



MENUS^{of}CHANGE[®]

The Business of Healthy, Sustainable, Delicious Food Choices

2014 ANNUAL REPORT

CHARTING THE FUTURE OF FOOD & THE FOODSERVICE INDUSTRY



HARVARD
SCHOOL OF PUBLIC HEALTH

Department of Nutrition

A still life photograph of fresh vegetables. In the center, a large leek with a thick, pale green stalk and a long, thin green leaf extends horizontally. To its left and right are two whole yellow onions with papery skins. Above the leek is a sliced mushroom showing its gills and stem. Below the leek is another sliced mushroom. The vegetables are set against a solid black background, which makes their colors stand out. The lighting is soft, highlighting the textures of the onion skins, the leek's stalk, and the mushroom caps. The entire image is framed by a thin yellow border.

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I. MENUS OF CHANGE: THOUGHTS FOR OUR FUTURE

To paraphrase a common admonition in the brokerage business, past performance is no guarantee of future success. Our industry—the restaurant and larger foodservice industry—has had a great run over the last several decades. Chefs have risen to prominence in our culture, strong businesses and brands have been built in every sector, and our customers have been enthusiastic partners in pushing us forward. But change is in the air. Diners increasingly care and know more about their food choices, while environmental challenges bring mounting unpredictability to the farms, ranches, and fisheries we rely upon. Our industry's future looks to be a more complicated one in which to navigate.

When looking ahead, we need to first think squarely about our future customers—and how they might disrupt existing business models and strategies. Millennials are bringing a new set of values, preferences, and aspirations to the table, and are insisting on a level of transparency that is entirely unprecedented. With Millennials already displacing Boomers as the largest customer segment in our industry, we must quickly rise to meet this challenge.

In parallel, public health and sustainability imperatives are converging in a way that ensures that the future of our foodservice concepts and menus necessarily will look very different than they do today. New business and growth opportunities are still enormous for both young entrepreneurs and seasoned operators, but risks are rising. From antibiotic resistance and new diseases in the livestock industry to persistent droughts and still-stubbornly high rates of obesity, the incubation of a global diabetes crisis, and a planet that will soon have another two to three billion people deciding what to eat each day (if, in fact, they have enough to eat), we may very well be witnessing something of a “perfect storm” that will demand not merely small changes around the edges, but entire paradigm shifts over time.

On the plus side, emerging technologies (robot chefs working in the kitchen? robot gardeners weeding farm fields?) and a never-before-seen passion on the part of consumers for new flavors

and food experiences give us unparalleled creative horizons. And we know that millions of Americans—if they have the means—love what chefs and restaurants, not to mention chef-driven prepared foods, contribute to their lives in terms of pleasure, community, and convenience. Along with creativity, we’re increasingly being paid to make complex choices about what our customers should eat in order to sustain their own health and the health of our planet. Whew!

This second *Menus of Change Annual Report*, co-authored by The Culinary Institute of America and Harvard School of Public Health—Department of Nutrition, is designed to help you as a foodservice industry leader make sense of the future business landscape, assess risks and opportunities, and develop strategies that will hold currency for three, five, ten, or more years.

At the end of the day, what we as chefs and operators choose to offer as a plate of food has enormous consequences, for the health of our customers and our planet. And yet just as we embrace evidence-based guidance from the scientific community as a key reference point in decision-making, we also know that we need—nationally—something akin to a new “moonshot” program to better and more fully realize the possibilities of bringing together deliciousness with healthy, sustainable food choices. This is an issue for all of us: our families, our schools, our employees, our troops. And it needs to start with a renewed commitment to the fundamentals: what we might call “farming for flavor.”

Part of our intent with this report, our 2014 conference, and the ongoing Menus of Change initiative, is to provide a comprehensive road map—and a growing toolkit—for industry transformation, knowing that everyone is leading different types of operations addressing different types of customer needs and desires.

If the list of imperatives and priorities seems long and daunting, it may be valuable to think about just five key areas of initial focus that could make sense for your company. As in much of business (and life), it's good to blend the positives with the negatives, look for those opportunities where one change triggers other positives, and remember

metrics. Drawn from the comprehensive Principles for Healthy, Sustainable Menus found on page 38, here's one approach for such a list:

- **Menu 10 percent more produce every year (year over year) for the next five years;** this will not only increase your customer's access to vegetables and fruits, it will likely reduce your sodium levels.
- **Reduce portion sizes of meat in half of your menu items,** including by introducing recipes and concepts where meat plays more of a supporting role and leveraging strategies from seasonal and local flavors to global cuisines.
- **Always offer a 50- to 100-percent percent whole-grain option with rice, pasta, potato, side dish, and bread choices.**
- **Tell your beverage supplier that you want more innovative, natural, and less sweet beverage options,** and will gladly help test market them—or better yet, craft them yourself.
- **Raise your standards for protein sourcing, including supporting producers who don't administer antibiotics to healthy animals and doubling the different kinds of fish and seafood you offer, sourced from sustainably managed fisheries.**

Whatever your business—small, independent or multi-national, corporate dining or fast casual—we encourage you to spend time with this report, pull out of it what's useful to you and your team, and be in touch with us on how together we can better facilitate change within our industry. Perhaps what's less important is what's on each of our “top five lists” as that we are driving forward together, and accelerating the pace of our innovation and the reach of our creativity.

Dr. Tim Ryan, President
The Culinary Institute of America



MENUS OF CHANGE IN 2014

WHAT'S FOR DINNER?

It remains a perennial question. But with Americans now spending about half of their food budgets outside the home, what it means is changing. No longer are we just asking what to eat, but also where to eat it.

Clearly, Americans are happy to outsource the cooking (not to mention the cleaning up.) At the same time, we have never been more concerned about where our food comes from. Increasingly, Americans want chefs to make healthy, responsible choices about what ends up on the plate so that in turn they can make the same choices as consumers.

Those choices affect not only what's for dinner. They affect public health, the environment, culinary culture, and the profitability of the dining establishments. Long-term trends, ranging from rising rates of obesity to climate change, already are reshaping opportunities and costs for the industry, from the largest foodservice and restaurant groups to small, independent eateries.

The good news is that the latest findings about what to eat from both public health and environmental science research are now converging with business needs and opportunities. Serving less meat, for instance, can help improve diners' health, reduce the level of greenhouse gases and pressure on limited resources such as water, and help improve restaurants' bottom line.

But challenges have surfaced too. In 2014, public health and environmental concerns weighed heavily on the bottom line: Climate change and drought have slashed harvests and herd sizes and boosted food cost. Fast-spreading diseases decimated industrial-scale pork and shrimp producers around the globe. This past year, the scientific consensus has grown more certain that the food and agriculture industry is on the front lines for the impacts of climate change and resistant disease, and also a major cause of its own problems. Food and agricultural production uses more antibiotics than treatment of disease in people and is responsible for large share of the world's greenhouse gas emissions. That also means that changes to benefit public health and the environment—such as serving smaller portions of red meat—directly help business.

The Menus of Change initiative, a partnership of The Culinary Institute of America and Harvard School of Public Health—Department of Nutrition, 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.

The *Menus of Change Annual Report* is a part of that mission. It aims to advance a long-term, practical vision that integrates optimal nutrition, environmental stewardship and restoration, and social responsibility within the foodservice industry. It includes a guide to the key issues that face the foodservice community, as well as recommendations for improving business performance. It also provides a dashboard to show the progress the industry has made—where it is moving fast and where it needs to make greater efforts. The indicators on the dashboard will help businesses to evaluate their own efforts in the areas that matter most. For culinary professionals and R&D teams, there also is a comprehensive set of principles to guide menu development and design.

Along with this report, the Menus of Change initiative hosts an annual leadership conference for food-industry executives, culinary leaders, investors, entrepreneurs, and change-makers to foster collaboration and speed progress in critical areas. It is also working to design a platform to bring together culinary and investment professionals to promote innovation in healthy and sustainable food concepts.

All of this work is supported by the energy, vision, and effort of two remarkable groups: the Menus of Change Sustainable Business Leadership Council, made up of forward-thinking executives and chefs, investors, and innovators, and the Menus of Change Scientific and Technical Advisory Council, which brings together leading scientists working on nutrition, environment, food and agriculture, and business. These two councils continue to meet in an ongoing effort to focus the industry on the issues where it can make the greatest difference and to combine rapidly evolving science and business imperatives to provide clear guidance to the profession.

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





II. EXECUTIVE SUMMARY: A TASTE OF WHAT'S TO COME

TOFU BURRITOS AT CHIPOTLE. MUSHROOM/MEAT (BLEND) BURGERS AT HUNDREDS OF COMPASS CAFÉS ACROSS THE COUNTRY. GARDEIN WINGS AT YARD HOUSE BREW PUBS. IN 2014, LEADING RESTAURANTS AND FOODSERVICE OPERATORS SERVED UP DELICIOUS ALTERNATIVES TO TRADITIONAL MEAT OPTIONS. THE TREND WAS SPURRED BY CONSUMER DEMAND FOR HEALTHY MEALS, THE ECONOMIC IMPACT OF CLIMATE CHANGE, AND THE SEARCH FOR PROFITS. IN OTHER WORDS, THE FOOD INDUSTRY IS FINDING WAYS TO SERVE THE TRIPLE BOTTOM LINE: PEOPLE, PLANET, AND PROFITS.

There is, of course, still much work to be done. The Menus of Change report is designed to help foodservice and culinary professionals to balance competing priorities and make the hard choices that will allow them to serve their customers, the environment, and their businesses. It surveys culinary trends, highlighting the latest innovations, and profiling companies and institutions, including Chipotle, Sweetgreen, and McGill University, that have made healthier, more sustainable food an ingredient for success. The report also polled chefs and restaurant operators about what they believe the future holds for menu development.

The centerpiece of Menus of Change is a concise analysis of 15 issues that sit at the intersection of public health, the environment, and the business of food. These summaries 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.

On the whole, the industry is moving forward: Ten of 15 issues received a score of four (making good progress) or three (holding steady), and the food sector improved its score on supporting animal welfare and sustainable seafood. Restaurant and foodservice professionals were unprepared, however, for the ways in which climate change—especially California's severe drought—affected their business. The industry score's fell from two (getting better but far from where it needs to be) to one, a significant decline.

AMONG THE ISSUES COVERED ARE:

Protein Consumption and Production:

Americans are eating less red meat. The USDA projects that beef consumption in the United States will drop by almost 6 percent between 2013 and 2015, and that may continue to shrink as historic droughts reduce cattle herds and further drive up the price of meat.

Tens of thousands of publications have, perhaps ironically, made it too complicated for the average eater to read, interpret, and synthesize nutrition science into useful guidelines.

The good news is that this may result in a small boost for health in the United States. But the growing demand for meat in the developing world means that intensive production will continue to adversely impact the environment. Chefs should create and market new and delicious plant-centric foods. This can positively impact North American diets, as well as the developing world, which closely watches trends in the United States.

Fruit and Vegetable Consumption and Production: More than 90 percent of American farmland is planted with commodities such as corn and soybeans instead of fruits and vegetables. The lion's share of produce is grown in California, which is in the midst of one of the most severe droughts on record. Meanwhile, the average American eats just 1.6 servings of whole fruits and 1.4 servings of whole vegetables, still short of the ideal intake of nine recommended by Harvard School of Public Health and other nutrition scientists. Chefs should work with progressive farmers and distributors to incorporate more produce into seasonal menus. While locally produced foods are desirable, in some cases produce from well-run farms shipped from far away can be more eco-friendly.

Climate Change: Intense and frequent weather swings already are bringing unprecedented challenges to the farming community, and as a result the foodservice industry. (In the first four months of 2014, beef prices rose 6 percent.) Chefs must work to source ingredients from farmers who use sustainable practices and design menus based on each growing conditions, as well as prioritize low-carbon foods on their menus. Chefs also must work to reduce their own environmental impact, as foodservice facilities have the highest energy intensity per square foot among commercial buildings in the United States.

Consumer Attitudes: Diners remain confused about the terms "healthy" and "sustainable," and a drumbeat of nutrition news leaves many more befuddled than enlightened. Over the last decade chefs have emerged as trusted and respected guides to good food. It is important that they educate themselves on these terms (and the practices they imply) and use them honestly. Most important, they can build demand by making craveable dishes that are healthful and sustainable too.

Scientific Consensus Is Constantly Evolving: And so this year we also offer guidelines and a checklist to help industry executives, entrepreneurs, and food-reform advocates evaluate new scientific claims about health and nutrition. This is particularly useful given that media reports sometimes mischaracterize scientific research, which in turn can upend or paralyze corporate efforts to develop healthy menus.

Finally, Menus of Change provides comprehensive advice and strategies for menu design that support the triple bottom line with the **Principles of Healthy, Sustainable Menu.** These guidelines outline essential culinary strategies, such as new focuses on portion size, calorie quality, and plant-based foods, which are needed to increase the success of new business models. They also provide a set of suggestions for menu development based on the latest nutrition science. To demonstrate how these ideas can be translated into action, this year's report is accompanied by a model menu, found at menusofchange.org, that incorporates key principles.

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 recent progress to improve nutrition, sustainability, and profitability. Its scores on critical issues that affect the foodservice industry will be 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 sustainability.

DASHBOARD SCORE KEY:
The scores assigned to each issue indicates progress or lack thereof in the food industry and/or culinary profession over the last 12 to 18 months, as follows:

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

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.

ISSUE	SCORE 2014	SCORE 2013	JUSTIFICATION
DIET AND HEALTH: RECENT TRENDS			Modest improvements towards 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. During the past year, the FDA decision 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.
PORTION SIZE AND CALORIC INTAKE			The demise of the low-fat paradigm is progress, but a fundamental focus on diet quality, not just quantity, is needed.
PROTEIN CONSUMPTION AND PRODUCTION			While red meat production and consumption in the United States is falling, it is growing 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.
FISH, SEAFOOD, AND OCEANS			There are myriad public and private efforts to improve seafood sustainability. But continued environmental concerns, mislabeling, and a lack of traceability threatens to mitigate their success.
CLIMATE CHANGE			The foodservice industry suffered from high costs and increased volatility, as long-predicted impacts of climate change affected both crops and livestock. There was continued modest progress in plant-centric menus, but action is coming too slowly to help foodservice companies avoid the costs of climate change.
WATER SUSTAINABILITY			The foodservice industry is only beginning to pay attention to water issues as drought and groundwater depletion weigh heavily on profits. Consumers' reduction in meat consumption and new preference for hardier greens help, but these trends do not reflect conscious efforts by the industry.
AGRICULTURE, DRUGS, AND CHEMICALS USE			The removal of some arsenical drugs in animal production and directives to stop antibiotic use for growth promotion is progress. But the drug nitarsone remains on the market and antibiotics can still be misused at low doses.
HEALTHY FOOD VS. HEALTHCARE SPENDING AND TRENDS IN MEDICAL-CULINARY EDUCATIONAL ALLIANCES			Innovative programs are starting to link healthcare and healthy eating. But the connection is not universal and more education and demonstration projects are required.
ANIMAL WELFARE			Several state and national policies aim to improve animal welfare, but the substantive impacts to date have been negligible. Overall, the positive movement has been in increasing public awareness.
LOCAL FOOD AND THE FARM-TO-TABLE MOVEMENT			Increased sales of locally grown foods demonstrate progress, but the U.S. food system must dramatically change to meet increased demand.
CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD			Many Americans are interested in healthier and more sustainable foods, but are confused and unclear about how to make better choices. This creates a tremendous opportunity for chefs to empower consumers.
CHEFS' INFLUENCE ON CONSUMER ATTITUDES			Chefs are very engaged in the movement for sustainability. But there needs to be additional focus on portion size, nutrition, and public health, and a move to offer more plant-based proteins on menus.
SUPPLY CHAIN RESILIENCY AND TRANSPARENCY			Food supply chains remain vulnerable to food fraud and contamination. More traceability information is needed.
INNOVATIONS IN THE FOOD INDUSTRY			The sector is bubbling with new ideas but there are not yet clear leaders and it may be difficult for foodservice professionals to know which technologies to embrace.
CHANGES IN INVESTMENT STANDARDS FOR THE FOOD INDUSTRY AMONG PROFESSIONAL INVESTORS			The industry has made progress 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.

OUR VISION



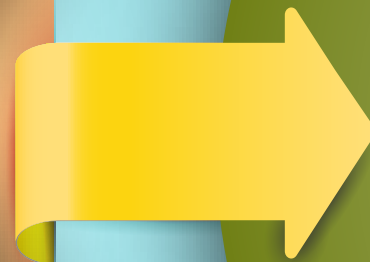
OUR VISION



HEALTHY, SUSTAINABLE,
AND DELICIOUS



BUSINESS MODELS
AND STRATEGIES



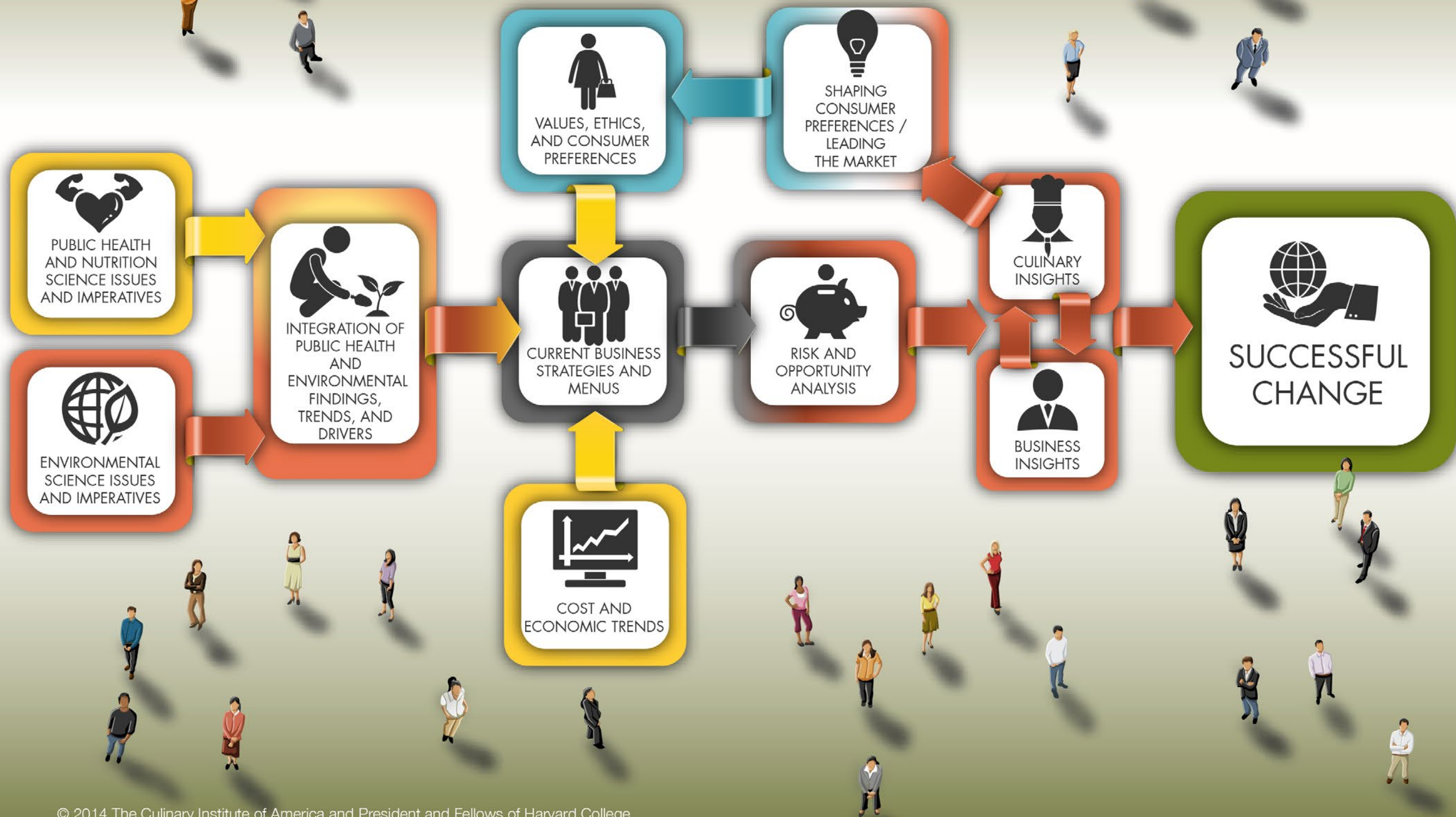
MENUS^{of} CHANGE[®]

The Business of Healthy, Sustainable, Delicious Food Choices

THE FUTURE OF FOOD

INTEGRATED GUIDANCE FOR
BUSINESS AND CULINARY LEADERS

GPS: A MODEL FOR CHANGE





There's no such thing as a free lunch. But there are several areas where technology is helping to make sustainability painless, even profitable.

III. GREEN SHOOTS: DELICIOUS SIGNS OF CHANGE

EVERYONE WANTS TO BE MORE SUSTAINABLE. BUT WHAT CHEFS AND FOODSERVICE PROFESSIONALS WANT TO KNOW IS: HOW MUCH IS THAT GOING TO COST? IS IT POSSIBLE TO GO GREEN WITHOUT TOO MUCH SACRIFICE?

Really, there's no such thing as a free lunch. But there are several areas where technology is helping to make sustainability painless, even profitable.

Take food waste. The United States throws away more than 36 million tons of food each year; food is the largest single contributor to municipal landfills. Globally, we waste an astounding amount: 1.3 billion tons of food, enough to feed the world's hungry. So important is the issue that the Environmental Protection Agency has created a Food Recovery Hierarchy. Buying only what we use is the preferred method of reducing food waste; incineration or landfill are the least sustainable. The EPA also holds a Food Recovery Challenge to encourage businesses and organizations to reduce waste.

There are many ways to reduce food waste, including composting, meal planning, and donating to food banks. Established companies, such as LeanPath and Unilever, both offer software to help track waste and identify cost-saving opportunities. LeanPath, which works with foodservice giants such as ARAMARK Healthcare and Sodexo, boasts that about 150 of its clients have reduced food waste by up to 80 percent after installing the system. Food manufacturing giant Unilever offers a free app, Wise Up on Waste, which is designed to help chefs track waste on a per-cover basis. Each week, users receive e-mail summaries comparing their performance against the industry average, as well as progress graphs that show week-by-week comparisons to help identify cost savings.

Smaller companies also are getting into the game. Leftover Swap is an edgy app—its founder calls it a kind of “couchsurfing” for leftovers—that allows users to post pictures of unwanted leftovers that others can claim. Based in Seattle, it lets individuals or restaurants snap a photo of their leftover food and post it for another hungry individual or a food pantry to take. Ingenious? Maybe, but the system does raise concerns about food safety. In the same vein but far more sophisticated is Zero Percent. Based in Chicago, the company started out much like Leftover Swap, helping restaurants to send out text messages to charities such as pantries and food banks. Now, its Chicago system takes stock of what is available at dozens of small restaurants and matches them with charities that will be serving meals that day or week to those in need. The software calculates an efficient pickup route to help charities orchestrate deliveries.

Also pitching themselves as no-sacrifice solutions are meat-replacement companies Hampton Creek and Beyond Meat. Hampton Creek makes eggs; Beyond Meat produces faux beef and chicken made from soy and other plant proteins. Both are trying to temper the demand for meat as the world population surges and tamp down the environmental impact of meat production.

Hampton Creek's first target is food manufacturers, who use about one-third of all the eggs in the United States to make baked goods, pasta, and so on. But the goal, company founder Joshua Tetrick told *Mother Jones*, is to replace the 80 billion factory-farmed eggs in the United States, a market valued at \$214 billion. Sales figures are still under wraps but its products are receiving rave reviews.

Beyond Meat also has big ambitions. According to market research firm Mintel, some 28 percent of Americans are trying to consume fewer meat products. Backed by big names out of the tech sector such as Bill Gates, Twitter founders Evan Williams and Biz Stone's Obvious Corp., and venture capital firm Kleiner Perkins, Beyond Meat offers them a way to meet that goal. The breakthrough is the way the company aligns soy and pea proteins to mimic meaty texture; a Beyond Meat chicken strip tears like real chicken does, which is indeed a feat of science.

The company's first focus is retail. But it also sells wholesale to Whole Foods Market, which uses Beyond Meat chicken strips in its southwestern "chick'en salad" and beef crumble in tacos and chili. Whole Foods' Global Prepared Foods Coordinator Paul White says Beyond Meat's products are very popular with company chefs because it can be used in everything from Mediterranean vegetarian foods to burritos, sandwiches, salads, and pizzas. Customers like it whether they are vegetarians or "cross-over omnivores" looking for a realistic meat substitute.

In 2014, Americans are used to getting what they want online with just the click of a button, and food is no different. Sites like Grubhub have helped traditional restaurants build and simplify their online-ordering and delivery. But a new host of startups are taking a different tack: offering subscriptions for healthful meals and snack boxes. The budding industry could steal dollars from diners' restaurant and takeout budgets because, while consumers like the convenience and taste of restaurant food, many also believe that food cooked at home is healthier.

Startup Blue Apron is successfully catering to that trend. The New York-based firm delivers meal kits with pre-measured ingredients for healthy meals such as cod with roasted potatoes or Korean stir-fried beef with vermicelli. Members subscribe to the service for about \$60 a week or about \$10 per person per meal. So far, the 18-month-old business delivers 600,000 meals a month to subscribers across the country. In April 2014, it received a new \$50 million investment, bringing its estimated worth to \$500 million.

In the snack sector—an industry worth some \$64 billion—one of the most creative firms is NatureBox, which has raised \$12.5 million in startup funds. Each month, the Silicon Valley-based company introduces as many as 10 new nutritionist-approved snacks, such as apple-pie figgy bars, peppery chickpeas, and praline pumpkin seeds. In 2012, the company launched 60 products and shipped 50,000 boxes. In 2013, it added more than 100 unique products and shipped 1 million boxes. The power of the model is that NatureBox can sell, test, and get feedback on products far faster than traditional CPG companies—all the better for moving Americans from chips and candy to healthier, more sustainable snacks.

If that sounds too good to be true, don't believe it. Industry innovations are putting sustainability within reach.





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

Author Michael Pollan said it first and best: Never has figuring out what to have for dinner been so bewildering. For what is at stake is not only our health, but the health of the environment that sustains life on earth. The following series of essays cut 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 economic 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. And so 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 sometime conflicts of interest.

One of the most influential review processes has been the U.S. Dietary Guidelines, which is intended to provide guidance to individuals, institutions, and federal policies related to food. Mandated by Congress, the United States Department of Agriculture updates its guidelines every five years. The Department of Agriculture 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 the Harvard 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

More than 90 percent of American farmland is planted with commodities such as corn and soybeans, rather than the fruits and vegetables that need to be more central to our diets.

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 an alternative Healthy Eating Index (AHEI). Based on the best available published literature, it takes into account findings from short-term studies in humans on the effect of different diets on blood cholesterol fractions and other risk factors and also 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 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 Alternative Healthy Eating Index 2010 (AHEI 2010), and has recently published an analysis examining both the USDA HEI 2005, the most recently available, 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.

For the Menus of Change process we have elected to use the elements of the Alternative 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 also most directly supported by evidence. (For example for political reasons the USDA refers to "added sugar" and the AHEI refers to soda and other sugar-sweetened beverages; the USDA refers to "solid fat" and the AHEI refers to red meat and dairy fat). In addition, the USDA HEI does not specifically include trans fat. As noted, 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 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 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 in diets of many flavors and nationalities.

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.

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

Reducing saturated fat is not beneficial if replaced by carbohydrates, but replacement with 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 and diabetes if compared to poultry, fish, eggs, nuts, or legumes.

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

3. Contamination and environmental risks should not deter consumption of seafood. 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 risk derived from theoretical calculations is substantially outweighed by the benefits of eating seafood. Some species of fish, such as swordfish, tilefish and tuna, do contain mercury, mainly from natural sources, and 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 concerns. 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.



RELATIVE GREENHOUSE-GAS EMISSIONS ASSOCIATED WITH SEVERAL COMMON PROTEIN SOURCES

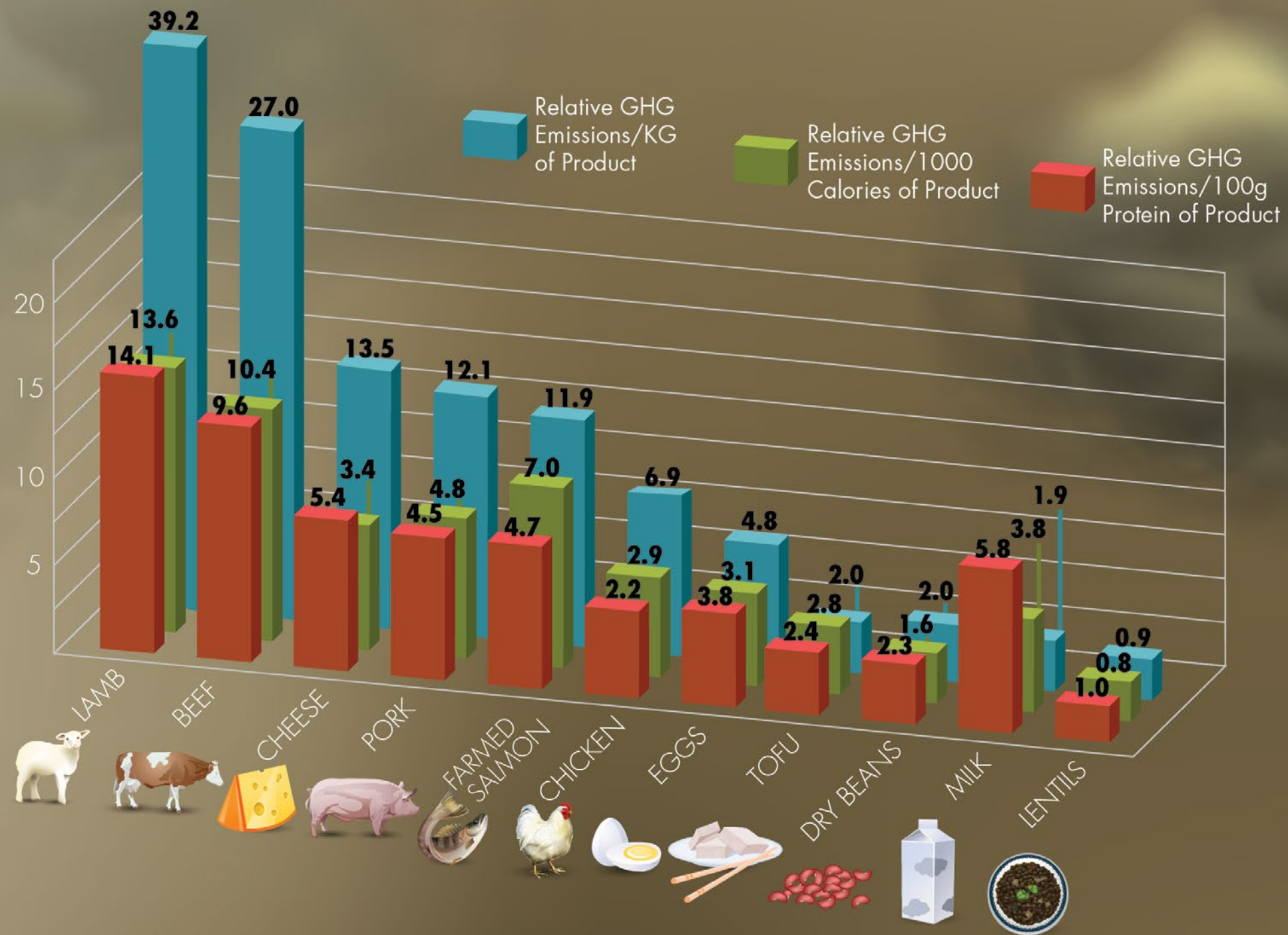


Table 1 illustrates the greenhouse-gas emissions associated with several common protein sources and is a good indicator of environmental impact including energy and chemical use, soil management, and mechanical irrigation. Both public health and the environment will improve if restaurants decrease the amount of red meat on menus and replace them 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/nutrlst/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/nutrlst/sr25a203.pdf>

INDICATORS OF DIETARY QUALITY AND RATIONALE FOR THE AHEI

The elements of the AHEI 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 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 with 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 diabetes.

Whole Fruits: Fruit consumption has been associated with lower risk of cardiovascular disease and some cancers. The AHEI included only whole fruit in our 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 as a homogenous food group, even though they differ greatly in composition, and thus potentially health effects. In a detailed 2013 analyses, 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. Additional analyses of specific fruits and vegetables are needed to provide more precise recommendations; it is possible, for example, to eat plenty of fruits and vegetables but still miss out on the most beneficial.

Whole Grains: Greater consumption of whole grains is associated with lower risk of cardiovascular disease, diabetes, and possibly colorectal cancer. Conversely, refined grains are not associated with lower risk, and may increase risk of diabetes, coronary heart disease, and other chronic diseases. In calculating whole-grain intake, the AHEI uses grams of whole grains, which accounts for the variability of the percent of whole grains in a range of “whole grain” products.

Nuts and Legumes: Nuts, legumes, and soy products are important 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 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, is 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 positive 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, increases 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 United States 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 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 and diabetes. Fortunately, use of these has been greatly reduced. 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 its ruling is enforced, trans fats will be essentially eliminated in the United States.

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. 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.

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, that has been seen with whole fruits.

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 USDA would prevent a large number of new cases of cardiovascular disease. Although further reduction to 1500 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, 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 1500 milligrams per day.

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 coffee intake is often limited by side effects of 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 United States 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. 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 the other aspects of a person’s diet.



Consumption of cheese has been increasing dramatically over the last several decades in the United States, becoming almost de rigueur in salads and sandwiches. This provides large amounts of sodium along with less healthy fats and many calories. Smaller amounts of cheese and 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 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 the Harvard School of Public Health applied the standards established in the Alternative Healthy Eating Index to national survey data for the United States. 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 this report, we used data for persons 20 years of age and older from 1999 through 2010, 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.

Although not included in the AHEI-2010 diet-quality score, total caloric intake is of interest because of its relation with obesity and weight gain. Total energy intake among adults decreased slightly during the same time period, on average by approximately 100

calories per day. However Body Mass Index (BMI), a measure of weight adjusted for height, increased over this period; a plateauing may have occurred during the last four years. The failure to see a decline in BMI despite the small reduction in reported caloric intake might be due to a subtle drift in dietary assessment methods, a reduction in physical activity, or an increase in watching television or other highly inactive pastimes.

Although the overall improvement in diet quality is encouraging, the scores remain poor, and room for vast improvements remains. For example, the average daily servings of whole fruits and vegetables were 1.6 and 1.4, respectively versus 2.1 servings of sugar-sweetened beverages and fruit juice. Women ate just one serving of whole grains, while men ate 1.3 servings. Sodium intake remained at approximately 3,400 milligrams per day. It is also noteworthy that the NHANES data that the Harvard School of Public Health analyzed shows improvement in diet through 2010 and does not include the effects of many public-health promotion campaigns and changes in foodservice operations since that time designed to increase our consumption of fresh fruits and vegetables and whole grains while reducing our intake of red meat. From the White House Garden to Meatless Monday, improving dietary quality has become a part of the national conversation that hopefully will lead to more rapid improvements.



SCORE: 4

Modest improvements towards 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. During the past year, the FDA decision 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.

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 also have 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, driven predominately by the exceeding low cost of commodities.

It's only logical to link the bigger portions to Americans growing waistlines. To battle obesity, however, 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 people to eat more calories. However, there is little evidence that voluntary changes in total calorie intake have a 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-ups help to explain individual differences in predisposition to obesity. But in the focus on calories in and calories out, the importance of 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.

Trans fats used to top the list for public-health enemies. Happily in recent years, they have been largely eliminated from the food supply. Today, the focus is on the type and amount of carbohydrates consumed. 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 promotes chronic diseases. Conversely, increasing the portion size and serving frequency of minimally processed carbohydrates (vegetables, fruits, legumes), healthful fats (nuts, avocado, oil-based salad dressings), and plant-based proteins (e.g., tofu) displaces less healthful foods, improves diet quality, and protects against chronic disease.

All calories are not alike. This belief has produced misguided attempts to modify the food supply and bred confusion among 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 satiating and induces 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 increasing the variety of foods and serving more minimally processed carbohydrates, healthful fats, and proteins (especially plant-based proteins). 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: 4

The demise of the low-fat paradigm is progress, but a fundamental focus on diet quality, not just quantity, is needed.



PROTEIN CONSUMPTION AND PRODUCTION

Over the past several decades, meat production and consumption have soared worldwide. Global production rose to 304 million tons in 2012, more than five times as much as in the 1950s, and average meat consumption per capita was 174 pounds in industrialized countries and 70 pounds in developing countries. Worryingly, the developing world is catching up: Over the last decade, meat production has increased nearly 26 percent in Asia, 28 percent in Africa, and 32 percent in South America. Since 1995, developing countries have seen per-capita meat consumption grow 25 percent versus 2 percent in industrialized countries, a 15-percent increase overall.

The global increase in meat production has severe environmental impacts, as the livestock industry contributes to problems of land degradation, climate change and air pollution, water shortage and water pollution, and a loss of biodiversity. The reason is simple: intensive animal agriculture relies on turning plants into animal feed, and takes several pounds of plant-based feed to produce a single pound of meat. This concentrates all of the impacts of farming

soybeans, corn, wheat, sorghum, and other pulses and grains into a much smaller amount of food for people. Put another way, it takes about 39 acres of farmland to produce 1,000 kilograms of ground beef for hamburgers and only three-quarters of an acre to grow 1,000 kilograms of potatoes to serve along with them. It takes one-sixteenth of an acre to produce 1,000 kilograms of carrot sticks, the healthier choice. For food service operators, this also concentrates the price and cost volatility.

The consumption of meat also has substantial impacts on human health. Diets that include substantial amounts of red meat and products made from these meats, including lean red meat but especially such items as bacon, hot dogs, sausage, salami, and bologna (which are high in sodium), increase risk of diabetes, heart disease, and some cancers. In addition, higher consumption of red meat, especially processed red meat, increases risk of premature death. A 2013 analysis, for example, increasing the consumption of red meat by more than one-half a serving per day (approximately one-and-a-half ounces) could elevate risk of diabetes by 48 percent. In contrast, substituting one serving of red meat per day with foods including fish, poultry, nuts, legumes, low-fat dairy, and whole grains can decrease risk of premature death by 7 percent to 19 percent, as well as reducing the risk of diabetes and heart disease.

The mix of health and price concerns (driven in part by persistent droughts) as well as a growing awareness of meat production's environmental impact has significantly affected consumption in

the United States, where trends are headed in a very different direction than most of the world. The USDA projects that beef consumption in the United States will drop by almost 6 percent between 2013 and 2015 (but the decline was far short of the 25 percent drop that some analysts say is necessary to meet 2020 targets). Over the past decade, beef production has dropped almost every year, including three of the largest drops in the past 35 years. Chefs can claim at least some significant responsibility as the use of chicken breast, a lean protein, doubled between 2009 and 2012 and there has been a 22 percent rise in vegetarian menu items. The foodservice industry also has changed the menu for everyday dining as it has embraced campaigns like Meatless Monday and challenges to make half of each plate fruits and vegetables.

RECOMMENDATIONS:

Chefs and the foodservice industry should continue to push healthy and sustainable proteins, especially plant-based proteins, as well as including poultry and fish, while looking for ways to use red meats in smaller portions. This approach also can help foodservice operators better manage costs as

climate and other factors make farming and livestock production less predictable. Chefs also have an opportunity to create a new aspirational vision for dining throughout the world—one that builds appeal and excitement around a plant-based foods—as other countries experience rising affluence and look to embrace U.S. eating habits that chefs have helped to foster.



SCORE: 3

While red meat production and consumption in the United States is falling, it is growing 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.



FISH, SEAFOOD, AND OCEANS

Seafood is a healthy and relatively environmentally friendly choice. And yet, annual U.S. seafood consumption is down 4 percent to 14.4 pounds per person, 70 percent of which is eaten in restaurants. Even though between 300 and 500 different species of fish and shellfish are sold annually in the United States, the top-10 types comprise 90 percent of the volume, with shrimp, canned tuna, and salmon being the most consumed. 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.

A number of groups are actively discussing ways to increase sustainability in the seafood category (which includes fresh and salt-water fish and shellfish, both wild and farmed). In particular, the seafood industry and other stakeholders are increasingly relying on third-party certifications and eco-labels to verify and highlight sustainable fishing and aquaculture practices. Waste is a significant issue, and high-quality frozen product is a means to control loss prior to preparation. Sustainability challenges that remain are described below.

Aquaculture: The demand for seafood globally far outstrips the available supply of wild species. To address this gap, aquaculture production is on the rise. If done correctly, it has the ability to be a very low-impact means of producing aquatic protein. Many groups, such as the Global Aquaculture Alliance Best Aquaculture Practices (GAA-BAP) and the newer but growing Aquaculture Stewardship Council (ASC), have developed certification standards as tools to recognize best practices and encourage farms to minimize their environmental impact.

For all of the benefits and activity around aquaculture certification, only five percent of the total global aquaculture production is certified.

Efforts are underway to create Aquaculture Improvement Projects and to engage more aquaculture operations in the certification process, which will ideally assure that poor production practices do not continue. The largest challenge of this year in the aquaculture space was the emergence of a disease in shrimp called Early Mortality Syndrome, which has affected both supply and price. The good news is that the bacteria that causes this disease has been identified, and the largest shrimp producing companies are predicting a recovery, and hopefully improved production practices.

Fisheries: As in aquaculture, improvements towards more sustainable fisheries continue. However, the Marine Stewardship Council (MSC), the largest and most widely accepted wild fishery certification program, has only certified about 8 percent of the global catch to date. To help fisheries improve, conservation groups, including members of the Conservation Alliance for Seafood Solutions, have spearheaded Fishery Improvement Projects, or FIPs. These projects connect environmental organizations, industry, and other stakeholders with troubled fisheries to move them toward sustainable practices and, ultimately, certification. To further the growth of FIPs, several new funding mechanisms have been created, including the industry-led Sea Pact and a collaborative effort between the Walton Family Foundation and Darden Restaurants, which was unveiled as a Clinton Global Initiative Commitment to Action in 2013.

Because U.S. regulations include mandates to ensure sustainable fisheries, some argue that U.S. fisheries do not need the additional independent evaluation. However, it is important to note that 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 addition, U.S. management regulations do not regularly apply to imported seafood, which makes up 90 percent of the \$9 billion U.S. market. The trade deficit is now over \$11 billion, and we import 91 percent of our seafood. It is for these reasons that third-party certifications continue to be important within the marketplace.



RECOMMENDATIONS:

The seafood category has a variety of valuable sustainability improvement mechanisms in place, but their benefits may be eroded if attention is not paid to the source of the fish. Chefs and food industry-professionals must know more about the seafood in their supply chain, including where it comes from and how it was caught and processed. Whenever possible, chefs should buy independent third-party certified products, or partner with an organization that specializes in understanding sustainable seafood issues (such as a member of the Conservation Alliance for Seafood Solutions).

In addition, the foodservice industry must move beyond the usual shrimp, salmon, and tuna in favor of a wider variety of fish and seafood from well-managed wild fisheries and aquaculture facilities. Smaller fish and seafood choices that are lower on the food chain, such as mollusks and sardines, are good options. (Clams are one of the most sustainable options because of their very limited environmental impact. Yet, on average, Americans eat only one-third of a pound of clams per year.) Chefs and food service companies can both serve a greater diversity of species and use their considerable influence to introduce diners to new varieties fish and seafood, including by teaching American consumers how to cook with more varieties.



SCORE: 3

There are myriad public and private efforts to improve seafood sustainability. But continued environmental concerns, mislabeling, and a lack of traceability threaten to mitigate their success.

CLIMATE CHANGE

For the foodservice industry, signs of increasing weather volatility and a changing climate are all around us. From the melting of polar ice caps to increasingly severe droughts in California, changing weather patterns in the United States and around the globe have become harder to ignore.

The world's food supply is rooted in agricultural systems and natural cycles, and is therefore vulnerable to the economic impacts of a changing climate. While these dynamics may seem far from the kitchen or the plate, they increasingly are having an impact on the culinary and foodservice industries.

The evidence that climate change is real is now irrefutable. The National Climate Assessment unveiled in May concluded that the effects of climate change are being felt in every corner of the United States and are expected to have a dramatic impact on agriculture. The International Panel on Climate Change also noted this year that climate extremes linked to increases in food prices were made "more likely by man-made emissions," and forecast more of the same, including reduced yields for corn, rice, and wheat in many of the world's key growing regions. Both are strong statements from the scientific community, who rarely draws connections between climate change and any one event.

Recent analyses also paint a stark picture for the future of the U.S. agricultural system, including changes in rainfall patterns, increased risk of flooding, and continued drought in California. These changes will in turn affect the rate of plant growth and crop ripening and may bring new pests and diseases—all of which will push up prices. A new report from Oxfam, released in May 2014, calculated that climate change will drive up the retail price of products like General Mills Kix cereal by up to 24 percent and

Kellogg Corn Flakes by as much as 44 percent over the next 15 years. Such retail price hikes are the consequence of rising prices of commodities like corn and rice, projected to double by 2030, with half of the increase due to climate change.

These dynamics are of growing concern among the food industry's leaders. Last year's Menus of Change report noted a 2012 survey of 350 executives from leading North American food and agribusiness companies that found that 68 percent believed weather extremes and volatility would be the "single biggest factor affecting North American food and agribusiness in 2013."

That forecast proved true: Historically high prices for beef, poultry, and other animal proteins and severe reductions in California harvests weighed on the bottom line. Unfortunately, these fears did not translate into significant changes in how chefs and foodservice companies write menus and manage sourcing and supply chains.

The food sector isn't just affected by climate change. It is also a major contributor to the greenhouse gases that lead to it. In the United States, more than a third of methane emissions—a potent greenhouse gas with 20 times the warming impact of carbon dioxide—come from food production. Globally, the food sector rivals transportation and energy as the largest single source of greenhouse gas emissions, with the majority coming from raising livestock and growing crops for animal feed.

Many things must be done to meet global targets for greenhouse-gas reductions. The foodservice industry, for example, is the number-one user of energy per-square foot; strategic thinking about energy use and food waste in commercial kitchens is a step in the right direction. But the biggest contribution the foodservice industry can make is to help reduce meat consumption. In 2013, beef consumption did fall slightly, according to the USDA. But the decline was far short of the 25 percent drop that some analysts say is necessary to meet 2020 targets.

RECOMMENDATIONS:

Foodservice and culinary professionals can play a key role both in reducing greenhouse-gas emissions and supporting practices that will help our food and agricultural systems adapt to climate change. These include reducing portion sizes for animal-based proteins, especially red meat, in recipes and menus, as well as purchasing ingredients from farmers who embrace sustainable practices. Other strategies, such as flexitarian offerings, vegetable tasting menus, and supporting campaigns like Meatless Monday, offer ways to reduce the consumption of meat and dairy. This move advances health and wellness objectives while containing food costs. Working with suppliers to source key ingredients from regions that are having good growing seasons and keeping menus flexible enough to adjust to less predictable harvests also can help reduce cost and risk.



SCORE: 1

The foodservice industry suffered from high costs and increased volatility, as long-predicted impacts of climate change affected both crops and livestock. There was continued modest progress in plant-centric menus, but action is coming too slowly to help foodservice companies avoid the costs of climate change.



WATER SUSTAINABILITY

A few years back, innovative restaurateurs introduced water menus. For a moment it looked like showcasing water's many textures and flavors might be the next big way to boost profits.

The moment passed. Sales of bottled water, driven by concerns about price and the environmental impact of shipping water around the world, have plummeted. But water is still central to profit for restaurants and foodservice companies. This time, though, water is not an opportunity. Instead, floods and droughts pose significant risks.

How? Last year, the annual rainfall in California was the lowest since the state was founded. Long predicted by climate scientists, the drought reduced yields and drove up the price for many fruits and vegetables, nuts, dairy, and livestock products. And these price increases are likely to ripple through

supply chains for at least several years. The drought also has led to a rationing of water in cities and among competing users, including farmers.

Scientists and other technical experts divide water into several types:

- Green water comes from rainfall. Due to climate change, growing regions are increasingly suffering from either having too little or too much in a short period of time.
- Grey water is the runoff from farms, ranches, and processing facilities. The best operators reclaim it for reuse.
- Blue water is the water underground and in lakes and rivers. It is mechanically pumped or diverted to make up for shortages of Green water, or the gap between the rain that falls each year and the needs of crops and livestock.

Blue water reserves are largely limited and are slow to replenish. They can't be tapped indefinitely to make up the difference. In California, the amount of groundwater pumped over the last century was enough to cover 122 million acres with water a foot deep. The groundwater reserves in California's San

Joaquin Valley, a major agricultural region, have been pumped down so far by so many wells that the ground is sinking, falling by more than 25 feet in some areas, and damaging infrastructure and farmland.

In the United States, California's drought has garnered most of the headlines. But nearly a year of drought in Brazil and much of the western United States also have helped drive up the price of animal feed and meat. It also has reduced domestic cattle herds to the lowest sizes in more than 50 years.

The good news is that the steps that chefs can take to avoid rising costs also help solve the most pressing issues. Some types of food take much more water to produce than others, and modest shifts in demand can make a big difference. The popularity of kale and Brussels sprouts, for example, marks a move to hardier crops that need less water than more tender, leafy greens. With a few exceptions, foods that take the most water to produce, or have the largest "water footprint," also have the largest "carbon footprints." (See figure on page 23.)

RECOMMENDATIONS:

Foodservice and culinary professionals can play a key role in reducing water demand in agriculture by developing menus and recipes that use a larger share of ingredients that take less water to produce. Sourcing food from producers that do not rely on mechanical irrigation also will limit the draw down of precious resources. Both measures can help ensure more dependable supplies and unexpected cost increases.



SCORE: 2

The foodservice industry is only beginning to pay attention to water issues as drought and groundwater depletion weigh heavily on profits. Consumers' reduction in meat consumption and new preference for hardier greens help, but these trends do not reflect conscious efforts by the industry.

GALLONS OF WATER USED IN FOOD PRODUCTION PER POUND



Source: Changing Tastes, using data from Mekonnen, M.M. and Hoekstra, A.Y. "The green, blue and grey water footprint of farm animals and animal products," *Value of Water Research Report Series No.48*, UNESCO-IHE, 2010; Gerbens-Leenes, P.W., Mekonnen, M.M. and Hoekstra, A.Y. "A comparative study on the water footprint of poultry, pork and beef in different countries and production systems," *Value of Water Research Report Series No. 55*, UNESCO-IHE, 2011; and Mekonnen, M.M. and Hoekstra, A.Y. (2012) "A global assessment of the water footprint of farm animal products," *Ecosystems*, doi: 10.1007/s10021-011-9517-8, 2012.

DRUG AND ANTIBIOTIC 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 in the feed and water of poultry and swine—a significant step forward. The second, the Food and Drug Administration's recent call for the voluntary cessation of the use of low-dose antibiotics, is much more problematic.

The story of arsenic in the food system began years ago when the FDA approved four arsenical drugs for use in poultry and swine to increase weight gain and improve feed-conversion efficiency; to improve pigmentation of the edible flesh of poultry and swine; and to control or prevent certain parasitic diseases such as coccidiosis in poultry.

These arsenical drugs are organic drugs, meaning that the arsenic is bound to carbon containing molecules to form a drug. While inorganic arsenic—arsenic not bound to a carbon-containing molecule—is a well-documented carcinogen, the organic forms of arsenic have been regarded as safe and stable, especially by industry.

Scientists have demonstrated, however, that organic arsenical drugs are metabolized by gut bacteria or by bacteria in poultry litter to inorganic arsenic. This raises concerns that inorganic arsenic may bioaccumulate in poultry meat and pork and poses an increased risk of cancer. In 2009, the Center for Food Safety and the Institute for Agriculture and Trade Policy petitioned the FDA to withdraw approvals for the four arsenical drugs.

By 2013, the FDA had still not responded to the petition, and both groups sued. Shortly after the lawsuit was filed, the Center for a Livable Future at Johns Hopkins University published a study finding that breast meat from industrially raised chicken, in which arsenical use is permitted, contained higher levels of inorganic arsenic than breast meat from USDA Organic chicken, in which arsenical use is prohibited. On September 30, one day before the court deadline, the FDA announced that the manufacturers of three arsenical drugs—arsanilic acid, carbarsone, and roxarsone—would voluntarily

withdraw approval for the use of these drugs in animals. Nitarsone, the fourth arsenical approved for use in chickens and turkeys, remains on the market and continues to be sold, especially to turkey producers.

Calls to crack down on the use of antibiotics in agriculture are growing around the globe, as public-health officials worry that we are on the cusp of a post-antibiotic era. In the United States, 2 million people get infections that are resistant to antibiotics, and at least 23,000 people die as a result. Crucial to combating such infections are more restrictive policies about when to prescribe antibiotics for humans and animals. In 2011, drug manufacturers sold 29.9 million pounds of antibiotics for use on industrial farms, the highest amount ever reported and four times the amount sold to treat sick people.

In 2013, the FDA at last took action. It recommended specific actions that drug companies should take to voluntarily withdraw or amend approvals to market antibiotics for use in feed or water for growth promotion and feed efficiency. The FDA also asked drug makers to amend approvals to require a veterinary feed directive for feed antibiotics or a veterinary prescription for water antibiotics.

Some hailed this as an important step in decreasing the misuse of antibiotics in industrial food animal production. But there are two major areas of concern: First, the guidance calls for voluntary rather than mandatory compliance. Second, and more troubling, the guidance permits the use of low-dose antibiotics for prevention as well as disease treatment and control. The dose (low and continuous over a long time) and route of administration (feed and water) for disease prevention is the same as for growth promotion and feed efficiency. 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.

Currently, there is no surveillance of antibiotic use in food animals. This makes it difficult to determine how injudicious preventive uses may be identified. Some public health professionals worry that there will be no real reduction in the misuse of antibiotics in animal production.

RECOMMENDATIONS:

The FDA is not moving fast enough to require industry to cut the use of antibiotics. And so it is essential to create demand for antibiotic-free meat that will force producers to change the way they operate. Chefs and foodservice professionals also can lend their voices to petitions and advocacy work that lobbies for change, such as last year's letter to Sam Kass, the executive director of Let's Move!, sponsored by the Pew Charitable Trust and the Chefs Collaborative.



SCORE: 3

The removal of some arsenical drugs in animal production and directives to stop antibiotic use for growth promotion is progress. But the drug nitarsone remains on the market and antibiotics can still be misused at low doses.



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 2012. That year, Americans spent \$1.35 trillion on food and more than \$2.9 trillion on healthcare, a ratio of one to two. These sobering statistics document an 18-fold increase in food expenditures over the past half a 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.

One reason for this shift may be the amount of time Americans spend cooking today as compared with the time spent decades ago, which has decreased by 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 an increase in Body Mass Index of 0.5. It is also notable, although not conclusive, that 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 almost exactly the same amount of time cooking as Americans and have comparable rates of obesity.

Despite such trends, it is rare for medical and culinary and food industry experts to share notes, skills, questions, and ideas as to how the communities—each responsible for trillions of dollars of the U.S. economy—might partner to diminish rates of obesity, diabetes, and other diet-related health problems. But over the last several years, some interesting pilot programs have seen success. Cooking Matters, a program sponsored by anti-hunger organization Share Our Strength, taught 89,000 low-income people in 40 states how to shop smart and cook healthy food on a budget. The non-profit Wholesome Wave launched a Veggie 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. At the annual Healthy Kitchens, Healthy Lives educational conference at The Culinary Institute of America in March 2014, 30 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.

These trends and programs are exciting but are all in early phases of development. The goal of enhancing the relationship between judicious food expenditures and judicious healthcare expenditures will be realized when collaborations between the medical, public health, culinary, and sustainability communities become ever more interdependent and collaborative.

RECOMMENDATIONS:

Thought leaders representing the medical, public health, food industry, business, agricultural, and entrepreneurial communities should meet regularly to explore novel trans-disciplinary strategies to combat obesity and other obesity-related diseases. They should work together and combine their powerful influences on society to teach families to cook and to develop other strategies to promote healthy, affordable, and delicious food.



SCORE: 2

Innovative programs are starting to link healthcare and healthy eating. But the connection is not universal and more education and demonstration projects are required.





THE TRUTH ABOUT SODIUM

In May 2013, the *New York Times* published on its front page a story with some startling news: “No Benefit Seen in Sharp Limits on Salt in Diet.”

The story informed readers that the prestigious and respected Institute of Medicine (IOM) had concluded that there was an “absence of data” to support recommendations to cut sodium intake below 2,300 milligrams per day—levels that the IOM had previously recommended for populations at risk of high blood pressure. Indeed, it continued, in certain subgroups such low levels of sodium might begin to cause harm. By the time the story had spun through the media cycle, many believed that there was no good reason to cut their salt consumption. French fries for everyone!

Of course, that interpretation could not be further from the truth. A wealth of studies has proved that sodium is linked to high blood pressure, which in turn is linked to the risk of heart attacks and strokes. Roughly two-thirds of adults worldwide have hypertension (a blood pressure of 140/90 mmHG or higher) and pre-hypertension (a blood pressure above 120/80 mmHG). The Global Burden of Disease Study recently identified elevated blood pressure as the leading modifiable cause of death and disability worldwide.

The IOM report particularly sowed confusion because it raised questions about whether Americans should have less than 2,300 milligrams or even 1,500 of sodium each day. But the question is largely irrelevant for most adults: The average American eats 3,400 milligrams per day—

an amount that hasn’t changed in decades. This is why nutritionists and influential organizations, including the American Heart Association, have reiterated that everyone should aim for a very low sodium level.

The pandemic of high blood pressure requires a comprehensive approach. For those with established hypertension, drug therapy is important. But drug treatment has no impact on individuals with pre-hypertension, who remain at high risk of heart disease but are not yet candidates for medication. More important, approximately 90 percent of Americans eventually develop hypertension, which is the result of a gradual rise in blood pressure starting early in life. This is why addressing the underlying causes of high blood pressure on a population-wide basis is the best strategy to reduce the health burden of this condition.

Americans get more than 75 percent of their sodium from processed and restaurant foods. That statistic illustrates the need for a clear and comprehensive approach to reducing the sodium content in our food supply. A successful approach would include: public education, individual dietary counseling, food labeling, coordinated, voluntary industry sodium reductions, and new Food and Drug Administration regulations. Chefs and foodservice operators can play an important role by routinely limiting sodium to the minimum needed and using alternative ways to add flavor and zest to meals.

Debates among scientists are common. But they should not derail sound policy. In the case of sodium, the Menus of Change leadership remains convinced that too much sodium remains a major public health problem.



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

CONSUMERS SAY THEY WANT TO BE SUSTAINABLE AND SUPPORT COMPANIES THAT BEHAVE SUSTAINABLY. BUT, AS ANY FOOD MARKETER KNOWS, THEY DON'T ALWAYS DO WHAT THEY SAY.

Eighty-four percent of consumers say they consider sustainability when shopping, according to the Hartman Group's 2013 Sustainability Report, but only 26 percent usually or always do base decisions on concerns for the environment or social well-being.

Moreover, consumers don't always give restaurants and foodservice companies credit for their sustainability efforts. When a company boasts of an environmental, social, or economic effort, 45 percent think it's just a marketing ploy and 22 percent believe they were forced to do it by government regulation or shareholders.

What is a restaurant or foodservice business to do? The key is shifting the message, experts say. While some die-hard consumers do want to hear about how the food they buy and eat benefits the environment or the local economy. Most are interested in how the more sustainable product can help them—whether that is because it tastes good, is more healthful, costs less, or works better than competing products.

Increasingly, chefs are being asked to weigh in on much more than how to cook great food. They are key voices in policy debates on how to reform food production, healthful eating, and the challenges of food insecurity. Chefs' visibility presents them an opportunity to help consumers to make those important connections between health and sustainability and their own lives.

This section provides insights and advice on how culinary professionals and foodservice businesses can help to promote animal welfare and decide how and when it makes sense to buy locally. It also suggests ways that chefs can cut through the confusion over terms such as "healthy" and "local" and encourage consumers to make good decisions.

Eighty-four percent of consumers say they consider sustainability when shopping, but only 26 percent usually or always do base decisions on concerns for the environment or social well-being.

- The Hartman Group

ANIMAL WELFARE

Fifty years ago, the country and the planet had fewer people, eating less meat, in smaller portions. The demand for meat, dairy, and eggs could be met by an agricultural system built of small farms and ranches practicing traditional animal husbandry with cows grazing on open ranges, pigs rooting through underbrush and wallowing in mud, and chickens scratching through pastures for grubs and bugs. Times have changed—dramatically.

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

The decline in animal welfare is inversely proportional to increases in yield and efficiency. The use of hormones, antibiotics, and changes in feedstock have led cattle, pigs, and chickens to grow faster and bigger and to be slaughtered sooner. High yield and efficiency is 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 cheap protein that CAFOs produce encourages people to eat more meat than is healthy. It is also inextricably linked to a degradation of soil, air, and water quality.

But efforts to improve animal welfare are underway and growing. As of 2014, nine U.S. states have passed legislation to ban gestation crates that cage pregnant and nursing sows so tightly they cannot turn around. Some of the world's largest food companies—McDonald's, Burger King, Sodexo, Sysco, and others—also have announced that they will eliminate gestation crates from their supply chains. In addition, seven states have banned crates for calves, and three states have banned tail docking for cattle. In 2014, California became the first to ban battery cages for laying hens. (Battery cages on average provide space per hen that is roughly

equivalent to an 8.5-by-11-inch sheet of paper.) This does not mean the hens will now be out on pasture. To the contrary, egg laying hens will now be in “colony cages” with twice the amount of space per hen.

In 2013, the FDA also decided to create voluntary guidelines to limit the use of antibiotics in factory-farmed animals. This will not, however, likely affect the administration of low doses of “preventative” antibiotics to animals, and a recent analysis suggests the net effect is anticipated to be minimal.

Overall, these are small, incremental changes. But the publicity raised by each one brings greater attention to and awareness of these animal-welfare issues.

RECOMMENDATIONS:

The community of foodservice and culinary professionals is responsible for a large proportion of the demand for meat, dairy, and eggs, and is therefore in a strong position to promote improvements in the welfare of the animals raised for food.

In response to the growing consumer demand, chefs can offer sustainably raised meats on their menus. But they also can be proactive. Foodservice and culinary professionals can 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 will support producers with superior animal-welfare practices, while negotiations with conventional producers could lead some to transition to better practices. If successful, such efforts could make food 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: 4

Several state and national policies aim to improve animal welfare, but the substantive impacts to date have been negligible. Overall, the positive movement has been in increasing public awareness.



LOCAL FOODS AND THE FARM-TO-TABLE MOVEMENT

Since the culinary community (re)introduced farm-to-table dining into the American marketplace in the 1980s, the concept has transformed the way we eat and the way we think about food. In a few brief decades, consumers have changed their dining and purchasing habits, often in response to a perceived loss of identity and flavor in the global food supply chain and their desire to make ethical food choices.

Local foods are now firmly established in the mainstream as one of the most significant and fastest-growing food concepts, regularly featured on the National Restaurant Association's "Hot List" as well as top grocery retail trends. Though there is no one official definition of "local food," and "local" is not always synonymous with "better," studies have shown that consumers believe it to be superior in terms of quality and a key contributor to growing local economies and promoting animal welfare. According to a National Restaurant Association survey, 89 percent of fine-dining operators currently serve locally sourced foods and 90 percent believed that local food would continue to grow in popularity. National chains also have embraced the trend: In 2010, Chipotle began serving at least 50 percent of at least one produce item from local farms within 350 miles from participating restaurants when seasonally available. Additionally, during the 2011-2012 academic year, school districts spent \$355 million on local food purchases for their school-meal programs.

Sourcing local food used to require personal connections. But today a spectrum of tools is available to help connect chefs with local and regional farmers. Those include in-person networking events, like Farm-Chef Connection in Portland, Oregon, and online tools such as AgLocal and Farmplicity. In the San Francisco Bay Area, the Capay Valley Farm Shop is a food hub that partners with 26 institutions such as Adobe to offer CSA boxes containing produce from a network of 35 farms. In Charlottesville, Virginia, the Local Food Hub aggregates locally grown produce, meat, and eggs

from over 70 small, family farms to distribute to large institutions such as schools, hospitals, restaurants, and retailers. The USDA's Know Your Farmer, Know Your Food initiative provides resources, grants, and assistance for food-sector businesses to strengthen ties to local farms. In May 2014, the agency made a historic investment of \$78 million in local and regional food systems, including food hubs, farmers markets, processing facilities, and distribution services.

The shift back to sourcing from small, nearby farms that grow food for flavor rather than durability for shipping has inspired culinary creativity and created a sense of place at the table, while increasing the dining public's awareness of seasonality and how food is grown. And, according to a host of recent studies, it has also done much more than that: Chefs' focus on buying from local farms is one of the reasons that many small farms still exist in the United States, even though most are located near cities and chefs who are interested in local supplies. The quest for authentic local flavors also has increased the diversity of crops and livestock raised on small farms and preserved heirloom seeds and breeds.

The problem is there still isn't enough locally produced food to meet demand. The relative scarcity of local food is in part a result of long-time federal policies that favor industrial agriculture that supplies the global marketplace. Currently, over 90 percent of American farmland is planted with commodity crops (e.g. corn, soybeans that are primarily used in animal feed, processed foods, and non-food products) rather than fruits and vegetables.

Sourcing locally grown foods leads to many good things. But buying local may not be an effective climate-change strategy. Environmental scientists and advocates have rightly pointed out that reducing the distance food is shipped from farm to table—whether from 1,500 miles to 100 or 100 to 10—will reduce energy use and emissions from trucking. But comprehensive studies on the greenhouse-gas emissions in food production show that the majority of them come from on-farm practices, with livestock farms generally having higher emissions than plant crops.

Farmers' decisions about whether to use synthetic fertilizers, pesticides, and mechanical irrigation, as well as how to manage soil, all affect greenhouse gas emissions more than transportation and storage. This is true even for fresh fruits and vegetables, where refrigerated transport and storage still account for no more than a quarter of emissions.

Additionally, dialing down the quantity of synthetic or fossil fuel-based inputs isn't automatically "good for the environment" if the farm does not produce a comparable yield. There is a finite amount of arable land available; a farm that produces 10 times more food with a minimal use of insecticides and other chemical inputs may be more sustainable than an organic farm who produces little. Choosing the "right" farms and increasing the share of plant-based foods on the menu are both more effective approaches for reducing greenhouse-gas emissions from the food system.

RECOMMENDATIONS:

Increasing the use of local foods depends heavily on companies' commitment to redesigning menus and hiring skilled professionals who can develop new dishes based on available ingredients. Culinary and foodservice industry professionals can take the first steps by working closely with progressive farmers and trusted intermediaries, including processors and distributors.

A number of companies already have been successful in developing sourcing strategies that require the use of a certain percentage of local produce on menus (often 20 percent to 30 percent to start). The results are appealing to their customers, who hear media messaging about local

foods and want to make that part of their own purchasing and dining habits without necessarily changing the restaurants they patronize.

It also encourages chefs to work with farmers to develop seasonal menus based on what the farmers can grow and to have farmers grow what the chefs want to use. Foodservice operators in higher education might consider partnering with the Real Food Challenge, a national organization that provides benchmarks and guidelines for sustainable and responsible sourcing. Its campus commitment challenges institutions to spend at least 20 percent of their total food budget on community based (local), ecologically sound, fair, and humane foods by 2020.



SCORE: 3

Increased sales of locally grown foods demonstrate progress, but the U.S. food system must dramatically change to meet increased demand.



CONSUMER ATTITUDES AND BEHAVIORS ABOUT HEALTHY AND SUSTAINABLE FOOD

Many Americans are aware of and care about healthful and sustainable food. But how that translates into food choices is challenging to assess. Many other powerful forces influence behaviors, such as taste, cost, marketing, and convenience. In some cases, for example, trendy cold-pressed juices, these factors converge. In others, such as seafood, they often are at odds with one another. Confusion over the definitions of “healthy” and “sustainable” foods makes it difficult for even the consumers who do care to make good choices.

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 United States Department of Agriculture translates those recommendations into food groups and foods: In the 1990s this took the form of the Food Pyramid, which evolved into MyPyramid.gov, and more recently into MyPlate.gov. The USDA also publishes and updates the Dietary Guidelines for Americans every five years. The third is the Food and Drug Administration. It approves specific health claims (“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 (how low in fat a product would have to 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, it is a lot of information. The good news is that in 2014 the FDA introduced a revamped version of the standard Nutrition Facts Panel, 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: In the summer of 2013, headlines blared that health professionals’ recommendations around final, “end game” targets for dietary sodium reduction were, in fact, too low (when the focus should have been on lowering sodium from current usage levels that are much too high). Last spring, a meta-analysis of research published in one of the top medical journals suggested that there was no evidence of benefit for replacing saturated fat with unsaturated fats (a meta-analysis that turned out to be layered with mistakes and flawed methodologies). Both generated a firestorm of controversy. The biggest losers, predictably, were consumers who were left with little idea about whom to believe.

Consumers are also confused by the term “sustainable,” which can mean many things: that the production of the food is not harmful or destructive to the environment or that a food business or farm is economically viable. According to research firm The Hartman Group, consumers are familiar with the term “sustainability” but do not have confidence in their abilities to identify sustainable products or companies. Worryingly, the gap between awareness of the term and the ability to pick out sustainable foods is growing over time.

RECOMMENDATIONS:

A notable subset of Americans is interested in healthful and sustainable food. Chefs can play an important role in translating all of this confusion back into something more palatable for the average consumer. A good way to start is by educating themselves about how and why the terms “healthful” and “sustainable” are confusing in the first place, and try to use them honestly (rather than manipulatively and inaccurately to promote sales, as is often the case). Then, and perhaps most importantly, chefs can build demand for healthful and sustainable food by making craveable dishes that are healthful too.



SCORE: 3

Many Americans are interested in healthier and more sustainable foods, but are confused and unclear about how to make better choices. This creates a tremendous opportunity for chefs to empower consumers.



CHEFS' INFLUENCE ON CONSUMER ATTITUDES

Professional organizations around the country are harnessing chefs' popularity and visibility to effect positive change. The Pew Charitable Trust and Chefs Collaborative rounded up more than 500 chefs to sign a letter asking Sam Kass, the director of the White House initiative Let's Move!, to focus on ending the use of antibiotics in food production. And chefs appointed as "culinary ambassadors" by the State Department took their first trips abroad to participate in public diplomacy programs: Naomi Pomeroy of Beast in Portland, Oregon, for example, traveled to Myanmar to build a training program for the Yangon Bakehouse, a social enterprise that teaches culinary skills to women. The James Beard Foundation, meanwhile, organizes boot camps to educate chefs on the issues, challenges, and opportunities in the food world, as well as media and advocacy training that will help them serve as changemakers.

Other organizations are working to provide healthier food choices to underserved communities. Wholesome Wave, founded by chef Michel Nischan, works in 28 states to incentivize low-income consumers to buy locally grown foods, a program that enhances public health and builds more robust markets for small producers. 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.

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. But are they willing and able to accept these new responsibilities, and do diners really care?

Data suggest a disconnect between with the perceived leadership role of chefs and what customers look for when selecting a restaurant for dinner on any given night. In the National Restaurant Association's What's Hot 2014, five of the top 10 trends for the year according to chefs

include the words "local" or "sustainable." And a 2012 James Beard Foundation survey of chefs about their perceived role as influencers in food-system change, showed that when asked, "Who has the most responsibility to create the change in the food system you want to see?" more than 82 percent of the chef respondents said that they had the most responsibility—more than policymakers or trade organizations. But only 10 percent of the chef respondents believed their attention to environmental sustainability issues was "very important" when customers were choosing where to eat. Perceptions of food quality and food safety were considered the most important factors that influenced customers' restaurant choices. For this information, they looked for good reviews and previous experience with the chef or restaurant.

That may be changing. Diners clearly are listening closely to what chefs have to say. 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 4 million unique users visit the top 160 food blogs each month. "There is so much potential for chefs to become involved in food policy," says chef Maria Hines, who owns three restaurants in Seattle. "There's so much more to do than just chatting up a restaurant guest who is curious about ingredients or sitting on a panel."

Chefs' perceptions of their leadership and potential for change must be nurtured. Organizations, including the CIA, the James Beard Foundation, and Chefs Collaborative, are working to provide support for chefs interested in political, health, and environmental issues. To establish credibility, however, chefs must be cautious about the positions they stake out on food issues, and must educate themselves on the issues they decide, or are asked, to discuss.

RECOMMENDATIONS:

Not all chefs are interested in pursuing these larger societal roles and responsibilities yet, and they may never be. As small business owners and operators, their 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 most are not as engaged when it comes to including healthier food choices on their menus. Though it may come from humanely raised heritage breeds, meat still reigns on fine-dining 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 must work harder at changing diners' attitudes, so that environmental sustainability issues and healthful foods become more than a 10-percent factor in consumers' dining-out decisions. Part of that work means redefining what indulgence means at the table; often, and particularly when eating out to celebrate a special occasion, diners do not want to feel they are sacrificing taste or not getting the best value for their meal. 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, sourcing ingredients, and creating dishes that are healthy for people, healthy for the planet, and still profitable. This three-pronged approach will prove critical in changing paradigms regarding sustainable and ethical sourcing.

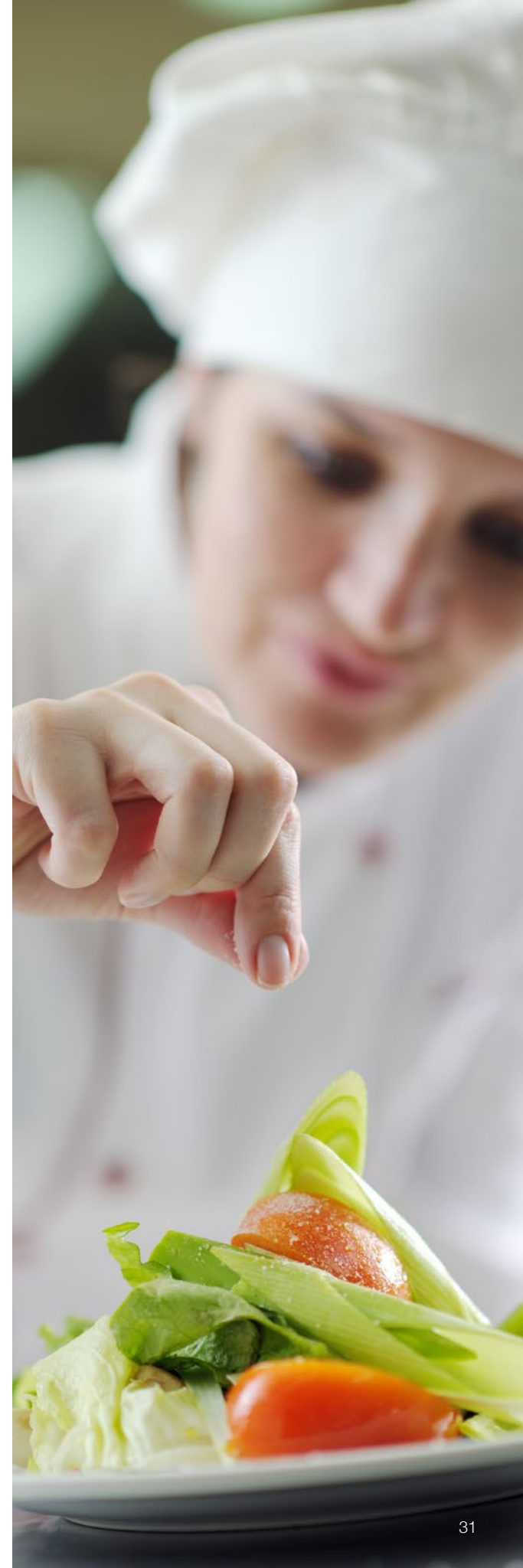
Chefs and foodservice operators should proactively reduce animal-protein portions to between two and four ounces for many main courses, for example, and devote more of their creativity to plant-based proteins (e.g., legumes and nuts, as well as products made from these). When cooking meat, chefs should 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 to 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. But there needs to be additional focus on portion size, nutrition, and public health, and a move to offer more plant-based proteins on menus.





NATIONAL RESTAURANT ASSOCIATION INDUSTRY FORECAST ON SUSTAINABILITY

In fall 2013, the National Restaurant Association unveiled its first sustainability report, a look at the trend of sustainability and why it's important. The report also highlights the projects on which the NRA is working to help restaurateurs better understand and adopt responsible practices that can save money, resources, and the environment.

Restaurateurs are interested in going green. According to the NRA's latest industry forecast, a majority of restaurateurs across all industry segments are looking to invest in energy- and water-efficient technology: 85 percent of quick-service and

80 percent of family dining and fast casual operators said they planned to invest in energy-saving lighting and equipment. Sixty percent of fine dining and 55 percent of casual dining operators said they planned to install water-saving equipment and devices. Still, there are barriers to change including a lack of education, limited resources — especially time—and a patchwork of local legislation. To that end, the NRA has established the Conserve Sustainability Education Program, which offers tools, such as checklists and tracking for operators, that help make the business case for sustainability. The NRA, along with the Grocery Manufacturers Association and Food Marketing Institute, also has formed the Food Waste Reduction Alliance, which focuses on reducing the amount of food waste going to landfills and increasing food donated to food banks and other like-minded charities.

For more information, please visit:
www.restaurant.org

THE EVOLUTION OF SCIENTIFIC CERTAINTY

Scientific knowledge continually evolves. Research is an iterative process, with each study adding to the body of knowledge. It is rare that the research community in any area achieves unanimous agreement about cause-and-effect relationships; even for smoking and lung cancer a few scientists consistently disputed the relationship. However, it is often possible to achieve significant scientific agreement. A large body of peer-reviewed published studies by different researchers shows statistically significant and consistent findings that are highly likely to represent a cause-and-effect relationship. When this does happen, researchers as well as the general public have strong directional guidance.

One reason that science may seem to reverse itself is that initial statements or guidelines are often based on very limited evidence. For example, the initial recommendations to consume margarines instead of butter were not predicated on any evidence that people consuming margarines had reduced rates of heart disease, but rather that margarines had lower levels of saturated fat than butter. Subsequent evidence showed that trans fat in these margarines had adverse effects on blood lipid levels, and connected high intakes of margarines and trans fat to a greater risk of heart disease. After a period of debate about the importance of trans fat, manufacturers have developed margarines that contain minimal levels of trans fat and are also relatively low in saturated fats.

When it comes to human health, few definitive statements can be made about effects on an individual. Even when the average effect on a group of people is well established, many factors, including genetics, environment, lifestyle, diet, among others, will influence a single individual's risk. This contributes to changes that appear over time in scientific evidence and resulting guidelines.

CREDIBLE VERSUS QUESTIONABLE CLAIMS

So how does the non-scientist determine when there is a high level of scientific certainty or significant scientific consensus on an issue? This takes considerable thought and effort. Consider the source. Who is funding the research? Is it a drug company, seed company, or grower who will benefit from increased sales of a “healthy” product? The source

of funding can sometimes bias the type of research that is conducted and the reporting of findings. However, this does not mean that all research is biased by the source of funding, and conclusions should be judged primarily by the strength of the study design and the methods of analysis. Where did you read the story? Is it a respectable publication or one simply looking to create controversy and sell a few more papers? It is important to note that even in the most august publications, journalists often struggle to translate scientific studies into stories that consumers can understand, and as a result articles can be misleading. (This is particularly true for headlines where copy editors, often someone who did not research the story, has to telegraph a complex concept into five words.) For this reason, it is hard to steer chefs and foodservice operators to always-reliable journalistic sources.

It is challenging, without personally reading—and understanding—the full study, to know if journalists have accurately reported on its findings. One online source of consumer-friendly nutrition science information is the Harvard School of Public Health Nutrition Source website (<http://www.hsph.harvard.edu/nutritionsource>). This resource, developed without funding from food industries, has been created with the goal of providing the best available information on topics related to nutrition and health, and includes commentaries on timely issues in nutrition science.

TYPES OF STUDIES

In the field of nutrition research, many types of studies are used to assess the impact of diet and lifestyle factors on health outcomes, each with differing strengths and weaknesses. The theoretical “gold standard” for nutrition research is the randomized, double-blind, placebo controlled intervention trial, but those are very expensive and usually nearly impossible to do with foods. For one, it is challenging to keep researchers and study participants “blinded” to the intervention versus the control when working with food. If a major disease is the outcome of interest, the study typically would need to follow thousands of people for many years; keeping participants on a specific diet for that duration is usually difficult. If many participants deviate from their assigned diets, the study may reach misleading conclusions.

The difficulty of conducting randomized trials of diets means that most of what we know about associations between dietary patterns and health outcomes is derived from large epidemiology studies where participants report on their diet and lifestyle habits every few years and medical diagnoses are documented and confirmed as they occur. The strength of this data comes from the fact that large numbers of study participants (tens or hundreds of

thousands of people) submit data that are combined and analyzed to provide insights into the relationships between dietary habits (e.g., frequent consumption of tree nuts) and health outcomes (e.g., reduced risk of Type 2 diabetes and heart disease). Statistical methods can be used to adjust for differences in participants who do or do not consume the dietary factor being studied.

Epidemiology studies can show associations, but cause and effect cannot be automatically assumed. Conclusions about cause and effect need to be made on the basis of all available evidence, including animal studies and short-term controlled feeding studies of risk factors. For example, the finding that trans fats had adverse effects on cholesterol fractions in short-term studies made it very likely that higher rates of heart attacks among individuals consuming high amounts of trans fats, compared to those with low intakes, represented a cause-and-effect relation.

Researchers look at many factors to determine the strength of findings, including:

- Who or what was studied? Rats are not humans.
- How many people were in the study? More is not always better, but a study with 100,000 participants almost always will be viewed as stronger than one with 1,000 participants.
- Was the study prospective (information on diet was collected before illness occurred) or retrospective (dietary data collected after the diagnosis)? Prospective studies are generally more valid.
- If this was an intervention study, was there a control group? A control group is needed to determine if changes are due to the intervention, or some other factor.
- How long were people followed, or how long was the intervention? Results from a longer-term study are viewed as more powerful, many studies are not sufficiently long to find an effect of diet.
- Did people drop out of the study? If so, why? If the intervention is too difficult (e.g., drinking an ounce of water every 15 minutes day and night) few participants will complete the protocol, and results will be distorted.
- Was the statistical analysis of the data done correctly? The use of widely accepted methods to determine will support the credibility of the findings.
- Were differences among groups statistically significant? Sometimes the placebo is just as powerful as the intervention.
- Were differences among groups clinically significant? For example, finding a one millimeter difference in blood pressure may be statistically significant, but it is not clinically relevant.

- Are the findings consistent with other studies, and with established biological relationships? If not, the findings may be a result of weaknesses in study design or the play of chance. Of course, they might turn out to be right, but final judgment should be made after confirmatory studies have been done.

CONSIDER THE SOURCE

When it comes to nutrition and health information, here are some questions (adapted from the Food and Nutrition Science Alliance “Ten Red Flags of Junk Science”) to determine if a source is credible:

1. *Does the source make recommendations that promise a quick fix?* Consuming a single food or dietary supplement, for example, will not “cure.” Dietary patterns over the long term are the most powerful predictor of health outcomes.
2. *Does the source provide dire warnings of danger from a single product or regimen?* Again, a single food or a short-term dietary regimen is not as important as long-term habits.
3. *Does the source make claims that sound too good to be true?* Many foods are marketed as “super foods.” While these are generally healthful foods, their individual nutrition and health benefits pale in comparison to an overall healthful plant-based diet like the Harvard Healthy Eating Plate pattern.
4. *Does the source draw simplistic conclusions from a complex study?* This happens frequently as journalists and other writers strive to communicate complex science into consumer-friendly sound bites. One of the more common mistakes is citing an animal study and drawing conclusions for humans.
5. *Does the source provide recommendation based on a single study?* Even the best of studies need to be confirmed or supported by other evidence.
6. *Does the source make dramatic statements that are refuted by reputable scientific organizations?* Publishers love controversy; it helps sell publications. If the claims don’t support the guidance provided by reputable scientific organizations, question why the controversy is being promoted.
7. *Does the source make recommendations designed to help sell a product?* Many products are backed by good science, but you should question the source and significance of the science before buying something based on a marketing claim.
8. *Does the source make recommendations based on studies published without peer review?* Although an anonymous review by other experts in the topic area is not an absolute guarantee that the findings are correct, peer review promotes scientific integrity; a research paper published without peer review is questionable at best.



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

RADICAL TRANSPARENCY HAS ARRIVED IN THE FOODSERVICE INDUSTRY. THE DINING PUBLIC, CHEFS, MANAGERS, AND INVESTORS NOW HAVE ACCESS TO INSTANT INFORMATION ABOUT THE FOOD THAT IS SERVED AND THE PRACTICES USED TO PRODUCE IT. THIS BRINGS NEW OPPORTUNITIES AND NEW RISKS.

On the positive side, new apps and web services make it easy for diners to choose the best place to eat and the best dishes to order, based on their health, values, and budget. All told, more than one third of American diners use their smart phones at least once a month to help decide what to eat.

Technology also is making over the front and back of the house. Customer orders, payments, and delivery can now be automated, and tablets, loaded with unlimited information about ingredients and cooking methods, can be used instead of paper menus. New software solutions also are helping kitchens to manage food waste, which totals more than a billion tons globally each year.

But much work remains to be done. Food products are increasingly sourced globally, and many pass through dozens of intermediaries before finding their way to our plates. Food traceability must be improved. Chefs can hurry along this process by asking for supplier and point-of-origin information for every food that they serve. Increasingly, their investors and their customers will demand it.

This section provides insights and advice on innovation, investment, and supply-chain resiliency to help culinary professionals and the industry move more quickly in the right direction.

SUPPLY CHAIN TRANSPARENCY AND RESILIENCY

In 2013, the food industry was rocked by controversial and large-scale food supply cases: a horsemeat scandal in Europe and the export of tainted milk to seven countries. Both cases demonstrate how food sourcing is highly globalized and why accurate labeling and better food traceability are more important than ever.

The horsemeat scandal in Europe exposed the vulnerabilities in international food supply. DNA testing conducted in the United Kingdom confirmed that some meat labeled and sold to consumers as beef was predominantly composed of horsemeat. Further investigation found that the traces of horsemeat came from Romania and that fraud was conducted by at least one of the suppliers in the complex web of international food distribution.

Major retailers including Tesco, IKEA, and Iceland were victims of the scam because they did not have the capability to trace, verify, or identify the sources of the meat they sell. All parties relied on the suppliers' promise. Jean-Rene Buisson, president of the French National Association of Food Industries, said it best: "Nobody really knows what industrial meat contains." Indeed he was right; a U.K. examination also discovered meat pies that actually had no meat.

On the other side of the globe, the New Zealand-based Fonterra Group, the world's largest dairy product exporter, announced in 2013 that it found the dangerous *Clostridium botulinum* bacteria in batches of its powdered milk and whey. Fonterra's products were globally recalled. But this was easier said than done. The recalled products were sold in seven countries, including China, the largest buyer of powdered milk. The size and interconnectivity of global supply chains made it difficult to track products containing the tainted milk and whey. The United States is not immune to such problems. Droughts in California over the last two years have increased reliance on imports for fresh fruits and vegetables.

The desire to trace food is not driven by food safety goals alone. Consumer preference for food tracking is now a point of differentiation for food producers and retailers. In Australia, McDonald's has launched a site that allows a customer to enter a product code and see where his food was sourced (trackmymaccas.com) and in the United States, Budweiser has launched a similar site (trackyourbud.com) that allows a user to enter a product code and identify the brewery that produced the beverage. Although these solutions might not be scaled to provide the traceability precision that is needed to resolve concerns, such as tracing the actual ingredients used in the products rather than only the final products, these examples show that the technical challenges are surmountable. Equally important, there is an economic benefit in providing more, and more precise, food traceability information, which will likely continue to be affected by consumers' desire for knowledge and transparency.

RECOMMENDATIONS:

Food products are increasingly 1) global in sourcing, 2) traded by various intermediaries, 3) labeled and re-labeled, and 4) used in industrial or large-scale food production (masking their origin). These features suggest that food traceability is needed more than ever. Buyers of food should begin by asking for supplier information and point-of-origin information on all food products. A system that deploys real-time tracing and updates would be some years away, but the examples from McDonald's and Budweiser show that it is possible and valuable to the consumer. Broadening distribution alternatives, in an era of ever-growing consolidation, should also not be ignored.



SCORE: 2

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

INNOVATIONS IN THE FOOD INDUSTRY

Startups that hope to makeover the food and restaurant industries 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, efforts that could allow more flexibility in the budget to buy higher-quality foods, such as meat raised without antibiotics, which customers are increasingly demanding.

Food waste is a natural focus for new companies because the numbers are staggering: An average of 10 to 12 percent of the food produced is waste in the high-volume foodservice. More than a billion tons of food is thrown away each year, more than enough to feed 868 million people who go hungry. Among the solutions for foodservice is LeanPath's tracking system that allows kitchens to record details of what food is disposed of, when, and why. That data is uploaded and analyzed so businesses can zero in on inefficiencies. For those not ready to pay for software, Wise Up on Waste is a free app created by Unilever Food Solutions designed to help chefs track waste on a per-cover basis.

Some especially creative ideas are on display in the effort to redesign the restaurant experience. Startups, such as MenuPad, Hubworks Interactive, 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. But the technology can be used for much more. Butter Systems, launched this year by Google co-founder Sergey Brin's younger brother Sam, for example, substitutes tablets for menus that could allow chefs to 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. That may be changing with Monsanto's 2013 purchase of The Climate Corporation for \$930 million. Initially conceived as an agricultural insurance firm, The Climate Corporation, which was founded by former Google employees, offers farmers detailed weather monitoring, prediction, and analysis to help them improve crop yields. This demonstrates to agricultural entrepreneurs, and perhaps more important to their funders, that there is money to be made in the sector.

RECOMMENDATIONS:

The thin margins in the restaurant business often make it difficult for chefs and foodservice operators to focus on "secondary" issues such as health and sustainability. But new technologies that help save money could offer forward-thinking restaurant professionals opportunities to allocate their budgets differently. Technologies that permit diners and customers to learn more about where their food comes from provide chefs a new way to educate diners.



SCORE: 3

The sector is bubbling with new ideas but there are not yet clear leaders and it may be difficult for foodservice professionals to know which technologies to embrace.



CHANGES IN INVESTMENT STANDARDS FOR THE FOOD INDUSTRY AMONG PROFESSIONAL INVESTORS

Investors increasingly consider a company's sustainability profile, factoring in environmental, social, and governance (ESG) into company valuations: In 2013, investors representing \$34 trillion in assets (about 15 percent of all investable assets) were signatories to the Principles For Responsible Investment (PRI), a global organization advocating ESG analysis. In the United States, investors representing \$11 trillion in assets were members of the Investor Network on Climate Change, a group that has pressured corporations to disclose carbon emissions, supply-chain risk, and sustainability management.

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 PRI/PWC report found that ESG factors can affect valuation for mergers and acquisitions transactions. Additional pressure to reform comes from the requirement for ESG disclosure to be listed on certain stock markets, and efforts to standardize ESG disclosure, such as through the Sustainability Accounting Standards Board.

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 emerged as a great concern for food-industry companies, and by severe drought in key agricultural production areas of California. 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 of assets under management have committed to using the ATNI benchmark to assess and communicate with companies they hold.

Income inequality is also an important trending issue, 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.

RECOMMENDATIONS:

Foodservice providers and food and beverage manufacturers should expect even greater scrutiny over the years to come on environmental practices, particularly relating water use and stress, and supply-chain labor. The industry should be a partner at the table discussing various options to resolve these issues.



SCORE: 2

The industry has made progress 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.



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**, an outgrowth of the **Menus of Change® Leadership Initiative** co-presented by The Culinary Institute of America (CIA) and Harvard School of Public Health—Department of Nutrition (HSPH) 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 hold unchanged for the long term. They outline pivotal culinary strategies designed to increase the odds 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-to-12 schools, in hospitals, and in low-income neighborhoods. Without the benefit of culinary expertise and insight, a focus on minimal food budgets relying 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.

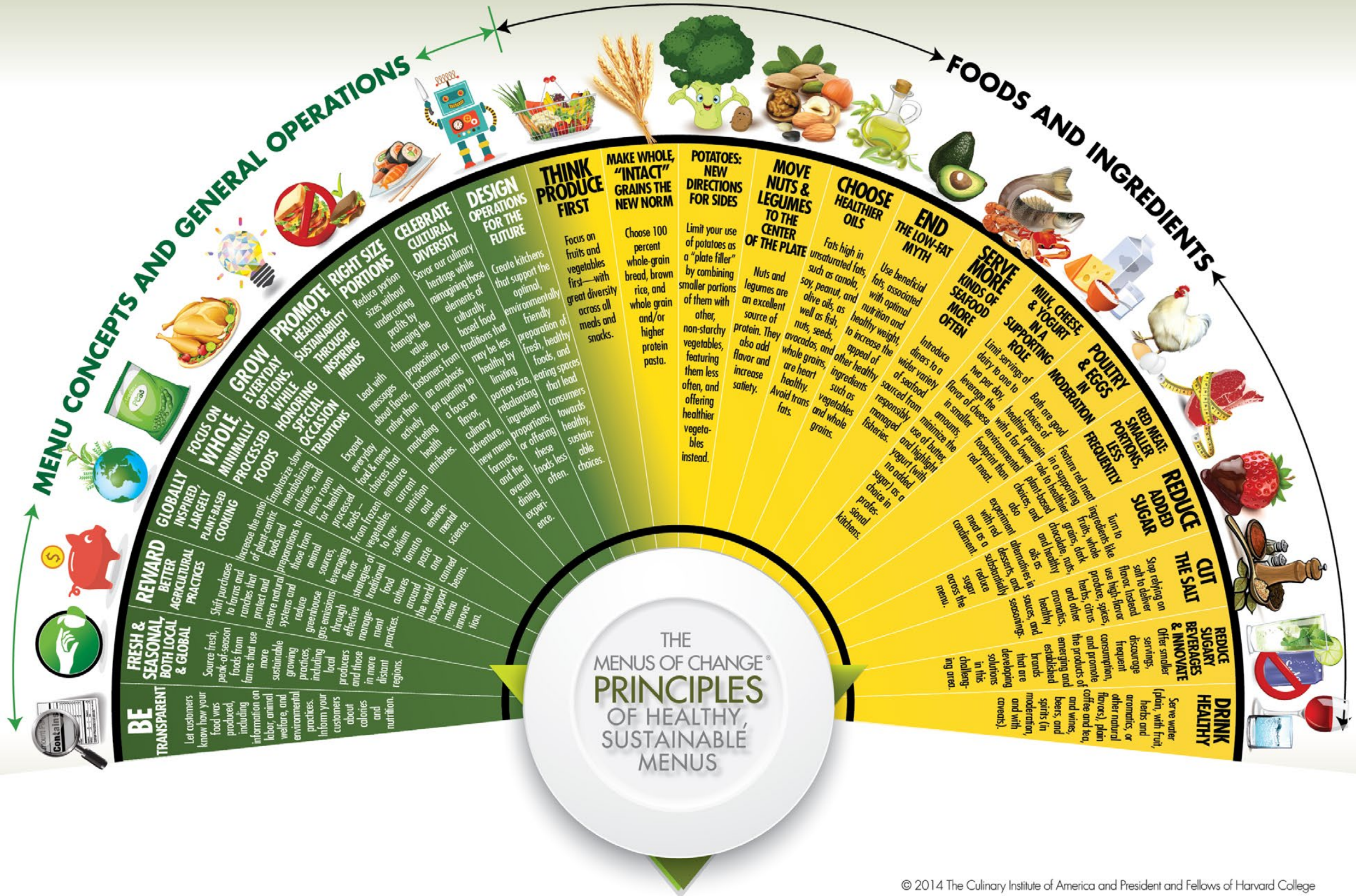
Finally, the Menus of Change Principles have not been chiseled in stone; rather, they are designed to be part of an interactive, cooperative, and evolving process. As science progresses, trends shift, and new opportunities and challenges come to light, we will revisit and revise this document annually. 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-HSPH Menus of Change website, menusofchange.org and the HSPH’s The Nutrition Source website, nutritionsource.org, which includes additional CIA-HSPH integrated diet and culinary-strategy information.

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 \$680 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.



MENU CONCEPTS AND GENERAL OPERATIONS

1. Transparency and Consumer Values.

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 hyperconnectivity 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. Fresh, Seasonal, both 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. Better Agricultural Production Methods:

Rewarding Best 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, not where it is grown. The best farms and ranches protect and restore natural systems and reduce greenhouse-gas emissions through effective management practices, such as choosing crops well-suited for their local growing conditions, minimizing use of 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. Globally Inspired, Largely Plant-Based

Cooking. 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. Whole, Minimally Processed Foods—With

Important Caveats. 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 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. Promote Health and Sustainability Through Inspiring Menus.

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, they are healthier).

8. Portion Size and Calorie Quality. 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 as important. Dishes should feature slowly metabolized whole grains, plant proteins including nuts, legumes, and healthy oils that promote lasting satiety as well as create great flavors.

9. Celebrating Cultural Diversity, Leveraging Demographic Changes.

Our respect for cultural diversity and the savoring and preservation of family traditions and centuries-old food cultures is as vital as our public health and environmental sustainability. Fortunately, these imperatives are compatible with these 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 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. Designing Operations for the Future. 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.

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, when instead 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. 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. Potatoes: New Directions for Sides. 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. 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 carbohydrate.

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, Avoid Trans Fats. 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. Palatability and Health: End the Low-fat Myth. Current nutrition science reverses the mistaken belief 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. Scientific research confirms that the vast majority of people reporting better adherence to a moderate- or higher-fat, healthy diet.

7. 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 species 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. Milk, Cheese, and Yogurt: An Evolving, 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. Poultry and Eggs: Good Choices, 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. Red Meat: Smaller Portions, Less Frequently. 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 an environmental perspective, 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. Added Sugar: Strategies Beyond Current, Unhealthy Excess. 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 mean 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: Frontiers of Flavor Discovery.

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. Sugary Beverages: Reduce and Innovate.

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 principle 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: Water, Coffee, Tea and, with Important 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—and 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 are 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.

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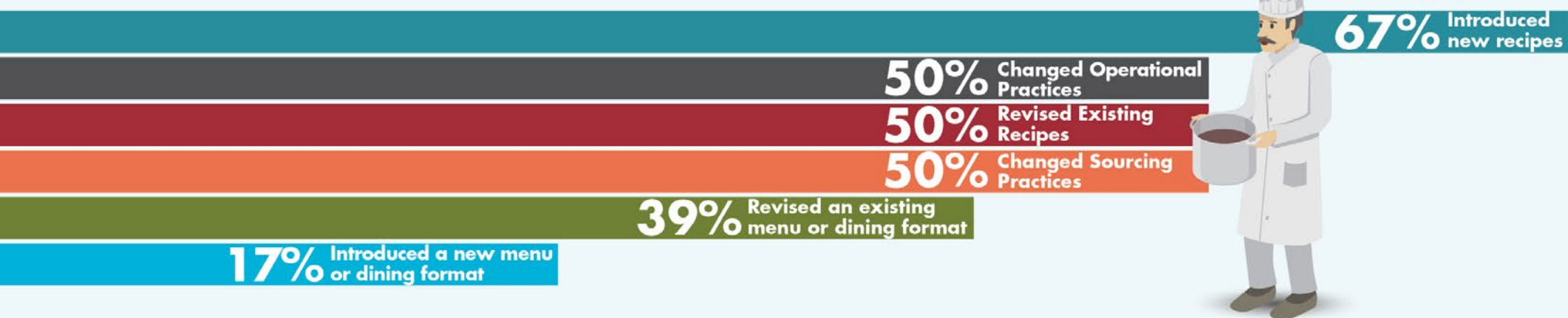


VIII. CULINARY INSIGHT 2014/2015: DESIGNING MENUS OF CHANGE

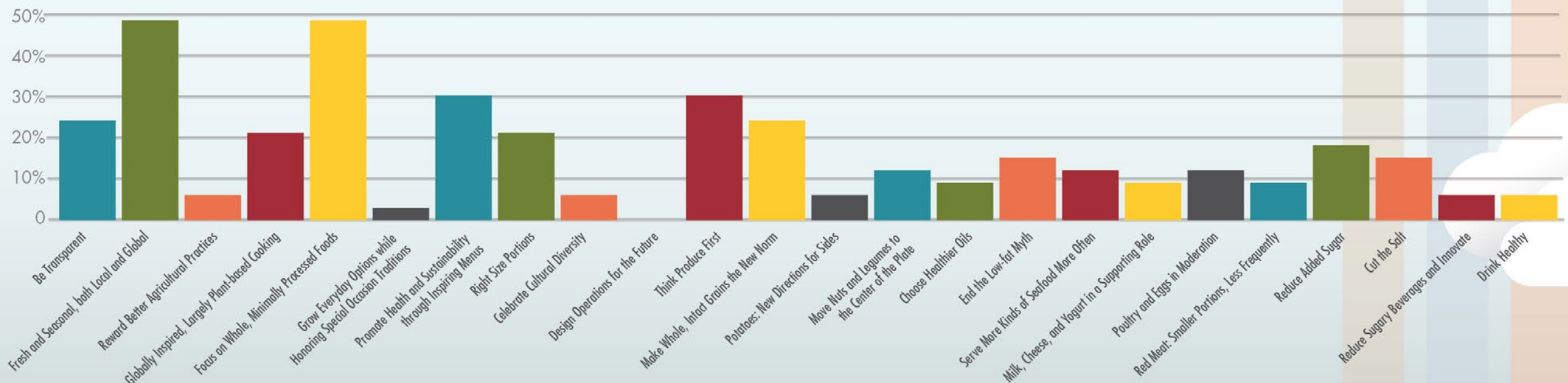
The most important aspect of the Menus of Change initiative is when the information presented to summit attendees, report readers, and colleagues encountered throughout the year moves from theory to practice. This year, we decided to ask how chefs and foodservice operators around the country are putting the Menus of Change Principles into action. In April, the CIA posted a survey that was answered by independent chefs and multi-unit operators from Washington to Florida, Missouri to Texas, and Connecticut to California who create menus in categories including college dining and school foodservice, healthcare and senior care,

prepared meals and food distributions, and stand-alone restaurants and food trucks. We asked how they use the information provided in the principles, how using the principles would impact their price point, what dishes they would create or already serve that they feel follow principles, and what guidance they are more likely to follow in the future, along with demographic information. Here are some of those answers (edited for overall length and clarity).

HOW HAVE YOU ALREADY USED SOME OF THE GUIDANCE PROVIDED BY MENUS OF CHANGE?



WHICH THREE PRINCIPLES WOULD YOU PICK IF ASKED TO CREATE A DISH AROUND THEM?



WHY DID YOU CHOOSE THOSE PARTICULAR PRINCIPLES?



WHAT DISH WOULD YOU CREATE—OR DO YOU ALREADY HAVE ON YOUR MENU—THAT REFLECTS THE PRINCIPLES YOU SELECTED ABOVE?

Pizza made with natural yeast, sprouted whole wheat flour, roasted faro flour, sprouted pea flour, topped with pear tomato confit, roasted artichokes, scallions, extra-virgin olive oil, and steamed shrimp or baby scallops

Chickpea and tofu curry stew

Organic turkey breast stuffed with quinoa and bulgur, pecans, dried cranberries, and organic spinach

Baby spinach salad with seasonal berries, Roquefort, and almonds with grilled chicken tossed with fresh garden herb balsamic vinaigrette

Hand-crafted turkey burger with mushroom duxelles topped with Cheddar and chutney

Rabbit and green olive stew with Meyer lemons

Shellfish bouillabaisse with saffron vegetable ragout

Locally (Missouri) raised trout with local black walnuts made into a relish served over Missouri-grown rice

Curry-scented salmon with braised greens and heirloom tomato fondue

We work with people who have diabetes, heart disease, stroke, dysphasia, etc. One dish on our weekly menu is crusted tilapia served with marinated tomato salad and brown rice.

Georgia trout with quinoa salad and fresh dill dressing

Balsamic chicken with olives and walnuts over quinoa and red grape salad

Fresh vegetable quesadilla

Spiced lamb meatballs with candied fig and bacon compote and rosemary mashed cauliflower. The lamb is local and grass fed and the bacon is house-cured from local pastured pork belly. All recipes are grain and sugar-free.

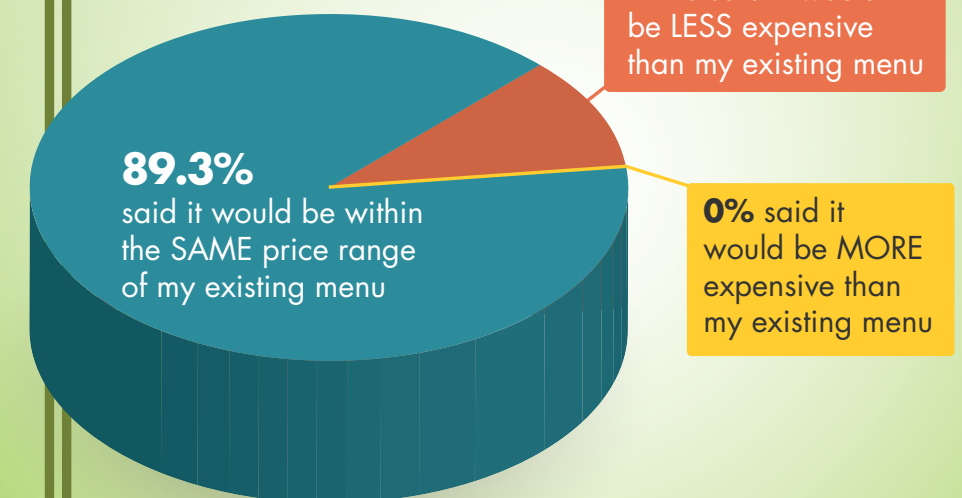
Moroccan vegetables with quinoa and kale as an entrée

Kamut salad with toasted hazelnuts, local goat feta, local tomatoes, and local herbs, dressed with extra-virgin olive oil

Braised asparagus with lemon

Homemade flatbreads made with organic wheat, flax, hemp seed, and chia seed, with organic heirloom hummus with organic veggies

\$ HOW WOULD YOU PRICE THIS DISH?





Imagine what it will be like to have our kids begging us to buy them fruits and vegetables instead of cookies, candy, and chips.

- Michelle Obama

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

EAT YOUR VEGETABLES. EAT LESS. THESE ARE THE TWO THINGS IT SEEMED THAT AMERICANS COULD NEVER BE PERSUADED TO DO. UNTIL NOW. IN THIS SECTION, WE SHOWCASE TWO REMARKABLE TRENDS IN THE FOOD WORLD AND SHOW THAT SOMETIMES GIVING CUSTOMERS WHAT THEY THINK THEY DON'T WANT CAN BE VERY PROFITABLE INDEED.

MARKETING VEGETABLES

Walk down the aisles of the grocery store and you'll find Elmo's smiling, furry red face beaming out from boxes of cookies, frozen waffles, and chicken nuggets—and kids pleading with their parents to buy them. This fall, Sesame Street's most popular monster will begin to appear on items like carrots, broccoli, even Brussels sprouts. While that may not seem like big news, there is a lot riding on Elmo's debut in the produce aisle. "Imagine what it will be like to have our kids begging us to buy them fruits and vegetables instead of cookies, candy, and chips," Michelle Obama said at a White House convening on food marketing to children in September 2013. "This is all about showing our kids that healthy food can be fun and that fruits and vegetables don't just make us feel good, they taste good too."

The collaboration is a direct challenge to the traditional public-policy approach of trying to restrict marketing of unhealthy foods—and for good reason. A recent study by researchers at Cornell University showed that when researchers gave children a choice between eating an apple, a cookie, or both and the vast majority of the kids chose the cookies. But when the researchers put Elmo stickers on the apples and let the kids choose again, nearly double the number of children chose an apple instead.

Similar results are being seen in the real world too. In 2010, Bolthouse Farms, the largest producer of carrots in the United States, saw carrot sales start to flatten. Jeff Dunn, the company's CEO and a veteran of Coca-Cola, decided to look for a new way to market his product. He talked to more than 20 ad agencies. All but one proposed selling baby carrots as an antidote to junk food. But the campaign that Dunn picked—and the one that worked—had the slogan "Eat 'em like junk food." After ads debuted in the test markets Syracuse and Cincinnati, sales immediately jumped 10 to 12 percent.

"Junk food is sold through a marketing strategy of excitement and emotion," says Dunn. "Healthy food is sold rationally: It's good for you and it does this or it does that for you. We realized we won't win by continuing down the path of doing what we are doing. We needed to be disruptive."

Dunn was instrumental in inking the Sesame Street deal that allows fruit and vegetable producers to use Sesame Street characters in promotions at no charge. And he continues to push innovative marketing strategies at Bolthouse. The company has placed carrot "vending machines" in schools across the country. It also introduced a new retail product called "shake-downs," baby carrots sold with seasonings such as ranch or chili lime. (One tagline: Shake 'em proud. Shake 'em often.) In 2013, gross sales of carrots jumped 4.4 percent to \$1.3 billion. In 2012, Campbell's bought Bolthouse Farms for \$1.55 billion, an investment that has allowed Dunn to greatly expand his marketing investment.

Dunn says these campaigns are a good start. But he adds that it is still important to restrict junk-food advertising with either regulation or voluntary efforts like Disney's decision to implement strict nutrition guidelines for the foods advertised during children's programming on its cable and network TV and radio stations. "Healthy food needs to be heard," he says. "If we don't change the share-of-voice issue, we don't fix the problem."

REDUCING SIZE, REDUCING CALORIES

Healthier food is in season at Houlihan's. For its newest spring/summer menu, the casual-dining chain served up three new dishes with fewer than 600 calories including lemon-and-herb grilled chicken with white beans and a kale-spinach-and-chard blend and miso-grilled salmon with stir-fried quinoa. A Key-lime and chocolate mousse, both under 420 calories, also debuted. Within 30 days, the desserts were the second- and third-most popular after the signature Kamikaze Brownie Sundae. (And who can resist that?)

Lower-calorie, if not smaller portions, are finally catching on. According to a study last year from the Hudson Institute, restaurants that offered more low-calorie dishes saw a 9 percent increase in food and beverage sales between 2006 and 2011. Those that didn't saw sales drop by 16 percent. Researchers defined "lower calorie" as an entrée with fewer than 500 calories; a side dish with fewer than 50 calories; and a beverage below 50 calories for an eight-ounce serving.

"Lower-calorie items are just good business," says the report's lead author Hank Cardello.

The numbers suggest the opportunity is not limited to healthy concepts such as Seasons 52 and Lyfe Kitchen but across the industry. A variety of operators are experimenting with low-calorie items. KFC has added small chicken sandwiches, Chicken Littles, 310 calories. McDonald's added an Onion Cheddar Burger, a smaller, lighter version of its LTO premium burger, to its Dollar menu. Perhaps the boldest move was Burger King's introduction of Satisfries, which boast 40 percent less fat and 30 percent fewer calories than McDonald's french fries, and at 270 calories for a small order, 70 fewer calories for the same amount of its own regular fries. In March, Burger King announced that Satisfries will be the standard on its kids' menu.

The ingredients in Satisfries are the same as in the company's regular french fries (so with presumably the same effects on blood sugar and insulin), but the batter absorbs less oil.

Visibly smaller portions remain a challenge. "Customers associate portion size with value. That's industry wide," says Kaegan Welch, the director of food and beverage at Le Pain Quotidien. Still, the European chain, which attracts a primarily female, health-conscious customer, has tested the concept: In 2010, LPQ introduced mini brownies with 77 percent fewer calories than their regular-size counterparts. Three years later, it remains the number-three seller at the bakery. Newer mini pistachio tarts, lemon tarts, and madeleines also make the top-20.

Despite its success, even Le Pain Quotidien prefers to keep the plates looking generous as it searches for ways to reduce calories. Its tartines shed calories by offering only one slice of bread, and the smoked salmon and turkey and avocado versions are top sellers.

A brown rice breakfast pudding is filling enough, but the tiny glass cup on an oval platter seems small. The company is considering a larger portion. "If you eat it, you realize it's appropriate," says Welch. "But the initial perception is that it's small. Customers' eyes are bigger than their stomachs."





In the old days, only 2,000 students were members of the McGill meal plan. (Why bother to eat in a cafeteria when you could eat better and cheaper in Montreal?) This year, 10,000 students joined.

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

TWENTY YEARS AGO, IF A MARKETER WERE ASSIGNED TO SELL HEALTHY FOOD, HE WOULD ASSUME IT WAS A DEMOTION. BUT IN THE 21ST CENTURY, “BETTER-FOR-YOU” FOODS ARE WHERE FOOD COMPANIES AND RESTAURANTS ARE FINDING GROWTH. HERE, WE HIGHLIGHT FOUR SMART (AND VERY SUCCESSFUL) RESTAURANTS AND FOODSERVICE OPERATIONS THAT ARE USING CREATIVE MARKETING AND CRAVEABLE FOODS TO SELL DINERS ON HEALTHY FOOD.

CHIPOTLE

Chipotle spent an estimated \$1 million to produce four episodes of *Farmed and Dangerous*, its satire of industrial agriculture. Yet the Chipotle brand is almost invisible on the series—the name is mentioned just twice. Like Alfred Hitchcock’s pop-up appearances in his films, blink and you’d miss it.

The goal of *Farmed and Dangerous*, though, is not to sell burritos. Well, not exactly. The series, which begins with a cow exploding after being fed a pellet made from crude oil, is to educate consumers about what Chipotle’s vision of a sustainable food system. “It is about shining a light on the fact that there are different ways to raise food,” says company spokesman Chris Arnold. “People have to choose what they think is best for them. The more they understand, the more they make informed decisions about where to eat.”

Traditional media—radio and billboards—are a great way to drive traffic to restaurants. But entertainment has proved a powerful advertising and branding strategy. Indeed, *Farmed and Dangerous* is the third in Chipotle’s own series of innovative campaigns.

The first was a short film called *Back to the Start*. Set to a Willie Nelson cover of the song “The Scientist,” it showed a farmer switching from pasture-raised animals to indoor barns and feed laced with antibiotics. It was originally conceived as something for its most loyal customers, an inspiration to make them “champions of the brand,” Arnold says. But as the project neared completion, executives realized it could be used more widely. Chipotle bought theater ads at 5,000 movie theaters, then 10,000. It was already a viral hit when it aired at the 2012 Grammy Awards telecast. To date, *Back to the Start* has been viewed 9 million times.

Chipotle liked the exposure but it wanted to give consumers a way to engage. Its next effort was an unsettling short film that shows a scarecrow peeking behind doors that boast claims like “natural” and “fresh” to see chickens being pumped with growth hormones (though chickens don’t actually receive growth hormones) and cows in cramped, miserable conditions. (The music is Fiona Apple’s haunting rendition of “Pure Imagination,” a song written for the film *Charlie and the Chocolate Factory*). After watching the film, fans could download a mobile game, where they could learn more. The film was viewed 12 million times. Six hundred thousand people downloaded the game.

Farmed and Dangerous stars Ray Wise as the chief executive of the Industrial Food Information Bureau (IFIB—get it?) who is asked to sell and defend an increasingly twisted and frightening line of products including oil-fed cows and eight-winged chickens. The storyline is meant to be over the top, of course. But Arnold says the parody is rooted in things that happen: food companies that buy research from academics, lobby Congress, and work to discredit their opponents. The plot is laced with opportunities for the characters to discuss the dangers of real-world concerns including animal welfare and antibiotics fed to livestock.

Arnold estimates that the media attention the series received would have cost the company nearly \$10 million—and that was before it had even aired. As Chipotle's Chief Marketing Officer Mark Crumpacker told an audience at the New York premiere: "We have a small marketing budget—maybe \$70 million compared to \$2 billion that McDonald's has. We had to do something unusual to stand out."

MCGILL UNIVERSITY

McGill University has one of the most expensive college meal plans in Canada, averaging about \$4,500 a year. But until recently it wasn't known as one of the best. That all began to change in 2009 when the college decided to give its food service an extreme makeover—with sustainability as a guide.

McGill's newly hired executive chef Olivier de Volpi's first step was to connect the kitchens with McGill's own Macdonald Farm, which until then had served primarily as a research and teaching center. The farm had orchards and as many as six acres planted with row crops. Some was sold at a local farmers market, but much went to waste. Within a week of the chef's meeting, the farm was dropping off loads of produce in the back of a pickup truck. Five years later, the farm plants nine acres of crops specifically for the college dining services. All told, the university now buys about 30 tons of produce annually and students volunteer 20,000 hours working in the fields.

It would be easy to say that this is something only McGill—or another university lucky enough to have a campus farm—can do. But Mathieu LaPerle, the college's director of student housing and hospitality, says that they treat the farm like any supplier. Any college can do the same by partnering with a local farm. And they'd be well advised to do so.

Why? Local sourcing and other green initiatives have generated a wealth of good will on campus. "We went from being a department that was disliked and written about in negative ways," says LaPerle. "Now we are a model. We have the most expensive meal plan in the country but no one complains because they feel like they are getting their money's worth."

Indeed, involving students has been key to McGill's success. LaPerle and de Volpi encourage them to help shape the food on campus. Students in environmental studies have participated in research projects with the dining services department and have seen their recommendations implemented. For example, at the students' urging, McGill was certified by the Marine Stewardship Council. When students proposed that the university buy 10 percent of its chicken from independent producers and 2 percent organic, they responded by buying 20 percent from independent producers and 10 percent organic in the first year. "Now those students are ambassadors for food and dining services," says LaPerle.

The food, of course, tastes better, too. Before 2009, the offerings included cafeteria staples like meatloaf and chicken fingers. Now the dishes emphasize local cuisine. The dining halls serve "Tom Cod," a local fish that is eaten whole, and Quebec beef, pounded thin and stuffed with vegetables. In the spring, they bring in local maple syrup and at Christmas, there is lobster on the menu.

The numbers tell the story. In the old days, only 2,000 students were members of the McGill meal plan. (Why bother to eat in a cafeteria when you could eat better and cheaper in Montreal?) The city's food offerings are just as good, maybe better, than they've ever been. This year, 10,000 students joined McGill's meal plan.

SWEETGREEN

In the spring of 2010, Sweetgreen, a small but ambitious local chain of salad bars in Washington, D.C., decided it was going to launch its own music festival. It was a low-key affair: 500 people, a few bands, and some food trucks in the parking lot behind its Dupont Circle location. Four years later, the annual Sweetlife Festival hosts 20,000 people; this year's sold-out show included hip acts like Lana Del Rey and Foster The People. Sweetgreen calls it a "celebration of flavorful music, wholesome food, and thoughtful living." A simpler description might be brilliant marketing.

Launched in 2007 by three recent graduates of Georgetown University, Sweetgreen's ambition was always to be more than a just a place to get something to eat. The food was important—and indeed the company makes a point of sourcing local and organic ingredients. But Sweetgreen, says co-founder Nicolas Jammet, had to be cool, "somewhere that fit our values." In other words, Sweetgreen wanted to become a lifestyle brand.

The Sweetlife Festival is perhaps the company's most visible effort to brand itself as a hip, Millennial company. At this event festival, food vendors include the most fashionable Washington and national brands: Rappahanock Oysters, Red Apron Butchery, Stumptown Coffee, and Flying Dog Brewery. But other company initiatives also show off its more conscious approach to capitalism. In partnership with DC Farm To School, it has developed an eight-lesson curriculum to teach students about healthy eating and where food comes from. Random Acts of Sweetness is a program started by an intern that includes leaving gift cards on bicycle seats.

Less visible to customers but essential to the company's identity is what Sweetgreen calls sustainable employment policies. "Just as some focus on customer experience," says Jammet, "we focus on employee experience." All team members start at above minimum wage and they earn Sweetgreen swag—green Converse sneakers, a Sweetgreen bike—for every year they stay. Store managers get one week of vacation to start and two weeks after two years. They also get an annual raise and a bonus, which at five years can reach as high as 40 percent of the employee's base salary. The proof is in the numbers. Jammet says that his four most profitable stores are the ones where employees have been there the longest and are invested in the business.

Such efforts have paid off. In 2013, Steve Case, who co-founded AOL, invested \$22 million in Sweetgreen through his Revolution Growth fund. To date, the company has 22 restaurants along the East Coast and plans more in Boston, Philadelphia, New York, and Washington. "By creating a strong culture, the Sweetgreen experience becomes more than just a food transaction," says Jammet. "It's about the greater experience that can be healthy, conscious, and fun at the same time."



THE MUSHROOM COUNCIL

It's the Fermat's Theorem of the culinary world, a seemingly impossible puzzle: How do you create healthy food that the masses will actually want to eat?

This was the challenge that the Mushroom Council set out to unravel in 2011. (The Mushroom Council is a founding corporate member of The Culinary Institute of America's Healthy Menus R&D Collaborative, a multiyear initiative dedicated to accelerating the development of targeted, practical solutions that expand healthy menu choices in the foodservice industry.)

Working with partners at the CIA and the University of California, Davis, they designed a study to determine if consumers would accept mushrooms as a partial substitute for meat in popular dishes. Chef-instructors from the CIA at Greystone in the Napa Valley developed recipes for dishes such as a taco blend that substituted mushrooms for part of the beef. The mushrooms are cheaper, healthier, and more environmentally sustainable than the usual meat.

During an initial meat plus mushroom tasting, something wasn't quite right. Then came the epiphany. "It tasted good but the texture was wrong," remembers Bart Minor, the Mushroom Council's president and chief executive. "That was the a-ha moment."

CIA faculty members recommended quartering the white button mushrooms, cooking them, and then mincing them to resemble the size and texture of the ground beef in the taco blend. The mushrooms added umami, or savory deliciousness, and kept the taco blend moist. In a CIA-UCD sensory study, research participants agreed: The taco blend with mushrooms had more flavor, moisture, and consumer appeal.

The first real-world test of the product came at the 2012 School Nutrition Association meeting. It was an instant hit. Foodservice directors thought it was delicious. Even better, it was an easy way to squeeze in more vegetables, something many schools have struggled to do since new federal guidelines governing school meals were introduced in 2010. It also offered them a way to lower their costs.

The Mushroom Council markets its new blends as a win-win-win: healthy, affordable, and tasty. Two years after its introduction, the product is an unqualified success. The United States Department of Agriculture made its first order this year National School Lunch Program. Foodservice chefs also are embracing the idea. "Using mushrooms in our burger is not only healthier but it adds flavor," says Eric Ernest, the executive chef at the University of Southern California.

Indeed the consumer sensory study showed the consumers generally like the meat-mushroom blends better than the 100-percent-beef taco blend due to the increased aromas, flavors, and texture/moisture levels that mushrooms add. This finding was especially true of educated, upper-income women and Millennials. Mushrooms can also help chefs to reduce sodium: The taco blend with the greatest amount of mushrooms (an 80:20 blend) was the only reduced-sodium sample that scored as well as the standard "full sodium" version with consumers. This suggests that the umami properties of mushrooms help to overcome the flavor losses when sodium is reduced in certain recipes. (This research has been recently accepted for publication by the peer-reviewed Journal of Food Science.)

Minor calls the mushroom blends a game changer: "You can make things healthier by putting broccoli in it. You can make things cheaper by putting soy or chicken in. This is revolutionary because it's so simple. It's meat and mushrooms. They go together like peanut butter and jelly."



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