that the restaurant sector was much better than other food sectors at increasing the availability of fruits and vegetables in recent years.

It’s not just vegetables that have earned higher status on menus, but a wider variety of whole grains and plant proteins. The United Nations declaring 2016 the International Year of Pulses has helped lentils, chickpeas, and beans leap into both the consumer and operator consciousness like never before. (Granted, they have been gaining ground for some time: According to Datassential, menuing of chickpeas has increased by 290 percent in the past decade.) These fiber-rich plant proteins offer numerous nutritional benefits, and also improve soil fertility through their symbiotic relationship with nitrogen-fixing bacteria that live in their roots.

A combination of factors is fueling this gradual transition to more plant-based diets. One is that consumers are starting to become more concerned about the health effects of frequent consumption of red and processed meat, in part due to the World Health Organization (WHO) announcement about the association with increased risk for certain types of cancer. (Unfortunately, as described in this report’s consumer attitudes issue brief, the way the WHO’s findings were explained in the press led to much confusion.) Second is a growing understanding of the environmental impacts of raising livestock.

Never before the past year has awareness been so strong about the connection between the health of our bodies and the health of the planet with regard to food choices. A national survey released in March by the Johns Hopkins Center for a Livable Future and Greenberg Quinlan Rosner Research found that 74 percent of American adults believe that the new dietary guidelines should include environmental implications and support sustainable agriculture practices. It also found that 70 percent of survey respondents felt that the agriculture industry has a responsibility to produce food sustainably. For context, only 30 percent of respondents felt the industry had a responsibility to provide food at low cost. Though encouraging that an agreement was reached among nearly 200 countries at the historic 2015 Paris Climate Conference (COP21), many experts were discouraged that greater emphasis was not placed on the role of global agriculture.

For these reasons and more, the 2015 Dietary Guidelines for Americans (DGAs), which were released in January 2016, proved a missed opportunity to include sustainability language in this country’s official guidance about what to eat. It was also a missed opportunity to provide a clear recommendation to reduce red meat consumption. Both had been advised by the scientific advisory committee’s report for the 2015 DGAs.

Given the complexities of change in order to benefit the triple bottom line of people, planet, and profit, the *Menus of Change Annual Report* is designed to give foodservice and culinary professionals the insights and the tools to make informed decisions about difficult issues. The report sifts through culinary trends and innovations to shed light on some of the most intriguing companies and projects happening around the country, all in the name of healthier, more sustainable food. The Menus of Change initiative also importantly provides comprehensive advice and strategies for menu design that support the triple bottom line with the Principles of Healthy, Sustainable Menus (see page 41). These guidelines outline culinary strategies, such as new focuses on portion size, calorie quality, and plant-based foods, which are needed to increase the success of new business models.

The centerpiece of Menus of Change is a concise analysis of 16 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. Among these 16 issues are:

#### Diet and Health

Encouragingly, the overall quality of the U.S. diet has improved steadily as of 2012 compared to 2000 and since the Harvard T.H. Chan School of Public Health's last report based on data through 2010. By far, the greatest progress since 2000 was in reduction of trans fat, estimated to be about 80 percent, which accounted for about half of the overall improvement in diet quality. The next greatest improvement was reduced consumption of sugar-sweetened beverages, which decreased by about 25 percent. Modest increases were also seen for fruit, whole grains, polyunsaturated fatty acids, and nuts and legumes. A modest reduction was seen for red and processed meat, contributing to improved diet quality. However, the overall score remains poor: below 50 out of 100 possible points. The only dietary component that significantly worsened was sodium intake. This highlights a need for foodservice operators to address this issue more directly through culinary strategies.

#### Climate Change and Fish, Seafood, and Oceans

For the first time, the score for fish, seafood, and oceans decreased compared to the prior year. Major factors include: continued underconsumption of fish and seafood overall paired with an over-reliance on just three species (salmon, shrimp, and tuna); fraud,

mislabeling, and other failures to ensure traceability; exposés of human trafficking throughout the Thailand fishing industry, which is linked to the farmed shrimp industry in the U.S.; and threats to oceanic ecosystems that are clearly tied to climate change. For instance, a Dungeness crab fishery in California—which typically brings in \$60 million per year—could not open last fall because record temperatures in the Pacific Ocean led to an algae bloom. The algae produced a neurotoxin called domoic acid, which made its way up the food chain to crabs. On the East Coast, the collapse of Atlantic cod stocks was found to be linked to climate change.

#### Water

The picture for fresh water is no less troubling. The World Economic Forum has ranked water scarcity's impact on drinking water and global food security as the top threat facing the planet in the next decade. Severe drought conditions continued in much of the western U.S., and the impacts cost over 20,000 jobs and over \$2 billion in revenue to the California agricultural economy alone. Many agricultural leaders are rallying in response; for instance, the Almond Board of California started a new initiative to stimulate agricultural practices that manage water use more efficiently. However, most food companies have yet to fully engage in the pressing issues of water supply security, water quality protection, and water use reduction and reuse. A recent report found that only one-third of 37 large food companies consider water risks in their agricultural supply chain, and only two of those 37 were actively addressing the impacts of their operation on water quality. Clearly there is much to be done.

Overall, the industry is making slow but steady progress: 12 of 16 issues received a score of four (making good progress) or three (holding steady), and improvements were seen in improving diet quality, local food and the farm-to-table movement, supply chain resiliency and transparency, and healthy food versus healthcare spending and medical-culinary educational alliances. Unfortunately, the industry took a step back with regard to fish, seafood, and oceans, and foodservice professionals continued to be underprepared for the impacts of climate change and water risks on their operations. Garnering the lowest scores of 1 and 2 respectively, these two areas remain of greatest concern.

# STATE OF THE PLATE

How are we doing? Sometimes it's hard to tell. The Menus 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, which 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 food industry and/or culinary profession over the last 12 months, as follows:



5. SIGNIFICANT PROGRESS



4. GOOD PROGRESS, WITH ROOM FOR MORE



3. NO SIGNIFICANT PROGRESS



2. GETTING BETTER, BUT FAR FROM WHERE IT NEEDS TO BE



1. SIGNIFICANT DECLINE OR REGRESS

## METHODOLOGY

The scores were developed based on the expert opinions of the members of the Menus 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 Menus of Change Sustainable Business Leadership Council to ensure they reflected new industry initiatives and practices.

ISSUE

SCORE  
2016

SCORE  
2015

SCORE  
2014

SCORE  
2013

JUSTIFICATION

<b>INNOVATIONS IN THE FOOD INDUSTRY</b>					Capital flows have increased into food and tech startups, with more focused on sustainability and health. The gap between the culinary and the tech worlds is narrowing.
<b>SUPPLY CHAIN RESILIENCY AND TRANSPARENCY</b>	+1/2				Supply chains remain vulnerable to fraud and contamination. More traceability is needed and leading companies are showing that higher standards can support customer, business, and environmental goals.
<b>CHANGES IN INVESTMENT STANDARDS FOR THE FOOD INDUSTRY AMONG PROFESSIONAL INVESTORS</b>					Investors in public companies now link stock performance with sustainability and rely on new disclosure tools and regulation. Investment is also increasing for newer companies that feature plant-forward concepts and sustainable supply chains.
<b>CHEFS' INFLUENCE ON CONSUMER ATTITUDES</b>					Many chefs and foodservice leaders are offering plant-forward options, including new full-service and fast-casual operations. Additional focus is needed on portion size, nutrition, and plant-based proteins.
<b>CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD</b>					Even consumers motivated to make healthier food choices can't help but be confused given the steady barrage of inconsistent advice and media coverage.
<b>LOCAL FOOD AND THE FARM-TO-TABLE MOVEMENT</b>	+1/2				Federal and local policies finally are supporting local and regional food. Hopefully, this will enable farmers, chefs (and other buyers), and consumers to accelerate growth in segments devoted to producing and consuming "good food."
<b>ANIMAL WELFARE</b>					Awareness is rising about animal welfare problems in the livestock industry. A growing group of producers is employing better practices, and both public and private sector policies are improving. But substantial room for improvement remains.
<b>DIET AND HEALTH: RECENT TRENDS</b>	+1/2				Modest improvements toward healthier diets include a large reduction in the intake of trans fats, an important reduction in sugar-sweetened beverages, modest reduction in red and processed meat, and a small increase in whole fruits, whole grains, healthy fats, and nuts and legumes.
<b>PORTION SIZE AND CALORIC INTAKE</b>					Public sentiment suggests a turning point, with interest in whole/minimally processed foods rising. The 2015 Dietary Guidelines for Americans includes a new emphasis on restricting sugar intake and lifting the upper limit on fat. Yet, a more fundamental focus on food (or calorie) quality, not just quantity, is still needed.
<b>PROTEIN CONSUMPTION AND PRODUCTION</b>					Red meat production and consumption in the U.S. is declining moderately. Exclusion of sustainability from the final Dietary Guidelines for Americans is a missed opportunity to better align human and environmental health aspects of our collective diet.
<b>FRUIT AND VEGETABLE PRODUCTION AND CONSUMPTION</b>					Though public interest and government initiatives have increased, long-term trends have not been reversed, and fruit and vegetable consumption still fails to meet recommended levels. Efforts have not yet achieved sufficient scale, and they are stalled by public policy and the associated high produce prices.
<b>FISH, SEAFOOD, AND OCEANS</b>	+1/2				There are multiple public and private efforts to improve seafood sustainability, and standards have emerged for both wild and farmed products. Work to lessen the environmental footprint of seafood is positive, but substantial exceptions persist, and issues of slavery and mislabeling are concerning.
<b>CLIMATE CHANGE</b>					Climate change continues to affect every aspect of the food system, through temperature and precipitation impacts on food production, transportation, refrigeration, and processing facilities. But the food sector continues to be a major contributor, and it will become only more difficult to adapt.
<b>WATER SUSTAINABILITY</b>					The food and foodservice industry is beginning to pay attention to water issues as drought and groundwater depletion affect profits and water scarcity is recognized as a global crisis. Consuming less meat and more hardier greens helps, but these trends do not yet reflect broad-ranging, conscious efforts by the industry as a whole.
<b>AGRICULTURE, DRUGS, AND CHEMICALS USE</b>					A growing number of mainstream foodservice companies are committing to reduce antibiotics in their supply chains and use "clean" ingredients. Although the regulatory progress has slowed, antibiotic resistance is gaining attention at the international level, including from the World Health Organization.
<b>HEALTHY FOOD VS. HEALTHCARE SPENDING AND TRENDS IN MEDICAL-CULINARY EDUCATIONAL ALLIANCES</b>					Innovative, interdisciplinary programs are being launched with increased frequency by high visibility organizations and institutions. Many of these are starting to link healthcare and healthy eating with culinary education.

# OUR VISION



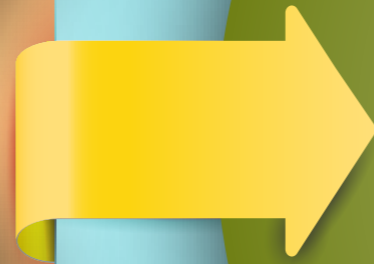
# OUR VISION



HEALTHY, SUSTAINABLE,  
AND DELICIOUS



BUSINESS MODELS  
AND STRATEGIES



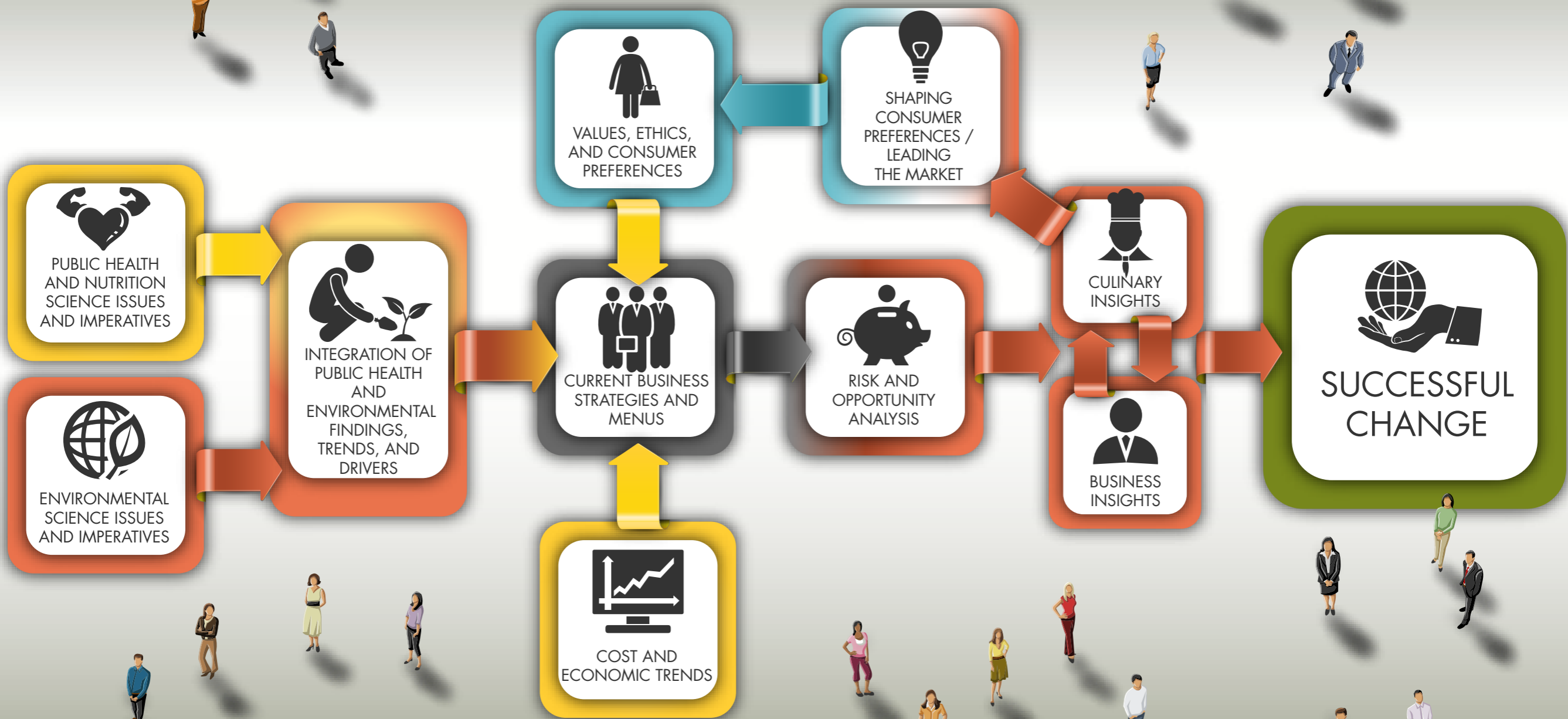
**MENUS<sup>of</sup> CHANGE<sup>®</sup>**

The Business of Healthy, Sustainable, Delicious Food Choices

**THE FUTURE OF FOOD**

INTEGRATED GUIDANCE FOR  
BUSINESS AND CULINARY LEADERS

# GPS: A MODEL FOR CHANGE





### III. GREEN SHOOTS: DELICIOUS SIGNS OF CHANGE

Nearly everyone has heard of community-supported agriculture programs, or CSAs, but a related model is gaining traction at sea: the restaurant-supported fishery. An organization called Dock to Dish provides its members direct access to a network of local small-scale fishmongers, who deliver freshly caught, wild, fully traceable fish that are rated as abundant and sustainable by the National Oceanic and Atmospheric Association (NOAA), which is the U.S. Government's measure of fishery health. Dock to Dish represents a paradigm shift from a demand-driven approach, where restaurants target popular species, to a supply-driven approach, where the fish delivered on a given day are the catch deemed most appropriate at the time. Those are often the so-called "trash fish" species, such as tautog, rockfish, and skate, long considered unsellable by fishmongers because consumers would turn up their noses. This shift is of critical importance because, as conservationists have been lamenting for years, overfishing of just a handful of types of seafood threatens the viability of ocean ecosystems. Three species—shrimp, salmon, and tuna—account for 60 percent of the seafood Americans consume, according to the National Fisheries Institute.

The restaurant-supported fishery model is also exciting because of the creativity and diversity it sparks on menus from coast to coast, exemplified by the wait list from numerous top chefs eager to participate. It's not only independent

chefs (including Dan Barber and Michael Cimarusti) who have joined Dock to Dish, but organizations as large as Google. Given the quantities of seafood purchased by restaurants and high-volume foodservice operations in particular, this model has tremendous potential for introducing diners to a new world of overlooked species.

On land, urban farms are nothing new, but now, from the concept of rooftop gardens have sprung rooftop *greenhouses*. Enter Gotham Greens, a series of four climate-controlled greenhouses occupying a total of 170,000 square feet of rooftop real estate in New York and Chicago, cities with both enormous populations and tremendous challenges for providing year-round local produce. But we aren't talking about a handful of herbs and tomatoes here; the reason rooftop greenhouses are being hailed as a "game-changer" is the commercial volume they can produce. A variety of types of produce, mainly leafy greens, are sold at grocery stores and restaurants at street level just steps away. Whole Foods Market, the delivery service Maple, and Union Square Hospitality Group are among their customers. Environmental benefits transcend the local angle: no pesticides or agricultural runoff are involved, and the recirculating hydroponic growing system uses water more efficiently. Consider too that rooftops sit on land already being used for something else, making them an efficient use of the earth's surface area at a time when the growing global population and dwindling farmland are of great concern.

Also reaching for the skies is AeroFarms, a company based in Newark, New Jersey providing vertical aeroponic farms that require no sunlight or soil, use 95 percent less water than traditional growing methods, and again no pesticides. Through a patented technology, its system can grow 250 varieties of leafy greens and herbs, which they emphasize to their retail and foodservice customers are harvested at peak flavor, undergo stricter food safety measures, and have longer shelf life compared with conventional produce. AeroFarms recently raised \$20 million to expand its operation.

On the policy front, one inspiring example of change is that food waste has gone well beyond grassroots campaigns and individual culinary or retail programs. The past year it earned the attention of the federal government, with USDA and the Environmental Protection Agency jointly announcing in September the first nation-wide goal to reduce food waste. The aim is to cut waste by 50 percent by the year 2030, through a partnership with private sector organizations as well as state and tribal governments.

To learn more about the outpouring of innovation the food and foodservice industry has witnessed over the past year, please see the issue brief on page 13.

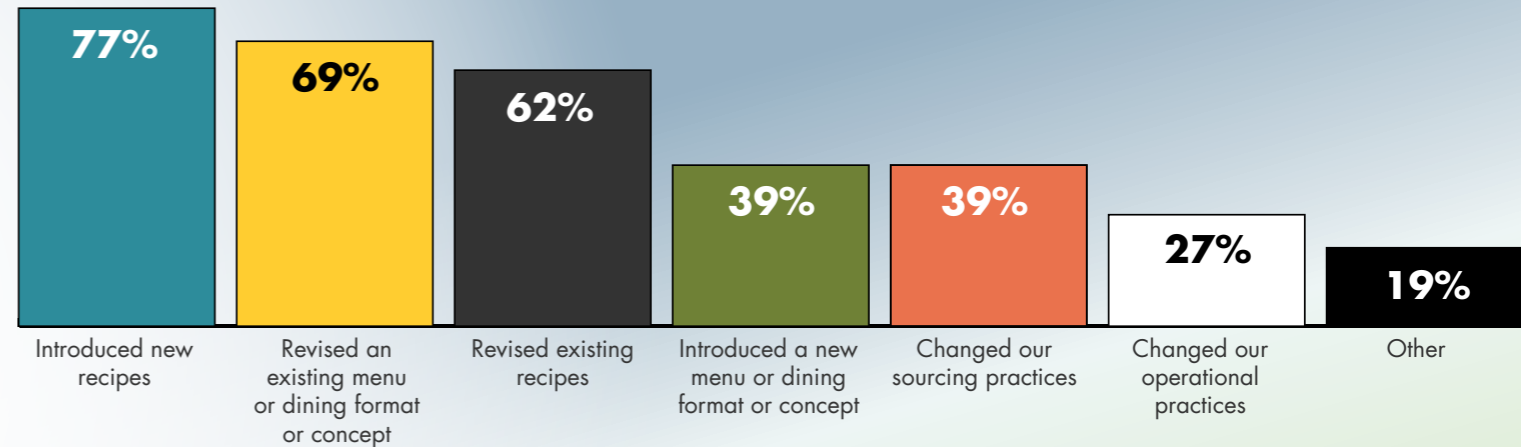
# IV: MENUS OF CHANGE IMPACT SURVEY

Menus of Change is deeply committed to the *measurement of change*: What impact is the initiative having on the foodservice leaders who engage with it, and on the industry as a whole? In its annual survey of attendees of Menus of Change leadership summits, the CIA aims to find out how operators use the initiative's guidance throughout the year. Respondents are based in locations throughout the United States and represent operations ranging from quick-service restaurants to K-12, from catering and healthcare/senior care to corporate dining and college and university foodservice.

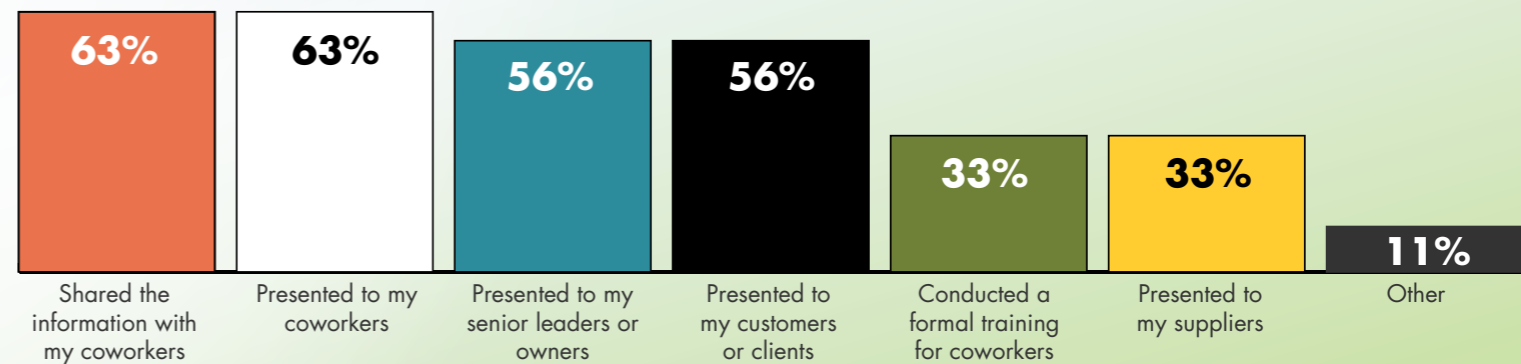
A remarkable 87 percent of respondents to the 2016 survey had acted on the guidance provided by Menus of Change. Among those who had made a change of some kind, 77 percent had introduced new recipes; 69 percent had revised an existing menu or dining format or concept; 62 percent had revised existing recipes; 39 percent had introduced a new menu or dining format or concept; 39 percent had changed sourcing practices; and 27 percent had changed operational practices. Encouragingly, among those who had made a change, 44 percent had done so across their entire operation. Another 36 percent had made the change at multiple locations.

Eighty-seven percent of respondents had also shared information from Menus of Change with others. For those who had shared the information, nearly two thirds had shared it digitally with their coworkers, and the same proportion had shared it with coworkers through a presentation; over half had presented to their senior leaders or owners, and the same proportion had presented to their customers or clients; a third had conducted a formal training for coworkers, and the same proportion had presented to their suppliers.

## HOW HAVE YOU ACTED ON GUIDANCE PROVIDED BY MENUS OF CHANGE?



## IN WHAT WAYS HAVE YOU SHARED MENUS OF CHANGE INFORMATION?



## HERE ARE SOME HIGHLIGHTS OF THE CHANGES THAT HAVE TAKEN PLACE AT OPERATIONS WHOSE LEADERSHIP HAS BEEN INSPIRED BY MENUS OF CHANGE:

**We converted one of our smaller outlets into an entirely vegetable-forward concept with Middle Eastern flavor profiles.**

**Changed all chicken purchases to "never had antibiotics, cage free, vegetarian diet only" poultry.**

**We have started a new concept called Roots and Shoots, featuring a variety of plant-and grain-based salads paired with demi sandwiches. We are beginning to more closely monitor the amount of meat served per customer.**

**We've changed our menu design for our main dining hall to be more seasonal and nimble.**

**We took an all-beef burger in a single location and replaced it with a beef and mushroom blend burger. It has been very well received. We also introduced a "plant-forward" station at our salad bar, which is comprised of many composed salads, mostly vegan options.**

**Increased the non-meat menu offerings and made them more appealing as center-of-the-plate options.**



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

THIS YEAR, THE STARS—OR MORE ACCURATELY THE DOLLARS—HAVE ALIGNED FOR THE INDUSTRY AS BOTH DINERS WHO DRIVE REVENUE AND INVESTORS WHO SET THE VALUE FOR FOODSERVICE COMPANIES BOTH AGREE ON THE IMPORTANCE OF RESPONSIBLY SOURCING FOOD.

Financial markets now recognize that strong environmental, social, and governance (ESG) efforts are linked to better business performance. The first standard guidance for Sustainability Accounting for our industry was released just as a host of studies highlighted in this report show that companies that pay attention to issues like water, responsible food sourcing, and labor practices have better returns for investors. And more stock exchanges now are requiring companies to disclose their risks from climate change and other environmental concerns.

Consumers also are increasingly asking the restaurants to know and share more about the food they are served. The old adage that sunlight is the best disinfectant has never been more apt as increased transparency has led a host of restaurant and foodservice companies to adopt clean ingredient policies, phase out the use of antibiotics and other additives, as well as improve animal welfare practices and either avoid or disclose the use of GMOs.

The risks from inattention to sourcing for both companies and their investors also has never been more tangible. Restaurants that pass off lesser seafood as lobster now are confronted by TV cameras much as companies that exposed the public to toxic chemicals were in

prior decades. And fraud in seafood as well as adulterating foods—such as adding wood fiber as filler in Parmesan cheese—can tarnish a brand in moments. A few visible and painful lessons have brought home both the importance of making sure you have transparent insights into supply chains along with the reality that chefs and foodservice companies are held responsible for what their suppliers are doing.

Innovation is also focused on providing even better solutions. This year's crop of venture-backed startup businesses include both traditional and delivery-only restaurants that have their own, vertically integrated supply chains that reach from "farm-to-take-out" as well as their own restaurant tables. A cluster of new companies are focused on improving the ability of larger foodservice companies to do the same and source locally, as well as those who continue to expand the range of plant-based proteins available to our industry. And the CIA's recently launched Food Business School is helping accelerate the efforts of today's culinary-minded entrepreneurs.

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.

# INNOVATIONS IN THE FOOD INDUSTRY

The foodservice industry is transforming rapidly to meet consumer demand for healthy, transparent, and convenient food. This seismic shift is being driven by a new, rapidly growing generation of food and tech startups. From new business models to apps and software, these companies are developing products and services that aim to help foodservice professionals improve margins, efficiencies, and sustainability. As investment in the sector grows and startups mature, the divide between the technology and culinary worlds is beginning to narrow.

## Food Waste Innovations

There continues to be much innovation in foodservice around reducing food waste and utilizing produce that is misshapen or slightly discolored. MintScraps, for example, offers a software platform that allows restaurants to monitor and reduce their waste. Using sensor technology, MintScraps gives restaurants real-time waste data and helps them identify potential cost savings. It also allows operators to monitor for inefficiencies and waste generation patterns to help streamline operations and cut costs. Also putting surplus food to good use, Zero Percent's software makes it easier for restaurants and retailers to donate leftover food to food pantries and soup kitchens. The startup even handles pick-up and delivery of the food and tracks donations for tax deductions. Mogo's app and web platform connect consumers to restaurants that offer leftover food at a discounted price.

Operators and chefs are increasingly recognizing the cost of food waste—an average of 10 to 12 percent of food is discarded—and looking for innovative solutions. In 2015, author and chef Dan Barber launched wastED, a month-long food waste pop-up serving dishes made entirely from scraps that are usually discarded. Inspired by wastED, chef Mario Batali and Dogfish Head Craft Brewery founder Sam Calagione launched WasteNot, beer made from waste such as overripe tomatoes, stale bread, and rotten grapefruit. Also inspired by its partnership with wastED, Baldor Specialty Foods—the Northeast's leading distributor of fresh produce—launched SparCs, a new program that offers trim, tops, and

peelings from the company's processing facility to chefs and manufacturers.

## Restaurant Innovations

Startups are leveraging technology and new restaurant models to make healthy, sustainable food more accessible, affordable, and convenient. Many of these companies are establishing their own local supply chains, which has been a boon to local food producers. These companies are also raising significant capital, a strong indication of investor interest in food startups.

Sweetgreen, a farm-to-table salad chain with 31 locations, for example, closed a \$35 million Series F round of funding, led by funds and accounts managed by T. Rowe Price, bringing the company's total funding to \$95 million. Along with investments in talent and technology—Sweetgreen already has a mobile ordering app that processes more than a quarter of all its transactions—the funding will be critical as the company tries to establish a national supply chain of local producers.



Dig Inn, a 10-unit farm-to-table fast casual chain, is able to offer meals at an affordable price point by contracting directly with small farms. The restaurant attracted \$15 million in Series C funding in 2015 in a round led by Wexford Capital, bringing the company's total funding to \$21.5 million. As with Sweetgreen, this funding will be critical as the chain expands and builds out its supply chain and its online and mobile ordering system and loyalty program.

A new crop of companies is developing delivery-only restaurants. Unlike traditional delivery services like Seamless that deliver food from restaurants, startups like Sprig, Maple, and Munchery make and deliver their own meals—often featuring locally sourced and organic ingredients—in just 15 to 30 minutes. Each day, the companies offer a limited number of lunch and dinner options for \$10-15, which people can

order via mobile apps. In addition, these companies use technology and data science to predict demand, design menus, and optimize deliveries. To date, Sprig has raised \$57 million in funding from investors that include Greylock Partners and Social+Capital Partnership; Maple has raised \$26 million and is backed by celebrity chef David Chang; and Munchery has raised \$117.2 million at a \$300 million valuation.

## Innovations in Sourcing

On the supply side, a number of companies have recently launched or expanded to make sourcing locally easier. Sourcing, Dine Market, and Blue Cart, for example, all offer online purchasing platforms that enable restaurants and foodservice operators to order from multiple local suppliers through a central dashboard. By streamlining the sourcing, invoicing, and payment process, these services make it easier to manage purchases from local producers who might not otherwise be set up to handle large commercial orders. Foodservice operators like Tom Colicchio's 'Wichcraft, Dropbox, and Munchery use these services.

Next-generation protein alternatives are aiming to reduce our dependence on animals for food. A growing number of companies are employing data science and technology to create alternative proteins that are more cost effective than animal proteins, not to mention tastier, healthier, and more environmentally sustainable than their predecessors.

Hampton Creek, a startup using data and food science to develop plant-based food products, is one such company making waves in the foodservice industry. In 2015, it deepened its partnership with Compass Group, becoming the foodservice operator's exclusive supplier of baking mixes and dressings. The partnership will also significantly expand Hampton Creek's reach, as the deal puts the startup's products in over 85 of US Foods' and Sysco's warehouses. Shaking up the industry is not without opposition, however. Last year, the company was sued by Unilever—though the suit was ultimately dropped—and targeted by the American Egg Board for labeling its eggless product a "mayo."

Many of the alternative protein startups are working on products that are months or years from coming to market. Impossible Foods, for example, is developing a plant-based burger that has the taste, look, and mouthfeel of a beef burger. The product is reportedly launching through a foodservice operator

in 2016. To date, the company has raised \$182 million in funding from prominent investors like Horizon Ventures, Bill Gates, and Khosla Ventures. Interestingly, Google tried to acquire the company for \$200-300 million in 2015, but Impossible Foods declined the offer.

## Investment Growth

Significantly more capital—\$9.75 billion across 507 deals—is flowing into food and ag tech startups around the globe from venture and angel investors than in previous years. In the past, investors were wary of investing in food and agriculture because of the highly regulated and political nature of the industries, as well as the low margins, complex supply chains, and limited adoption of technology. A series of high-profile valuations, acquisitions, and IPOs, however, have helped to warm investors to food. For example, meal kit delivery startup Blue Apron garnered a \$2 billion valuation; Priceline acquired OpenTable for \$2.6 billion in 2014; and Shake Shack doubled its IPO price in its first day of trading, valuing the company at more than \$1.6 billion. The growing number of high-profile investors like Steve Case, founder of AOL and chairman and CEO of Revolution LLC; Danny Meyer, CEO of Union Square Hospitality Group; and Bill Gates, founder of Microsoft, also help to boost investor confidence in the space.

Another sign of progress on this front is the growing number of food and agriculture-focused investment funds. Twenty-two food and agriculture funds launched in 2016. One such firm is S2G Ventures, which launched a \$125 million fund to invest in "soil to shelf" food and agriculture startups. Its investments include Sweetgreen, Beyond Meat, and Shenandoah Growers. Another growing area of startup capital is coming from corporate venture funds, like Mars, General Mills, and Unilever.

Finally, METRO launched the Techstars METRO Accelerator, the first food accelerator dedicated to digital transformation in restaurants, hotels, and catering companies. Through the program, startups receive €120,000 (\$137,000) in investment capital, as well as access to mentors, investors, and customers.

While it is encouraging to see so much capital flowing into food, some worry that startups are overvalued and a food bubble is looming. Blue Apron, for example, which raised \$190 million at a \$2 billion valuation, has yet to reach profitability.

## RECOMMENDATIONS:

Consumer demand has made it clear that health, sustainability, and convenience present some of the greatest opportunities for growth in the foodservice industry. Given increasing investment in food and agriculture innovation, and a growing array of available tools in the foodservice industry, culinary professionals should embrace new menu techniques, technologies, and business models to help reduce food waste, enhance convenience, and source locally. Foodservice operators should focus on how to improve convenience by offering mobile ordering and delivery options. Additionally, operators should seek out partnerships with emerging companies that can help them better meet these consumer demands.



### SCORE: 4

From the significant increase in capital flowing into food and tech startups to the growth of startups focused on sustainability and health, the past year has seen a wide range of innovative new initiatives that are narrowing the gap between the culinary and the tech worlds. While there are more technologies, services, and business models available to foodservice professionals, many startups are focused on growth and have yet to reach profitability. It remains to be seen what happens if the bubble bursts.

### IN SUMMARY:

- Startups are increasingly developing new products and services for the foodservice industry, with a great number of high-potential technologies coming to market.
- Chefs and foodservice leaders should embrace the growing number of products and services now at their disposal to streamline local ingredient ordering, minimize waste, and improve their bottom line.
- Despite the significant amount of capital being invested in food and agriculture startups, some argue that companies cannot support the valuations at which companies are raising capital. Many of these startups have yet to demonstrate profitability.

# SUPPLY CHAIN RESILIENCY AND TRANSPARENCY

In 2015, the food industry saw advances in how food suppliers are responding to increased consumer attention on food sourcing. Greater awareness among consumers has led to demands for more specific food sourcing and animal treatment information, such as GMO and antibiotic use. The past year also showed that global food supply is still subject to large-scale contamination and fraud. However, it appears that the ability to trace food-borne illness has improved during acute outbreaks.

At the start of 2015, Chipotle made news in its discovery, as a result of a routine animal welfare audit, that one of its major pork suppliers did not adhere to its animal welfare policies. Its handling of the case showed its commitment to the highest standards in food supply. It elected to be very transparent with its customers about the discovery by reducing the availability of pork carnitas in about one-third of its restaurants, instead of sourcing conventional pork in its place. It also started looking for a new supplier that could meet its stringent animal welfare and no-antibiotic policies. That difficult search revealed a significant challenge and limitation in the global food supply. Chipotle made a reasonable compromise in the selection of a new pork supplier, Karro, a UK-based pork producer that follows a European model permitting antibiotic use to keep an animal healthy, not for growth promotion, and slaughtering animals after a withdrawal period so that the meat from the animal treated with antibiotics does not contain the antibiotic residue.

This example stresses the issue that the availability of food suppliers with such high standards remains limited globally. Although Chipotle was applauded for its admirable approach to resolving its pork supply issue, which appeared to have had no negative impact on earnings, its multiple and unrelated incidents of E. coli contamination were poorly handled and revealed major operational issues across its restaurants. The contamination issues weighed heavily on Chipotle's stock price in the second half of 2015. It is a reminder that food safety must be a priority for all participants in the food industry.

In recent years, consumers have pushed firms to disclose more about food sourcing, especially in

the production of meat. Chipotle, along with Panera Bread, were the only two restaurant chains awarded a grade A from Friends of the Earth's *Chain Reaction* report for their no-antibiotic policies in meat. This report highlighted that most of the 25 quick-service restaurant chains surveyed do not have a policy for, or offer any transparency on, the sourcing of their food or information on their use of antibiotics. Only a minority of restaurants is currently upfront about this information, at a time when transparency demands by consumers are dramatically changing the marketplace. Consumers seem to value Panera's demand for antibiotic-free chicken from suppliers, and other restaurants have taken note. In 2015, McDonald's, Chick-fil-A, and many other quick-service restaurants announced that they would follow Panera and remove antibiotics from chicken in coming years. It is evidence that consumers are paying attention to the sourcing details of food and demanding greater transparency from restaurants.

On the retail side, Whole Foods Market announced its first large-scale distribution of non-GMO-produced pork in a partnership with American Homestead Natural Pork. (This non-GMO pork is available in Whole Foods stores in the Pacific Northwest.) There are challenges in developing food supplies with higher standards in animal treatment, but consumers are demanding those higher standards. Kellogg's, Cargill, Campbell's, and Clif Bar, through its support of Justlabelit.org, have all announced support for the labeling of GMO food, showing that food industry leaders have committed to disclosing GMO ingredients and important information related to food sourcing.

Fraud also continues to concern consumers and food companies as both diners and businesses sometimes pay for authentic, fresh, and high quality food ingredients but are sold something different. The past year's news headlines highlighted a few of the more widespread instances, which included adulteration of Parmesan cheese with wood cellulose, inaccurate labeling of low-quality and old olive oils, and passing off low-cost fish and shellfish for lobster in both independent and larger chain restaurants. With seafood fraud such an issue, the National Oceanic and Atmospheric Administration Presidential Task Force, formed in 2015 to specifically improve traceability and combat food fraud in seafood sourcing, offers promise that the industry will soon see improved transparency in seafood sourcing.

The core benefits of improved food traceability include providing consumers with information on where, how, and by whom their food was produced, and providing a means to trace contamination in the

food supply. Recent large-scale food contamination events and an increased interest in food production techniques (such as the use of GMO products) continue to increase the importance of food traceability for consumers. Currently, improved food traceability is being pursued by a few food and restaurant leaders. As public interest continues to grow, we can expect increased calls for regulation and a rise in the role of third parties to verify food sourcing.

## RECOMMENDATIONS:

Food products are 1) global in sourcing, 2) produced at a variety of standards by both large and small producers, 3) not easily examined or audited, 4) easily misrepresented without strict tracing to origin or collaboration between the producer and retailer, and 5) subject to more sourcing inquiries by consumers. These features suggest that food traceability is needed more than ever to satisfy customer demands.



### SCORE: 3.5

Food supply chains remain vulnerable to food fraud and contamination. More traceability information is needed, but courageous foodservice companies are showing that higher standards can be established in a manner that supports customer, business, and environmental goals.

### IN SUMMARY:

- Consumers demand and value information about the sourcing and treatment of food ingredients. Three examples from the past year are illustrative:
  - Whole Foods Market committed to GMO labeling and a first large-scale launch of non-GMO pork. Firms like Kellogg's, Cargill, Campbell's, and Clif Bar have led the cause to require GMO labeling in food products, showing that food suppliers can successfully embrace food labeling.
  - Panera Bread's leadership in moving to antibiotic-free chicken is fundamentally altering how chicken is sourced for other large chains like McDonald's and Chick-fil-A.
  - The new NOAA Presidential Task Force to improve traceability and combat fraud in seafood was formed.

# CHANGES IN INVESTMENT STANDARDS FOR THE FOOD INDUSTRY AMONG PROFESSIONAL INVESTORS

Until a decade ago, few investors believed that a company's sustainability performance was tied to its financial performance. In past Menus of Change reports, we have chronicled the gradual shift towards greater acceptance of this link. In the past year, however, the investing ecosystem has undergone a sea change; whereas the environmental, social, and governance (ESG) performance of a company was hotly debated for its impact on financial performance, this issue is now largely settled. For food manufacturers and restaurateurs, this means that investors will expect programs, policies, and reporting on issues such as the health and nutrition profile of products. A number of publicly traded companies have emerged as leaders in ESG disclosure and in the incorporation of sustainability into business strategy. For example, Unilever, General Mills, and Kellogg's have established science-based targets for carbon emissions that align with the global target of keeping warming below 2° C. While this shift in expectations is especially true of larger, publicly traded companies, venture capital and private equity firms also increasingly consider these issues.

A confluence of factors is driving this change. First, the U.S.-based Sustainability Accounting Standards Board (SASB) has completed industry-specific guidelines for ESG reporting after meetings with investors, industry leaders, and other stakeholders.

These guidelines clarify those ESG issues that are most material (i.e. important to financial performance). Within the restaurant industry, material ESG issues include:

- **Energy and Water Management**
- **Food Safety**
- **Nutritional Content**
- **Food and Packaging Waste Management**
- **Fair Labor Practices**
- **Supply Chain Management and Food Sourcing**

Second, there has been a wave of studies supporting the notion that companies that invest in these material ESG factors, based on SASB definitions, perform better for investors. SASB also provides numerous examples of how strong sustainability performance on material issues relates to company value within the restaurant industry specifically. Furthermore, when companies with better sustainability performance are included in a mutual fund, performance is also generally improved overall, incentivizing investors to pick sustainable companies. For example, in a Morgan Stanley study analyzing the performance of over 10,000 mutual funds, those funds with a sustainability focus met or exceeded the returns of traditional funds 64 percent of the time.

Third, regulatory changes made in 2015 will also propel the market for "sustainable" funds. A ruling by the U.S. Department of Labor clarifies that managers of 401(k)s and pension funds may include sustainable funds, and that consideration of ESG factors may contribute to the financial performance of a given fund. This change is an important departure from past rulings, where sustainable funds were required to present additional documentation, or were discouraged from being included on retirement platforms. As a result, sustainable restaurants and foodservice companies are now more likely to be served up in a company pension plan.

Stock exchanges are also increasingly requiring or encouraging disclosure of material ESG issues within public filing documents, such as company annual reports (10-Ks). The NASDAQ stock exchange, for example, provides guidelines and training to companies on ESG disclosure, and it offers 70 sustainability-related indexes.

Finally, though millennials have yet to dominate retirement investing, their investing preferences differ greatly from their parents. They are twice as likely to seek out a fund that confers a sustainability benefit, and also twice as likely to divest of a particular company based on its ESG performance. These trends mimic millennial preferences for working for sustainable, inclusive companies, and for products with better sustainability profiles. For restaurateurs, these preferences show that the next generation of investors will make ever-greater demands for ESG disclosure and good performance.

## RECOMMENDATIONS:

Foodservice companies and food and beverage manufacturers that put sustainability at the center of their businesses are increasingly attracting private investment and being rewarded by public markets. They should expect even greater scrutiny over the years to come on these issues. Companies and restaurants should develop cost-effective, clear plans for addressing the risks and opportunities identified by investors, and provide disclosure in company reports. Given the potential for brand value, progress on sustainability goals should also be shared with employees and consumers.



## SCORE: 4

Investors in publicly traded companies now more clearly link stock performance with sustainability strategy and performance, relying on new disclosure tools and regulation. Private investors have significantly increased their support for new food and foodservice companies that feature plant-forward concepts and focus on sustainable supply chains.

Large, publicly traded companies in the industry have typically identified major environmental and labor risks, but challenges remain, particularly in their supply chains. Wage disparity and other labor concerns remain a weakness for the industry, as labor issues may lead to work stoppages, reputational loss, or product safety failures.

## IN SUMMARY:

- Investors increasingly consider sustainability performance an essential component of a food company's financial performance. On both the public and private sides, they have been shifting support to foodservice chains and startup food and beverage companies that focus on healthier, more sustainable, often plant-based foods.
- Investors have agreed on industry-wide standards for disclosure of sustainability progress in annual reports filed with the U.S. Securities and Exchange Commission (known as the 10-K). Stock market exchanges are also embracing voluntary or mandatory sustainability reporting in public filings.
- Regulatory changes no longer challenge the inclusion of sustainability-focused funds on retirement platforms.





## VI. DEMOGRAPHICS AND CONSUMER PREFERENCES: ISSUES, TRENDS, AND CHANGING APPETITES

From pop-up restaurants to high-volume, multi-unit chains, and from trend-spotting magazines to the latest cookbooks, plant-forward eating continues to gain prominence in American culture. The issue briefs in this section highlight the ever-evolving role of chefs in shaping diners' palates and preferences, as well as the nuances and challenges of shifts to greater local sourcing and greater investment in local food systems. This section also explores ideas for equipping consumers to navigate the complex informational contexts they inhabit in order to make food choices that benefit both their own well-being and that of the environment. Understanding these challenges and providing

solutions for consumer confusion are of critical importance given that the available information about nutrition and sustainability often contradicts the scientific evidence—and that the information comes from an often overwhelming number of sources, from government recommendations and academic journal publications to blogs and the media, from celebrity chefs to athletes and artists. Finally, this section covers the most important developments in the past year regarding the promotion of animal welfare. As the following essays illustrate, diners' demands will continue to be characterized by an only growing list of not only health and environmental values but ethical values.

# CHEFS' INFLUENCE ON CONSUMER ATTITUDES

Chef-driven, plant-forward menus have been on the rise for the last two years. Today, this trend is rapidly emerging in fast casual and other high-volume concepts, representing a widening range of new categories of plant-centric dining around the country and garnering appreciation as well as increased demand from consumers and media alike. In the National Restaurant Association's What's Hot 2016 Culinary Forecast, which surveyed 1,600 chefs, nine out of the top ten trends revolve around health and sustainability, with some form of local sourcing occupying three of the first four spots.

AL's Place—a San Francisco restaurant by Culinary Institute of America alumnus Aaron London that presents a menu dominated by vegetables, with meats as side dishes—topped *Bon Appétit's* 2015 Hot Restaurant list. Semilla, a Brooklyn-based restaurant serving a seven-course tasting menu in which animal proteins are rare, took no. 4. Daniel Humm and Will Guidara of Eleven Madison Park and the NoMad in New York announced the launch of a new fast-casual restaurant focused on seasonal vegetables and grains, Made Nice. And chefs continue to make vegetables the focus of their written work as well: Hugh Acheson, of Five & Ten, Empire State South, and other Georgia restaurants, published *The Broad Fork: Recipes for the Wide World of Vegetables and Fruits*; Michael Anthony of Gramercy Tavern in New York wrote *Vis for Vegetables*, which won a 2016 James Beard award; and Yottam Ottolenghi of London's Ottolenghis and Nopi continued his domination of the sector with the release of *Nopi: The Cookbook*, another 2016 Beard winner.

The CIA's widely popular pop-up restaurant Pangea, which offers a menu centered around Menus of Change Principles, returned to the Hyde Park campus this winter. While the 2015 iteration featured a 10-course tasting, this year's menu offers diners the choice of three courses for \$18, including such options as tomato sushi roll with parsnip rice and smoked haddock with kale salad and lime yogurt. In The Egg, a new à

la carte dining facility located at the CIA's Student Commons in Hyde Park, menuing strategies include a general plant-forward approach (where fruits and vegetables are showcased as part of the plate sometimes exclusively, sometimes paired with a reduced portion of land-based animal protein) and a daily burger selection that always includes a blend of animal protein and plant product (such as beef, mushrooms, and barley; lamb and bulgur wheat; and turkey and black bean). Grilled market fish is served each day with a choice of side dishes prepared with guidelines such as the use of monounsaturated fats whenever possible and a limitation on fast-metabolizing carbohydrates such as potatoes. All the breads are blends of whole-grain and white flours, and all pastas are whole wheat-, lentil-, or spelt-based.

Food waste continues to be a venue for creativity, after the success of Dan Barber's wastED pop-up restaurant last winter in New York. Italian celebrity chef Massimo Bottura ran the Ambrosian Refectory during Expo Milano, where a rotating cast of equally famous chefs cooked with foods unused by the Expo. In Brooklyn, Saucy By Nature's menu is created from leftover ingredients its parent catering company didn't serve at events the night before. As more chefs and operations continue to make reducing food waste a priority, they encourage consumers to follow suit at home.

A growing number of chefs are also coming out as healthy. Just as tattoos and rowdy nightlives made for headlines in decades past, in recent months media have been showcasing leading chefs' fitness regimens, alcohol-free lifestyles, and dietary changes. While this does not always directly translate to what they are feeding their customers, more often than not personal health practices are being reflected on menus that have become lighter and more plant driven, and can serve as inspiration to diners who look up to these chefs.

Beyond the purely creative, developments on the social and policy front have been noticeable in the past year, triggering their own impacts. Pressures from both government (new regulations affecting tipped employees, minimum wage, the implementation of the Affordable Care Act, and family leave time) and customers (around values and ethics, as well as nutrition and the environment) have forced many restaurants and foodservice operations to spend more on everything, from organic greens and antibiotic-free meats to labor. With so many demands layering in all at once and more anticipated in years to come as some of these regulations take effect

on an increasing scale over the next five years, and variations occur depending on state, city, or customer base, outcomes for the health of the foodservice industry are unclear. At a minimum, these regulations and consumer sentiments will most certainly factor into how chefs think about their positioning regarding health, sustainability, menu pricing, and business strategy going forward. Chefs and operators are also becoming more transparent about the pressure that these changes put on their operating costs, in part to educate customers about increased menu prices.

As more chefs and companies take a leading role on social issues and are featured in the media both nationally and locally, the public will gain a greater understanding of the business side of the restaurant industry—and likely will need to be prepared to pay more for their food, or make other trade-offs, as a result of changing policies and diner aspirations. At the same time, foodservice operators are increasingly turning to their suppliers to challenge them to invest in increased health and sustainability attributes in their products without always having to pass along additional costs in the form of higher prices.

## RECOMMENDATIONS:

Because so much of this country's food is prepared and/or consumed outside the home, chefs and high-volume foodservice leaders play a crucial role in aligning health, sustainability, flavor, and value. While special occasion dishes still very much belong on menus, chefs and foodservice operators can positively impact their consumers' everyday diets by providing healthier everyday options on their menus. This includes proactively reducing land-based animal-protein portions (with a special focus on red meat) to between two and four ounces for many main course items, for example, offering greater varieties of fish and seafood, and devoting more of their creativity to vegetables and plant-based proteins (e.g., legumes and nuts, as well as products made from these). All the while, they must emphasize the pleasure of these healthier foods and food patterns, and use their appeal among the media to reinforce those messages (either overtly or more implicitly). When cooking meat, chefs should also look to use whole animals, to direct their customers toward lesser-known cuts of meats, reduce waste, and trim food costs.

Chefs and operators' perceptions of their leadership and potential for change must be nurtured. Organizations, including the CIA, the National Restaurant Association, Chefs Collaborative, and the James Beard Foundation, are working to provide support to chefs interested

in sustainability issues. To establish credibility, however, chefs must be cautious about the positions they take on these issues, and must educate themselves on the topics they decide, or are asked, to discuss. For their own long-term financial sustainability, chefs and restaurateurs must also be transparent with their customers to help them understand the new reality of running a food business in 2016.



## SCORE: 4

Many chefs and foodservice leaders are deeply engaged in the movement around sustainability and healthier food choices and are making progress in offering more plant-forward menu options, including launching full-service and fast casual operations focused on these directions. Societal changes related to elements like health insurance and minimum wage are requiring restaurants and companies large and small to be more agile and adapt their business models. Chefs and operators at all levels of the industry need to place an additional focus on portion size, nutrition, and public health, and offer more plant-based proteins on menus.

## IN SUMMARY:

- Plant-forward and food waste-based menu directions, from fine dining to fast casual, are dominating media coverage and diner interest, as many chefs continue to transform their cooking and use those elements as creative outlets.
- Changing governmental regulations and customers' mindsets are forcing restaurants and foodservice operations to adapt their business models, which some are doing by abolishing tipping and paying all employees higher hourly wages. Operators will need to be agile in addressing these changes so as not to limit their ability to also increase their commitments to health and sustainability imperatives with their often attendant additional costs.
- Through creative menuing and transparency about their business decisions, chefs and foodservice operators must work harder at changing diners' attitudes, so that environmental sustainability, social, and health issues become ever greater factors in consumers' dining-out decisions.

# CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD

Improving the way Americans eat depends in large part on the choices they make for themselves and their families. One bright spot is that soda consumption has substantially decreased since 2007. Sales of soda are down 25 percent, and more Americans report trying to avoid drinking soda. This significant progress was likely made possible by it being one recommendation for which there is unanimous support among experts and by it being easy for consumers to comprehend that soda provides nothing but empty calories and harmful amounts of sugar or artificial sweeteners.

Other news about the American diet is more concerning as dietary quality remains poor and disparities across socioeconomic groups have not improved. This may be influenced by an increase in unhealthy snack food advertising to African American and Hispanic youth. Moreover, except for the youngest children, obesity rates appear to be holding steady or slightly increasing.

Many consumers rely on mass media for information, and likely receive little more than sound bite versions of claims about health and nutrition. Added to the mix this year was the World Health Organization's conclusion that consumption of processed meat increases the risk of cancer. The WHO's press release spurred a cascade of articles in the popular press attempting to clarify, deny, or ridicule the WHO's report. The first problem was reporting that processed meat met WHO's Level 1 classification

of carcinogens along with tobacco and asbestos. This was predictably misconstrued as a claim that processed meat was as carcinogenic as tobacco, but WHO's esoteric categorization system is based on the degree of evidence that something is carcinogenic, not the degree of risk. Another problem was that the evidence was presented in terms of epidemiological statistics—degree of increased risk—which are easily misunderstood by the average consumer. So the claim that frequent consumption of cured meat can lead to an 18-percent increase in the risk of getting colon cancer became misinterpreted as consuming cured meat puts one's risk of getting colon cancer at 18 percent. The public should have been told more clearly that the evidence is now overwhelming that processed meat is a carcinogen, and regular consumption can increase one's risk of colon cancer from roughly 5 percent to 6 percent.

Contradictory headlines about nutrition continue unabated. Inconsistent claims abound about the health versus risk of sodium, saturated fat, sugar, carbohydrates, meat, GMO foods, and organic foods. It can be hard not to become skeptical when experts disagree, the advice is contradictory, and there is little other basis on which to make a decision. It is easy, then, to dismiss expert advice and just eat what you want. One of the main problems is that the information most available to consumers tends to be “expert” advice in the form of dictates, without providing a compelling rationale. Moreover, experts can disagree, in part because flawed research can be hyped by the media and in part because, like all sciences, knowledge of nutrition is continually being refined and expanded. This problem was compounded this year by the lobbying by the food industry that took place between the Dietary Guidelines Advisory Committee's report and the January release of the new Dietary Guidelines for Americans. The DGAC is made up of top experts who based their recommendations on the best evidence available and not the interests of the food industry. The original recommendations of the advisory committee are the recommendations consumers can trust and should follow.

To equip consumers with effective decision-making strategies, we should turn to evidence-based studies of how people reason about nutrition and what governs their decision-making

when faced with such inconsistencies. Research in psychology has documented that people, even young children, often try to make sense of complicated domains in terms of explanatory principles and causal mechanisms. For example, a 2013 study published in the journal *Psychological Science* targeted young children's conceptual gaps and misconceptions about nutrition to effectively teach them why we need to eat a variety of healthy foods. These preschool children then selected more vegetables to eat during snack time. This same approach could be extended to adults by focusing on specific conceptual gaps and misconceptions they hold about nutrition. By cutting through the confusing, ever-changing advice about eating, this approach could provide a coherent framework to reason about healthy food choices.

## RECOMMENDATIONS:

By continuing to make healthy foods tempting, delicious, readily available, and affordable, chefs and foodservice professionals can encourage healthier food choices using scientifically validated recommendations, such as those provided by the 2015 Dietary Guidelines Advisory Committee and Harvard T.H. Chan School of Public Health. On the other hand, consumers are bombarded by a continual flow of contradictory information about what is healthy. Thus, there is a need to create and validate the effectiveness of materials designed to overcome specific conceptual gaps and misconceptions adults hold about nutrition. Having such a coherent conceptual framework about health and nutrition could help foster effective decision-making.

Researchers and science reporters alike should take care when presenting epidemiological statistics as percent increase in risk knowing that consumers often interpret that as the level of risk itself. Ensuring that press releases always present risk data along with the relevant baseline risk could go a long way to avoid confusion. When presenting data, researchers and reporters should also be careful to distinguish between a meta-analysis—numerous studies already published, as the WHO report was based on—and a new experimental finding.



## SCORE: 2

Even consumers motivated to make healthier food choices can't help but be confused given the steady barrage of inconsistent advice.

## IN SUMMARY:

- A variety of U.S. agencies are responsible for offering nutrition advice and determining what foods are considered “healthy.” Confusion about what to eat is only heightened by contradictory messages and oversimplified news headlines.
- New and existing research from the field of psychology offers conceptual and behavioral insights that can be adapted into effective decision-making strategies for consumers
- Chefs and foodservice leaders can help minimize confusion about healthy food choices by referring their customers to scientifically validated recommendations—such as those offered by the 2015 Dietary Guidelines Advisory Committee and Harvard T.H. Chan School of Public Health—and by making healthy food tempting, available, and affordable.





# LOCAL FOODS AND THE FARM-TO-TABLE MOVEMENT

The farm-to-table movement leapt into the mainstream in the early 2000s, as food activists around the country strove to develop strong connections between restaurants and local farming communities. Consumers seek local and regional foods not only from restaurants, but also in farmers' markets or from their food retailers; furthermore, many have advocated the use of local foods in the burgeoning farm-to-school movement. A 2015 USDA report to Congress indicates that the use of intermediated channels (which includes farm-to-restaurant sales), in regions with thriving local food systems, helps farmers increase sales.

The bulk of research on the farm-to-table movement addresses benefits to consumers and farmers. Locally and regionally produced food is fresher and tastier when it reaches consumers. The benefits of local and regional foods extend beyond the consumer's palate, as purchasing food raised nearby supports local farms and can bring economic benefits to local communities. The relatively short shipping distances in local and regional markets allow farmers to produce high-value heritage and heirloom varieties of livestock and produce, which are unable to maintain their quality when being shipped over long distances.

Farms that produce for local and regional markets have unique characteristics. Such farms tend to be smaller than the average U.S. farm, and are clustered in the Northeast and the West. Viability of these farms—located on the rural-urban interface—is dependent on selling their products for a high price, to consumers in urban centers. Farms growing fruits and vegetables account for 29 percent of all local food farms, and the bulk of local food sales (51 percent) are for fresh produce. Farms selling to local retailers and local restaurants through intermediated channels typically have higher sales than the local food farms selling directly to consumers. Yet, fewer than 50,000 of two million farms in 2012 sold their products in intermediated local channels.

The main challenge facing the farm-to-table movement is procuring locally and regionally

produced food, which requires a significant amount of effort on the part of chefs and buyers. A variety of tools can help buyers locate desired products: MarketMaker, funded by land grant universities and the USDA, currently links buyers and sellers in 20 partner states. Regional sourcing is facilitated through local networks (for example, New Mexico-based non-profit organization Farm to Table) or extension services of land grant universities. These internet-based networks have significantly expanded opportunities; yet despite marketing advances, procurement outside of the traditional channels remains challenging.

Restaurants face constraints on the supply of local food by the inherent seasonality of agricultural production. While farms in California are able to produce year-round, for most of the nation there is little production for a portion of the year. As an example, a study of the farm-to-restaurant supply chain in Columbia County, New York, found that restaurants purchased from local farms for an average of 20 weeks per year. Thus, meeting procurement needs is time-intensive and requires juggling multiple suppliers throughout the year, and may mean that limited products are available during certain times of the year.

From the farmer perspective, increasing the quantity supplied to restaurant channels may require meeting costly, specific food safety practices for on-farm production and handling along the supply chain. The final rules for produce safety, as authorized by the Food Safety Modernization Act, offer qualified exemptions to farms with sales below a \$500,000 threshold (average of the past three years) that primarily sell direct to consumers and restaurants located within 275 miles. Buyers are able to impose stricter requirements on farmers, such as Good Agricultural Practices (GAP), which small farms may find costly and difficult to implement. For farmers and restaurants alike, avoiding a food safety outbreak is paramount to business viability.

Purchasing locally and regionally can provide farmers with incentives to produce varieties suited to local agro-ecosystems, which often taste better. However, it has not been scientifically documented that locally and regionally produced foods are better for the environment, despite the idea that lower food miles automatically confers a smaller carbon footprint. At the same time, it is encouraging that despite the fundamental challenges of the farm-to-table supply chain, restaurants and consumers continue to participate in the experience, because through their farm-to-table menus, restaurants may be able to raise awareness about the connections between agricultural production and fresh, tasty food.

## RECOMMENDATIONS:

Consumer demand for locally and regionally produced food continues to grow, yet the steep learning curve of marketing to new customers appears to be making farmers reluctant to increase production levels or shift large amounts of their production into local and regional markets. Supply limitations may dampen further growth in the market, unless farmers are sufficiently convinced that the local and regional markets are profitable in the short term and the long term. To increase market supply, buyers should provide farmers with a consistent market for specialized products, and at good prices. Note, however, the contradiction of supply growth is that as supply increases farm prices are likely to fall. Buyer commitment to farmers, in terms of both price and quantity, will reduce some of their risk of entering into new local and regional markets.



## SCORE: 3.5

At long last, federal and local policies are supporting local and regional food. Hopefully, the combination of farmers, chefs (and other buyers), and local and regional food consumers in this new policy environment will accelerate growth in the segment of the food system devoted to producing and consuming "good food."

## IN SUMMARY:

- Current Current farm-to-table trends include restaurant gardens, local sourcing of meat and produce, hyperlocal sourcing of greens, and seasonal menus. Procurement of locally and regionally produced food requires a significant amount of effort on the part of chefs, buyers, and farmers, including the extra steps required to satisfy new food safety requirements.
- Despite the popularity of "food miles," little evidence supports the concept that locally and regionally produced food is more environmentally sustainable than food shipped long distances. Consumers do benefit from local and regional food, though, as it is fresher and tastier.
- Both local and regional food contribute to economic sustainability by supporting local economies and increasing profit opportunities for participating businesses. By providing markets for farmers, chefs and foodservice professionals can be leaders in this area.

# ANIMAL WELFARE

One hundred years ago, the country and the planet had fewer people, eating less meat, in smaller portions. The demand for meat, dairy, and eggs was met by an agricultural system built of many more farms and ranches that were smaller than those that predominate in livestock agriculture today. In many cases, though not all, this involved practicing traditional animal husbandry with cows grazing on open ranges, pigs rooting through underbrush and wallowing in mud, and chickens scratching through pastures for grubs and bugs. Times have changed—dramatically.

More people now inhabit the country and the planet, and they are eating more meat, in larger portions, more frequently. About 99 percent of animals raised for food in the United States live all or at least some portion of their lives in concentrated animal feeding operations (CAFOs). These do not include open range, underbrush, or pastures. Instead, they employ gestation crates, battery cages, debeaking, tail docking, runt thumping, dehorning, castration, detoeing, maceration, and billions of animals living and sleeping in their own waste.

The decline in animal welfare is inversely proportional to increases in yield and efficiency. The use of hormones, antibiotics, and changes in feedstock have led cattle, pigs, and chickens to grow faster and bigger and to be slaughtered sooner. High yield and efficiency are achieved by packing thousands of livestock tightly together without the ability to engage in natural behaviors, such as grazing, rooting, or scratching for food. Feedstock, composed primarily of corn and soy, has to be produced in massive quantities and transported to the CAFOs. The cheapness of the animal protein produced in CAFOs leads people to eat more meat than is healthful. This high yield practice is also inextricably linked to degradation of soil, air, and water quality.

Small legislative steps have been made in a growing number of states to improve the welfare of some farm animals. These include bans on: gestation crates that cage pregnant and nursing pigs so tightly they can't turn around, crates for calves, tail docking for cattle, and battery cages to house laying hens. Previous updates for this report have addressed some of these issues. One example was a 2013

FDA plan to work with the livestock industry on a voluntary reduction of antibiotic use when used for increasing growth or feed efficiency rather than treating disease. Another example was the California ban on battery cages for laying hens that restricted these chickens to a living space the size of an 8.5- x 11-inch piece of paper, 24 hours a day.

In 2015, a promising alternative to legislative solutions emerged: Two major restaurant chains, Panera Bread and Chipotle, made commitments to better align their procurement practices with improved animal welfare. Panera—which has been a leader in the industry for a decade working against antibiotic use and confinement—announced that it was on target to achieving 100 percent antibiotic-free turkey and chicken in its products by the end of 2015. Additional efforts by Panera include decreasing the proportion of pork purchased from farms using gestation crates and increasing the proportion of eggs from cage-free chickens, as well as the proportion of beef from grass-fed and free-range cattle. Chipotle, another industry leader, also announced an antibiotic-free policy in 2015 for all its meats. Since then, more than a dozen other well-known restaurant companies and brands have also made commitments to reduce or eliminate the use of antibiotics in their supply chains and to use cleaner ingredients. Similarly, members of the Menu of Change community have been removing antibiotics from their purchasing. R&DE Stanford Dining, for example, has stopped buying chicken, beef, and pork raised with antibiotics and only purchases cage-free eggs and humanely raised beef and pork.

The work of early pioneering companies now may provide much needed data on some of the practical logistics involved. For example, if the demand for antibiotic-free meats and cage-free eggs continues to increase, how quickly can the livestock and egg industries respond with a change in supply? There will be some initial challenges with price volatility if demand exceeds supply. Hopefully, these will be among the critical seeds of change that could lead to substantive improvements in animal rights and welfare. As a more engaged and informed consumer base votes with its forks and dollars for improved animal rights and welfare practices, chefs can play an important role in finding and supporting farmers who can supply this demand.

## RECOMMENDATIONS:

Foodservice and culinary professionals are responsible for a large proportion of the demand for meat, dairy, and eggs, and are in a position to promote profound improvements in the welfare of animals raised for food. A small but growing consumer segment is placing greater emphasis on animal-welfare issues related to their food purchases; it would be helpful to have options for these customers. From a more proactive perspective, foodservice and culinary professionals could redesign menus with a greater number of meatless options and reformulate recipes to use smaller amounts of meat, dairy, and eggs. A selective and informed approach to food sourcing and supply-chain management can help to support and sustain producers with superior animal welfare practices. Negotiations with producers may lead some of them to transition to improved animal welfare practices. If successful, such efforts could make foodservice professionals a driving force in restoring traditional animal husbandry, supporting small farms and ranches, and improving the state of animal welfare in the meat, dairy, and egg sectors.



## SCORE: 3

Awareness is rising about the problems with animal welfare in the livestock industry. Some alternative practices are being employed by a growing group of producers, and progress has been made through both public and private sector policy changes. However, there remains substantial room for improvement.

## IN SUMMARY:

- Nearly all animals raised for food in the U.S. live in concentrated animal feeding operations, which degrade soil, air, and water quality.
- An increasing number of states have passed legislation to address and prevent some of the animal abuses, including gestation crates for pigs and battery cages for egg-laying chickens.
- In the past year, several major restaurant chains including Panera Bread and Chipotle announced progressive policy changes regarding sourcing animal foods, including commitments to use antibiotic-free meats and cage-free eggs. Since then, more than a dozen well-known companies and brands have made similar commitments.





The overall trend in dietary quality continues to improve as trans fat is almost gone and soda is decreasing. An important decrease in diabetes incidence is an early pay-off. However, we have far to go to achieve a healthy, sustainable national diet, and this good news should be reason to redouble our efforts.

## VII: NUTRITION, HEALTH, SUSTAINABILITY, AND FOOD ETHICS: SCIENCE AND POLICY HIGHLIGHTS

The release of the 2015 Dietary Guidelines for Americans (the first since the Menu of Change initiative was launched), the World Health Organization's announcement about the health risks of frequent consumption of red and processed meats, and the historic global commitment to address climate change have brought new urgency to the ongoing work of Menu of Change. These measures and many other recent developments highlighted in this section underscore how much is at stake in our work to shift the available menu options: the overall health of humans and of the natural systems that sustain life on earth. The following series of essays cuts through the complexity of nutrition and environmental science to provide clear guidance for culinary professionals. These issue briefs also suggest steps that foodservice industry professionals can take to not only address current public health and environmental challenges, but also to provide leadership in the absence of improvements in public policy.

### DIET AND HEALTH: RECENT TRENDS

Over the last several decades, researchers have intensively studied the relationships between what we eat and our health, in particular conditions such as cardiovascular disease, cancer, and total mortality. This has included experiments in animals, small controlled feeding studies in humans lasting for several weeks, large epidemiologic studies with decades of follow-up, and a limited number of randomized trials in humans. While these studies have been enlightening, the resulting tens of thousands of publications have, perhaps ironically, made it incredibly complicated for the average eater to read, interpret, and synthesize this vast body of knowledge into useful guidance. Other documents have been published to review the literature and develop overall conclusions. But many of these reviews also have limitations as a result of gaps in the scientific literature (which remains a work in progress), the limited perspectives of some of the committees, and sometimes even conflicts of interest.

One of the most influential review processes has been the Dietary Guidelines for Americans, which is intended to provide guidance to individuals, institutions, and federal policies related to food. Mandated by Congress, the United States Department of Agriculture (USDA) updates its guidelines every five years. The USDA also created the Healthy Eating Index (HEI), a scoring system that can be used to rate the diets of individuals, or the menus of foodservice operations, based on adherence to its guidelines. In 1995, however, researchers at Harvard T. H. Chan School of Public Health were concerned that the U.S. guidelines were inconsistent with the best available scientific evidence.

They decided to use data on dietary intakes reported by over 100,000 men and women to determine whether those who adhered most closely to the federal guidelines had lower risks of cardiovascular disease, cancer, and other

major chronic diseases, compared to those who adhered less well. Disappointingly, after accounting for tobacco use, physical activity, and other factors, there was little relation between adherence to the Dietary Guidelines for Americans and the risk of major chronic disease. Thus, these investigators developed the Alternate Healthy Eating Index (AHEI). Based on the best available published literature, it takes into account findings from short-term studies in humans on the effects of different diets on blood cholesterol fractions and other risk factors, as well as long-term prospective epidemiologic findings. Emphasis was given to findings that were supported by both types of evidence.

Using the same populations in which the USDA's HEI had been evaluated, the Harvard investigators documented that better adherence to their own alternative index did predict lower risk of major chronic disease. During subsequent five-year updates, the U.S. Dietary Guidelines have evolved to be closer to Harvard's alternative index. Because scientific evidence has continued to accumulate, the Harvard group updated its guidelines as the Alternate Healthy Eating Index 2010 (AHEI 2010), and has published an analysis examining both the USDA HEI 2005 and the AHEI 2010 in relation to the risk of major chronic diseases. As expected, the scores were strongly correlated. Now, adherence to both predicted better health outcomes, although the AHEI 2010 did so somewhat more strongly.

The USDA subsequently released the HEI 2010, which is more similar to the AHEI 2010, and the recently issued technical report of the 2015 Dietary Guidelines Advisory Committee suggests that the official 2015 Guidelines should move even closer to the AHEI 2010. Importantly, the Advisory Committee concluded that the upper limit on percentage of calories from total fat should be eliminated, and that the emphasis be on the type of fat. For the first time, the committee explicitly recommended reduction of red and processed meats, for both health and environmental reasons. The limit on dietary cholesterol was also removed, in part because most of the U.S. population was already under the earlier limit of 300 mg/day, and large studies had not shown egg consumption to be related to risk of heart disease, except among people with diabetes. However, the committee did not actively promote egg consumption, and regarded eggs as approximately neutral; notably, some foods such as nuts, whole grains, and plant oils can actually reduce

blood cholesterol levels and risk of heart disease, and thus could be used to create healthier breakfast options compared with eggs. Unfortunately, the final 2015 Dietary Guidelines ignored key elements of the Advisory Committee report. Congress ordered the USDA not to include anything about environmental impacts of diet in the 2015 Dietary Guidelines. Also, the final Dietary Guidelines ignored the recommendations of the Advisory Committee to limit intake of red meat for health reasons and to reduce consumption of sugar-sweetened beverages.

For the Menus of Change initiative, we have elected to use the elements of the Alternate Healthy Eating Index 2010 as the primary focus for evaluating healthfulness of diets. These have considerable overlap with the USDA's criteria but tend to be more intuitive and most directly supported by evidence. (For example, for political reasons the USDA has referred to added sugar and empty calories, while the AHEI refers to soda and other sugar-sweetened beverages; the USDA has referred to solid fat, while the AHEI refers to red meat.)

In addition, the USDA HEI does not specifically include trans fat. Notably, the elements of the AHEI 2010 closely resemble those of the traditional Mediterranean diet, which has been associated with lower risks of many adverse health outcomes. This conclusion was reinforced by the results of a major randomized trial conducted in Spain. Compared to a group who were assigned to a low-fat diet, men and women assigned to a Mediterranean diet that emphasized healthy fats, such as olive oil and nuts, had a reduced risk of high blood pressure, diabetes, and total cardiovascular disease. In many respects, the Mediterranean diet serves as a gold standard for a healthy diet, but understanding the key elements of this diet allows its principles to be incorporated into the diets of many cultures and with different flavors.

## DIVERGENCE OF SCIENCE FROM CONVENTIONAL BELIEFS

Conventional wisdom is often flawed, and the widely held beliefs about healthful eating are no exception. The Harvard Alternate Healthy Eating Index rates diets based on science that may not be familiar to everyone. Several topics in particular merit explanation because of their divergence from commonly held beliefs:

### 1. "Low fat" is not an appropriate diet goal.

Low-fat diets were all the rage in the 1980s and 1990s. But new, strong evidence has shown that the type of fat in the diet, rather than total fat, is strongly linked to heart disease. Moreover, low-fat diets are not effective for long-term weight control, as shown in a recent compilation of over 50 studies that lasted for one year or longer. Indeed, weight loss was actually modestly better on lower carbohydrate diets when the intensity of intervention was similar in both diet groups.

The type of fat is important. Trans fats from partially hydrogenated vegetable oils should be avoided, and unsaturated fats from vegetable oils should be used to replace saturated fat when possible. Saturated fat itself is similar to most carbohydrates in its relation to heart disease; replacing it with carbohydrates has no benefit, and it can be harmful if those carbohydrates are refined starch or sugar. A 2014 meta-analysis (a statistical summary of published studies) printed in a prominent medical journal caused a wave of confusion by concluding that the type of dietary fat was unrelated to risk of heart disease, leading to a media storm epitomized by *The New York Times* article title, "Butter is Back." Unfortunately, the meta-analysis was deeply flawed in several ways. A recent and more complete summary of prospective studies refuted the 2014 meta-analysis and confirmed the benefit of replacing saturated fat with polyunsaturated fat, which mostly comes from vegetable oils, nuts, and seeds. As expected, replacing saturated fats with typical carbohydrates had no benefit on heart disease. However, if saturated fat is replaced by whole grain carbohydrates that are high in fiber and low in glycemic index, this is likely to be beneficial.

### 2. Lean cuts of red meat are not the answer.

Reducing saturated fat is not beneficial if replaced by carbohydrates, but replacement by unsaturated fats will have multiple health benefits. Therefore, simply reducing the fat content of red meat likely will have minimal benefits because it is often replaced by calories in the form of refined starches, potatoes, and sugar. Moreover, other evidence suggests that higher intake of red meat, irrespective of its total fat content, increases risks of heart disease, stroke, and diabetes if compared to poultry, fish, eggs, nuts, or legumes.

### 3. Contamination and environmental risks need to be minimized, but these should not deter consumption of seafood from a health perspective.

An earlier report that fish, specifically farmed salmon, had been contaminated by industrial chemicals triggered a widespread scare that led many people to reduce their consumption of fish. But there was no evidence that the amounts of the chemicals found were enough to cause human disease. Also, the very small risk derived from theoretical calculations is substantially outweighed by the clear benefits of eating seafood. Some species of fish, such as swordfish, tilefish, and tuna, do contain mercury, mainly from natural sources; these fish should not be consumed by pregnant or lactating women. However, it is extremely important that pregnant women do eat fish in general, because a generous intake of omega-3 fatty acids is needed for neurological development of the fetus.

Overfishing and damaging forms of aquaculture are also serious issues. But the worries generally concern a handful of popular commercial species such as tuna, cod, salmon, and shrimp, and these species are being produced sustainably in some places. Eating a wider variety of fish species, both wild and farmed, is one simple measure that can contribute towards maintaining a healthy diet and addressing environmental concerns. In particular, both health and environmental impacts will be improved by consumption of small wild species such as anchovies, sardines, and herrings that are primarily used now to feed other fish or livestock, and in the supplement industry. Given that further increases in fish consumption will need to come primarily from aquaculture, research on aquaculture methods to enhance the already efficient conversion of feed to fish, and to reduce the environmental footprint, will be a sound investment.



## INDICATORS OF DIETARY QUALITY AND RATIONALE FOR THE AHEI

The elements of the Alternate Healthy Eating Index 2010 are described below, each with a brief scientific rationale. The scientific literature on each of these is large, and a more extensive discussion of these topics is beyond the scope of this report. The indicators are discussed in more detail and with additional references on the Harvard T.H. Chan School of Public Health website, Nutrition Source. ([nutritionsource.org](http://nutritionsource.org)).

**Vegetables:** Vegetable consumption has been associated with lower risk of cardiovascular disease, in part because vegetables are a major source of potassium, which reduces blood pressure, but other components may also contribute to this lower risk. The relation between vegetable consumption and cancer risk is much weaker than previously believed, but some modest benefit is likely for specific forms of cancer. Potatoes (including baked, mashed, and french fries) are not included as a vegetable because they are a major source of starch, have not been associated with lower risk of chronic disease in epidemiologic studies, and are associated with increased risk of weight gain and diabetes. Nutritional considerations took a step backward when members of Congress inserted a clause in the 2014 budget agreement that the Women, Infants, and Children (WIC) program should consider potatoes a vegetable, as they had previously done to the USDA school health standards. Corn has also been associated with weight gain and should be considered as a starch rather than a healthy vegetable.

**Whole Fruits:** Fruit consumption has been associated with lower risk of cardiovascular disease, diabetes, and some cancers. The AHEI included only whole fruit in its definition. Fruit juice, which is high in rapidly absorbed sugar, is not associated with lower risk of cardiovascular disease or cancer, and is associated with weight gain and risk of diabetes. Until recently, fruits have been considered a homogenous food group, even though they differ greatly in composition, and thus potentially health effects. In a detailed 2013 analysis, specific fruits differed greatly in relation to future risk of diabetes. Although most fruits were associated with lower risk, the regular consumption of blueberries was associated with the lowest risk. Eating plenty of fruits and vegetables is desirable, but additional analyses of specific fruits and vegetables are needed to provide more precise recommendations.

**Whole Grains:** Greater consumption of whole grains is associated with lower risk of obesity, cardiovascular disease, diabetes, and possibly colorectal cancer, and overall mortality. Conversely, refined grains are not associated with lower risk, and may increase risk of diabetes, coronary heart disease, and other chronic diseases. In calculating intake of whole grains, the AHEI uses grams of

whole grains, which accounts for the variability of the percent of grains that are whole in a range of “whole-grain” products. (This variability is because the U.S. Food and Drug Administration (FDA) allows the description of “whole grain” if a product is 51 percent or more whole grain.)

**Nuts and Legumes:** Nuts, legumes, and soy products are valuable sources of protein and contain important constituents such as unsaturated fat, fiber, copper, magnesium, plant sterols, and other nutrients. Nuts and other vegetable proteins have been associated with lower risk of cardiovascular disease, especially when used as a substitute for other protein sources, such as red meat. Nuts are also associated with lower risk of diabetes and of weight gain.

**Fish (EPA + DHA):** Two or more servings of fish per week, including species high in long-chain (n-3) fatty acids EPA + DHA, are strongly protective against fatal cardiac arrhythmias and sudden cardiac death. This also may lower the incidence of other cardiovascular diseases.

**Polyunsaturated Fat:** Replacing saturated fats with polyunsaturated fats leads to beneficial changes in blood cholesterol fractions, is associated with a lower risk of coronary heart disease, and may lower risk of type 2 diabetes. In contrast, a low-fat diet has had no beneficial effects on cardiovascular disease risk factors, lipid profile or blood pressure, and has not reduced the risk of cardiovascular disease, breast cancer, colon cancer, or total mortality. One popular belief is that n-6 fatty acids, the large majority of polyunsaturated fat in the U.S. diet, increase inflammation, cardiovascular disease, and other conditions, and that the ratio of n-6 to n-3 fatty acids is critical. This hypothesis has been consistently refuted in many studies. Indeed, the doubling of intake of n-6 fatty acids over the last 50 years almost certainly accounts for a large part of the major reduction of cardiovascular mortality in the U.S. during this time. Both n-3 and n-6 fatty acids are essential, and we need adequate amounts of each of these; the ratio is irrelevant.

Monounsaturated fats also have beneficial effects on blood lipids. In practice, replacing saturated fats with polyunsaturated and monounsaturated fats means

using liquid vegetable oils instead of butter, lard, or partially hydrogenated fats or tropical oils (e.g. palm, palm kernel, coconut oils) wherever possible. Moderate use of coconut oil when the special flavor is important is reasonable, but is best not used as a basic cooking fat.

**Trans Fats:** Trans-isomers of fatty acids, formed by partial hydrogenation of vegetable oils to produce margarines and vegetable shortening, are associated with higher risk of coronary heart disease, diabetes, and weight gain. Fortunately, use of these has been greatly reduced, and we have now seen benefits in the form of improved blood cholesterol fractions in national surveys of both children and adults. Accelerated declines in the risk of heart disease have been seen in cities that banned trans fats in restaurants and in Denmark, which banned trans fats nationwide. The AHEI recommends that partially hydrogenated fats be avoided completely. In late 2015, the FDA announced that partially hydrogenated fats would no longer be considered Generally Recognized As Safe (GRAS) and must be removed from the food supply by 2018, thus eliminating industrial trans fat in the U.S.

**Red and Processed Meat:** Consumption of red meat and processed meat is associated with greater risk of coronary heart disease, especially when substituted for nuts, poultry, or fish. Red meat and/or processed meat are also associated with higher risk of stroke, diabetes, and colorectal and other cancers, and total mortality. A recent report provides evidence that similar replacements for red meat during adolescence will reduce a woman’s future risk of breast cancer. A 2015 review by the World Health Organization (WHO) confirmed the association with colorectal cancer.

The greater risks of cardiovascular disease are mediated in part by the higher amounts of saturated fat and cholesterol in red meat, but other factors are also likely to play a role.

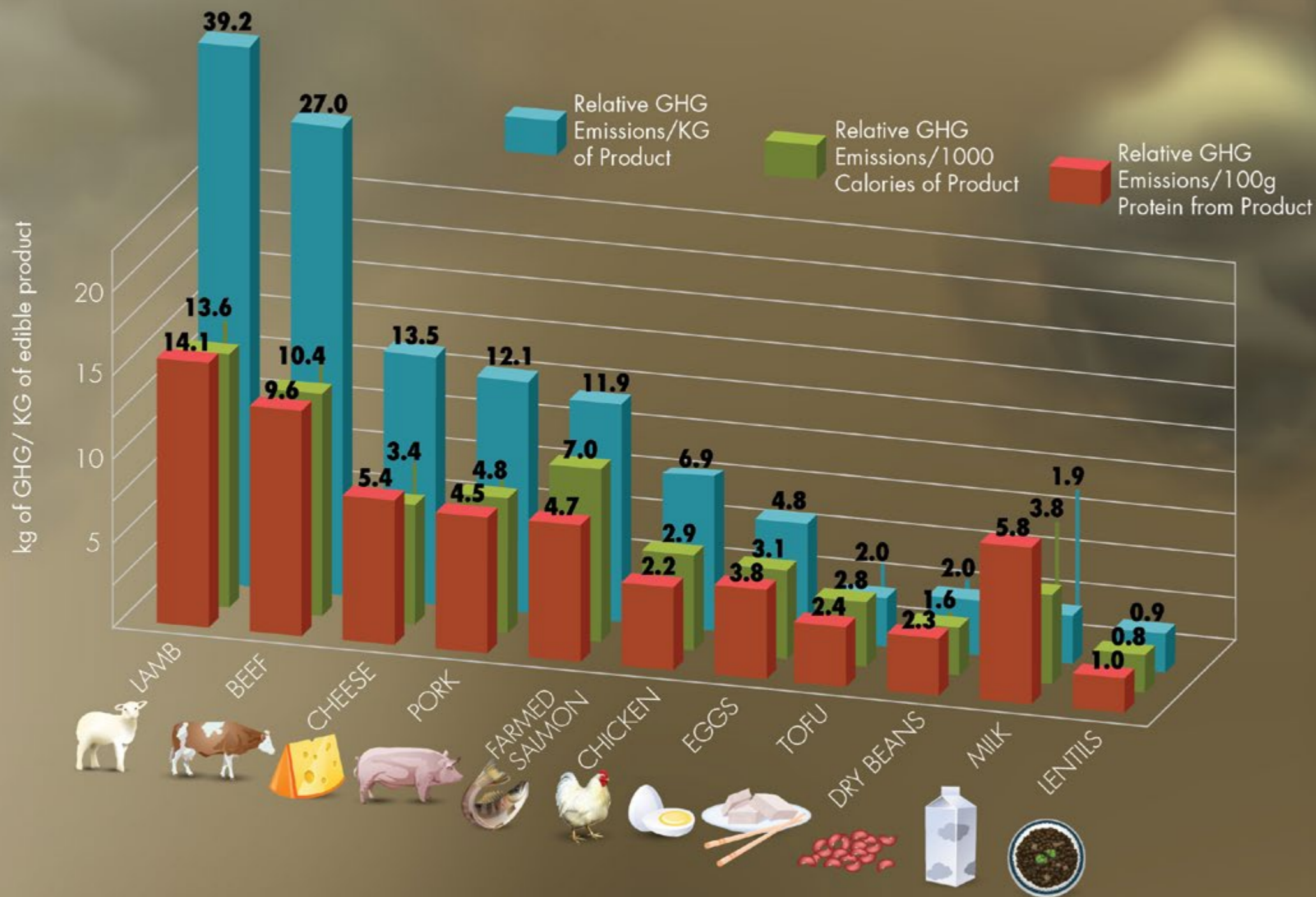
Environmental assessments lead to similar conclusions about protein choices: Selecting better types of red meat or eating “nose to tail” are not a sufficient solution because red meats have an outsized impact on the land, water, and climate compared to poultry, fish, and plant-based proteins

such as soy, beans, and nuts. Table 1 (page 24) illustrates 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.

**Sugar-Sweetened Beverages:** Intake of sugar-sweetened beverages, including soda and fruit drinks, is associated with increased risk of weight gain and obesity, cardiovascular disease, diabetes, and gout. The AHEI included intake of fruit juice in this category, given the positive association with risk of diabetes, and the lack of beneficial effects on cardiovascular disease or cancer, which has been seen from consuming whole fruits. The large amounts of sugar added to other foods, in addition to beverages, are also likely to have adverse health effects, but these effects have been less well documented; for this reason, other sources of added sugar were not included in the score.

**Sodium:** High sodium intake increases blood pressure, and salt-preserved foods are associated with greater risk of stomach cancer, cardiovascular disease, and total mortality. Further, sodium-reduced diets significantly lowered the risks of high blood pressure and cardiovascular disease in clinical trials. Reductions in sodium intake to 2,300 milligrams per day, as recommended by the U.S. Dietary Guidelines, would prevent a large number of new cases of cardiovascular disease. Although further reduction to 1,500 milligrams per day does reduce blood pressure, intakes this low have not been studied directly in relation to risk of cardiovascular disease, and such a study would be difficult to conduct. Because hypertension is a strong risk factor for cardiovascular disease, the American Heart Association and other groups have recommended that large parts of the U.S. population who are at higher risk of hypertension aim for 1,500 milligrams per day. Controversy has recently emerged about whether the goal for sodium reduction should be 2,300 or 1,500 milligrams per day. This controversy has little practical impact because average intake in the U.S. is about 3,500 mg per day, so it is a huge challenge to even get close to 2,300 mg per day.

# RELATIVE GREENHOUSE-GAS EMISSIONS ASSOCIATED WITH SOME COMMON PROTEIN SOURCES



**Table 1** illustrates 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>



## 2015 DIETARY GUIDELINES FOR AMERICANS: WHICH REPORT TO FOLLOW?

The 2015 Dietary Guidelines for Americans (DGAs) are an improvement in some important ways over the previous (2010) version, especially with the removal of the restriction on percentage of calories from total fat, the new limit for added sugar, and a shift in focus to healthy dietary patterns (versus just nutrients). Unfortunately, Congress censored the DGAs scientific advisory committee's conclusion that red meat consumption should be reduced for reasons of planetary health; this was within the scope of the committee because it is not possible to have food security if our food supply is not sustainable. However, the USDA went further and also largely ignored its own scientific advisory committee's conclusion that consumption of red and processed meat should be reduced for health reasons. In addition, the clear scientific conclusion that sugar-sweetened beverages should be singled out for reduction was eliminated in the final recommendations. Though the final DGAs are the official reference point for various governmental directives that cascade from them (e.g., U.S. government-funded feeding programs), chefs, food business leaders, food and health reporters, and the general public should focus instead on the earlier report of the 2015 Dietary Guidelines for Americans scientific advisory committee as the far better dietary guidance document based on the current state of scientific evidence.

—Walter Willett, MD, DrPH, Chairman, Department of Nutrition, Harvard T.H. Chan School of Public Health

## DIETARY FACTORS NOT INCLUDED AS INDICATORS

**1) Alcoholic Beverages:** Strong evidence indicates that moderate consumption of alcoholic beverages reduces risk of heart disease and diabetes. However, even at these moderate levels, risk of breast cancer is increased, and alcohol consumption increases risk of traffic injuries and abuse. Because of these competing risks and benefits, which depend in part on age and family history of alcohol dependence, this topic was deemed too complex to be useful as an indicator of diet quality for an overall population.

**2) Coffee and Tea:** The health effects of these beverages have been studied extensively, and they are safe and good alternatives for sugar-sweetened beverages. Some health benefits have been seen for coffee, including reductions in risk of diabetes and premature death. But because caffeinated coffee intake is often limited by effects on sleep due to caffeine, and tea seems to be neutral with respect to health, they were not included as indicators. Notably, the apparent benefits for diabetes and premature death are also seen for decaffeinated coffee, suggesting that factors other than caffeine are responsible for these favorable outcomes.

**3) Milk, Cheese, and Other Dairy Products:** Milk is widely promoted as essential for adequate calcium intake and bone health. However, the basis for the calcium requirements in the U.S. is dubious—they are much higher than the WHO's definition of adequate intake—and recent studies consistently do not show any reduction in bone fractures with high dairy consumption by either adolescents or adults. Also, high consumption of dairy products puts large amounts of saturated fat into the food supply. For these reasons, greater consumption has not been included as an indication of higher dietary quality. Although there is not sufficient reason to promote higher consumption of dairy products in general for health reasons, moderate consumption of one or two servings a day can add variety and flavor to diets and may contribute to diet quality, depending on other aspects of a person's diet.

Consumption of cheese has been increasing dramatically over the last several decades in the

U.S., becoming almost de rigueur in salads and sandwiches. Cheese provides large amounts of sodium along with less healthy fats and many calories. Smaller amounts of cheese and the use of alternative ways to add flavor and variety to these foods would be desirable. Recent data suggest that consumption of yogurt may be associated with reduced weight gain and diabetes, and this deserves further investigation. Of particular concern are the large amounts of sugar added to milk and many yogurts. Minimizing added sugar and using the natural flavor of yogurt to advantage should be a goal.

## TIME TRENDS IN KEY DIETARY INDICATORS

To judge whether American diets are becoming more healthful for this report, investigators from Harvard T.H. Chan School of Public Health have applied the standards established in the Alternate Healthy Eating Index to national survey data for the U.S. Each variable is scored from 0 to 10, with 10 being the healthiest. Thus, for polyunsaturated fat, whole fruits, vegetables, whole grains, nuts, and legumes, a higher score means higher intake.

For trans fat, sugar-sweetened beverages and fruit juice, red and processed meat, and sodium, a higher score means lower intake. The total score is the sum of the individual elements; 100 would be perfect. For the 2016 report, we used data for persons 20 years of age and older from 1999 through 2012, the latest available data from the U.S. National Health and Nutrition Examination Survey (NHANES), which is a representative national sample of the U.S. population [see the November 2015 paper in *Health Affairs* by Wang, D. et al]. Complex foods, such as a soup or stew, were dissected so the individual components were included as red meat, vegetables, etc. Intake of trans fat is not available from the NHANES, so FDA data from the late 1990s and 2010 were used to estimate the national trend.

Encouragingly, the overall quality of the U.S. diet has improved steadily since 2000 and since our last report based on data up to 2010. However, the overall score remains poor, and there is room for vast improvement. (The average score remained

below 50 out of 100 possible points.) By far, the greatest progress since 2000 was in reduction of trans fat, estimated to be about 80 percent, which accounted for about half of the overall improvement in diet quality. The next greatest improvement was reduction in consumption of sugar-sweetened beverages, which decreased by about 25 percent. Modest increases were also seen for fruit, whole grains, polyunsaturated fatty acids, and nuts and legumes. A modest reduction was seen for red and processed meat, contributing to improved diet quality. The only dietary component that significantly worsened was sodium intake.

Using data relating AHEI scores to health outcomes in two large Harvard cohorts, it was estimated that the improvements in dietary quality from 2000 to 2012 prevented 1.1 million premature deaths and resulted in 8.6 percent fewer cardiovascular disease cases, 1.3 percent fewer cancer cases, and 12.6 percent fewer type 2 diabetes cases. Consistent with these estimates, in late 2015, the Centers for Disease Control and Prevention (CDC) reported that diabetes incidence rates had decreased by about 20 percent in the U.S., which is remarkable because this appears to be the first time a country has even slightly bent the curve in the epidemic of this disease. Because intakes of trans fat and sugar-sweetened beverages are both clearly related to risk of type 2 diabetes, the important reductions in these dietary components are likely key explanatory factors in the decrease in diabetes incidence.

The improvements in diet quality were not shared across groups defined by income and education; among the lowest socio-economic groups there was little improvement. This is troublesome because the AHEI score is based on prediction of morbidity and mortality, so disparities in health are likely to increase. It is noteworthy that the NHANES data were available only through 2012 due to delays in processing, and do not include the effects of many public health promotion campaigns and changes in foodservice operations since that time, which have been designed to increase consumption of fresh fruits and vegetables and whole grains, while reducing intake of red meat. From the White House Kitchen Garden to Meatless Monday, improving dietary quality has become a part of the national

conversation that hopefully will lead to more rapid improvements.



### SCORE: 3.5

Modest improvements toward healthier diets include a large reduction in the intake of trans fats, an important reduction in sugar-sweetened beverages, modest reduction in red and processed meat, and a small increase in whole fruits, whole grains, healthy fats, and nuts and legumes. The FDA's step to remove partially hydrogenated fats from the GRAS category is a valuable step forward even though most trans fat has already been removed from the U.S. food supply.

#### IN SUMMARY:

- Progress is visible, including the FDA's action to eradicate trans fat from the food supply, an important reduction in the consumption of sugar-sweetened beverages, and a small increase in how much whole fruits, whole grains, legumes and nuts Americans consume. However, the trend toward higher sodium intake is troublesome and highlights a need for foodservice operators to address this issue more directly.
- The removal of an upper limit for percentage of energy from total fat intake is an important step forward that will allow reductions in carbohydrate intake, which should focus on reducing intakes of refined starches and sugar. Replacing saturated fat with unsaturated vegetable oils whenever possible remains an important goal.
- The move by Congress to censor from the Dietary Guidelines any suggestions of a link between dietary choices and environmental impacts is unfortunate because of the urgency to limit greenhouse gas production and climate change.



# PORTION SIZE AND CALORIC INTAKE

Portion sizes have increased dramatically in the last half century: Restaurant portions ballooned to lure in “value” customers, and the rate of new, larger portion-size introductions among a sample of common commercial products increased by more than a factor of 10 from 1970 to 1999—the period when obesity rates increased most rapidly—driven predominantly by the exceedingly low cost of commodities. In recent years, some manufacturers have repackaged highly processed foods into smaller unit sizes (e.g., the 100-calorie pack). But the public health impact of these changes may be minimal, if these products are marketed in a way that promotes consumption of multiple portions.

Although it seems intuitive to link the larger portions to Americans’ growing waistlines, the relationship between calorie quantity and quality must be carefully considered, to ensure that changes in portion size produce real benefits.

Extensive research demonstrates that for many individuals, larger portions lead to more calories consumed over the short term. However, there is little evidence that changes in total calorie intake, independent of dietary quality, have a meaningful long-term effect on body weight. When lean or obese individuals are under- or overfed, energy expenditure and hunger change in ways that resist long-term weight change. In short, body weight appears to be under strict long-term control by biological factors.

Genetic make-up helps to explain individual differences in predisposition to obesity. But in the focus on calories in and calories out, the importance of modifiable environmental factors, especially *diet quality*, is often lost. This is especially problematic because diet quality strongly influences individuals’ risks for diabetes, heart disease, and other degenerative conditions associated with the Western diet.

There are many modifiable biological drivers of body weight, but the most important are hormones in general, and insulin in particular. States of high insulin secretion are characteristically associated with weight gain (e.g., excessive insulin treatment in type 2 diabetes), whereas reduction of insulin levels causes weight loss (e.g., inadequate insulin administration in type 1 diabetes). Diet has a major impact on insulin secretion, predominantly related to the total amount and type of carbohydrate consumed. Highly processed starches and added sugars have a high “glycemic load” and inordinately raise blood sugar and insulin levels.

**Trans-fat** used to top the list of public health enemies. Happily, in recent years **trans-fat** has been largely eliminated from the food supply. Today, increased focus on the type and amount of carbohydrates is needed. A strong case can be made that increasing the portion size of refined starchy foods (e.g., extruded breakfast cereals, bread, white rice, pasta, fries) and added sugars (e.g., sugar-sweetened beverages, highly sweetened desserts) erodes diet quality and leads to chronic disease. Conversely, 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 carbohydrate.

All calories are not alike. The belief that they are has produced misguided attempts to modify the food supply and led to confusion and indecisiveness 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 lead to lasting benefit, if that meal is less than satisfying and leads to subsequent overeating.

In this context, recent initiatives for nationwide calorie labeling should be viewed as only part of the solution. Humans have evolved to accurately match calorie intake with expenditure by eating whole, natural foods. Intuitively, we know that 100 grams of apple will have less energy than the same weight of nuts. However, we cannot know how many calories might be present in processed packaged foods and fast foods without explicit information, setting the

stage for overconsumption. For this reason, calorie labeling remains an important public health measure, not as a means to maintain an accurate accounting of daily calorie balance, but to help prevent overconsumption of low-quality processed foods.

## RECOMMENDATIONS:

The foodservice industry has an unprecedented opportunity to help end the epidemics of obesity and related diseases. However, a paradigm shift is needed. Measures that only reduce calories, without enhancing the quality of those calories, are destined to fail. Instead, the focus should be on serving more minimally processed carbohydrates, healthful fats, and healthful proteins, while simultaneously reducing high glycemic index carbohydrates. The goal is to make healthy foods in appropriate portion sizes the most appealing options. These changes will require simultaneous restructuring in national food policy, to increase the amount of these products in the food supply, and to lower their cost relative to commodities.



## SCORE: 3

Efforts to improve diet quality continue to move in a positive direction: away from the low-fat paradigm and a single-minded focus on calorie reduction. The public seems to have reached a turning point, with demand for commodity-based industrial food products in decline and interest in whole/minimally processed foods rising.

The 2015 Dietary Guidelines for Americans includes a new emphasis on restricting sugar intake and lifting the upper limit on dietary fat. However, one concern is the continuing focus on calorie balance, reflected in the first guideline—despite evidence that body weight over the long term can be best controlled by improving diet quality, not restricting calorie intake.

Thus, though some progress has been made, a more fundamental focus on food (or calorie) quality, not just quantity, is still needed.

## IN SUMMARY:

- All calories are not alike, so it is critical to complement the current focus on portion size with a shift in our cultural thinking on diet *quality*.
- Now that trans fat has been largely eliminated from the food supply, the leading dietary cause of obesity and related complications is highly processed carbohydrates—not just sugar but also refined grains and potato products.
- 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.

## IN A WORD: SATIETY

Satiety forms a critical link between diet and successful weight control, one of the greatest public health challenges of our time.

Prior nutritional recommendations encouraged low-fat diets in the belief that this major nutrient – with twice the calorie density of protein or carbohydrate – would cause weight gain. However, new research indicates that calories from many high-fat foods (e.g., nuts, olive oil, dark chocolate) provide greater satiety than those from processed carbohydrates (those derived from added sugars or refined grains).

Optimal, evidence-based strategies to support satiety and healthy metabolic function are essential to reversing and ultimately ending the world-wide obesity and diabetes crises, as well as reducing global needs for food production—and related environmental impacts—in an era of rapidly rising population growth.

Often repeated phrases in the public health community and media such as “balance energy intake [calories] 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, and ultimately many food, health, and environmental challenges.



# PROTEIN CONSUMPTION AND PRODUCTION

The average American over age 20 consumes between 48 percent and 76 percent more protein than is recommended, for women and men respectively. Animal sources account for approximately two thirds of this dietary protein. Yet, plants such as nuts, seeds, beans, peas, legumes, grains, and cereals are also important sources of 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.

In the past several decades, meat production and consumption have increased sharply worldwide, especially in developing countries. Global demand for livestock products is projected to increase 70 percent by 2050, driven by population growth and rising affluence. While beef consumption in the U.S. is at the lowest level in over two decades, total meat consumption (red meat plus poultry) remains high: 57.1 kg per capita in 2013, the fifth highest consumption rate globally.

Animal-based foods contribute disproportionately to the total environmental costs of food production. The livestock sector is responsible for over 14 percent of all human-induced greenhouse gas emissions (GHGE), nearly a tenth of global human water use, and 63 percent of reactive nitrogen mobilization. The main reasons for these impacts are enteric emissions from ruminant animals such as beef and milk cows, emissions to air and water from manure management, and the production of animal feed (39 percent of the corn crop, which uses more land than any other crop in the U.S., goes to feeding livestock, with the remaining 31 percent to make

fuel ethanol, 13 percent to exports, and 6 percent to produce high fructose corn syrup and other sweeteners). Feed conversion efficiencies of raising livestock 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.

Production methods certainly influence the environmental impact of animal-based foods, but popular alternatives must be fully assessed before being lauded as solutions. For example, while pasture-based beef production may have local benefits such as reduced soil erosion and nutrient losses, it often involves higher GHGE and system energy use per kg of beef than confinement feeding operations. 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.

Meat consumption also has significant impacts on human health. The science is clear that regular consumption of red meat contributes to risk of chronic diseases and premature death. Dietary recommendations should distinguish poultry and fish from beef and pork, as 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 deaths could be prevented in the U.S. if American adults cut their current red meat consumption of about three servings to less than half a serving per day.

In 2015, the International Agency for Research on Cancer (IARC) of the WHO announced that processed meats such as hot dogs, bacon, and sausages should be classified as carcinogenic (Group 1) to humans for colorectal cancer. It was estimated that each 50-gram portion of processed meat eaten daily increases the risk of colorectal cancer by 18 percent. Unprocessed red meats were classified as "probably carcinogenic" (Group 2A) because evidence suggests a link between regular consumption of unprocessed red meat and increased risk of developing colorectal cancer, as well as pancreatic and prostate cancer.

The WHO report has significant implications for consumption of red and processed meats because these meats have already been associated with type 2 diabetes, cardiovascular disease, and other chronic disease, and the WHO report on increased cancer risk further underscores the need for consumers to reduce their consumption of meats, especially processed meats.

On the flip side, eating plant-based, protein-rich foods, such as legumes and nuts, reduces the risk of chronic diseases and premature death. In the past year, new studies add further 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 vegetable protein was not associated with risk. The authors suggest that replacing animal protein with vegetable protein or other macronutrients may reduce the population-wide risk of diabetes.

Eggs and dairy products should also be distinguished from meats. There is little evidence that moderate consumption of eggs (up to one egg per day) has adverse effects on the risk of chronic diseases. However, consumption of dairy products may affect human health in complicated ways, including potential benefits and risks, which may depend on the types of dairy products. Dairy has been suggested to confer benefits on weight control and diabetes prevention, but the existing evidence does not support this notion. In a recent study, Harvard researchers followed 41,436 men in the Health Professionals Follow-Up Study, 67,138 women in the Nurses' Health Study, and 85,884 women in the Nurses' Health Study II. They found that total dairy, milk, and cheese were not significantly associated with risk of type 2 diabetes, and that yogurt was the only dairy product associated with lower risk of diabetes. This study refutes the widely held assumption that higher dairy intake is beneficial for body weight and diabetes prevention. In other words, a higher amount of dairy protein is not required to achieve health benefits.

Fortunately, the market has been responding with a flood of meatless protein alternatives, some from

quite novel sources. From the old standards of seitan, tofu, and tempeh to protein-rich grains like quinoa, to mycoprotein-based Quorn™ and lupine, wheat, or rice-based food products designed to combine with meats, options abound for replacing meat with vegetable-based proteins. Insect-based proteins are also emerging as a potential alternative, with some restaurants in New York and California experimenting with insects on the menu, and numerous packaged goods companies using them as an ingredient in snacks. Also growing are the creative uses of seaweeds and algae. A recent assessment of soy protein isolate (SPI)—a highly processed soybean-based ingredient used in many meat alternative products—found that, because of the significant heating required during processing, SPI may match or exceed unprocessed chicken, pork, or even beef in key environmental impact categories. This is a reminder that even plant-based protein sources, and especially those demanding exceptional amounts of processing, should be considered on a case-by-case basis.

Recent years have also seen numerous studies exploring the environmental effects of diet 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. A 2014 study showed that the total GHGE of the recommended diet in the 2010 Dietary Guidelines for Americans would be about the same as that of the current diet, despite a recommended 20-percent decrease in calories and reduced meat consumption. However, the vegetarian and vegan adaptations of the Dietary Guidelines reduce GHGE by 33 percent and 53 percent, respectively. A dietary pattern aligned with the Healthy Eating Plate recommendations made by Harvard T. H. Chan School of Public Health also shows a 33 percent reduction in GHGE without eliminating meat, largely through a shift from red meat to chicken, and reduced dairy consumption.

Finally, fish and seafood present an interesting dietary paradox. Farmed fish often show high feed conversion efficiencies (typically less than 2:1), and there are well-known health benefits to fish consumption. At the same time, overfishing has had significant impact on wild fish stocks. Improvements to aquaculture practices mean farmed fish may become an important future protein source.

## RECOMMENDATIONS:

Chefs and the foodservice industry at large have an important role to play in leading and inspiring the new cultural norms about how much protein and what kinds of protein consumers need. Research shows that, when asked about changing meat consumption habits, individuals experience complex moral and psychological barriers. Information about negative outcomes is not enough: Eaters need leaders. Chefs should aspire to move red meat from the center of the plate and consider its value as a condiment. They should also ask themselves whether meat of any kind is really key to delivering the flavor and experience consumers seek. There are many creative and delicious ways to prepare meals in high-volume foodservice operations that put plant-based proteins front and center—while cutting costs, reflecting global cuisines, and reducing environmental damage along the way. A shift from a meat-based diet to a plant-based diet will improve the health of both humans and the planet.

In practice, healthy protein sources like fish, chicken, beans, and nuts should be used in place of red meat (including processed red meat). There is no need to go overboard on dairy protein: One to two servings of dairy products can be recommended for people who choose to include dairy as part of a healthy dietary pattern.



## SCORE: 3

While red meat production and consumption in the U.S. is falling moderately, it continues to grow in the developing world. Climate conditions, such as droughts throughout the American West, are reducing supplies and raising costs, stressing the need to further lower red meat consumption. There is a maturing conversation in the academic literature on the environmental and health effects of diet change. This conversation is beginning to enter into policy realms, as concerns around climate change and future food security escalate. For the first time, the 2015 Dietary Guidelines Advisory Committee (DGAC) report considered diet sustainability as part of the evidence base to develop Dietary Guidelines for Americans (DGAs). The 2015 DGAC recommended that the U.S. population reduce consumption of animal products, especially red and processed meats, for both health and sustainability reasons; after heated debate and pressure from the meat industry, sustainability was declared to be outside the scope of the DGAs and would be excluded from the final guidelines. While the DGAC recommendation has raised an important discussion to the national level, exclusion of sustainability issues from the dietary guidelines is a missed opportunity to better align human and environmental health aspects of our collective diet.

## IN SUMMARY:

- High meat consumption 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.
- Through culinary strategies that make plants the stars on menus, chefs and foodservice professionals can lead cultural shifts away from an overreliance on animal protein in the diet.

# FRUIT AND VEGETABLE PRODUCTION AND CONSUMPTION

For culinary professionals, fruits and vegetables offer a terrific opportunity for menu innovation, great flavor, sales growth, and health promotion.

Few public health principles enjoy as strong a scientific justification and as broad a base of industry support as recommendations to enhance fruit and vegetable consumption. Fruits and vegetables provide fiber, vitamins, minerals, and phytochemicals, and displace less healthy food options in the diet. Yet, the United States is doing poorly at producing and consuming more fruits and vegetables.

The unsatisfactory progress can be seen in diverse measures. Based on the most authoritative national food intake survey reported by USDA and Department of Health and Human Services, from 2001-2004 and 2007-2010, fruit intake remained relatively stable, and vegetable intake significantly declined. Three quarters of Americans fall short of fruit recommendations and more than four fifths fall short of vegetable recommendations. In 2015, the National Fruit and Vegetable Alliance (NFVA)—a coalition including The Culinary Institute of America (CIA), leading trade associations, prominent nutrition science associations, and USDA—evaluated recent progress in advancing fruit and vegetable consumption and assigned an overall grade of “D-.”

Similarly, based on food supply data adjusted for food losses, there has been no improvement in the per capita supply of fruits and vegetables. In the most recent decade of data available, from 2004 to 2013, daily fruit per capita availability was nearly unchanged, from 0.89 cup-equivalents to 0.86 cup-equivalents, and daily vegetable per capita availability fell from 1.80 cup-equivalents to 1.65 cup-equivalents.

The problem is not primarily on the supply side. It is true that drought in California and other environmental limitations elsewhere complicate fresh fruit and vegetable production in the “fruitful rim” of agricultural production. It also is true that uncertain labor market conditions are a major problem in labor-intensive production industries, and the federal government still has an unwise planting limitation against fruit and vegetable production on land that qualifies for federal government row-crop subsidies. Yet, especially when one considers imports as well as domestic production, the United States has adequate capacity for long-run supply if there is sufficient demand.

On the demand side, one problem has been lack of national-level marketing and advertising for fruits and vegetables. In 2012, the Federal Trade Commission evaluated data on food marketing expenditures for 2006 to 2009, years during which the Children’s Food and Beverage Advertising Initiative (CFBAI) sought to improve the healthfulness of the food marketing environment. Out of \$1.8 billion in child-directed food and



beverage advertising in 2009, less than one half of one percent was for fruits and vegetables. The fraction of advertising that was allocated to fruits and vegetables fell from 2006 to 2009. Even the federal government’s semi-public generic commodity promotion programs offer only small amounts of support for fruits and vegetables. These “checkoff” programs are established by Congress and managed jointly by producer boards and USDA, with funding from mandatory assessments on producers. Most of this funding promotes milk, other dairy products, beef, and pork. It is difficult for USDA’s Agricultural Marketing Service, which oversees the checkoff programs, to give sufficient attention to fruits and vegetables in the midst of these larger efforts. There is considerable potential

for increased fruit and vegetable promotion in the restaurant sector. The CIA and cooperating restaurants have been working since 2010 on the Healthy Menus R&D Collaborative. The collaborative operator members’ menus featured a 28 percent increase in the use of fruits and vegetables from 2012 to 2014. NFVA’s 2015 progress report gave the restaurant sector a summary grade of “B-“, which at least was better than the overall score for all sectors. However, for the sector as a whole, only 16 percent of vegetables and 4 percent of fruit is consumed in restaurants, and these percentages have not improved over time.

## RECOMMENDATIONS:

Because current progress has not been satisfactory, opportunities for improvement abound.

For agriculture, the federal government should repeal the planting limitations against fruit and vegetable production on land that qualifies for federal row-crop subsidies. Although it might seem like a peripheral issue, a more important supply-side measure may be to steady farm labor markets by reviving the sensible compromise positions that have been painstakingly reached, but never passed, in federal immigration reform.

For the restaurant sector, there is a growing variety of models for success in promoting fruits and vegetables, ranging from vegetarian options to creative preparations for vegetable-loving carnivores. And high-volume foodservice operators can continue to innovate in product sourcing for greater freshness and appeal, adding new fruit and vegetable items to their menus, changing the default items in children’s meals to include fruits and vegetables, and highlighting fruits and vegetables on menu boards.

In federal nutrition assistance programs, Congress and USDA can continue to expand pilot initiatives such as the Healthy Incentives Pilot (HIP) in Massachusetts, and the newer Food Insecurity Nutrition Incentives (FINI) projects at sites around the country. These projects offer additional support for fruit and vegetable purchases by low-income families who otherwise might be deterred by the prices of fruits and vegetables.

For consumer demand, the sky is the limit. In federal child nutrition programs, there can be continued expansion of fruit and vegetable

initiatives, and a higher standard reimbursement rate for the meals themselves, to account for the cost of providing healthier meals. And real money can be put behind bold new fruit and vegetable initiatives—such as engaging online videos from the “FNV” campaign of the Partnership for a Healthier America.



## SCORE: 3

Recent public interest and governmental initiative around promoting fruit and vegetable consumption have increased. But these efforts have not yet achieved sufficient scale, and they are stalled by production restrictions and the associated high produce prices. As a result, long-term trends have not been reversed, and fruit and vegetable consumption still fails to meet recommended levels.

## IN SUMMARY:

- Despite well-documented evidence of health benefits and strong urging from the federal government, food intake surveys and food supply data both document a failure to increase fruit and vegetable consumption.
- Despite increased yield, efficiency, and lower prices for many sectors of food production, fruit and vegetable farmers receive fewer subsidies and face restrictions around what land can be used to grow their crops.
- Innovative food sourcing initiatives and significant increases in government programs to incentivize produce consumption are encouraging, yet still only operating at relatively small scale.

# FISH, SEAFOOD, AND OCEANS

Seafood continues to be a healthy and relatively environmentally friendly choice. This year, the US Dietary Guidelines Advisory Committee addressed the role of seafood as an important source of nutrients, and also as a way to link changes in our diet to increased sustainability. While the concern about mercury remains ever-present (*Consumer Reports* indicates that canned tuna is “the most common source of mercury in our diet”), the Food and Agriculture Organization of the United Nations and the World Health Organization stated that, “Regarding contaminants, for the majority of wild caught and farmed species, neither the risks of mercury nor organic pollutants outweigh the health benefits of seafood consumption.” And yet, annual U.S. seafood consumption remains at less than 15 pounds per year—still *half* the global average. Thus, while we need to eat more seafood, we need to do it in a smarter way. To help educate us, the Seafood Nutrition Partnership has launched a public health campaign to inform Americans about the benefits to heart health from eating seafood.

Paul Greenberg, an author and preeminent seafood advocate, writing in *The New York Times*, stated four simple rules for eating seafood. He suggested that we eat a) American seafood, b) a much greater variety than we currently do, and c) mostly farmed filter feeders, and that d) some explanations are in order. The last statement is one of the singular guiding principles behind seafood. It is a fact that contradictions abound, and this helps explain the above difference between *Consumer Reports* and FAO/WHO guidance. Overall, seafood is healthy, but there can be exceptions. With this in mind, we see that Greenberg advocates for eating seafood from well-regulated countries (as is the United States), and striving for increased variety in order to break out of the shrimp-salmon-tuna triumvirate that accounts for 60 percent of all seafood consumed in the U.S. His advice to eat more farmed filter feeders—oysters, mussels, clams, and especially seaweed—is a way to use food production to decrease the impacts humans have on the oceans.

Because the vast majority of humans live on the coast, our wastes (such as municipal sewage and run-off from agricultural lands) add nutrients to the waters. These nutrients help plankton grow, and this in turn feeds filter feeders. Growing more filter feeders thus helps remove nutrients from the oceans. In this case, seafood consumption can be truly restorative.

The need for restorative food production is necessary because in seafood, we are seeing the effects that humans can have on the ecosystem. In the fall of 2015, a Dungeness crab fishery in California—which typically brings in \$60 million per year—could not open because record temperatures in the Pacific Ocean led to an algae bloom. The algae produced a neurotoxin called domoic acid, which made its way up the food chain to crabs. (In mild cases, domoic acid can cause gastro-intestinal distress in humans, and at worse, death). On the East Coast, the collapse of Atlantic cod stocks was found to be linked to climate change. Acidic waters continue to affect oyster aquaculture on the West Coast, and scientific agencies such as the National Sea Grant Program are dedicating funding to address this issue in both fisheries and aquaculture.

While seafood can be an ecologically and socio-economically sound protein choice, a myriad of issues must still be solved. One such issue that remains a challenge is waste. Another is slavery. Reports of human trafficking within the Thailand fishing industry affected U.S. markets in that the fish being caught are turned to fishmeal, and then into farmed shrimp. In turn, many retailers have made promises to enforce anti-slavery policies within their supply chains. This issue has been a bell-weather in 2015, and a significant number of businesses have made commitments to eliminate slavery and human abuses in their food chains. While purchasing domestically or from countries that have assurances of no human rights abuse is a step, mere assurances may be an oversimplification given that mislabeling is still pervasive within seafood. In our domestic wild salmon supply, Oceana recently found that 43 percent of samples labeled wild Pacific species were actually Atlantic species and thus farmed. It is important to note that this study was conducted during winter when wild salmon

were out of season. A prior study conducted in season found a mislabeling rate of 7 percent. To fight fraud, a risk-based traceability program is being developed as mandated by the Presidential Task Force on Combating Illegal, Unreported, and Unregulated (IUU) Fishing and Seafood Fraud. The list of at-risk species that will form the basis of the upcoming traceability program includes:

<b>Abalone</b>	<b>Pacific Cod</b>
<b>Albacore Tuna</b>	<b>Red Snapper</b>
<b>Atlantic Cod</b>	<b>Sea Cucumber</b>
<b>Bigeye Tuna</b>	<b>Sharks</b>
<b>Blue Crab</b>	<b>Shrimp</b>
<b>Dolphinfish</b>	<b>Skipjack Tuna</b>
<b>Grouper</b>	<b>Swordfish</b>
<b>King Crab (red)</b>	<b>Yellowfin Tuna</b>

## RECOMMENDATIONS:

As in past years, to best understand seafood, foodservices leaders must know what they buy and where it is produced, and must communicate this information honestly and effectively to diners. Being able to accurately trace fish will increase social pressures for accurate labeling and ensuring the fish we eat is from robust stocks that are fished according to the best ecological and social standards.

Food waste is a challenge because it amplifies all resources required to produce edible food. A fish certified as sustainable isn't truly sustainable if it is thrown away. In many situations, frozen instead of fresh fish is a good choice, since it lasts longer. So is serving appropriate portions. Finally, consider greater use of smaller fish and seafood types that are lower on the food chain, such as mollusks and sardines. (Clams are one of the most sustainable options because they are produced within the U.S. and have a very limited environmental impact. Yet, on average, Americans eat only one-third of a pound of clams per year). Chefs and foodservice professionals can both serve a greater diversity of species and use their considerable influence to introduce diners to new varieties of fish and seafood, increasing American consumers' understanding of how to cook with more varieties at home.



## SCORE: 2.5

Arriving at a single score is difficult amid myriad contradictions. There are multiple public and private efforts to improve seafood sustainability, and standards have emerged including that of the Marine Stewardship Council for wild products, and of the Aquaculture Stewardship Council as well as the Global Aquaculture Alliance for farmed products. This work to lessen the environmental footprint of seafood warrants a positive score of a 4. At the same time, exceptions persist, and issues of slavery and mislabeling merit a low score, suggesting further work. Given the variation in actions across this diverse protein category, the overall score is 2.5.

## IN SUMMARY:

- Despite widely demonstrated health benefits, Americans continue to underconsume seafood both in total and in sufficient variety.
- Chefs and foodservice professionals should reduce waste through the use of frozen fish and reasonable portions, while also introducing diners to seafood choices beyond the typical salmon, shrimp, and tuna. Varieties such as carp, clams, mussels, sand dabs, seaweed, and squid are underconsumed and yet relatively better for the environment.
- Significant certification efforts help identify a substantial volume of product as being more environmentally friendly. The challenge is to get more product certified, and then continue to improve that which has attained certification.

# CLIMATE CHANGE

The foodservice industry's primary focus is food, a central part of the lives and culture of every American. Climate change poses a critical threat to the ability of the U.S. food system to deliver high quality, nutritious food consistently and in adequate quantities year round. Over the next few decades, temperatures will continue to rise, precipitation patterns will change, and unexpected and unusual extreme events will continue to occur. Direct effects on food production are already being felt. However, indirect effects on parts of the food system beyond the farm gate—such as impacts on transportation infrastructure or changing availability or price of perishable products—may prove to be more important for the foodservice industry, including harvesting, processing, packaging, distributing, transporting, refrigerating, retailing, and preparing food. Much can be done to reduce the vulnerability of the industry to climate threats, and actions can be taken by the foodservice industry to reduce its impact on the climate. The foodservice industry is well positioned to encourage the consumption of high-efficiency sources of protein, such as legumes, soy, chicken, and fish, which can bring substantial greenhouse gas savings through changes in consumption patterns compared with eating red meat.

Farmers have found that crops and livestock are sensitive to the direct effects of climate change, particularly increasing temperatures, changes in precipitation patterns, and increased carbon dioxide in the atmosphere, the primary cause of climate change. Exceeding the optimum temperatures for crops causes more rapid maturation and increased moisture stress of plants. Experiments have shown that higher carbon dioxide concentrations affect the nutrient content of grains and legumes, lowering their protein, zinc, and iron content. These impacts should be of great concern to the foodservice industry, since they could be accompanied by changes in taste, texture, and seasonal availability.

The reliability and consistency of specialty crops will continue to be affected by climate extremes. Pests and bacterial infections whose rapid spread is connected to rising temperatures threaten oranges from Florida, Texas, and other states. Likewise, high-

quality Arabica coffee, currently grown in mountainous areas in more than 60 tropical countries, is threatened by rapidly warming temperatures. In the short term, the foodservice industry can find alternative sources, but in the long-term, technological approaches and plant breeding that may affect both quality and quantity will be necessary to maintain access to these products.

Multi-year droughts, such as the one currently affecting California, are more likely to occur, particularly in arid and semi-arid regions. These impacts may increase competition for scarce or perishable food items as farmers find them more difficult to produce reliably from one year to the next. One-sixth of global agricultural production is traded internationally, which may either provide new opportunities for sourcing or pose challenges to maintain the quality of the food we consume. The foodservice industry can strengthen its efforts to reduce risks from climate impacts by diversifying its food sourcing to support sustainable farms from multiple regions.

Once food leaves the field, the transporting, refrigerating, trading, and purchasing of food by wholesalers and retailers may also be affected by climate and climate extremes. Each step in this sequence tends to increase carbon footprint and increase potential for food waste. Extreme precipitation events can directly affect transportation systems through the flooding of roads, and storm surge can damage road, rail, and shipping infrastructure. Heat waves can increase the demand for electricity, damage transportation infrastructure, and stress the ability of refrigeration units to maintain appropriate temperatures while in transit. Such events can impair just-in-time food distribution networks, impeding the ability of restaurants and food outlets to meet their own high standards. As atmospheric carbon dioxide increases, we can expect disruptive extreme heat waves and large-scale catastrophic floods to become more common.

Every part of the journey that food ingredients take from field to fork, through ships, trucks, warehouses, retail stores, and refrigerators, can be vulnerable to climate change. Thought needs to be given to identifying vulnerabilities and threats to the U.S. food system from climate change, and action should be taken to ensure that the foodservice industry reduces its own contribution to climate change where possible.

## RECOMMENDATIONS:

The foodservice industry can make a substantial contribution to both mitigation and adaptation to climate change through increasing the efficiency of its own practices. Shifting away from menus and restaurant concepts that emphasizes livestock products, particularly red meat, can dramatically reduce greenhouse gas emissions. Also, in the U.S., up to 40 percent of all food is thrown away without being eaten. Thirteen percent of solid waste in California's landfills is food; when it rots, it produces prodigious amounts of the potent greenhouse gas methane. As is set out in the Environmental Protection Agency's Food Recovery Hierarchy, the foodservice industry can help lower these emissions by reducing the volume of surplus food generated through a variety of techniques: reducing portion size; adopting promotions that offer more meals rather than more food at a single meal; continuing to improve the accuracy of demand forecasting; finding creative uses for scraps on menus; diverting unfit scraps to animal feed and excess food to soup kitchens and shelters; and participating in composting programs to create nutrient-rich soil for agriculture. Efforts such as these require the commitment of the industry as a whole as well as collaboration within communities across multiple sectors.

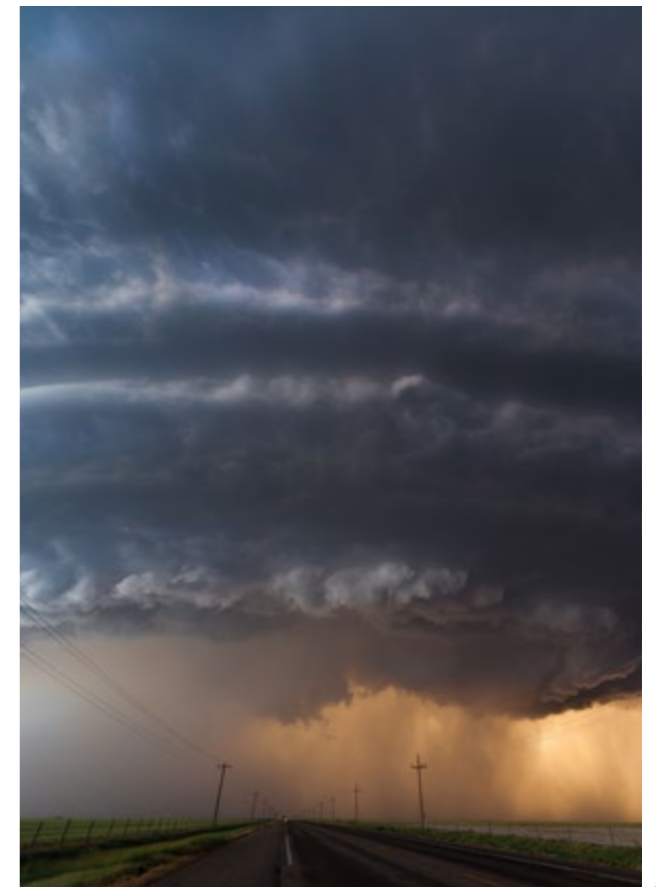


## SCORE: 1

Climate change continues to affect every aspect of the global food system, through temperature and precipitation impacts on food production, transportation networks, refrigeration and processing facilities, and new efforts to reduce food waste. As the climate continues to change, these impacts will accelerate, and it will become more difficult for us to adapt.

## IN SUMMARY:

- Greenhouse gas emissions continue to rise, and agriculture both contributes to that, especially from livestock production, and is affected by it, especially from severe weather events that damage crops.
- Every part of the journey that food ingredients take from field to fork, through ships, trucks, warehouses, retail stores, and refrigerators, can be vulnerable to climate change, and these changes will ultimately affect the quality and quantity of food available to the foodservice industry.
- The foodservice industry can make a substantial contribution to both mitigation and adaptation to climate change through increasing the efficiency of its own practices, particularly by shifting away from red meat and reducing the amount of food waste going to landfills through creative reuse, recycling, and composting.



# WATER SUSTAINABILITY

The World Economic Forum in 2015 ranked water scarcity's impact on drinking water and global food security as the top threat facing the planet in the next decade. Worldwide, 40 percent of agricultural production—food, feed, fiber, and (bio)fuels—depends on irrigation, either from surface water or groundwater. More than two-thirds of global water consumption occurs in agriculture. The diversity, quality, and availability of food products in the U.S. and around the globe vitally depend on a steady supply of high-quality, non-saline irrigation water in these irrigated regions. Climate change adds further uncertainty, so sustainability of these water resources is key to global food security.

During 2015, much of the western United States experienced continued drought conditions, lingering now for one-and-a-half decades with only a couple of two-year interruptions. In California, the 2014-2015 winter (the state's rainy season) turned out mostly warm and dry, lacking any measurable snow-pack and leaving surface water reservoirs severely depleted. As a result of this fourth year of exceptional drought, nearly two million acres were left fallow in the state. That represents a 45 percent increase over normal conditions. Drought impacts in 2015 cost the California agricultural economy over 20,000 jobs and more than \$2 billion in revenue. Yet, overall agricultural production continues to increase – by 5 percent in 2014 alone, the last drought year for which statistics are available.

The ability to weather such extreme droughts without major production losses is partly due to growers shifting to more efficient irrigation technologies. Much more importantly, the current resilience to drought relies on California's (and other western states') ability to tap into large groundwater resources that replace insufficient surface water supplies.

But with the cumulative rainfall deficit over the past 15 years now larger than even the largest western U.S. drought in recorded history—the dust bowl of the 1920s—groundwater reservoirs have taken a large toll, with storage being rapidly depleted and water levels falling to record lows. Some of the immediate consequences include: dry wells needing costly replacement, increased pumping cost, seawater intrusion, and large-scale land subsidence in some areas, disrupting the integrity of California's surface water canal infrastructure. Increased pumping to lift groundwater from growing depths and the replacement of dry irrigation wells cost California agriculture about \$1 billion between 2014 and 2015. The higher energy needs to meet increased pumping lifts also have a direct and substantial impact on greenhouse gas emissions from the energy sector, thus further linking the food industry to global warming.

At the same time, California's groundwater resources are threatened by excess farm nutrients and pesticides leaching to the water table, along with salinization due to not only seawater intrusion but to groundwater systems being recharged with ever saltier irrigation water. These systems are being disconnected from streams that once had functioned as a natural, low-impact “salt flush.” Beyond California, similar impacts are seen in agricultural regions around the globe. Many regions have come to increasingly rely on over-taxed groundwater resources to make up for ever-more erratic supplies of surface water and reduced snowpack due to global warming: the vast Ogallala aquifer system along the American High Plains, regions in the Mediterranean and Middle East, in Pakistan and northwestern India, South Asia, and in China, as well as some areas in Latin America and Australia.

While mostly perceived as a local problem, the widespread threat to groundwater resources in irrigated regions around the world requires vigilant and persistent attention by local, regional, and global players to network with partners to find locally and regionally pertinent long-term solutions.

The food and foodservice industry is a large indirect user of water through its food water footprint – the virtual water embedded in foods processed, served, or sold. The foodservice industry and restaurants in California are also directly impacted by the state's mandated reductions of water use. As part of drought emergency measures, all urban and industrial water users were required to reduce their consumption by 25 percent relative to 2013 (the second year of drought). The ambitious program was largely successful, mostly due to reductions in irrigation of urban parks and lawns and some transformation to more drought-tolerant yet attractive forms of urban landscaping. These efforts were mirrored by some individual efforts from restaurants, food processors, and other water users in the foodservice industry. In the California restaurant sector, not automatically serving each diner a glass of water, sometimes mandated by local governments, has been a mostly symbolic gesture to raise public awareness of the drought. More significant water use reductions may yet be realized through reduced water use in kitchens, bathrooms, processing facilities, and so on.

Others are taking broader measures. The Almond Board of California has embraced a new initiative called Accelerated Innovation Management (AIM). Through this initiative to stimulate new agricultural practices that are more sustainable, it defines sustainable almond farming as utilizing “production practices that are economically viable and are based upon scientific research, common sense and a respect for the environment, neighbors and employees. The result is a plentiful, nutritious, safe food product.” The AIM initiative includes a focus on water management and efficiency and the broader sustainability of water resources. Similar sustainability programs are increasingly becoming part of the foodservice industry.

Stakeholders in agricultural regions around California have also initiated meetings, often professionally facilitated, to discuss formation of Groundwater Sustainability Agencies (GSA), required by 2017 through California's

new Sustainable Groundwater Management Act. Many agricultural water agencies will be participating in GSA efforts, writing and implementing Groundwater Sustainability Plans by 2022 and beyond. The food and foodservice industry has the opportunity to be a key participant in this process, which explicitly encourages GSAs to embrace broad stakeholder engagement.

Over the next few years, in California and other states, agriculture will become more engaged in implementing management practices that better protect groundwater resources. Transparency about grower practices and measurable improvements in groundwater quality will be increasingly important to demonstrate sustainability, partly driven through regulatory efforts, and partly driven through sustainability partnerships between growers and the food and foodservice industry (e.g., Coca-Cola, General Mills, Unilever, Driscoll's, and the overall farm-to-fork movement).

On a global scale, a recent study underscored the need for food companies to increase their engagement in managing water risks – water supply security, water use reduction and reuse, and water quality protection. The report looked at water risk management holistically – across the agricultural supply chain and into direct operations. The evaluation of water risk management in 37 major food sector companies found that about two-thirds of these large businesses consider water in their own operation, about one-third also consider water risks in their agricultural supply chain, and even fewer operations manage water risks as part of their business planning and investment decision-making. Attention to reducing water quality impacts by agricultural producers was entirely absent, while only two of 37 companies were found to be actively reducing their operations' waste discharge. Also, few companies engage in active watershed protection planning efforts or offer financial support to growers for implementation of more sustainable farming practices. Global and federal initiatives are needed but have yet to engage the foodservice sector at a broader scale.

Like other food sectors, the foodservice industry may still realize innovative solutions to reduce water consumption, increase water reuse, and decrease waste discharge, including food waste discharge. Food waste in particular represents significant potential for reduced water use, namely through the “virtual water” waste embedded in food's water footprint. More importantly, 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 risks in agricultural production and move toward sustainable farming practices. Chefs and foodservice providers can adjust menus through understanding the impacts of food production. Menus may favor sustainable suppliers, while also minimizing the water footprint and water quality impacts across the food portfolio that a menu represents.

## RECOMMENDATIONS:

There is no one-size-fits all sustainable food solution for chefs and foodservice providers. Chefs and foodservice operators should source from growers demonstrating sustainable groundwater and water management practices and reduced use of agricultural chemicals and waste impacts to water quality. Menus can feature foods with lower water footprints, which often are those with the smallest carbon footprints. Menu decision-makers should also consider quality impacts to groundwater or surface water (nitrate and other fertilizer pollutants and pesticides), so they are encouraged to consult online resources to calculate the nitrogen footprint of various foods. Meat-free Mondays, green-forward menus, and farm-to-fork business strategies are some promising advances, with flexibility to learn from and adapt menus to water scarcity in regions that produce significant amounts of food.

Larger food and foodservice companies may be able to build outreach programs to engage with groups of growers directly on reaching measurable outcomes regarding water supply and quality. Such programs often require familiarity with local conditions to prioritize the most promising solutions.



## SCORE: 2

The food and foodservice industry is beginning to pay attention to water issues as drought and groundwater depletion weigh heavily on profits and as water scarcity is recognized as a high-priority global crisis. Consuming less meat and a new preference for hardier greens help, but these trends do not yet reflect broad-ranging, conscious efforts by the industry. Culinary professionals can play diverse yet critically important roles in finding sustainable water solutions.

## IN SUMMARY:

- The ability to withdraw groundwater from healthy aquifers at relatively low cost is crucial for maintaining agricultural production despite drought.
- Groundwater overdraft, agricultural chemicals, animal waste, and salinization pose a significant threat to long-term global food security, and integrated approaches to managing groundwater quantity and quality and surface water quantity and quality are crucial.
- There is no one-size-fits-all solution for crafting menus that strongly support water sustainability. It is helpful to menu smaller and fewer meat items, along with larger fruit and vegetable portions. Attention to water and environmental conditions in regions that grow food, as well as engagement with growers and food suppliers on sustainable water practices, are important steps toward finding more specific long-term solutions.

# GALLONS OF WATER USED IN FOOD PRODUCTION PER SERVING



18.1 1.9  
2 oz.



30.3 3.1  
3 oz.



30.3 3.1  
3 oz.



33.8 3.1  
6 oz.



35.9 3.5  
1.5 oz.



92.2 14.5  
3 oz.



292.1 11.8  
3 oz.

INDUSTRIALLY  
RAISED LIVESTOCK

PLANT-BASED  
FOODS



1.9 4.4  
8 oz.



13.8 0.8  
1 oz.



13.5 2.7  
1 oz.



9.6 4.9  
8 oz.



7.9 0.4  
1 oz.



9.1 3.2  
1 oz.



17.5 30.5  
1 oz.

Total Water is made up of Green, Blue, and Grey water (from runoff)

Green Water (from rainfall)

Blue Water (from groundwater, lakes, and rivers)

Source Data: m3/ton in Water Footprint Network Water Statistics Table (Animals, Crops) for the U.S.  
Sources: T. Harter, 2015, Changing Tastes, 2015 and M.M. Mekonnen and A.Y. Hoekstra, "The Green, Blue and Grey Water Footprint of Crops and Derived Crop Products," and "The Green, Blue and Grey Water Footprint of Farm Animals and Animal Products," Value of Water Research Report Series No. 47 and 48, UNESCO-IHE, Delft, the Netherlands, 2010.

# AGRICULTURE, DRUGS, AND CHEMICALS USE

In 2013, the United States saw important developments in the restriction of the use of organic arsenicals in the production of food animals. Documentation of the breakdown of organic arsenicals by bacteria in the gut of poultry to yield inorganic arsenic, a Class 1 carcinogen, led to the removal of three of the four organic arsenicals from the feed and water of poultry and swine—a significant step forward that was fully implemented in 2015. The fourth drug, Nitarsone, has been used to prevent and treat blackhead disease in turkeys. Research in 2015 found residual inorganic arsenic in turkey meat. The Food and Drug Administration (FDA) urged Zoetis, the manufacturer, to voluntarily withdraw Nitarsone from the market. This intervention was finalized in December 2015, and there are no longer any arsenical drugs on the market in the U.S. for use in animal production. The final removal of arsenic from the animal portion of the U.S. food supply is a significant public health advance.

In December 2013 the FDA called for the voluntary cessation of the use of low-dose antibiotics. This call, formally known as Guidance for Industry #213, was much more problematic and allowed for continued use of low-dose antibiotics for disease prevention, with the expectation that all antibiotic use was to come under the supervision of a veterinarian. Manufacturers of antibiotics used in animal production were given several months to indicate their voluntary compliance with Guidance #213 and three years to implement the labeling change. Unfortunately, a mere labeling change has proved insufficient to prevent industrial producers from business as usual while claiming they are only using low-dose antibiotics for disease prevention. Given that the dosages and routes of administration through water and feed are the same for growth promotion and for disease prevention, Guidance #213 is proving to be a toothless tiger in the regulatory domain. Sales of antibiotics for use in animal production actually increased in 2014, and preliminary 2015 data suggests that the trend will continue. The only change is that animal producers will no longer be able to buy antibiotics off the

shelf at the local feed store. The FDA believes that veterinary oversight will assure that preventive use is judicious, but the American Veterinary Medical Association is closely aligned with industry trade associations.

In 2014, the Pew Charitable Trusts examined the labels of all the antibiotic products affected by the guidance, nearly 300 total, and found that 23 percent of the products had dosage levels for disease prevention that fell within the range of growth promotion doses, and nearly half of those are classified by the FDA as “critically important” in human medicine with the remainder classified as “highly important.” Pew urged the FDA to monitor and publicly report antibiotic use in animals by species and by purpose to establish a clear target for reducing antibiotic use in animals and to evaluate the effectiveness of disease prevention label claims.

In February 2015, the FDA released a report on drug residues in the milk supply: About 1,900 samples were tested for 31 different drug residues, and only 15 milk samples—less than one percent—were confirmed positive, including 11 positive samples from 953 samples of “targeted” dairies, which had previous tissue residue violations in culled dairy cows at slaughter. Unfortunately, six of the drugs detected (ciprofloxacin, gentamicin, sulfamethazine, tilmicosin, tulathromycin, and florfenicol) are approved by the FDA for use in lactating dairy cows, so they are not routinely screened for under the Grade “A” Pasteurized Milk Ordinance for milk and milk products.

The last year has seen continued movement by producers, retailers, and foodservice operators to eliminate the use of low-dose antibiotics in animal production. Responding to increasing consumer demand for meat raised without antibiotics, Perdue Farms and Tyson Foods announced plans to stop using antibiotics in their chicken hatcheries, while reserving the prerogative to use antibiotics in feed when prescribed by a veterinarian to prevent or treat disease. The two major chicken producers make the usual industry claims that they don’t use medically important antibiotics anyway. The science of antibiotic resistance, however, shows that the use of any antibiotic at low dose over time selects for resistance genes with crossover effects on antibiotics important to human medicine. In March 2015, McDonald’s announced its plan to begin serving only chicken that had been raised without “medically important antibiotics,” a good first step

but insufficient for the same reason of antibiotic resistance. A few days after the McDonald’s announcement, Costco Wholesale, the third largest U.S. retailer, said it would be phasing out antibiotics in its chicken and other meat products but did not release a date for achieving its goal. Panera Bread now sources all of its pork and chicken products from producers who do not use antibiotics, and imports beef from Australia to fulfill its commitment to serve only meat and other animal products raised without antibiotics. Bon Appétit Management Company and Chipotle are also leaders in the movement toward antibiotic-free meat.

A worrisome new development are the reports of colistin resistance in food animals in over a dozen countries, not yet including the U.S. Colistin has been the final defense against life-threatening gram-negative infections by bacteria with multi-drug resistance. A recent *Lancet* publication described the discovery of colistin resistant E. coli during routine surveillance for antibiotic resistant bacteria in food animals in China. The documentation of a new resistant gene and its plasmid-mediated transfer from one species of bacteria to another, coupled with the reports of colistin resistance in a number of other countries just within the past year, is truly alarming. The global need is greater than ever to eliminate all non-therapeutic uses of antibiotics in animal production and the restriction of any antibiotics important to human medicine.

## RECOMMENDATIONS:

The FDA is still not moving fast enough to require industry to cut the use of antibiotics, but growing consumer demand for antibiotic-free meat appears to be forcing producers to change the way they operate. Chefs and foodservice professionals are increasingly effective in advocating for antibiotic-free meat.



## SCORE: 3

Lack of real progress on the regulatory front is counterbalanced by growing demand from chefs, foodservice professionals, and consumers for antibiotic-free meats, with companies like Bon Appétit Management Company, Panera Bread, and Chipotle applying pressure on producers. Growing awareness of the threat of antibiotic resistance is stimulating serious attention to the problem at the international level, including the World Health Organization.

## IN SUMMARY:

- The FDA’s 2013 Guidance for Industry #213 calling for voluntary measures has not proved effective in reducing the amount of antibiotics used in low doses via feed and water.
- Advocacy groups such as Consumers Union and Pew Charitable Trusts continue to urge the FDA to impose more rigorous accountability measures upon the food animal industry.
- Because the FDA lags behind consumer demand with regard to regulatory pressure on producers to remove antibiotics from the meat supply, chefs and foodservice operators are playing an increasingly pivotal role in shifting the industry toward antibiotic-free meat.



# HEALTHY FOOD VS. HEALTHCARE SPENDING AND TRENDS IN MEDICAL-CULINARY EDUCATIONAL ALLIANCES

In 1960, the total annual U.S. expenditures for food were estimated at \$74.6 billion. This was nearly three times as much as the total expenditures that same year of \$27.2 billion for healthcare. Fast forward to 2014: U.S. citizens spent \$1.46 trillion on food and \$3.0 trillion on healthcare, flipping the ratio, with healthcare spending now twice that of food.



These sobering statistics document a 19.6-fold increase in food expenditures over the past half-century, as compared with a 110-fold increase in healthcare expenditures over the same period of time. Interestingly, in recent years almost a quarter of all preventable deaths in the U.S. were from causes linked to dietary risk.

One reason for this shift may be the increasing reliance on hyper-processed foods of white flour, added sugar, excess salt, and unhealthy fats, as well as the decreasing amount of time Americans spend cooking today as compared with the time spent decades ago—a decrease of 50 percent across all demographic groups between 1965 and 1995. Interestingly, even though this could be more circumstantial than causative, each 30 minutes of reduced cooking time has been associated with a 0.5 increase in Body Mass Index (BMI). Regrettably, however, physicians do not typically receive training with regard to dietary and lifestyle counseling, nor are these items currently included in their required certification examinations.

Over the past two years, four studies have been published exploring the relationship between time spent cooking and the quality of one's diet. Two suggest that more time spent cooking is predictive of enhanced diet quality and one does not. This latter study raises the point that asking about time spent cooking, without some clarification about what one is cooking (e.g. family dinners vs. preparation of frequent desserts for family and friends), may lead to erroneous conclusions. The fourth study, a review of relevant studies, suggests the need for more and better scientific inquiry regarding the impact that cooking, for a range of purposes and including a range of competencies, may have on health outcomes and costs.

While such controversies persist, the hypothesis remains that teaching both healthful nutrition and health-based culinary skills to individuals may increase their freedom to choose a healthier diet and lifestyle. Yet, it is rare for medical, culinary, and food industry communities—each responsible for trillions of dollars of the U.S. economy—to share data, skills, questions, and ideas, or partner in efforts to diminish rates of obesity, diabetes, and other diet-related health problems.

In recent years, some interesting pilot programs have emerged. Cooking Matters, a program sponsored by anti-hunger organization Share Our Strength, has taught more than 120,000 low-income people in 40 states how to shop for and cook healthy food on a budget. The non-profit Wholesome Wave launched a

Fruit and Vegetable Prescription Program that allows doctors to give money to families struggling with diet-related disease to buy fresh fruits and vegetables at local farmers markets. Kaiser Permanente runs more than 50 farmers markets at its various hospitals and has recently launched a program to deliver healthy, non-processed foods to the homes of post-operative patients. “Gardens to Hospitals” is an innovative “ecopreneurial” company that builds and maintains hydroponic greenhouses on hospital property, supplying fresh vegetables 12 months per year. At the annual Healthy Kitchens, Healthy Lives® educational conference at The Culinary Institute of America (CIA) in 2016, more than a third of the healthcare professional attendees reported that their hospitals and/or health systems already had built a demonstration or teaching kitchen, or had plans to do so in the coming 24 months.

Over the past year, considerable progress has been made with regard to the establishment of joint, medical-culinary partnerships. Specifically, the CIA has partnered with the Harvard T.H. Chan School of Public Health to launch the new Teaching Kitchen Collaborative. Composed of 25 organizations from the corporate, medical, community, and educational sectors that have developed prototype teaching kitchens and teaching kitchen-related curricula, the collaborative has been built with the intention of establishing best practices and testing these across various populations. These will include patients, corporate employees, college and university students, K-12 students, retirees, and others. (See the sidebar on page 37 for more.)

In addition, the Tulane University Goldring Center has developed a curriculum for medical student training in “culinary nutrition,” and this curriculum has been licensed by more than a dozen U.S. medical schools. While formal research to assess the value, or lack thereof, of this rapidly expanding range of culinary-medical partnerships is still in its infancy, this past year has set the stage for such inquiry in the immediate future.

These trends and programs are exciting, early phases of innovation and development, and they require the ongoing support of the healthcare, culinary, and public health communities. The goal of enhancing the relationship between judicious food expenditures and judicious healthcare expenditures will be realized when more robust collaborations between the medical, public health, culinary, and sustainability communities become ever more inter-dependent and concerted; and, when they are made replicable, scalable, and shown to improve both health outcomes and costs.

## RECOMMENDATIONS:

Chefs, foodservice leaders, and cooking schools should explore opportunities to work with hospitals, health systems, medical/nursing/dietetic training programs, and corporations that are building and refining teaching kitchens in order to train employees, patients, and adults, kids, and families in their communities. Conversely, schools of public health, medicine, and allied health and policy should consider partnerships with foodservice companies and trained chefs to develop novel curricula and programs for those they serve. Healthcare professionals—and their curricula—should explore ways to incorporate knowledge about the translation of nutrition science into practical advice for patients. Ultimately, demonstration projects can lead to the establishment of research networks that assess the impact of these trends in medical-culinary educational alliances. The establishment, in this past year, of the CIA-Harvard Chan School Teaching Kitchen Collaborative has set the stage for this next phase of activity.



## SCORE: 3

Innovative, interdisciplinary programs are being launched with increased frequency by high visibility organizations and institutions. Many of these are starting to link healthcare and healthy eating with culinary education.

## IN SUMMARY:

- In 1960, Americans spent nearly three times as much on food as they did on healthcare. Today, Americans spend twice as much on healthcare as they do on food.
- The relationships between cooking, dietary choices, food purchasing patterns, and health outcomes are just beginning to be studied formally as alliances between health and culinary organizations begin to take shape.
- Over the past year, an increasing number of innovative partnerships involving the culinary, medical, public health, IT, and sustainability sectors began to take shape. These programs, curricula, and pilot projects now set the stage for demonstrations and formal studies to assess the value of such partnerships in terms of their ability to change behaviors predictably and sustainably; to impact health outcomes; and, ideally, to lower healthcare costs and enhance productivity and quality of life.



## TEACHING KITCHEN COLLABORATIVE: ADVANCING PERSONAL AND PUBLIC HEALTH THROUGH CULINARY LITERACY AND INTEGRATIVE LIFESTYLE TRANSFORMATION

Over the past year, The Culinary Institute of America has partnered with the Harvard T.H. Chan School of Public Health to launch the **Teaching Kitchen Collaborative** (TKC) to bring together 26 thought-leading organizations across 15 states using teaching kitchen facilities as catalysts of enhanced personal and public health.

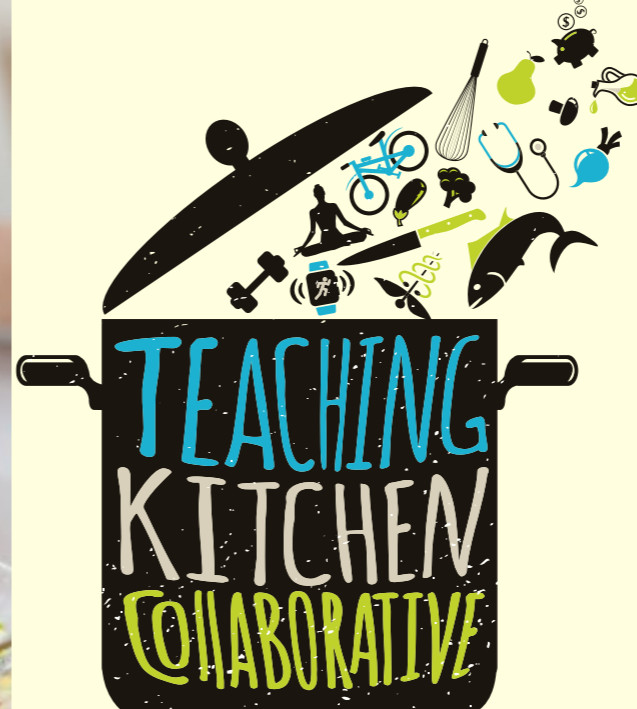
The collaborative grew out of the Healthy Kitchens, Healthy Lives® (HKHL) conference ([healthykitchens.org](http://healthykitchens.org)), which provides healthcare professionals with both didactic and experiential learning in nutrition, healthy cooking, exercise and movement, mindfulness, and health coaching. Offered 12 times since 2006 and attended by more than 4,000 registrants in total, HKHL has naturally turned into an incubator for early adopters and architects of teaching kitchens in various institutional settings used for health promotion. However, these facilities and their respective curricula are largely being funded, implemented, and piloted in isolation.

By collecting and sharing information across organizations, populations, and geographic areas, the TKC will function as an accelerator to support the development of best practices for reproducibility, scalability, and evaluation of emerging models and educational programs, with three focus areas of research, best practices, and scalability.

Co-chaired by David Eisenberg (director of culinary nutrition at Harvard Chan School) and Greg Drescher (CIA's vice president for strategic initiatives and industry leadership) with coordination from Allison Righter (nutrition instructor at CIA's Hyde Park campus), the TKC is supported by generous philanthropic support from several foundations, with additional support provided by member-grantors. Member organizations include community-based organizations, such as LA Kitchen and the YMCA of Pittsburgh, and primarily academic and/or medical institutions, such as Cleveland Clinic, Kaiser Permanente San Francisco Medical Center, Princeton, Stanford, University of California (Berkeley, Los Angeles, San Diego, and San Francisco) and Vanderbilt.

The TKC meets twice a year at different member organization sites, while collaborating on a regular basis through virtual working group meetings that work toward developing resources that can be used both internally among members and externally with individuals and organizations across the country.

This new initiative marks a tremendous step forward in establishing strong medical-culinary partnerships and driving the use of teaching kitchens for improved public health.



# HEALTHY MENUS R&D COLLABORATIVE: WORKING TOGETHER TO TRANSFORM MENUS IN THE VOLUME FOODSERVICE INDUSTRY

The Culinary Institute of America Healthy Menus R&D Collaborative, established in 2010, is a working group of volume foodservice culinary and nutrition leaders who leverage their combined influence and experience with the single-minded goal of finding practical solutions that help expand the availability and sales of healthy menu choices.

Members include leaders from our nation's top foodservice operations and representatives from food companies and commodity boards also committed to providing a greater variety of healthful food and beverage options for American diners.

The collaborative grew out of the Worlds of Healthy Flavors® invitational leadership retreat, held each January in partnership with the Harvard T.H. Chan School of Public Health. The retreat provides a forum for nutrition experts and foodservice leaders to discuss best practices for expanding healthy

menu options in the U.S., along with the most current contextual factors. In 2016, for instance, top of mind for most members is the need to comply with the new mandate from the Food and Drug Administration to provide calorie and nutrition information in chain restaurants and retail food outlets that serve prepared foods, with a deadline of May 2017. Central to the group's exchange of healthy menu strategies is an emphasis on leading with flavor while driving profitability.

The membership-based collaborative includes representation from McDonald's, Darden, Brinker, Panda Restaurant Group, Aramark, Compass Group, Sodexo, AVI Foodsystems, Yum! Brands, Google, Subway, Dunkin' Brands, and many other high-volume operators. The co-chairs of the initiative are Deanne Brandstetter, vice president of nutrition and health for Compass Group; Pam Smith, founder and president of Shaping America's Plate; and Tom

Gumpel, vice president of R&D for Panera Bread. Collectively, operator members feed over 100 million Americans every day. This means that even very small changes can have a tremendous impact on public health.

Leadership and guidance from Menus of Change has had and will continue to have a significant influence on the work of the collaborative, as members pursue their mission: "collaboratively engaging with foodservice industry leaders, resource specialists, manufacturers, and other suppliers to identify and explore non-proprietary culinary insights, applications, strategies, and solutions that can help chain restaurants and other large volume foodservice providers fulfill our customers' desire for delicious and nutritious menu choices."

Along with focusing on reducing sodium, increasing use of produce, improving carbohydrate quality

(with an emphasis on beverages and whole grains—and a new interest in sprouted whole grains), and strategic calorie design, members have added protein quality to their list of priorities.

Member interest in advancing protein quality stemmed from research and guidance shared through the Menus of Change leadership summit and annual reports as well as from increasing consumer interest in antibiotics, hormones, and a wide range of animal welfare issues, as well as growing opportunities around plant protein. Members started their work in this area at the January 2016 All-Member Meeting with a SWOT analysis—identifying strengths, weaknesses, opportunities, and threats—that will provide insights into two to three protein-related areas where, collectively, members can have the most impact on public and environmental health.



# HEALTHY KIDS COLLABORATIVE: ACCELERATING INNOVATION AND DEEPENING EXPERTISE IN K-12 SCHOOL FOOD

Building on its long-running annual conference to advance culinary-driven, healthier foods for K-12 students, in 2015 The Culinary Institute of America launched the Healthy Kids Collaborative (HKC): a year-round, invitational initiative designed to both accelerate innovation and deepen technical and professional expertise in K-12 school food. It brings together leading school nutrition professionals, school chefs, suppliers, and other stakeholders to discover flavor and menu strategies, highlight successes and best practices, and develop training protocols and resources. The goal is to share the insights and solutions gained with school districts across the United States.

School nutrition has shifted significantly in recent years from a “heat-and-serve” or “pass-through” operation to more onsite food preparation. This brings challenges related to staff training and equipment needs. Other challenges include the many factors that influence the school nutrition environment, which has a discernible impact on the amount of food students consume. Factors include the amount of time students have to eat, whether recess is held before or after lunch, the level of engagement among staff, and facility design. Along with these challenges also come numerous opportunities. For instance, research

has confirmed that chef-enhanced school meals increase the selection and consumption of vegetables. Chefs can increase the palatability of foods served to children and, as a result, their consumption of healthier foods.

Aiming to address these challenges and opportunities, the inaugural Healthy Kids Collaborative meeting was held in December 2015. It welcomed 66 corporate members and school nutrition members including chefs and directors from Sodexo, Aramark, Chartwells, Revolution Foods, Minneapolis Public Schools, Metro Nashville Public Schools, Detroit Public Schools, and others. Highlights of the meeting included a team-building kitchen activity where they created new school menu items, a demonstration on using intact whole grain in schools, and a tasting exercise demonstrating effective methods for reducing sodium and increasing flavor. To determine priorities and work on an ongoing basis to develop resources and practical solutions, the collaborative formed five working groups focused on the following areas: staff culinary education and training, produce acceptance and consumption, flavor development and sodium reduction, school food environment, and food and nutrition quality.

## WHAT ARE THE GREATEST OPPORTUNITIES IN SCHOOL NUTRITION AND FOODSERVICE? THE SIGNS OF PROGRESS? THE AREAS MOST IN NEED? OVERALL, WHERE IS SCHOOL FOOD HEADING?

“The Healthy Kids Collaborative is moving school nutrition from a compliance culture to a **culinary culture**. By being more focused on the food we will be better able to meet the taste and nutrition needs of our young guests.”  
—Cathy Powers, partner, Culinary Nutrition Associates; chair, HKC

“**The school nutrition environment** is most assuredly a vital part of the school climate and should have a positive influence on the health of the learning environment, which does include the cafeteria. The noise level, the comfort and physical structure, along with positive interactions among and between students and staff should remain a primary focus in contributing to the overall success of our students, both academically and socially.”  
—Nancy Rice, state director, School Nutrition Division, Georgia Department of Education; chair, HKC

“As school chefs and graduates of The Culinary Institute of America, we know [that] what motivates children to delight in **consuming fresh fruit and vegetables** is a cachet of cool, craveability, and relatability. All of these can be created by promoting food literacy and wellness as an integral part of curriculum. Experiential learning is critical for children to gain meaningful insights into how produce is grown and harvested, what it tastes and looks like as it goes from seed to plant, and the changes it encounters through a range of culinary techniques and applications. That is really the best way to encourage consumption. Well, and chefs in white coats. It’s much cooler for a chef to tell you to eat your vegetables than your mom.”  
—Cody Williams ’02, ’04, program manager, Sonoma Valley Unified School District (California); chair, HKC Produce Working Group  
—Lisa Feldman ’91, director, Culinary Services, Sodexo—which succeeded in converting burger patties to a meat-vegetable blend at over 250 of their K-12 schools, which collectively feed two million of the 50 million children in school today—  
co-chair, CIA Healthy Menus R&D Collaborative Produce Working Group; and chair, HKC Vendor Relations

“The greatest opportunities in school nutrition with respect to **staff culinary education and training** center around collaborative partnerships and sharing of information. Why reinvent the wheel when something is working well within another district? The Institute of Child Nutrition (ICN) is working with diverse groups of experts (i.e., school nutrition professionals, chefs, and allied organizations) to develop new culinary trainings for various audiences within school nutrition. Being a central repository of information, it’s our role to provide a platform of best practices so others may be able to replicate the same successes.”  
—Aleshia Hall-Campbell, acting executive director, Institute of Child Nutrition, The University of Mississippi

“The greatest opportunity in K-12 lies in positively impacting both student learning and student health through healthier lifestyle habits. These healthy habits include eating more ‘real’ foods, selecting more plants (vegetables and fruits) at meal times, and achieving **adequate hydration by drinking plenty of water**. Both children and parents need education – regarding nutrient dense/whole foods, nutrition/health and wellness, and cooking skills – for positive, sustainable change.”  
—Michael Rosenberger, director, Food and Nutrition Services, Irving Independent School District (Texas)





## THE FUTURE OF SUGAR-SWEETENED BEVERAGES

One of the most important milestones of the 2015 Dietary Guidelines for Americans was that, for the first time, they set a specific limit on the amount of added sugar Americans should consume each day. The guidelines have long instructed Americans to reduce their added sugar intake, but only now have they put an exact value on that guidance: no more than 10 percent of daily calories. That is approximately 50 grams of sugar, or 12 teaspoons. Many Americans currently consume about twice that amount, and the guidelines report that about half of their added sugar intake comes from sugar-sweetened beverages. Fifty grams happens to be

the amount of sugar in just one 16-ounce bottle of Coke. These include not only sodas, though, but energy drinks, sports drinks, sweetened coffees and teas, flavored waters, fruit drinks, and alcoholic beverages. Furthermore, sugar consumed in liquid form has more severe negative health impacts—namely the spike in blood sugar, which can, over time, contribute to insulin resistance and type 2 diabetes. For these reasons and several others, consensus has pointed to replacing sugar-sweetened beverages with water and other healthier options in order to move the needle on Americans' sugar consumption.

## WHAT DOES ALL OF THIS MEAN FOR THE FUTURE OF SODA AND SUGAR-SWEETENED BEVERAGES IN AMERICA? WHICH ORGANIZATIONS IN THE FOODSERVICE INDUSTRY ARE LEADING THE WAY WITH REGARD TO OFFERING HEALTHIER BEVERAGE CHOICES? HERE, WE HEAR FROM FOUR OF ITS VISIONARY VOICES:

“Sodas, in public health jargon, are low-hanging fruit—easy targets of advocacy because of their high sugar content and zero nutrients. It’s great that health advocates have gotten the word out that sugar-sweetened beverages are nothing but liquid candy, best consumed in the smallest amounts possible. Sales of full-sugar sodas have been declining for at least 15 years, and it is no surprise that the soda industry considers concerns about obesity to be the number one threat to its profits. **The word is out: If you are thirsty, drink water.** I expect to see further efforts to discourage sugary drink consumption: tax initiatives, warning labels, removal of the drinks from vending machines, bans on hospital and workplace consumption, and all of the other efforts introduced by advocates in the past few years. The next challenge will be introducing some curbs on marketing sugar-sweetened beverages to kids. All of these actions have raised public consciousness about healthy beverage intake. Foodservice providers: Take notice!”

—*Marion Nestle, Paulette Goddard professor of nutrition, food studies, and public health, New York University, and author, Soda Politics: Taking on Big Soda (and Winning)*

“Recent research shows that people are drinking less soda and more bottled water. The good news is that when they choose bottled water, they are picking the packaged beverage with the smallest environmental footprint: The results of a 2014 benchmarking study by the International Bottled Water Association show that the amount of water and energy used to produce bottled water products in North America is less than all other types of packaged beverages. It is also the healthiest beverage choice: Compared to sugary beverages, **water naturally has no artificial flavors or sweeteners to interfere with the enjoyment of food** or to potentially lead to higher risk of obesity, diabetes, or heart disease.”

—*Kristin Wilcox, vice president of government relations, International Bottled Water Association*

“**We are in the midst of a beverage revolution.** As people learn that a 20-ounce bottle of soda has 16 teaspoons of sugar (imagine putting that in your morning coffee!), they are more and more likely to drink water instead of sugar. What a healthy choice! People who drink water instead of soda, sports drinks, bottled teas, and other sugary beverages dramatically reduce their risk for diabetes and heart disease.”

—*Harold Goldstein, executive director, California Center for Public Health Advocacy*

“I truly believe that **sugary carbonated beverages have peaked** and today’s college students are realizing that they need to stay hydrated, and they want a flavor profile at times, but they don’t want large amounts of sugar.”

—*Cheryl Garner, executive director of dining, conference, and catering services, at University of California, Riverside*

### OPERATOR SPOTLIGHT: UC RIVERSIDE

In 2015, when University of California, Riverside was striving to follow the Menus of Change principle “reduce sugary beverages,” they decided to create some niche beverages not covered by their Pepsi contract. So they rolled out a line of spa waters and agua fresca for both their residential and retail restaurants. They noticed almost immediately that most students were lining up for ice from the Pepsi machine and then heading for the spa waters—bypassing the standard Pepsi beverages altogether.

UC Riverside uses a “text and tell” feedback system throughout its operation, and it frequently receives feedback about the spa waters they serve, enabling them to gauge the relative success of different flavors. For example, when they tried a variation made with dried banana chips, vanilla, cinnamon, and orange zest, the text and tell system lit up with the student comment: “The banana foster water is amazingly satisfying!” Inspired by what they were seeing from their diners, UCR Dining representatives attending the National Restaurant Association’s annual gathering spoke with Pepsi leadership about the need for less sugary beverages. They expressed a concern that the soda company was missing a huge shift in consumer beverage preferences. Because the Pepsi representatives there were not convinced, UCR Dining invited one of their vice presidents out to the campus to see firsthand: The vice president was asked to stand in front of the Pepsi machine of one of the residential dining halls for 20 minutes. During that time, student after student passed by the Pepsi machine and opted for a spa water. Not one student took a Pepsi beverage.

As a result of the visit, Pepsi agreed to supply the campus with new equipment, adding water and carbonated water valves that could be used as a stand-alone, or an added flavoring, many without sugar. They also brought in some less sugary beverages that had not been available in the market before. “The big goal is to influence Pepsi, to show them, ‘You are missing the boat. You’re not responding to the times,’” says Cheryl Garner, UCR’s executive director of dining, conference, and catering services. “Influencing them is what makes the biggest difference.”



## VIII. PRINCIPLES OF HEALTHY, SUSTAINABLE MENUS

Consumers say they want food that is healthier, 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](mailto: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](http://menusofchange.org), and Harvard Chan School’s Nutrition Source website, [nutritionsource.org](http://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 \$780 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-BASED** 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**



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

## MENU CONCEPTS AND GENERAL OPERATIONS

### 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, food 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. 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.

### 4. Leverage globally inspired, plant-based 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. 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 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 towards reversing obesity trends and reducing food waste. This is different than 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). Calorie quality is also important. Dishes should feature slowly metabolized whole grains, plant proteins including nuts 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 are compatible with 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 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. As behavioral economics studies have shown, dining-room operations and foodservice eating spaces also deserve more attention: design, set-up, service, and communication strategies can all lead consumers towards 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—they should be filling half their plates with produce. 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.

**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 the 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 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.

**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.** 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. Current guidance from nutrition research recommends consuming a maximum of two 3-ounce servings 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). 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 than unprocessed red meats. Many diners choose to splurge on red meat when they eat out, and 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.

**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, high-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 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 national 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 of 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.





## IX. CASE STUDIES: THE SELLING OF HEALTHY, SUSTAINABLE, DELICIOUS FOOD CHOICES

“...if you are in the restaurant business and you aren’t addressing the ‘LOHAS movement,’ you’re going nowhere.”  
—Paul Westra

One of the unique contributions made by the 24 Principles of Healthy, Sustainable Menus is that they provide comprehensive guidance that integrates both environmental and public health imperatives. Operators who are inspired to act upon the principles often find value in focusing on just a few at a time, acknowledging that their efforts will evolve over time in order to eventually address all or at least many potential areas of improvement.

This section of the report provides case studies including a new, curated compilation from the Menus of Change University Research Collaborative. These analyses and concrete examples are meant to inspire both the broad, all-encompassing pursuit of healthier, more sustainable food choices and to equip foodservice professionals to take action to address

specific principles in deep and highly targeted ways. For this reason, attention is paid to, for instance, the overarching “LOHAS,” or “Lifestyle of Health and Sustainability,” movement pervading the foodservice industry, along with the need for interdisciplinary food systems-oriented research in order to shift eating patterns and agricultural practices at a large scale. Also highlighted are strategies for addressing a single principle: for instance, the marketing tactic of using product placement in TV shows to make fruits and vegetables more appealing, or scaling a new fast casual model entirely focused on sustainable seafood. In combination, the insights enclosed in this section should help ignite change across a broad range of leaders committed to shaping a better future of food.

# INVESTOR SPOTLIGHT: STIFEL

## LOHAS IT OR LOSE IT

In December 2015, Paul Westra stood in front of a National Restaurant Association meeting of chief financial officers and declared that if you are in the restaurant business and you aren't addressing the "LOHAS movement," you're going nowhere. Westra is an equity research analyst covering restaurants for Stifel, an investment bank based in Baltimore, where he works as a "glorified scorekeeper," tracking who is losing and who is winning in the restaurant business and why. LOHAS stands for Lifestyle of Health and Sustainability; it includes everything from fitness culture and farm-to-fork dining to green cleaning products and taglines such as "free-range," "gluten-free," and beyond. Stifel estimates that LOHAS is already a \$150-billion supermarket business and is resonating with at least one third of American consumers. Stifel advises hundreds of institutional clients (i.e., those managing mutual funds) as well as individuals who are making decisions about investing in the restaurant industry, and LOHAS is at the core of their investing guidance.

One of the restaurant brands that most embodies Stifel's LOHAS ideal (and has the stock figures to show it) is Zoës Kitchen. The fast casual chain—which serves Mediterranean cuisine and encourages customers to "taste the many ways the Mediterranean lifestyle inspires goodness"—attracts customers for its brand identity of sustainable, all natural, wholesome, real food, made from scratch. According to Stifel, Zoës' sales trajectory indicates the potential for 10-fold growth, from the 150 locations they have now to 1,600. To Stifel, Zoës is the mathematical definition "that this LOHAS movement is true." But the power of the Zoës Kitchen brand, from Westra's perspective, extends beyond healthy Mediterranean food to the broader ethos of the Mediterranean lifestyle, which he describes as staying in shape and spending time outdoors, the same "psychographic profile" as consumers who do yoga. Stifel points to Roti Mediterranean Grill, whose tagline is "food that loves you back," as one of several other examples of successfully leveraging the broader Mediterranean lifestyle.

The focus on LOHAS doesn't mean operators must transition their menus to all vegetarian or make their brand 100 percent healthy, he says, but at least elevate the emphasis on better quality ingredients, and address the now mainstream request from diners to understand where food comes from. "Whatever that means to your brand, it's really important in today's marketplace for that to be a part of it," Westra says.

"Lifestyle" in the LOHAS definition goes beyond health and the environment, he explains. Take Shake Shack, for instance, which has tapped into what Westra calls "the experience economy," where consumers, especially millennials, "want to be associated with brands that represent the values they believe in, and that represent our better halves, which includes how these companies treat the globe and how they treat their employees." Shake Shack's motto is "Stand for Something Good;" the company expresses that through ethical and transparent sourcing, donating to local communities, sustainable architectural design, and how it pays its employees. So Westra reports that Shake Shack does \$1,500 in sales per square foot, and notes that people will wait in line for 20 minutes for a burger not because of its nutritional value but because of how dining there becomes implicit support of the causes that Shake Shack represents. Stifel's exact stock ratings for Zoës or Shake Shack will undoubtedly change from day to day, but generally speaking, it advises clients that LOHAS is a trend with staying power. It encourages clients to invest in the brands that have enthusiastic consumers, or "strong local influencers," who champion the brand through habits like taking selfies while holding a Shake Shack bag in one hand.

Stifel insists that *how* companies do something is far more important than what they do—how they treat their customers, their community, their employees, and the planet. So what does that mean, exactly? Here are three rules of thumb Westra offers for designing a winning restaurant concept:

### 1. Think carefully about your three pieces of clay: the environment, the food, and the service.

Westra says the environment must be a from-scratch kitchen, with high-quality ingredients. The food should be part of the LOHAS movement, because "that ties you to being part of a lifestyle brand, not just a restaurant brand." And great service should come from again, the *how* of a company, specifically how it treats its employees. "People want to work for and patron brands that do things the right way...so that their consumers and employees effectively become brand ambassadors."

### 2. Do more dinner sales than lunch sales; do more dine-in sales than takeout sales; and serve more women than men.

Westra reports that these three elements are required for a restaurant concept to make enough money that it's worth building. He explains that lunch is very competitive, meaning consumers are less choosy about what they eat for lunch so they have low switching costs from one spot to the next. In addition, the barriers to entry for lunch are much lower than for dinner, i.e., you only need about \$25,000 to open a food truck and make sandwiches. The second reason is that brands don't matter as much to people when eating at home, i.e., it's rare to walk around your living room with what he calls "that self-esteem cup of Starbucks." Lastly, women make three quarters of dining decisions, his data suggests, so they'll choose where the entire family is going to eat on a given night. "What's really exploding on the marketplace today is counter service restaurants that can do dinner, dine-in, and women," Westra says. And what brand checks all of those boxes? Zoës Kitchen.

### 3. Understand your customers' purchasing behaviors beyond food.

Westra's consumer insights indicate that there are 52 types of people in America grouped by various types of purchasing behaviors. His research shows that most brands find that 20 percent of the types of people—about 10 of the 52 types—make up over 50 percent of their sales. This means that it is critical to a foodservice operator's success to understand customers' "psychographic profiles": as opposed

to demographic, psychographic relates to values, hobbies, how people spend their time, and so on. Stifel advises restaurateurs to find brands with which their foodservice brand can cross-pollinate, i.e. Athleta with Zoës, and locate new units near those places.

Ultimately, Stifel's investment strategy comes down to that old saying of those doing good doing well. "If you don't have a 'come to Jesus' speech for your employees about adopting LOHAS," he says, "you should." Because remember: LOHAS is not a fad or a trend. It's a movement.



# MARKETING SPOTLIGHT: PRODUCE MARKETING ASSOCIATION MEETS ENTERTAINMENT RESOURCE & MARKETING ASSOCIATION

## WHAT WILL IT TAKE TO SELL CONSUMERS ON FRUITS AND VEGGIES? A FRESH TAKE.



When it comes to selling food to American consumers, fruits and vegetables don't get the lion's share of the marketing budgets. That's a problem, because Americans on average aren't eating nearly enough fruits and vegetables compared to the daily recommended level (see page 30). But an unprecedented new partnership is betting on the potential of a powerful tactic in Hollywood: product placement. Last fall, the Produce Marketing Association (PMA) announced a new strategic alliance with the Entertainment Resource & Marketing Association (ERMA) to increase the appearance of fresh produce on television shows, movies, and online entertainment. PMA is the leading trade association for all segments of the global produce industry, and ERMA is an association of entertainment marketing professionals who work with production studios. They have a track record of growing demand for products by making them ubiquitous on-screen. The idea behind their new joint program "Fresh Takes" is to weave in more air time for fresh produce items so that Americans subconsciously start to associate these items as normal, as part of everyday life.

People watch an average of four hours of television per day; that's just the screen time for TV, which becomes much greater when you add entertainment consumed online. Product placement is a tried and true strategy, from cars

to designer sunglasses, but until now, the snack and soda companies have been the ones mostly taking advantage on the food side. Now, for what appears to be the first time in the history of Hollywood, fresh, non-branded fruits and vegetables will start to get written into the plots of popular TV shows: For instance, when the Dunphy family from "Modern Family" is eating out at a restaurant, they might order pizza with mushrooms and green peppers instead of sausage and extra cheese; or when they go out for ice cream they might order it with fresh berries on top. Produce items will also start to appear more on sets and in the background of shows and movies: Again in "Modern Family", Phil and Claire Dunphy might have an argument in the produce aisle of the grocery store, while pushing a cart full of fresh produce; or more generally, two characters might have a conversation in a kitchen with a large bowl of fruit sitting on the counter.

With the program tagline "We supply the produce. You supply the set," PMA, through its members, makes non-branded fresh produce items available to motion picture companies, TV studios, and online entertainment producers to use at no charge. Given PMA's philosophy of "More Matters," Fresh Takes could build on existing product placement—say, when a cereal company is already paying to be in a scene, Fresh Takes can nudge directors to have the character add bananas. There are also opportunities for what waiters do on screen, adds Kathy Means, vice president of industry relations for PMA. A script could have waiters asking diners if they want to add a salad to their entree, she says, or when mentioning the evening's specials, they could be reading those that make plant-centric dishes sound the most irresistible. "How [characters] order, those throw-away lines could have a huge impact on somebody at home," Means says.

Importantly, though, Fresh Takes does not involve a health message. Means says, "We want this to be reflective of how people are. We know that

when January comes and everyone tries to make radical change it lasts two weeks; if they're lucky, to the Super Bowl. So instead of making it be this medicine message, just make it part of what people are already doing. When they order a hamburger, make sure they say 'with lettuce and tomato and onion' on it."

Much of the program involves building new relationships with Hollywood's writing teams. It's important to make these insertions as natural as possible, fitting with the personas and habits that popular television and movie characters are already known for. The last thing Fresh Takes leaders want is viewers thinking, "But Jay hates to cook, he would never do that!"

This innovative approach to increasing fruit and vegetable consumption in the United States has huge potential because humans relate and identify with the characters we watch on TV.

This is especially true for children. While Fresh Takes is targeting all consumers, special opportunities exist for marketing "F&V" to children, so studios like Universal, Fox, and especially Disney offer some of the most promising potential collaborations. For adults, the goal is to make it culturally normal to frequently consume fresh fruits and vegetables; for children and teenagers, it's about that *plus* the cool factor.

"When popular characters choose produce from the store, the fridge, or the restaurant menu as part of their everyday interactions, viewers will identify with that as the right way to eat," said ERMA President Michael Schragger in the press release. "By identifying shows with school age characters we hope we can help move today's youth to a healthier lifestyle and lessen the incidence of problems such as childhood obesity."



# EMERGING CHAIN SPOTLIGHT: LUKE'S LOBSTER

## TRAP TO TABLE

When walking into Luke's Lobster, a "taste the source" chalkboard on the wall indicates the exact harbor where the lobster in the lobster roll was caught. The server at the counter will then explain that, for example, Stonington is located in Downeast Maine, and it is named after old rock quarries, which used to be a big part of the economy that today relies more on lobstering. You'll then hear about the sustainable fishery management practices the Stonington lobstermen abide by, which include throwing egg-bearing female lobsters back into the water, but only after first v-notching their tail flippers. That indicates to any future lobsterman who pulls her up at a time when she doesn't have eggs that she's a good breeder, so he'll toss her back as well to keep her in the population. Finally, when you receive your lobster roll, your receipt will list more information about the harbor of origin and sustainable fishing practices.

In a time of pervasive mislabeling of seafood—and a new Presidential Task Force on Combating Illegal, Unreported, and Unregulated (IUU) Fishing and Seafood Fraud (see page 31)—this fast casual seafood restaurant group is founded on the principles of sustainability and traceability. The Maine-style lobster shack was started in 2009 and now has 19 locations in New York, Boston, Philadelphia, DC, Chicago, and Las Vegas. Luke's is a fully vertically integrated company, owning and carefully controlling everything that happens from the dock to the plate. "It's the same transparency as if you were in a traditional Maine lobster shack sitting right on the dock where the seafood was landed," says Ben Conniff, co-founder and president. Luke's even built its own seafood processing company, Cape Seafood, to process its five million pounds of lobster annually.

Along with allowing greater control over quality, having its own processing facility also enables the company to optimize taste. Conniff explains: "As

soon as you take that lobster out of its habitat, it's not moving the way it is supposed to; it's not in water of the correct temperature; the salinity is off; it's not eating its normal diet. All those things contribute to the flavor and texture of the meat. So rather than trying to keep lobster alive as it's shipped around the country, we cook it at its freshest possible moment." The tail cooks faster than the knuckles and claws, so using a convection steamer, Luke's cooks each piece to the texture and temperature that will lock in the best possible flavor for that piece, which has been carefully graded by size. "Guests are really blown away by the level of flavor, the sweetness, the tender texture of the meat," Conniff continues, "because they're used to eating lobster that somebody brought home and threw the whole lobster in the pot and boiled or steamed it until it was pretty red and they said, 'OK, it's done.'"

Luke's sources the lobster for all its locations from the Maine lobster fishery 70 percent of the year. The exceptions are May-June and December, when it sources from Canadian fisheries because those are especially active during those times of year, while the Maine lobster fishery is slower. Doing so helps prevent over-fishing.

"Sustainability for us is about committing to practices that ensure the population of the species is maintained and growing at rates that a lobsterman's children and grandchildren and great-grandchildren will have as good of a chance of making a living on that resource as a lobsterman today does," Conniff says. It just so happens that that long-sighted business incentive of ensuring the viability of the local economy coincides with what's best for the environment: preserving and even growing the population of Maine lobster, which has tripled in the last 20 years.

In the restaurants, it's all about flavor. When Luke's team developed the recipe for its lobster roll, its bestseller, it didn't go light on mayonnaise or butter due to health concerns, but because it wanted to



showcase the quality of the lobster. Health was not a leading focus when Conniff and Luke Holden (co-founder and CEO) started the business. Like many other types of seafood, lobster is a healthy source of protein with omega-3 oils and other vitamins and minerals. And now, they realize, especially with their fast-casual format, the health benefits may be the secret to transforming lobster from something Americans eat only on special occasions or very infrequently to something they eat every week.

In addition to lobster rolls, which are \$16, the menu includes crab and shrimp rolls, soups, and a winter "Tail & Kale" salad at \$14 that was a big seller: a whole steamed, chilled lobster tail on a bed of baby kale, a scoop of hot quinoa, a scoop of chickpeas, topped with roasted pumpkin seeds and pickled onions, and dressed with poppyseed vinaigrette. In light of this success, Luke's will continue to offer a rotation of seasonal salads.

Do customers bristle at these price points for sandwiches and salads? Initially, some did. But as diners learn everything that has gone into bringing them their lobster roll—the lobsterman waking up at dawn, pulling up traps one by one, carefully handling each lobster one by one to make sure it stays alive from the boat to the dock to the processing facility, then the painstaking grading and cooking of each piece to its optimal specifications, having third party and government organizations inspect for food safety and quality, and finally sending the lobster out to restaurants, where time is invested to educate and train servers about sustainable fishery practices so they can talk with customers about what they're eating—their sticker shock turns to appreciation. A willingness to pay "what the food is really worth," Conniff says. Whether that insight is a sign of where fast casual cuisine is headed more broadly, it seems the writing is literally on the wall.

# BETTERING OUR FOOD CHOICES AND OUR FOOD SYSTEM: INSPIRATION FROM THE MENUS OF CHANGE UNIVERSITY RESEARCH COLLABORATIVE



of manufacturers that are industry leaders in addressing health and environmental issues. MCURC members work to leverage the unique opportunities in the higher education sector for advancing culinary literacy and nudging young adults towards healthier, more sustainable food and lifestyle choices. They also work on interdisciplinary, food systems-level research, including the use of campus dining facilities as living laboratories to test strategies for behavior change.

Since its inception, MCURC has held its first annual summit, produced educational resources, and dedicated its research energy on three specific areas of inquiry: food waste, values-based purchasing metrics, and reimagining the role of animal and plant proteins on menus. Over time, its website will provide recipes, toolkits, and training materials, as well as findings from multi-site, interdisciplinary research.

What follows is a sampling of some of the exciting ways that MCURC members have been working to accelerate the adoption of Menus of Change principles in their campus dining operations, while fostering research and education to advance a food system that supports better health for both humans and the environment. For a full overview of the initiative as well as a complete list and detailed profiles of the member institutions involved, please visit [mccollaborative.org](http://mccollaborative.org).

## MENU CONCEPTS

Last fall, The Hartman Group reported, “College dining halls are increasingly being seen as an extension of the classroom where students are being educated about healthy and sustainable food choices.” The dining divisions of MCURC member institutions take these responsibilities, and these opportunities, very seriously. Developing innovative menu concepts and dining stations is one such strategy:

- To help make whole, intact grains the norm, University of New Hampshire offers an oatmeal station every day at all dining halls and features four different types of whole grains each day in its salad bars.
- At UC Berkeley, a new café called brown’s was launched at the start of the 2015-2016 academic year with the vision of a “delicious, plant-forward, local, seasonal, and educational” menu and an emphasis on transparency. Cal Dining Executive Director Shawn LaPean had workshopped this concept at the 2015 Menus of Change conference during the “Make It Work in Your Operation” breakout session and, following invaluable audience input on his approach, he and his team were able to transform the old campus restaurant. Brown’s does not offer soda or other sugar-sweetened beverages, sources 80 percent of its ingredients from within 250 miles, and practices primarily scratch cooking. Additionally, its reimagined menu includes a “flipped plate” concept where patrons can order two plant-based options and one animal protein. The menu economics of \$8 for the flipped plate (or \$6 for a plate of three plant-based sides) compared to \$12 for the traditional plate nudges students toward a plant-based plate. Sales have exceeded expectations and response has been overwhelmingly positive.
- Many foodservice operators within and beyond campus dining have realized that diners often avoid the salad bar because of negative experiences they have had with the salads they have composed for themselves in the past. To empower diners with better salad-making skills, University of Southern California posts engaging signs that offer step-by-step instructions for making a salad that is both healthy and delicious.
- As part of its “Think Produce First” campaign, UC Riverside made a switch in the summer of 2015 to de-couple proteins from most

salads on its retail menus. Now the salads, without protein, are listed as the menu item, while an assortment of proteins are listed as optional add-ons. Executive Director of Dining, Conference and Catering Services Cheryl Garner and her team were encouraged to change the defaults in part by the realization that 27 percent of purchases on campus are vegetarian or vegan. As Garner says, her team felt it “could satisfy more people with a single concept this way. They can just opt in for a protein if they want one.”

- Many member campuses have embraced the “Protein Flip” strategy advanced by Menus of Change, whether through healthy bowls that offer small servings of meat as a condiment or blended burgers of meat with vegetables or grains.
  - At Yale, the sweet potato and quinoa patty is a top seller.
  - In a partnership with the Mushroom Council, Harvard University Dining Services (HUDS) replaced some of the meat in 10 beef-based dishes with mushrooms, ultimately reducing saturated fat by 31 percent and calories by 20 percent. They estimate that transitioning to “the blend” in just one five-pound meatloaf recipe, served in just one meal service, lowered the carbon footprint by the equivalent of taking a car off the road for six months. Student response has been so enthusiastic that the meat/mushroom chili is now a daily lunch feature, and a quarter of all burgers are blended turkey with brown rice and vegetables.
  - Sales of UC Riverside’s “Earth ‘N’ Turf” burger have matched those of its cheeseburger. The menu board touts that the blended burger is 40 percent wild mushroom, 60 percent grass-fed beef, and “100 percent moist and delicious.”

To accelerate the move among American consumers—in particular college students, faculty, and staff—towards healthier, more sustainable, plant-forward diets, The Culinary Institute of America and Stanford University have partnered over the past year and a half to launch the Menus of Change University Research Collaborative (MCURC). The collaborative brings together campus executive chefs and foodservice directors, leaders in university administration and business, and academic faculty in relevant disciplines to collaborate on research and education in support of culinary-centric, evidence-based food system innovation within and beyond universities.

With representation from 37 colleges and universities, membership ranges from Ivy League schools to large state universities, along with supporting ex officio membership from select organizations outside of higher education. Sponsorship support comes from a variety

- In UCLA's Bruin Plate, the largest residential restaurant on campus, the concept is "fresh, delicious and wholesome food" while following the best practices available for sustainable foodservice operations. The LEED Silver certified facility does not have any deep fryers or sugar-sweetened beverages (instead offering in-house flavored waters, iced tea, and other healthy drinks), and provides additional delicious choices not often found in campus dining settings. These include a nut butter bar and a dessert station called "Sweet Bites" where students can fill large bowls with fresh whole and sliced fruit or choose from a few more indulgent options, which are all 200 calories or less. Through large windows, soft tones, wood surfaces, low-water succulent plants, and artwork such as hand-painted depictions of native culinary herbs, the overall design goes hand-in-hand with the menu concept to support the mission of fostering mindful eating.

- While many MCURC members aim to encourage mindful eating through educational flyers, information booths and fairs, dedicated de-stress zones, warm lighting and inviting furniture, they also recognize that students are busy and often want to eat on the run. In meeting students where they are, operators are innovating around hand-held, grab-and-go offerings. For instance, UC Riverside offers a Greek yogurt berry parfait wrap in a whole-grain tortilla as a to-go item all day. Several campuses are offering healthier snacks in university-run convenience stores and mini grocery markets, and others have mobile produce and healthy snack stands across campus.

## STAFF TRAINING, PURCHASING, AND OPERATIONAL INSPIRATION

- Through a program called "UM Farm to College," University of Montana directed over a million dollars in just the past fiscal year to local and sustainable food purchases, representing nearly a third of UM Dining (UMD)'s annual food budget. UMD partners with over 150 different farmers, ranchers, and food producers throughout Montana. The millions of dollars

that the university's dining department has invested in local and sustainably produced products over the past decade-plus have significantly boosted the state's agricultural economy and helped accelerate a transition to more sustainable agricultural systems.

- At University of Southern California, Executive Chef Eric Ernest and his team have developed a "Food Philosophy"—a thoughtful articulation of the values system set forth by USC Hospitality, and their unique ways of interpreting, acting upon, and evaluating their performance with respect to Menus of Change Principles and other core beliefs. For instance, the document states, "Our chefs constantly strive for the elevation of culinary strategy as a nutritional advantage. We meet our customers' needs of the present without compromising the ability of future generations to meet their own needs." The USC Hospitality Food Philosophy includes specific sourcing standards and guidance for working with smaller producers. Some of its key values include: recognizing the opportunities presented by increased global connectivity for introducing diners to greater culinary adventure; always leading with messages about flavor; the belief that "preservation of family traditions and centuries-old food cultures is as vital as public health and environmental sustainability," along with a celebration of the great compatibility between all three imperatives; and an emphasis on "continuing education for our culinary professionals that will enhance creativity, employee engagement and increased guest satisfaction."
- Leaders of University of Washington's Housing and Food Services Department worked with Coca-Cola and International Paper to develop the first compostable soft drink cup, and with Starbucks to develop their first line of compostable cups.
- University of Massachusetts, Amherst found through its annual survey that 35 percent of its students report eating less beef since arriving at UMass, and 94 percent indicate a goal to eat more fruits and vegetables. UMass employs a small plates format throughout its stations, both to reduce waste and to communicate appropriate portion sizes. UMass Director of

Residential Dining Garrett DiStefano told The Hartman Group blog Hartbeat, "Modeling serving sizes helps students understand that their 'normal' may actually be overeating. We can help them understand that feeling full can be accomplished with plant-based proteins that are healthier for them." As an example of changing what is considered a normal portion size, UMass offers its smoothies in four-ounce cups.

- UC Santa Barbara's Director of Residential Dining Jill Horst partnered with Professor David Cleveland in the environmental studies department to create a program where students can intern in the dining department. One project involved precise measurements of food waste. In another project, a student intern gained a valuable new skill while addressing a critical need for the dining division: conducting a gap analysis, a thorough "How are we doing?" with respect to the 24 Menus of Change principles. The analysis helped shed light on many existing successes and bright spots—for instance, all of UCSB's seafood sourcing is considered "best" and "good" by Monterey Bay Aquarium Seafood Watch guidelines; its shift to tray-less dining in 2009 reduced plate waste by 50 percent and saved a *million* gallons of water per year; and in one of the main dining commons, whole-wheat pizza crust is always available—but they realized there were other areas that needed significant improvement. Added sugars stood out as a spot to improve upon, specifically breakfast cereals, soda, and desserts, so they have made that a priority area to work on, for example by using more fruit to sweeten dishes.
- University of New Hampshire was recently recognized by Farm to Institution New England (FINE) as a "Sea to Campus Case Study": In 2014, a student named Spencer Montgomery founded a student group called Slow Fish UNH to raise awareness about the need to support local fisheries. The group's outreach and educational efforts persuaded University leaders to sign on to Slow Fish Principles and make a stronger commitment to not only sourcing more local seafood but menuing more underutilized species. Incidentally, Spencer is now the Seafood Operations Manager at the regional distributor Dole & Bailey.

- Each quarter, as part of its Seeds of Change program (its adaptation of the Menus of Change principles), UC Riverside's dining department does a full-throttle campaign around a single Menus of Change principle. Each campaign consists not only of the given purchasing change or menu change, and rolling that out across retail, catering, and residential dining, but staff training around how to communicate to students, displaying visually engaging marketing materials, and offering educational resources and presentations for students and staff. For instance, with its "Choose Healthier Oils" campaign, Executive Chef of Retail Dining Burke Reeves created a quick reference guide for all culinary staff, requiring mastery of key teaching points for engaging students at the salad serving station, describing the health benefits of trying a dressing made from a variety of delicious olive oils and vinegars.

## CURRICULAR OFFERINGS AND STUDENT ACTIVITIES

- A growing number of colleges and universities are building teaching kitchens or already offering hands-on cooking courses, nutrition education, food literacy, mindfulness, and other food-related life skills training through existing facilities. Numerous MCURC member institutions are helping to pioneer a movement with CIA-Harvard Chan School's Teaching Kitchen Collaborative (see page 37) about the importance of teaching kitchens—developing best practices, spreading awareness about the potential health impacts for participants, and addressing increasing student demand to gain cooking skills during their college years. These institutions include: Harvard, Princeton, Stanford (through licensed curriculum provided by MCURC ex officio member organization Jamie Oliver Food Foundation), UC Berkeley, UCLA, UC San Diego, and UC San Francisco, as well as ex officio member organization Google.
- Faculty members are working rapidly to add more food-related courses each academic year, and as many as 30 U.S. colleges and universities now offer official degrees or minors in food studies or food systems. (The number is much higher if programs in sustainable agriculture are included.) A few highlights of the course offerings:

- University of Washington offers an undergraduate course taught by Assistant Nutritional Sciences Professor Jennifer Otten entitled “Food Studies: Harvest to Health,” and the wait list has dozens of students, not to mention graduate students trying to sit in. Attendance in her course has more than doubled in the past three years, as has interest in her course “U.S. Food and Nutrition Policy,” forcing her to find larger lecture halls.

- In early 2013, the UCLA Healthy Campus Initiative was launched to support the idea of “the healthy choice as the easier choice.” It brings together campus-wide stakeholders to coordinate existing efforts and work on new, highly focused, carefully evaluated projects in five themed areas (called “pods”): MindWell, BEWell (Built Environment), EatWell, MoveWell, and BreatheWell. In order to pedagogically strengthen the EatWell component of the HCI mission, UCLA recently launched both a food studies minor, with courses for the interdisciplinary program spanning departments such as English, world arts and cultures, environment and sustainability, and community health sciences, and a new graduate certificate in food studies, across departments such as anthropology, psychology, agriculture, law, geographic, and natural and social sciences. They succeeded in developing the latter by identifying existing food-related courses on campus, and formalized it for students by making it a certificate program. It’s open to any graduate or professional student on campus. It aims to foster robust interdisciplinary learning, conquering the current divide seen on many campuses where students studying arts and humanities speak entirely different languages and operate in completely different worlds from students studying sciences and engineering.

- In addition to degree programs in sustainable agriculture and food systems, University of New Hampshire offers a dual major in ecogastronomy, a collaboration between the university’s college of life

sciences and agriculture, college of business and economics, and its renowned Sustainability Institute.

- At UC Berkeley, which offers an undergraduate minor in food systems, students in the food systems organization and management course are given the project assignment of working at a Cal Dining facility and adapting a recipe using the Menus of Change Principles of Healthy, Sustainable Menus. Working in small teams and paired with an executive chef or manager, students must calculate the immediate food costs associated with the menu change, as well as the menu item’s long-term financial sustainability. They must also think through the marketing opportunities of the menu item, portion control, equipment and kitchen layout needs, along with anticipated challenges of making the menu change, such as consumer acceptance, allergen concerns, staff training needs, and so on. The course is required for the nutrition-dietetics major in the Nutritional Sciences and Toxicology department and is taught by Registered Dietitian Nutritionist Kristen Rasmussen,



who also advised Cal Dining on the brown’s cafe concept and co-led the 2016 CIA-Harvard Healthy Kitchens, Healthy Lives conference (for more on this, please see page 36).

- University of Montana offers a sustainable food and farming emphasis through the environmental studies department. While it is not an official degree, both undergrad and grad students may add this concentration to their course of study, and it includes opportunities for hands-on work growing organic food on a local farm.

- Northeastern University offers a new minor in food systems sustainability, health, and equity, and it is one of several outgrowths of its Consortium on Food Systems Sustainability, Health, and Equity, a university-wide collaboration among faculty, students, and staff. In addition to sponsoring talks and symposia—over the past decade Northeastern’s one-of-a-kind Xhibition Kitchen has welcomed more than 350 guest chefs and cookbook authors to provide interactive cooking demonstrations for the campus

community—the Consortium incubates research collaborations such as a partnership between faculty, students, and Northeastern Dining to study pathways for expanding food purchases from local and regional providers.

### RESEARCH: SPOTLIGHT ON UCLA

While multi-site research is currently underway across MCURC member campuses, over the past few years, it has been exciting to see individual colleges and universities conducting inventive cross-departmental studies on their own students and staff in order to gain insights related to behavior change. UCLA is just one example of an MCURC institution with a strong track record of doing so.

In a collaboration between the Healthy Campus Initiative and UCLA Housing and Hospitality Services, researchers converted 38 percent of the 105 vending machines across campus (which see about 2,000 total purchases per day) into HCI approved machines. For machines with that designation, snacks deemed to be healthier were given an “Eat Well” sticker and placed at eye level. Campus-wide, prices were adjusted to incentivize the sale of healthier items and discourage the sale of popular unhealthy items. Rigorous nutritional criteria were used to evaluate all the food products for inclusion or exclusion as “healthy,” and these assessments were informed by healthy vending guidelines supplied by Los Angeles County as well as UCLA nutritionists. The pilot vending machines sold about seven times the number of healthier items compared to the regular machines, while maintaining the machines’ financial performance. Supplemental survey data showed that about two thirds of a sample of vending machine customers felt there were not enough healthy options available on campus vending machines. Bolstered by the results of the first year of the study, the UCLA vending team increased the number of healthy choices in *all* machines.

Continuing this collaboration, starting in fall quarter 2016, HCI and H&HS will embark on a two-year study of a residential dining hall’s “flex station” to test whether the new station’s selection of enticing prepared salads, slow-simmered braises, and roasted and fermented vegetables can increase consumption of plant-based foods and lower consumption of animal protein.

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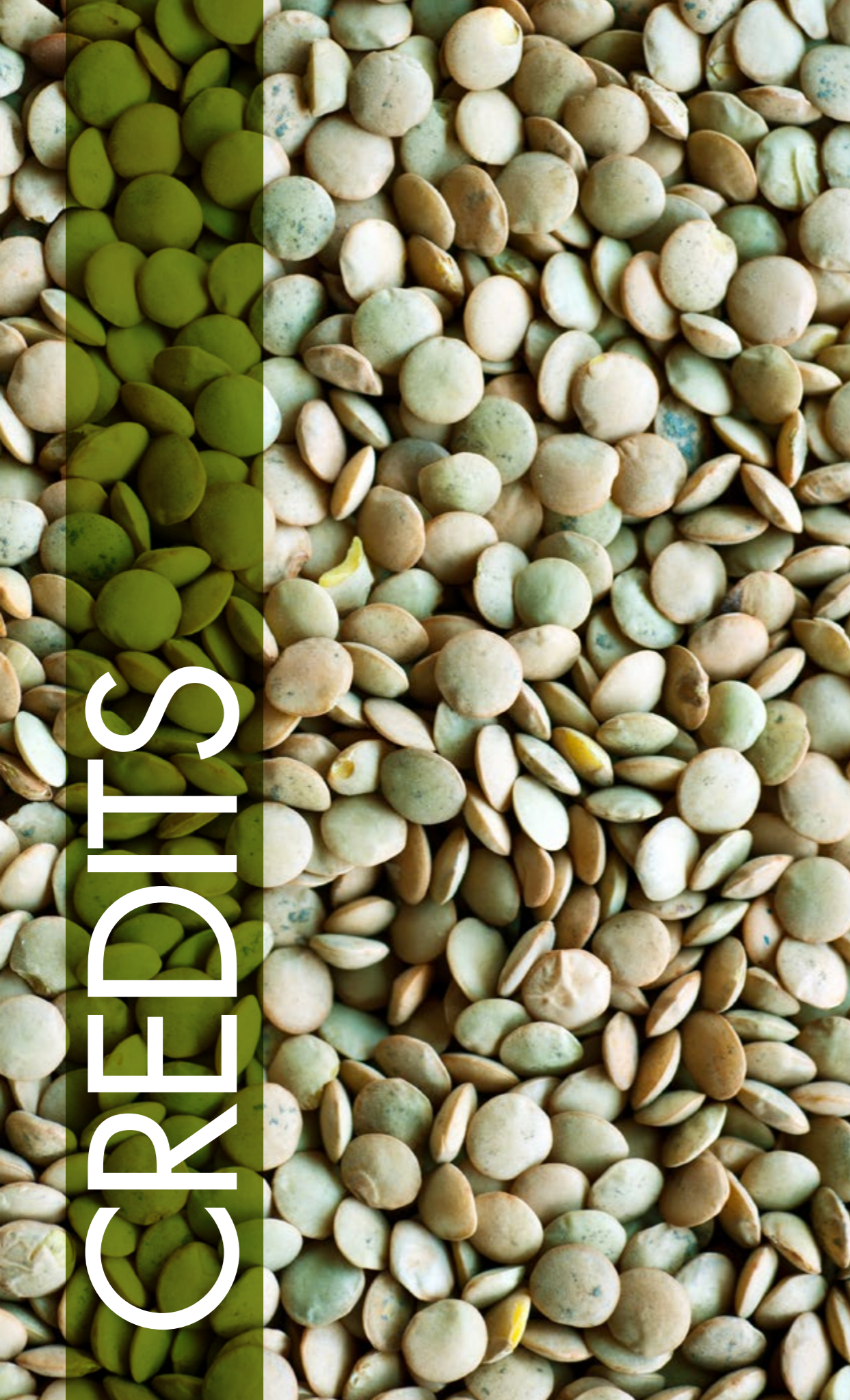
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# MENUS OF CHANGE ANNUAL REPORT

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