

**WONDRIUM**

Topic  
Food & Wine

Subtopic  
Food

# Where Our Food Really Comes From

Guidebook

Brad Barnes



Culinary Institute  
of America



# WONDRIUM

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A portrait of Brad Barnes, a middle-aged man with short, graying hair, smiling slightly. He is wearing a dark-colored plaid button-down shirt. The background is a dark, neutral color.

## Brad Barnes

Brad Barnes is a Certified Master Chef and a strategic food business development consultant. He is also the president of Pure Food Consulting, a company focused on innovation in all types of food businesses. He previously was the senior director of consulting and industry programs for The Culinary Institute of America. The American Culinary Federation certified him as a culinary competition judge, and the World Association of Chefs' Societies certified him as an international judge. He is the coauthor of *So You Want to Be a Chef?*, *So You Are a Chef*, and *The American Culinary Federation's Guide to Culinary Certification*.

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# Scope

This course explores how the American food supply system really works—from a 30,000-foot level. It will also help you better understand how you as a consumer can take charge of the various levers and switches within your power to help shift the food supply system to an even better place.

There's a romantic vision of a farmer growing food, picking it fresh, and selling it in a quaint stand by the side of the road. But this isn't really how people get most of the food they need. The food supply chain is—and must be—much more complex in order to deliver fresh, wholesome products, in great condition, with minimal processing, to everyone who needs it. The values of transparency and integrity play a very important role here. In this course, you'll discover how a variety of food systems work as well as how they sometimes don't work the way people want them to.

The United States is one of the most diverse food-producing countries in the world. It grows, processes, and creates some of the best products—from fresh produce to jams, frozen pizzas, chicken nuggets, and cold cuts. The course will examine the drivers of decisions for the people who make food in the US and help you understand how to influence those decisions. You'll explore ways to level the economic factors that drive the American food supply chain and retool the food system to create an even more viable one. It will first take understanding and vision, and the course will address that vision and how it applies to you.

This course delves into many facets of the food business in the US today, covering everything from how a chef envisions a dish to how a product comes to fruition in the world of packaged goods. The course will help you understand the many pathways that various foods take from the field to wherever they are destined to go, including the costs and implications in each journey.

The course explores how the US government oversees the rules and regulations of all aspects of the food supply chain. From safety to processing and to size, shape, and weight standards, there are rules, laws, and guidelines that keep everyone and everything in line. The course will uncover what that line is, how it is defined, and where it breaks down. You'll learn about how the infrastructure could be better used and how the wealth of expertise within the American system that is often mired by bureaucracy could be taken advantage of.

With a growing tide of plant-forward eating, the giant meat-production industry is facing challenges. This industry is an important one to the US economy, from ranchers to truckers to the packing industry. Yet the way this system operates today is unsustainable, from both an environmental and a wellness standpoint. You'll explore how this transition plays out and how the economics can sustain it without the huge volume of production that occurs today.

Even the food supply chain at home is complex, and feeding a family of four in today's society can be daunting. How does a family, busy with life, continually ensure that everyone in the family gets the nourishment they need to live a healthy life? There are a number of basic but often-overlooked skills that allow a family to accomplish this in a home setting. Product choice, preparation, storage, and handling are all basics that support a well-fed family. And that doesn't even cover creating and cooking delicious menus to avoid highly processed foods that can be detrimental to health. In this course, you will discover how you can better manage your home food supply and learn trade secrets that chefs use to keep order in a kitchen.

The course will discuss the future of the American food supply chain, including a variety of perspectives and possible solutions to current problems. You'll consider who will be involved and how the world will be able to be fed effectively when the next generation is in charge. You can imagine how the future world, with fewer resources and on a warmer globe, may look at things very differently than people do now. American society is rapidly learning lessons for the future as tastes and delivery systems evolve, and you can begin to see how things must shift if you look closely enough through the right lens.



# From Farm to Table to Feeding the World



**F**arm-to-table is an artisanal process in which the consumer purchases fruit or vegetables from the person who stewarded them into existence. While the farm-to-table experience offers some of the most delicious and purest foods, it isn't actually how people get most of the food they need. To create a meaningful source of nourishment for everyone in the country, Americans depend on a much larger commercial system that's driven by many factors, including massive volume and complex economics.

## THE JOURNEY OF A TOMATO

Imagine a farmer growing an amazing tomato, picking it fresh, and selling it to you only hours later from a stand on the side of the road on a lazy summer or fall afternoon. This is a wonderful way to get your produce—when you can. But often most people can't.

**Americans eat nearly 24 million tons of tomatoes in a single year. Roughly half of them are sold fresh, while the others go into cans, jars, spaghetti sauce, ketchup, salsa, and other processed forms. Ninety percent of them are grown in California and Florida, which means they need to find their way to your kitchen before they spoil—often from thousands of miles away and passing through many sets of hands.**



Unless you're getting your tomato straight from the farmer, the supply chain that gets that fresh tomato to you works something like this.

A farmer prepares the fields and buys the seeds that will grow into the tomato plants. Most likely, they are seeds that have been bred to enhance durability and appearance at the expense of flavor.

The farmer ensures that the infrastructure for growing these plants is in place; this means having adequate water, fertilizer, and farm machinery.

Then, the seeds are planted, and the tomatoes begin to grow. They require care every day, as well as good weather—specifically, the right weather for tomatoes—and the farmer has to hope that not too many pests come along.

Once the tomatoes are ready to pick, the farmer begins that process, picking and packing the tomatoes for transport.

The tomatoes are then held in a warehouse for shipping until the moment they are nearly ripe but still sturdy enough to make their way through the rigors of shipping and distribution. Once enough tomatoes are ready to ship, those almost-ripe tomatoes head out on the road, or by air or rail.

During their journey, the tomatoes must be cared for and held in the right conditions. Since they were not ripe when picked, the tomatoes will ripen to some extent along the way, and by the time they reach their final destination, they are ripe enough to be sold or prepared but not so ripe that they can't be stored a bit longer.

They arrive at a distribution center, where they will be parceled out to various distributors and then taken to grocers and other large-scale buyers—perhaps a fresh salsa company. There may be other secondary distributors along the way, such as those that will take smaller batches to individual restaurants. When the tomatoes finally arrive at their final point of sale, they will be close to ripe and ready for you to take home and eat or maybe ripen them a bit more.

This is the simple version of how just one food item makes its way through a commercial system at a scale sufficient to provide tomatoes to everyone who wants them. That includes the millions of people who don't have direct access to an artisan farmer.

The United States has about 330 million people, each of whom consumes about 4 pounds of food every day. That's 1.4 billion pounds of food that has traveled from a field or a farm to you, with lots of hands along the way to sort, inspect, clean, cut, package, and transport it. As long as the system is working, a new batch of food arrives at your favorite grocery store or restaurant each day to replace what you ate. The average supermarket has about a 3-day supply of food on their shelves; in that period alone, nearly 4 billion pounds of food makes its way to US consumers.

It's impossible to say how much food is traveling through the entire US food system at any given time. Perishables can take a few days to a few weeks to go from source to supper. Grains, on the other hand, may be stored in silos for up to three years before they're shipped off to cereal and tortilla makers, bakeries, or breweries. Either way, it's a lot.

What really boggles the mind is the complexity of the systems that handle all that volume. It takes an incredible number of methods and processes to get this enormous volume of food—both animal and vegetable—from point A to point B and beyond using all the available technologies.

Control is critical when it comes to growing produce such as tomatoes. The produce must be delicious enough for consumers to want to buy it but also grown in sufficient quantity and at a price that offers an attractive profit for the producer. The produce must be of the right variety for the climate in which it's being grown and receive the right amount of water and nourishment. It must be protected against pests and blight; it must be harvested at the right time and then stored and transported to the restaurant or market where it can be enjoyed by the consumer. Control can be a challenge, though, when Mother Nature is in charge, no matter how much is done to manage the process.

### **THE US FOOD SUPPLY CHAIN**

Over time, the US population has soared and clustered in urban areas, while the number of food producers has plummeted. This has resulted in concentrations of production in geographic locations that are often far away from the consumers. Now the products must be bred to withstand the rigors of transportation as well as the extended time window from harvest to transportation. Harvesting and handling practices have evolved to encourage or slow down the ripening of fruits and vegetables in transit. This includes

storing them in “modified atmospheres” using different amounts of oxygen, carbon dioxide, and ethylene than they usually “breathe.” Food production has moved from sustenance to business to big business and now demands intense capital investment, predictability, and efficiency, like any other industry.

According to the United Nations Food and Agricultural Organization, 75% of the world’s food supply comes from 12 plants and 5 animals. It’s amazing that of all the things there are to eat on the planet, this small group of foods is so dominant.

This shows how increasingly dependent people are on sugar, corn, rice, wheat, and potatoes—the top five consumed crops. Additionally, sugar is at the top of the list, which indicates a high level of processing that many foods go through to be palatable to consumers and, in some cases, to enhance shelf life.

Raising animals has its own unique set of issues. And when done at the scale we’re discussing, it can be a truly daunting proposition. Farms and ranches are continually raising healthy, quality animals to end up on the meal plates of millions of people every day. Like a tomato farmer with their seeds, ranchers and dairy farmers want animals bred for size, ratio of meat to fat and bone, conversion of feed to usable product, and other considerations.

Top Plants	Metric Tons, 2011
Sugar	1,800,377,642
Maize	885,289,935
Rice	740,961,445
Wheat	701,395,334
Potatoes	373,158,351
Soybeans	262,037,569
Cassava	256,404,044
Tomatoes	159,347,031
Bananas	107,142,187
Onions	86,343,822
Apples	75,484,671
Grapes	69,093,293

Top Animals	Metric Tons, 2011
Beef & Milk	725,123,869
Chicken & Eggs	155,183,059
Pork	118,168,709
Goat Milk & Meat	20,000,000
Sheep	8,229,068

Some animals are raised strictly for meat while others produce other valuable products, such as eggs and milk. For these, productivity and useful life span are major concerns.

The rigorous inspection and handling procedures in the US are sophisticated and standardized and help to ensure that our meats are safe and fresh. The inspection, grading, and handling protocols that have evolved in the meat industry are applied in each processing location under the auspices of the USDA, which is actively involved in most of the food regulation development and at work every day of the year inspecting thousands of food manufacturing plants across the US. But all this work to ensure your safety adds millions of dollars to the cost of the product.

Preston Keres/USDA/Flickr/PD





While there is a robust export market for US meats, much of the fish in the US food supply is sourced from global markets because US waters are relatively small compared to the oceans covering the planet. With seafood consumption historically lagging red meats and poultry by a considerable margin, the US is somewhat behind other countries when it comes to wild harvesting and aquaculture. In much of the rest of the world, per capita demand for seafood is so high that harvesters have placed a premium on efficiency—in some cases at the expense of responsible fishery management. About 93% of the world’s fisheries are at maximum capacity, while 34% are overfished, meaning they can’t sustain the current harvesting level. As demand for wild stock increases, the idea of aquaculture becomes more important—and doing that well, sustainably, and responsibly becomes even more important.

Maintaining freshness of seafood and other perishables through proper handling and temperature control is a critical factor and one that makes the US food supply distinctly different from any other supply chain on earth. Once the clock starts ticking on a perishable product, the keys to quality and safety are rapid movement, processing, and preservation. These all add significant cost to the original product.

This window of volatility is called shelf life, and every food that you consume has a unique set of properties that affect its shelf life. Either food is picked, packed, shipped, and distributed within its window of freshness or ways to slow down or stop the volatility are found. Each of these options comes with its own set of decisions, including figuring out ways to maintain taste and flavor by adding preservatives such as sodium or nitrates.

The preservation of food has been the food industry's version of the Holy Grail for humans' entire civilized history. It began when humans discovered that cooked animals were easier to eat and digest than raw meat. Since then, the effect of fire and heat on food has played a key role in its preservation.

Indigenous Americans knew that foods that were salted and dried would last through the winter and that the hard squashes of fall could be stored underground in stable, cool surroundings to extend their life.

Pasteurization revolutionized the way people eat. With the use of ice and then commercial refrigeration came the possibility of keeping food fresh long enough to transport it across great distances and creating the modern food supply chain.

The food industry has adapted traditional preservation techniques such as canning, curing, cooking, drying, pickling, and freezing for the commercial market, while adding new technologies like irradiation and ultrahigh-pressure pasteurization. While all of these tactics do help stabilize the food supply, they all have implications on cost and can even impact nourishment and quality.

There is a certain amount of primary processing and handling that gets the food from where it's grown to the next stop in the supply chain, which consists mainly of cleaning, sterilizing, sorting, butchering, grading, chilling, and packing. Bones and skins of animals—as well as produce remnants such as leaves, stalks, and inconsistently sized or poor-quality items—may be directed along the way to secondary markets such as pet food, sustainable packaging, compost for soil, or even clothing.

This may happen at the producer/harvester level or at a more centralized location. Either way, it's the beginning of a chain of value—adding steps by a second or third pair of hands—and like all the stops that follow, it's also the beginning of adding cost to the product.

The next step involves further processing. There may be various tiers of further processing, each adding its own value, but generally there is a vast array of the most fascinating, specialized machinery that slices, dices, mixes, emulsifies, cooks, chills, vacuum-packs, tumbles, selects, and dries—to make products from ravioli to french fries, sugar-roasted peanuts, and frozen batter-dipped fish fillets. The aim of this technology is to meet demand at an incredibly massive scale with consistent, safe, quality products at a price that people can reasonably pay.

These are the fourth, fifth, and maybe even sixth sets of hands to touch the product, and the depth and breadth of processing that occurs is massive.

Throughout this chain, transportation and logistics are like nerve synapses, relaying items from one node to another. At the front end of the chain, a lot of the transportation focuses on aggregation of product. But as the product gets closer to the consumer, transportation and logistics shift into a scattering mode to get the product from the aggregators to the grocery stores and restaurants that will sell them to people. Although technology is just now enabling some direct-to-consumer sales, the supply chain model still relies on those who own “the last mile.”

Generally, distribution buyers purchase a product and sell it to another distributor in the chain or all the way to the end consumer. The model may change depending on the size or volume of goods the distributor purchases or on the product lines that the distributor deals in. Most distributors sell to end users—the chain or independent restaurant, college or university, grocery store or hypermarket, ballpark concessionaire, or office caterer. They may also resell to other distributors who don't have space to carry all the products their customers may want.

**Instead of a network of local, cottage-industry producers, America is mostly fed by a commercial, profit-driven system that, despite legitimate criticism, still delivers the most consistent, wholesome, affordable, and nutritious food in the world.**

## THE PEOPLE

One of the critical factors on which the whole food supply chain depends is the people—from farm workers and laborers to manufacturing teams, food-service cooks, and consumers. There are also people in the transportation industry, including truckers, rail engineers, pilots, warehouse workers, sales and distribution experts, logistics specialists, and the people who ensure the supply chain functions. And there are those who provide oversight, such as government inspectors, the USDA, the FDA, import and export authorities, trade commissions, sales and marketers, ad agencies, and packaging designers.

There are many opportunities for retooling this system in ways that can increase sustainability, the nutrient value and taste of food, and the ultimate well-being of the country.

This process will also require figuring out how to get the best and most nourishing food into the hands of everyone at a reasonable price, keep farmers and food manufacturers profitable, and ensure that the safest food system on earth stays true to a commitment Abraham Lincoln made in 1862 to be the backbone of a strong nation—both economically and nutritionally. There is much to celebrate but also much to improve on, and the only way to move the needle is with a shared understanding and vision.



# How Consumer Choices Change Our Food

## 2

**O**n average, American households waste more than 30% of their food purchases, according to the USDA. The most frugal households waste about 8.7% of their purchases, while some throw away 50%, to the tune of \$240 billion each year. This is on top of the 72 billion pounds of food that's thrown away before it even hits your shopping bag—much of it because someone deemed it too ugly for you to buy or it was an irregular size.



### HOW TO MOVE THE NEEDLE

It's easier than people would like to admit for food waste to occur, whether from poor planning, spoiled leftovers, or products that simply don't taste good.

Food waste is one of three main aspects of the food supply system where everyone can move the needle, but this mission must be paired with two others to create substantial change.

You can start by becoming a more educated consumer in order to drive producers to supply the food you want. This is important because it will directly impact the other two potential areas of change: reducing food waste and passing along an appreciation of good food to children.

Fifty years ago, consumer purchases represented around 60% of the US's gross domestic product, or the total value of goods and services produced in a year. Since then, it has risen 10 percentage points to nearly 70 cents of every dollar spent in the US economy. At the same time, the amount, speed, and direction of information Americans have about the food they buy has exploded.

## 2. How Consumer Choices Change Our Food

Mass communication before 2000 was a one-to-many model where a company advertised and promoted products to consumers with little opportunity for those consumers to respond as a whole. Today, a single misstep by a company can damage its reputation overnight. Conversely, a groundswell of consumer support for a company that offers value to society beyond its products or services—what some call conscious capitalism—is becoming the Holy Grail of marketers everywhere.

Never before have you, as a consumer, had so much power at your fingertips. You can research purchase options and rate products and experiences. There is virtually no excuse for anyone to buy goods that are substandard or to not understand what they are buying. It's a many-to-many conversation, and everyone—including the suppliers—is paying attention, always.

Smartphones have not only changed how people communicate, listen to music, and take pictures; they have also become a tool for better food shopping. Today, you can have your grocery list in your phone, complete with links to products and promotions that help you assess the quality, price, and value of your potential purchase.

But the flip side of this power is the dizzying access to a pool of infinite options.



With an ever-increasing number of products and brands available anywhere and at any time, combined with all types of noise from marketers and friends—tweets, text messages, social media, and emails—each consumer is now inundated beyond comprehension.

Marketers try to access your wallet by getting your attention and telling you why you should buy their product. If they want to earn your attention, they must present you with value for your money, and that value proposition is what you should always keep in focus. It is their promise to you, and you can hold them to it.

However, in order to do that, you must truly understand what is valuable to you. This takes time and changes as you do, or as your family does.

### COMMUNICATING WHAT YOU WANT

Retailers use a vast and complicated matrix of data collection and analysis to figure out what you want. Food businesses spend millions of dollars annually to figure out how you will buy food, what you will buy, and how frequently you will buy it.

One way you can exercise your power as a consumer is to make your values known through your voice and behavior. Social media, loyalty programs, surveys, and ratings all provide actionable, low-cost data points embraced by marketers. And today they are not only interested in what you buy but also what you think of them. If you were ever surprised by a merchant responding to a comment you made on Yelp, you've experienced reputation management. So, it behooves you to use your voice clearly and directly to the companies you buy from.

In the Menus of Change platform at the Culinary Institute of America, one of the key principles for producing change is rewarding good suppliers. This means that you need to speak up. You need to express your opinions, both the good and the bad.

With social media today, virtually every major food supplier has a channel, and your input is more than welcomed. But if you don't say anything, suppliers will either keep guessing or look to less efficient, costlier ways to get the data they want—passing the cost along to you in the price and value of the product.

Naturally, you may feel that your data is personal and belongs to you. But your data is also a vote for what you want. If you choose whole-grain cereals over sugar-packed breakfast snacks, don't you want someone to know so they'll supply more of what you want?

If you're willing to make this trade-off, you aren't alone. In a 2016 survey of more than 7,000 consumers, 57% said they were willing to share personal data in exchange for offers or discounts. Similarly, 52% of consumers would share personal data in exchange for product recommendations, and 53% would do the same for personalized shopping experiences. Now that sounds like a positive move to help the people making food know what you're looking for.

According to a 2017 State of Personalization Report, 44% of consumers said they're likely to "become repeat buyers after a personalized shopping experience." And almost half of the surveyed consumers said they bought a product after a brand personally recommended it, even though they initially hadn't intended to buy it.

Another issue for consumers is knowing what they really want—not just in the short term, but in the long run. Many people have very little insight into the impacts of their food decisions, even on a personal level. If the majority of consumers seriously considered the fact that being overweight can eventually lead to a personal plague of health issues, would they keep putting poor-quality food in their mouths? That is, after all, the primary cause of chronic obesity.

You as a consumer have the power to determine exactly what you're being offered. You've always had the power of the pocketbook or wallet. Now you have a bullhorn to go with it.

Many consumers don't use that bullhorn regularly enough to object to things like too much packaging, or sugar-laden barbecue sauce, or sodium-packed salad dressings.

**Using your bullhorn or vote with your supermarket can help create a chain of communication that's heard up and down the food supply chain.**

Would consumers make different choices knowing that their choices are being sought, monitored, and acted on by the very best brands across the country? Your behaviors can create any cycle you want them to.

Whether by secret ballot or bullhorn, though, your voice comes with responsibilities.

Understanding the seasonal and geographic dynamics of food is a good place to start. Farm-to-table is often thought of as the best way to produce food. It's a system in which a farmer grows food and sells it directly to a consumer who eats it. But when logistics inherent to that concept are unpacked, the constraints as well as the benefits in that system are revealed.

For an agricultural product grown and distributed at scale, there are trade-offs. One trade-off is peak seasonal deliciousness if people want to enjoy that product when they want it year-round. So, producers adjust, using preservation techniques that capture seasonal flavor but might change the texture of the product. Or they manipulate the ripening process in a poor imitation of Mother Nature.

So, which food qualities suit producers' needs better and meet consumers' expectations? It may depend on what you're trying to accomplish.

When discussing or considering food, deliciousness comes first, nourishment a close second, with sustainability and wholesomeness right behind. While this is a close race and each one is critically important to the overall game, flavor is the most important.

To enhance flavor, stop voting for everything to be available all the time. The fresh food industry has adopted a model that allows almost every type of fruit and vegetable to be purchased at all times of the year. This model relies on very high-carbon transportation systems, many imported products, and hybrid varieties of produce that allow for various types of growth conditions and generally are more durable.

This may seem convenient, but to what extent are you trading down in quality and flavor for this convenience? How many times have you brought home a container of strawberries and been disappointed by the taste or texture? Did you return it to the store? Did you send an email to the number

on the package? Probably not. It's more likely that you left it in your fridge until it became mushy and furry and then threw it away because it "went bad."

But it didn't "go bad." It came to you at a high price, you thought it tasted nasty, and you let it rot. Then, you probably bought it again the next week, hoping it was better. Was it?

These are the chronic issues across the US: the waste of food, the loss of money connected to it, the decline of deliciousness, and the failure to pass along good habits to children. There's another: food insecurity.



### FOOD INSECURITY

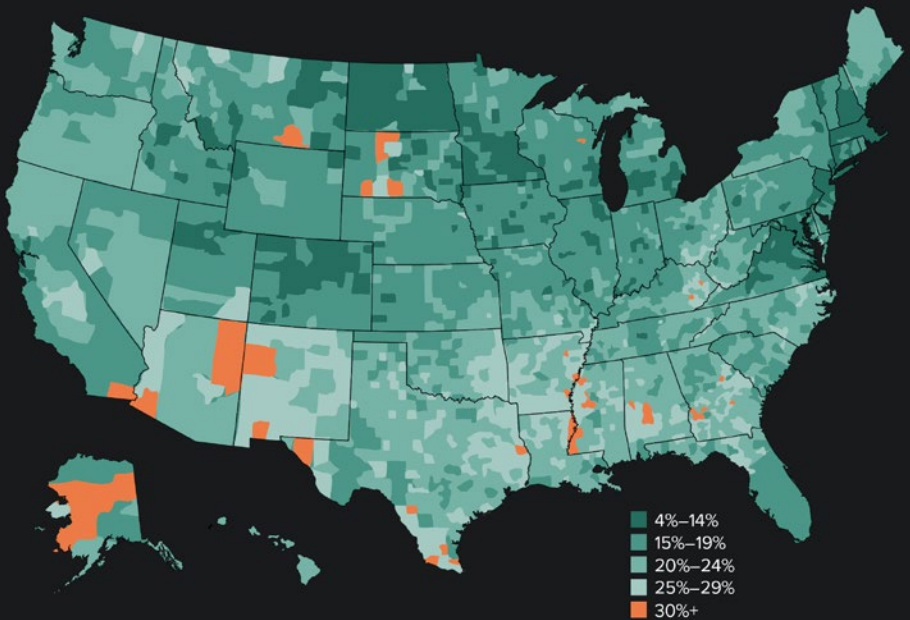
You may be lucky enough to be able to afford to forget about the \$6 you wasted on those strawberries, but many people can't. Some will buy those strawberries, which will taste bad, and they won't be able to buy more until their next paycheck. Or they may not be able to get back to the store in a timely manner to return the bad produce. This will make them more likely to buy processed foods that are of exactly the same quality every time instead of trying to guess at how delicious those strawberries may—or may not—be.

An ongoing study at Harvard has discovered that the relationship of location and economics deeply affects the availability of quality food. Areas that have limited access to affordable and nutritious foods are called food deserts, and Dr. David Williams has discovered that people living in food deserts are unlikely to be treated the same as, say, a shopper in a suburban supermarket when it comes to a quality dispute. The store located in a food desert might not accept the return, even if the consumer tries to get their money back.

But there are options. Dr. Williams's study began to integrate accessible, good food into low-resource communities. As fresh produce and more nutritious ingredients became more available, the communities embraced these new options, food waste decreased, and people began to feed themselves better. This simple approach to creating a transparent and fresh food supply is helping eliminate food deserts in America.

This is a larger and more complex issue than it might seem on the surface, and it requires your voice—and everyone's together—to change this dynamic. It begins with you, the consumer, insisting on good food.

## United States Food Insecurity 2019



## TERMS AND LABELS

How do you know what's good and what isn't? To begin with, prioritize transparency over buzzwords like *local*, *natural*, or *fresh*—each of which is either poorly defined by the US government or not defined at all. The primary agencies that create such definitions are the USDA and FDA.

The FDA does not regulate the use of *organic*, but the USDA does, in great detail. *Fresh* is defined by the USDA as what it's not (frozen, dried, cured, irradiated, or canned), but any chef will tell you that items flash-frozen within hours of harvest often taste better and are of superior quality than those that linger for weeks in the supply chain.

*Natural* is in a gray area, loosely defined by the FDA as containing no ingredients that don't naturally occur in the product but avoiding the issue of crop applications such as pesticides. *Local* is defined by the USDA as “the direct or intermediated marketing of food to consumers that is produced and distributed in a limited geographic area.” Depending on whom you talk to, *limited* means anywhere from 100 to 500 miles or within the same state or region.

Unlike other terms, *genetically modified organisms* (GMOs) are strictly regulated by three government agencies: the FDA, the USDA, and the EPA. While you might have heard the alarm over Frankenfoods like tomatoes with flounder genes, genetic modification can carry benefits like increased yield, nutrient value, and disease resistance, which lessens dependence on pesticides.

**GMOs are descendants of scientist Gregor Mendel's genetic manipulation of peas in the 1860s.**

Emerging labels that are currently unregulated include *artisanal*, *seasonal*, *house-made*, *functional foods*, and *nutraceuticals*. The perceived or claimed benefits of freshness, quality, enhanced

performance, or healing represented by these labels are not evaluated by any government agency.

## PROCESSED FOODS

It's because of these regulations that processed foods are not necessarily as bad as they sound. It's true that products classified as heavily or ultra-processed foods account for about 60% of the calories consumed by Americans, and it is known that relying too heavily on them can push consumers toward higher risks of obesity, diabetes, and cardiovascular disease.

On the other hand, food processing has helped preserve and distribute some of the most delectable products for centuries. Some curing and preservation techniques actually transform an inedible fresh product—like olives—into something both edible and delicious.

The nature of the food supply is that fresh produce is picked over a small period of time in large batches. Since there are large amounts of these foods available all at once, it's critical to be able to preserve them and sell them incrementally across a period of an entire year.

The secret to buying processed foods is learning to read labels. They're incredibly useful, often indicating the source and specific variety of product. Start by checking the net weight to see how much of the product is actually in the package. Just remember that net weight also includes water and juice as well as the solids.

Next, look at the ingredient label, which lists what's in the package in descending order of how much of each ingredient is in the package. It's not unusual to seek out a particular product only to find that the ingredient you're buying it for is way down the list of ingredients on a particular package.

Then, look at the nutritional label. Refuse to buy anything with more than the USDA-recommended 225 milligrams of sodium per portion in order to stay within the guidance of getting no more than 2,300 milligrams of sodium per day. Check portion size when trying to figure out the amount of salt, fat, or sugar in a product.

Buy mostly fresh produce in season and learn how to cook it. Buy what you like to eat. Always look at the package labeling to see where the product was grown. Is it produced in the US or shipped from halfway around the world?

Look for the name of the producer—sometimes you can even find the name of the farm! And pay attention to the brand name. Once you find a brand that's consistently good, keep buying it.

Learn how to choose good produce, using aroma, firmness, and stem appearance as guides. Avoid produce with shriveled skin or brown stems, which tells you that the produce has already lost some of its natural water content and won't be as juicy as you want it to be. Frankly, it's old. This is particularly prevalent in grapes.

If the produce doesn't look good, don't buy it, and tell the store manager about your choice. If you come home and find the produce is spoiled, take it back and demand the same quality control and service you would if this were \$4,000 worth of annual spending on other items. This is your money and your food.



# From Farm to Where You Shop

# 3

Customers' wants and needs drive what types of foods they buy, how they shop, when they shop, and what they expect from a given store. It's not unusual for customers to not even be fully aware of their wants and needs, but their behavior is still driven by them. That's why supermarkets, club stores, and other mass retailers invest so much in obtaining data that will help them know their customers as intimately as they'll allow. These retailers rely on that data to create environments that are targeted to their customers in order to get them to visit their stores, influence purchases, and keep them coming back.



## TYPES OF GROCERY RETAILERS

In the grocery segment, there are as many strategies for competing as there are retailers. That said, the most successful grocery retailers connect with their customers via one or more of three basic strategies: by being focused on price, high-quality products, or value.

First, price-focused retailers tend to focus on the basics of cleanliness, organization, and efficiency while offering low pricing, which is driven by their massive purchasing power. These stores tend to stay away from more upscale or targeted products and lean toward the American staples that appeal to the greatest number of customers. They usually also offer a larger selection of these basic products. That's why you'll see dozens of varieties of pickles but not much kimchi, if any. If it doesn't move, it doesn't stay on the shelf. This is what retailers call velocity.

Then there are the upmarket retailers who incorporate products perceived to be high quality into their brand strategy. The products have a corresponding higher price point as well. These stores operate on the philosophy that premium brands enhance your experience, so you will pay more for them. They might not carry 12 different types of all-purpose flour, but you can get that black lentil fettuccine you've been craving.

Finally, the value-focused retailers have managed to earn above-average quality and price perceptions. You get a blended experience, and these stores are often the best at creating an experience that keeps you engaged, acts as a one-stop shop, and can still be attractive to the broadest audiences. These stores tend to carry a large number of private labels and proprietary-seeming products, so once you're hooked on these products, you have a hard time replacing them without changing your eating habits. It is an interesting hook that has worked well for retailers, as consumers try to balance the needs of their expanding palates with stagnant paychecks and shrinking food preparation time.

This is an admittedly broad tour of food retailing. Nearly all stores in the value and price category have enhanced their selections of prepared, natural, organic, and global products over time. These products have become traffic drivers in mainstream retail stores. As these chains track profitability by section and square foot, they're more than happy to take advantage of products with higher prices and margins so long as they move.

The quality-based stores often leverage experiences and storytelling to support higher pricing. They build brand loyalty through more emotional connections—such as the support of local producers—making your dollars seem to include more value than just the product itself.

## HOW STORES INFLUENCE YOUR PURCHASES

A business that was once dominated by traditional advertising, newspaper flyers, and in-store promotions has quickly given way to an intricate dance of data-driven marketing and technology.

Loyalty programs, for example, not only serve to create store brand preference and drive traffic but also capture every detail of your purchase behavior—from how much you spent to what you spent it on and when you spent it.

This data gets uploaded into a database that can make broad forecasts about your buying patterns and preferences. Retailers can then use this information for targeted advertising, such as sending you a notification via email.

There are several ways that a store tries to influence your shopping experience, and it usually focuses on increasing your spending—be it intentional or impulse buying. For years, the saying was that milk is always at the back of the store because everyone drinks milk and the customers will therefore need to pass hundreds of other enticing items on the way to the dairy department.

Nowadays the process is more scientific, with items that you frequently use going up or down in price as your willingness to pay is tested. And you thought that shopper's card was a gift for you to save money! You and the products you buy are forever linked—along with when you bought them, how much you bought, and how much you spent.

These are all part of the deal you make in exchange for the benefits of a loyalty club. For many, it's worth it. But sleuthing technologies don't stop at loyalty clubs. Through geocaching on your phone, Bluetooth, and Wi-Fi, retailers—both food and nonfood—can track your movements around the store, including how much time you spend in a given location.

**Your local store is a blueprint of how people buy groceries and feed themselves and their families as well as what their standards are.**

Another way that customers are directed toward purchase options is through packaging, signage, and displays. Graphic design, including colors, fonts, and photos, is critical to packaging. Slogans and taglines have given way to more compelling descriptors like *organic*, *gluten-free*, *small-batch*, *artisan*, *handcrafted*, and *grass-fed*. Today, *low-sodium* and *uncured* are all the rage—as is *no added sugar*, with little regard to whether there was any sugar in the product in the first place. It's possible that the product contains a naturally sweet substance like juice, or perhaps one that is molecularly deconstructed so it doesn't require being labeled as sugar.

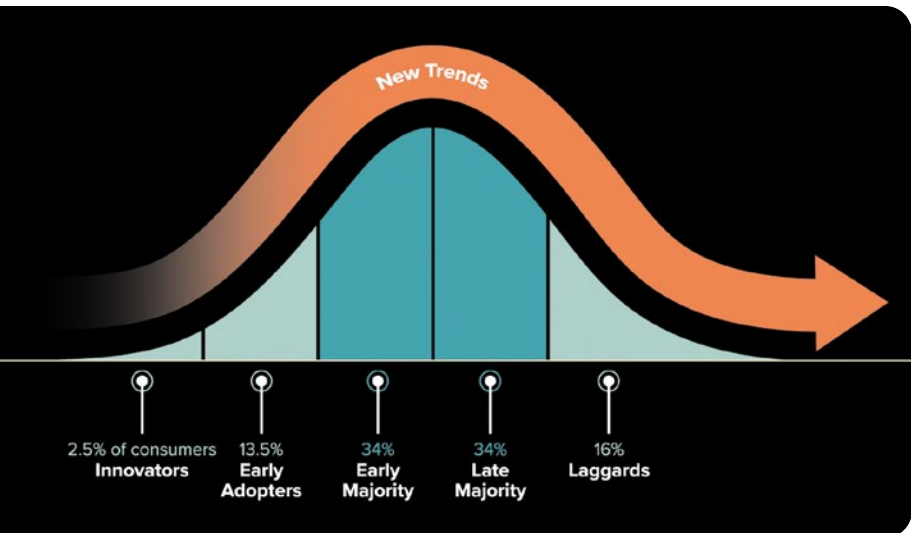
And here's the rub: Food marketers and retailers will push the bounds of credibility with these labels until you push back. The word *natural*, for example, has no clear legal definition, while *organic* does.

You can count on two things: These buzzwords are infinite, and they are directing you to products that retailers think you want and need and that make them money.

How do retailers know?

The food supply is perpetually driven by trends, and these trends are driven by you—often in response to media.

There is a predictable response suggested by the Rogers adoption curve, depending on whether you are an innovator, early adopter, early majority, late majority, or laggard, according to researchers. By the time a trend reaches the late majority stage, chances are you won't hear much about it because it is no longer food news. You can get a read on a neighborhood by seeing what's promoted at the market and how early or late it is on the adoption curve.



## SECTIONS OF A SUPERMARKET

A supermarket is generally divided into three main sections. The perimeter has mainly fresh foods, such as produce, meats, deli, bakery, and dairy.

The middle of the store, which is called center store, has staples from flour to soups, cereals, paper goods, and condiments.

The front of store is where you find the checkout lines, which tempt customers with impulse buys, such as candy.

The perimeter contains all refrigerated spaces, so they're the most expensive areas in the store. The products kept here are perishable, and velocity is at a premium. The amount of space is a major economic engine of the store, with profit margins up to 40% for bakery, deli, and prepared items.

The center store is the workhorse. Profit margins on products in the center aisles average about 1%, so this area is all about volume. And volume is about visibility. The infamous endcaps are the places where the grocer puts the things that they make money on but you didn't necessarily come to the store to buy.

Endcaps provide intercept opportunities, designed to introduce new products or move seasonal items. They are also among the most expensive locations for manufacturers to place their goods by paying the retailer to put them in certain locations—a practice called slotting allowances. To increase the chances that you'll buy their product, manufacturers also provide dollar allowances to retailers to fund price promotions, such as limited-time offerings.

## CATCHING YOUR EYE

You're probably used to walking the aisles in the hunt for items on your shopping list. If it's a popular but low-profit-margin item, it will likely be on a lower shelf since the grocer knows you will seek it out because of its lower price. But what they really hope is that they can distract you with another item at eye level that will make them more money. Eye-level positions are also premium positions for manufacturers to slot—meaning pay for the privilege of the position—especially if it's a new and unproven product. In any event, if it doesn't sell, it loses its prime parking spot.

Grocers use a number of other ways to catch your eye, such as point-of-purchase display units. These are the stands that sit inside the aisles and put a product in your way, impeding your path, so that you must notice it.

Retailers also use promotional price strategies, designed for maximum visibility—such as buy two, get one free. Promotions like this call out to you via moving signs called danglers placed near the product, on floor stickers, and in that app on your phone. Even if you don't need more than one of the advertised product, those extra things may end up in your basket.

Why do they do that to you?

Profit is the easiest answer, but there's a subliminal angle as well. They want you to feel successful.

Whether you're acting as a hunter-gatherer or a caretaker when you shop, making a purchase and bringing it home to your family is consistent with that role. If you have saved money, are bringing home something new and exciting, or feel good about the clean labels you bought, you are now successful.

The store may well have contributed to that perceived success by making you aware of new items or offering price reductions on some of your favorite products.

Enabling your success elevates simple shopping satisfaction to long-term loyalty.

Manufacturers play a critical role in this chain of experiences. Even the most mundane consumer packaged goods have gone through a remarkable design effort to make them noticeable and desirable enough to purchase and enough of a value to buy again. This all happens before the products arrive at the back door of the grocery store.

**The ways of getting food in all forms to sell to you, the customer, promises to undergo a fascinating evolution within the food system in the years ahead.**

## NEW PRODUCTS

A product that sits on the shelves starts as an idea in someone's head, usually responding to some perceived need, solution, desire, or gap in the market. Perhaps marketing data and consumer insights have told them that people need a BBQ sauce with honey and chipotle or some legume-based snack like flavored chickpeas. Many times, these are riffs on existing products but in a new form, flavor, or nutritional profile.

Maybe consumer insights discovered that hummus demand is about to go off the charts. Ok, so how is hummus produced at scale? What should it be made from? How should the label read? These are just the first of many factors that will be considered, including flavor profile, texture, supply chain, production lines, shelf life, target price, and packaging.

During the development process, all these factors will be exhaustively scrutinized, evaluated, tested, and redone to end up with something that has a reasonable chance to sell in volume.

If it doesn't sell at scale, most food producers will pass early in the design phase. It's not unusual for a manufacturer to set a \$500 million hurdle on projected sales to greenlight a new product.

Additionally, an idea must continue to be relevant for years, even decades, to be considered as a viable product or it is not worth the journey of developing it and trying to sell it.

Once the product prototype is designed and passes muster with at least 40% to 50% positive outcome scores in survey mode, it will need to be scaled to production. This may include everything from designing machinery for making the food to the packaging material and the graphics that will represent the product.

It also will include the massive marketing and promotional campaign that will invest an influx of precious cash into getting this product sold. The manufacturer has to make the case for consumer need and desire to supermarket-chain purchasing agents who are inherently risk averse. This can take months to arrange and cost plenty of cash. The entire system is a far cry from the way products first made their way into consumers' hands and mouths.

## RESTAURANTS, AT-HOME DINING, AND FOOD HALLS

A century ago, the food supply chain was really a system of moving raw products by train or ground transport to various hubs in urban areas. In these big cities, workers started to transform raw products into minimally processed foods—so beef was butchered, produce trimmed and packaged, and fish iced and gutted. Hubs evolved from landing zones to distribution centers for food in various forms. As these places grew busier, the people doing business there needed to eat, so food started being prepared and eaten on-site. And since all these folks were milling about in the name of food, it made logical sense to sell smaller parcels of food to the clientele to take home, so groceries were also sold.

Today, restaurants and retailers can both trace their roots back to these humble beginnings.

The grocery category dominated the share of the food dollar well into the 1960s. As their primary consumer, the homemaker, went back into the workforce and disposable income increased, that share of the dollar began to tip toward the food-service industry (or food away from home), peaking at 54 cents on the dollar in 2018. As you can imagine, retailers have been unhappy but hardly able to do much about what is essentially a generational and societal shift.

In the past few years, there has been a movement back to eating at home, regardless of where the food was purchased. This has been a boon for retailers, who have been able to grow their high-margin prepared foods category by leaps and bounds. Grocers are particularly well suited to compete in this area since they have the purchasing power, labor, and a facility inside their stores to take fresh ingredients from the raw state to prepared—usually at a lower cost than a restaurant. They also already have your traffic and attention since you needed to go to the store anyway.

But they are not alone. And they are somewhat vulnerable due to their sheer mass, including real estate and capital investments, which makes them inherently less nimble and responsive. Meal kit companies, convenience stores, and gourmet markets have all joined the pursuit of your dollar.

In an interesting twist, a crossover hybrid has emerged as operators have discovered how to recreate the wonderful vibe and variety of food hubs of the past in what may be today's hippest food scene, the food hall.



There's a good chance that this business model will thrive and morph over the next decade to become a social and economic hub for how people buy goods, eat, and meet, as well as becoming a central distribution point for foods and raw products. What's more, the food hall concept allows would-be entrepreneurs the opportunity to embark on food businesses without the same cash commitment as a full restaurant or market. Not only can these small business owners piggyback on prep and storage space, but they can also pool together for services like delivery and marketing.

Food halls may also provide some solutions to problems that exist in the food world by helping to create greater food equity and supporting small business owners in underserved areas. The decentralization of retail from huge megamarkets to individual operators who can get closer to customers in underserved areas known as food deserts could have an impact on the availability of good food that's also nutritious.



# From Farm to Restaurants, Slow and Fast

# 4

**T**he food-service industry is the second-largest private sector employer in America, with about 15 million employees—roughly 1 in 10 of all US jobs. It provides opportunities for the small business owners who are the backbone of our economy, as well as management and advancement opportunities for minorities and women that they might not find in other fields. Currently, 9 in 10 restaurants have fewer than 50 employees, and 7 in 10 are single-unit establishments. Just under half of managers are women, and the industry employs more minority managers than any other industry.

## COMMERCIAL FOOD SERVICE

Many people think of food service and restaurants as interchangeable, but the industry is much more segmented. It broadly divides into commercial food service—businesses that exist solely to make a profit—and noncommercial—feeding sites that exist primarily to support an organization’s core mission. Each category breaks down further into specific segments.

Commercial food service is mainly comprised of restaurants, or what the USDA calls eating and drinking establishments. Restaurants account for nearly three-quarters of food-service sales. They are classified by different criteria, including ownership, service style, and price point.

The three main ownership segments are independent, chains, and multiunit independents.

Chain restaurant companies can be national or regional. Most locations are franchised to local owner-operators who must maintain brand standards, contribute to joint marketing funds, and pay a share of revenue to the parent brand. So, when you are buying your Big Mac, you are actually paying an independent businessperson, not McDonald’s corporate, and this owner-operator provides jobs, taxes, and other benefits to the local economy.

Even if parent brands franchise most of their stores, they also maintain a limited number of so-called company stores in order to test new menus, equipment, and services. The parent companies also may own the real estate that the franchises sit on, giving the parent company an additional revenue stream and leverage. The corporate mindset of the parent company and the entrepreneurial spirit of the local owner-operators do not make for natural chemistry, and there is always some degree of friction.

In the best cases, that friction is harnessed in a true partnership to produce innovation and new menu items using input from those closest to the customer at the store level.

McDonald’s, of course, is a prime example of the fast-food service style. The technical industry classifications by service are quick-service restaurants and full-service restaurants. Quick-service restaurants generally achieve their speed of service through limited menus, minimal on-site preparation of items, and

batch-cooking menu items just ahead of time to meet anticipated demand. They are also characterized by no waitstaff, disposable packaging, and a lack of alcohol.

A recent subset of quick-service restaurants is a segment called fast-casual. These are restaurants like Chipotle that feature more chef-driven, customizable menus at a slightly higher price point. They may serve alcohol and, in some cases, use ceramic dishware. There is no waitstaff per se, but you may have a runner bring your food to your table after you've ordered. You can probably detect a change in culture and vibe in a fast-casual restaurant as well. The large quick-service companies refer to their restaurants as stores or units, but there's some variation.

The most common way of recognizing a quick-service restaurant versus a full-service restaurant is where and when you pay. In quick-service restaurants, including fast-casual, you pay at a point of sale like a register or app before you get your meal.

Full-service restaurants are divided mainly by price point. Fine dining, or white tablecloth in industry jargon, is at the high end and often includes signature restaurants inside upscale hotels. Many years ago, they were the mainstay of the industry, primarily used for a relaxing night out, for business or travel, or to celebrate special occasions. Even now, Mother's Day is the busiest day of the year for many of these places. They tend to be destination locations, meaning that you need to make a special effort to go there, and you usually spend more time and money there per occasion.

Over time, however, dining occasions began to include entertainment, often with family in tow. Casual restaurants such as cafés, diners, and pubs have long existed, but the introduction of an entertainment factor gave rise to casual theme restaurants—sports bars and tiki lounges, for example. These restaurants tend to cluster near malls and other high-traffic areas.

The more meals prepared at home are replaced with meals prepared away from home, the more the convenience factor becomes a primary driver of dining patterns. In addition to location, speed of service and everyday affordability are the main hallmarks of these restaurants.

Fast-food brands are the obvious players in this space, especially as they evolved from dine-in to drive-through and then to in-line kiosks at airports, office buildings, cafeterias, and convenience stores. But hybrid concepts now include what the industry calls food service at retail—supermarkets, convenience stores, and gourmet markets that offer prepared foods either for immediate consumption (ready to eat) or take-home (ready to heat).

### NONCOMMERCIAL FOOD SERVICE

The noncommercial food-service category represents about \$200 billion in sales per year and breaks down into education, health care, business and industry, parks and recreation, cruise lines, and sports and entertainment. Education is usually separated into K–12 and colleges and universities; health care is separated into hospitals, senior living, and assisted living.

This type of food service exists mainly to support the core mission of the host location. Food is a critical component of healing in hospitals and helps students learn at colleges and universities. This kind of food service entails feeding the doctors, nurses, teachers, administrators, and support staff who are also part of the mission.

Food service is also a prime competitive factor for students and parents deciding where to spend their tuition dollars and for attracting faculty. Likewise, in business and industry, food service is an important perk for hard-to-recruit-and-retain employees.

Despite the *noncommercial* label, some companies are very interested in making as much profit as possible. These are the contract feeders who, for a fee, will handle some or all of an organization's food-service needs. That includes hiring staff, developing the menu, purchasing, and handling operations. Colleges and universities, for example, are about evenly split between contractors and self-operated. Business and industry runs higher as a contracted service.

In both cases, you'll see branded concepts meant to compete with outside restaurant brands. This is a tactic called keeping people on campus in order to enhance productivity. The \$200 billion total revenue number that was mentioned is likely to be a bit deflated compared to commercial food service because prices in noncommercial sites are often kept lower for this reason—but as food quality increases, prices change as well.

There's an old belief in food service that trends start in fine dining and trickle down to the rest. Nowadays that could not be more wrong. For example, noncommercial operators embraced the principles of healthy eating well before restaurants did. They are now leading the industry in sustainability, waste prevention, and animal welfare. They disrupted service styles with scatter systems, or multiple stations, that are the standard now in hotel catering as well as curated food bars like at Chipotle.

## VOLUME FOOD BUSINESSES

One of the main differences between commercial and noncommercial food service is volume.

Restaurants usually serve hundreds of meals in a single location once or twice a day. Large hotels with conference centers serve thousands of meals across multiple locations and room service three times a day, with some snacks between meals. Penn State University serves 20,000 meals per day at 51 locations across the state.

For volume operators, the place for cooking and serving must be properly outfitted to support the production of the food, with an efficient traffic flow and proper storage of ingredients, work in process, finished dishes, and leftovers. This, along with the labor and talent the operation can afford, determines the viability of the production goals.

A volume food business will need to hire a massive number of cooks and get them to deliver what is deemed as good food using specific and measurable criteria. This requires extensive training and standard operating procedures, ranging from obsessively monitoring time and temperature to prep techniques and equipment developed for volume cookery to the recipes themselves. Even small errors can be magnified at this scale, at best affecting the quality of the food and at worst affecting food safety and creating work hazards for guests and staff.

**The food supply often figures out how to satisfy demand based on cost, leaving quality out of the equation.**



But *good* is still a subjective term. The concept of deliciousness includes factors that are static and factors that are ever-changing based on audience.

Volume food service must begin the process of defining their customers' likes and needs before ever embarking on training staff. Given the number of customers, it will be a highly diverse population. It's even more important, then, to document and define what those wants and needs are so they can be met.

Once those benchmarks are established, teams can be taught how to reach their goals and deliver delicious food to customers.

Hiring and training staff is just one of the complexities connected to the process of getting food to the table. Talent, skill, and the associated labor are the most expensive aspects of bringing food to the customer in a food-service setting. They are worth understanding so that you can form an opinion around how those things affect your experience in dining or in your business.

## PROCESSED AND CONVENIENCE FOODS

To offset the high cost of labor and to ensure that what's defined as good is reached consistently, most volume food service must rely on processed foods. This is a key aspect to understanding the world of food service.

A good example is the artichoke, an item enjoyed by many and understood by few. In a commercial setting, an artichoke must either be cooked by someone with real culinary know-how or produced by a machine. In noncommercial settings, it's too expensive to have a high-end chef prepare these gems, only to have them end up on a salad bar, which requires a large quantity of artichokes. So volume food service relies on processed artichokes.



Talent, training, and skill of the staff are all variables, so in order to provide a never-ending supply of good food to keep businesses moving, operators also need to look at the idea of convenience foods. Suppliers like to call them value-added products. These are several steps more processed than canned artichokes and may include frozen soups, for example, if an operation doesn't have the talent or equipment to make its own stocks or bases.

Part of the art of using value-added products is looking at them as ingredients in their own right. For example, broccoli trim—the leftover bits of stem you get when you trim the broccoli stalk—can be steamed, pureed, and added to a frozen cheddar soup to make a signature item like broccoli cheddar soup while also decreasing food waste. These foods are important tools because they extend the options for operators to meet customers' tastes and needs within the constraints of their budgets, teams, and facilities.

Given that processed and value-added products play such a critical role in defining *good*, this is an area that many operators can improve on. These products are ingredients in their own right. People have standards for the hamburger, potatoes, and lettuce they buy—and will reject them if those standards are not met. People need to develop similar mindsets when they use processed and value-added products as well.

The food supply system generally drives the customer experience, but it needs to be the other way around. Consumers should always be on the lookout for the products they are being fed and understand what they are and how they get to the table. There will always be some level of processed food in the world—that's one reason your food is affordable. But you should avoid the temptation to let costs get in the way of deliciousness.



# Think like a Chef about Food Choices

# 5

**S**erving food to people that they want, need, expect, and even crave day after day has always depended on a myriad of factors, but it's only recently that the profession has been recognized for the wide skill set it requires. Culinary schools and colleges have had a lot to do with the elevation of chef to true career status, as have professional development, associations, and certification programs.

## CHEFS AND THE FOOD SUPPLY CHAIN

How does a chef interact with and manage the many parts of the food supply chain? And how do chefs make food seem to magically appear on a plate or in a buffet line? Frankly, it all starts with you—the consumer.

If the food isn't what you want, you won't buy it. If it doesn't taste good, you won't come back. If the service is bad, you'll tell people. Each of these scenarios affects chefs' ability to make a living or stay in business in a stark dollars-and-cents way.

Then there's the ethical side. You trust chefs to serve a safe and wholesome product. You assume they treat their staff fairly. You want them to be respectful of the environment. For many, there's also an emotional component. Connecting with an audience the way any live performer does is a motivation for a chef as well.

## THE LOGISTICS OF MAKING GOOD FOOD EVERY DAY

The logistics of making delicious food every day—food that chefs would make for their mom or dad and be proud of—certainly involves creativity but also extensive systems and processes.

Since no one can cook dozens of different dishes for hundreds of people all at once, most tasks are assigned to other people—line cooks and prep cooks, for example, who must understand their roles and execute consistently to certain specifications like recipes, plating instructions, and proper temperature. The larger the operation, the more people and processes the chef is responsible for. Those who spend most of their time managing these processes are called executive chefs.

The average executive chef in a medium-sized hotel or conference center has 40 to 60 cooks feeding a few thousand meals per

**Programs like the Culinary Institute of America's ProChef Certification have been critical in codifying the knowledge areas culinarians of every level and career path must develop.**



day from various locations throughout the operation at different times. When chefs arrive each day at their kitchen, a certain busy buzz is the sign of a large, well-coordinated team at work, following well-codified procedures that are conducted in the same way every day.

Repetition and discipline are the keys to consistency, but they can also make the life of an average cook somewhat mundane. Not all the people on a given team are food enthusiasts, either; some are there simply because they have to punch a clock somewhere to make a living.

This can easily result in a type of complacency that can be called the widget syndrome. To you, a tuna salad sandwich is a singular, precious meal. To a cook in a hotel, it may be one of 200 they'll be making on their shift, following the 200 they made yesterday. It's easy for them to start thinking of those sandwiches as widgets instead of as your midday sustenance or a pleasant diversion, perhaps, from the stress of a business trip.

You've probably had one of these before, never knowing you were eating a widget. The chef's job is to make sure you get the tuna salad sandwich of your dreams. If chefs settle for serving widgets instead of beautifully crafted, individual dishes that they just happen to make hundreds of times, you won't be back.

How do chefs know if you're actually dreaming about tuna salad sandwiches in the first place? This is the process called menu engineering—or the way that chefs construct a set of offerings that fit the needs and desires of their guests. They start with data on which existing items sell and which don't.

From that, they can usually extrapolate what percentage of their guests prefer chicken over seafood, spicy food versus plain, and grilled versus fried—and even how many guests will order dessert or coffee.

They also know that preferences change with the weather, the seasons, and the type of events happening nearby that will draw in a crowd.

Each item you read on a menu represents the intersection of many considerations, such as who is eating the food, what they like to eat, how many customers there are, and, of course, whether they can make money on it.

The menu must be able to be executed within a certain physical space that can accommodate a certain number of staff using a certain set of existing equipment. It must address concerns such as how much room there is to store food and for how long. Chefs will also want to spread the cooking load between grills, ovens, fryers, and ranges so that no station gets backed up once the ordering begins.

An average menu for a lunch restaurant might have 25 items. Each of these items will have a base recipe (for the finished dish itself), a build sheet (a list of ingredients, including items already prepared ahead), and about 3 to 4 sub-recipes (such as sauces and salad dressings that will be used in the build sheet). That's about 125 pieces of information. Each of those items will have 4 to 8 ingredients—say 4 on average since some ingredients are used in multiple recipes. All in, that's roughly 500 small parts making up the whole. That's a lot of products to procure, quality-control, store, and handle on a regular basis.

**To use a theater metaphor, the chef is sometimes the performer—but more often the director or producer. It's a combination of right- and left-brain thinking.**

And they all have their own individual shelf lives, meaning the window in which you can use each of them before they go bad. Chefs constantly have dozens of clocks ticking in their heads.

With more than a million restaurants in the US alone, there simply is not enough labor or talent to staff all the kitchens. Most of them depend in varying degrees on what are referred to as ready-to-use or value-added products that arrive at the back door either fully prepared or peeled, sliced, and diced. They are like a head start for many operators.

In many ways, the scratch-versus-prepared decision is based on similar concerns you have at home when feeding your family—just at a much larger scale. How much time do you have? What kind of cook are you? What foods are accessible? When buying value-added products for home—which even chefs do—you’ll also factor in the ingredients, dietary label, type and level of processing, and things like flavor, taste, and texture.

## THE IDEA STAGE

The idea process is where the chef gets to create something by calling in all the resources that live in their brains—where they synthesize their collective experiences, travels, sensory memories, palates, and skill sets into concepts that start making their way down the path to becoming menu items.

Frankly, many items won’t make it, but chefs can’t stop inventing—it’s the way they’re wired. Every chef will have their own method, but the focus must be keenly directed on what customers will want and buy. This may seem obvious, but the restaurant business is littered with victims of the golden palate syndrome—chefs who have a “cook it and they will come” mentality, only to be sorely disappointed when they don’t. Loyalty is very temporary in the food industry, and there are plenty of opportunities for a customer to fall in love with the next new restaurant or simply find another place to get a sandwich.

But before even getting to that sandwich, the overall menu must have a persona. As a document, everything from its look and feel to how it reads will say something about the restaurant’s brand. The promises that this document makes indicate both the restaurant’s values and the experience you can expect when you dine there. There will be sensory promises like *crispy*, *sizzling*, and *spicy*; there will be hot-button descriptors like *sustainable*, *local*, *nutritious*, *fresh*, or *artisanal*.

TRADITIONAL	Ole Town Bistro	RESTAURANT
<b>Appetizers</b>	<b>Open-Faced Sandwiches</b>	
<b>Schmears and Our Grilled Breads</b> our signature chopped chicken and duck livers	<b>Jambon Blanc</b> with brie and whole grain mustard on rye	
<b>French Onion Soup</b> with gruyere, nduja toast, sherried beef broth	<b>Shrimp Louie</b> with avocado and boiled egg on pumpernickel	
<b>Charcuterie Selection</b> spicy salami, prosciutto, jamon serrano and pickles	<b>Chicken Breast Salad</b> with pimento cheese on sprouted wheat bread	
<b>Cheese Selection</b> triple cream, semi soft, hard and blue, honey, burnt almonds and toast	<b>Smoked Salmon</b> with caviar, cucumber, red onion pickles and caper, cream cheese on pumpernickel	
<b>Caviar</b>	<b>Jamon Serrano</b> with manchego, arugula and lemon salad on pimenton bread	
Imperial Kaluga	<b>Roasted Sirloin</b> with dill pickles, horseradish mustard and gruyere on pumpernickel	
<b>Egg Dishes</b>	<b>Grilled Cauliflower and Portobello</b> with red peppers, tapenade and lemon mayo on sprouted wheat	
<b>Quiche Lorraine</b> bacon, onion, gruyere	<b>Traditional Sandwiches</b>	
<b>Quiche Aux Champignon</b> with truffles, gouda, crimini and porcini	<b>Tuna Club</b> tuna, avocado, aioli, tomato and onion on wheat	
<b>Omlette</b> with truffles, asparagus and gouda	<b>Croque Monsieur</b> ham and gruyere	
<b>Shirred Eggs</b> with cauliflower cassoulet	<b>Croque Madame</b> ham, gruyere, egg	
<b>Salads</b>	<b>Norwegian</b> smoked salmon and capers	
<b>Roasted Chicken</b> with bacon lardons, boiled egg, radishes and parmesan with caesar dressing	<b>Entrées</b>	
<b>Classic Tuna</b> with green beans, potatoes, olives, tomato and boiled egg on butter lettuce with parsley vinaigrette	<b>Locally Sourced Burger</b> ground chuck and cold garnishes, brioche bun	
<b>Beluga Lentils and Farro</b> with roast vegetable, pickled beets, steamed asparagus, artichokes, aged goat cheese and parsley vinaigrette	<b>Crispy Chicken Paillard</b> with lemon and capers	
<b>Grilled Salmon Paillard</b> with portobello, white beans, olives, artichoke and boiled egg on butter lettuce with tomato vinaigrette	<b>Sizzling Grilled Salmon</b> with artichokes and coriander vinaigrette	
<b>Poached Shrimp</b> with palm hearts, avocado, cucumber and grilled asparagus on lacinato kale with coriander vinaigrette	<b>Sustainably Sourced Moules</b> steamed hot, with tomato, shallots and bacon	
	<b>Charbroiled Flat Iron or New York Strip</b> with bearnaise butter	

Once that's established, the creative process can be broken down by category. Each menu item in each section is in direct competition with the others to see which one pleases the customer the most.

It's very rare that a great dish is thought up completely out of thin air. Chefs are constantly building their databases—and, like taste memories, the dishes of those chefs they admired when they were coming up are some of the most inspiring. Each stands on the shoulders of those who came before them.

Chefs have to test all the menu items and document all the details until they can be confident handing it off to someone else to prepare on the line.

Each part of every menu item's description requires a procedure and recipe, and then someone must be trained to execute that process—actually, more than one person since no one works every day and the sandwich needs to be made when the customer wants to eat it. Probably every day some prep is done, and then the sandwich is assembled. No cook will walk in the door already understanding how to make the sandwich. There is no giant playbook that prepares a chef for the experiences they will encounter in a professional kitchen.

## **BUILDING A CULTURE AND A BUSINESS**

How do chefs avoid letting their newest menu item become a widget?

It begins with building a culture that directly applies to what the chefs are trying to accomplish—whether feeding doctors, nurses, patients, and staff at a hospital; soldiers in a dining facility; affluent Manhattan theatergoers on 7th Avenue; or office workers who need to get lunch in a hurry. No matter the audience, setting, or genre of food service, they must have a culture that is clearly derived from their daily mission.

Then, they have to ensure that they live it. Every food-service operation is a home, and its team is the heart of that home.

Next, they have to design the workflow and teach the team to follow it in a disciplined, consistent way. This workflow must ensure both the deliciousness of the food and the more pragmatic aspects of the operation—maintaining costs, working in a safe and timely fashion, limiting food waste, keeping everything clean, and communicating efficiently.

Each kitchen is divided into sections in some way. Many follow the traditional European brigade system, which separates food by type and preparation—such as cold foods, soups, or vegetables—or per the equipment used—grill, fry, roast, sauté, etc. These days, as chefs move further from the traditional roots of professional kitchens and diversify menus, there are other ways of arranging the workflow; there may be a wok, wood-fired oven, or pasta station, for example, that needs to be incorporated.

Nevertheless, the premise is that each team will be responsible for various actions and processes in the task of bringing the food from its raw state or purchased form to that required by the menu. This will require a system that trains each team member, from dishwasher to cook, to do a job that supports the overall process.

The last step in this process is all about that plate getting finished and sending it out to the customer. The timelines, the orchestration, the way it gets to the customer, and the presentation all prove that the process is working or not. It's the moment of truth, and whether it occurs hundreds or thousands of times a day, each one is individual.

This is the point when a cook becomes part of the intimate relationship between a guest and their meal. It is an amazing invisible bond between cook and customer—something that the diner can't directly see. In a flash, your food is made, plated, and brought to you. In that instant, you've placed your trust in that cook—and the chef who leads the team—to present you with delicious, safe, and wholesome food that is worth every penny you paid or more.

This moment, this trust, is sacred—always respected and never violated. This is the chef's responsibility, charge, and pleasure.



# Why Your Food Costs What It Costs

# 6

**T**he family farm is one of the most important institutions of American heritage. Most people have no idea how much the American farmer and rancher do for them every day, hours before many get out of bed. But today, there's a common perception that greedy landowners, intent on achieving wealth through real estate development and industrial farming, are using their economic clout to push small farmers off their lands. The truth is a bit more complicated.



## FARMING FACTS

Today, 98% of all farms are family owned, and they account for 86% of the food grown in the US. That production is evenly split between large farms and small ones.

The family farm is alive and well, but as society has moved from an agrarian to an industrial one and now to an increasingly service-based economy, there are far fewer families farming.

And it's true that some farmers are reluctantly selling land as real estate values wildly outstrip crop income and younger generations become discouraged by their future prospects as farmers.

In 1776, about 90% of the American population lived on family farms. In 1900, that number went down to about 40%. By 1950, it had shrunk to about 15%. Currently, only about 2% of the population lives on family farms.

Certainly the increase in overall population has affected that decrease in percentage, but so have the dynamics of a farming system that has scaled up its production to be the most powerful producer on the globe.

As the number of farms—and farmers—has decreased, the size and output of each has dramatically increased. It's a study in efficiency, fueled by innovations in crop and soil science, water management, animal husbandry, farm equipment, and technique.

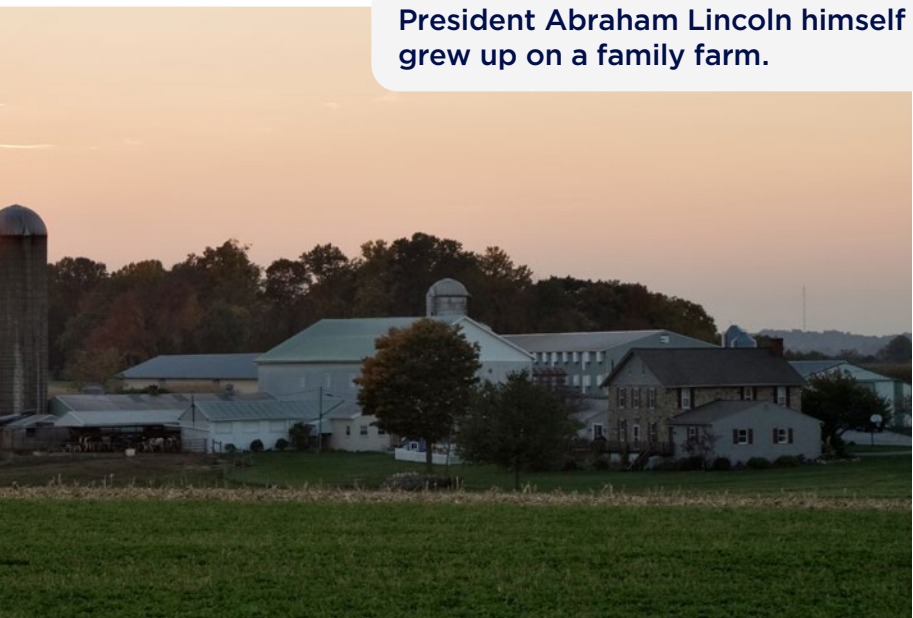
This relatively small community of farmers and ranchers—made up of approximately 6.4 million people—produces almost all the food Americans need and even more to export around the globe, driving farm production levels to staggering levels.

It's an amazing feat—one that the farming and ranching communities can be proud of. How did it happen?

## ABRAHAM LINCOLN'S AGRICULTURAL PLAN

Even while embroiled in the Civil War, Abraham Lincoln had a vision for the country that reached beyond keeping it united and eliminating slavery. Justin Morrill, a senator from Vermont, shared Lincoln's vision. He authored a bill to set aside federal lands that would be used to build colleges that would “benefit the agricultural and mechanical arts.” Lincoln signed the bill into law in 1862.

**President Abraham Lincoln himself grew up on a family farm.**



The land grant institutions created by the bill became engines of education and research in both of those fields and provided opportunities to students who might not have otherwise been able to afford higher education. There are now 112 land grant colleges, including 33 tribal and 19 historically Black institutions spread across every state in the country.

The bill also kicked off one of the greatest periods of economic development in US history, along with profound social changes. At the time Lincoln signed it, nearly half the population lived on farms, and agriculture was predominantly for feeding one's own family rather than for business.

The Morrill Act provided the tools necessary for people to make a living income from farming as a business. Through the engineering education it provided, it also created the opportunity for children of farmers to move into the cities to take better-paying industrial jobs. Both had deep and lasting impacts on agriculture. Farmer flight really began when farmers started to have other options that offered a better lifestyle for many. After all, farming is a difficult way to make a living.

The remaining farmers needed to become more and more productive even as their labor pool continued to shrink. The land grant institutions stepped up by adding grants and extension services to broaden the reach and multiply the impact of their education and research.

The two primary drivers of Lincoln's agricultural plan were economics and health.

## THE ECONOMIC SYSTEM

The farmer gets a portion of the \$1.7 trillion dollars that people in the US spend on food yearly. That's divided roughly equally between food service and retail spending. Regardless, the same amount trickles down to pay the farmer for their animal feed, labor, livestock, soil treatments, and seed—not to mention equipment, maintenance, fuel, electricity, real estate, taxes, loan interest, etc.

Shockingly, the farmer only gets 14 cents of every food dollar, and that share continues to decrease. Just 20 years ago, the farmer's take was 16.5 cents per dollar. Think of this the next time you are craving that perfect steak, sweet ear of corn, or juicy strawberries.

As a whole, farmers are not doing terribly. The median income of owner-operator farms consistently trends a bit higher than the median income of all US households—but lower than owner-operators of businesses in general. Most family farms are residential, meaning the owners live on their farms, but they often include members who earn income outside the farming business to boost or stabilize income when crop yield or market prices are lower.

What happens along the economic chain that connects farmers with you?

Most economies have long rewarded the practice of adding value more than the act of producing raw materials, and the US economy is no different. Well before Abraham Lincoln, the American Revolution was spurred on, in part, by the British practice of shipping rich American raw materials back to England, processing them, and then selling them back to Americans at exorbitant prices.

In some cases, colonial raw materials were even marked off-limits to the colonists so that the British could harvest and process them directly. The Pine Tree Riot of 1772 was an act of resistance against the British claim to the straight and sturdy white pines of New Hampshire for their own use in naval and commercial shipbuilding.

The USDA calls this commodity flow, starting with the value of food products farmed, fished, or imported and adding profit margins for each successive stage: processing, packaging, transporting, wholesaling and retailing, and food service. Together, these additional stages make up the other 86 cents of every food dollar.

Processing represents about 15 cents of the value add of each product, and packaging makes up another 2 cents. Transportation is about 3.5 cents.

Every one of these value adders has to hire workers, pay taxes and light bills, and support corporate overhead like finance, real estate, and marketing. The aggregate labor cost throughout the food supply chain is about 52 cents, while the others add up to another 10 cents. Miscellaneous costs and profit round out the rest.

Processing can be divided into primary processing and further processing. In both cases, meat is the largest category. Dairy, beverages, grains and oilseeds, and fruits and vegetables complete the list of primary commodities. Beverages

are the second largest in the further processed category, followed by baked goods, tortillas, and dairy products. About 1.7 million employees work in food processing, representing about 15% of all manufacturing jobs.

The trucks on the road, the combines in the field, and the bartender with their bottles on the shelf are tangible, easy-to-see costs in the supply chain. Less apparent are the seeds the farmer buys; memberships in professional organizations; insurance; and loss due to waste, spoilage, or compliance with strict, out-of-date codes.

Even harder to spot or quantify is the degree to which fickle and changing consumers add to research and development. While the land grant system, government programs, and nonprofits contribute both funding and knowledge, each commercial enterprise in the hypercompetitive, slow-growing industry that is food must subsidize its own continual innovation to stay relevant.

Eighty-six percent of food manufacturers report feeling pressure to do so. As the pace of change escalates, so do the activity and investment. The result is that food companies report that they spend an estimated \$21 billion, or about 2% of their revenue, on research and development efforts.

This investment is fourfold and includes the cost of the innovation activity; the cost to retool logistics, including supply chain, production lines, and staff training; the cost to advertise and promote their products; and the cost of failed products.

**The price you pay for your beloved red ketchup also had to cover the manufacturer's blue ketchup experiment in 2011.**



Each year, more than 20,000 new food consumer product goods are launched. That's just shy of half of all new product introductions. The top three categories—accounting for nearly half of all new product introductions—are beverages, snacks, and sauces and seasonings.

The most popular aims of new product labels are kosher, no- or reduced-allergen, gluten-free, no-preservative, and GMO-free. Environmental and ethical claims follow closely behind.

QR codes and the websites they direct customers to create another new cost in the marketing mix.

But these kinds of changes don't come close to comparing to the cost of a dud. It takes about 2 years to develop a new food product and 70% to 80% of them will fail.

## THE QUEST FOR MAXIMUM EFFICIENCY

The economic system is far more than a simple accounting of where each dollar goes, however. The quest to achieve maximum efficiency helps keep food affordable while maintaining profitability for all the value adders in the chain.

Operating at scale is a key driver of efficiency. This applies to both the farm and processor levels, where recent activity in mergers and acquisitions shows a significant trend toward consolidation. Consumer interest groups and government policy makers, in fact, are carefully monitoring the balance between efficiency and market control.

While consumers don't have to read *The Wall Street Journal* first thing every morning, they certainly need to be aware that consolidation can enhance efficiency but also reduce competition. The same competition that keeps a never-ending stream of products coming can also keep prices in line.

When you imagine a chain of buying and selling, it's logical to think of each transaction happening one after the other in a linear process. A shrimp farmer in Southeast Asia, for example, might raise his shrimp, then sell it at market price to a packer, who then contracts with a shipping company to transport a certain number of containers across the ocean to the Port of Los Angeles, where a buyer takes possession and distributes it.



In reality, that farmer may be growing their shrimp under contract at a price that was agreed to six months before the baby shrimp were a gleam in anyone's eye. This could be the packer or a high-volume end customer like Red Lobster. The container of shrimp may also be bought and sold several times while it is on the ocean without the new owner ever taking possession of it. But the laws of supply and demand can change during the voyage, and if mere pennies per pound can be made, the wheels of commerce will continue to turn. Unfortunately, the shrimp farmer does not see a dime of this.

Still, contract pricing is a good deal for the farmer, the buyer, and the consumer because it tends to dampen wild price swings driven by market conditions. This enhances efficiency because it allows for better forecasting and planning.

Even a reasonably stable commodity like farmed shrimp has supply, and therefore economic, challenges. The Indonesian tsunami of 2004 devastated the entire crop of shrimp, hatcheries, and facilities. Forward planning and contingencies for Mother Nature are other invisible but very real costs of business for producers.

Commodity flow is a study in the science of efficiency. The logistics of transportation alone—planning train, plane, and truck routes and calculating turnaround times to unload the transport and ready it for the next load—are complicated, even before figuring out how to make sure trucks are as full on the return trip as they are on the outbound portion.

Plenty of vast food warehouses sit empty. But those warehouses fill up and empty with surprising speed. With perishables, it can happen in 24 hours or less.

Any time that a product spends on a floor or shelf or in refrigeration is time that the product is not earning money. In fact, it's costing you money—especially when refrigerators and freezers are involved. At almost every stop in the value-adding chain, inventory turnover is a critical management metric that can get people hired or fired.

A recent practice in efficiency is called just-in-time inventory. It sounds pretty simple: Just as you are about to run out of something, it magically appears on your loading dock. That way, you don't need to front the money or pay to store more than you need for very long. But in truth, it is incredibly complicated.

The essence of your business is to sell things. If you don't have them, you can't sell them. In the business-to-business world that makes up most of the supply chain, the consequence of running out of something can be dire when others are depending on your products to run their own businesses. They will likely look to find another vendor. It's not the same as someone being disappointed because the supermarket ran out of bananas.

These same business-to-business companies also have to concern themselves with balancing buying and selling so that the products are coming in the back door at the same rate that they're going out the front. Mistakes on either side can lead to warehouses that are too full or too empty. Not only do companies need to use increasingly sophisticated data and technology to forecast the amount of product to move through the facility, but they must also consider price trends so they can time purchasing accordingly.

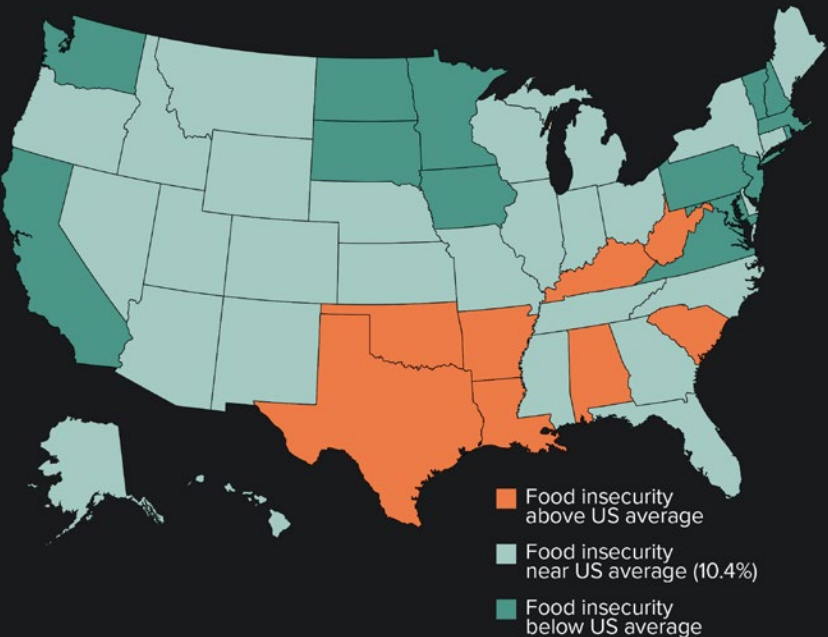
The just-in-time practice saves money for consumers most of the time. In some ways, it's also a house of cards that can easily be brought down by weather, natural disasters, trucking strikes, blocked canals, or pandemics. Nearly everyone in the supply chain has adopted the practice, including the network of companies that supply the suppliers. But companies operate with different cushions to avoid disruption. And all it takes is one teetering domino to make the others fall.

## FOOD INSECURITY AND FIXING THE SYSTEM

Rarely do supply chain disruptions affect everyone equally. The populations that are hardest hit are usually the ones least able to weather price spikes or lack of availability. Food insecurity is, according to *The New York Times*, “a problem revealed to have been hiding in plain sight by the pandemic,” referring to COVID-19.

Degrees of food insecurity range from the threat of deprivation to severely disrupted eating and reduced intake. Black and Hispanic families are twice as likely to be food insecure as white families.

### Food Insecurity 2019–2021



The reasons are many and complex. It is a function of accessibility as well as income—59% of households experiencing food insecurity live above the poverty line. These populations have less disposable income to spend on rising food prices and are often single-parent households with less time, income, and access to transportation to use in the search for food, which is often not easily accessible.

Whether in very rural or urban areas, full-service grocery stores are often farther away from where people live, especially in predominantly minority neighborhoods. These areas where food is less available—or unavailable—within walking distance are called food deserts.

Food deserts have fewer full-service restaurants and grocery stores. Instead, their most convenient shopping options include convenience stores, bodegas, and fast-food restaurants, with higher prices and less nutritious food than supermarkets.

Food insecurity is experienced by 10.5% of American households—about 38 million people. But that number increases to 14.8% of households with children and 15.3% with children under age 6. Nearly 28% of households led by single women experience food insecurity.

Food insecurity is a precursor to hunger, but by the time those affected experience hunger, they have often already experienced psychological damage. This is a very real by-product of the economics of the US food supply chain.

How can this happen in the land that Lincoln imagined?

The farmers have lived up to their part, in some cases producing more food than they could actually sell. During the COVID-19 pandemic, images of record food assistance lines appeared alongside pictures of farmers dumping milk and other crops. This was at a time when food insecurity in households with children spiked to 28%.

Even in non-pandemic times, rural households account for 17% of the food insecure. It's ironic that corn or wheat harvested in your zip code, maybe even down the road, has to travel through a vast supply chain before it ends up on the shelves of a supermarket that is too far away for you to conveniently drive to.

In supply chain–disrupting crises such as recessions, natural disasters, and pandemics, emergency food programs typically kick in. Some are very creative, such as using closed restaurants to provide meals. Ongoing government research and funding can pinpoint areas of need and address them via the National School Lunch Program and the Supplemental Nutrition Assistance Program (SNAP). But these programs only treat the symptoms, not the flaws in the system.

Since all food production begins in a specific local environment, perhaps fixing the system can best be addressed at the local level. In rural and near-rural areas, farmers' markets, food co-ops, and community-supported agriculture have proven to be effective at closing the supply chain gap—and so have farm-to-school initiatives that link growers to children through programs that combine both food and education. Many of these initiatives are also happening in urban areas, spurred by urban farmers using rooftops, aquaponics, and even highly efficient indoor, computerized farming. Even without high tech, smaller farms that don't need as much land are inching closer to downtown areas across the country.

Critical to this is education—not just teaching schoolchildren what makes food delicious and nutritious, but also enabling households to grow, prepare, and preserve some of their own food at home or via community gardens. Also springing up are programs that combine funding, education, and mentorship to help entrepreneurs tap into the supply chain at its root.



# 7

## The Hidden Food Expenses We All Pay For

The American diet kills more Americans than smoking, car crashes, drug overdoses, or violent crime. In fact, according to the *Journal of the American Medical Association*, poor diets are the leading cause of mortality in the US. The American diet is also a primary factor in rising health-care costs. According to the Milken Institute, the total cost of obesity each year is more than \$1.7 trillion—just less than 10% of the gross domestic product. And these costs will keep rising.

## THE REAL COST OF FOOD

You might think of the cost of your food as the total of what you pay the grocery store, restaurant, or other food outlet. But the cost of food is also the total of what these outlets pay their suppliers; what their suppliers pay their manufacturers, processors, packers, truckers, farmers, etc.; plus a little profit for everyone who adds value along the way. Ironically, that number is also a little more than \$1.7 trillion.

So, if you add this cost to the diet-related cost of health care, you could say that the true cost of your food is double its direct cost.

Unfortunately, you'd be wrong.

The Rockefeller Foundation released a study measuring both the direct and indirect costs of food. According to the foundation, the direct cost is “the cost of producing, processing, retailing, and wholesaling the food we buy and eat.” Indirect is “the cost of healthcare for the millions who fall ill with diet-related diseases, ... the present and future costs of the food system’s contributions to water and air pollution, reduced biodiversity, or greenhouse gas emissions, which cause climate change.”

So, health-care spending is only the beginning. The food system also comes with significant environmental, societal, and other economic costs. These can be measured and do not even include qualitative costs such as animal welfare.

This study found that the sum of those costs—or the true cost of your food—is actually triple what you might think it is. The system is simply getting too expensive to sustain without meaningful change.

How did this situation come to be?

**More Americans die from having too much to eat than having too little.**

## THE MODERN FOOD SUPPLY CHAIN

The US first began shifting from an agrarian economy based on small, local farms and households to an industrialized one during the rebuilding process following the Civil War.

As mentioned previously, the land grant system of universities established by the Morrill Act of 1862 under Abraham Lincoln pointed the full force of higher education and agricultural research at this transition. That vision included fostering both economic and health benefits of a brand-new food system.

The birth of the modern food supply chain—a true model of efficiency, among other things—was spurred by the consumer economy following World War II. Like many industries in the US's capitalist system, the food supply chain created wealth and prosperity by keeping costs to a minimum and enhancing profits.

But Lincoln's vision had two parts: economic growth and the nourishment of American citizens. In retrospect, if more attention had been paid to the way food was being produced, sold, and distributed to everyone who needed it, the system would have been much more adept at feeding people well—nutritional prosperity to go along with financial prosperity.

All too often, the business of doing business and the focus on maximizing profit weakens a developing system by overlooking reinvestment and longer-term impacts. Like a drug that makes you feel great now while ignoring tomorrow morning, achieving profit success can obscure side effects that cause the system to break down over time. These side effects—such as making food that's crave-able but unhealthy or believing that natural resources are limitless—make the system unsustainable.

This fact is easily hidden when people create businesses that are valued mainly on sheer profit and sold before certain long-term implications are known. The original practitioners may or may not have known the harm of taking shortcuts. Either way, they are gone. Conversely, as anyone looks to create any new business, it behooves them to look far down the road and imagine how they can create a business that's sustainable and, thus, truly successful.

A century and a half after Morrill, the Rockefeller Foundation's report demonstrates the flaws of tying sustenance to a system driven by pure profit. The US food supply system was not built with malice in mind, nor was it built by corporate machines that had the intention of destroying the population's health or the environment. The modern food supply system was actually a great improvement—a boon for economic growth—and it has served Americans well by providing what they need to eat every day.

Since Morrill, countless passionate individuals have dedicated their livelihoods to loftier goals, such as quality, innovation, and flavor.

Still, the throttles and brakes on this engine have ultimately always been financial. The problems are hard to see and even harder to repair.

Producers have not always looked beyond profit to consider the other positive and negative impacts of the food they produce, such as how it might best feed children, nourish the most vulnerable populations, or regulate the food system's contributions to water and air pollution, reduced biodiversity, or greenhouse gas emissions.

What was not considered was how many people would eventually end up working this vast system that delivers food to people's tables—some 10% of workers, even more if you count the people who maintain the roads for truckers or smelt the steel for building supermarkets and sandwich shops.

How that food might be moved from the place it's grown to the place where it will be consumed in the face of a now-dire need to lower carbon footprints has not been forecasted.

It has also not been realized that professions critical to the food supply chain may not be attractive to the next generations—be it trucking, cooking, or stocking shelves.

This is the tip of a very large iceberg.



As the US grows and demand for food increases, more and more truck drivers are needed. At the same time, fewer and fewer truck drivers join the profession every year, resulting in a growing labor deficit in a growing industry.

The reasons for this are not entirely clear. Has driving a truck become a less viable job for supporting a family? Could there be a generational aversion to this type of work? Are the physical and mental challenges of truck driving keeping new workers from entering the field? You could—and should—ask the same questions about the entire food labor force.

Food transportation and logistics will by necessity look very different in the future. Will new ways be developed to move products to their destinations faster and more sustainably, or will food produced closer to its destination be a bigger part of the solution? What role will automation and technology play? The answers to these questions are unknown, but it's time to start asking them.

But most of all, how the food produced will best serve people's long-term health and diets—not just for themselves but also for future generations—has not been considered. When you look at the public health issues caused by eating the food most readily supplied by the US food system, it is clear that the cost of poor food and poor dietary habits, and simply overeating, is off-loaded to other areas of the economy. This includes things like rising insurance rates and Medicare and Medicaid's inability to keep pace with their funding.

### THE EFFECTS OF SALTY FOOD

Agencies like the Centers for Disease Control and Prevention and the American Heart Association are making massive efforts to try to find solutions for many problems caused by the consumption of too much salt, sugar, and fat. They're trying to answer questions like these: How did American diets change to include so many elements that aren't good for people? Who pays the cost of these changes?

When it comes to the food supply in health care and senior congregate feeding, there are regulations, guidelines, and well-intentioned practices to protect the ways these populations are fed. However, they are not always successful due to the often-myopic way in which these guidelines are put into action.

For example, consider the simple salad. A great salad can be healthy, plant based, satisfying, and delicious. But there is one place where things go south.

Every salad relies on a tasty dressing to make it palatable for most people. One of the most important factors in senior living and health care is preventing foodborne illness since these populations are highly susceptible to the problems associated with it. So, there's no room for error and every reason to mitigate risk.



Managing risk in the operations that feed these at-risk populations generally must fit into very limited budgets. Today, most health-care systems are woefully understaffed. There's usually a dietitian who understands the connection between feeding and clinical outcomes involved in the process, but the dietitians don't control the food-service budgets.

Often, those budgets are managed by contracted food service, where the most important expenses lie in labor. Since labor must be kept at a low level and the budget doesn't include enough cooks—let alone cooks capable of making foods from scratch—many products used in making the meal must be processed or highly processed.

With little to no scratch preparation and limited refrigeration, most of the foods must be shelf stable. One of the main ingredients in making foods shelf stable is salt.

**Sodium is one of the primary causes of chronic disease in US society.**

So back to that salad. No true low-sodium dressing is shelf stable, so for someone to be able to enjoy that salad, cooks must use a dressing that often has an unhealthy or unnecessary amount of sodium and sometimes a high sugar content.

So, in this case, a potentially healthy item was salted enough to make it less healthy, particularly for this demographic of eaters. This all happened due to the financial constraints built around a business whose job it is to care for the sick and elderly.

But since the aftereffects of salty food are not reflected in the financial statements of the food-service provider, this cost is not even a consideration in their planning. If it were accounted for on the food-service profit and loss statement, the strategies for that business would be much greater, and there would probably be specially trained cooks and chefs to ensure that the foods they served supported health, rather than damaging it.

Public and private health advocates are trying to make headway here, but of course this interrupts the financial models that businesses already have in place and meets with a myriad of stumbling blocks, all having to do with siloed financial systems. These systems ultimately push the cost of health outcomes to a line item on the public books, increasing your taxes and health-care costs.

This complex example emphasizes that the costs related to the food system must be carefully scrutinized to fully understand their effects.

### **TRUE COST ACCOUNTING**

The US food system is so large and complicated that it's difficult to fully understand where the cracks in the foundation may be and how they can be repaired. True cost accounting is the first necessary step toward remaking the incentive structure that drives the food system today.

It is already known that the unhealthy American diet doubles the direct cost of food. The Rockefeller report points to other health considerations as well, some of them just now being studied. Antimicrobial resistance, for example, is thought to cause 35,000 deaths and 2.8 million infections each year in the US—22% of which are related to antibiotics in the food supply.

Another impact is labor: the people who grow the corn, feed the cattle, move the goods, and make the aluminum cans that are used to get food from the field to the shelves.

Getting food from grocery store shelves and restaurants to tables requires another army of people who mop the floors at markets and wash the dishes in restaurants.

Many agricultural workers labor for unsustainable wages to ensure that profits are high enough to satisfy corporate America's needs. According to the Rockefeller study, food workers are vastly undercounted and, in some cases, invisible due to child and illegal labor. This invisible cost accounts for \$100 billion of the true cost of food in the US.

Profitability is neither inherently immoral nor illegal. In fact, profit is nonnegotiable. From a standpoint of overall success, a business must make money, and since money is made with the support of the labor force, it is imperative to note that both employers and employees must create a symbiotic cycle of success to ensure that the business is truly successful with all costs factored in.

The issue is that many of the people who work on ranches and farms and private restaurants are underpaid or insecurely employed—meaning they work with few or no benefits, are paid cash for some or all of their work, or have not gained proper immigration status.

The collective impact of workers with no insurance, no vacation pay, or undervalued jobs is massive. They use public health care only when urgently necessary, which you probably pay for.



As the workers age and become less productive, due to the fact that bodies surrender to age and cannot accomplish physical tasks as quickly, it becomes a financial burden everyone bears—shifting the dollar cost into the public arena, nowhere to be found on the employer’s profit and loss statement, balance sheet, or annual report.

Until the workforce of America is stable, satisfied, and compensated in a way that gives everyone a path to fulfilling their version of the American dream, the US will not be as strong as it possibly could be.

According to MIT, a living wage in 2019 was \$16.54 per hour. This is the bare minimum that one needs to earn for a family of four to survive, assuming the two adults are both working full time. Many American farm workers do not earn this, let alone have two adults in the family able to earn this much. When a family spends 70 to 80 hours per week working and cannot earn enough to live or prosper, this brings hidden costs to the food system that cannot possibly be estimated. Additionally, it is important to note that there are far more workers in the system that are unreported, and therefore this metric is a very rough and incomplete estimate.

There are also societal inequities regarding access to nutritional food, education, and environment. Food insecurity is 2.4 times as prevalent in Black households as in White ones, according to the 2021 Rockefeller study. Diabetes is 1.7 times higher among the Latinx population than the general population. Indigenous Americans are 19 times more likely to have reduced access to clean water and sanitation. And the federal minimum wage has been stuck at \$7.25 per hour—less than half the \$15 per hour that many say is the barest of living wages.

Consumers have yet to grasp that what they are paying for food doesn’t cover its true cost, nor is it equitably shared. Instead, they are spending—exorbitantly and inefficiently—on the consequences.

Likewise, the environmental impact of today’s industrial farming was never foreseen by Lincoln or Morrill. How could they have imagined the scope and scale of 21st-century farming? Those who live by the land, whether for ranching or farming, have generally been cognizant of the health of the earth because their livelihood depends on it. However, people and nature are not

always in agreement on who controls what, and even the best-intentioned practices can have detrimental consequences for the land, air, and water when deployed at massive volume.

Greenhouse gases from food production cost approximately \$300 billion annually. This includes both carbon emissions and refrigeration gases, despite the improvements made with Freon use. Not a penny of that is factored into the cost of an apple or zucchini at the store.

An additional \$60 billion of unaccounted food costs comes from water use and \$67 billion from soil erosion. A staggering \$455 billion comes from what the Rockefeller study calls biodiversity cost, meaning the amount it costs to restore crop and grazing lands to use for other purposes, including reversing the effects from nitrogen pollution. Another \$15 billion represents greenhouse gases from packaging used at nearly every step in the process.

So, what can you as a consumer do about this? You could start with boycotting the plastic clamshell. Simply not buying products packed this way can help.

But even manufacturing more sustainable plastics still contributes to greenhouse gas emissions, and biodegradable packaging is the same as permanent when tossed into a sealed landfill where it will not break down.



The concept of true cost accounting for food is fairly new, and many of the solutions are only beginning to emerge.

Many of the same land grant universities created by the Morrill Act in 1862 are in the chase for answers. In all, there are 112 land grant universities studying extreme weather, climate change, and diminishing resources while training the scientists of tomorrow to ensure nutritional and societal health in the future.

But some things are right in front of you and immediately actionable. Food waste is a big leak. Each year, Americans throw away about 30% of the food that's produced. Each year, tons of wheat are grown but not eaten. Millions of school meals are produced and thrown out as lunchtime ends.

Millions more pounds of produce will go bad on supermarket shelves and in home refrigerators. At hotels, seafood towers displayed in ornate ice bowls must be trashed at the end of the banquet for safety's sake.

When the cost effects on the environment are considered, many of the lines are blurry, but others are startlingly clear. You must look closely to understand where the effects of your actions are most impactful.



# The Global Future of Food



**M**ixed messages about health, sustainability, and food ethics inundate industry research and media stories. Is coffee good or bad for you today? How much carbon was expended processing and transporting all those paper cups and plastic straws? If you use compostable disposables, will they break down in the landfill? (The answer is no.) This tsunami of information comes at a time when the American consumer cares about doing the right thing more than ever. Nearly a third of Americans prefer to eat at restaurants that feature sustainably sourced ingredients. And like the media, investors and product developers have taken note.

## A FOOD SYNDemic

The years 2020 and 2021 brought on information overload as COVID-19 went from epidemic to pandemic to endemic. But the world was already in the middle of a food *syndemic*—a medical term for the adverse interactions between diseases and social conditions.

The global health community defines the syndemic as the convergence of three pandemics: obesity, undernutrition, and climate change. According to *The Lancet*, a leading global health journal:

These three pandemics—obesity, undernutrition, and climate change—represent ... a syndemic, [or] synergy of pandemics that co-occur in time and place, interact with each other, and share common underlying societal drivers.

This means that there are three main ways in which the global food system is failing, and it will only get worse if the system itself and the way it's used isn't changed. As consumers look ahead to the industry that puts food on tables across America and globally, there are many things to consider.

The food supply chain has evolved over time into an amazing system that provides wholesome and affordable food products for the US and many other countries; this is the largest, most productive food economy in history.

With that comes tremendous responsibility on both the supply and demand sides. As its limits are pushed and the system becomes increasingly fragile, consumers and producers must become conscientious, jointly acting as responsible stewards of the future.

*The Lancet* cites the primary cause of obesity as policy inertia—or the lack of geopolitical will in curbing it due to opposing commercial and political forces. In this standoff, obesity and malnutrition are simply allowed to increase without intervention. Beyond the issues of too much and too little food, *The Lancet* also cites undernutrition: a diet of foods that are not calorically valuable—so people are eating things that fill them up, causing them to gain weight, yet do not contribute to their overall nutritional health.

If this inertia is the result of opposing forces, then a systemic perspective must be adopted to identify the issues that cause it and possible solutions. *The Lancet* identified the major systems driving the global syndemic as food and agriculture, transportation, urban design, and land use.

The questions they posed addressed these issues: Why do the systems operate the way they do? Why should they change? Why are they so hard to change? What leverage points are required to overcome policy inertia and address the syndemic?

This list of considerations is long and complicated, which is appropriate given the complexity and scale of the American food supply.

**The current global system is simply incapable of feeding another 2 billion people by 2050.**

## MENUS OF CHANGE

Since 2013, the Culinary Institute of America has been studying many of these same issues with Harvard’s T. H. Chan School of Public Health. It’s a powerful collaboration between the medical and public health communities, researchers, and the food industry that has resulted in the Menus of Change platform. It’s also one of the only organizations that also puts culinarians at the same table.

A working group within Menus of Change called the Menus of Change University Research Collaborative is comprised of 270 members representing 68 higher-education, research, and other institutions that share best practices and applied research implementing Menus of Change findings in student dining.

Menus of Change exists at the intersection of wellness, sustainability, and food ethics—or, as the CIA likes to say, “the business of healthy, sustainable, delicious food choices.” In fact, all three are among the pillars of the college’s educational mission—along with professional excellence and global cultures and cuisines. Unlike single-focus strategies to address each separately, Menus of Change’s key position is that an integrated platform of aligned principles is the best way to make progress on all three at the same time.

**There's no way to change the way people eat without making food delicious.**

In all, there are 24 principles that make up the platform. Of these, many support plant-forward dining—which is neither vegan nor vegetarian but instead lies on the continuum between herbivore and carnivore, according to personal taste, but with more plant foods in the diet than animal.

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

The need for this fundamental shift could not be clearer. Every serving of beef requires 320 gallons of water to produce, whereas beans and legumes require 58 and 44 gallons per serving, respectively. Cattle are also land intensive, especially when factoring in crops that are grown for animal feed rather than human consumption.

One of the most land-intensive agricultural crops is corn, of which 38% is used to feed livestock. Of the animals that are fed, cattle have the least efficient conversion ratio—about 36 calories for the steer to each 1 for humans. The ratio for pork is 11 to 1, poultry is 9 to 1, and eggs and dairy are about 6 to 1.





Ruminants, such as cows and sheep, emit far higher levels of greenhouse gases than pigs and poultry, and all are higher than most plants. Many of the emissions are methane from the animals themselves and waste, but the carbon footprint of feeding, managing the manure and soil, transporting, and processing also has a large impact.

Last, there is the long-understood relationship between saturated animal fat and cardiac disease. *The Lancet* found that a global shift to a flexitarian diet that is predominantly vegetarian with the occasional inclusion of animal protein could potentially prevent approximately 11 million premature deaths per year.

While the whole Menus of Change platform lists 24 principles, you can use these simple guidelines—and look for restaurant and grocery partners with similarly aligned values.

Feature minimally processed, slow-metabolizing plant-based foods in your diet.

Place animal-based foods in a reduced or optional role, with a special emphasis on decreasing purchases of red meat. Prioritize fish and poultry among animal-based proteins, with dairy options and eggs playing a supporting role.

Highlight the value of fresh, seasonal, locally produced foods; minimize sugary beverages and added sugars and sweeteners; and reduce sodium and unhealthy additives.

Emphasize healthy dietary patterns and eat a diverse set of whole foods. Pay more attention to making sure you're eating quality calories full of vitamins and other nutrients.

Celebrate cultural diversity. Some global cuisines have evolved over thousands of years with the Darwinian advantage of keeping their populations healthier than others. Within them lies plenty of delicious inspiration.

Use your food purchasing power to encourage innovation and sustainable practices in retail food and restaurant concepts and business models to advance public health, social well-being, and the food system.

## **SOLVING FOOD SUPPLY PROBLEMS: TRANSPARENCY**

Behind deliciousness, a close second in solving food supply problems is transparency.

When the farm-to-table paradigm is romanticized, it has more to do with understanding who grew it, how fresh it is, and where the origin was—the pedigree, so to speak, and the stamp of care for a given product.

There's no reason you can't ask the same questions of any supplier that you would of that farmer. Whenever possible, choose ingredients with transparent ingredient sourcing that supports sustainable farming methods and fisheries. Ask for fully transparent information regarding the nutritional value of a product and understand how it was grown, when it was made or grown, and how far it traveled to make its way to you.

Products don't have to be hyperlocal to be good, and not everything that is hyperlocal is good. That's the value of transparency.

You can demand a more transparent food system, but with that, you need to be a part of that system of transparency by being aware, caring, and responsive. You may have already noticed entrepreneurs producing and labeling products in more transparent ways to stand out in a crowded marketplace. You can meet them in the middle.

## BUILDING MORE SUSTAINABLE AND MORE LOCAL FOOD SYSTEMS

Centralizing production into fewer massive factories is a way to gain efficiencies, increasing profits and keeping prices down. Reimagine a world where many smaller, more local food manufacturers were prevalent and the entire food system would change. The need for long-haul truckers would be reduced, along with road wear and tear and greenhouse gas emissions.

The system would be less dependent on those hard-to-fill jobs that could tip it out of balance with labor shortages. Perhaps most of all, the financial benefits from the commerce in decentralized markets would contribute to the prosperity of those local communities.

For many years, even those involved in urban planning and development have studied how the way in which cities are designed can promote better health by encouraging daily exercise and providing retail accessibility. Less prosperous in-between areas in many cities and exurbs located between downtown and the suburbs are being targeted as opportunity zones.

Local governments are starting to provide tax credits and other initiatives in order to revitalize these areas. It would behoove everyone to populate them intentionally with food businesses—both retail and manufacturing—and you can vote for this with your dollars.

You can't completely undo the trend of consolidation and still expect to feed everyone, but as food becomes more accessible and the visibility of more local food producers increases, people will likely become more aware of the value and impact food has in their lives.

Diversifying the supply to the food system also reduces the risk that monocultures—single strains of crop and animal species—present. The current reliance on limited genetic varieties would have catastrophic impacts should they fail. Increasing local and decentralized growing practices would benefit crop diversity and regenerative agricultural practices.

Food-service operators are already demanding these practices, creating enough volume business for smaller producers to be able to make a profit while localizing their efforts and creating sustainable processes closer to home.

Another key concept that's come from the CIA-Harvard collaboration is the idea of caloric value. Within the three macro ingredients in the human diet—fats, carbohydrates, and proteins—the same number of calories can vary widely in their ability to nourish or harm the human body.

In general, less processed food items provide better nutritional value, plant fats are better than animal fats, and complex carbs are better than simple carbs.

You can look at foods strategically and make decisions as to how you want to fuel your body, understanding both long- and short-term effects.

To transform plants and animals responsibly into the things that feed and nourish humankind, there must be a deep and ingrained respect for all the aspects of the global food system—even recognizing what parts of the system need to be fixed so that they can then be fixed.

**To create the foundation of a more sustainable and nourishing American food system, the value of food needs to be elevated in the minds of everyone in the country—to attach a value to feeding themselves and their families that everyone can treasure and be proud of.**



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4840 Westfields Boulevard, Suite 400

Chantilly, VA 20151-2299

USA

1-800-832-2412

