# MENUS of CHANGE®

The Business of Healthy, Sustainable, Delicious Food Choices

## 2015 ANNUAL REPORT

The Culinary Institute of America | Harvard T.H. Chan School of Public Health, Department of Nutrition

# CONTENTS


| | | |
|---|---|---|
| I. | Menus of Change: Culinary Education for Our Future | 3 |
| | Menus of Change in 2015 | 4 |
| II. | Executive Summary | 5 |
| | State of the Plate and Score Key | 6 |
| | 2015 Menus of Change Dashboard | 7 |
| | Our Vision | 8 |
| | GPS: A Model for Change | 10 |
| III. | Green Shoots: Delicious Signs of Change | 11 |
| IV. | Nutrition, Health, Sustainability, and Food Ethics: Science and Policy Highlights | 13 |
| V. | Demographics and Consumer Preferences: Issues, Trends, and Changing Appetites | 30 |
| VI. | Business Imperatives: The Changing Calculus on Costs, Risks, and Opportunities | 37 |
| VII. | Principles of Healthy, Sustainable Menus | 41 |
| VIII. | Culinary Insight 2015: Reinventing the Burger | 46 |
| IX. | Business Analysis: The Art of the Possible and Profitable | 48 |
| X. | Marketing Perspectives: The Selling of Delicious, Healthy, Sustainable Food Choices | 50 |
| XI: | Impact Survey Results | 53 |
| XII: | For Further Information | 54 |
| XIII: | Advisory Councils | 56 |
| XIV: | Credits | 58 |

# I. MENUS OF CHANGE: CULINARY EDUCATION FOR OUR FUTURE

Scientific and government reports and media headlines of the past year—together with seismic shifts in next-generation restaurant customer attitudes towards health, environmental imperatives, and food ethics—signal that continual changes in our industry are part of a new status quo, not a series of periodic issue to be solved.

Our third *Menus of Change Annual Report* on the future of food and foodservice, co-presented by The Culinary Institute of America and Harvard T. H. Chan School of Public Health, once again brings together the most critical information and insights to help our industry's culinary and business leaders prepare for a changing landscape of menus, concepts, and business strategies. The report is being issued in conjunction with our 3rd Annual Menus of Change Leadership Summit, also in collaboration with Harvard Chan School, held for the first time at our newly completed Marriott Pavilion at the CIA's main campus in Hyde Park, NY.

Academic innovation and interest on the part of our faculty and students in these issues continue to accelerate, as witnessed by their engagement around a number of recent CIA curriculum additions, including the applied food studies concentration in our bachelor's program in Hyde Park, as well as the farm-to-table concentration based at our California Greystone campus. Students in the latter program have the opportunity to re-imagine menus—and flavors—from the ground up by spending class time in our three-acre farm and learn directly about strategies in sustainable production practices.

Also new within the past year is the launch of the CIA's Food Business School (FBS), our center for executive and graduate education. FBS has taken as its mission to "enable and empower students to design, deliver, and lead transformative innovations that address the world's most pressing food-systems challenges—*and its greatest business opportunities*."

That sense of focusing on business opportunities is also fundamental to the Menus of Change initiative, as well as to our thinking, more broadly, about these issues here at the CIA. Because, from an operator perspective, if we don't have foodservice cost and profit structures that work, and customers willing to support change with their actual food purchases, we have very little. Yes, absolutely we need the best science and other expertise we can gather to crystalize the risks and problems; and we need to understand how, from an evidence-based perspective, we are not simply facing a daunting list of imperatives but rather an *integrated* view of the drivers of change for the future. Further, we need to work collectively to develop broad strategies that can foster a more robust environment for change within our industry.

Then we need to support and encourage the innovators and entrepreneurs among us to take up the challenge of re-inventing and renewing the art of deliciousness, and the business models and menu concepts of our industry. Our customers, our guests, expect no less of us.

**Tim Ryan '77, President**
The Culinary Institute of America

# MENUS OF CHANGE IN 2015

Over the past year, menus changed and so did the fundamentals of the foodservice industry. "It" ingredients defied conventional wisdom: Trash fish, carrot tops, "ugly" fruits and vegetables, and seeds worked their way into the nation's most innovative menus, as chefs found ways to bring new flavors to diners while also reducing food waste and increasing farm yields.

More predictably, chefs continued a successful trend of opening independent restaurants that think plants first. The Culinary Institute of America opened Pangea, its first plant-forward restaurant, to help train the nation's best young culinary talent for the future of fine dining.

Meanwhile, the now abundant crop of innovative kale- and Brussels sprout-studded recipes continued its move into the mainstream, showing up on the menus of Panera Bread, Corner Bakery, and dozens of other national restaurant chains. Even McDonald's followed suit, testing kale in new breakfast items.

Menus always change. But established business models often remain in place… except for the past year. Two of the world's largest restaurant companies—McDonald's and Yum! Brands—set a new course for the quick service restaurant (QSR) segment, promising to move away from artificial additives and towards cleaner ingredient lists. McDonald's also flipped from emphasizing more menu options and food served faster to made-to-order burgers and slower service.

These shifts came when the two companies faced declining sales as supply chain problems of food quality, labor, and animal welfare came to light. Meanwhile, Chipotle pulled carnitas off the menu at a third of its restaurants when it discovered similar problems among its suppliers, further strengthening its brand's reputation among the dining public. These moves all underscore the business case for better monitoring of supply chains and greater transparency with diners.

The past year in science was a bit more predictable, but equally important. Climate and environmental scientists were unsurprised to find that 2014 was the hottest year ever (again) and it was a historically dry year in California (again). Both weighed heavily on restaurants that didn't nimbly manage menus and supply chains. So far, 2015 is on pace to yet again set more troubling, and costly, records on both measures. But as this year's report shows, efforts to shift to more plant-forward approaches represent a rare opportunity to both better manage food costs and help address climate and water issues.

Meanwhile, the nutrition community wrestled with an annual harvest of contrarian studies and catchy book titles that urged the public to return to the diets of past decades, or even millennia, when our foraging skills brought us closer to nature and lifespans were a bit shorter. Headlines followed, but the fundamental science remained unchanged.

Some of the biggest changes in how we eat may come as science is translated into public policy. This spring, the Dietary Guidelines Advisory Committee released its long awaited recommendations for what Americans should eat. The recommendations include less meat, sugar, and refined grains, and more plants, closely matching the principles of Menus of Change. While there is still much political "sausage making" to come, the committee's report further emphasizes that public health and environmental imperatives must come together.

The Menus of Change initiative aims to do the essential, difficult, and unprecedented work of integrating the latest findings from both nutrition and environmental science into a single set of recommendations to help foodservice and culinary professionals make better choices and successfully navigate the rapidly changing landscape.

This annual report is a part of that mission. It seeks to advance a long-term, practical vision that integrates optimal nutrition, environmental stewardship and restoration, and social responsibility within the foodservice industry. The tools it offers include a guide to the key issues that face the foodservice community, a dashboard that will help businesses evaluate their own efforts in the areas that matter most, and a comprehensive set of principles to inform menu development and design.

The CIA and Harvard Chan School invite businesses to use this report to measure their progress and to work through 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

## WHEN IT COMES TO FOOD, HEALTH, AND THE ENVIRONMENT, THE PAST YEAR SAW A TREMENDOUS OUTPOURING OF INNOVATION AND INVESTMENT, CONTROVERSY AND CONFUSION.

Some of the world's top chefs turned to fast-casual restaurant concepts, many of which put plants on a pedestal. The issue of food waste took center stage, with entrepreneurs and chefs alike jumping into the discussion to help bring solutions to market. And it seems that across nearly every college campus, interest is buzzing around finding ways to improve the food system: Last fall, the University of California, Davis announced a new Innovation Institute for Food and Health, backed with $40 million from Mars, Incorporated and $20 million from the university; Harvard T.H. Chan School of Public Health partnered with Harvard Law School in a university-wide food system innovation challenge awarding $50,000 to the first place team of interdisciplinary students; and in November, The Culinary Institute of America launched The Food Business School, the CIA's center for executive and graduate education, and the world's first business school dedicated to food entrepreneurship and innovation.

The 2015 Dietary Guidelines Advisory Committee made history by including environmental considerations in its nutritional guidance for the first time ever. California's drought, far from over, brought the term "water footprint" into the mainstream lexicon and made the concerns about the environmental toll of animal protein in American diets only more pressing. However, a flawed meta-analysis created a wave of confusion by concluding that the type of dietary fat was unrelated to the risk of heart disease, with misleading media headlines like "Eat Butter" and "Butter Is Back" only making matters worse.

Amid these national conversations, Menus of Change is more relevant today than ever before. As the initiative hits the three-year milestone, some remarkable progress has been made. For example, Compass Group USA announced a commitment to four key Menus of Change principles, with corresponding metrics to track progress. The adoption of these principles, which supplements its existing commitments to sustainability, applies across its foodservice portfolio. In this report, you will learn more about not only the announcement from Compass Group but the many other ways the Menus of Change initiative is making real and lasting impact in the foodservice industry.

But it would be a mistake to interpret all these important efforts, these signs of progress, as indication that the work is done. In fact, the challenges remain formidable. In a survey conducted in January 2015 by Datassential on behalf of the Menus of Change initiative, most foodservice operators polled across the U.S. feel that a shift toward more plant-forward menus is important; yet nearly all feel that doing so presents a major challenge.

The *Menus of Change Annual Report* is designed to help foodservice and culinary professionals navigate the complexities of change: to gain the insights and the tools to make informed decisions about difficult issues in order to benefit the triple bottom line of people, planet, and profit. Along with sharing findings from this survey of operators, this report draws on two surveys conducted by the CIA, one to gauge the impact of the initiative on past participants and users of Menus of Change materials, and another to examine what innovations are taking place when it comes to offering alternatives to an all-beef burger. 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 through the **Principles of Healthy, Sustainable Menus**. These guidelines outline essential culinary strategies, such as new emphasis on portion size, calorie quality, and plant-based foods, which are needed to increase the success of new business models. They also provide a set of suggestions for menu development based on the latest nutrition science.

The centerpiece of Menus of Change is a concise analysis of 16 issues that sit at the intersection of public health, the environment, and the business of food. These 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 also assigns each issue a score that rates the industry's efforts in these critical areas. The scores are updated annually. Among these 16 issues are:

**Diet Quality and Consumer Attitudes and Behaviors**
The past year has been a particularly confusing one for consumers and foodservice operators who want to make the healthiest choices. New and existing evidence has recently led to some encouraging conclusions among the nutrition community: The Dietary Guidelines Advisory Committee's report removed the advice to limit the percentage of calories from total fat, instead emphasizing the *type* of fat. Also noteworthy was the elimination of the recommendation to limit dietary cholesterol, due to a lack of evidence that egg consumption was related to heart disease risk except among people with diabetes, considering eggs effectively neutral. While these recommended updates to the Dietary Guidelines have the potential to improve diet quality, misleading headlines pose a major hindrance to consumer understanding. And with such an overwhelming number of purveyors of advice about nutrition, much of it contradictory, the average consumer is left unequipped to navigate the food landscape in ways that are most optimal for health and sustainability.

**Protein Sources and Production**
In its groundbreaking conclusion about the intersection of people and planet when it comes to food, the Dietary Guidelines Advisory Committee's report concludes that, "a dietary pattern that is higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in animal-based foods is more health promoting and is associated with lesser environmental impact (GHG emissions and energy, land, and water use) than is the current average U.S. diet." The advice to Americans is to reduce consumption of red and processed meats, for both health and sustainability reasons. But there is still a long road ahead to put this advice into action. It falls to chefs to present smaller portions of red meat, more plant proteins, and more plants in general, in delicious and satisfying ways.

**Climate Change**
The year 2014 had the highest average annual global temperature on record, and 2015 is so far proving to be warmer still. Greenhouse gas emissions continue to rise, with agriculture and especially livestock production both contributing significantly to the rise while also suffering from its effects, namely severe weather events that damage crops. Culinary professionals have a major role to play in beginning to move the needle the other direction; for instance: directing their collective purchasing power to farms with responsible management practices such as efficient irrigation and fertilizer systems; using existing crop supplies in creative ways and reducing food waste; and providing alternatives to beef on menus.

Overall, the industry is making gradual progress: 12 of 16 issues received a score of four (making good progress) or three (holding steady), and scores improved for supporting supply chain resiliency and transparency; innovations in the food industry; and most notably, changes in investment standards for food industry companies among professional investors. The issue of water sustainability—affected most dramatically over the past year by California's fourth year of record drought—remained a two (lacking significant progress even as the challenge grows) from 2014. Restaurant and foodservice professionals continued to be underprepared for the impact of climate change on their operations, which remains the industry's most intractable issue, still at a score of one.

## METHODOLOGY

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

# 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

# 2013–2015 MENUS OF CHANGE DASHBOARD

| ISSUE | SCORE 2015 | SCORE 2014 | SCORE 2013 | JUSTIFICATION |
|---|---|---|---|---|
| DIET AND HEALTH: RECENT TRENDS | | | | Modest improvements toward healthier diets include reduction in the intake of trans fats and sugar-sweetened beverages, and a small increase in whole fruits and whole grains. Actions to undercut standards for nutritional programs for low-income Americans and school children are steps backwards. |
| PORTION SIZE AND CALORIC INTAKE | | | N/A | Efforts to reduce calories continue to move toward an emphasis on low-sugar and smaller portion size, but a more fundamental focus on food (or calorie) quality, not just quantity, is needed. |
| PROTEIN CONSUMPTION AND PRODUCTION | | | | Red meat production and consumption in the United States continue to decline but are growing in the developing world. Climate conditions are reducing supplies and driving up price volatility, underscoring the business benefits from further reductions. |
| FRUIT AND VEGETABLE PRODUCTION AND CONSUMPTION | | N/A | N/A | While the promotion of fruit and vegetable consumption has increased, it has not yet achieved sufficient scale and long-term trends have not been reversed. |
| FISH, SEAFOOD, AND OCEANS | | | | Public and private efforts are improving seafood sustainability. But continued environmental concerns, social ills, mislabeling, and a lack of traceability hinder the path toward true sustainability. |
| CLIMATE CHANGE | | | | Although the announcement in November 2014 by China and the U.S. to curtail future greenhouse gas emissions is positive, carbon emissions are still relentlessly increasing and atmospheric $CO_2$ has crossed a significant threshold of 400 ppm. |
| WATER SUSTAINABILITY | | | N/A | Reducing meat consumption and raising awareness about water stress are helpful measures that consumers and chefs can take, but these trends do not yet reflect broad efforts in the foodservice industry, while producers face prolonged periods of drought. |
| AGRICULTURE, DRUGS, AND CHEMICALS USE | | | N/A | Lack of real progress on the regulatory front is counterbalanced by growing demand from chefs, foodservice professionals, and consumers for antibiotic-free meats. |
| HEALTHY FOOD VS. HEALTHCARE SPENDING AND TRENDS IN MEDICAL-CULINARY EDUCATIONAL ALLIANCES | | | | Innovative programs are starting to link healthcare and healthy eating along with culinary education. But these connections are not yet widespread, and more education and demonstration projects are required. |
| ANIMAL WELFARE | | | | Better, alternative practices are being employed by a small group of producers, and some promising legislative and policy initiatives are being proposed and passed. However, in general there remains substantial room for improvement. |
| LOCAL FOOD AND THE FARM-TO-TABLE MOVEMENT | | | | Federal and local policies are supporting local and regional food. The combination of farmers, buyers, and food consumers in this new policy environment will hopefully accelerate growth in the segment. |
| CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD | | | | Even consumers motivated to make healthier food choices can't help but be confused about the right choices given the steady barrage of inconsistent advice, including efforts to create confusion around the Dietary Guidelines Advisory Committee's report. |
| CHEFS' INFLUENCE ON CONSUMER ATTITUDES | | | | Chefs are engaged in the movement for sustainability and are making progress in offering more plant-forward menu options, but need to increase their consideration of portion size, nutrition, and public health. |
| SUPPLY CHAIN RESILIENCY AND TRANSPARENCY | | | | Food supply chains remain vulnerable to fraud and contamination. More traceability information is needed. |
| INNOVATIONS IN THE FOOD INDUSTRY | | | | An outpouring of innovation can be seen throughout the industry, and a greater array of tools and technologies are available to foodservice professionals. But it may be difficult for some culinary professionals to know which technologies to embrace. |
| CHANGES IN INVESTMENT STANDARDS FOR THE FOOD INDUSTRY AMONG PROFESSIONAL INVESTORS | | | | Private investors have significantly increased their support for new food and foodservice companies that feature plant-forward concepts and focus on sustainable supply chains. |



© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on Menusofchange.org. All rights reserved.

# OUR VISION

© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on Menusofchange.org. All rights reserved.

# OUR VISION

HEALTHY, SUSTAINABLE, AND DELICIOUS

BUSINESS MODELS AND STRATEGIES

MENUS of CHANGE®

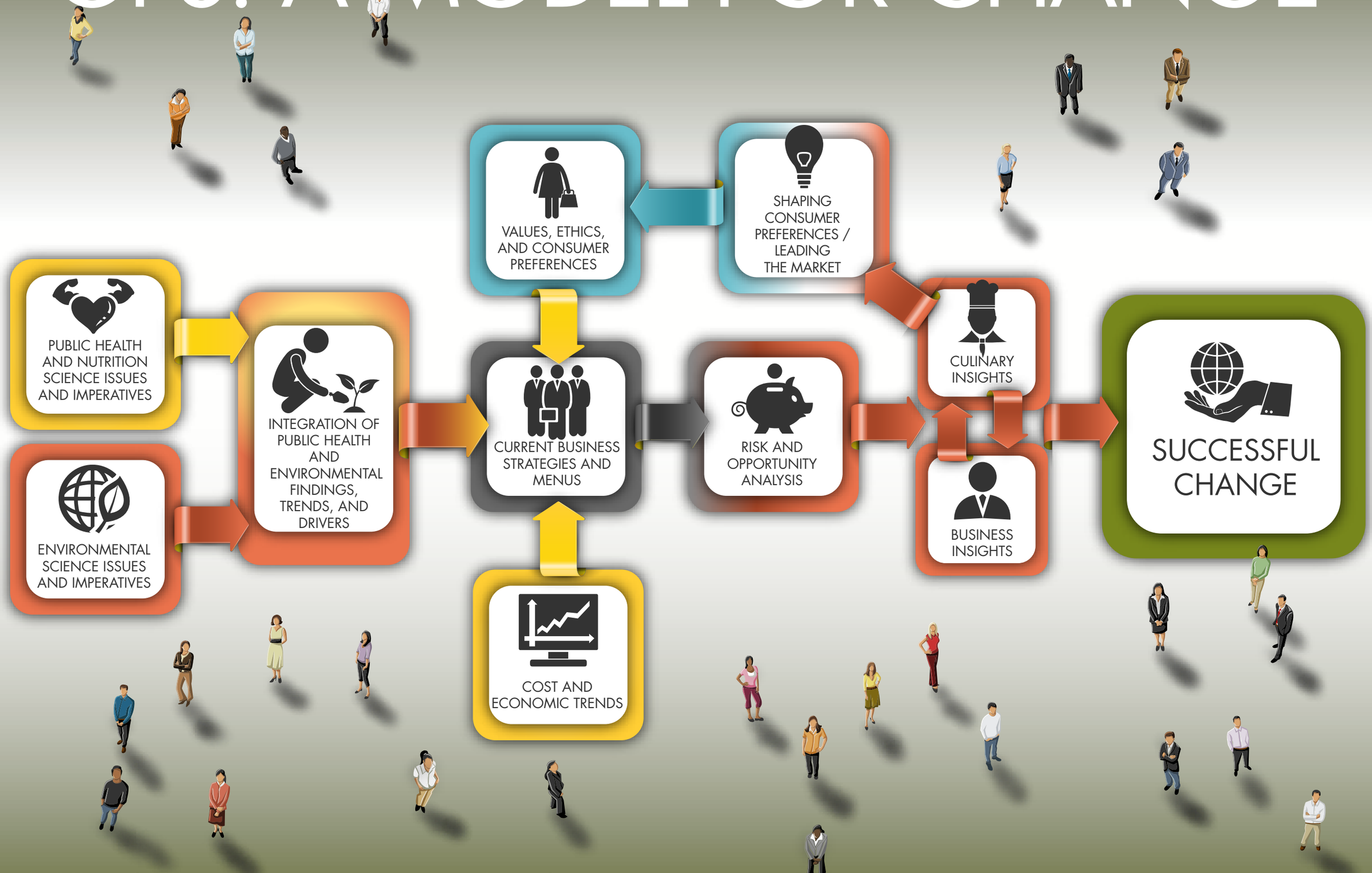
The Business of Healthy, Sustainable, Delicious Food Choices

## THE FUTURE OF FOOD

INTEGRATED GUIDANCE FOR BUSINESS AND CULINARY LEADERS

© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on Menusofchange.org. All rights reserved.

# GPS: A MODEL FOR CHANGE




© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on Menusofchange.org. All rights reserved.

It seemed that 2014 would go down as 'The Year of Food Waste Awareness,' but then 2015 hit, and reducing food waste is now even more firmly mainstream.

# III. GREEN SHOOTS: DELICIOUS SIGNS OF CHANGE

In the past year, farm-to-table has been taken far beyond just restaurants to a wide range of institutions. In April, thanks to a $50,000 grant from USDA, Farm to Institution New England (FINE) held its first Farm to Institution Summit at University of Massachusetts, Amherst. A public-private network across six states, FINE brought together hundreds of chefs, teachers, students, farmers, policy makers, fishermen, and other leaders and advocates to increase the amount of local and regional food served in K-12 schools, colleges and universities, and hospitals and clinics.

Anyone who has traveled by airplane would likely agree that the typical fare available in airports has long lagged behind the rest of the food movement. Healthy, fresh, culinary-driven options have become more common over time, but recently, in what *The New York Times* called "farm-to-terminal," locally sourced products and ingredients have become more widespread. Rick Bayless' restaurant Tortas Frontera at the Chicago O'Hare International Airport now buys its bacon and chorizo from a pig farmer in LaGrange, Indiana, a (relatively) local supplier 170 miles away. Demand is so high—with some passengers even placing orders for Tortas Frontera through a mobile app before they reach the airport—that the farmer had to expand his land and his workforce. Innovative business solutions like FarmLogix, which connects farmers to large institutions, have helped farmers overcome traditional barriers to supplying airports, which include getting through security and geographic and logistical challenges. O'Hare also boasts an aeroponic garden where airport restaurants can gather herbs and vegetables. The food offerings at San Francisco International Airport's Terminal 2 were dramatically improved several years ago, selling products from nearby farms and producers; now John F. Kennedy International Airport is selling produce grown in New York, as well as local products like honey. Michelin-starred chef Alain Ducasse has been hired by Newark Liberty International Airport to upgrade the fare in one of its terminals—only one of the many chefs involved in the airport's extensive revamping of its food options, with a focus on freshness and nutrition.

It seemed that 2014 would go down as "The Year of Food Waste Awareness," but then 2015 hit, and reducing food waste is now even more firmly mainstream. The National Restaurant Association ranked food waste ninth in its "What's Hot in 2015" list of the top 20 food trends, which reflects survey results from over a thousand chefs. It shares a Top 10 list that includes locally sourced and sustainably produced meats, seafood and produce and the movement towards natural ingredients and away from processed foods.

In Europe and the U.S., initiatives are gaining traction that encourage the use of less than perfect foods that producers typically discard because they have no wholesale or retail demand for them. Some are true grassroots efforts, done in an almost subversive way; others offer the backing of a large organization or media platform. A Lisbon-based cooperative named Fruta Feia ("ugly fruit") is bucking the traditional quality regulations set by the European Union for produce sold in supermarkets, which dictate strict parameters around size, color, and texture, and allow only the slightest imperfections.

Yet, Europe wastes 89 million tons of food a year, according to a study released in May 2014 by the Dutch and Swedish governments, who support efforts to reduce food waste. Since winning a $20,000 entrepreneurship competition in late 2013, Fruta Feia has been growing. It now has hundreds of registered customers who pay a membership fee and receive weekly crates of otherwise neglected fruits and vegetables. Fruita Feia buys unwanted produce from farmers, at about half the price paid by supermarkets, and uses nontraditional distribution centers rather than retail stores. In the U.S., *Food & Wine* launched in March a #loveuglyfood campaign and invited its readers to post photos of their "crooked carrots, terrifying monkfish, and other not-so-beautiful foods" on various social media platforms, using the hashtag.

Other social media campaigns, such as that of endfoodwaste.org, ask consumers and businesses to pledge to eliminate food waste. According to the Natural Resources Defense Council, 40 percent of food produced in the U.S. is wasted. In the fall of 2014, the organization hosted the "Woodstock of Food Waste" in Berkeley and Oakland, California, gathering representatives from 16 states and seven countries to discuss the issue's next frontier.

Chefs are also doing their part. A menu labeling system launched last year in Düsseldorf, Germany, called "All You Can't Eat," allows diners to pay the same price for a smaller-than-normal portion and have the restaurant send its saved food costs to a local food bank. In March, chef and author Dan Barber put his acclaimed New York City restaurant Blue Hill on hiatus in the name of addressing food waste: He transformed both the dining room and the menu into a pop-up restaurant called wastED, where every dish was about elevating scraps, overlooked ingredients, and byproducts and inefficiencies along the food chain. Imagine, for instance, biting into a burger made from a juice company's leftover vegetable pulp. (Any food remaining on diners' plates went straight to the hens at Barber's sister restaurant, Blue Hill at Stone Barns.) Barber's larger goal is to bring about a cultural shift in how chefs and consumers think about feeding people. To that effect, he invited a different guest chef to join him in the kitchen each night and feature a dish on the menu; CIA alumni Grant Achatz, Andrew Carmellini, Enrique Olvera, Alex Raij, and Alex Stupak were among those who accepted the challenge.

On the investment side, crowd-funding platforms that specifically support food system change are emerging rapidly and strongly. One of them, Barnraiser, is an organization launched last spring by Eileen Gordon Chiarello, a Napa Valley-based entrepreneur and business partner with her husband, chef Michael Chiarello. Thanks to Barnraiser, a group in Nevada County, California—led in part by organic farmer Amigo Bob Cantisano, who helped start California Certified Organic Farmers (CCOF)—raised 167 percent of its goal, for a total of over $33,000 to help revive heirloom fruit and nut trees from the Gold Rush era that are resistant to drought and pests. The Riverside Project, based in Charles Town, West Virginia, also exceeded its funding goal, surpassing $17,000 to host a workshop to raise a timber frame pavilion this August. The structure will become a community hub offering retreats, trainings, and youth programs around topics such as permaculture and sustainable food production.

Increasing farm-to-consumer options and reducing food waste are indeed delicious signs of change, and these movements are growing alongside a handful of initiatives related to marketing and fund-raising that are equally encouraging.

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

Fueled by misleading reports about the role of dietary fats, the past year has been particularly confusing for consumers and foodservice operators wishing to make the healthiest decisions. What is at stake is not only our health, but also the health of the environment that sustains life on earth. The following series of essays cuts through the complexity of nutrition and environmental science to provide clear guidance for culinary professionals who hope to offer healthy and sustainable choices. It also looks at national trends that suggest new ways the food industry can positively impact public health.

## 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; controlled feeding studies in humans lasting for several weeks among a few dozen subjects; large epidemiologic studies with several decades of follow-up; and a limited number of randomized trials in humans. While some of 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 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. Although this would seem to be a minimal criterion for dietary guidelines, this was the first time any guidelines had been evaluated this way. Disappointingly, after accounting for tobacco use, physical activity, and other factors, there was little relation between adherence to the Dietary Guidelines 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. This finding was confirmed in other large populations. 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. Specifically, and very importantly, the Advisory Committee concluded that the limit on percentage of calories from total fat 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. This point is important to keep in mind because some foods such as nuts, whole grains, and plant oils can actually reduce blood cholesterol levels and risk of heart disease.

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 and dairy fat.) In addition, the USDA HEI does not specifically include trans fat. As mentioned, the AHEI 2010 was a stronger predictor of health outcomes when all elements were combined. 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 in 2013 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, but understanding of the key elements of this diet allows its principles to be incorporated into diets of many flavors and cultures.

## 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 with which some may not be familiar. 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 it is the type of fat in the diet, rather than the percentage of total fat, that is linked to heart disease. Moreover, low-fat diets are not effective for long-term weight control. Specifically, the AHEI recommends that trans fats from partially hydrogenated vegetable oils 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, and replacing it with carbohydrates has no benefit and 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 (for further information on the original paper and commentaries, along with a teach-in at Harvard Chan School, see page 54.) 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 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 this 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.** A recent 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 not avoid 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 with good practices these species can be produced sustainably. Eating a wider variety of fish species, both wild and farmed, is a 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, livestock, and 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).**

**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 and have not been associated with lower risk of chronic disease in epidemiologic studies, and also 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.

**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 may increase 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 due to the fact that there is no federally regulated definition of "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 did not reduce 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 it is the ratio of n-6 to n-3 fatty acids that is critical. This hypothesis has been consistently refuted in many studies. Indeed, the doubling 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.

**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 2013, the FDA announced that partially hydrogenated fats would no longer be Generally Recognized As Safe (GRAS); if implemented, industrial trans fat would be eliminated 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.

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. Figure 1 (page 16) 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 them 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 has not been studied directly in relation to risk of cardiovascular disease, and such a study would be difficult to conduct, this does further reduce blood pressure. 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. The controversy exists largely because trials of 1,500 milligrams per day have only shown benefits on blood pressure and have not examined risk of cardiovascular disease, which requires much longer and larger studies.

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

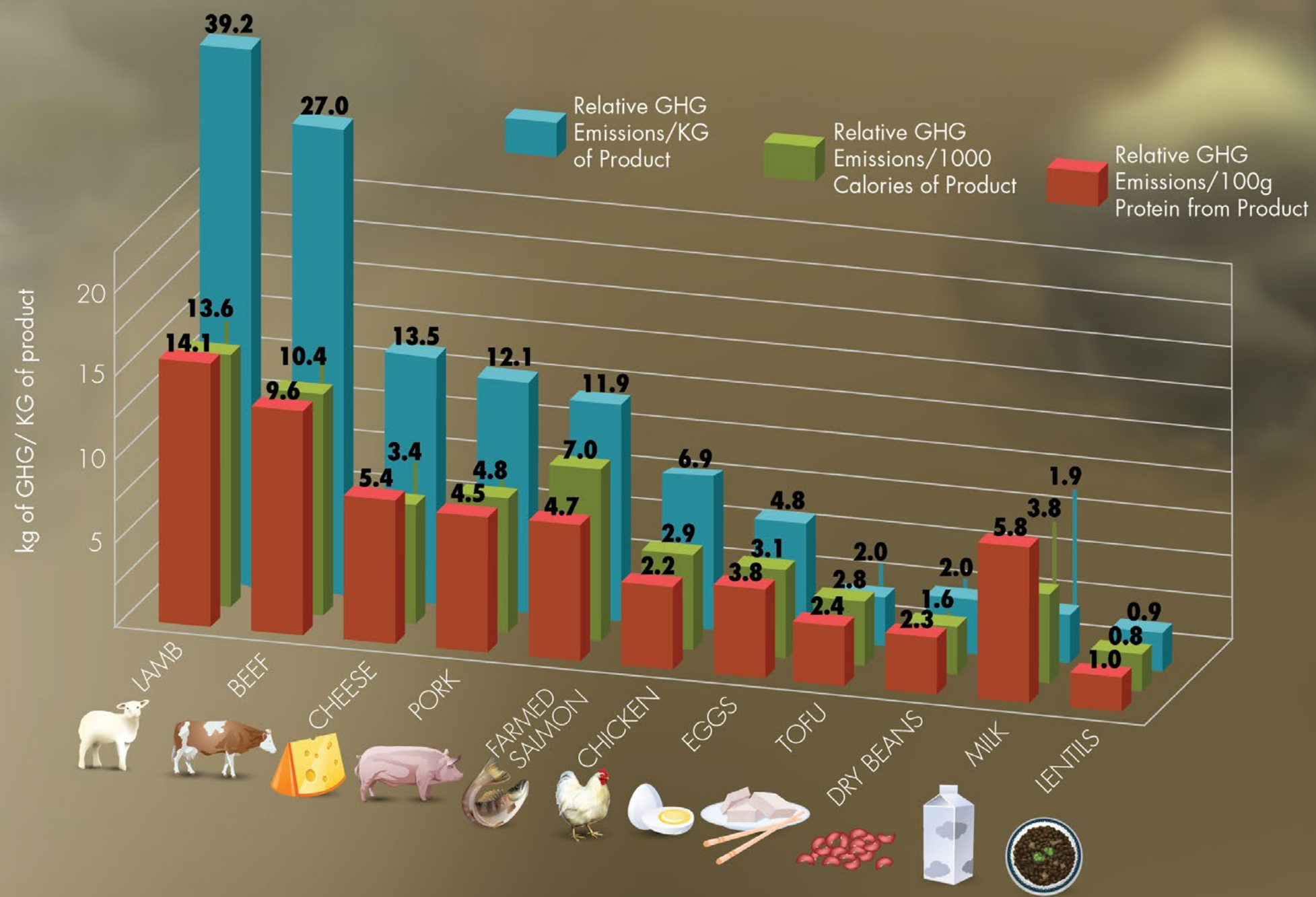



**Table 1** illustrates the greenhouse-gas emissions associated with several common protein sources and is a good indicator of environmental impact including energy and chemical use, soil management, and mechanical irrigation. Both public health and the environment will improve if restaurants decrease 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 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on menusofchange.org. All rights reserved.

## 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, especially a reduction in risk of diabetes. 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.

**3) Milk, Cheese, and Other Dairy Products:** Milk has been 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 World Health Organization'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

In an effort to judge whether American diets are becoming more healthful for this report, investigators from Harvard T.H. Chan School of Public Health 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 2015 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. 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. However, the overall score remains poor, and there is room for vast improvement. (The average score is below 50 out of 100 possible points.) For example, the average daily servings of whole fruits and vegetables were 1.6 and 1.7 respectively, versus 1.7 servings of sugar-sweetened beverages and fruit juice. Women ate just 1.2 servings of whole grains, while men ate 1.6 servings. Sodium intake remained at approximately 3,400 milligrams per day.

The improvements 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 that were analyzed show improvement in diet through 2012, without even including the effects of many public health promotion campaigns and changes in foodservice operations since that time, which have been designed to increase our consumption of fresh fruits and vegetables and whole grains, while reducing our 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

Modest improvements toward healthier diets include a large reduction in the intake of trans fats, some reduction in sugar-sweetened beverages, and a small increase in whole fruits and whole grains. The FDA proposal 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. Actions by Congress to undercut standards for nutritional programs for low-income Americans and for school children are steps backwards.

### IN SUMMARY:

- Progress is visible, including the FDA's proposal to eradicate trans fat from the food supply, some reduction in the consumption of sugar-sweetened beverages, and a small increase in how much whole fruits and whole grains Americans consume.
- Several myths persist about what constitutes sound eating habits, and the past year saw confusion deepen about the relationship between type of fat consumed and heart disease risk, largely due to a flawed meta-analysis.
- The move by Congress to classify potatoes as a vegetable in the Women, Infants, and Children (WIC) program is an unfortunate step in the wrong direction.

# PORTION SIZE AND CALORIC INTAKE

Portion sizes have increased dramatically in the last half century: The archetypical 6.5-ounce sugar-sweetened beverage from the 1950s has given way to bottles of 20 ounces or more. And as Morgan Spurlock graphically illustrated in his movie, *Super Size Me*, restaurant portions have also ballooned to lure in "value" customers. Indeed, 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.

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 were under- or overfed to change body weight by 10 percent, energy expenditure decreased or increased, respectively. In addition, after a period of forced overfeeding, research volunteers decreased food intake until original body weight had been restored. In short, body weight appears to be under strict long-term control by biological factors, and the body's metabolism responds to resist weight change.

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 index" 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), healthful fats (nuts, avocados, oil-based salad dressings), and plant-based proteins (nuts, legumes, soy products) displaces less healthful foods, improves diet quality, and protects against chronic disease.

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.

## 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 plant-based 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 reduce calories continue to move in a positive direction: away from the low-fat paradigm and toward an emphasis on low-sugar and smaller portion size. This constitutes progress, but a more fundamental focus on food (or calorie) quality, not just quantity, is 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 plant-based proteins, shifts in national policy are needed to decrease prices of these foods relative to commodities, as are culinary strategies from the foodservice industry to make these options more available on menus and served in a delicious variety of ways.

# PROTEIN CONSUMPTION AND PRODUCTION

In the U.S., animal sources account for approximately two thirds of 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 environmental impacts and the risk of chronic diseases and premature death.

In the past several decades, meat production and consumption have increased sharply worldwide, especially in developing countries. Since 1995, per capita meat consumption has grown 25 percent in developing countries and two percent in developed countries, for a 15-percent increase overall. 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 remains high: 118 kg per capita in 2011, the fifth highest consumption rate globally.

Animal-based foods contribute disproportionately to the overall 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, which influences global warming, reduced air and water quality, and biodiversity loss. The main reasons for these impacts are the production of animal feed (corn, soybeans, etc.), enteric emissions from ruminant animals, and emissions to air and water from manure management. 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. As a result, the land use, resource needs, and associated emissions for producing feed crops compound for animal products. In regions with high demand for land, this can also lead to deforestation and biodiversity loss. In addition, ruminant animals (beef and milk cows, and sheep) emit methane, a powerful greenhouse gas, as part of their normal metabolism. The result is even larger carbon footprints for these animal products.

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 typically involves higher GHGE and system energy use 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. Processed meats are particularly deleterious due to their high contents of saturated fat, sodium, and preservatives; these include lean red meat but especially such items as bacon, hot dogs, sausage, salami, and bologna (which are especially high in sodium). Nearly one in 10 deaths could be prevented in the U.S. if American adults cut their current red meat consumption to less than half a serving per day.

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 chronic diseases. However, consumption of dairy products may affect human health in complicated ways, including both benefits and risks, both of which vary among different populations. 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. The study found that total dairy, milk, and cheese were not significantly associated with risk of type 2 diabetes and that yogurt is the only dairy product that was 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, higher amount of dairy protein is not required to achieve health benefits.

Yet, meat and dairy products are the foods that receive the most support by the federal government's generic commodity check-off advertising programs, which are established by Congress and managed jointly by producer boards and USDA. The idea with these advertising campaigns—which have included "Beef. It's What's for Dinner"; "Ahh, the Power of Cheese"; "Pork. The Other White Meat"; "Got Milk?"; and the milk mustache campaign—is not to sell a specific brand but to increase overall demand for a generic category. Yet, there is no check-off support for poultry, fish, or whole grains, and only very little for fruits and vegetables. It is difficult to lead U.S. consumers to eat more plant-based proteins, and to shift a greater proportion of their diets in general to plant foods, while simultaneously pushing for increased consumer demand for milk, cheese, butter, beef, and pork.

The past year has 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, as confirmed in a systematic review published this year. In one of the few U.S.-based studies, Heller and Keoleian (see For Further Information, page 54) found that, despite a recommended 20-percent decrease in calories and reductions in meat consumption, the GHGE of the average recommended diet in the *2010 Dietary Guidelines for Americans* would be about the same as that of the current diet. 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 reductions in dairy consumption. Studies also demonstrate that reducing animal products in the diet can be an effective means of conserving water and energy resources.

In a comprehensive analysis published in *Nature* in 2014, Tilman and Clark (see For Further Information, page 54) compared diets with less or no meat (for example, a Mediterranean or vegetarian diet) to the average American diet. The authors conclude that, "Alternative diets that offer substantial health benefits could, if widely adopted, reduce global agricultural greenhouse gas emissions, reduce land clearing and resultant species extinctions, and help prevent certain diet-related chronic non-communicable diseases."

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 have an important role to play in leading and inspiring the new cultural norms necessary to prompt dietary shifts. 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: 1-2 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 driving up costs, stressing the need to further reduce 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 report considers diet sustainability as part of the evidence base to develop *Dietary Guidelines for Americans*. The report concludes that, "a dietary pattern that is higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in animal-based foods is more health promoting and is associated with lesser environmental impact (GHG emissions and energy, land, and water use) than is the current average U.S. diet." The 2015 Dietary Guidelines Advisory Committee recommends that the U.S. population reduce consumption of animal products, especially red and processed meats, for both health and sustainability reasons.

## 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

Fruits and vegetables provide fiber, vitamins, minerals, and phytochemicals, and displace less healthy food options in the diet. Yet, Americans' consumption of fruits and vegetables falls very short of recommendations.

The federal government's Healthy People 2020 objectives express this shortfall through meticulous advice: It suggests Americans raise fruit intake from 0.53 cups per thousand calories to a target of 0.90 cups, and raise vegetable intake from 0.77 cups per thousand calories to a target of 1.14 cups. The government's MyPlate graphical guidance makes the same broad point with a more colorful flourish: It suggests we strive to fill half our dinner plate with fruits and vegetables. Americans rarely do so when we cook at home, and, on average, consume even fewer fruits and vegetables when we eat out.

Despite clear health benefits of consumption, the trends for fruit and vegetable production are unfavorable. According to the U.S. Department of Agriculture's (USDA) Loss-Adjusted Food Availability (LAFA) data series for the most recently available two decades, from 1993 to 2012, per capita daily fruit availability fell from 5.6 ounces to 4.7 ounces, and per capita daily vegetable availability fell from 7.7 ounces to 7.1 ounces. The reasons behind the trends relate to both supply and demand. As industrialization and technology have boosted productivity in recent decades, U.S. food in general has become more affordable. However, these gains in productivity and subsequent reductions in price have been more rapid in other food sectors than in fruit and vegetable production, which remains comparatively labor-intensive. The Consumer Price Index (CPI) for fruits and vegetables has risen more rapidly than the corresponding indices for other food groups.

It is widely believed that farm subsidies for corn and soybeans have led people to consume far too much unhealthy grains, sweeteners, meats, and processed foods at the expense of fruits and vegetables. Subsidies for fruits and vegetables are indeed far lower than those for grains and soybeans, and the 2014 Farm Bill retained a small but unwise restriction that discourages fruit and vegetable production on land that qualifies for federal subsidies. Recent research suggests that this restriction may have a significant impact on fruit and vegetable production in some regions. The fruit and vegetable industries do benefit from government programs that provide conservation payments, marketing and grading services, agronomic research, subsidized water inputs, and demand promotion through school meal programs. And a new pilot program, Whole-Farm Revenue Protection, may make it more feasible for fruit and vegetable growers to take advantage of federal crop insurance programs. Overall, farm policy is one, but not the only, reason for low fruit and vegetable consumption. Aside from the significant issue of the high cost of fresh produce, other potential reasons for low consumption are that most of the produce sold in supermarkets has been farmed for yield, uniformity, and safe transport, rather than flavor, along with the widespread use of cooking techniques (such as steaming rather than roasting or searing) that do not offer consumers the full taste potential of fruit and vegetable dishes.

In general, the greenhouse gas emissions associated with producing fruits and vegetables are far lower than for animal-based foods. A few notable exceptions are imports by air freight and hothouse production of out-of-season fruits and vegetables. Tomatoes or cucumbers grown in these heated greenhouses carry 15 to 20 times the carbon footprints of those grown in fields. Environmental assessments of fruits and vegetables must consider the nutritional purpose of particular foods. For example, if measured on a per-calorie basis, leafy greens have appeared to have a high environmental impact, simply because they have few calories, but these foods are an environmentally efficient source of many nutrients beyond just food energy. Other environmental impacts, such as water use and water quality, are strongly dependent on the location of production. While "locally grown" produce may have important socio-economic benefits, it is not necessarily lower in environmental impact. Appropriate choices of fruits and vegetables offer chefs an opportunity to encourage healthy eating and environmental sustainability together, while also offering seasonal flavor experiences.

In recent years, the dramatic growth of farmers' markets, farm-to-school programs, food hubs, and other food sourcing innovations have enhanced public attention to fruits and vegetables. This growth has been rapid, but it's important to realize that the base that growth has started from is relatively small. The majority of fruits and vegetables purchased in the U.S. are still from supermarkets, superstores, and restaurants, and most of these businesses use modern national and international supply chains (as opposed to local or regional ones). So while new innovations in local production and distribution are encouraging, these conventional food chains remain an important source of healthful fruits and vegetables.

Federal, state, and local governments have increased their promotion of fruits and vegetables using many tools: the federal fresh fruit and vegetable program in school meals programs, the fruit and vegetable voucher offered through the Women, Infants, and Children (WIC) program, a Healthy Incentives Pilot (HIP) to test a financial incentive for fruits and vegetables, the new federal Food Insecurity Nutrition Incentive (FINI) program, and a cornucopia of local farmers' market incentive programs.

## RECOMMENDATIONS:

Federal and state governments should encourage and support private-sector initiatives to expand fruit and vegetable production in non-traditional areas with the right growing conditions. As a small but symbolically important step, the federal government should remove the planting restriction for fruits and vegetables on land that receives federal subsidies. Federal, state, and local governments should continue to investigate and evaluate innovative programs to promote fruit and vegetable consumption through social marketing and financial incentives.

In the private sector, manufacturers and retailers can continue their long history of product innovations to encourage increased fruit and vegetable production. Restaurants at every scale can continue their efforts to enhance the share-of-plate devoted to fruits and vegetables. Perhaps most importantly, chefs and food industry leaders can lure consumers to fruits and vegetables through taste: preparing and serving fruits and vegetables in ways that heighten their visual appeal and flavor profile. Many chefs and even high-volume chains around the country have recently been elevating the status of fruits and vegetables on their menus, and collectively raising produce's profile in the restaurant world. But more emphasis is needed, as chefs and menu decision makers are powerful influencers when it comes to changing cultural perceptions and boosting consumers' willingness to try new foods.

## SCORE: 3

There has been an enormous amount of recent public interest and governmental initiative around promoting fruit and vegetable consumption. 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, consumption of fruits and vegetables remains far below recommended levels.
- 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; as a result, production and overall availability remain low, and prices remain high.
- 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 is a healthy and relatively environmentally friendly choice. And yet, annual U.S. seafood consumption is less than 15 pounds per year. That's *half* the global average. Despite up to 500 different species of fish and shellfish being available in the U.S., the top 10 types comprise 90 percent of the volume consumed. This year, salmon became the second most consumed seafood behind shrimp, which has been the most consumed seafood for over a decade. Canned tuna decreased to third place, with a minor slip in volume consumed, but still above two pounds per person per year. The majority of shrimp, tuna, and salmon are caught or farmed overseas (largely a result of a search for cheaper and more consistent protein). This has led to a lack of transparency, and concern about environmental practices, which in turn raises questions for chefs and consumers.

Seafood consumption is associated with a host of health benefits. Fish is an important source of low-calorie protein, provides high levels of amino acids, micronutrients, and minerals, and may be beneficial for brain development. Seafood, especially from marine sources, provides a good source of long chain omega-3 fatty acids, which have been linked to lower risk of heart attack and stroke. These health benefits are weighed against how much methylmercury, a neurotoxin, fish contains. This year, the FDA recognized the beneficial health effects, while reporting that pregnant women consume only about one third of the FDA recommended amount of fish, and this can impact their children by not allowing full IQ development. The FDA recommends that consumers including women who are pregnant or breastfeeding eat a minimum of two to three servings of fish a week.

This year, the discussion of seafood sustainability has continued to heighten, and we now see an ever-increasing number of claims that the seafood being sold is sustainable. Yet "sustainable" implies an end of journey, that all necessary work has been done, and there is no longer a need to improve. All sectors of the food industry need to work to continually increase the sustainability of their products, as this is the ever-important process toward food system improvement Certification is an important component of the path to sustainability, but represents only a step along the way. The challenge moving forward will be to determine how to differentiate the rigor of different types of certification so they all do not converge toward a single low bar of sustainability that is passable by all.

**Aquaculture:** Aquaculture production is important because global demand for seafood exceeds supply of wild species. Of the top 10 seafood species consumed in the U.S., 57 percent is produced in aquaculture. However, most of that is imported. U.S. domestic production is low and focused on shellfish, plus niche production of trout, salmon, and shrimp. The Global Aquaculture Alliance (through its Best Aquaculture Practices (BAP)) and the Aquaculture Stewardship Council (ASC) continue to lead certification initiatives to ensure production meets specific criteria.

To address the fact that, globally, less than ten percent of seafood is certified to an independent third party "eco-label scheme" (e.g., MSC, GAA, ASC), efforts are underway to create Aquaculture Improvement Projects (AIPs) and to engage more aquaculture operations in the certification process, which will ideally reduce poor production practices. A new concept in AIPs is area management, which will address not only production at the farm level, but assure that multiple farms in an area do not interact in a way that cumulatively harms the environment.

**Fisheries:** As in aquaculture, improvements toward more sustainable fisheries continue. However, the Marine Stewardship Council (MSC), the largest and most widely accepted wild fishery certification program, has only certified about eight percent of the global catch to date as meeting its standard for fishery management. The reasons for this low uptake include but are not limited to: the high cost and time of conducting the certification; the uncertainty for the return on investment; and the potential for mixed messaging through the appearance of less rigorous programs. To assist in the creation of additional certified product, collaborative efforts— including the fishing industry, retailers, and members of the Conservation Alliance for Seafood Solutions—have spearheaded Fishery Improvement Projects (FIPs). These projects connect environmental organizations, industry, and other stakeholders with troubled fisheries to move them toward sustainable practices and, ultimately, certification.

Because U.S. regulations include mandates to establish sustainable fisheries, some argue that U.S. fisheries do not need additional independent evaluation. However, a number of U.S. stocks are still subject to overfishing and/or are overfished, are inadequately enforced, and, in some cases, are not managed with enough precaution to adequately ensure rebuilding. In the Gulf of Maine, managers suggest again limiting the total allowable catches of cod. This could disrupt the U.S. Gulf of Maine groundfish fishery, prompting much consternation.

## RECOMMENDATIONS:

Foodservices leaders must know what they buy and where it is produced, and must communicate this information honestly and effectively to diners. DNA methods are becoming so readily available that high school biology classes now can use them. But DNA methods are only as good as our biological understanding of the species. In most cases, we can tell the species, but not a specific location, and most definitely not the methods used to catch or grow the fish. Widely available methods of testing seafood DNA will increase the social pressure for accurate labeling, and there is a growing interest in developing other labels (such as mineral content) that can provide regional information on fish stocks.

One of the biggest challenges to sustainability is waste. 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 seafoods 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, including through teaching American consumers how to cook with more varieties.

## SCORE: 3

There are myriad public and private efforts to improve seafood sustainability. Thus, from a nutrition and environment perspective, the seafood category continues to be a leader (suggesting a score of 4). At the same time, however, come troubling claims that suggest the goal of sustainability has already been reached (which will limit further work). These claims arrive in light of continued environmental concerns, social ills on fishing boats (which provide fish meal for aquaculture feed), mislabeling, and a lack of traceability, all of which hinder the path toward true sustainability (suggesting a score of 2). Given the variation in actions across this diverse protein category, the overall score is an average of 3.

## 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 better for the environment.
- Efforts such as Aquaculture Improvement Projects and Fishery Improvement Projects are helping certify a greater number of aquaculture farms and fisheries as sustainable, however, certification does not mean there isn't more work to be done; it is merely an important piece of the movement toward a sustainable seafood system.

# CLIMATE CHANGE

The global food system needs to feed up to 10 billion people by 2050, an additional two to three billion mouths within three to four decades—while under the specter of a changing climate. The year 2014 was the highest annual global temperature on record. Agriculture, including animal grazing, accounts for at least six percent of human derived greenhouse gas emissions in the U.S. So, in addition to a need for agriculture to adapt to changes, it has a role to play in stabilizing the climate.

When global food security specialists factor in the needs of the currently undernourished percentage of the population, they arrive at a target to roughly double the available food supply by 2050, through a mix of increased production and changes in eating habits (primarily reducing meat consumption). This target should be reached while simultaneously reducing greenhouse gas emissions.

The foodservice industry must be part of both these solutions: improving overall global food security, and helping to stabilize the climate by reducing greenhouse gas emissions from food production and utilization. The National Climate Assessment estimates that even in the U.S., a country known for its relative wealth and abundance of food, 15 percent of citizens lack food security. Food security—the access to sufficient healthy and culturally appropriate food—is a complex interaction of factors including production, distribution, and economic access; it is not merely a matter of "growing more."

Can we "grow more"? Looking first at food production, agriculture and grazing consume 38 percent of the global land surface. This area has not changed much in decades because, simply put, most of the quality farmland has already been discovered and developed. Very little arable but unoccupied frontier remains on earth. Climate change is slowly shifting what constitutes optimum crop regions, yet so far farmers have been able to adapt by changing crop types, planting dates, and genetic varieties. However, while past increases in crop yields have resulted from improved genetics, fertilizer use, and irrigation, there is limited scope left for those increases to continue in U.S. farming.

In October 2014, a global Sustainability Science Congress in Copenhagen focused on two issues relevant to the foodservice industry. First, food production systems must substantially improve the *efficiency* of irrigation and fertilizer application. Irrigation supplies will diminish in the future, so water conservation strategies need to be developed now. Fertilizer use is either too limited in much of the underdeveloped world, or too extravagant in the developed world, where excess nutrients run off into rivers and cause water pollution and even ocean dead-zones.

Second, the way we use food must be improved, as it is a way to boost human food security even if crop production does not increase. Many studies have documented shocking levels of food loss and waste—between 25 and 40 percent—during storage, transportation, and retailing. In underdeveloped countries, the problem is commonly a lack of refrigeration for storage and transport. In the developed world, an excess of food is available; much is simply not needed and goes unpurchased. This means food insecurity in America is a function of poverty, not inadequate supply.

The biggest climate risk to American agriculture is the now well-documented increase in extreme weather events over the last few decades, events that can cause severe damage to crops. Extreme precipitation, hailstorms, tornados, farmland flooding, and resulting erosion are causing crop losses that will accelerate in the coming decades with the changing climate. Flipping the coin, extended regional drought is now leading to increased reliance on irrigation wells and permanently depleting groundwater that will curtail future irrigation capacity in some critical regions. It is also severely reducing crop production capacities, primarily in the southern Great Plains and Central Valley of California. Because of region-wide depletion of groundwater resources, some global food specialists fear we may have reached the planet's peak capacity to produce food.

Furthering the problem, only about 60 percent of current crop production is directly consumed by humans, while 35 percent is fed to animals, and five percent is used for biofuels. Reducing meat consumption—particularly beef, which has the largest carbon footprint of any meat—is a primary way to increase the overall availability of food for humans. Animals also produce methane and nitrous oxide, which are potent greenhouse gases. It is also important to discourage the use of biofuels derived from food crops, most notably corn ethanol. Feeding 10 billion people will be challenging enough without diverting some of the production to fuel the vehicles of the wealthiest nations, with the certain consequence of raising food prices for all, and especially threatening food security for the least affluent.

## RECOMMENDATIONS:

Chefs and foodservice companies may not have the power to directly control farm management, irrigation, or fertilizer use; however, they have significant purchasing power. They can help improve the climate outlook by investing their purchasing dollars with farms that actively promote and practice sustainable management and farming practices. Menus that feature mostly plant-based foods and a smaller share of animal proteins can also drive changes in what farmers choose to grow. Carefully choosing meat suppliers is paramount. Finally, the foodservice industry should double down on efforts to reduce food waste throughout operations (including by connecting with innovative distribution solutions and apps to share their unused foods) and donate unneeded food to local charities to distribute to those in need.

## SCORE: 1

Although the announcement in November 2014 by China and the U.S. to curtail future greenhouse gas emissions offers a glimmer of hope, the reality is that carbon emissions are still relentlessly increasing, atmospheric $CO_2$ has crossed a significant threshold of 400 ppm, and there seems little national political momentum in the U.S. to change course, or even have a mature discourse on the issue.

## 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.
- Food insecurity is a problem not only in developing countries but in the U.S., and not only today, but in the future, as the global population rises. In addition to growing more food, there is a need to improve fertilizer and irrigation efficiency and to utilize the existing crop supply in more efficient ways than feeding it to animals or turning it into biofuels.
- Certain factors are beyond the direct control of the foodservice industry, such as farm management or international agreements to curtail greenhouse gas emissions. However, the industry can direct its collective purchasing power toward better choices: actively support sustainably managed farms, operate energy-efficient facilities, engage with programs to reduce food waste, and provide alternatives to beef on menus.

# WATER SUSTAINABILITY

Selling water—as a beverage itself or in other beverages—can be central to profits for restaurants and foodservice companies. But today, conversations about water in the foodservice industry are not so much about water served to guests, but the water it takes to grow the food to serve in restaurants, and the increasing concern that there isn't enough of it. In the 1960s, the threat of famine hung over many places in Asia, Africa, and Latin America. But in recent decades, neither Latin America nor Asia have suffered large famines, for the most part. Why have all continents except Africa been able to manage resilience to food shortages?

The answer lies with groundwater development. Undeniably, the Green Revolution, economic development, and globalization have prevented the recurrence of famines in these places. But something much more important has been playing out behind the scenes, without which many of the successes of the Green Revolution and other economic development programs would have been unachievable on these continents. Regions most prone to famines were typically those with significant agricultural production but high risk of failing crops due to climate conditions—warm climates in temperate and semi-arid regions that are subject to droughts or even extended droughts, and crop failure due to lack of water. The growing ability to withdraw groundwater, at relatively small costs, from a productive aquifer immediately below agricultural land, has provided small farmers around the world with a vital source of irrigation water. Localized groundwater access points avoided the need for large infrastructures and allowed farmers to operate independently of formal but often unreliable irrigation districts. More importantly, wells brought a significant buffer against the devastations of drought.

In the early 20th century, the invention of the turbine pump revolutionized agriculture in the western U.S. It allowed for large-scale irrigated farming in flat, semi-arid landscapes with plenty of sunshine, excellent soils, and abundant local groundwater resources, typically sand and gravel aquifers. Since the 1970s, South America, India, Pakistan, Bangladesh, Southeast Asia, and China have been introducing affordable well pumping buoyed by cheap, subsidized energy prices and the ability to create an extensive well drilling and maintenance industry. Sub-Saharan Africa, on the other hand, has seen limited groundwater development, and is still subject to recurring famines. (Political instability, energy costs, and lack of well drilling and maintenance infrastructure are thought to be the chief impediments to further groundwater development in Africa.)

Despite the great advancements of groundwater development, particularly in Latin America and Asia, some devastating social and environmental costs are posed by the overdevelopment of wells and overuse of regional water supplies.

In many places around the globe, large-scale groundwater development has led to a significant decline in water levels. In California, large-scale water projects have been built, transferring water from the northern part of the state all the way to the Mexican border. These canals have alleviated some of the overdraft observed in California but have also caused a range of ecosystem impacts through altering natural stream flows. China is now building even larger water transfer projects despite significant concerns over impacts to the environment and affected communities.

Irrigated agriculture provides 40 percent of global agricultural products, and in many of these irrigated regions, groundwater is a significant part of the water resources portfolio, most often as a drought reserve. Often, natural or intentional recharge of aquifers has not kept up with the extraordinary scale of groundwater extraction. As a result, groundwater overdraft leads to seawater intrusion in coastal basins, water quality degradation, sinking lands (land subsidence), drying rivers, and increased energy needs to lift groundwater. Most importantly, given the importance of irrigated agriculture, continued overdraft will deplete groundwater in key agricultural regions within decades, posing a serious risk to long-term global food security.

Sustainable groundwater management is therefore critical. All around the world, governments in regions with agricultural irrigation are struggling to address groundwater overdraft. In the U.S., diverse state laws govern the extraction of groundwater, typically through water rights permits. Some affected states have shown progress in slowing groundwater overdraft, but none have been able to completely reverse it. The Texas Panhandle will predictably exhaust its groundwater resources in the Ogallala Aquifer within a few decades. Australia's Millennium Drought has forced conjunctive use of groundwater and surface water resources. Similarly, California's ongoing drought has put the spotlight on groundwater usage, failing wells, and a resurgence of large-scale land subsidence: In the Central Valley, lowering of water tables within the sedimentary aquifer system is causing clay layers that naturally separate individual aquifer units to be compressed, thus irreversibly lowering the land surface, in some regions by over six inches in 2014 alone. While subsidence does not significantly affect the ability to recharge aquifers, the overlying infrastructure, in particularly canals, levees, and flood control structures may become inoperable. And agricultural regions in California are not only challenged by dwindling groundwater supply, but are also impacted by significant groundwater quality degradation from fertilizers, salinization, and seawater intrusion.

With new groundwater legislation, recently signed by California's Governor Jerry Brown, the future of groundwater use, protection, and management in California's agricultural landscape will be an increasingly integrated approach. Importantly, new regulations for groundwater sustainability and groundwater quality protection have emphasized the engagement of landowners and local stakeholders in the planning and implementation of new regulations, providing farmers with opportunities for participation in the decision-making process, dialogue, and education. Improved irrigation practices such as drip irrigation, deficit irrigation, and nutrient management can save water and keep agricultural chemicals from contaminating groundwater. Managing and protecting groundwater resources for long-term sustainability means additional investments into improved water management and alternative farming practices, and in some cases potential cutbacks in agricultural production. The additional costs and burden to growers, consumers, and taxpayers are a key reason why sustainable groundwater practices have not been adopted in the U.S. or on other continents.

The good news is that chefs can take steps to help solve the most pressing issues related to water sustainability. Some types of food take much more water to produce than others, and modest shifts in demand can make a big difference. With a few exceptions, foods that take the most water to produce, or have the largest "water footprint" (particularly meat) also have the largest "carbon footprint." (See figure page 25). Red meat has among the largest water footprint due to the need to grow forage for the animal. Similarly, cheese is associated with significant water use. But when produced in a region that has ample water, this may not pose an environmental threat (at least from a water resource perspective). Considering the origin of foods and the water stress in those regions is, therefore, important.

## RECOMMENDATIONS:

Foodservice and culinary professionals have an opportunity to play a key role in supporting sustainable water management by developing menus and recipes that use a larger share of ingredients that require less water to produce. Sourcing food from producers that actively and demonstrably participate in sustainable groundwater management and protection also will limit drawdown and degradation. Both measures can help ensure more dependable supplies of this precious resource.

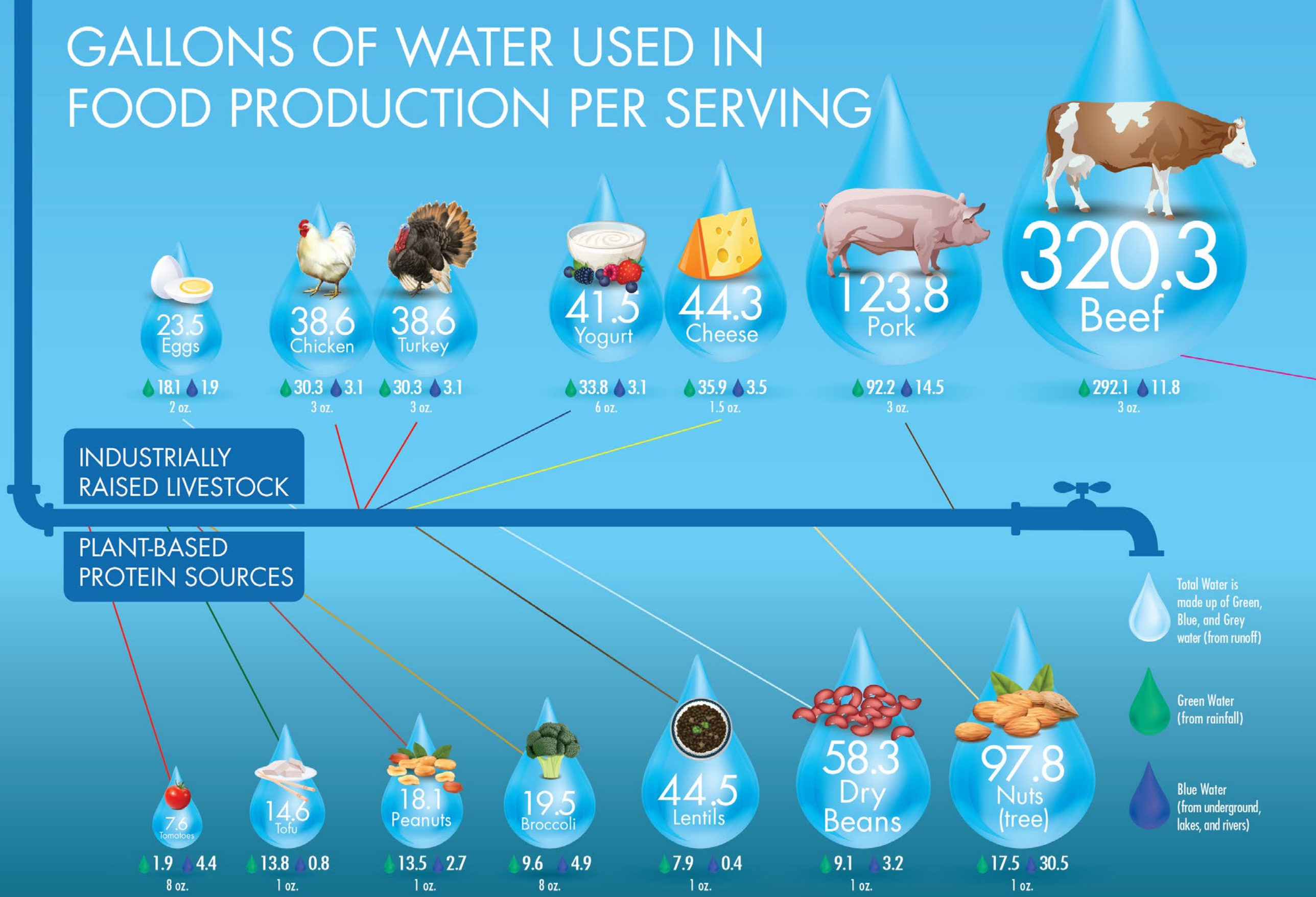
## SCORE: 2

The foodservice industry is only beginning to pay attention to water issues as drought and groundwater depletion weigh heavily on profits. Reducing meat consumption and raising awareness about water stress are helpful measures that consumers and chefs can take, but these trends do not yet reflect broad-ranging, conscious efforts by the industry.

## IN SUMMARY:

- The ability to withdraw groundwater from healthy aquifers at relatively low cost is crucial for maintaining irrigated agricultural production even in drought periods.
- Groundwater overdraft poses a significant threat to long-term global food security, and integrated approaches to managing both groundwater quantity and quality are crucial.
- Chefs and foodservice operators can learn which foods require the most water to produce, source from producers participating in sustainable groundwater management, and menu items emphasizing foods that have smaller "water footprints," which often are those that also have smaller carbon footprints.

# GALLONS OF WATER USED IN FOOD PRODUCTION PER SERVING




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.

© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the *Menus of Change® Annual Report* on Menusofchange.org. All rights reserved.

# AGRICULTURE, DRUGS, AND CHEMICALS USE

In 2013, the United States saw two important developments in the restriction of the use of drugs and chemicals in the production of food animals. The first was the removal of arsenicals from the feed and water of poultry and swine—a significant step forward. The second, the Food and Drug Administration (FDA)'s call for the voluntary cessation of the use of low-dose antibiotics, is much more problematic. This call, formally known as Guidance for Industry #213, 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 is 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 likely to prove to be a toothless tiger in the regulatory domain. 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.

Last year, 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 September 2014, California Governor Jerry Brown vetoed a California State Senate bill backed by industry that would have implemented Guidance #213 in the state, including the loophole for using low-dose antibiotics for disease prevention. Consumers Union praised the Governor for the veto: "We congratulate Governor Brown for his unwillingness to codify weak FDA guidance that allows antibiotics to continue to be overused on healthy farm animals for disease prevention instead of disease treatment."

This spring, 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 some encouraging shifts from producers, retailers, and foodservice operators. 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. Bon Appétit Management Company and Chipotle Mexican Grill are also leaders in the movement toward antibiotic-free meat.

## 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, Panera, and Chipotle applying pressure on producers.

## IN SUMMARY:

- The use of antibiotics in the production of food animals is still not as judicious in practice as was expected in principle as a result of the FDA's 2013 Guidance for Industry #213. This is due to the fact that dosages and routes of administration through water and feed are the same for antibiotics given to promote growth as those to prevent disease, and because the guidance called for merely *voluntary* cessation of low-dose antibiotics for growth promotion.
- Advocacy groups such as Consumers Union and Pew Charitable Trusts have called on 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 VERSUS HEALTHCARE SPENDING AND TRENDS IN MEDICAL-CULINARY EDUCATIONAL ALLIANCES

In 1960, the total annual U.S. expenditures for food were estimated at $74 billion. This was roughly three times as much as the total expenditures that same year of $27 billion for healthcare. Fast forward to 2013. U.S. citizens spent $1.42 trillion on food and $2.9 trillion on healthcare, flipping the ratio, with healthcare spending now twice that of food.

These sobering statistics document an 18-fold increase in food expenditures over the past half century, as compared with a 102-fold increase in healthcare expenditures over the same period of time. These trends in health-related expenditures are considered unsustainable, as are the increasing rates of obesity, diabetes, and other diet- and lifestyle-related medical conditions. 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). It is also notable, though not conclusive, that many industrialized countries where individuals spend more time preparing their foods have lower rates of obesity. For example, Italian and French adults spend about 19 more minutes per day cooking than Americans and have far lower rates of obesity. By contrast, adults in the United Kingdom spend approximately the same amount of time cooking as Americans do and have comparable rates of obesity.

Over the past year, 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.

While such controversies persist, the hypothesis remains that teaching both healthful nutrition and health-based culinary skills to individuals who consume less healthy foods 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.

Over the last several years, some interesting pilot programs have seen success. Cooking Matters, a program sponsored by anti-hunger organization Share Our Strength, has taught 120,000 low-income people in 40 states how to shop smart 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 in March 2014, 34 percent of the registered healthcare professionals 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. An even larger percentage of attendees (38 percent) at the 2015 Healthy Kitchens, Healthy Lives conference confirmed the establishment of teaching kitchens across organizations and healthcare delivery systems.

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 expenditures on food expenditures and judicious healthcare expenditures will be realized when collaborations between the medical, public health, culinary, and sustainability communities become ever more inter-dependent and concerted.

## RECOMMENDATIONS:

Foodservice companies and culinary professionals should increase their use of healthy, whole and minimally processed foods, and partner with medical professionals to leverage their powerful influence to promote healthy, affordable, and delicious foods.

Chefs and cooking schools should explore opportunities to work with hospitals, health systems, and corporations that are building and refining teaching kitchens in order to train employees, patients, and community members (adults, kids, and families). Schools of public health, medicine, and allied health and policy should consider partnerships with foodservice companies and trained chefs. Ultimately, demonstration projects can lead to the establishment of research networks that assess the impact of these trends in medical-culinary educational alliances.

## SCORE: 2

Innovative programs are starting to link healthcare and healthy eating along with culinary education. But these connections are not yet widespread, and more education and demonstration projects are required.

## IN SUMMARY:

- In 1960, Americans spent 2.7 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.
- Although a range of promising programs have recently been teaching Americans cooking skills and providing assistance to purchase fresh fruits and vegetables, greater collaboration is still needed among the medical, public health, culinary, and sustainability communities.

# THE CULINARY INSTITUTE OF AMERICA'S HEALTHY MENUS R&D COLLABORATIVE: WORKING TOGETHER TO TRANSFORM MENUS IN THE VOLUME FOODSERVICE INDUSTRY

From reaching out to the healthcare community through its Healthy Kitchens, Healthy Lives conference to working with K-12 school nutrition and foodservice professionals through its Healthy Kids Collaborative, the CIA tackles the challenge of advancing healthier foods across America by approaching it from all angles. As part of that multi-faceted approach, menu research and development has long been at the heart of its mission, and since its inception in 2010, The Culinary Institute of America Healthy Menus R&D Collaborative has made remarkable strides.

The Collaborative is a working group of volume foodservice culinary and nutrition leaders developing and implementing menu solutions with the goal of offering a greater variety of healthful and flavorful food and beverage choices for American diners. In particular, the group focuses on solutions that are practical and actionable, as well as collaboration with manufacturers and suppliers to bring about change. The Collaborative grew out of the Worlds of Healthy Flavors leadership retreat, held each January in partnership with Harvard Chan School. 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 2015, for instance, top of mind for most members is the need to comply with the new mandate from the Food & Drug Administration to provide calorie and nutrition information in chain restaurants and retail food outlets that serve prepared foods, with a deadline of December 1, 2015.) Central to the group's exchange of healthy menu strategies is an emphasis on leading with flavor while driving profitability.

The membership-based Healthy Menus R&D Collaborative includes representation from McDonald's, Darden, Brinker, Panda Restaurant Group, ARAMARK, Compass, Sodexo, AVI Foodsystems, Yum! Brands, Google, Subway, and Dunkin' Brands. The co-chairs of the initiative are Deanne Brandstetter, MBA, RD, CDN, vice president of nutrition and health for Compass Group; Pam Smith, RDN, founder and president of Shaping America's Plate; Tom Gumpel, vice president of R&D for Panera Bread; and Jamie Carawan, senior director of culinary innovation for On the Border Mexican Grill. 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.

Along with focusing on reducing sodium, increasing produce, and improving carbohydrate quality (with an emphasis on beverages and whole grains—especially intact whole grains), members have now added strategic calorie design to their list of priorities. Future areas of focus may include kids' menus and fat quality.

With regard to reducing sodium levels and increasing fruits and vegetables on menus, Collaborative members' companies have made significantly greater progress over the past few years than the industry average in those areas. The power of the Healthy Menus R&D Collaborative are its collective focus and effort. According to survey research from Datassential, only 61 percent of the industry as a whole is working on increasing use of produce, compared to 95 percent of the Collaborative members who are focusing R&D resources on this area—an important area for foodservice leaders who want to address sodium reduction as well as calories.

Given the particular leadership and membership of this initiative, along with results such as these, it may only be a matter of time until the rest of the industry follows suit.

**For more information, please visit ciahealthymenus.com.**

# INTRODUCING THE MENUS OF CHANGE UNIVERSITY RESEARCH COLLABORATIVE

Over the past three years, the Menus of Change initiative has laid a formidable foundation around the business of healthy, sustainable menus, charting the future of foodservice in America. To accelerate the move among American consumers—and college students, faculty, and staff in particular—towards healthier, more sustainable, plant-forward diets, The Culinary Institute of America and Stanford University partnered in fall 2014 to launch the new Menus of Change University Research Collaborative (MCURC). The Collaborative seeks to bring 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. Recognizing the significant amount of energy for food system transformation today being driven by concerned university students and forward-looking faculty and administration, the Collaborative leverages the unique position of universities to advance healthier, more sustainable life-long food choices among students—who will soon be adult decision-makers.

The invitational, membership-based initiative has representation from 36 leading institutions both public and private—from University of Washington and University of Massachusetts, Amherst to small Ivy league schools—as well as various geographic regions—from throughout the University of California system to Kansas State University and Northeastern University. The MCURC will also work in tandem with the CIA-Google Culinary Innovation and World Flavors Lab now in development at Google's Mountain View campus. This new applied research facility will function as a real-world testing ground to evaluate an entire matrix of hypotheses on how best to implement the Menus of Change Principles of Healthy, Sustainable Menus in high-volume foodservice. Along with Google, Jamie Oliver Food Foundation and the U.S. Olympic Training Center are serving as advisory (ex officio) members.

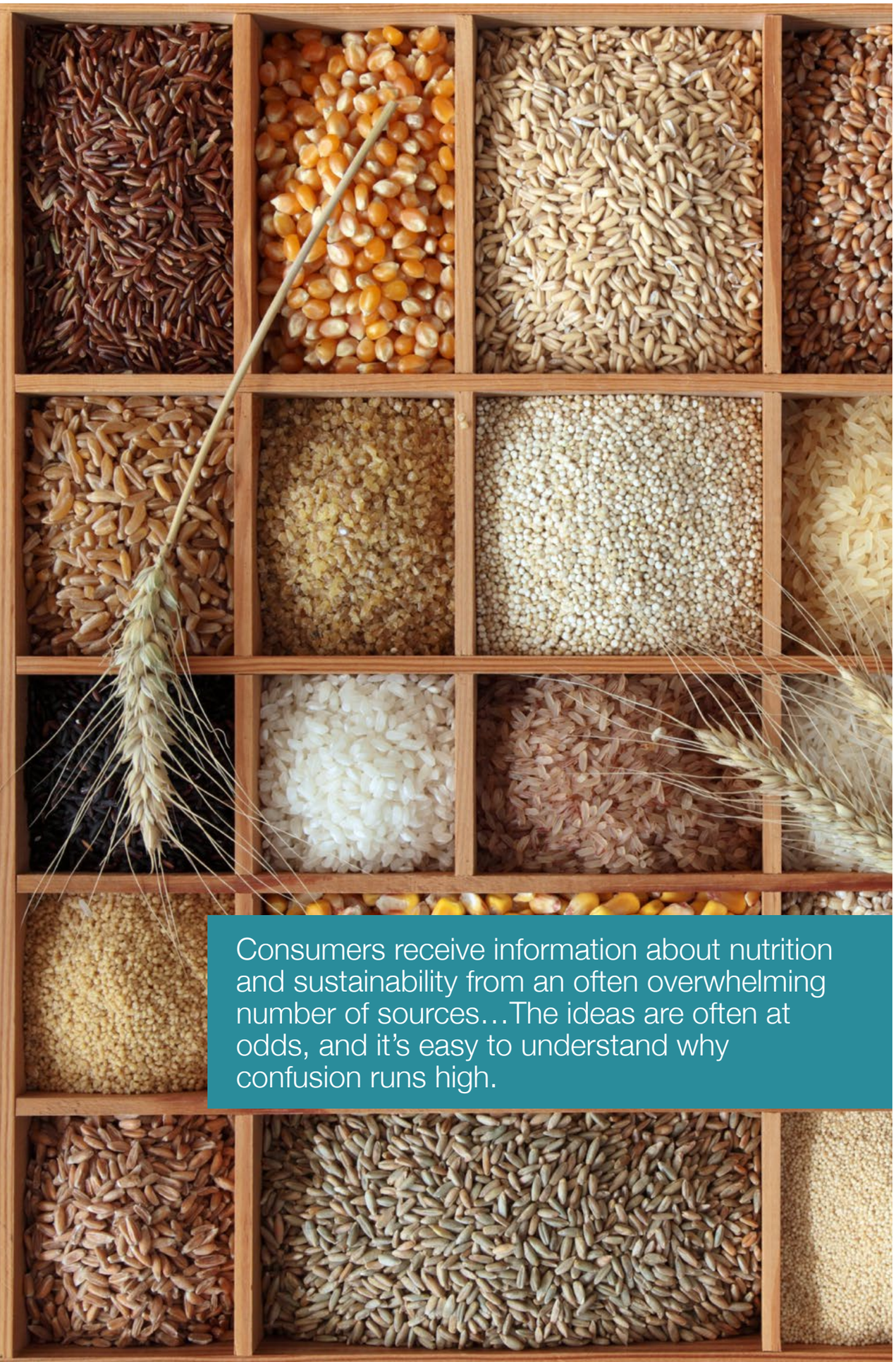
The study of food—whether focused on the related areas of agriculture, the environment, medicine, public health and nutrition, food science, hospitality, business, psychology, anthropology, history, political science, or law—is often siloed within academia. Faculty members also are not usually engaged with the leadership of their campus dining program. Food studies programs that are emerging across the U.S. are starting to chip away at these silos. However, it is not yet standard practice for university efforts around food studies to be truly comprehensive, or thoroughly reflected in the food choices, menu development strategies, and procurement guidelines of their respective foodservice operations.
To help make inter-disciplinary and cross-departmental collaborations the norm, the MCURC aims to foster a national research agenda shaped by projects similar to inspiring examples like these:

- At Lebanon Valley College in Pennsylvania, philosophy professor Robert Valgenti, PhD, co-chair of the MCURC Academics Committee, teamed up with Metz Culinary Management to turn the dining hall into a research laboratory. The student-centered research program, Engage, Analyze, and Transform (E.A.T.), generates data the campus dining team can act on to improve both operations and student experience. One project resulted in a 19 percent reduction in food waste per student across one semester, keeping over 25,000 pounds of food out of landfills.

- In fall 2013, the Berkeley Food Institute announced its first Request for Proposals for seed grants, with the specific aim of supporting projects that are systems-oriented, innovative, and likely to effect change in policy and practice. A stunning 24 projects requesting over $750,000 in total were submitted for just $89,000 of initial funding. One of the winning projects was a partnership between the statistics and integrative biology departments to study the prevalence and distribution patterns of weeds like dandelion and purslane. By crowdsourcing data through a mobile app, researchers will identify barriers and opportunities for increased consumption.

- The CIA and UC Davis conducted a meat/mushroom sensory study to explore strategies to reduce meat and sodium on menus by substituting mushrooms in meat-based dishes. This research was published in 2014 in the *Journal of Food Science*. Chefs and foodservice operators across the nation have since taken inspiration from the finding that blending meat with umami-rich mushrooms can improve the nutritional quality of certain dishes and actually enhance flavor.

Examples like these, and the Stanford Dining case study on page 51, speak to the remarkable amount of interest in this type of collaborative work, as well as its enormous potential impact. Clearly, the results can extend well beyond the sum of constituent parts.



Consumers receive information about nutrition and sustainability from an often overwhelming number of sources…The ideas are often at odds, and it's easy to understand why confusion runs high.

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

If the thousand-plus professional chefs who belong to the American Culinary Federation have a true pulse on their diners' needs, then the nation is heading in an encouraging direction, increasingly taking personal and planetary health into consideration when dining out. According to the National Restaurant Association's What's Hot in 2015 survey, which bases its annual forecast on input from these chefs, nearly *all* of the Top 20 Food Trends relate to health and sustainability. Locally sourced animal proteins and produce make the top 10, as do sustainable sourcing, transparency about point-of-origin, and healthy, minimally processed foods. In the top 20, it's heartening to see an interest in more whole grains, more cuts of meats, and more kinds of fish, with the latter bearing importance both for human health and for not depleting stocks of the overly popular species.

The good news is that operators are on the same page as consumers, for the most part: three-fourths of both consumers and foodservice operators polled in a recent CIA-Datassential survey feel the foodservice industry must play an active role in addressing public health and environment issues.

The flows of influence are also complex: sometimes consumers are ahead of restaurateurs, and sometimes it's the reverse; sometimes consumers are ahead of policymakers, and sometimes it's the reverse. Supply cannot always keep up with demand, and the infrastructure, labeling, and certification systems are not always in place to turn aspirations into action. But chefs have an opportunity to menu in ways that better reflect consumer preferences: for instance, the CIA-Datassential survey found that there aren't enough menu items featuring whole/intact grains compared with the way consumers wish to order. The same was true of nuts and legumes, Greek yogurt and tofu, and nut butters and nut flours. On the other hand, foodservice operators reported that several efforts to shift protein on plates have been unsuccessful, usually when they have neglected to communicate a change.

The *way* chefs address evolving consumer demands is of critical importance. Consumers are finicky, and often contradictory, in what they say they want and how they actually behave. Messaging is key—telling the story of ingredients, emphasizing the options available with a menu change and ways to customize, as well as putting a face to the food by bringing a chef front and center to explain a new menu item or offer up a taste.

Consumers receive information about nutrition and sustainability 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. The ideas are often at odds, and it's easy to understand why confusion runs high.

The issue briefs in this section highlight the most important developments in the past year when it comes to promoting animal welfare, the nuances and challenges of shifts to greater local sourcing, investing in local food systems and urban agriculture, and equipping consumers to navigate the complexity so they can make food choices that benefit both their own well-being and that of the environment.

# ANIMAL WELFARE

A 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 dominate 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.

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 CAFOs do not include open range, underbrush, or pastures. Instead, they employ gestation crates, battery cages, debeaking, tail docking, runt thumping, dehorning, castration, detoeing, and maceration, and leave 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 and antibiotics, along with 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 a degradation of soil, air, and water quality.

Small legislative steps have been made in a growing number of states to improve the living conditions for 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.

However, one of the most recent pieces of legislation in this area was rejected. A New Jersey bill to ban gestation crates, which was backed by broad bipartisan support, was vetoed by Governor Chris Christie in November 2014. The pork industry does not have a large presence in New Jersey, so the number of animals affected would have been minimal. But the veto helps explain how political this type of issue can be: Some argue that a reason for the veto was Christie's potential intent to run for president in 2016, which would require him to campaign in Iowa, a state with a large pork industry presence.

Disturbing investigative reporting on livestock experimentation was published in January 2015. For 50 years, the U.S. Meat Animal Research Center in Clay Center, Nebraska, a unit of the U.S. Department of Agriculture, has been funded by tax dollars to "make lamb chops bigger, pork loins less fatty, steaks easier to chew," as journalist Michael Moss described it in his *New York Times* exposé. Some of the results have included: pigs that bear litters so large and frail that higher and higher proportions of the piglets die; cows that bear triplets that are deformed or have life-threatening birthing complications; or lambs born in open fields where they are left to starve or be eaten by predators. News reports revealed that this research center has been exempt from guidelines of the Animal Welfare Act (AWA), which was an important factor in the ongoing and long-term allowance of cruelty and suffering for the sake of cheaper and more profitable meat. Notably, a bill has now been proposed by lawmakers from both parties that would remove the current AWA exceptions for federally run agricultural experiment facilities, and require that these animals be provided with the same protections that the AWA affords all other livestock.

The case of cage-free eggs is an interesting development in the area of animal welfare. California is the first state to ban the use of battery cages to house egg-laying hens, in which the standard amount of floor space per hen is roughly equivalent to an 8½-by-11 sheet of paper. Eliminating the battery cages may have improved living conditions for egg-laying hens, but there remains additional room for change. Ending the use of battery cages is not the same as sending these hens all out into the pasture, which many in the public may have assumed. Many intermediate options exist that meet California's guidelines, including using cages that are simply larger than the battery cages. Consumers and foodservice professionals should not rely on labels such as "free-range" to decide which kinds of eggs to buy—especially since the price associated with different labels can vary dramatically—but instead talk with suppliers to learn the details on the chickens' living conditions.

## RECOMMENDATIONS:

Foodservice and culinary professionals are responsible for a large proportion of the demand for meat, dairy, and eggs, and they are in a position to promote profound improvements in the welfare of the animals raised for food. There is a small but growing consumer segment that is placing greater emphasis on animal welfare issues related to their food purchases, and 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

There is a growing awareness of problems regarding animal welfare, namely in the livestock industry. Better alternative practices are being employed by a small group of producers, and some promising legislative and policy initiatives are being proposed and passed. However, in general there remains substantial room for improvement.

## IN SUMMARY:

- As yield and efficiency have increased in American agriculture, animal welfare has worsened.
- Investigative reporting released in January 2015 reveals that tax dollars and the federal government have been funding a little-known facility in secluded Nebraska for 50 years that has been experimenting outside the guidelines of the Animal Welfare Act to find ways to produce cheaper meat and higher profits in ways that involve animal cruelty and suffering.
- Nearly all animals raised for food in the U.S. live in concentrated animal feeding operations, which degrade soil, air, and water quality, and sell animal protein so cheap that people consume it at unhealthy rates. While some legislative improvements have been made in recent years, including a ban on tight cages for pregnant and nursing pigs called gestation crates, a similar ban in New Jersey was recently vetoed, underscoring the politics of changing the way animals are raised in the U.S.

# 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. As a result of these efforts, today the American Farm to Table Restaurant Guide lists restaurants located in more than 30 states and the District of Columbia. Four of the top ten trends for 2015, as identified by the National Restaurant Association, are related to local foods, with locally-sourced meats and seafood edging out locally-sourced produce in the list of hot trends.
A standardized definition of "local" is lacking, but that has not dampened enthusiasm for local and regional foods. 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. This year, for the first time, Congress requested a report on local and regional food systems, signifying that policy makers are paying serious attention to the growth in consumer demand for locally produced food.

The perceived benefits of local and regional foods are numerous. Locally and regionally produced food is fresher and tastier when it reaches consumers. Because of the relatively short shipping distances, farmers are able to produce and market foods that are not able to withstand the 3,000 miles much of the traditionally produced and marketed food must travel. Thus, heritage and heirloom varieties of livestock and produce are re-emerging as niche products on restaurant menus and in specialty markets. The benefits of local and regional foods extend beyond the consumer's palate, as purchasing food raised nearby supports local farms and possibly brings economic benefits to local communities. Furthermore, farms that market locally and regionally tend to be smaller than the average U.S. farm; this segment of the farming industry tends to be more economically vulnerable, thus the farm-to-table movement provides direct support to a group that struggles to maintain viability. Many consumers report that they seek out local food in order to support nearby small- and medium-sized farms, and that they appreciate the opportunity to understand where their food comes from and, possibly, know the farmers producing their food.

In many ways, the farms that produce for local and regional markets have unique characteristics. The farms marketing locally and regionally are clustered in the Northeast and the West. Viability of such farms—said to be those located in 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, yet their sales comprise 51 percent of all local food sales, indicating that the bulk of local food sales are for fresh produce. The farms selling to local retailers and local restaurants, so-called "intermediated sales," typically have higher sales than the local food farms selling directly to consumers. Yet, fewer than 50 thousand of two million farms in 2012 sold their products in the intermediated local channels.

The statistic revealing the extent of farms participating in local and regional food markets points to the main challenge facing the farm-to-table movement: Procuring locally and regionally produced food requires a significant amount of effort on the part of chefs and buyers. A variety of available 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. Regionally based sourcing is facilitated through local networks (such as the New Mexico-based non-profit organization Farm to Table) or extension services of the land grant university systems (for example, Colorado State University). These internet-based networks have significantly expanded opportunities; prior to their establishment, farm-to-table sales were only possible when chefs and farmers, or chefs and farmer agents, were in constant communication; chefs needed to expend energy to ensure that needed, high quality ingredients were available, and farmers (and their agents) wanted to make sure they had willing buyers for their perishable products. Despite such advances in marketing, procurement outside of the traditional channels remains challenging; farmers face costly obstacles to increasing the quantity supplied to the direct market channels, such as meeting specific food safety practices for on-farm production and handling along the supply chain.

The perception that locally and regionally produced foods are better for the environment stems from the idea that lower food miles automatically confers a smaller carbon footprint. However, the emissions associated with bringing local food to market may be higher or lower, in comparison to food shipped globally or nationally. The amount of emissions ultimately depends on the mode of transportation and the quantity in a shipment. For example, a shipment of agricultural products across the nation in railcars emits fewer emissions than products driven 150 miles in a small truck. An often overlooked aspect of the environmental sustainability of local food production is the use of energy intensive chemical inputs, such as fertilizer; if a product is not well suited to the local climate, local farmers may actually increase environmental damage by increasing their usage of inputs.

While it is well accepted that agricultural production disrupts the agro-ecosystem, largely through use of synthetic chemicals that reduce biodiversity and contaminate water, the extent of degradation depends on farm management practices. Understanding the environmental consequences of production by farms selling to local and regional markets, in comparison to traditionally marketed food, would require studying their use of synthetic and non-synthetic pesticides and fertilizers, as well as other practices such as crop rotation and tillage. But the assumption that many consumers make—that a smaller or closer farm will necessarily have a lower environmental impact—is not based in science. The environmental degradation associated with food production and marketing depends on how the food is produced, marketed, and transported, and deserves additional research before reaching definitive conclusions.

## RECOMMENDATIONS:

Consumer demand for locally and regionally produced food appears to be at an all-time high: There is growth in schools' and institutions' use of locally and regionally produced food, new food distribution businesses are capitalizing on consumer demand for local food, and new farm-to-table restaurants continue to open. Yet farmers are responding slowly to the market demand and are seemingly reluctant to increase production levels or to shift large amounts of their production into local and regional markets. Their rationale is that marketing to new customers has a steep learning curve, and is risky.

Supply limitations will dampen further growth in the market, and may in fact result in higher prices for locally and regionally produced foods. Increasing the use of locally and regionally produced foods ultimately depends on an increase in supply. In other words, farmers must be convinced that the local and regional markets are profitable in the short term and will remain so in the long term. Market supply will increase if buyers provide farmers with a consistent market for specialized products, for which they receive good prices. Buyers also need to be committed to farmers, who will be assuming a significant amount of risk by entering into new local and regional markets.

Local food systems possess many opportunities for farmers, restaurants and consumers, including supporting local economies, consuming fresher food, and increasing profit opportunities for participating businesses. Yet, additional research is needed to understand how to adopt these practices in ways that enhance sustainability.

## SCORE: 3

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:

- Purchasing local and regional foods is associated with numerous benefits, including opportunities for consumers to taste heirloom varieties, enjoy fresher and often more delicious foods, and connect with farmers on a deeper level, as well as economic benefit to smaller-scale growers and participating restaurants. However, the environmental degradation associated with a given food depends on how it is produced, marketed, and transported, and not necessarily on it coming from a smaller or closer farm, so the relative environmental impact of local foods deserves additional research before reaching definitive conclusions.

- While it continues to require additional time and effort, chefs and foodservice professionals should further investments in local farmers' products and in long-term relationships with these growers. The associated challenges of local and regional procurement can be mitigated by taking advantage of a variety of new tools and resources.

- Farm-to-table dining and consumer demand for local and regional foods have been mainstream for some time and are continuing to rise; federal and local policies are now finally lining up with this demand, signally greater potential for growth of this segment of the food system.

# URBAN AGRICULTURE

Today, there is widespread agreement that the current contribution of urban agriculture to food production fulfills a relatively small proportion of the food and nutrition needs of city residents. However, densely populated cities and their need for clean air, nutritious food, and renewable energy affect the way we grow, process, and consume food in the world. This fact increases the importance of global urban food systems and their impact on the health and well-being of urban residents.

There is a global need to sustainably supply healthy food by 2050 to the 9 to 10 billion people who will be living on the planet, primarily in the world's metropolitan regions. The U.S. need is characterized by approximately 50 post-industrial cities with aging infrastructure in need of replacement, hollowed-out urban cores surrounded by neighborhoods with abundant vacant land and buildings, concentrations of marginalized residents who traditionally have not shared in new economic and growth opportunities, education and healthcare systems in desperate need of modernization and innovation, and competing agendas for future development. We must invest in innovations and research that address the connectivity of food, water, and energy in future urban settings.

Where are the islands of innovation? Urban farms are being developed around the world, primarily using vacant land, greenhouse technologies, soil-based rooftops, and hydroponic systems. Here are a few examples reported recently by Citiscope:

**Brooklyn Grange** in New York City operates the world's largest rooftop soil farm in the boroughs of Queens and Brooklyn, totaling two and a half acres. The farm grows more than 50,000 pounds of organically cultivated produce each year, and distributes it through farmers' markets, community-supported agriculture networks, and wholesale to restaurants and catering companies.

**Gotham Greens** in New York City operates two hydroponic rooftop farms in Brooklyn, growing over 600,000 pounds of leafy greens and tomatoes each year, recycling all wastewater, and using photovoltaic panels for electricity needs.

**Urban Organics** in Saint Paul, Minnesota started experimenting with aquaponics, a method that combines fish farming and hydroponics. The facility, located in a former brewery, grows organic-certified greens and vegetables by reusing the nutrient-rich water from its tilapia-raising tanks, which in turn gets cleaned by the plants. This closed-loop, symbiotic system is waste-free and requires only two percent of the amount of water used in traditional agriculture.

**Mirai plant factory** in Japan turned a former Sony factory located in an area badly affected by the 2011 tsunami into an indoor farm that produces10,000 heads of lettuce per day. The farm uses hydroponic cultivation, as well as an LED lighting system developed by GE for optimal plant growth, using 40 percent less power than fluorescent lights.

These islands of innovation and many others around the world are motivated by a combination of factors, including interests in new economic opportunities and entrepreneurship, healthy eating and living, social justice and equal opportunity issues, and environmental and ecological concerns associated with the current industrial food production systems.

Still missing in the urban food movement is a coordinated resolve to create innovative systems that embrace and yet build upon our food and agriculture production successes of the past. The 21st century challenges of providing essential food, water, and energy resources to expanding urban populations—without jeopardizing the already limited resources of energy and water predicted for urban populations in 2050—will require as yet unimagined innovative solutions. For example:

- Through a research and innovation agenda, universities could embrace urban food production systems in the same manner they embrace rural-based farming.
- Business entrepreneurs could assume the investment risk in bringing innovation to scale, and possibly failing, but eventually refine the business models that work in local and global marketplaces.
- Municipal leaders could commit to exploring long-term urban sustainability plans that holistically address community needs.
- Community members could commit to partnering in a new dialogue.

# 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. Not all changes in food consumption require explicit decisions about health and nutrition, but depend instead on subtle contextual factors that can "nudge" people into making wiser choices. Examples include the order in which food is presented in cafeterias, the sizes of plates, social norms, and more. Yet the explicit decisions people make about what to eat, or whether and how to improve their diets, are key to progress.

At least three U.S. agencies are charged with helping to define what is "healthy." The Institute of Medicine sets guidelines for nutrients, which include protein, carbohydrates, fats, vitamins, and minerals. The U.S. Department of Agriculture (USDA) translates those recommendations into food groups and foods. The third agency is the Food and Drug Administration (FDA). It approves specific health claims (such as, "1.5 ounces per day of most nuts, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease") and defines the criteria for label claims (for instance, how low in fat a product must be to indicate it is "low-fat" or "reduced fat").

Other groups that provide nutritional health recommendations include professional associations such as the American Heart Association and the American Cancer Society. The food industry, particularly the developers and providers of packaged and processed foods, adds another level of complexity with claims such as "natural," "zero net carbs," or "rich in antioxidants."

All in all, there is a lot of information. The good news is that in 2014 the FDA introduced a revamped version of the standard Nutrition Facts label, which replaces out-of-date serving sizes and aligns them with how much people really eat, as well as a design that downplays the importance of total fat and highlights key parts of the label such as calories. But on the whole, consumer confusion has continued to mount. Many consumers rely on mass media sources for information and probably receive little more than headlines or sound bite versions of research claims about health and nutrition. New claims—about recommended sodium intake, saturated fat and heart disease risk, the effects of a low glycemic diet, and on protective effects of being overweight—have been rendered into headlines throughout the popular press, sometimes based on flawed research and sometimes misrepresenting the findings of sound research. Together, many of these headlines—that low salt is risky and higher salt protective; that saturated fat is just as healthy as unsaturated fat; that avoiding sugar and starches is not beneficial; and that overweight people live longer—sound like permission to eat fast food with impunity.

New findings about consumer attitudes present a mixed picture. An online survey of mothers conducted soon after the release of USDA's MyPlate found those most likely to have adopted MyPlate were mothers who already had been using MyPyramid. This means that MyPlate had not yet reached much beyond people already motivated to seek out nutritional guidance. A study of low-income urban schools before and after the adoption of healthier school meal standards found that the amount of food children threw away remained high but did not get worse, and that fruit and vegetable consumption increased. But not all studies report such positive results.

Over the past year, consumers were also confronted with a range of continuing debates: calories in/calories out versus good calories/bad calories; breakfast is/is not the most important meal of the day; GMO foods are perfectly safe/hazardous to health and the environment; organic foods do/don't provide health benefits; and the aforementioned debates about sodium, saturated fat, and refined sugars.

How can consumers navigate the morass of continually shifting recommendations? 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. But 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.

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* was designed to carefully calibrate materials for teaching young children about nutrition, in particular about the need for eating a variety of healthy foods. The investigators first documented what children already believed, then designed age-appropriate materials to enable them to better understand nutrition. Greatly surpassing their peers, preschool and early elementary school children exposed to these materials showed a deep understanding of key nutrition concepts: different foods have different nutritional profiles; diverse biological functions require different nutrients; digestion releases nutrients from foods; and blood carries the nutrients throughout all parts of the body. And in two studies, children who had been provided with this explanation for the need to eat a variety of healthy foods selected more vegetables during their snack time. By cutting through the confusing, ever-changing advice about eating, this evidence-based approach could be extended to adult consumers to provide them with 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, because consumers are bombarded by a continual flow of contradictory information about what is healthy, but no coherent conceptual structure in which to reason about health and nutrition, the time is right to develop a coherent, evidence-based educational framework about nutrition that would foster effective decision-making.

## SCORE: 2

Even consumers motivated to make healthier food choices can't help but be confused given the steady barrage of inconsistent advice, including efforts to create confusion around the Dietary Guidelines Advisory Committee's report.

## 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 or oversimplified news headlines.
- New and existing research from the field of psychology offers evidence-based studies that can be adapted into effective decision-making strategies for consumers.
- Chefs and foodservice leaders can help minimize confusion by making healthy food craveable, available, and affordable.

# CHEFS' INFLUENCE ON CONSUMER ATTITUDES

One of the past year's leading trends has been the opening of restaurants with vegetable-centric menus and the overall proliferation of vegetable- and plant-based dishes in operations of all sorts. A number of new chef-driven QSR operations (page 48) showcase plant-based menus. CIA alumnus Andrew Carmellini made vegetables the focus of the menu at his latest New York City restaurant, Little Park, which has a new American slant. At Semilla in Brooklyn, José Ramirez-Ruiz and Pamela Yung offer a seven-course tasting menu where animal proteins make only a rare appearance, as supporting cast for a wide range of vegetables.

The CIA's newest restaurant, Pangea, takes a plant-forward approach to "re-imagine Earth's flavors." The 10-plate tasting menu is offered as two versions, meatless and regular (where meat is nonetheless treated as a condiment more so than center of the plate). The guiding principles behind ingredient sourcing are local first, organic when possible, and sustainable always. Careful attention is paid to utilizing as much of a product as possible to bring food waste as close to zero as possible. The restaurant opened in January on the Hyde Park campus and is scheduled to run until early summer at a minimum—demand has been high from both students whose education takes them through campus restaurants and diners eager to try creative dishes.

The high-profile nature of the leaders of plant-forward restaurants and menus is creating media buzz around such dining practices—tying them to flavor, creativity, and sustainability, rather than only to health. It is for now purely speculative, but this might go a long way in helping diners think of plant-based meals as indulgent too. It is, however, also likely that a number of diners won't notice that meat is not prominently featured, but elect to eat at one of those restaurants because of a chef's reputation rather than for ideological or health reasons.

Other organizations are working with chefs to provide healthier food choices to underserved communities. Washington, DC-based Share Our Strength works with hundreds of chefs around the country to relieve childhood hunger and teach families how to cook healthy, affordable meals. At local levels, many chefs support efforts to reduce hunger or improve food access, for example, by cooking for and appearing at charitable events. America Cooks with Chefs, which includes partners such as the Clinton Foundation, *Good Housekeeping*, and the James Beard Foundation, pairs celebrity chefs with home cooks to demonstrate the benefits of healthy cooking.

As political, environmental, and public health issues related to food become ever more important, chefs are being asked to be leaders in the fight for food system change. Having a large following places them in such situations: According to a study by Forbes, the top 40 chefs reach more than 10 million people through Twitter and millions more on Facebook, Pinterest, Google+, and Instagram. Nearly four million unique users visit the top 160 food blogs each month. Print media also continue to offer platforms, whether as regular editorials in *The New York Times* or with books, such as Dan Barber's *The Third Plate*, in which he states that the farm-to-table movement has not gone nearly far enough in creating a sustainable food system for tomorrow.

In the National Restaurant Association's What's Hot 2015 Culinary Forecast, nine out of the top ten trends revolve around health and sustainability. This matches the results of a CIA/Datassential survey (see page 50), in which both operator and consumer respondents expressed at vast majority the need for the foodservice industry to address public health and environmental issues. Chefs' 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 political, health, and environmental issues. To establish credibility, however, chefs must be cautious about the positions they take on food issues and must educate themselves on the issues they decide, or are asked, to discuss.

## RECOMMENDATIONS:

As small business owners and operators, chefs' primary focus is often on sustaining their livelihoods and those of the people whom they employ. What's more, food-system issues will never resonate with all diners. Many chefs have been strong advocates of local-food systems and sustainable-food systems, but may not have been as engaged when it comes to including healthier food choices on their menus. Meanwhile, high-volume operators have made significant improvements in their healthful food offerings, but not always paid enough attention to sustainable production practices.

Chefs play a crucial role in aligning health, sustainability, flavor, and value by preparing menus that don't sacrifice any of those elements. Chefs must take a triple-bottom-line approach to health by sourcing ingredients and creating dishes that are healthy for people, healthy for the planet, and healthy for the bottom line.

Chefs and foodservice operators should proactively reduce animal-protein portions to between two and four ounces for many main courses, for example, and devote more of their creativity to plant-based proteins (e.g., legumes and nuts, as well as products made from these), as several high-profile chefs have begun doing this past year. When cooking meat, chefs should also look to use whole animals, to direct their customers toward lesser-known cuts of meats, reduce waste, and increase their own revenue sources.

Chefs should promote messages of pleasure for foods beyond meat and fat. Vegetables, which are increasingly seen as a valid creative outlet for chefs, offer great potential to further push healthier main-course options. Chefs can also use their appeal among the media to reinforce these messages. High-volume operations should use their extensive reach among the dining public to similarly promote a message that includes sustainability priorities, and they should reflect them in their purchasing practices.

## SCORE: 4

Chefs are very engaged in the movement for sustainability and are making progress in offering more plant-forward menu options, including launching full-service and fast-casual operations around the concept. But there needs to be additional focus on portion size, nutrition, and public health, and an overall move at all levels of the industry to offer more plant-based proteins on menus.

## IN SUMMARY:

- High-profile chefs and institutions around the country are developing concepts, from fast food chains to stand-alone fine dining restaurants, that revolve around plant-forward menus.
- Chefs have taken to social or print media to stake out arguments around sustainability and the future of the food system.
- Chefs must work harder at changing diners' attitudes, so that environmental sustainability issues and health become ever greater factors in consumers' dining-out decisions.

# CHEFS MOVE TO SCHOOLS

Chefs Move to Schools (CMTS) is a national volunteer movement to partner chefs with schools to educate children about healthy eating. Originally launched as part of First Lady Michelle Obama's Let's Move! campaign, this past year CMTS enhanced its operating structure and dedicated staffing through an agreement with the National Food Service Management Institute (NFSMI) and with support from USDA.

In January, the leaders of CMTS came together in Washington, D.C., to develop strategies for taking the initiative to a level of greater impact. "It's not sexy to formalize a process, but it really is important," says Greg Silverman, the managing director of Wellness in the Schools (a non-profit that also brings chefs to school kitchens, along with coaches to school playgrounds) and a member of the Chefs Move to Schools National Advisory Committee, which was founded at this January gathering. The group also mapped out a plan that includes standardizing a training curriculum for participating chefs and carrying out a major website redesign. The revamped website launched in early April and contains a chef directory and resources for culinary professionals and parents. Along with other new projects in the works, CMTS is currently evaluating a new pilot program, Chefs Stay After School, in select after-school programs across the country. On May 8, the organization held its first National Chefs Move to Schools Day, calling on chefs nationwide to join the fight against childhood obesity by sharing their excitement and expertise in the kitchen with children in their communities.

One of the primary goals of the Chefs Move to Schools program is to understand where chefs can make the most impact and develop best practices to share. They've learned a few key lessons so far.

## THE POWER OF THE CHEF COAT

It's not always about the cooking itself, but the excitement factor. "When Chef Bill Telepan [CIA graduate and chef-owner of Telepan and Telepan Local in New York City] is in a school in the South Bronx, and he's passing out root vegetable fries, kids are willing to try these things they haven't tried before," Silverman says. "He's in a chef coat, he is an amazingly talented chef, and most importantly, he is really engaging. The school food staff are under the gun timing wise, so just that extra piece of support—like getting kids excited about vegetables—is a first step. We can then clamor for changes like meal patterns or kitchen upgrades. But if the kids don't like the food, we can't say that."

Rather than an elaborate presentation of a technique or dish, greater impact can often come from a chef simply engaging with students in the school cafeteria and talking about his or her favorite vegetables. With the Wellness in the Schools model, a school will bring a chef into the classroom to talk about garbanzo beans and cook hummus together, then connect the dots by following with a hummus tasting in the cafeteria, and helping school food staff prepare and present the foods to students.

Silverman says: "Chefs have this unique ability—if they do it in the right way, which is collaborative and supportive—where everyone loves working with them, and they can help teach staff key technical skills, or go into the cafeteria and show a really fun and tasty way they've cooked beets. So, as opposed to formalizing processes not being sexy, chef coats are!"

## RELATIONSHIPS ARE KEY

Chefs volunteering through CMTS have taken different approaches to working with schools, offering to help out in a multitude of ways. Many chefs come from independent fine dining restaurants and may not have the same understanding or expertise as other types of chefs about how to work in school foodservice. It's important to arrive with a desire to help, a willingness to learn and listen, and of course a strong respect for the school foodservice staff. It's crucial to build that relationship over time and discover where a chef's skills can be most useful.

And, like in any team-centric kitchen, "You best be ready to roll up your sleeves, and take part," Silverman says. "As a team, having fun, working with school staff and engaging school students, that's how we will continue on a path to roll back the tide of childhood obesity in the United States."

To learn more, visit: **chefsmovetoschools.org** and **wellnessintheschools.org**.

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

## WILL DINERS CONTINUE TO SPEND MORE OF THEIR MONEY AT RESTAURANTS THAT CAREFULLY SELECT THE FOOD THEY SERVE, FEATURE MORE PLANT-FORWARD DISHES, AND COOK IT FRESH? THE SMART MONEY SAYS THEY WILL. THE FAST MONEY DOES AS WELL.

This year, the venture capital community is backing a host of new restaurant companies that emphasize plant-forward menus, scratch cooking, and carefully sourced ingredients, as well as a group of food companies that are looking to replace animal proteins with plants, from Beyond Meat and Hampton Creek, which are coming up with plant-based replacements for the chef and home cook, to Amazing Protein, which is finding ways to reduce the amount of meat used in the processing plants that supply some of the nation's largest restaurant chains.

The Culinary Institute of America also launched The Food Business School, its new center for graduate and executive education, to accelerate the efforts of today's culinary-minded entrepreneurs. The tech world also is turning its attention to the foodservice industry, with innovations to increase access to local foods, connect with diners, and reduce food waste.

Stock markets are recognizing and rewarding similar approaches. Among publicly traded restaurant companies, Chipotle saw its stock nearly double during a year when it had to remove items from its menu in order to uphold its commitment to "food with integrity" and its sustainable sourcing standards.

Financial markets now recognize that strong environmental, social, and governance (ESG) efforts are linked to better business performance. The past year has shown that almost every restaurant and foodservice company can benefit from an increased focus on ESG. While investor expectations are increasing quicker than the industry's performance, this section of the report calls out the areas with the greatest returns: improving transparency and surveillance of global supply chains and sharing more of that information with our diners.

This section also 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.

# SUPPLY CHAIN TRANSPARENCY AND RESILIENCY

In 2014, the food industry saw an increase in consumer awareness of food sourcing and supply. Much of the attention on food origination has focused on the use of genetically modified organisms (GMO) in food products. Whole Foods Market announced a commitment to label all GMO products in its retail offerings by 2018. This means that Whole Foods will confirm GMO use in over 100,000 food suppliers—a herculean task. Numerous apps are now available to assist buyers in identifying GMO foods when shopping in stores. Meanwhile, state laws on the labeling of genetically modified foods have been passed in Maine, Connecticut, and Vermont, and were narrowly defeated at the ballot in various others. Consumers have demonstrated a dramatic increase in their desire for more information about food supply.

Although GMO status has taken the spotlight to date, the consumer interest in food supply extends far beyond GMOs. New apps allow shoppers to identify features of food when making purchasing decisions. Buycott is an app that tracks the firms involved in a food product and their agendas and policies, allowing customers to purchase based on everything from the political positions of food producers to the environmental impacts of specific crops. HarvestMark, an app focused on food sourcing, has an even more extensive database of food features. Even Applegate, a leading meat producer, provides videos about the sourcing of food items on its webpage. Videos are linked via barcode numbers unique to products, allowing customers to see who produced their meat and where.

The efforts to better label food and define its features are perhaps best at work through Just Label It, an effort spearheaded by Gary Hirshberg, former CEO of Stonyfield Farm. This initiative is undertaken by the food producers and not third party observers. Leading brands like Stonyfield Farm, Annie's Homegrown, Horizon Organic, and Organic Valley are among their over 700 partners. Just Label It recently commissioned a survey that found that 91 percent of Americans favor labeling of GMOs in food. With both food suppliers and customers calling for more information about food and its sourcing, the awareness of this issue in our food supply has never been greater.

In the summer of 2014, another company shook our consciousness around global food supply and its safety. OSI Group, an Illinois-based firm that supplies large, international fast food outlets in China, apologized for selling expired and possibly rotten meat through its Chinese division, Shanghai Husi Food Co. The division was responsible for processing chicken and beef sold to many American fast food restaurants, including McDonald's, Papa John's, Burger King, KFC, and Pizza Hut, as well as fast food outlets in parts of northern China. This case shows the great reliance the international food supply has on a few major food processors. OSI Group is one of the largest meat processors in the U.S. and China and serves many competing fast food outlets, showing that while food may be served in different places, it is often sourced from the same provider. Although in the wake of the OSI Group scandal CEOs of both Burger King and McDonald's pointed to deception regarding the quality of the meat they received, there were few alternative suppliers for them to consider. OSI Group and major restaurant groups have since agreed to new and greater oversight of meat processing. It's likely China is not alone in its severe lack of food supply surveillance.

The fact that this case was brought to light by a disgruntled employee—and not by food supply chain detection or even a quality check by restaurants—further suggests that stronger surveillance and confirmation of our food supply are sorely needed.

Like the horsemeat scandal in Europe in 2013, this case highlights the complex, international web of food transfers that challenge restaurants and food suppliers in tracking and verifying the origin of food. Market evidence suggests that customers care about food sourcing and food safety: Yum! Brands, the parent company of KFC, Pizza Hut, and Taco Bell, watched sales at its outlets in China drop over 14 percent in the scandal's aftermath. Redeveloping trust with consumers will require a focus on traceability of the food supply.

Just as China is still investigating this lapse, the U.S. Food and Drug Administration (FDA) has approved the importation of chicken to the U.S. from four major Chinese chicken processors. Although the current rule does not allow imports of Chinese-raised chickens, this is expected to soon change, which raises new concerns about introducing Chinese chicken into the U.S. food supply, such as bird flu. In the U.S., the processing of poultry has taken a new direction, showcasing the food safety risks at work. The Modernization of Poultry Slaughter Inspection rule was proposed in January 2012, containing the proposal to increase the line speed in poultry processing plants from 140 birds per minute to 175, and to alter the role of FDA inspectors. Some 20 plants had been using the higher line speed for a decade as part of a demonstration project. The proposed expansion of higher line speed to all processing plants encountered sharp criticism from food safety, worker health, and animal welfare groups. The language of the act was changed in response to this criticism before being passed in 2014, maintaining line speed at 140 birds per minute but grandfathering in the 20 plants operating at 175 birds per minute.

In the U.S., the FDA has taken steps to designate "high-risk foods" as required by the FDA Food Safety Modernization Act. The goal is to focus particularly on foodborne outbreaks that occur or are amplified at critical processing steps. The FDA has worked with the Centers for Disease Control and Prevention (CDC) to craft a draft set of criteria for identifying those foods that pose high risk. These criteria focus on preventing the spread of illness through food, in particular processed food, and represent an important step toward developing a safer food supply. Challenges in tracking food and ensuring food safety in light of recent large-scale food safety cases have contributed to President Obama proposing to centralize food safety responsibilities under a new, single food safety agency within the Department of Health and Human Services, as compared to the 15 governmental agencies that currently have a voice on the matter.

Increasing droughts, climate change, and agricultural use of water on marginal land have also raised concerns over how the use of water in food production has contributed to droughts. The year of 2014 brought one of the most severe droughts ever seen in California, with political, environmental, and ethical implications, raising the overall awareness of water use in food production. However, challenges to the use of water in food production are also threatening the Ogallala Aquifer beneath the Great Plains and the Florida aquifer used to produce many winter crops. In such places, sound and responsible water management practices have been identified. However, consumers need labeling and tracing in order to make purchases that support these environmentally sustainable producers and further strengthen the economic feedback loop to reward producers for making sound environmental decisions.

Efforts to label the GMO status of food shows an increasing interest in understanding what we consume. They also illustrate the need to expand awareness of other important factors in the supply of food, such as its origin, handling, farming and husbandry practices, and even the environmental impact of its production. As shown by the OSI case, the food supply does show singular "bottlenecks," or major food handlers that supply many restaurants and customer. This makes food tracing more difficult but even more important. As evidenced by the recent increase in food sourcing apps that provide consumers and food suppliers with the ability to demonstrate the sourcing and origin of food, we can expect only a greater demand for transparency and traceability.

## RECOMMENDATIONS:

Food products are increasingly 1) global in sourcing, 2) traded by various intermediaries, 3) poorly examined at critical manufacturing steps, and 4) used as ingredients in industrial or large-scale food production (masking their origin). These features suggest that food traceability is needed more than ever. The past year saw advances in the U.S. supply chain, such as GMO labeling, consumer interest in developing additional food origin labeling schemes, and steps by the FDA to track "high-risk foods." Foodservice operators should be proactive and share information about sourcing and origin, and consider adopting food labeling standards as well as purchasing from suppliers who permit tracing through apps and barcodes.

## SCORE: 3

Food supply chains remain vulnerable to fraud and contamination. More traceability information is needed.

## IN SUMMARY:

- GMO labeling commitments by Whole Foods Market and several state lawmakers in the U.S. represent broader consumer demand for greater transparency, and more traceability information, in the food supply.
- Recent food safety scandals, such as that of OSI Group, Inc.'s sale of expired chicken and beef to major fast food outlets in China, suggest a need for stronger surveillance of the food supply. The good news is the U.S. government has recently recommended a new federal agency tasked with food safety and regulation.
- Many user groups, food tracing apps, and food labeling consortia have gained traction and become mainstream, allowing buyers and customers to track food in specific parts of the food supply and gain a better understanding of what they consume.

# INNOVATIONS IN THE FOOD INDUSTRY

The divide between the tech and culinary worlds has long been glaring, with two communities speaking utterly different languages. But with that divide have also come currents of opportunity, and a palpable change has occurred in the last few years. New conferences, for instance—from Bon Appétech and BITE Silicon Valley, to the CIA's reThink Food, presented in partnership with MIT Media Lab—are at least in part to thank for bridging the gap. Opportunities for dialogue such as these can contribute to greater understanding among leaders in both fields, and ultimately help drive innovation at the intersection of food and tech.

Startups hoping to "disrupt" the food and foodservice industries, as startups aim to do in all industries they enter, are increasingly attracting attention and investment from venture capital and private-equity investors. Some specifically focus on health and sustainability. But almost all try to improve the bottom line. Doing so may, for example, allow more flexibility in a foodservice operation's budget to buy higher quality foods, such as meat raised without antibiotics, which customers are increasingly demanding.

Food waste is a natural focus for several new companies because the numbers are staggering: An average of 10 to 12 percent of the food produced is wasted in high-volume foodservice. More than a billion tons of food is thrown away each year, more than enough to feed 868 million people. To help reduce waste, a variety of new apps and software services exist for tablets and smartphones—such as LeanPath's tracking system, which allows kitchens to record details of what food is disposed of, when, and why.

Looking to the distribution side of food waste, the Maryland-based organization Food Cowboy provides a live, crowd-sourced map that connects food bound for landfills—say, a trucker moving pallets of tomatoes, only to realize some of the pallets are over-ripe—with a database of 700 charities, of which 350 are food banks, so that food can be redirected. Consider it "air traffic control" for food waste.

In consumer packaged goods, Bump Mark is an alternative food label that uses the bio-reactivity of gelatin—as a protein, it degrades at the same rate that protein-based foods inside a package would—to indicate when a food should be discarded. This technology can reduce food waste by more accurately measuring when a product has reached its expiration date, unlike an arbitrary date after which it is still safe for consumers, even though many might toss it based on calendars alone.

Innovations have also made local and "hyperlocal" sourcing, especially of produce, more doable for foodservice operations. Among new solutions is a startup called OtherShip Foods, which has created a system that can produce food without soil, allowing racks of fruits and vegetables to grow directly inside a next-generation shipping container that can be parked outside a restaurant's kitchen door. Chefs can take what they need, leaving the work of restocking and system maintenance to OtherShip staff who occasionally stop by. The energy intensiveness of local produce can vary depending on growing practices, but energy savings are often to be had from reducing the "food miles," or distance required to transport produce from farm to table, and from fewer losses due to spoilage in transit. While it is still early to measure the new company's results, with a goal of helping restaurants boost the amount of their produce that is local from 30 to at least 70 percent, the impact could be tremendous.

Another innovative company on the supply side is Sourcery, a payment platform that lets restaurants, commercial kitchens, and other food retailers and buyers place orders with multiple local suppliers through a central dashboard. By streamlining the sourcing, invoicing, and payment process for caterers, restaurateurs, and kitchen managers, Sourcery can help change how they procure their foods. It makes it easier to buy from local producers who might not otherwise be set up to handle large commercial orders, and also easier for local producers and distributors to gain exposure to new customers. Backed by deep-pocketed Silicon Valley investors, such as Y Combinator, Sourcery has more than 100 food businesses on board, including Tom Colicchio's 'Wichcraft, Dropbox, Munchery, and Airbnb.

Some especially creative ideas are also on display in the realm of restaurant design. Startups such as MenuPad, HubWorks, E la Carte, and Butter Systems offer digital ordering and payment products designed to boost restaurant check averages, limit wait times, and improve overall customer service. By substituting tablets for menus, chefs can offer detailed information about ingredients and cooking methods.

Luring investors to start-ups in agriculture has been a tougher sell. The sector is highly regulated and political, a turn-off to investors who are used to investing in sectors such as high-technology or pharmaceuticals. However, in the wake of a billion-dollar exit for the venture firms that invested in The Climate Corporation, acquired by Monsanto, this may be changing. Venture capital firms such as Khosla Ventures have added a number of ag-tech startups to their portfolios in the past year. And AgFunder is a new crowdfunding investment platform specifically for new technologies related to agriculture. Cases like these demonstrate to agricultural entrepreneurs, and perhaps more important, to their funders, that there is money to be made in the sector.

Another sign of progress on this front is investment by research universities in innovative, integrated initiatives related to agriculture and food systems change. The University of California, Davis, announced last fall the launch of a new Innovation Institute for Food and Health. It is designed with the intention of delivering high-impact, "Silicon Valley-type breakthroughs in food, agriculture, and health," as its press release states. The institute is backed for the next 10 years with at least $40 million from Mars, Incorporated, and $20 million from UC Davis, namely through its World Food Center. Also this past fall, the deans of Harvard University's Law School and T.H. Chan School of Public Health announced campus-wide challenges to students to submit novel ideas for addressing the complex challenges of the current food system. The emphasis is on interdisciplinary team project proposals, vying for a $50,000 grand prize.

Finally, The Culinary Institute of America recently launched the Food Business School (FBS), the college's new center for graduate and executive education, which aims to accelerate innovation in the food and foodservice industries. FBS supports the aspirations of entrepreneurs through online and real-world learning, team-based idea generation and concept testing, and relationships and insights throughout the food industry.

## RECOMMENDATIONS:

Consumer demand has made it clear that health and sustainability 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 and technologies to help reduce food waste, to source locally, and to educate diners about where their food comes from and what is in it.

## SCORE: 4

From global forums and venture capital funding to university-wide campaigns and crowdfunding, the past year has seen a wide range of innovative new initiatives that are bridging the gap between the culinary and the tech worlds. A greater array of tools and technologies are now available to foodservice professionals, but it may be difficult for some to know which technologies to embrace. The good news is that new initiatives, such as the CIA's Food Business School, have been designed specifically to address this issue, in large part by nurturing a new network of leaders in the arena of food innovation.

## IN SUMMARY:

- Silicon Valley—and those who aim to spark Silicon Valley-like breakthroughs—is increasingly turning its attention to the agriculture and foodservice industries, with a great number of high-potential technologies coming to market.
- Whether through new ways of thinking about menuing and sourcing, using new tablet interfaces, or supporting new products from startup companies, chefs and foodservice leaders should embrace the tools now at their disposal.
- Efforts such as the CIA's Food Business School are beginning to address the lack of both strong leadership in this space and a cohesive framework for navigating the many new innovations on the market. Yet, further investments in transformative ag-oriented companies and solutions are still needed.

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

In the past year, professional investors who trade shares of publicly traded companies and back start-up companies have significantly shifted their support to favor businesses that embrace environmental sustainability, public health, and social benefits.

Over the past five years, venture capital firms have invested more than a half billion dollars into new food companies. Start-ups in California, New York, and Massachusetts have attracted most of the investment, as those regions emerge as the nation's new centers for food innovation. We've seen rapid growth at companies like Asian Box and sweetgreen that offer smaller portions of meat or rely on meat as a condiment. At the same time, companies like Amazing Protein are introducing products to help reduce the amount of meat in everyday offerings; like Beyond Meat and Hampton Creek, they also are receiving private investment to expand their plant-based food products both nationally and globally.

Meanwhile, restaurants that embrace plant-forward concepts and the Mediterranean diet have successfully transformed into publicly traded companies: the value of Zoës Kitchen, for example, has more than doubled since it became a public company in April 2014, outperforming many older QSR chains.

That's not surprising, as financial analysts and professional investors increasingly consider a company's sustainability performance, factoring in environmental, social, and governance (ESG) elements into company valuations. In 2014, investors representing $45 trillion in assets (about 20 percent of all investable assets) were signatories to the Principles for Responsible Investment (PRI), a global organization advocating ESG analysis. That's up from $34 trillion in the year before. Professional investors and publicly traded companies now are engaging in a virtuous, and profitable, cycle, as the University of Oxford found that almost 90 percent of research reports on publicly traded companies now find that strong ESG performance is linked to better business performance, and that sustainability practices positively influence stock performance.

In the U.S., more than 100 investment firms representing $13 trillion in assets were members of the Investor Network on Climate Risk (INCR), a group that has pressured corporations to disclose carbon emissions, supply chain risk, and sustainability management. This figure is also up from the prior year, which totaled $11 trillion.

The impetus for such investor pressure lies in the financial risks associated with ignoring sustainability. For example, a report by the Carbon Disclosure Project found that "industry leadership on climate engagement is linked to higher performance on three key financial metrics that reflect overall corporate quality: return on equity; cash flow stability; and dividend growth." A report from PRI and PwC, a network of firms, found that ESG factors can affect valuation for mergers and acquisitions transactions.

What does this mean for food and beverage companies and small restaurants? Good ESG practices increasingly are seen as an important indicator of management quality.

This approach is working its way through the finance ecosystem. Climate change and water risk, heightened by severe drought in key agricultural production areas of California, emerged as a great concern for food industry companies. Investors have asked companies to report on water use in their supply chains, as activist groups have focused on food manufacturers in particular.

Investors are also concerned about company innovation and commitment to health and wellness, which continues to provide strong growth and opportunity for the sector. Investors now have a benchmark on company efforts to improve product formulation, marketing practices to children, and micronutrient outreach to developing country markets through the Access to Nutrition Index (ATNI). Investors representing over $2.6 trillion in assets under management have committed to using the ATNI benchmark to assess and communicate with companies they hold.

This new investor focus also has helped prompt changes in some of the world's largest food companies like McDonald's and Yum! Brands, which must focus on both satisfying diners and increasing the value of their companies. As their stock prices flounder, both are focusing on more transparency and minimally processed foods. McDonald's USA President Mike Andres recently announced new menu approaches, commenting, "Why do we need to have preservatives in our food? We probably don't." Meanwhile, Yum! Brands' CEO Greg Creed also said his company "must clean up our menu labels. We have to pull preservatives out."

Income inequality is also an important trending issue in the investment community, and restaurateurs in particular should expect challenges to low-wage business models that may increase turnover and brand risk, particularly given recent research that demonstrates better performance from some companies that make fair wages a priority, and public support for increasing the minimum wage.

Walmart, the nation's largest employer, recently announced that it will pay its employees at least 25 percent more than the minimum wage, and many large restaurant companies like Starbucks and Panera Bread already pay employees above that in order to recruit and retain a talented labor force. But the specter of "McJobs" still weighs on the restaurant and foodservice industry, tarnishing brand images and hampering the ability to recruit workers.

## 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 environmental practices, particularly relating to water use and stress, as well as supply chain labor. The industry should be a partner at the table discussing various options to resolve these issues.

## SCORE: 4

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

The industry has made progress in identifying environmental and labor risks from key supply chain commodities, but it is unclear if uptake is sufficient to safeguard the consistent supply of those goods. The industry has been largely reactive to wage disparity, which is unlikely to be a viable strategy for the long term.

## IN SUMMARY:

- Attention to sustainability issues is increasingly considered an essential component of a food company's financial performance.
- Investors on both the public and private side have been shifting support to foodservice chains and start-up food and beverage companies that focus on sustainable and healthier, plant-based foods.
- Despite significant progress in the past year on the sustainability front, affecting both the success of certain emerging companies and the practices of longstanding fast food chains, both restaurateurs and the investment community should address increased pressure to improve wage disparities in the foodservice sector.

## 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 $710 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.

# VII. 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**.

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

# PRINCIPLES
## OF HEALTHY, SUSTAINABLE MENUS

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

The Culinary Institute of America® | HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH Department of Nutrition

## MENU CONCEPTS AND GENERAL OPERATIONS

**BE TRANSPARENT ABOUT SOURCING** AND PREPARATION

**BUY** Fresh AND SEASONAL, LOCAL AND GLOBAL

**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

**CELEBRATE CULTURAL DIVERSITY** & DISCOVERY

LEAD WITH **MENU MESSAGING AROUND FLAVOR**

REDUCE PORTIONS, EMPHASIZING CALORIE QUALITY OVER QUANTITY

**DESIGN** HEALTH AND SUSTAINABILITY INTO **OPERATIONS AND DINING SPACES**

## FOODS AND INGREDIENTS

**THINK PRODUCE FIRST**

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

SERVE **LESS RED MEAT, LESS OFTEN**

**REDUCE ADDED SUGAR**

**CUT THE SALT;** RETHINK FLAVOR DEVELOPMENT FROM THE GROUND UP

SUBSTANTIALLY **REDUCE SUGARY BEVERAGES;** INNOVATE REPLACEMENTS

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

DESIGNED BY J WRIGHT DESIGN

© 2015 The Culinary Institute of America and President and Fellows of Harvard College, as published in the Menus of Change Annual Report. All rights reserved. See the full version of the principles at http://www.menusofchange.org/news-insights/resources/

# 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.

# VII. CULINARY INSIGHT: REINVENTING THE BURGER

A staple in most operations, whether full service, fast casual, or quick service, the burger offers the perfect platform for flavor innovation. In the past, that might have meant adding bacon to ground beef. More recently, innovation has focused on moving burgers away from 100 percent meat, blending in vegetables, whole grains, and legumes to create more plant-based menu options. In March, the CIA surveyed the culinary community to understand how chefs and operators have been reimagining the burger, from blends to fully vegetarian or even vegan options. The creative potential expressed in the responses shows promising movement forward. However, they also make clear that customer demand must follow, which is still challenging in many areas. Here are some of the survey's answers (edited for overall length and clarity).

## Do you have a non-traditional burger on your menu that includes a significant percentage of plant or vegetable components, whether blended with meat (beef, pork, or lamb) or a strictly vegetarian option?

77% YES

23% NO

## WHAT'S IN THAT BURGER?

### BLACK BEANS

Many respondents serve a form of black bean burger as a vegetarian option (spiced with cumin, blended with mushrooms or with kale, for example).

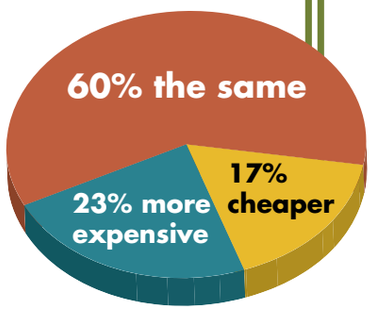
### MUSHROOMS

Mushrooms are the most popular blend with meat.

### BROWN RICE/QUINOA

Brown rice and quinoa appear frequently in vegetarian or vegan patties.

## HOW DOES THE NON-TRADITIONAL BURGER'S PRICE RELATE TO YOUR OTHER BURGERS/SANDWICHES?




## HERE ARE SOME OTHER IDEAS FEATURED IN RESPONSES:

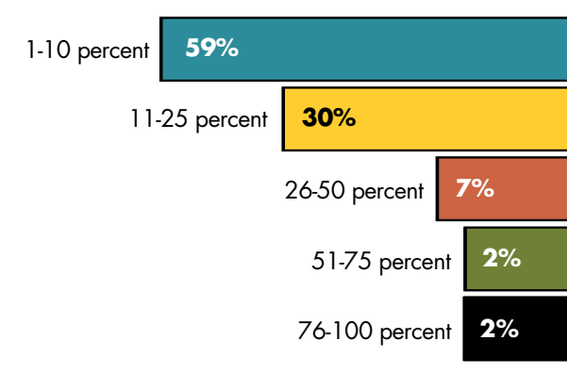
### VEGGIE BURGERS

- **WILD RICE POLENTA BURGER**
- **A BLEND OF TOFU, BEANS, AND WHEAT**
- **Patty of carrots and other veggie pulp blended with nut-seed pâté**
- Locally sourced/farmers' market beets, quinoa, black bean, roasted red peppers, celery, minced kale and spinach, quinoa flour for binding, ice cubes for juiciness
- **Taro veggie burger with brown rice, zucchini, and mushrooms**
- House-made white bean patty, goat cheese, sliced cucumber, avocado, alfalfa sprouts, lemon aioli, and a brioche oat bun
- **QUINOA, ROASTED EGGPLANT, WHITE BEAN**

### MEAT BLENDS

- **SOY, QUINOA, BUFFALO BLEND**
- Beef stuffed with feta, spinach, and pine nuts
- **Blend of ground duck, duck fat, chickpea paste, black bean paste**
- **TUNA AND AVOCADO**
- **Turkey burger with tzatziki sauce**

## WHAT PERCENTAGE OF YOUR BURGER/SANDWICH SALE DOES IT REPRESENT?



## WHAT OTHER VEGETARIAN OR MEAT-BLENDED BURGERS HAVE YOU CONSIDERED ADDING TO YOUR MENU, IF ANY?

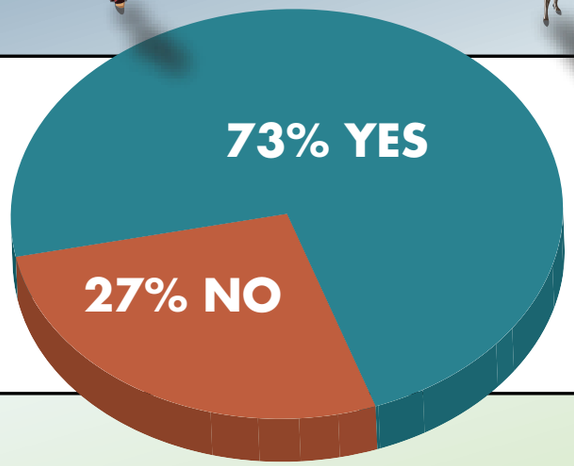
**LENTIL, PURPLE POTATO, AND LEEK BURGER**

Mushroom burger with 20 percent roasted minced mushrooms added to ground turkey or ground beef

**A fish/salmon burger utilizing our fresh scraps from our butchers, with vegetables added to the raw meat, fresh herbs, and pan-seared when prepared**

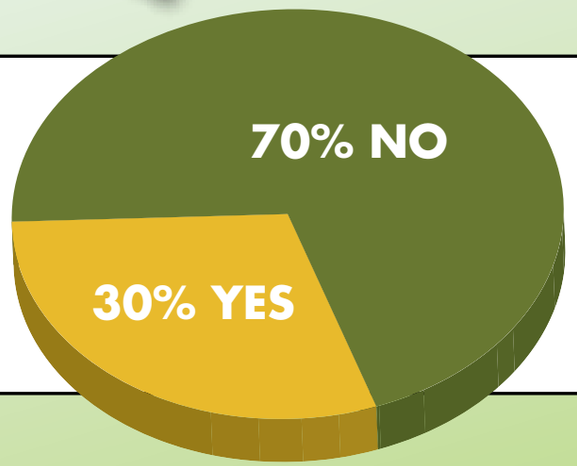
**Moroccan sliced chicken slider—not currently a blend but we are playing around with recipes that would incorporate lentils or another plant-based protein**

**ZUCCHINI-MUSHROOM BURGER**




DO YOU HAVE A BURGER ON YOUR MENU MADE WHOLLY OR IN PART FROM POULTRY?

HAVE YOU TRIED TO INCLUDE A VEGETARIAN/MEAT-BLENDED BURGER ON YOUR MENU AND IT DIDN'T WORK?




## IF YOU TRIED A VEGETARIAN/MEAT-BLENDED BURGER AND IT DIDN'T WORK, WHY DO YOU THINK THAT IS?

It did work but took up valuable menu room and was less than 2 percent of sales

**THE AREA I LIVE IN IS NOT VERY HEALTH CONSCIOUS. THEY WANT MEAT AND A LOT OF IT**

The kids just don't buy it. We have to price it high because it costs more. Also, it isn't really even that good for you... just because it is vegetarian doesn't mean the sodium or fat are good

**TASTED LIKE SAWDUST**

Not a lot of vegans

**BLAND FLAVOR PROFILES, INCONSISTENT COOK**

**IT WAS NOT INNOVATIVE OR VERY DELICIOUS**

**NOT A SIGNIFICANT ENOUGH AMOUNT OF PATRONS LOOKING FOR THAT ITEM**

**Didn't bind together well**

**VEG BURGER PERCEIVED AS IRONIC**

Not enough demand, made with fresh ingredients that would eventually have to be thrown out

it's about bringing craveable food that's often healthy and responsibly sourced—food formerly reserved for the fine dining crowd—to the masses.

# IX. BUSINESS ANALYSIS: THE ART OF THE POSSIBLE AND PROFITABLE

## CHEF-DRIVEN FAST FOOD

CHEFS HAVE LONG LOOKED AT OPENING CASUAL RESTAURANTS AS A WAY TO SUPPORT THEIR FLAGSHIP FINE-DINING INSTITUTIONS. IN THE LAST YEAR, HOWEVER, MANY OF THE COUNTRY'S LEADING CHEFS HAVE HAVE TURNED TO FAST FOOD, OFTEN WITH A PLANT-FORWARD FOCUS AND HAVE TURNED TO FAST FOOD, OFTEN WITH A PLANT-FORWARD FOCUS.

The Washington, D.C.-based José Andrés, known for a wide range of successful restaurants in his ThinkFoodGroup portfolio, from the experimental cuisine of Minibar and his Las Vegas restaurant é to Spanish and Middle Eastern favorites at Jaleo and Zaytinya respectively, launched this spring the first of a vegetable-centric quick service restaurant with the tongue-in-cheek name "Beefsteak" (as in the tomato) and a tagline that proclaims "vegetables, unleashed."

Daniel Patterson, of the lauded Coi in San Francisco, has teamed up with CIA alumnus Roy Choi, king of L.A. street food and co-founder of Kogi, to bring the world the best hamburger possible (beef cut with quinoa, barley, and seaweed) for, they hope, 99 cents. They consider their fast food vision revolutionary: Loco'l will source locally, offer fair wages to its employees, and aim to build community in the areas where it opens restaurants. Choi recently explained to Eater that the vision is "to create a fast food concept with the heart of a chef." A crowd-funding campaign through Indiegogo raised more than $128,000 to help build the first outlets, which will open in a low-income area of San Francisco called the Tenderloin, which many argue is a food, desert, and the Watts neighborhood in Los Angeles.

Chris Jaeckle, chef-partner of All'onda in New York and a Morimoto veteran, also recently opened a fast casual spot, Uma Temakeria. It features Jaeckle's signature rolls but also hand rolls made to order, and it seeks to use only sustainable seafood and ingredients associated with minimal environmental damage. Joshua Skenes, chef-owner of Saison in San Francisco, has teamed up with Umami Burger restaurateur Adam Fleischman to debut Fat Noodle, a fast-casual Chinese noodle bar. That's a long way from the 18-seat Saison, recipient of three Michelin stars, which can feature as many as 20 courses at prices that vary by the day but are typically several hundred dollars per person.

Another CIA graduate, Franklin Becker, most recently of Abe & Arthur's restaurant in New York City, has opened a plant-forward quick-service chain called The Little Beet. Diners pick from sides like charred cauliflower or Southwest-style millet and pair them with proteins in salads, bowls, soups, or wraps in customized plates; combinations are in the $8-$14 range for a meal.

Overall, these new companies are aiming to make their top-quality food accessible to the masses through average checks under 10 dollars.

What's happening is the speed, price point, and ubiquity of Subway meeting the quality, culinary training, and concern for sourcing of Chez Panisse. Several chefs credit Chipotle founder (another CIA alum) Steve Ells for inspiration; in fact, Andrés

aims to follow a similar model and says he hopes to reach Chipotle-level scale. Many of the new concepts, such as Fat Noodle, follow Chipotle's create-your-own, assembly line model, with various combinations of bases, proteins, toppings, and sauces.

We also need to recognize the chefs who pioneered this new path. Wolfgang Puck Express have been in airports across the country for decades, and big names from Rick Bayless to Bobby Flay boast multi-unit fast casual chains. But what has changed is that overall the restaurant industry has grown tremendously, especially in fast-casual, with stars like Panera Bread and Chipotle bringing in double-digit billions across nearly two thousand locations apiece. (Meanwhile, McDonald's stock is floundering.)

What underlies all these new concepts is the potential for average people to eat a Michelin star-caliber meal at a single-digit price. In other words, it's about bringing craveable food that's often healthy and responsibly sourced—food formerly reserved for the fine dining crowd—to the masses.

# COMPASS GROUP HEEDS THE CALL … AND THEN SOME

Compass Group USA, the leading foodservice management and support services company, announced in February that it has adopted four new initiatives based on the Menus of Change Principles of Healthy, Sustainable Menus. While Compass Group, which posted $13.6 billion in revenues in 2014, has made commitments towards health and environmental imperatives over the years, it considers these four new initiatives as the necessary next steps to help make the foodservice industry sustainable in the future.

Metrics are at the core of its new program. Compass Group developed a Menus of Change scorecard in conjunction with its global purchasing arm, Foodbuy, to benchmark and measure its progress. All four commitments will be measured over the next three years, starting January 1, 2015, and will compare baseline amounts from each quarter every year, year over year. The amounts will be measured in total purchasing volume of produce and red meat, and total spend on whole grains. The four commitments are:

**Commitment 1: "Increasing customers' access to vegetables and fruits by focusing on globally inspired, largely plant-based cooking."**

- Goal and measurement: Increase pounds of produce by five percent each year.
- Menu engineering: While fresh produce is considered optimal, frozen vegetables will be included, as will efforts such as: offering the option of two vegetable sides for certain meal combinations, aiming to fill half the plate with fruits and vegetables, and stealth nutrition like adding more vegetables to chili.

**Commitment 2: "Including recipes and concepts where meat plays more of a supporting role, reducing red meat portion sizes and offerings, and leveraging strategies from seasonal and local flavors, vegetable proteins, and global cuisines."**

- Goal and measurement: Reduce beef purchases by 10 percent each year, and address other red meat (pork and lamb) in years two and three.
- Menu engineering in the first year: The goal will be to increase options for existing promotions such as "flexitarian" and "mushroom blended favorites," which are hamburgers made of fresh mushrooms combined with ground beef. Other efforts will include focusing on non-beef seasonal specialty sandwiches for catering and grab-and-go menu items, and taking inspiration from Mediterranean and Asian preparations where meat is served in combination with vegetables and grains rather than as the star at the center of the plate.

**Commitment 3: "Increasing our offerings of grain options that are at least more than 50 percent whole grain."**

- Goal and measurement: Increase purchases of whole grains by five percent each year, and always offer a 50 to 100 percent whole-grain option for rice, pasta, potato, and bread choices.
- Menu engineering: The efforts to reach this goal include: offering special sandwiches on whole-grain bread, highlighting at least one whole grain in daily specials, making brown rice available, featuring whole grains in select exhibition-style bowls, and offering more whole-grain options for breakfast.

**Commitment 4: "Conscious Menuing and Messaging. Promote health and sustainability through inspiring menus, customer interaction at the chef's table, and telling the story about great food."**

- Goal and measurement: By leading through flavor first, elevate the role of the chef as the bridge to making healthy choices. Aim for positive feedback from annual client satisfaction surveys and quarterly business reviews.
- Menu engineering: The main approaches for the fourth commitment are around messaging, telling stories about specific farms and growing practices behind ingredients, using social media to highlight relevant menu items, and encouraging guests to try something new through sampling.

As part of its emphasis on leading with flavor, Compass won't be heavily promoting the changes at the unit level. Instead, Christine Seitz, vice president of culinary for Compass Group USA Business Excellence, says, "Our voice to our consumer and client is through our menu engineering." For instance, in a corporate cafeteria, a tablespoon of farro might be tossed into a salad as a garnish or blended into a meatloaf instead of the traditional bread, adding texture and a nutty flavor, with as only discernable effects the dish's appealing appearance and taste, and an enticing menu heading that creates interest in the dish for its story, not for its nutrients.
The light-bulb moment for Seitz was a realization she had during the 2014 Menus of Change conference, which she attended with several of her colleagues: "I loved the point about seatbelts and smoking, and how long it takes to create change," she says. "I was part of the 'Super Size Me' era in the '80s, the movement to increase portion and plate sizes to show value. We serve over seven million meals a day, and our culinary teams can effect change with sustainable portion sizes." A few weeks later, in July, Compass pledged to strive toward these goals starting January 1, 2015.

She had to convince the senior leadership to commit, so she developed a task force of over 80 chefs, dietitians, and marketing and communication leads—including Deanne Brandstetter, vice president of nutrition and wellness at Compass Group, the Americas and former co-chair of the CIA's Healthy Menus R&D Collaborative—to determine how the commitments would be applied to all the different levels of business, from K-12 and business and industry (B&I) to hospitals and senior living. Their culinary leaders and this task force are implementing the changes at the unit level.

Marc Zammit, former vice president of corporate sustainability for Compass and a founding member of the Menus of Change Sustainable Business Leadership Council, led many of the strides Compass made in food purchasing and product development, for example, around antibiotics and seafood. He says it was clear to the Compass leadership that now is the time for a shift of this magnitude: "It was the perfect storm between the initiative's message and what customers wanted."

When it comes to consuming plant proteins, consumers are ahead of operators in many respects.

# X. MARKETING PERSPECTIVES: THE SELLING OF DELICIOUS, HEALTHY, SUSTAINABLE FOOD CHOICES

For decades, "healthy, craveable" food was an oxymoron, and marketers were left scratching their heads about how to sell consumers on the idea. Today, the landscape could not be more different. Here we share the findings of a new survey of American consumers and foodservice operators and highlight the marketing strategies applied by two foodservice operations—one emerging chain, one university dining operation—that are seeing great success in selling diners on plant-forward dishes, and in the process making healthy, craveable food a redundancy.

## DATASSENTIAL SURVEY FINDINGS

Earlier this year, the CIA partnered with Datassential to conduct a survey about the state of plant-forward dining in the foodservice industry. The aim was to uncover views from both consumers and foodservice operators about a variety of issues related to protein; concerns that operators have when it comes to making protein-related changes to their menus; and the ways that operators can both react to changing consumer demands and lead consumers to more plant-centric eating patterns. The survey was completed online by 1,013 consumers and 634 operators—menu decision-makers from restaurants ranging from QSR to upper casual, and from onsite operations ranging from K-12 to hospitals. Here's what we learned.

The consensus among both consumers and operators (about three fourths of each group) is that the foodservice industry must play a role in addressing broad issues related to public health and the environment. Surprisingly, though, both groups place less emphasis on the foodservice industry's role in addressing protein production and consumption than they do on its role in addressing broad health and environment issues. This signals a disconnect, since the single most significant contribution the foodservice industry can make toward environmental sustainability is to reduce red meat on menus, as part of a larger shift toward more plant-based and healthy dishes.

Food safety is far and away the most important issue for consumers, cited by 80 percent as an issue of concern. In contrast, only about half of consumers polled were concerned by the impact of animal protein production on the environment and current consumption levels of animal proteins in the U.S. Interestingly, consumers are more concerned than operators about antibiotics and steroids in animal proteins and dairy products. Maeve Webster, senior director at Datassential, who led the survey administration and analysis, notes: "Consumers appear more engaged in environmental and health-related issues, while operators are more concerned with business-oriented issues such as cost and consistent supply." Operators must realize that the fact that consumers are concerned about health and environmental issues *makes* those business issues.

When it comes to consuming plant proteins, consumers are ahead of operators in many respects. "Operators have work to do in closing the gap between consumption and current away from home availability levels," Webster reports. "This

is particularly true for non-animal protein options such as legumes, Greek yogurt, nut butters and flours, and tofu, seitan, etc." This is likely due to the fact that only 10 percent of operators feel that increasing plant-forward dishes would be easy, while the vast majority believe it would be difficult. On the plus side, reducing the portion size of animal protein on menus is expected by nearly half of operators to increase the healthfulness of the entrees, and by over a third to increase the culinary innovation involved with the dishes.

Perhaps one of the most significant findings is one that supports key Menus of Change principles and other case studies and analyses described in this report: "Pasta dishes, stir fries, and plant-based dishes—all of which can use meat as a condiment or supporting ingredient—have greater potential among consumers than vegetarian or vegan options."

All of these findings are important contextual factors for understanding how operators *talk* about shifts to more fruits and vegetables, whole grains, nuts and legumes, less meat, and so on. The idea of animal protein as a garnish appeals to half of consumers, yet does not resonate at all with 28 percent of them, so it's important for operators to focus on telling the story behind a menu item with reduced animal protein or increased produce in order to increase interest. Greater sourcing transparency appeals to 70 percent of consumers, offering a clear communication opportunity when it comes to conveying the reasoning behind a menu change. Another key strategy for doing so is through menu items that draw from world cuisines, as described in the case studies below. Using ingredients from other countries' and regions' cuisines is expected to make menus more interesting and unique, while allowing operators to use more plants and less animal protein. On the list of possible menu changes an operation could execute, featuring more global cuisines on menus is second in likelihood only behind requiring greater transparency from vendors; these are changes that 36 and 37 percent respectively are likely to do, and nine and five percent respectively are already doing.

The most significant menu challenges that operators are facing are fluctuating protein costs and how to make healthier items equally appealing to diners. The cost issue might become enough incentive for some operators to reduce portion sizes of animal protein, but it will be important that they be open with their diners if and when they do so.

Another key finding relates to how well operators understand diners. Webster explains: "Operators overestimate patron interest in vegetarian items but may be under-estimating interest in blends and smaller animal protein sizes, particularly if those proteins are higher quality." This presents a tremendous opportunity, but it has to be done with proper communication. There are times and places for "stealth health" and keeping a menu change under the radar—meaning that operators must each determine what is best for them individually—but on average, the times that operators communicated a menu change to patrons were the times a change received the most positive response. This can take place through web content or directly on the menu. Some examples of these well-received changes are: featuring more world cuisines, using high-impact preparations on produce, creating mixed grill dishes, adding or replacing a meat option with a non-meat option, and using higher quality meat. The reverse is true as well, as operators reported that they typically did not communicate a reduced portion size of animal protein, or a reduced number of entrees focused on animal protein, and both of these changes were not well received. As one operator shared, "We only tell them if they ask, but this tactic is not successful."

As far as *how* to communicate a menu change, such as reducing the amount of meat in a dish, operators are most likely to label a dish as a new recipe. Cited by 59 percent of operators, using language such as "topped with" or "served with" as menu descriptors is considered the most effective way of communicating dishes using meat as a condiment. By contrast, only 24 percent of operators consider it effective to either rely on servers to romance these kinds of dishes or to group all similar items under a menu header indicating that meat is not the primary ingredient in those items. Quality is especially important when it comes to any potential shift in value perception, as Webster reports: "Given quality is a key driver for consumers—and this has born out in the success of fast casual operators—leveraging quality may help to counteract 'more for less' value." Consumers also view seasonal, fresh, and local as adding value.

Here are some specific communication strategies that operators are using alongside menus and recipes that feature smaller portions of animal protein and more produce, grains, and plant proteins:

- giving customers options of 5-,6-, or 8-ounce portions of animal proteins, after first talking with their most loyal customers about their preferences (interestingly, more consumers than operators said they find it appealing to choose from a variety of protein sizes, indicating a clear opportunity)
- emphasizing the sustainability angle of a menu change rather than the health benefit
- introducing a new menu while communicating the new menu choices through tableside visits from the chef and thoroughly briefed staff.

One of the greater hurdles to increasing items where meat is a garnish rather than a main ingredient is convincing diners to try these dishes. Two thirds of operators agreed with the statement, "If I could just get my patrons to order plant-forward dishes, with meat in much smaller portions (1-2.5 ounces), I know they would love them but it's hard to get them to move away from traditional meat-forward items." This suggests that samples are a marketing tactic not to be forgotten. In other words, sometimes it's best to just let the food…speak for itself.

# STANFORD UNIVERSITY

Stanford University is known for many things: academic rigor, an idyllic campus dubbed "the Farm," and a pipeline of innovation to neighboring Silicon Valley. It is also an athletic powerhouse. NCAA student-athletes are provided a specific meal each day through the university's Training Table program, which is designed to maximize athletic performance through proper nutrition. As Stanford's culinary team plans its menus and messages to students, using nutrition to help students perform at both their mental and physical peak.

Toward this end, Residential & Dining Enterprises (R&DE) Stanford Dining developed the Performance Dining @ Stanford initiative in 2011, as it was gearing up to build the school's first new dining hall in 20 years.

Working in partnership with Stanford Athletics, Stanford School of Medicine, and The Culinary Institute of America—groups that had never worked together prior—R&DE Stanford Dining used the opportunity of this new facility, the Arrillaga Family Dining Commons, to create a one-of-a-kind college foodservice concept. Together they created six categories for foods shown to boost everything from brain power to the immune system: Enhanced Immunity; Anti-Inflammatory Components; Food Synergy; Brain Performance; Sports Performance: and Antioxidants. Each category was given a distinct icon, and icons were displayed on signage throughout the dining hall, telling the benefits of the dishes offered at the salad bar and various serving stations.

"My vision for the Arrillaga Family Dining Commons was to create a design that focuses on academic enrichment by enhancing the student living-and-learning experience with an equally unique, innovative, educational and sustainable dining experience," said R&DE Senior Associate Vice Provost Shirley Everett, who introduced and championed the Performance Dining initiative.

Under the Stanford performance criteria, it's not about counting calories or tracking nutrients. It's about how students feel, and how they perform both in and outside of the classroom when they eat different food combinations. The menus with better outcomes include mostly plants, and foods that are less processed.

"We think Performance Dining is a better way to message about healthy eating and support the academic mission of the university," says Eric Montell, executive director of R&DE Stanford Dining, who led the program design along with Elaine Magee, Stanford's wellness and performance nutritionist. "We made healthy eating relatable to students' lifestyles."

The state-of-the-art, two-story Arrillaga Family Dining Commons approaches well-being and food education in a holistic way: The upstairs dining hall leads into a large, open seating area with live piano music. There is an expansive servery with a custom induction display cooking station, a "Wall

of Fire," which includes an expansive chargrill for all types of meats, and a gas-fired deck oven. Additionally, the upstairs includes a culinary studio where students can watch the action as food is prepared and cooked. The first floor includes a study lounge, a "De-Stress Zone," a wellness room for dance and yoga classes, and a teaching kitchen, which R&DE Stanford Dining uses to host cooking classes, demonstrations, and events featuring celebrity chefs.

Alongside the displayed Performance Dining icons is an important visual communication technique: the placement and display of food. In the dining hall, the Performance Bar, with a variety of healthy options that fall into one or more of the Performance Dining categories, is front and center; it's intentionally the first thing students pass when entering.

Along with events and a biweekly newsletter, R&DE Stanford Dining supplements the student dining experience with educational materials provided in the dining environment itself: on display screens and menu cards, and in sample food items attached to flyers sharing tips and facts for developing healthy, sustainable eating habits. For instance, the team has handed out small squares of chocolate with mindful eating tips to convey the importance of mindful eating and simple pleasures.

One of the most concrete outcomes to emerge from the way the performance icons and sustainable sourcing message have resonated with the Stanford community is how they are affecting future dining hall design on Stanford's campus. At the recently remodeled Florence Moore Hall, the R&DE Stanford Dining team decided on an open kitchen layout with a centrally located Performance Bar. Chefs are always visible to students, and vice versa, and students can develop relationships with the people cooking and serving their food and ask about what they're eating, what's in it, and where it came from. These stations, which include a hearth oven for pizzas and flatbreads and several made-to-order stations, also encourage students to try new foods, namely global cuisines with which they may be unfamiliar and that often emphasize more fruits, vegetables, and plant-based proteins than traditional American college fare of comfort foods.

"The facility is breathtakingly gorgeous," says Christopher Gardner, professor of medicine at the Stanford Prevention Research Center in the School of Medicine, who ought to know: Last spring, he and several other faculty members started using it as a teaching space, cooking quarterly meals with small groups of students. Hosting the educational dinners began as an academic idea, with each meal to be themed from a different department such as anthropology or earth sciences, but the timing couldn't have been better, Gardner said: "There was Eric, and he said, 'By the way, here's a dining hall, completely remodeled, for you to go cook in.'"

As an outgrowth of the Stanford Food Summit, Gardner and some of his fellow health promotion researchers conducted a cluster-randomized study before and after a healthy eating marketing campaign that used the Performance Dining icons. They introduced the signage at two dining halls, while two other dining halls served as controls, and they did so during the week of final exams—a period of high-stress for students, often associated with an increase in unhealthy eating habits. The results, which were published in 2013 in the *Journal of American College Health*, showed that students in the dining halls that received the performance dining messages maintained healthy eating levels, whereas students in the control group ate more poorly during finals week.

The Performance Dining messaging campaign was first piloted at Arrillaga Family Dining Commons, but the response from the Stanford community was so overwhelmingly positive it has since been rolled out across campus.

# CAVA GRILL

In 2006, three childhood friends, Ike Grigoropoulos, Ted Xenohristos, and chef Dimitri Moshovitis, all children of Greek immigrants, opened Cava Mezze, a full-service restaurant that emulates the mezze style (small plates) of dining prevalent in Greece and throughout the Mediterranean. Cava Mezze now has three locations. In 2011, the partners spun off Cava Mezze Grill, now called simply Cava Grill to avoid confusion with the name of the original restaurant. Cava Grill is a fast-growing, fast-casual Greek and Mediterranean chain with 11 locations in the Washington, D.C. area representative of a new generation of emerging chains. Having recently raised $16 million, it is now poised to open in Los Angeles, its first new market. (The business also includes a retail line of dips and spreads, Cava Foods, which is sold at grocery outlets such as Whole Foods Market throughout the Mid-Atlantic and Northeast. They are planning to soon expand to Chicago and the Midwest.)

Cava Grill admittedly targets health-conscious consumers, but it does so in a unique way. Its marketing is not focused on eating a light meal, or eating its food because it seems like something one *should* do, but rather something one *wants* to do, thanks to an emphasis on flavor (that happens to come from many plant ingredients). The customizable concept—with an average ticket of about $12—might sound familiar, but it's one that continues to score well with diners, especially Millennials: start with a base (salad, pita, or rice); add dips, spreads, and a protein (falafel, meatballs, grilled or braised meat); and finish with toppings (pickled banana peppers, quinoa tabbouleh, mint, crumbled feta) and sauces (Sriracha Greek yogurt, spicy harissa, lemon herb tahini).

Cava Grill emphasizes local sourcing and the quality of what it sources. The chain sells diners on transparency, simplicity, and purity. Cooking is done from scratch. The design of the restaurants is modern and sleek, yet inviting and comfortable. Many units have at least partial open kitchens, hearth ovens, and spices and greens on display.

The chain's website posts a kind of manifesto, reminiscent of the sensationally popular Holstee Manifesto from a few years ago, which is a set of about 15 pithy commandments such as "Do what you love, and do it often" and "When you eat, appreciate every last bite." Cava Grill's list of statements describes its culture and what it stands for. Entitled "For those who savor," and without using words like "mindfulness" or "slow food," the message evokes that ethos of Mediterranean culture, which is at the heart of the Mediterranean cuisine it offers. The following statements are representative of the overall approach Cava Grill takes in communicating with diners: "Good, healthful food, made with simple, colorful ingredients, steel knives, skillful hands and fire;" "With olive oil, lemon, sea salt, cracked pepper, a fistful of spice and zero apologies;" "Because while others are content to feed their faces, you desire food that feeds your spirit; Food that fills you and fulfills you, too." The chain doesn't call its local charity work "CSR," or the farmers and manufacturers it buys from "suppliers," but instead, all are "partners," again evoking a theme of Mediterranean culture, this one of familial ties and community.

Cava's rapid growth speaks to the success of its approach. "We knew that we could take culinary-driven, high-quality ingredients and put it in a fast format, where you combine it by leveraging the naturally healthy profile of Mediterranean foods," Cava's CEO Brett Schulman told the DC-area news station, WTOP, in January. "But what we've seen is these trends just accelerate even faster than we expected."

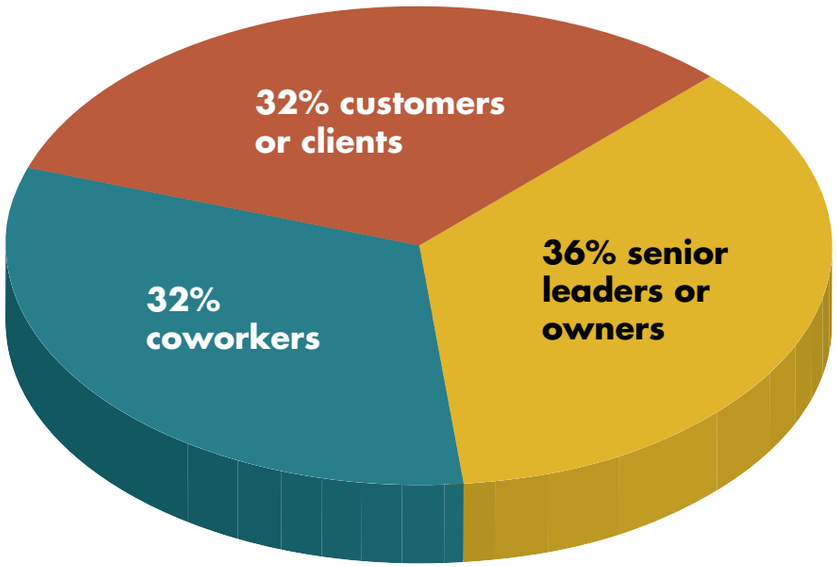
# XI. MENUS OF CHANGE IMPACT SURVEY 2015

What would Menus of Change be without measuring the change that the initiative catalyzes? In January, the CIA surveyed past attendees of the Menus of Change Annual Leadership Summit to ask what use they make of the information they are throughout the year.

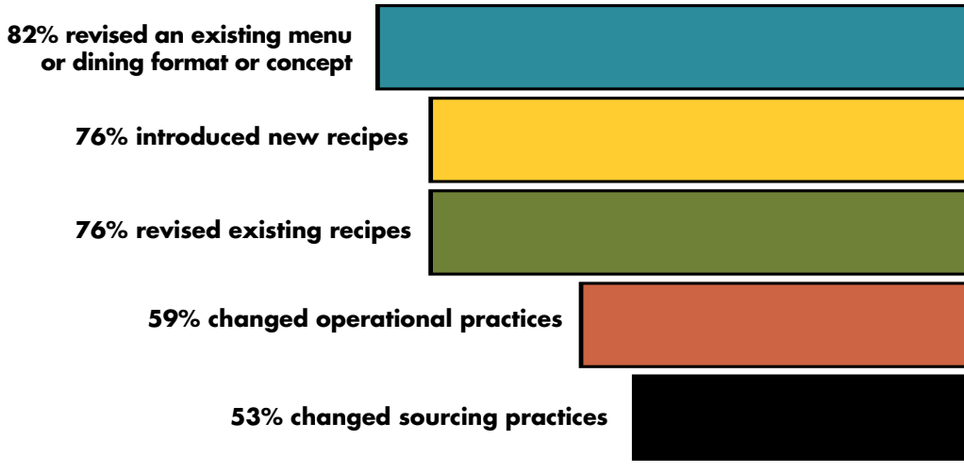
A nearly total majority (96 percent) of attendees have shared information from Menus of Change with others, with 41 percent doing so digitally, 36 percent sharing presentations with senior leaders or owners, 32 percent with customers or clients, and 32 percent with coworkers.

Three-fourths of the attendees have acted on some of the guidance provided by Menus of Change. Of those, 82 percent have revised an existing menu or dining format or concept; 76 percent have introduced new recipes; 76 percent have revised existing recipes; 59 percent have changed operational practices; and 53 percent have changed sourcing practices. New or revised approaches were most commonly implemented across multiple locations.

## WITH WHOM HAVE YOU SHARED MENUS OF CHANGE INFORMATION?




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




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

# FOR FURTHER INFORMATION


**DIET AND HEALTH: RECENT TRENDS**

Akbaraly T.N., Ferrie J.E., Berr C., et al. Jul, 2011. Alternative Healthy Eating Index and mortality over 18 y of follow-up: results from the Whitehall II cohort. *Am J Clin Nutr*. 94(1):247-253.

Albert C.M., Campos H., Stampfer M.J., et al. 2002. Blood levels of long-chain n-3 fatty acids and the risk of sudden death. *New England Journal of Medicine*. 346(15):1113-1118.

Appel L.J., Sacks F.M., Carey V.J., et al. Nov 16 2005. Effects of protein, monounsaturated fat, and carbohydrate intake on blood pressure and serum lipids: results of the OmniHeart randomized trial. *Jama*.294(19):2455-2464.

Barclay A.W., Petocz P., McMillan-Price J., et al. Mar 2008. Glycemic index, glycemic load, and chronic disease risk--a meta-analysis of observational studies. *Am J Clin Nutr*. 87(3):627-637.

Bazzano L.A., Li T.Y., Joshipura K.J., Hu F.B.. Jul 2008. Intake of fruit, vegetables, and fruit juices and risk of diabetes in women. *Diabetes Care*. 31(7):1311-1317.

Beresford S.A., Johnson K.C., Ritenbaugh C., et al. Feb 8 2006. Low-fat dietary pattern and risk of colorectal cancer: the Women's Health Initiative Randomized Controlled Dietary Modification Trial. *JAMA*.;295(6):643-654.

Bernstein A.M., Sun Q., Hu F.B., Stampfer M.J., Manson J.E., Willett W.C. Aug 16 2010. Major Dietary Protein Sources and Risk of Coronary Heart Disease in Women. *Circulation*.122(9):876-883.

Bernstein A.M., Pan A. Rexrode K.M., Stampfer M.J., Hu, F.B., Mozaffarian, D. Willett, W.C. Mar 2012. Dietary protein sources and the risk of stroke in men and women. *Stroke*. 43(3): 637-44.

Bes-Rastrollo M., Sabate J., Gomez-Gracia E., Alonso A., Martinez J.A., Martinez-Gonzalez M.A. Jan 2007. Nut consumption and weight gain in a Mediterranean cohort: The SUN study. *Obesity (Silver Spring)*.15(1):107-116.

Bibbins-Domingo K., Chertow G.M., Coxson P.G., et al. Feb 18 2010. Projected effect of dietary salt reductions on future *cardiovascular* disease. *N Engl J Med*. 362(7):590-599.

Chiuve S.E., Sampson L., Willett W.C. May 2011. The association between a nutritional quality index and risk of chronic disease. *Am J Prev Med*.40(5):505-513.

Choi H.K., Curhan G. Feb 9 2008. Soft drinks, fructose consumption, and the risk of gout in men: prospective cohort study. *Bmj*. 336(7639):309-312.

Chowdhury R, Warnakula S, Kunutsor S, Crowe F, Ward HA, Johnson L, et al. Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk: A Systematic Review and Meta-analysis. *Ann Intern Med*. 2014;160:398-406. doi:10.7326/M13-1788

Cook N.R., Cutler J.A., Obarzanek E., et al. Apr 28 2007. Long term effects of dietary sodium reduction on cardiovascular disease outcomes: observational follow-up of the trials of hypertension prevention (TOHP). *Bmj*. 334(7599):885-888.

Cross A.J., Leitzmann M.F., Gail M.H., Hollenbeck A.R., Schatzkin A., Sinha R. Dec 2007. A prospective study of red and processed meat intake in relation to cancer risk. *PLoS Med*. (12):e325.

de Munter J.S., Hu F.B., Spiegelman D., Franz M., van Dam R.M. Aug 28 2007. Whole grain, bran, and germ intake and risk of type 2 diabetes: a prospective cohort study and systematic review. *PLoS Med*. 4(8):e261.

Estruch R., Ros E., Salas-Salvado J., et al. Feb 25 2013. Primary Prevention of Cardiovascular Disease with a Mediterranean Diet. *N Engl J Med*.

Farvid M.S., Cho E., Chen W.Y., Eliassen A.H., Willett W.C. Sep 2014. Adolescent meat intake and breast cancer risk. *Intl J Cancer*.

Farvid M.S., Ding M., Pan A., Sun Q., Chiuve SE., Willett W.C., Hu F.B., Oct 2014. Dietary linoleic acid and risk of coronary heart disease: a systematic review and meta-analysis of prospective cohort studies. *Circulation*. 130(18): 1568-78

Fung T.T., Malik V., Rexrode K.M., Manson J.E., Willett W.C., Hu F.B. Apr 2009. Sweetened beverage consumption and risk of coronary heart disease in women. *Am J Clin Nutr*. 89(4):1037-1042.

Gonzalez C.A., Riboli E. Sep, 2010. Diet and cancer prevention: Contributions from the European Prospective Investigation into Cancer and Nutrition (EPIC) study. *Eur J Cancer*. 46(14):2555-2562.

Haas P., Machado M.J., Anton A.A., Silva A.S., De Francisco A. 2009. Effectiveness of whole grain consumption in the prevention of colorectal cancer: Meta-analysis of cohort studies. *Int J Food Sci Nutr*.1-13.

Halton T.L., Willett W.C., Liu S., Manson J.E., Stampfer M.J., Hu FB. Feb 2006. Potato and french fry consumption and risk of type 2 diabetes in women. *Am J Clin Nutr*. 83(2):284-290.

Hansen L., Dragsted L.O., Olsen A., et al. Jul 2010. Fruit and vegetable intake and risk of acute coronary syndrome. *Br J Nutr*. 104(2):248-255.

He F.J., Nowson C.A., MacGregor G.A. Jan 28 2006. Fruit and vegetable consumption and stroke: meta-analysis of cohort studies. *Lancet*. 367(9507):320-326.
He F.J., Nowson C.A., Lucas M., MacGregor G.A. Sep 2007. Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: meta-analysis of cohort studies. *J Hum Hypertens*. 21(9):717-728.

He K., Song Y., Daviglus M.L., et al. Jul 2004. Fish consumption and incidence of stroke: a meta-analysis of cohort studies. *Stroke*. 35(7):1538-1542.

Howard B.V., Van Horn L., Hsia J., et al. Feb 8 2006. Low-fat dietary pattern and risk of cardiovascular disease: the Women's Health Initiative Randomized Controlled Dietary Modification Trial. *Jama*. 295(6):655-666.

Hung H.C., Joshipura K., Jiang R., et al. Nov 3 2004. Fruit and vegetable intake and the risk of major chronic disease. *J Natl Cancer Inst*. 21(21):1577-1584.

Intersalt Cooperative Research Group. Intersalt: An international study of electrolyte excretion and blood pressure: Results for 24-hour urinary sodium and potassium excretion. *Br Med J.* 297:319-328.

Jakobsen M.U., O'Reilly E.J., Heitmann B.L., et al. May 2009. Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies. *Am J Clin Nutr*. 89(5):1425-1432.

Jiang R., Manson J.E., Stampfer M.J., Liu S., Willett W.C., Hu F.B. Nov 27 2002. Nut and peanut butter consumption and risk of type 2 diabetes in women. *Jama*. 288(20):2554-2560.

Jung S., Spiegelman D., Baglietto L., et al. Feb 6 2013. Fruit and vegetable intake and risk of breast cancer by hormone receptor status. *J Natl Cancer Inst.* 105(3):219-236.

Koh-Banerjee P., Franz M., Sampson L., et al. Nov 2004. Changes in whole-grain, bran, and cereal fiber consumption in relation to 8-y weight gain among men. *Am J Clin Nutr*. 80(5):1237-1245.

Larsson S.C., Virtamo J., Wolk A. Feb 2011. Red meat consumption and risk of stroke in Swedish women. *Stroke*.;42(2):324-329.

Larsson S.C., Virtamo J., Wolk A. Aug 2011 Red meat consumption and risk of stroke in Swedish men. *Am J Clin Nutr*. 94(2):417-421.

Malik V.S., Schulze M.B., Hu F.B. Aug 2006. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am *J Clin Nutr*. 84(2):274-288.

McCullough M.L., Feskanich D., Rimm E.B., et al. 2000. Adherence to the Dietary Guidelines for Americans and risk of major chronic disease in men. *Am J Clin Nutr*. 72:1223-1231.

McCullough M.L., Feskanich D., Stampfer M.J., et al. 2000. Adherence to the Dietary Guidelines for Americans and risk of major chronic disease in women. *Am J Clin Nutr*. 72(5):1214-1222.

McCullough M.L., Feskanich D., Stampfer M.J., et al. Dec, 2002. Diet quality and major chronic disease risk in men and women: moving toward improved dietary guidance. *Am J Clin Nutr*. 76(6):1261-1271.

Mellen P.B., Walsh T.F., Herrington D.M. May 2008. Whole grain intake and cardiovascular disease: a meta-analysis. *Nutr Metab Cardiovasc Dis*. 18(4):283-290.

Moran B. 2014. Is Butter Really Back? Available at http://www.hsph.harvard.edu/magazine-features/is-butter-really-back/

Mozaffarian D., Rimm E. 2006. Fish intake, contaminants, and human health: evaluating the risks and the benefits. *JAMA* .296(15):1885-1899.

Mozaffarian D., Katan M.B., Ascherio A, Stampfer M.J., Willett W.C. Apr 13 2006. Trans fatty acids and cardiovascular disease. *N Engl J Med*.;354(15):1601-1613.

Ogden C.L., Carroll M.D., Kit B.K., Flegal K.M. Feb 2014. Prevalence of childhood and adult obesity in the United States, 2011-2012. *Jama*.311(8): 806-14.

Pan A., Sun Q., Bernstein A.M., et al. Oct 2011. Red meat consumption and risk of type 2 diabetes: 3 cohorts of US adults and an updated meta-analysis. *Am J Clin Nutr*. 94(4):1088-1096.

Pan A., Sun Q., Bernstein A.M, et al. Apr 9 2012. Red meat consumption and mortality: results from 2 prospective cohort studies. *Arch Intern Med*. 172(7):555-563.

Pan A., Sun Q., Bernstein A.M., Manson J.E., Willett W.C., Hu, F.B. Jul 22 2013. Changes in red meat consumption and subsequent risk of type 2 diabetes mellitus: three cohorts of U.S. men and women. *Jama Intern Med*. 173 (14): 1328-35.

Prentice R.L., Caan B., Chlebowski R.T., et al. Feb 8 2006. Low-fat dietary pattern and risk of invasive breast cancer: the Women's Health Initiative Randomized Controlled Dietary Modification Trial. *Jama*.;295(6):629-642.

Riserus U., Willett W.C., Hu F.B. Jan 2009. Dietary fats and prevention of type 2 diabetes. *Prog Lipid Res*.;48(1):44-51.

Sacks F.M., Svetkey L.P., Vollmer W.M., et al. 2001. Effects on blood pressure of reduced dietary sodium and the dietary approaches to stop hypertension (DASH) diet. *N Engl J Med*. 344:3-10.

Salmeron J., Hu F.B., Manson J.E., et al. Jun 2001. Dietary fat intake and risk of type 2 diabetes in women. *Am J Clin Nutr*. 73(6):1019-1026.

Schulze M.B., Manson J.E., Ludwig D.S., et al. Aug 25 2004. Sugar-sweetened beverages, weight gain, and incidence of type 2 diabetes in young and middle-aged women. *Jama*. 292(8):927-934.

Sinha R., Cross A.J., Graubard B.I., Leitzmann M.F., Schatzkin A. Mar 23 2009. Meat intake and mortality: a prospective study of over half a million people. *Arch Intern Med*.169(6):562-571.

Strazzullo P., D'Elia L., Kandala N.B., Cappuccio F.P. 2009. Salt intake, stroke, and cardiovascular disease: meta-analysis of prospective studies. *Bmj*.339:b4567.

Sun Q., Spiegelman D., van Dam R.M., et al. Jun 14 2010. White rice, brown rice, and risk of type 2 diabetes in US men and women. *Arch Intern Med*. 170(11):961-969.

Tilman D. and Clark M. 2014. Global diets link environmental sustainability and human health. *Nature* 515.7528: 518-522.

Trichopoulou A., Costacou T., Bamia C., Trichopoulos D. 2003. Adherence to a Mediterranean diet and survival in a Greek population. *N Engl J Med*. 348:2599-2608.

U.S. Department of Agriculture, U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition ed: Washington, D.C., *U.S. Government Printing Office*; 2010.

Wang D.D., Leung C.W., Li Y., Ding E.L., Chiuve S.E., Hu F.B., Willett W.C. Oct 2014. Trends in dietary quality among adults in the United States, 1999 through 2010. *Jama Intern Med*. 174(10):1587-95.

W.C.R.F./A.I.C.R. 2007. *Second Expert Report: Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective*.

Yang Q., Liu T., Kuklina E.V., et al. Jul 11 2011. Sodium and potassium intake and mortality among US adults: prospective data from the Third National Health and Nutrition Examination Survey. *Arch Intern Med*. 171(13):1183-1191.

Yang Q., Zhang Z., Gregg E.W., Flanders W.D., Merritt R., Hu F.B. Apr 2014. *Jama Intern Med*. Added sugar intake and cardiovascular diseases mortality among US adults. 174(4): 516-24.

**PORTION SIZE AND CALORIC INTAKE**

Ebbeling C.B., Swain J.F., et al. June, 2012. Effects of dietary composition on energy expenditure during weight-loss maintenance. *Jama*, 307:2627-34.

Kral T.V. Nov, 2005. Effects on hunger and satiety, perceived portion size and pleasantness of taste of varying the portion size of foods: a brief review of selected studies. *Appetite*. 46:103-5

Leibel R.L., Rosenbaum M., et al. March, 1995. Changes in energy expenditure resulting from altered body weight. *N Engl J Med*. 332:621-628

Ludwig D.S. May, 2002. The glycemic index: physiological mechanisms relating to obesity, diabetes, and cardiovascular disease. *Jama*. 287:2414–23

Ludwig D.S., Friedman, M.I. 2014. Increasing adiposity: consequence or cause of overeating? *JAMA*. 311:2167-8

Mozaffarian D., Hao T., et al. June, 2011. Changes in diet and lifestyle and long-term weight gain in women and men. *N Engl J Med*. 364:2392-404

Roberts S.B., Young V.R., et al. Sept, 1990. Energy expenditure and subsequent nutrient intakes in overfed young men. *Am J Physiol*. 259:R461-9

Young L.R., Nestle M. Feb, 2002. The contribution of expanding portion sizes to the US obesity epidemic. *Am J Public Health*. 92:246-9

**Protein Consumption and Production**

Chen M., Sun Q., Giovannucci E., Mozaffarian D., Manson J.E., Willett W.C., Hu F.B. Nov 2014. Dairy consumption and risk of type 2 diabetes: 3 cohorts of US adults and an updated meta-analysis. *BMC Med*. 25;12(1):215.

Food and Agriculture Organization of the United Nations. Food supply-livestock and fish primary equivalent: http://faostat3.fao.org/browse/FB/CL/E

Food and Agriculture Organization of the United Nations. Livestock and the environment: http://www.fao.org/livestock-environment/en/

Gerber P.J., Steinfeld H., Henderson B., Mottet A., Opio C., Dijkman J., Falcucci A. and Tempio,G. 2013. Tackling climate change through livestock – a global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO). Rome: http://www.fao.org/ag/againfo/themes/en/Environment.html

Gidon E., Shepon, A., Makov,T. and Milo, R. Jul 2014. Land, irrigation water, greenhouse gas, and reactive nitrogen burdens of meat, eggs, and dairy production in the United States. *Proceedings of the National Academy of Sciences of the United States of America*. 111(33):11996-12001.

Girod B., et al. 2014. Climate policy through changing consumption choices: Options and obstacles for reducing greenhouse gas emissions. *Global Environ. Change*.
Graça J., Calheiros M., Oliveira A. 2014. Moral disengagement in harmful but cherished food practices? An exploration into the case of meat. *Journal of Agricultural and Environmental Ethics*. 27:749-765.

Hallström E., Carlsson-Kanyama A., Börjesson P. 2014 Environmental impact of dietary change: A systematic review. *J Cleaner Prod*.

Hedenus F., Wirsenius S., Johansson D.A. 2014 The importance of reduced meat and dairy consumption for meeting stringent climate change targets. *Clim Change*. 124:79-91.

Heller M.C. and Keoleian G.A. Oct 2014. Greenhouse gas emissions of the U.S. diet: Aligning nutritional recommendations with environmental concerns. *Proceedings of the 9th International Conference on Life Cycle Assessment in the Agri-Food Sector* (LCA Food 2014), Schenck R., Huizenga D. (Eds.) San Francisco. 539.

Hixson S.M. 2014. Fish nutrition and current issues in aquaculture: The balance in providing safe and nutritious seafood, in an environmentally sustainable manner. *J Aquac Res Development*. 5: 234.

Hu, F. B. 2005. Protein, body weight, and cardiovascular health. *Am J Clin Nutr* 82(1 Suppl): 242S-247S.

Jalava M., *et al*. 2014. Diet change—a solution to reduce water use? Environ. Res. Lett. 9.

Larsson SC, Orsini N. 2014. Red meat and processed meat consumption and all-cause mortality: a meta-analysis. *Am J Epidemiol*. 179(3): 282-9.

Ley, S.H.et al. 2014. Associations between red meat intake and biomarkers of inflammation and glucose metabolism in women. *Am J Clin Nutr*. 99(2):352-60.

Marrin D.L. 2014. Reducing water and energy footprints via dietary changes among consumers. *International Journal of Nutrition and Food Sciences*. 3(5): 361-369.

Modernel P., Astigarraga L., Picasso V. 2013 Global versus local environmental impacts of grazing and confined beef production systems. *Environmental Research Letters*. 8:035052

Nielen et al. Jul 2014. Dietary protein intake and incidence of type 2 diabetes in Europe: the EPIC-InterAct Case-Cohort Study. *Diabetes Care*. 37(7):1854-62.

Pan, A., Q. Sun, et al. 2012. Red meat consumption and mortality: results from 2 prospective cohort studies. *Arch Intern Med*. 172(7): 555-563.

Pan A, Sun Q, et al. 2013. Changes in red meat consumption and subsequent risk of Type 2 diabetes mellitus: three cohorts of US men and women. *JAMA Intern Med*. 173 (14): 1328-35.

Pelletier N., Pirog R., Rasmussen R. 2010. Comparative life cycle environmental impacts of three beef production strategies in the Upper Midwestern United States. *Agr Syst*. 103:380-389.

Pelletier N., Tyedmers P., Vitousek P.M. Oct 2010. Forecasting potential global environmental costs of livestock production 2000–2050. *Proceedings of the National Academy of Sciences of the United States of America*. 107(43):18371-18374.

Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M., & Haan, C., 2006. Livestock's Long Shadow: Environmental Issues and Options. Rome: United Nations Food and Agriculture Organization.

Tilman, D. and Clark, M. 2014. Global diets link environmental sustainability and human health. *Nature* 515.7528: 518-522.

The WorldWatch Institute, http://www.worldwatch.org

Wilde P. Chapter 9.7 Generic commodity checkoff programs (Chapter 9.7). *Food Policy in the United States: An Introduction*. 2013. New York: Routledge/Earthscan.

**FRUIT AND VEGETABLE PRODUCTION AND CONSUMPTION**

Balagtas J.V., Krissoff B., Lei L., Rickard B.J. 2014. How has US farm policy influenced fruit and vegetable production? *Applied Economic Perspectives and Policy*. 36(2): 265-286.

CDC state indicator report: http://www.cdc.gov/nutrition/downloads/State-Indicator-Report-Fruits-Vegetables-2013.pdf

Healthy People 2020 Objectives: http://www.healthypeople.gov/2020/topics-objectives/topic/nutrition-and-weight-status

Loss-Adjusted Food Availability: http://www.ers.usda.gov/data-products/food-availability-(per-capita)-data-system.aspx

Low S. et al. Jan 2015. Trends in U.S. local and regional food systems: A report to congress. *Administrative Publication No*. (AP-068).

Miller P.E., Reedy J., Kirkpatrick S.I., and Krebs-Smith S.M. 2014. The United States food supply is not consistent with dietary guidance: Evidence from an evaluation using the Healthy Eating Index-2010. *Journal of the Academy of Nutrition and Dietetics*.

Tilman, D. and Clark, M. 2014. Global diets link environmental sustainability and human health. *Nature* 515.7528: 518-522.

## FISH, SEAFOOD, AND OCEANS

Aquaculture Stewardship Council. http://www.asc-aqua.org/

Agnew D.J., Pearce J., Pramod G., Peatman T., Watson R., et al. 2009. Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570.

Alverson, D.L., Freeberg, M.H., Pope, J.G., Murawski, 1994. A global assessment of fisheries bycatch and discards. Rome: Food and Agriculture Organization of the United Nations.

Food and Drug Administration. May 2014. A quantitative assessment of the net effects on fetal neurodevelopment from eating commercial fish (as measured by IQ and also by early age verbal development in children): http://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/Metals/UCM396785.pdf

Global Aquaculture Alliance. http://www.gaalliance.org/

National Chicken Council. Per capita consumption of poultry and livestock, 1965 to estimated 2015, in pounds: http://www.nationalchickencouncil.org/about-the-industry/statistics/per-capita-consumption-of-poultry-and-livestock-1965-to-estimated-2012-in-pounds/

Top 10 Consumed Seafoods: http://www.aboutseafood.com/about/about-seafood/top-10-consumed-seafoods

U.N. Food and Agriculture Organization, Fisheries and Aquaculture Department. 2012. State of World Fisheries and Aquaculture, Part 1.

Foley J.A. et al. 2011. Solutions for a cultivated planet. *Nature*. 478: 337-342.

Gurian-Sherman D. 2011. Raising the steaks: Global warming and pasture-raised beef production in the United States. Union of Concerned Scientists: http://www.ucsusa.org/food_and_agriculture/solutions/advance-sustainable-agriculture/global-warming-and-beef-production.html#.VK21oE10yVs

Hatfield J.G., et al. 2014. Agriculture (Chapter 6). Climate change impacts in the United States. *The Third National Climate Assessment*.

Melillo J.M., Richmond T.C., and Yohe G. W., Eds. U.S. Global Change Research Program. 150-174. Available at: http://nca2014.globalchange.gov/report/sectors/agriculture

West P.C., et al. 2014. Leverage points for improving global food security and the environment. *Science*. 345: 325-328

## WATER SUSTAINABILITY

California Environmental Protection Agency, Central Coast Regional Water Quality Control Board. Irrigated lands Regulatory Program: http://www.swrcb.ca.gov/centralcoast/water_issues/programs/ag_waivers/index.shtml

California Environmental Protection Agency, Central Valley Regional Water Quality Control Board. Dairy Program Regulations and Requirements: http://www.waterboards.ca.gov/centralvalley/water_issues/dairies/dairy_program_regs_requirements/

California Environmental Protection Agency, Central Valley Regional Water Quality Control Board. Irrigated Lands Regulatory Program (ILRP): http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/

Central Valley Salinity Alternatives for Long-Term Sustainability: http://www.cvsalinity.org/

Giordano M. and Villholth K. G. (eds.). 2007. *The Agricultural Groundwater Revolution: Opportunities and Threats to Development*. Available at: http://dx.doi.org/10.1079/9781845931728.0000

Knudson, Tom, "San Joaquin Valley sinking as groundwater stores are depleted" in *The Sacramento Bee*, April 6, 2014.

Molden D. (ed.). 2007. *Water for Food, Water for Life*. International Water Management Institute. Available at: http://www.fao.org/nr/water/docs/summary_synthesisbook.pdf

The Pacific Institute: http://pacinst.org/issues/water-food-and-agriculture/

The Water Footprint Network: http://www.waterfootprint.org/

UC Davis and Water Education Foundation. International Conference Toward Sustainable Groundwater in Agriculture, San Francisco 2010 and 2016 (tentative): http://ag-groundwater.org

University of California, Division of Agriculture and Natural Resources. California's Sustainable Groundwater Management Act: http//groundwater.ucdavis.edu/SGMA

**Agriculture, Drugs, and Chemicals Use**
Consumers Union. Sept 2014. *CU praises California Governor Jerry Brown for vetoing weak bill to ban the use of antibiotics in livestock*. Available at: http://consumersunion.org/news/cu-praises-california-governor-jerry-brown-for-vetoing-weak-bill-to-ban-the-use-of-antibiotics-in-livestock/
News Desk. "Tyson Announces Removal of Antibiotics From its Chicken Hatcheries." *Food Safety News*, October 2, 2014.

Pew Charitable Trusts. Nov 2014. *Gaps in FDA's antibiotics policy*. Available at: www.pewtrusts.org/en/research-and-analysis/issue-briefs/2014/11/gaps-in-fdas-antibiotics-policy

Strom, Stephanie. "McDonald's Moving to Limit Antibiotic Use in Chickens." *The New York Times*, March 4, 2015.

U.S. Department of Health and Human Services, Food and Drug Administration. Dec, 2013. "Guidance for Industry #213: New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food-Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209."

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

Appelhans B.M., et al. 2015. Meal preparation and cleanup time and cardiometabolic risk over 14 years in the Study of Women's Health Across the Nation. *Prev Med*. 71:1-6.

Barlow, Tom. "Americans Cook the Least, Eat the Fastest." *Forbes*, April 15, 2011.

Centers for Medicare and Medicaid Services of the US Department of Health and Human Services. National Health Expenditure Fact Sheet. Available at: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NHE-Fact-Sheet.html

Cooking Matters. 2012. *2012 Annual Review*. Washington, DC: Share Our Strength. Available at: http://cookingmatters.org/httpdocs/CM_AnnualReview_FINAL.pdf

Cooking Matters. What We Do: http://cookingmatters.org/what-we-do
Cutler D.M., Glaeser E.L., Shapiro J.M. 2003. Why have Americans become more obese? *J Economic Perspectives*. 17(3):93-118.

Economic Research Service of the United States Department of Agriculture. Food and Consumer Price Index and Expenditures: Table 1. Available at: http://www.ers.usda.gov/data-products/food-expenditures.aspx

Eisenberg D.M., Burgess J.D. Mar 2015. Nutrition education in an era of global obesity and diabetes: Thinking outside the box. *Academic Medicine*. (Online; currently in press.)

Gardens to Hospitals: http://www.gardenstohospitals.org

Healthy Kitchens, Healthy Lives: www.healthykitchens.org

Kaiser Permanente. Medical Center and…Grocery Store? https://healthy.kaiserpermanente.org/static/health/en-us/landing_pages/farmersmarkets/in-northern-california.htm

Monsivais P., Aggarwal A., Drewnowski A. 2014. Time spent on home food preparation and indicators of healthy eating. *Am J Prev Med*. 47(6):796–802.

OECD. 2011. Society at a Glance—OECD Social Indicators: http://www.oecd.org/social/soc/47573400.pdf

OECD. June 2014. *Obesity Update*. Available at: http://www.oecd.org/els/health-systems/Obesity-Update-2014.pdf

Reicks M., et al. 2014. Impact of cooking and home food preparation interventions among adults: outcomes and implications for future programs. *J Nutr Educ Behav*. 46:259-276.

US Burden of Disease Collaborators. 2013. The state of U.S. health, 1990-2010: burden of diseases, injuries, and risk factors. *JAMA*. 310(6):591-606.

Wholesome Wave: https://www.wholesomewave.org

Wolfson J.A., Bleich S.N. 2014. Is cooking at home associated with better diet quality or weight-loss intention? *Public Health Nutr*. 7:1-10.

## ANIMAL WELFARE

American Society for the Prevention of Cruelty to Animals. Farm Animal Cruelty. Available at: http://www.aspca.org/fight-cruelty/farm-animal-cruelty.

Barber, D. *The Third Plate: Field Notes on the Future of Food*. 2014. New York: The Penguin Press.

Borron, S. How the FDA's Voluntary Guideline Fails to Curb Antibiotic Misuse in Livestock, March 11, 2004. Available at http://www.foodandwaterwatch.org/blogs/how-the-fdas-voluntary-guidance-fails-to-curb-antibiotic-misuse-in-livestock/. (Accessed May 15, 2014.)
Jacobson, M.; Staff of the Center for Science in the Public Interest. *Six Arguments for a Greener Diet*.

Kristof, Nicholas. "Abusing Chickens We Eat." *The New York Times*, Dec. 3, 2014.

Moss, Michael. "U.S. Research Lab Lets Livestock Suffer in Quest for Profit." *The New York Times*, Jan. 19, 2015.
Popkin, B. 2009. Reducing Meat Consumption Has Multiple Benefits for the World's Health. *Arch Int Med*. 2009. 169:543-545.

Pray, L., Pillsbury, L., Oria, M. 2012. *Exploring Health and Environmental Costs of Food: Workshop Summary*. Washington, D.C.: National Academies Press.

## LOCAL FOODS AND THE FARM-TO-TABLE MOVEMENT

American Farm to Table. Restaurant Guide: http://www.americanfarmtotable.com/

Clancy K., and Ruhf K. 2010. Is local enough? Some arguments for regional food systems. *Choices*. 25(1): 123-135.

Low S. et al. Jan 2015. Trends in U.S. local and regional food systems: A report to congress. *Administrative Publication No*. (AP-068).

MarketMaker: https://foodmarketmaker.com/

National Restaurant Association. 2015 Culinary Forecast. Available at: http://www.restaurant.org/Downloads/PDFs/News-Research/WhatsHot2015-Results.pdf
Urban Agriculture

Bradley, J. and Katz, B. 2014. *The Metropolitan Revolution*. Washington, D.C.: Brookings Institute Press.

Despommier, D. 2010. *The Vertical Farm: Feeding Ourselves and the World in the 21st Century*. New York: St. Martin's Press.

Halais, F. 2014. *Five Urban Farms that are Growing Big*. Citiscope.

U.N. Report. 2012. *Food Production Must Double by 2050 to Meet Demand from World's Growing Population, Innovative Strategies Needed to Combat Hunger*, Experts Tell Second Committee. A Panel Discussion. Sixty-fourth General Assembly.

## CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD

Brown A. W., Bohan Brown M.M., and Allison, D.B. 2013. Belief beyond the evidence: using the proposed effect of breakfast on obesity to show 2 practices that distort scientific evidence. *American Journal of Clinical Nutrition*. 98: 1298-1308.

Centers for Disease Control & Prevention. August 2014. Progress on children eating more fruit, not vegetables. *Vital Signs*.

Cohen J.F., Richardson S., Parker E., Catalano P. J., and Rimm E. B. 2014. Impact of the new U.S. Department of Agriculture school meal standards on food selection, consumption, and waste. *American Journal of Preventive Medicine*. 46: 388-394.

Dhurandhar E. J. et al. 2014. The effectiveness of breakfast recommendations on weight loss: a randomized controlled trial. *The American Journal of Clinical Nutrition*, ajcn.089573

Gripshover S. J. and Markman E. M. 2013. Teaching young children a theory of nutrition: Conceptual change and potential for increased vegetable consumption. *Psychological Science*. 24: 1541-1553.

Mmari K. N. 2014. Does selection of foods in the school cafeteria by 6-8 year olds translate into consumption? Results of a cafeteria observation study. Paper presented at the 142nd APHA Annual Meeting and Exposition.

Sacks F. M. et al. 2014. Effects of high vs low glycemic index of dietary carbohydrate on cardiovascular disease risk factors and insulin sensitivity. The *Journal of the American Medical Association*. 312: 2531-2541.

Thaler R.H. and Sunstein, C.R. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. 2008. New Haven: Yale University Press.

Tobias D. K., et al. 2014. Body-mass index and mortality among adults with incident type 2 Diabetes. *New England Journal of Medicine*. 370: 233-244.

Wansink B. and Kranz S. 2013. Who's using MyPlate? *Journal of Nutrition Education and Behavior*. 45: 728-732.

Wansink B., van Itteersum K., and Payne C. R. 2014. Larger bowl size increases the amount of cereal children request, consume, and waste. *Journal of Pediatrics*. 164: 323-326.

## CHEFS' INFLUENCE ON CONSUMER ATTITUDES

Barber, Dan. 2014. *The Third Plate: Field Notes on the Future of Food*. New York: The Penguin Press.

Barlow, J. C. 2011. *Chefs Can Save the World: How to Green Restaurants and Why They Are the Key to Renewing the Food System*. Self published.

Black, Jane. "Vegetable Scraps Go Haute: How to Cook Root to Stalk." *The Wall Street Journal*, May 22, 2015.

DeJesus, E. "Why Fine Dining Chefs Are Getting Into the Chain Game." Eater, October 6, 2014. Available at http://www.eater.com/2014/10/6/6896297/why-fine-dining-chefs-are-launching-fast-casual-concepts

Meijers, Nina. "6 Food Crowdfunding Platforms Launch in 2014." Food+Tech Connect, January 20, 2015. Available at: http://www.foodtechconnect.com/2015/01/20/6-food-crowdfunding-platforms-launch-2014/

National Restaurant Association. "What's Hot Culinary Forecast." Available at http://www.restaurant.org/News-Research/Research/What-s-Hot

## Supply Chain Resiliency and Transparency

Applegate. Real Food has a Story: http://www.applegate.com/real_food_has_a_story

Burkitt, Laurie and Jacob Bunge. "Meat-Supplier's CEO Apologizes for China Unit: Local Management Accused of Intentionally Selling Expired Products; Five Detained." *Wall Street Journal*, July 23, 2014.

Dellinger, A.J. "'Buycott' App Review: Scan a Barcode and Learn Everything about the Company that Made It." *Digital Trends*, May 25, 2013.

Food and Drug Administration. February 2014. *FDA's draft approach for designating high-risk foods as required by Section 204 of FSMA*. Available at: http://www.fda.gov/downloads/Food/GuidanceRegulation/FSMA/UCM380212.pdf

HandPicked Nation. Food Sourcing? There's an App for That: http://www.handpickednation.com/food-sourcing-theres-an-app-for-that/

HarvestMark: http://www.harvestmark.com/about-us.aspx

Huddleston Jr., Tom. "Chinese meat scandal hurts sales at fast-food giant Yum Brands." Fortune.com, October 7, 2014.

Just Label It: http://www.justlabelit.org/

News Desk. "Food & Water Watch Sues USDA Over New Poultry Inspection Rule." *Food Safety News*, September 13, 2014.

Nixon, Ron. "Obama Proposes Single Overseer for Food Safety. *The New York Times*, February 20, 2015.

Potter, Ned. "GMO Labeling: How to End the Fight." *Forbes*, November 7, 2014.

Sewell, Alvin. "A Victory for Activism: Worker Safety and Line Speed." *Food Safety News*, August 6, 2014.

Strom, Stephanie. "Chinese Chicken Processors Are Cleared to Ship to U.S." *The New York Times*, August 30, 2013.

Whole Foods Market. Our Commitment to GMO Labeling: http://www.wholefoodsmarket.com/our-commitment-gmo-labeling

## Innovations in the Food Industry

Constable, Pamela. "Food Cowboy App Helps Charities Get Passed-Over Produce onto Plates Faster." *The Washington Post*, July 4, 2014.

"Dean Minow Challenges Students to Seek Solutions to Problems in U.S. Food System." *Harvard Law Today*, November 13, 2014. Available at: http://today.law.harvard.edu/dean-minow-challenges-students-seek-solutions-problems-u-s-food-system/

Iowa Economic Development. *Cost-Saving Energy Solutions for Food Businesses*. Available at: http://www.iowaeconomicdevelopment.com/userdocs/documents/ieda/foodbiz.pdf

Schiller, Ben. "Food Charities Can Now Be More Like Food Companies with Just-in-Time Food Waste Logistics." *Fast Company*, August 21, 2014.

Schiller, Ben. "These Living Food Labels Disappear as Your Food Goes Bad." *Fast Company*, August 5, 2014.

"UC Davis and Mars, Incorporated Announce Plans to Create First-of-its-Kind Innovation Institute Focusing on Food, Agriculture and Health." *UC Davis News and Information*, September 17, 2014. Available at: http://news.ucdavis.edu/search/news_detail.lasso?id=11022

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

Baker, Sophie. "PRI Exec Harnessing the Power of $45 Trillion." *Pensions & Investments*, October 27, 2014.

Ceres. Investor Network on Climate Risk (INCR): http://www.ceres.org/investor-network/incr

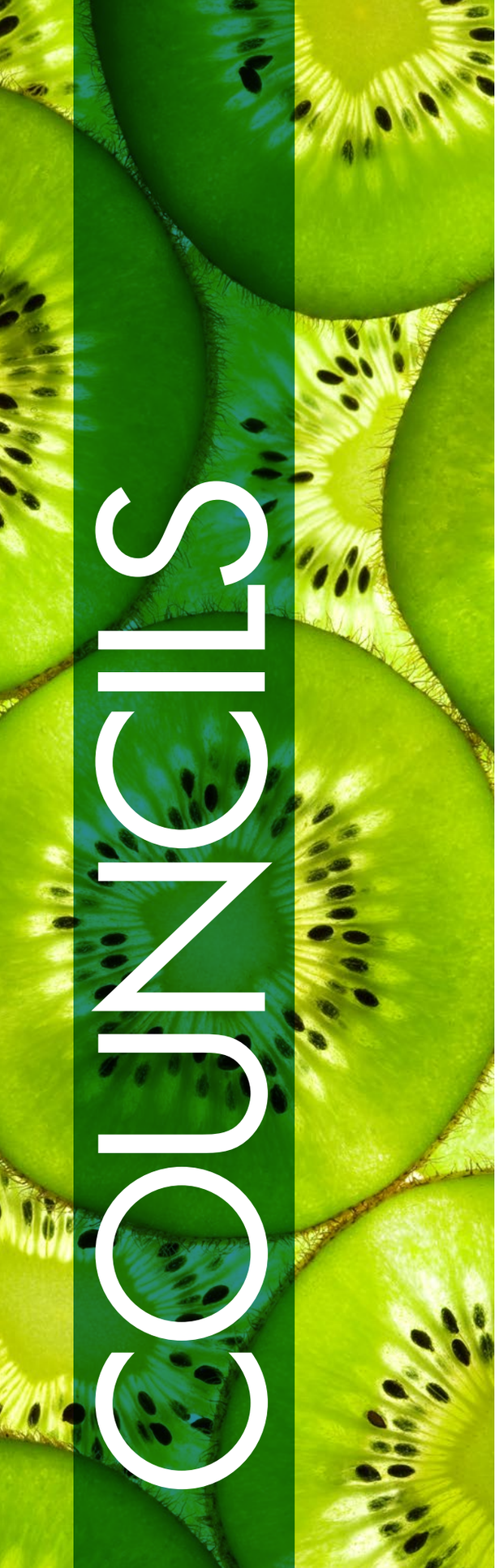
Clark G., Feiner A., and Viehs M. *From the Stockholder to the Stakeholder*. University of Oxford's Smith School of Enterprise and the Environment, in association with Arabesque Asset Management Ltd. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2508281

Jargon, Julie. "Former Taco Bell Chief Takes on Yum." *The Wall Street Journal*, December 11, 2014.

Jargon, Julie. "McDonald's to Pare Menu, Review Ingredients." *The Wall Street* Journal, December 10, 2014.

Phillips, Erica E. "Food 'Accelerators' and the $10 Bag of Pasta." *The Wall Street* Journal, January 6, 2014.

Pitchbook, 2015: http://pitchbook.com/




# MENUS OF CHANGE SCIENTIFIC AND TECHNICAL ADVISORY COUNCIL

**Walter Willett**, MD, DrPH
Chair of Menus of Change Scientific and Technical Advisory Council, Professor of Epidemiology and Nutrition and Chairman of the Department of Nutrition at Harvard T. H. Chan School of Public Health, Professor of Medicine at Harvard Medical School (Boston, MA)

**Lawrence Appel**, MD, MPH
Professor of Medicine at Johns Hopkins University School of Medicine (Baltimore, MD)

**Lilian Cheung**, ScD, RD
Director of Health Promotion and Communication, Editorial Director of Nutrition Source at the Harvard T. H. Chan School of Public Health—Department of Nutrition (Boston, MA)

**Carolyn Dmitri**, PhD
Associate Professor of Food Studies at New York University
(New York, NY)

**David M. Eisenberg**, MD
Adjunct Associate Professor, Harvard T. H. Chan School of Public Health—Department of Nutrition, Executive Vice President for Health Research and Education at the Samueli Institute (Boston, MA)

**Rick Foster**, PhD
W.K. Kellogg Professor in Food, Society and Sustainability at Michigan State University (East Lansing, MI)

**Christopher Gardner**, PhD
Associate Professor of Medicine at Stanford University, Director of the Nutrition Studies Group and the Postdoctoral Research Fellow Training Program at Stanford Prevention Research Center (Palo Alto, CA)

**Andrew Hargadon**, PhD
Charles J. Soderquist Chair in Entrepreneurship and Professor of Technology Management at the Graduate School of Management at University of California, Davis, Senior Fellow at the Kauffman Foundation (Davis, CA)

**Thomas Harter**, PhD
Cooperative Extension Specialist, Department of Land, Air, and Water Resources at the University of California, Davis (Davis, CA)

**Marty Heller**, PhD
Senior Research Specialist, Center for Sustainable Systems at the University of Michigan (Ann Arbor, MI)

**Frank Hu**, MD, PhD
Professor of Nutrition and Epidemiology and Co-Director of the Obesity Epidemiology and Prevention Program at the Harvard T. H. Chan School of Public Health, Professor of Medicine at the Harvard Medical School and Brigham and Women's Hospital (Boston, MA)

**Betty Izumi**, PhD, MPH, RD
Assistant Professor in the School of Community Health at Portland State University (Portland, OR)

**Greg Keoleian**, PhD
Professor and Co-Director of the Center for Sustainable Systems at the University of Michigan (Ann Arbor, MI)

**Robert Lawrence**, MD
Center for a Livable Future Professor, Professor of Environmental Health Sciences, Health Policy, and International Health at Johns Hopkins Bloomberg School of Public Health, Professor of Medicine at Johns Hopkins School of Medicine (Baltimore, MD)

**David S. Ludwig**, MD, PhD
Director of the New Balance Foundation Obesity Prevention Center and Researcher at Boston Children's Hospital, Professor of Pediatrics at Harvard Medical School, and Professor of Nutrition at Harvard T. H. Chan School of Public Health (Boston, MA)

**Ellen M. Markman**, PhD
Lewis M. Terman Professor of Psychology and Senior Associate Dean for the Social Sciences, Stanford University (Stanford, CA)

**Eric Rimm**, ScD
Director of the Cardiovascular Epidemiology Program and Associate Professor of Epidemiology and Nutrition at Harvard T. H. Chan School of Public Health (Boston, MA)

**Steven, W. Running**, PhD
Regents Professor of Ecology and Director of Numerical Terradynamics Simulation Group, University of Montana (Missoula, MT)

**Frank M. Sacks**, MD
Professor of Cardiovascular Disease Prevention at Harvard T. H. Chan School of Public Health—Department of Nutrition, Senior Attending Physician at Brigham and Women's Hospital, Professor of Medicine at Harvard Medical School (Boston, MA)

**Barton Seaver**
Director of the Healthy and Sustainable Food Program at the Center for Health and the Global Environment at the Harvard T. H. Chan School of Public Health (Boston, MA)

**Michael Tlusty**, PhD
Director of Research at the New England Aquarium (Boston, MA)

**Russell Walker**, PhD
Associate Director of the Zell Center for Risk Research and Clinical Associate Professor of Managerial Economics and Decision Sciences at the Kellogg School of Management at Northwestern University (Highland, IL)

**Parke Wilde**, PhD
Associate Professor at the Friedman School of Nutrition Science and Policy at Tufts University (Boston, MA)

# MENUS OF CHANGE SUSTAINABLE BUSINESS LEADERSHIP COUNCIL

**Arlin Wasserman**
Chair of the Menus of Change Sustainable Business Leadership Council, Principal and Founder of Changing Tastes (Gaithersburg, MD)

**Michiel Bakker**
Director, Global Food Services, Google, Inc. (Mountain View, CA)

**Rick Bayless**
Chef-Owner of Frontera Grill, Topolobampo, and XOCO (Chicago, IL)

**Shelley Balanko, PhD**
Senior Vice President of Business Development, The Hartman Group (Bellevue, WA)

**Gail Christopher, PhD**
Vice President for Programs at the W.K. Kellogg Foundation (Battle Creek, MI)

**Sierra B. Clark, PhD**
Department of Nutrition, Food Studies, and Public Health, New York University (Washington, DC)

**Christy Consler**
Senior Vice President of Human Resources and Corporate Sustainability at Jamba Juice (Pleasanton, CA)

**Steve Ells '90**
Founder and CEO of Chipotle Mexican Grill (Denver, CO)

**Mike Faherty**
Vice President of Brand Building in the Food Category for Unilever North America (Englewood Cliffs, NJ)

**David Feller**
Founder and CEO of Yummly (Palo Alto, CA)

**Danielle Gould**
Founder and CEO of Food+Tech Connect (New York, NY)

**Claudia Hogue**
Foodservice Marketing Director for the Alaska Seafood Marketing Institute (Seattle, WA)

**Andrea Illy**
Chairman and CEO of illycaffè (Trieste, Italy)

**Nicolas Jammet**
Co-founder and Co-CEO, Sweetgreen (Washington, DC)

**Mollie Katzen**
Cookbook author, charter member of the Harvard T.H. Chan School of Public Health Nutrition Roundtable (Berkeley, CA)

**Michael Kaufman**
Managing Director, Astor Group (Chappaqua, NY)

**Ellen Kennedy**
Senior Sustainability Analyst for Calvert Investments (Bethesda, MD)

**Deborah Madison**
Author (Galisteo, NM)

**Craig McNamara**
Founder and President of the Center for Land-Based Learning (Winters, CA)

**Jehangir Mehta '95**
Chef and Restaurateur (New York, NY)

**Bart Minor**
President and CEO of The Mushroom Council (San Jose, CA)

**Eric Montell '89**
Executive Director of Stanford Dining at Stanford University (Palo Alto, CA)

**Steven Petusevsky '77**
Founder and Principal, Steven M. Petusevsky Entreprises (Plantation, FL)

**Clifford Pleau '81**
Director of Culinary Development and Executive Chef at Seasons 52 (Orlando, FL)

**Jim Prevor**
Founder and Editor in Chief of *Produce Business* (Boca Raton, FL)

**William Rosenzweig**
Dean, The Food Business School; Co-Founder and Managing Partner, Physic Ventures, LLC (Healdsburg, CA)

**Diana Simmons**
Director of New Product Commercialization for Clif Bar & Company (San Francisco, CA)

**Rafi Taherian, CEC**
Executive Director of Yale Dining (New Haven, CT)

**Kirsten Saenz Tobey**
Founder and Chief Innovation Officer for Revolution Foods (Berkeley, CA)

**Ken Toong**
Executive Director of Auxiliary Enterprises at University of Massachusetts (Amherst, MA)

**Peter Truitt**
Founder and Co-Owner of Truitt Brothers, Inc. (Salem, OR)

**Scott Uehlein, '85**
Vice President of Food & Beverage and Corporate Chef for Canyon Ranch (Tucson, AZ)

**Marc Zammit**
Vice President of Corporate Sustainability and Culinary Initiatives for Compass Group USA (Pal Alto, CA)

**Anthony Zolezzi**
Operator Partner at Pegasus Capital (New York, NY)

# CREDITS

# MENUS OF CHANGE ANNUAL REPORT

## CONTRIBUTORS AND REVIEWERS (ADVISORY COUNCILS)

**Michiel Bakker**

**Sierra B. Clark, PhD**

**Carolyn Dimitri, PhD**

**David M. Eisenberg, MD**

**Rick Foster, PhD**

**Christopher Gardner, PhD**

**Marty Heller, PhD**

**Thomas Harter, PhD**

**Frank Hu, MD, PhD**

**Robert Lawrence, MD**

**David S. Ludwig, MD, PhD**

**Ellen Markman, PhD**

**Jehangir Mehta**

**Eric Montell**

**Steven W. Running, PhD**

**Peter Truitt**

**Michael Tlusty, PhD**

**Russell Walker, PhD**

**Parke Wilde, PhD**

## EDITORIAL COMMITTEE

**Editor: Sophie Egan**, MPH
Director of Programs and Culinary Nutrition for Strategic Initiatives, The Culinary Institute of America

**Managing Editor: Anne E. McBride**
Culinary Programs and Editorial Director for Strategic Initiatives, The Culinary Institute of America

**Greg Drescher**
Vice President for Industry Leadership and Strategic Initiatives, The Culinary Institute of America

**Arlin Wasserman**
Chair of the Menus of Change Sustainable Business Leadership Council, Principal and Founder of Changing Tastes

**Walter Willett, MD, DrPH**
Chair of Menus of Change Scientific and Technical Advisory Council, Professor of Epidemiology and Nutrition and Chairman of the Department of Nutrition at Harvard T. H. Chan School of Public Health, Professor of Medicine at Harvard Medical School

## DESIGN

**Jason Wright**
**J Wright Design**
**www.jwrightdesign.com**

For reproduction, please contact
**info@menusofchange.org**

All rights reserved, © 2015 The Culinary Institute of America and President and Fellows of Harvard College.

The Menus of Change® (MOC) Report and Annual Summit are co-presented by The Culinary Institute of America (CIA) and Harvard T.H. Chan School of Public Health—Department of Nutrition. A Menus of Change Scientific and Technical Advisory Council composed of leading nutrition, environmental, and other scientists and scholars (menusofchange.org/advisory-councils/stac/), together with Harvard Chan School and CIA, are solely responsible for the nutrition and environmental guidance of the report and conference. The Menus of Change Sustainable Business Leadership Council (menusofchange.org/advisory-councils/sblc/) contributes insights to parts of the report and conference designed to help translate this guidance into actionable strategies for foodservice industry change, highlight case studies in innovation (e.g., menu research and development, product sourcing, and supply chain management, etc.), and build industry participation in supporting healthier, more sustainable menus. Project sponsors and other commercial interests are not permitted to influence the editorial independence of the Menus of Change initiative.

4TH ANNUAL LEADERSHIP SUMMIT

# JUNE 14-16 2016

The Culinary Institute of America | Hyde Park, NY

For more information, visit

## WWW.MENUSOFCHANGE.ORG

© 2015 The Culinary Institute of America and President and Fellows of Harvard College