## Overview

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>PAYING THE REAL PRICE OF FOOD</td>
<td>4</td>
</tr>
<tr>
<td>SIMULATING THE FOODSCAPE</td>
<td>12</td>
</tr>
<tr>
<td>AMPLIFYING FOOD INFLUENCERS</td>
<td>21</td>
</tr>
<tr>
<td>DISCOVERING SOIL AS THE SECRET INGREDIENT</td>
<td>29</td>
</tr>
<tr>
<td>CLIMATE-PROOFING CULINARY TRADITIONS</td>
<td>37</td>
</tr>
<tr>
<td>ENDNOTES</td>
<td>45</td>
</tr>
</tbody>
</table>
INTRODUCTION

Our climate crisis poses an urgent and all-encompassing existential challenge to life as we know it. Food systems are at the fore of this global dilemma. We can eat our way into climate catastrophe, or we can eat our way out of it. The food we grow, harvest, process, distribute, and eat is intimately linked with our environment. On one hand, according to the Intergovernmental Panel on Climate Change, nearly a quarter of global greenhouse gas (GHG) emissions come from the agriculture sector and resulting land use.1 On the other hand, droughts and floods severely impact farmers and their land. Temperature changes affect crop growth and reproduction cycles, and new research suggests global warming causes key crops to produce more carbohydrates that can crowd out the production of nutrients. Meanwhile, many pests and weeds thrive in hotter and wetter conditions, making agricultural production all the more challenging and potentially more resource intensive.

And it’s getting worse. The World Resources Institute has looked at the projected population growth across the globe and the anticipated shift toward higher-meat diets to find that “agriculture alone could account for the majority of the emissions budget for limiting global warming below 2°C” in 2050.2 Additionally, the FAO’s "Status of the World’s Soil Resources” sums up our present soil situation: “Soils are fundamental to life on Earth but human pressures on soil resources are reaching critical limits.”3

Agriculture’s pressure on the critical limits of our biosphere are often overlooked or underappreciated in the media and pushed to the backstage at global climate events. Of the 4,500+ climate change articles published in 16 leading US newspapers from 2005 to 2008, only 2.4% mentioned food or agriculture as contributors to climate change and only 0.4% were substantially focused on the issue.4 Recent analysis found that the global climate change conference COP24 served a meat-heavy menu that could have produced over 4,000 metric tons of greenhouse gases.5

Given their impact on our individual and planetary health, food systems will take center stage of the global climate change discourse. Governments will begin adopting new subsidies and tax structures that build truly resilient agricultural industries, while advanced simulation software will enable anyone to model foodscapes for insights about what to grow, package, or consume. Individuals across the entire supply chain will be held accountable for the true cost of their practices, diverse food influencers will reshape what is considered edible, and new ingredients like soil will be in-demand. While climate disrupts social and political communities, culinary traditions will evolve to maintain cultural identities across space and time.

Food will no longer be seen as a problem for our climate future, but instead, as a delicious and resilient solution ripe for harvest.
PAYING THE REAL PRICE OF FOOD

Toward true cost accounting
PAYING THE REAL PRICE OF FOOD

Toward true cost accounting

The food on our plates costs the world a lot more than we paid for it at the grocery cash register or restaurant counter. As Food Tank points out, “Many consumers would not recognize the link between buying a cheap chicken for their roast dinner and the conditions of workers in chicken processing factories (which were recently highlighted in an Oxfam report), or the environmental impact of chicken feed production, or the increasing prevalence of antibiotic resistance, some of which is associated with the high use of antibiotics in chicken sheds.” Trying to monetize those true costs and incorporate them into decision making is currently impractical because the necessary data simply isn’t available.

Over the coming decade, the true cost of food production, distribution, manufacturing, and shopping will become internalized into the operating costs of business and the retail costs of food products. Advances in the digitization of supply chains from farms to stomachs will provide necessary data for life cycle analyses, consumer-facing third-party certifications, and sustainability regulations, providing farmers, policy makers, food companies, and eaters with a deeper understanding of the real costs and benefits that our food systems afford.

Our farm laborers, our healthcare system, and even our farmed animals have historically absorbed the hidden cost of food production. True cost accounting metrics will push costs back onto producers and consumers, but its largest effect will be felt by the environment. By leveraging datasets that measure the ecosystem services of farmland, third-party sustainability metrics, and aggregated lifecycle analyses of food products, we will be able to materially measure the costs that our production processes and consumption habits have on our biosphere.

Through new taxation structures, product labels, and data visualization software, farmers, eaters, and everyone in between will be able to fully understand—and have to pay for—the true costs of the foods we know and love. Once true costs are apparent and internalized across our food system, our actions around food and our values around climate mitigation will finally align.

“Although food appears never to have been cheaper, when we look beneath the surface, we are actually paying far more for it than we might possibly imagine.”

—Sustainable Food Trust®
Research published in Nature Sustainability modeled the impact that corn production has on air pollution and its resulting human health impacts. Researchers found that “reduced air quality resulting from maize production is associated with 4,300 premature deaths annually in the United States, with estimated damages in monetary terms of US$39 billion.” Ammonia from fertilizer is the worst source of corn’s air pollution.

Researchers are beginning to measure the footprints that food systems have not just on GHG emissions but also on a long list of other environmental impacts like air and water pollution to get an entire systems-level view.
Measuring ecosystem services

**WHAT**
The Natural Capital Project is a global collaboration that builds free and open-source tools to enable long-term and strategic decisions to be made about society that take into account the impact that ecosystem services provide.10

**SO WHAT**
Publicly-available and easily-accessible databases will create the necessary infrastructure for everyone and anyone to make systems-level decisions about the life-cycle impacts of food production, distribution, and consumption.
Labeling the climate impact of food

**WHAT**
As part of its goal to be climate-neutral by 2050, The Danish Ministry of Energy, Utilities, and Climate has announced a plan to label all food products with their carbon footprints so that consumers can make more informed, climate-friendly purchasing decisions.11

**SO WHAT**
While the environmental impact of a food product is often invisible, labels can help educate and nudge consumers toward more climate-friendly purchases.
Taxing food externalities

WHAT
Research from the Oxford Martin Programme on the Future of Food found that a meat tax “would reduce global greenhouse gas emissions by over one hundred million tonnes, mainly due to lower beef consumption.”

SO WHAT
If neither producers nor retailers internalize the environmental costs of their products, researchers and governments are actively exploring tax structures that could reduce GHG emissions from food.
Sustaining business through transparency

**WHAT**
HowGood is a platform that tracks over 125 sustainability metrics from over 350 independent sources for more than 1 million products so that retailers can source better and consumers can purchase more sustainably.\(^\text{13}\)

**SO WHAT**
Sustainable products create sustainable businesses. HowGood has found that a subset of 5,000 of their most sustainable products sell 20-180% better than the less sustainable counterparts.
Creating climate policy principles

WHAT
The Sustainable Food Policy Alliance, comprised of Danone North America; Mars, Incorporated; Nestlé USA, and Unilever United States, has released a series of climate policy principles that include the establishment of a carbon pricing system that “sends a clear signal to the marketplace to reduce economy-wide GHG emissions.”

SO WHAT
Global Consumer Packaged Goods (CPG) companies are taking steps for their own companies and for policy makers in their markets to build a food system that reflects and internalizes carbon footprints.
SIMULATING THE FOODSCAPE

Toward modeled environments
One of the biggest challenges in building truly resilient and regenerative foodscapes is that we lack a systems-level model of the complex interactions that occur from soil to stomachs, and every step in-between. Decisions that we make about food consumption, farming practices, policy design, and product development are all made with limited information about their true impact on the food system as a whole. With such a limited perspective, we are forced to navigate unintended consequences from our actions after they emerge and we overlook potential opportunities to mitigate climate impacts because we have no way of seeing them.

Over the next decade, computational modeling platforms that draw from distributed and open databases will converge with ambient sensing technologies embedded in homes, farms, manufacturing facilities, and retail to create the necessary conditions for modeling foodscapes. Machine learning systems and high-resolution satellite imagery will combine to create a dynamic map of food production. Our ability to simulate whole plant growth and on-farm growing systems in computer models will accelerate and be paired with advanced weather projections to inform what should be grown where and when. We will test and learn with great precision before implementing anything.

With such holistic models, policy makers, food companies, and eaters will simulate possible decisions they are faced with making—about where to deploy an inspector, how to design more sustainable supply chains, or which climate-friendly ingredients should be incorporated into a diet. The models will provide data-driven insights about climate-positive decisions. We will also see real-world spillover effects as individuals change their own behavior by running these simulations themselves, since the process of modeling itself can change how one acts.

“Identifying and modeling the intrinsic properties of the food system [...] will help organizations and governmental institutions to track progress towards sustainability.”

— Thomas Allen & Paolo Prosperi, agricultural researchers

SIMULATING THE FOODSCAPE
Growing crops in silico

WHAT
The Foundation for Food and Agriculture Research (FFAR) has given a $5 million grant to researchers at the Institute for Sustainability, Energy, and Environment at the University of Illinois at Urbana-Champaign to continue their work building a computational platform that provides a virtual model of whole plant growth. The simulation incorporates multiple models ranging in scale from cells to ecosystems.16

SO WHAT
Research and development to drive climate-smart crops, which will have complex interactions with their changing ecosystems, can be accelerated by the computational ability to create digital twins of whole plants rapidly “grown” in models as opposed to slow growth in soil.
Designing food with flavor-cyber-agriculture

**WHAT**
The MIT Open Ag Initiative has applied its machine learning model for indoor farming to a specific goal: increase the concentration of flavor-producing molecules in basil. Through controlling numerous growing variables in a contained environment—light, water, nutrients, temperature, and other climate variables—their growing systems can optimize beyond yield for values like deliciousness.\(^1\)

**SO WHAT**
As we gain deeper insights into the specific “climate recipes” of different crops, we will be able to control conditions to maximize climate resilience and sustainability—reducing waste while maximizing yield of delicious food with minimal inputs.
Mapping West Africa’s cocoa farms

WHAT
Hershey’s is using satellites to map 50,000 cocoa farms that are part of its supply chain in West Africa in order to gain insights into how it can best protect forests by increasing agroforestry and strategically distributing 2.5 million high-yield cocoa seedlings.18

SO WHAT
High-resolution satellite imagery of entire supply chains will enable large food companies to make more data-informed decisions on how to achieve their sustainability goals. This imagery is also critical input for any model that simulates the upstream impacts of a company’s decisions.
Building the “Wood Wide Web”

WHAT
Ecosystems comprised of trees survive and thrive with crucial help from microbial systems that deliver nutrients between the soil and plant roots. Such an interconnected and symbiotic web of organisms has been mapped for the first time on a global scale using over 28,000 species of trees in over 70 countries.¹⁹

SO WHAT
Ecosystem mapping will increasingly incorporate interactions at multiple scales, from the micro to the macro, in order to understand and simulate potential changes in those models. Soil is critical for agricultural production, and the microbes in our soil will need to be included in our models as much as the crops those microbes support.
Spreading in-store surveillance systems

**WHAT**

Kroger and Walmart are installing cameras throughout select stores. Kroger has embedded discreet cameras with facial recognition software in price displays on shelves to identify the age and gender of shoppers. Walmart has high-resolution cameras to monitor their produce before it becomes overly ripe or bruised.\(^2\)

**SO WHAT**

Modeling impacts of food systems and climate will involve not only agricultural production but also food retail environments. As retail outlets become digitized and imbued with ambient monitoring systems, we’ll have larger and larger datasets about food purchasing to use in our simulations.
Teaching computers to find risky farms

WHAT
Concentrated Animal Feeding Operations, as defined by the US Department of Agriculture, are animal feeding operations housing 1,000 or more animals for at least 45 days per year. No one knows how many CAFOs exist. We do know they place an extensive burden on the environment. Two Stanford University professors used machine learning to analyze USDA satellite imagery and identify CAFOs in North Carolina. They found 15% more poultry CAFOs than manual surveys had mapped.21

SO WHAT
An accurate and efficient map of industrial animal feeding operations will help regulators assess each farm’s environmental risk. As climate-induced extreme weather events become more frequent, these risk assessments will be essential in ensuring a safer and more environmentally-friendly future of food.
Creating positive spillover effects from simulations

WHAT
Researchers at Drexel University have created a brain training game called DietDash during which players navigate a grocery store aisles and try to avoid sugary food. Overweight players lose an average of 3.1% of their body weight after eight weeks of game play.22

SO WHAT
Simulations and games can be used to impact real-world behavior. As more of our foodscape are modeled and advanced simulations are run by companies, researchers, and eaters, we’ll have real-world spillover effects that help create our preferred futures.
AMPLIFYING FOOD INFLUENCERS

Toward a new breed of plant-based tastemakers
Carnism—“the invisible belief system, or ideology, that conditions people to eat certain animals”—has long been challenged by eaters and activists for environmental, health, and ethical reasons. Now, the movement is gaining momentum thanks to support from some unlikely suspects. Pro-athletes, large incumbent meat companies, immigrant chefs, and social media celebrities are all blurring traditional assumptions about who promotes plant-based diets.

The global alternative meat market is expected to grow by 1,000% over the next decade, reaching $140 billion and taking 10% of the global meat industry. These market projections will turn out to only represent the tip of the iceberg for a massively disruptive alternative meat industry driven primarily by environmental concerns. The rapid, global transition away from carnism will be accelerated by recent improvements in the taste, texture, and price of plant-based and cultured meat analogues, as well as expensive marketing campaigns from venture-funded companies seeking to cash in on a new market.

Although reducing meat consumption may be an effective form of climate action, those taking a market-based approach are staying away from talking about that, knowing that it’s a politically polarizing issue. Instead they may rely on health data, such as the World Health Organization’s (WHO) classification of processed meat as a type 1 carcinogen or the finding that plants contain all 20 dietary amino acids, and thus can comprise a complete diet. And still, we know that science doesn’t ultimately sway behavior. Instead, the decision to eat meat or refrain will be driven by identity politics. As communities, corporations, or even entire countries adopt meat-free identities, boycott businesses that serve meat, or publicly shame people who choose to eat it, the political divides will become even more entrenched.

The social influencers who are able to cross party lines will hold the key to influencing food behavior change, and act as Trojan horses for introducing consideration of a climate-friendly diet to new audiences. The battle over whether or not we deem meat edible will focus on redefining traditional notions of masculinity, socioeconomic status, or liberal environmentalism. The winning ideologies are going to be the ones that understand how to communicate effectively in an extremely polarized environment.

“Disagreements about the impacts of meat consumption on the environment and health are less likely to be ‘settled’ by science because they are becoming wrapped up in people’s cultural values and tribe identities.”

—Jayson Lusk25
Growing political polarization of meat

**WHAT**
Food and Agriculture economist Jayson Lusk's longitudinal Food Demand Survey has found that in America, beef demand is higher for conservative Republicans than liberal Democrats and that polarization is increasing over time. 25

**SO WHAT**
Understanding the identity politics behind eating meat is going to be the most essential component of designing any behavior change campaign. Increased polarization may force more companies into needing to take a stand on the issue.
Challenging the masculinity of meat

**WHAT**
Beyond Meat’s “Go Beyond” campaign features pro athletes like Shaq, Kyrie Irving, Alex Honnold, and Shaun White promoting the plant-based burger as fuel for their performance.26

**SO WHAT**
The campaign challenges the cultural assumption that eating meat is a sign of masculinity and strength as well as debunks myths about protein consumption (the average American eats almost twice the daily recommended amount)—with the hope that shifting this perspective can spur sales of plant-based products.
How to be vegan in the hood

WHAT
Erick Castro’s popular Instagram shares recipes and restaurants for inexpensive, delicious vegan foods in New York City, especially for audiences whose primary food choices are fast food restaurants and convenience store bodegas.²⁷

SO WHAT
Cultural influencers like Castro help shift the perception of veganism away from an elitist, affluent, white trend and embrace and celebrate a deep history of plant-based eating in African American and Latino culture.
Overturning traditional diet assumptions

**WHAT**
Aileen Suzara, owner of Sariwa restaurant in San Francisco, CA, serves plant-forward Filipino dishes to challenge assumptions that fried, meat heavy dishes are “traditional” and that giving them up would mean losing culture.28

**SO WHAT**
By tapping into ancestral knowledge of ingredients, she is decolonizing definitions of Filipino food. Discovering culturally appropriate ways to celebrate food stories that promote healthier eating will be a key enabler that encourages people to shift away from once beloved foods (such as Spam, in Aileen’s case) that are contributing to chronic disease.
German government takes meat off the table

WHAT
In 2017, the German Minister of the Environment Barbara Hicks enacted a policy to ban meat and fish from being served at official government functions. Hicks describes it as an important way to be credible and exemplary in their climate actions.29

SO WHAT
The decision was met with great resistance in the land of bratwurst, and points to the ongoing power struggles over cultural norms for what’s on the menu and how that relates to climate concerns.
Soldiers fight for vegan food

WHAT
None of the US military’s meals ready to eat (MREs) are fully plant-based. Growing numbers of soldiers are putting pressure on the Defense Logistics Agency to provide healthy, balanced, vegan meals, which are less expensive and will keep them fit for combat.30

SO WHAT
Rising rates of obesity are making it harder for the military to find combat-ready soldiers, making a shift toward healthier diets a national security priority. Some soldiers describe their switch to veganism as a desire to reduce violence in their personal life because it’s so prevalent in their work.
DISCOVERING SOIL AS THE SECRET INGREDIENT

Toward more delicious food from healthier dirt
Earth’s soil supports all plant and animal life, absorbs carbon, and filters water. Increasing soil microbiology can result in hundreds of tons of increased GHG capture per acre—and yet current agricultural and deforestation practices are degrading it at alarming rates. Danielle Gould and Mike Lee, co-founders of Varietal and Alpha Food Labs, eloquently outline the problem: “CPG products that become wildly successful almost always create monocultures of some kind. A reliance on trendy ingredients like yellow peas, almonds, and oats incentivizes farmers to only grow those crops, but creates no market for the variety of additional crops farmers must grow to keep soil healthy and biodiverse.”

However, there’s hope. The convenient truth is that agricultural practices that nourish the soil also produce more flavorful and nutritious foods, as well as higher, more profitable yields. Leading with a focus on deliciousness, food companies, farmers, and chefs around the world are championing responsible land stewardship and creating craveable foods to build a market to support these practices. This is happening through a mix of market and regulatory approaches: making new products that support old soil health favorites (like crop rotation), breeding entirely new perennial varietals, and passing local legislation to finance implementing these changes.

Farmers have long known that soil is their most important ingredient. By 2030, eaters will share that passion. Methods for tracking and communicating about soil health will proliferate, utilizing lightweight and distributed networks of sensors with smart packaging that traces a product’s ingredients back to their soil impacts. Brands with good soil practices will add that information to an already crowded label. Communities will take pride in their local soil health, and food tourism may increase in locations with the best practices. Just as “Blue Zones” mapped regions of the world where people live longer, healthier lives, “Brown Zones” will emerge as a coveted label that qualifies regions for tax cuts or carbon credits to recognize the essential role of soil.

“Soil is key to all survival on planet earth—95 percent of food directly or indirectly relies on it.”

—Tina Owens31

**DISCOVERING SOIL AS THE SECRET INGREDIENT**

*Toward more delicious food from healthier dirt*

Soil is key to all survival on planet earth—95 percent of food directly or indirectly relies on it.

—Tina Owens31
Private sector support scales healthy soils

WHAT
In 2018, Danone North America launched a soil health initiative that committed US$6 million over 18 months towards promoting regenerative soil practices amongst farmers who grow feed for cows, and the dairy farms where they buy milk.32

SO WHAT
As America’s largest yogurt producer, and the world’s largest Certified B Corporation, Danone North America recognized the potential for scaled impact across their supply chains. Shifting corporate incentives to focus on environmental impact can break the cycle of short-termism that has led to so much soil degradation in the first place.
Growing for guilds, not individual ingredients

**WHAT**

Jungle Project grows breadfruit, a “perennial supercarb” in diverse agroforestry systems in Costa Rica. These systems grow breadfruit in a “guild” — a permaculture concept of grouping plants together that benefit each other and the soil — with moringa and cacao.33

**SO WHAT**

If soil is the ingredient for which we’re optimizing, shifting agricultural systems to grow for soil first optimizes the use of soil nutrients. This requires that brands create demand for all of the guild’s components in their supply chains, not just one popular “superfood.”
Better soil makes better snacks

**WHAT**

Varietal Crop Crackers are designed around supporting crop rotation, an age-old technique for maintaining soil health. For one of their cracker flavors, Dark Northern spring wheat, Huntsman millet, and Bravo flax are used in the recipe to create demand for sets of crops that make up a crop rotation. These crops work synergistically to promote healthy and productive soils while sequestering atmospheric carbon.34

**SO WHAT**

Varietal is bringing superior flavor to well-established, simple snack categories to get the mass market to support regenerative agriculture. One of the ways they do this is by building a conversation around the idea that food that promotes soil health not only benefits the planet, but benefits taste buds. Building market demand can support farmers to transition current monocropped acreage into more diverse mixes to promote soil health.
Climate-resilient food hampered by climate disruptions

**WHAT**

General Mills’ Cascadian Farms was set to be the first major brand to launch a product with the soil-enhancing perennial grain, Kernza. However, bad weather ruined most of this year’s crop. They instead launched a very limited release of Honey Toasted Kernza along with a crowdfunding campaign to support further research by The Land Institute.35

**SO WHAT**

Efforts to implement climate-friendly agriculture may be thwarted by climate change along the way. Looking for innovative funding models can help de-risk the transition for CPG companies to establish an adequate supply and scale up ingredients that sequester carbon and improve soil health.
Automating carbon credits for soil health

**WHAT**
Farmers Edge, a precision data agriculture company based in Canada, launched a carbon credit program that enables producers on their platform to earn carbon offset credits through an existing local Conservation Cropping Protocol.36

**SO WHAT**
Funding for conservation efforts exists, but is often very laborious for farmers to access. Ag tech companies can help farmers easily quantify, measure, and verify conservation results in order to create a robust marketplace that rewards good land stewardship.
California introduces climate surcharge at restaurants

**WHAT**

Restore California Renewable Restaurants program allows participating restaurants to add 1% to the check that goes towards California’s Healthy Soil Program, which funds farmers and ranchers to adopt practices that put more carbon back in the ground.37

**SO WHAT**

This partnership between the California Department of Food and Ag, the California Air Resources Board, and The Perennial Farming Initiative enables eaters to directly support farmers who want to transition to methods like no-till or cover cropping, but don’t have the capital to support it up front. They estimate that if just 1% of CA restaurants participate it will generate $10 million per year to fund farmers.
CLIMATE-PROOFING CULINARY TRADITIONS

Toward resilient food cultures
CLIMATE-PROOFING CULINARY TRADITIONS

Toward resilient food cultures
Climate change threatens not only our health and safety, but also our cultures. Extreme weather that forces people to flee their homeland, for example, poses a very real threat to the longevity of cultural practices. Destruction of architecture and landmarks wipes away the sense of identity that those things confer.

Cuisines—just as critical to cultural identity as landscapes or built environments—are similarly under threat. Iconic foods like maple syrup, wine, coffee, and more are all at risk of extinction. As communities are uprooted, cultural touchstones are obliterated, and traditional foods disappear, there will be a scrambling of cultural signifiers. The cultures of the post-climate-change world will crystalize as a combination of past cultures in new geographies and new foods brought into existence as an outcome of climate action.

Some of these foods will be traditional ingredients or forgotten crops. Others will be the result of engineering and scientific breakthroughs, aimed at sequestering carbon or reducing footprints. As we move into an era of new foods and ingredients on the plate in the name of climate action, we’ll see those same foods become gathering points for new cultures. These will be combinatorial cultures that arise out of a mix of displaced people seeking to retain their identities, the need to accept low-footprint foods, and the constraints of resources. This might mean indoor vertical tea plantations to enable tea ceremonies in new contexts, or cell cultured seafood for coastal communities that have been pushed inland.

The companies, climate activists, and agronomists who seek to introduce climate-smart, novel foods will only succeed in doing so when they integrate those foods into this post-change food culture through co-creating recipes with chefs, serving the needs of home cooks, and catering to the palates of eaters.

“The food we eat is not only a quantity of proteins or vitamins, but it is a diversity of foods that forms the basis of our different civilizations.”
— José Graziano da Silva, FAO Director-General

“The food we eat is not only a quantity of proteins or vitamins, but it is a diversity of foods that forms the basis of our different civilizations.”
— José Graziano da Silva, FAO Director-General

Institute for the Future
Engineering resilient cultural heritage

WHAT
In April 2019, The American Chestnut Foundation (TACF) held a kickoff brunch to announce that they had released a genetically-engineered blight-resistant chestnut varietal. Of course, the brunch heavily featured traditional “lost” dishes made from chestnut. Part of the foundation’s mission is to help reforest the Eastern US with this silvicultural crop that also happens to sequester carbon at a high rate.39

SO WHAT
The success of climate action projects will depend in part on how people accept them into their everyday life. Projects like the TACF that tie new cultural practices (like chestnut brunches) into carbon sequestration practices may be more successful than practices that don’t incorporate a human element.
Improving markets through cultural knowledge sharing

WHAT
While prickly pear cactus has been grown in Northern Africa for some decades, a Food and Agriculture Organization of the United Nations (FAO) publication that drew on input from Mexican experts championed the culinary versatility of the crop, as well as its extreme heat and drought tolerance. In 2019, farmers in Africa are able to remain in place growing prickly pear thanks to the increased demand due to the intentional and directed dissemination of Mexican culinary tradition by the FAO report.40

SO WHAT
Markets that are coming under pressure from heat and drought—or other climate effects—may be able to be revitalized or even completely transformed by borrowing cultural knowledge and techniques from places that have already grown accustomed to those stresses. The keepers of cultural knowledge, like Mexican chefs and farmers, will increasingly find themselves in possession of extremely timely and relevant solutions, but will oftentimes need a catalyst to bring their solutions to scale.
Inventing a new caffeine fix

**WHAT**
Atomo is creating a drink molecularly indistinguishable from coffee, but synthesized from sustainable ingredients and processes rather than the intensive traditional method of farming coffee. 41

**SO WHAT**
Companies that create synthetic foods have to rest on the existing cultural framework in which familiar foods reside. When (and if) the real version of these foods becomes untenable, the mooring of the original cultural practices may be cast away. For example, the obsession over origin that propelled third wave coffee into a global phenomenon simply wouldn’t be a consideration in a world of synthetic coffee. Instead, we’ll see new practices arise: perhaps in this case, a fascination with the molecular composition of coffee, or the ritual of choosing a cup based on its environmental impact.
Reconsidering a world-wide market by promoting local values

**WHAT**
In West Africa, Oumar Barou Togola is working with local women farmers to grow sustainable alternatives to rice, that also happen to be traditional plants that have been supplanted by the invisible hand of global agribusiness over the past decades. The pilot project has grown rapidly, in large part because it encourages a strong local market for rediscovered beloved foods.42

**SO WHAT**
The shift away from environmentally-taxing commodity crops will not simply be framed as a sustainability cost-benefit comparison. It will depend on the acceptance of alternatives as delicious and interesting as well as sustainable. As the margin for growing crops in non-ideal climates for the sake of global commodity markets shrinks, the gap will be filled in part by the reintroduction of sustainable and culturally-relevant foods.
Borrowing Italian expertise to reinvent a Vietnamese product in the US

WHAT
Scientist Marissa McMahan and chef Ali Waks Adams received a grant to develop a green crab-based fish sauce after discovering that ocean environment change has lead to a dearth of traditional crab species in the US Northeast. They brought in Venetian experts to teach local fishermen about the species, and won a grant to develop a riff on Vietnamese fish sauce from the unfamiliar crab.43

SO WHAT
This type of combinatorial cuisine-building will become commonplace and will turn over rapidly in the coming decades. As species rise and fall in availability and sustainability, we will borrow expertise from a pastiche of cultures to invent new foods that resonate with consumers.
Transplanting a global crop

WHAT
Turkey, the principal producer for hazelnuts, has been undergoing unfavorable climates for the crop since 2013. Seizing the opportunity to supply the market, plant breeders in the US engineered a type of hazelnut tree that thrives on the east coast, and is resilient to climate volatility. The breeder says that while most people in the US have never tasted fresh hazelnuts; the chefs that he has tested will “go crazy for [them].”

SO WHAT
Crops that are deeply tied to certain geographies, like hazelnuts, will undergo rapid and significant movements as people seek out the places best suited to produce them under new conditions. In places where these crops are quickly introduced, chefs, sellers, and value-add businesses will create new cultural resources to integrate them: recipes, cuisines, and products.


ENDNOTES


33. https://www.jungleproject.com/


ACKNOWLEDGEMENTS

Research Team: Quinault Childs, Max Elder, Sarah Smith
Peer Review: Rod Falcon, David Pescovitz
Editor: Mark Frauenfelder
Copy Editor: Lenore Weiss
Communications: Maureen Kirchner
Executive Producer: Jean Hagan
Production and Design: Robin Bogott, Kelsey Kamm
About the Institute for the Future

Institute for the Future (IFTF) is an independent, nonprofit 501(c)(3) strategic research and educational organization celebrating 50 years of forecasting experience. The core of our work is identifying emerging trends and discontinuities that will transform global society and the global marketplace. We provide insights into business strategy, design process, innovation, and social dilemmas. Our research generates the foresight needed to create insights that lead to action and spans a broad territory of deeply transformative futures, from health and health care to technology, the workplace, learning, and human identity.

Institute for the Future is based in Palo Alto, California. www.iftf.org
About …

THE FUTURE 50

This research is supported by IFTF’s Future 50 partnership, which offers research-based perspectives, global expertise, signals of change, and specialized data to help organizations transform urgent foresight into actionable insight. Our Future 50 partners invest in critical research, enlightened facilitation, and strategic experimentation to shape the future of a world in flux. To learn more about the partnership, visit: www.iftf.org/future50.

THE FOOD FUTURES LAB

IFTF’s Food Futures Lab identifies and catalyzes innovations with the potential to reinvent food systems, drawing connections across global disruptive shifts to challenge assumptions and reveal emerging strategies for resilience in a rapidly changing world.
EATING OUR WAY OUT OF THE CLIMATE CRISIS

How Rethinking our Food Systems Can Balance the Biosphere