Food System Futures:
Innovation, Justice and the Promise to Feed the Nine Billion

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There are clear winners and losers in the contemporary global food system – some enjoy the benefits of convenient abundance while others suffer from the impacts of hunger and exploitation. In the face of growing world population and threats to environmental sustainability, debates abound regarding the best ways to close these gaps and achieve a well-fed world for all. This developing research project aims to understand the dominant narratives that shape public discourse and policy regarding food system problems and solutions, as well as to offer a critical vision for a sustainable and equitable path forward. The research centers on a comparative analysis of two clusters of advocates for food system change – what I term the techno-optimists and the grassroots critics. Each of these groups tells a distinct story about why the food system is in crisis, and each claims to possess the key tools of innovation that are necessary for a sustainable transition.

The techno-optimists are represented by a set of 21st century power-brokers who champion scientific innovation as vital to solving world hunger, achieving ecological sustainability, and promoting global development. High-profile philanthrocapitalists such as Bill Gates invest and donate enormous sums of capital into initiatives that leverage digital communication tools and biotechnology to meet the food and farming needs of a growing international public. Entrepreneurial actors like those developing “cultured meat” grown in the labs of Silicon Valley believe that high-tech food companies will create a
sustainable and equitable bioeconomy. Emerging social movements such as effective altruism enlist young people into a rationalist, technologically-determinist worldview, advising members to seek career paths that will allow them to become fiscal and intellectual forces in a thoroughly modern future food system.

By contrast, the grassroots critics are united by a story which argues that scientific innovation has led to a concentration of power among a set of dominant players and a system of racialized exploitation across the global food system. They note that earlier promises to sustainably feed the world have come up short, and they are wary of the outsized role played by corporate and philanthrocapitalist actors in setting the global food agenda. What is actually needed, they insist, is people-powered social innovation, a process that unlocks solutions from within communities by activating local and cultural knowledge, building strong social networks, and motivating broader social movements that promote racial justice, equity, and “real food.” In the Global South, this takes the form of networked cooperatives of peasant farmers like La Via Campesina, which has emerged as a vocal advocate for agroecological farming and food sovereignty. In developed nations such as the United States, coalitions of food justice groups including the HEAL Food Alliance seek to incubate social innovation in community-based food system projects and protect the rights of workers across the food chain. Even some wealthy philanthrocapitalists have tried to join the ranks of the grassroots, notably Kimbal Musk, who is helping to develop new and scalable models for urban agricultural food production and distribution in Brooklyn and beyond.

The techno-optimists see tremendous opportunity in new technology and the power of markets to close the global hunger gap, while the critics argue that this gap is built into
the very business model of the corporate and governmental powers at the helm of the food system. Ultimately, this project not only aims to describe the contours of this historical and ideological competition, but also offers a positive vision for a future food system that combines the best of scientific and social innovation. Indeed, I argue that understanding the discursive and material manifestations of innovation – a nearly ubiquitous buzzword of 21st century life – is vital to understanding the conflict, since the concept has become a central guide for determining how knowledge is valued, how capital flows, and how the strategic plans for the future of food are constructed and implemented. Only if we improve deliberation between the techno-optimists and grassroots critics, I suggest, by promoting collaborative action at the intersection of scientific innovation and social justice, can we expect to feed the nine billion global citizens of 2050.

The materials that follow represent recent publications at the early stages of this developing research agenda. “After the White House Garden: Food Justice in the Age of Trump” builds upon my previous research on community-based food justice to examine the implications of the Trump administration for organizing efforts that use food as a tool for social and racial justice in urban America. “Fixing Hunger at its Roots” connects the local to the global with an analysis of the UN Sustainable Development Goal of Zero Hunger, highlighting the political and economic foundations of hunger and food insecurity around the world. Finally, “Why We Should Make Room for Debate about High-Tech Meat” investigates Silicon Valley-backed food science and biotechnology efforts that aim to develop alternatives to animal proteins, raising critical questions about whether big scientific promises can lead to legitimate social change. Together, the works and this colloquium consider how interdisciplinary scholars, scientists, advocates and activists
might realize a future food system that promotes innovation, sustainability, health and justice for all.
After the White House Garden: Food Justice in the Age of Trump

Garrett M. Broad*

Introduction: The White House Garden and the Good Food Movement

In October of 2016, one month before Donald Trump won a surprise victory in the United States Electoral College, First Lady Michelle Obama announced a number of measures to protect and maintain her famed White House vegetable garden. Initially constructed back in 2009, the garden had been expanded to include a larger seating area and a prominent new archway, as a combination of wood, stone, steel, and cement materials were used to reinforce the construction. Together with $2.5 million in newly secured private funding, as well as an upkeep agreement with the National Park Service, the developments strongly suggested (although did not guarantee) that the garden would remain a permanent fixture of the White House grounds. “I take great pride in knowing that this little garden will live on as a symbol of the hopes and dreams we all hold of growing a healthier nation for our children,” Mrs. Obama was quoted as saying.¹

In many ways, the White House garden encapsulated central debates that occupied the “good food movement” throughout the course of the Obama administration. In its early

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days, the garden’s establishment proved an exciting rally cry for alternative food advocates, many of whom expected it would kickstart a broader conversation about the health and sustainability of our food system. Writing an open letter to the next “Farmer in Chief” prior to the 2008 election, prominent food journalist Michael Pollan specifically called for the creation of a White House garden, which he hoped would inspire the planting of school and home Victory Gardens and offer “a way to enlist Americans, in body as well as mind, in the work of feeding themselves and changing the food system.”

At the same time, the garden also became a flashpoint for conservative backlash against the so-called “nanny state” tendencies of the Obama years. This was particularly the case after Michelle Obama launched the “Let’s Move!” initiative to combat childhood obesity, along with her related forays into improving school nutrition standards. As the Texas Congressman Ted Poe argued when he introduced a bill that pushed back against USDA school food regulations: “The federal food police need to stay out of our schools.”

And from yet another perspective, for many urban food movement activists who described their work in the language of food justice, the White House garden proved a source of deep ambivalence. Its symbolic power seemed to offer a vote of confidence for the types of non-profit, community-based programs they had been operating for years – using agriculture and cooking to promote community health and build grassroots power in historically marginalized low-income neighborhoods and communities of color. As time progressed, however, a skeptical cynicism set in for many food justice advocates, as the grassroots authenticity and overall efficacy of the Obama-led initiatives were called into question. Did these programs really

promote systemic change, or did they actually encourage a style of individualized thinking that blamed victims of food injustice for their own predicament? 4 Did the Obama administration really offer a challenge to the corporate food industry, or did it instead offer an example of neoliberal corporate co-optation at its worst? 5 Did garden-based learning programs across the country truly tackle the structural economic and environmental barriers at the root of nutritional inequity, or did they distract from the real work of building effective social movements and enacting progressive policy change?

To return to the steel and cement reinforcements at the White House garden – what exactly was cemented in place, to be (hopefully) protected from the potentially undermining influence of the new fast-food aficionado in chief?

Community Based Food Justice

In terms of acute threats to public health, it is clear that the Trump administration could do significant damage by violating basic civil liberties, as well as by creating large holes in the existing (if inadequate) social safety net. Specifically, these issues may arise through initiatives that include cutting food assistance and nutrition programs, reducing affordable health care access, and punishing immigrant families, in addition to efforts that reshape regulations in a way that hinders food safety, weakens labor rights, and diminishes the ecological sustainability and resilience of the food system. 6 Forceful and timely responses to these threats must be undertaken in the years ahead, and there are a host of anti-poverty, immigrant rights, environmental, labor and other advocacy groups that must be

supported in their efforts.

If the “good food movement” is to play a productive role in this resistance, it is my contention that the insights and organizing perspectives of the community-based food justice movement should be a driving force. Over the course of at least the last decade, this loosely networked constellation of activists, organizations and programs has championed many of the same general strategies that are popular in the broader food movement – from building gardens, to providing nutrition education, to improving access to healthy foods in under-resourced urban neighborhoods. What sets the community-based food justice approach apart, however, is its more incisive focus on racial and economic inequality; its commitment to building programmatic leadership from within low-income communities of color; its development of partnerships with allied social justice movements across the urban-rural divide; and its broader theory of change that highlights food’s potential as a strategic entry point for building grassroots power, catalyzing community development, and effecting social change.7

The good news for those activists who use food as a platform for community organizing is that there will remain opportunities to persist. This partly emerges from the fact that federal support for community food programs has never been particularly strong. The USDA’s Community Food Projects Competitive Grant Program, for instance, has been providing grants to non-profits for entrepreneurial community food and planning initiatives since 1996, and has given out an average of $5 million annually since 2012.8 Similarly, the Healthy Food Financing Initiative was created by the Obama administration to improve healthy food access in under-resourced neighborhoods and is now run jointly by the USDA, Treasury, and Health and Human Services. In 2016, the initiative awarded approximately

$7.4 million in new grants to 11 different projects. In recent years, a number of small federal grants have also come through the Environmental Protection Agency, generally awarded to community food projects that demonstrate a connection to climate change mitigation and education.

Early returns from the Trump administration suggest that these types of programs could be on the chopping block and it is unlikely that any new programs in this vein will be developed. Though major cuts would present a significant setback to local organizers, there remains a possibility that some community food projects could be spared from a Trump administration purge. This shred of optimism emerges from the fact that community food projects tend to reflect a long-standing bipartisan consensus in the United States that valorizes the possibility of community-based action to overcome inequality of outcome. Indeed, many conservatives who decry federal intervention on school nutrition standards actually like the idea of entrepreneurial efforts that improve local nutrition environments. For food justice advocates, the opportunity to work at the local level is aligned with their preferred style of participatory organizing and community problem-solving. This is not to say that conservatives agree with the community organizer’s worldview, the latter of which highlights how the legacy and ongoing reality of racialized economic discrimination makes certain communities subject to generations of food and environmental injustice. But a good number of those community organizers – as well as their local constituents – have some paradoxical commonalities with limited government conservatives, having long ago given up on the dream that the federal government would one day intervene to fully remedy their predicament. In the past, social justice activists have found creative ways to navigate these contradictory community


dynamics and they are likely to continue to do so in the future.11

The local community remains limited, of course, as a site for political and economic change. For this reason, community-based food activism has often been critiqued from the left, especially by those who argue that too much time and money has been spent developing cooking and gardening projects that are relatively superficial and frequently administered by affluent whites from outside of the community. Yet, the community’s enduring ability to serve as a space for experimentation, relationship-building, and consciousness-raising suggests that it should not be dismissed outright, but rather cultivated to perform at the best of its potential. The question for the community-based food justice movement, in the age of Trump and beyond, is how can it best make progress toward its social transformation goals?

Recommendations for Strategic Action

Grassroots people-power remains a hallmark of the community-based food justice approach, but the ability to pay living wages to educators and organizers, to provide incentives for youth participants, and to build community institutions that contribute to local economic development are all central to sustaining that grassroots power for the long-term. Especially in the face of a hostile federal government, those committed to food justice must work hard to develop and expand projects and programs that are fiscally sound in their approach, as well as demonstrably effective with respect to achieving their educational, organizing, and advocacy goals.

Community-based food justice activists compete for a limited pool of fiscal resources, a pool that is not always allocated on the basis of organizational merit or community need. The resources available to support non-profits in this domain generally come from three main areas – 1) public funding, including modest federal support, state and municipal grants, and through partnerships with public universities; 2)
private funding, including from foundations, corporations, private universities, and individual donors; and 3) through self-generated revenue, commonly derived via the establishment of food-focused social enterprises under a non-profit structure. Often following the example of Michelle Obama and the impassioned calls of garden advocates like Michael Pollan and Alice Watters, recent years have seen a significant amount of money spent to create food and garden-based programs in schools and community spaces across the nation. After a season or two of harvest, however, many of them go fallow, perhaps due to a lack of long-term administrative and financial support, or due to a lack of integration into the culture of the community in which they were established.12

The takeaway is that community-based food justice organizers and their supporters in law and policy must proactively articulate and demonstrate what makes for successful programs, and then communicate that message to funders, donors, and policymakers at multiple levels of society and government. This means embracing a culture of process and goal-oriented evaluation – bolstered by participatory partnerships with allied professionals and researchers – and from there, having a willingness to shift aspects of strategy when research suggests they could be more effective. There are many opportunities, for instance, for community food practitioners to embrace new technological innovations that could improve their agricultural productivity, including those that are integrated into urban design and architecture.13 There are also significant opportunities to encourage social innovations that improve economic viability, particularly efforts that lead to community acquisition of land and property in the face of encroaching real estate development and gentrification.14 Equitable partnerships

14. See Nathan McClintock, Radical, Reformist, and Garden-Variety Neoliberal:
between community activists and outside collaborators can build community capacity and prevent stagnation across these domains.

On a related note, organizers and their supporters must also have the courage to point out why some food-based programs are more deserving of support than others. Today, many of the best-funded community food projects are not situated in communities that suffer from food injustice at all, as lower-income communities for whom food is more likely to serve a vital nutritional and organizing need struggle to gain recognition. This is part of a problem that extends well beyond food injustice, as a recent report from the National Committee for Responsive Philanthropy points out: “Philanthropic funding for the people who need it most has lagged behind booming assets, and foundations have continued to avoid strategies that have the greatest potential to change the status quo.”

Across the social justice landscape, more funding is needed that directly benefits underserved communities, addresses root causes, and provides more dollars as general support and multi-year funding. My own research into this topic points to several key principles that make for effective food justice programs: strong food justice initiatives fundamentally reflect and are shaped by the needs and interests of community members, have clear plans for fiscal and organizational sustainability, and are guided by a vision of social change that connects food injustice to a broader analysis of inequality in America.

On this final point, the years ahead necessitate significant coalition-building and collaborative action between food justice advocates and other movement actors fighting for progressive change. Here again, it is vital to reiterate the power of food as an

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16. Id.
organizing tool – its centrality to our health and ecology, as well as its universal connection to culture and community, gives food activists a unique ability to incorporate their concerns into the work of others. To be specific, community food advocates can help affordable housing advocates integrate gardens into design efforts, rally food service workers around a living wage, and coordinate with those seeking protection for the immigrants who play such vital roles in the food system. Indeed, one could argue that the best healthy food policies are actually progressive housing, labor, and immigration policies, which can open up the time and financial resources for families and communities to pursue healthier relationships with food. Further, state and municipal programs and policies in these areas can serve as a testing ground that could be scaled up if future federal administrations are more responsive to social justice concerns. In the years ahead, only an integrated approach – one that combines grassroots advocacy, policy development, and broader movement building – will be able to turn these aspirations into reality.

Conclusion

Following President Trump’s victory, a collectively authored editorial by good food advocates Michael Pollan, Mark Bittman, Olivier De Schutter, and Ricardo Salvador argued that it was time to expand the consciousness of the food movement. The most important work food activists could do, they argued, was to get involved in urgent social justice struggles: “(F)ighting for real food is part of the larger fight against inequality and racism,” they wrote, adding, “[n]atural allies are everywhere.” While it was heartening to hear this much-needed appeal to social justice solidarity, nothing in that call to action was particularly new. For years and even decades, community-based food justice activists have been engaged in exactly these types of

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social justice coalitions, and have been calling for the broader food movement to see food as a tool for social transformation – not as a magic cure-all for health disparities or environmental injustice. Through it all, these activists have understood that the power of the food justice movement was never centered in the White House garden, supportive as that symbolic action might be. Moving forward, it should be those food justice activists who are at the forefront of the food movement’s response to President Trump – building authentic social justice partnerships, developing sustainable and effective models for community-based programming, and articulating a future vision for a more just food system.
In this post, Garrett Broad describes community-based efforts to combat food insecurity in the United States and the rising stakes of the current administration’s plans to roll back food assistance and nutrition programs.

This is the second entry in our new series “De-Provincializing Development,” which seeks to cast a critical eye on US progress towards the new UN goals. It examines SDG #2: Zero Hunger.

In early 2017, Food Network host and celebrity chef Alton Brown announced on social media that he was taking a road trip across the United States and needed recommendations for the best dining spots along the way. After several months of Instagramming his #ABRoadEats, Brown declared Los Angeles the top food town in all of America.
For anyone who has had the pleasure of enjoying the fresh produce and diverse cuisines of Los Angeles, Brown’s choice should not be that surprising. What might be surprising, however, is that Los Angeles County is home to nearly 1.5 million people with limited or uncertain access to an adequate supply of food—the largest population of food-insecure people of any county in the United States. And, as is the case in urban and rural areas across the nation, rates of food insecurity are dramatically higher in its immigrant communities and low-income neighborhoods of color.

This paradox of culinary abundance alongside food injustice is a central obstacle to the United Nations’ ambitious Sustainable Development Goal (SDG) of “Zero Hunger,” which aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. But the sobering truth is that we already produce more than enough food to feed the world; hunger in the twenty-first century, then, is mostly a failure of society and politics. Achieving the goal of zero hunger requires solutions that tackle food insecurity at its roots: combating poverty, decreasing inequality, and promoting food democracy.
Well-intentioned efforts like food pantries or school gardens, which tend to focus on food in isolation from other social issues, don’t go far enough to eliminate food insecurity in the long term. Rather, the most effective projects use food as a platform for an antipoverty and antiracist agenda for change, integrating initiatives related to food access and agriculture with participatory education and community economic development.

It’s been nearly a decade since I first began documenting how organizations and local residents in South Los Angeles—one of the most food insecure parts of LA—strive to achieve food justice for all. My research has shown that well-intentioned efforts like food pantries or school gardens, which tend to focus on food in isolation from other social issues, don’t go far enough to eliminate food insecurity in the long term. Rather, the most effective projects use food as a platform for an antipoverty and antiracist agenda for change, integrating initiatives related to food access and agriculture with participatory education and community economic development.

As I have traversed the country in recent years, I’ve come across a number of organizations that are developing increasingly well-conceived and holistic food justice projects, including Harlem Grown’s educational and workforce development initiatives, Uplift Solutions’ prison-to-supermarket model of reentry programming, Mandela Marketplace’s suite of cooperative food enterprises that support workers and farmers, WhyHunger’s grassroots movement-building strategies, and many more in between.

Over this time, I’ve seen the problem of hunger framed almost exclusively as a developing-world dilemma. Popular visions of hunger call to mind the famine declared in February 2017 in parts of South Sudan, as one hundred thousand people faced acute starvation and one million more stood on the brink. Across the globe, nearly eight hundred million people—or one in nine citizens—do not have enough to eat, and ninety-eight percent of those people live in developing countries.
Yet, around the same time that famine was declared in South Sudan, developments in the United States confirmed that hunger is not only a developing-world concern. The United States House Budget Committee—emboldened by the recent election of Donald Trump—approved a plan to slash the Supplemental Nutrition Assistance Plan (SNAP, formerly known as the Food Stamp Program). Critics pointed out that more than forty-two million Americans already live in food-insecure households, insisting that the $150 billion in cuts would push millions more vulnerable, low-income Americans deeper into poverty. Trump’s severe crackdown on immigration would make things even worse, forcing frightened immigrant families to forgo food assistance, creating labor difficulties for farmers and workers, and ultimately making it harder for everyday Americans to access fresh and affordable foods.

Still, even with these clear flaws evident in the food system, a persistent set of optimists continue to remind the public that significant progress has been made on the issue of hunger. They point out that the UN nearly met its Millennium Development Goal to cut hunger in half between 1990 and 2015, famines are remarkably rarer than they were a century ago, and Americans spend less of their income on food than any other nation in the history of the world. Technologically minded advocates often credit the Green Revolution for these gains and insist that the tools of biotechnology or logistical fixes to the problem of food waste will eradicate hunger once and for all.

But this progress and these promises should not be used to deflect from the fact that we could have done a better job all along, or from the moral imperative that we must do better in the years ahead. A better way forward requires a recognition that hunger will only be
eradicated if nations and communities grapple with the fundamental issue at hand—not technology, but poverty. This is what propels the work of the US-based food justice groups I mentioned above, as they aim to create a more just economic system, invest in marginalized communities, and promote nutritional health and sustainability through the process.

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At this moment, #ZeroHunger lives online as a UN-promoted Instagram hashtag, but it’s still a long way from the villages of South Sudan or even the streets of South LA. And there is serious danger that the regressive budgetary, health care, immigration, environmental, and trade policies of the Trump administration will impede the domestic and international progress that has been made to reduce hunger and food insecurity. But there is also hope that the oppositional reaction to Trump could provide the force needed to expand the vision and goals of the food movement, pushing antihunger advocates to recognize the need for more sustainable economic models, a stronger safety net, the protection of immigrant rights, and the centrality of environmental justice in the ongoing quest for food equity.

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Why We Should Make Room for Debate about High-Tech Meat

The burgeoning alternative protein industry is drawing new lines and making interesting bedfellows—all the more reason to stay engaged in the conversation.

BY GARRETT BROAD
09.28.17

“We built a lab with glass walls. That was on purpose,” Ryan Bethencourt, program director for the biotech accelerator IndieBio, told me as we sat in the company's wide open basement workspace in the South of Market district of San Francisco.

Glass walls—it's a design philosophy that many animal rights activists have argued could turn the world vegan, if only people could see into the slaughterhouses that produce their meat.

But IndieBio is taking a different approach. “If we put a lightning rod in the ground and say we are going to fund the post-animal bioeconomy,” Bethencourt, a self-described ethical vegan, explained, “then we're going to create foods that remove animals from the food system.”

He pointed me to two examples currently in the accelerator: NotCo, a Chilean startup using a mix of plant science and artificial intelligence to create mayonnaise and dairy products, and Finless Foods, a two-man team using “cellular agriculture” to create lab-grown or “cultured” seafood. The latter is just one of several new products in development that creates meat without relying on actual livestock, using only a few cell tissues from animals instead.

While the number of alternatives to animal protein has been growing steadily over the last several years, it remains a relatively niche market. Bethencourt and his colleagues at IndieBio are eager to get their food into the hands of the masses. “If we don't see our products used by billions of people, then we've failed,” he told me.

But it's not just altruism that drives this emerging industry. There's big money betting on a future of animal products made without animals.

Just look at IndieBio alum Memphis Meats, a cultured meat company that announced late last month that it had raised $17 million in Series A funding. High-profile investors have included Bill Gates, Richard Branson, and ag industry giant Cargill, none of whom seemed deterred by the fact that no lab-grown meat product has ever actually been made available to consumers yet.
Major investment has also been pouring in for high-tech products made solely from plants. Hampton Creek, best known for its eggless mayo and dressings—and numerous controversies involving its embattled CEO Josh Tetrick—has been dubbed a “unicorn” for its billion-dollar valuation. (The company recently announced that it’s getting in on cultured meat innovation, too.)

Products from Beyond Meat are now in over 11,000 stores across the United States, supported in part by early investment from Gates and a 2016 deal with Tyson Foods. Gates is also a backer of Impossible Foods, which has raised upwards of $300 million since it launched in 2011 and has the capacity to churn out one million pounds of “plant meat” each month in its new Oakland production facility.

All of this big money, of course, has followed big promises. According to the innovators and investors involved, a sustainable, well-fed, economically thriving world that makes factory farming obsolete is now within our reach.

I've spent the last few months talking to scientists and entrepreneurs in the plant-based and cultured meat landscape. As a vegan since my college days, it’s been hard for me not to get excited by the vision they present.

But, as someone who has spent the better part of the last decade working as a food justice researcher, author, and activist, lingering concerns have kept my enthusiasm in check. The truth is, food scientists, corporations and philanthropists have made big promises before, but the food system is still a mess. Farmers and workers continue to be marginalized, environmentally irresponsible practices remain the norm, animals are mistreated on a massive scale, rates of hunger
and food insecurity are alarmingly high, and chronic diet-related disease is on the rise across the globe.

I find myself with mixed feelings about the whole enterprise. On one hand, I'm skeptical that these technological fixes will automatically lead us to some sort of agricultural utopia. But I'm also concerned that many who identify with the food movement might be missing out on the chance to shape the future of food because they're turning their backs on food science altogether.

According to Professor Cor van der Weele, a philosopher of biology at Wageningen University in the Netherlands who studies public perception of animal protein alternatives and has a book forthcoming on the topic, my reaction is far from unique.

"Meat has, for a long time, led to a very polarized debate—you were either a vegetarian or a staunch meat lover," she explained. "Cultured meat has been very effective in undermining those polarities. It brings ambivalence more to the foreground, and it also makes possible the formation of new coalitions."

I'm interested in the possibilities these new coalitions present. But it's hard not to wonder: Could what's good for Silicon Valley really be good for eaters in South L.A., food entrepreneurs in Detroit, and farmers in Iowa? Could the “post-animal bioeconomy” bring us the kind of sustainable and fair food system we've all been waiting for?

Farming Beyond Meat
When I stepped into the El Segundo, California office of Ethan Brown, CEO of Beyond Meat, the writing was literally on the wall. Four stylishly designed posters outlined the company’s mission: improving human health, positively impacting climate change, addressing global resource constraints, and improving animal welfare.

“We’re lucky that for the first time in a long time, profit-seeking behavior and what’s good are aligning,” Brown told me.

“The whole genius of the thesis of what we’re doing is that you don’t have to have the mission in mind for it to be the right thing to do,” added Emily Byrd, a senior communications specialist at the Good Food Institute, a non-profit that promotes and supports alternatives to animal agriculture and works with companies such as Beyond Meat. “That’s why writing efficiency into the process is so important.”

Food-tech proponents insist that animals are really poor bioreactors for converting plants into protein. They suggest we simply skip that step—either by building meat directly from plant sources or using a laboratory bioreactor to grow meat cultures.

It would be a clear win for animals, and one that could mitigate the negative environmental impacts of factory farming at a moment of growing global demand. But what would it mean for farmers?

For one, it would require a lot less corn and soybeans—the two crops that currently dominate this country’s farm landscape. Shifting the commodity system wouldn’t be easy, but Brown argues that, “If you were to redesign the agricultural system with the end in mind of producing meat from plants, you would have a flourishing regional agricultural economy.”

By relying on protein from a wider range of raw ingredients—from lentils to cannellini and lupin—he says companies like his have the potential to diversify what we grow on a mass scale. It would be better for the soil and water, and farmers could theoretically benefit from having more say in what they grow with more markets to sell their goods.

When it comes to putting this type of system into practice, however, a lot of details still need to be worked out. Byrd pointed me to the writings of David Bronner, CEO of Dr. Bronner’s soap company, who envisions a world of plant-based meats and regenerative organic agriculture. He suggests that the soil fertility-boosting power of diversified legume rotations, combined with a modest amount of Allan Savory-inspired livestock management, could put an end to the factory farm and the massive amounts of GMO corn and soy (and the herbicides) that feed it.

Even cultured meat advocates see a future that is better for farmers once we move away from raising animals for food.

“In my mind, farmers are the ultimate entrepreneurs,” said Dutch scientist Mark Post, who created the first cultured hamburger, at the recent Reducetarian Summit in New York. “They will extract value from their land however they can. And if this is going to fly and be scaled up, we need a lot of crops to feed those cells. And so the farmers will at some point switch to those crops because there will be a demand for it.”

What crops and what types of farms would feed those cells? Right now it’s unclear, since up to this point cultured meat has used a grisly product called fetal bovine serum to do the job. Along with the
continued use of animal testing, it's one of the few ways that these food-tech innovators have been unable to move beyond using animals completely. Several companies claim they've begun to find plant-based replacements for fetal bovine serum, assisted in the discovery process by complex machine learning systems like Hampton Creek’s recently patented Blackbird™ platform. But intellectual property keeps them tight-lipped on the particulars.

As for how those crops—and others used in the production of meat alternatives—would be produced, there's not much more clarity. In my conversations with people in the food-tech world, the opinions on organic and regenerative agriculture ranged from strongly opposed to agnostic to personally supportive. But with the likes of Gates and Cargill playing an increasingly big role in the sector, it's unlikely that a wholesale switch toward these practices is on the horizon.

It's not surprising, then, that some food activists are not buying what the alternative animal product advocates are selling.

**Big Questions About Big Promises**

“We want to see a food system in the hands of people and not in the hands of profit-driven companies,” said Dana Perls, senior food and technology campaigner for Friends of the Earth (FOE).

She expressed a set of misgivings about the role of genetic engineering and synthetic biology in the plant-based and cultured meat space. Are these products really about sustainably feeding the world or are they more about investor profit? Are we sure we know the long-term health impacts?

Perls noted the U.S. Food & Drug Administration's (FDA) recent decision to stop short of declaring that a key genetically modified ingredient in Impossible Foods’ plant-based “bleeding” Impossible Burger was safe for human consumption. That determination did not mean the burger was unsafe, however, and Impossible Foods stands by its integrity.
Perls was encouraged by the fact that some plant-based products—like those produced by Beyond Meat—do not use GMO ingredients. And she recognized that, from a technical perspective, cultured meat does not necessarily use genetic modification either—although it could in the future. But she and others are still uneasy. “The fact that there is a lot of market-driven hype propelling these genetically engineered ingredients ahead of safety assessments and fully understanding the science is concerning.”

Other concerns have been raised about the healthfulness of highly processed alternative meats which often lack a strong nutrient profile. But food-tech advocates maintain that conventional meat products go through multiple layers of processing, too, even if the label doesn’t always reflect it. And they are quick to note that meat is a major source of foodborne illness and has been associated with cardiovascular disease.

“[Our] number-one driver is far and away human health,” Beyond Meat’s Brown explained. “It’s absolutely the number-one thing that brings people to this brand.”

Plant-based and cultured meat producers see themselves promoting sustainability, promising healthier options in a world that demands convenience and good taste. But it’s not clear yet how universally accessible these products will be. Plant-based burgers made by Beyond Meat are now for sale in a number of grocery stores (including Safeway), for instance. But at about $12 a pound, they’re still much more expensive than conventional ground beef, which costs around $3.50 a pound, and even more than some higher-end ground grass-fed and organic ground beef, which sells for around $10 a pound.
Residents and activists in so-called food deserts are still calling for investments that provide access to fresh vegetables and create local economic growth. Alternative meat producers insist prices will come down once their supply chain improves, but only a concerted plan to promote equity will stop the venture-backed food-tech industry from reinforcing these types of longstanding nutritional and economic disparities.

“The decision about what an equitable food system looks like shouldn’t be determined by biotech itself,” FOE’s Perls argued. “We need to move with precaution, with transparency, and with a full understanding of what we’re doing so that we can make sure that we’re moving ahead in a way that has more benefits than harm.”

It’s hard to disagree with those assertions. At the same time, groups like FOE have been locked in a battle with the biotech world that often doesn’t allow either side to engage in a genuine dialogue. I, for one, don’t want to see that happen with these high-tech meat alternatives. Precaution is an important value, but aren’t there also serious risks if we don’t boldly engage with these scientific endeavors?

**An Appeal to Dialogue**

IndieBio companies like NotCo and Finless Foods say they want to communicate more with the public, helping to demystify new food technology and get people to become participants in the process of innovation.

“You have to be very transparent when you are changing the way that people eat. And that’s what we’re trying to do here,” said Finless Foods co-founder Michael Selden. “I’ve always been a political activist. And for me this is part of my food activism.”

If there’s any hope to build solidarity between food scientists and food activists, now is the time for those talks to begin. Perhaps the bigger question, though, is whether anyone is willing to listen.

“Within the scientific community, there’s this idea that every innovation leads to a future world that’s better,” Christopher Carter, a professor of theology who studies food justice and animal ethics, said. “But for many people of color, innovation and science have sometimes been harmful, or even come at their expense.”
In other words, if the biotech boosters are really interested in dialogue, it's important for them to engage with critical histories of food and technology, which will help them understand why earlier promises to sustainably feed the world have fallen short. Equity should be at the center of their work and addressing the concerns of the most vulnerable eaters and food producers must be part of their bottom line.

“If you have people at the table who are asking those kind of questions, and the people who are doing the innovation are actually taking them as valid questions, I think that could help mitigate some of the potential problems that are going to come up,” Carter argued.

On the other side, a necessary first step for the most diehard critics of genetic engineering would be to become more familiar with the basic biochemistry involved in these new products. Food movement advocates should also avoid knee-jerk reactions that romanticize “natural” foods while villainizing any and all food-tech innovation.

It's clear that food tech isn’t a silver bullet, but I'm also optimistic about the new coalitions that could take shape between scientists, investors, farmers, entrepreneurs, and eaters. We might never come to a clear consensus, but progress is only possible if we channel our ambivalence into honest, evidence-based, and historically grounded dialogue.

So if, like me, you are interested in a future of food tech that promotes real sustainability and food justice, I hope you'll join the conversation. I'll see you there, behind the glass walls.