THE 25% SHIFT

The Benefits of Food Localization for Boulder County and How to Realize Them

By Michael H. Shuman / February 2012

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REBUILDING COMMUNITY RESILIENCE AND SELF-RELIANCE

Foreword

Boulder-based **Transition Colorado** contracted economist **Michael H. Shuman** of **Cutting Edge Capital** to conduct a study on the potential economic impacts of increased food localization in Colorado, with a particular focus on Boulder County, and to examine challenges and opportunities for localization within our local foodshed. It was inspired by similar reports Shuman had completed for New Mexico and the Greater Cleveland area. We are now pleased to present Shuman's report from this study, "The 25% Shift: The Benefits of Food Localization for Boulder County & How to Realize Them."

One key purpose of this report is to provide producers, policy makers, local governments, investors, and entrepreneurs the economic perspective and data that will help justify significantly increased investments in local food and farming enterprises, especially in infrastructure redevelopment. The information contained here aims to lay the foundation for a new era of economic development through food localization.

This report is one part of a much larger project. Transition Colorado is organizing a **Boulder County Food Localization Plan**, a community food assessment and strategic planning process for actually achieving 25% food localization. Through the early stages of the process , we have been seeking to better understand the current dynamics of the local food system, the current value chains, as well as gaps, challenges, and opportunities. Ultimately, we expect to engage scores of community stakeholders to develop a comprehensive implementable food localization plan for Boulder County.

The major goal of the Boulder County Food Localization Plan is to create a significant economic development strategy for the region based on the production, processing, and distribution of locally-grown food. The Plan will outline the framework for developing a resilient and self-sustaining local food economy.

In this Foreword, we broadly describe the reasons for undertaking such a project, our methodologies, and important caveats.

Roots of the Local Food Shift

A local food revolution is already underway in many communities, although it's still in the very early stages. It's not simply about "lifestyle choices" or mere differences in values. This revolution is a response to a growing predicament at the heart of our food and farming system and at the heart of our globalized economy.

Tremendous changes are beginning to take place in the way we eat and the way we produce our food. In many communities the Transition movement is helping to catalyze this local food revolution—or as we are renaming it, the **Local Food Shift**—which is beginning to unfold around the world, and which we feel is one of the most hopeful, most promising developments of recent years.

The essence of this nascent movement is food localization—shifting from a globalized, industrialized food system in which we all are dependent on distant and unreliable suppliers for our basic food needs, to a resilient and self-reliant locally-based food supply system where communities are able

to provision their own essential food needs by relying on bio-intensive production methods that restore soil, rekindle connection with the land, and rebuild community.

The **Boulder County EAT LOCAL! Week**, organized by Transition Colorado, was an early cultural expression of the local food shift in Boulder County, combining a community celebration of local food and farming, an experiential connection with the local culture that is emerging around local food, and the recognition that new food and farming enterprises are promising precursors of a new economic paradigm. It demonstrated that many people in Boulder County are already beginning to shift toward local food.

The benefits of food localization are well known and worth repeating:

Health Returning to a seasonal, mostly organic local diet will significantly improve the health of our communities, especially our children, and dramatically reduce health care costs.

Environment Shrinking our "foodshed" (which now stretches around the globe) will not only reduce food-miles, but bio-intensive cultivation methods will also sequester carbon in the soil, making food localization one of the most effective approaches to reducing greenhouse gas emissions.

Economy Rebuilding our local food system is one of the most important strategies for strengthening our local economy; food localization can create new jobs and generate hundreds of millions of dollars in new economic activity.

PREPARING LOCALLY FOR THE GLOBAL FOOD CRISIS

The local food shift has come about from a grassroots demand for increased access to fresh, organic, healthy food grown close to where consumers live (preferably by people they know and trust, maybe even by themselves). It is what more and more of us want for our children, for our families, for our own bodies, and for our own well-being.

Inspired and informed by authors and speakers like Michael Pollan, Barbara Kingsolver, Joel Salatin, and Will Allen, and by such films as "Food, Inc." and "The World According to Monsanto," many people also see something new appearing in our troubled society—an inspiring cultural shift. Long before anyone was calling it a movement, there was something wholesome about this local food shift. And there was a strong undercurrent of joyfulness, even fun, as we began to rediscover our connection with land and neighbors and food.

However, from the very beginning this movement was deeply guided by an underlying but often unspoken realization that it was imperative for our communities to learn how to feed themselves again; that it was necessary to begin to wean our communities from dependence on globalized industrialized food systems; that it was necessary to reclaim our food sovereignty and develop resilience and self-reliance in our food supply at the community level.

The reasons for these necessities are essential to understand. Here are the core dynamics as we see them:

- A convergence of global crises—inevitable fossil fuel depletion (aka "peak oil"), compounding effects of climate change, and global economic instability—is likely to disrupt the global food supply in unexpectedly devastating ways.
- A thorough analysis of these factors leads to an inescapable conclusion that the growing global food crisis will soon land in our own communities (even in Boulder County).
- Therefore, it is now essential (and unavoidable) to quickly shift from a globalized/industrialized food system to one that is far more local, far more human-labor-intensive, and far less dependent on fossil fuels (for fertilizers, pesticides, insecticides, and herbicides—as well as for processing, storage, cooling, heating, and transportation).

In view of these dynamics, there is little choice but to rapidly localize our food system to the maximum extent possible.

FROM COMMODITY EXPORT AGRICULTURE TO LOCAL FOOD PRODUCTION

As in most places, since World War II agriculture in Boulder County has become primarily focused on producing exports. Conventional farmers have been told that their mission is "to feed the world." Thus, approximately 95 percent of all agricultural production in the county is exported.

At the heart of the local food revolution is the concern that our ability to meet our basic food needs locally has been thoroughly undermined by big agribusiness, including the "value-added" food processors whose products have added considerable heft to our waistlines and contributed directly to a national health crisis of obesity, Type II diabetes, and a host of food-related diseases. The real cost of this arrangement has been very high.

Local food advocates are also acutely aware that the globalized food system is highly dependent on fossil fuels for inputs (synthetic fertilizers and pesticides), processing, storage, cooling, and transportation. They see increasing signs that dependence on foreign oil—inevitably increasing in price as global oil production peaks—puts big agribusiness and "conventional" agriculture in a no-win situation, and that the misnamed "Green Revolution" is exhibiting signs of failure in the face of already-devastating impacts of climate change.

They are equally concerned that widespread application of synthetic chemicals is jeopardizing long-term soil fertility. "The soil is a living thing, and we are murdering it," says Carlo Petrini, founder of the Slow Food movement. "Industrial agriculture has embraced the idea of farming without farmers," he says, "but at this rate one day we'll be forced to farm without land."

To complicate matters further, as author Anna Lappé concludes in *"Diet for a Hot Planet: The Climate Crisis at the End of Your Fork and What You Can Do About It,"* the way we currently grow, process, ship, market, and cook our food may be contributing more than 30 percent of all greenhouse gas emissions.

All these factors have combined to make food one of the most unsustainable spheres of human activity. Food localization begins to reverse this trend, and to establish a healthy and regenerative local food economy.

FOOD LOCALIZATION AS ECONOMIC DEVELOPMENT

There are many reasons for pursuing food localization here—and everywhere—but perhaps the most compelling for residents of Boulder County and Colorado will be its positive contribution toward economic development.

We were initially inspired by what happened in Woodbury County, Iowa, where a visible decline in agriculture led to a decision to localize food and farming, with a focus on organic agriculture. Among the drivers were a 100% tax rebate on agricultural land converted to organic, and a mandatory local organic food purchase policy in local government. Such decisions, beginning in 2005, led to smaller farms, more labor, and higher income in the ag sector. In Woodbury County, conversion from industrial agriculture and growing commodity crops to organic agriculture was understood—and now demonstrated—as a powerful way to strengthen their local economy.

Subsequently, we learned of a study that economist Michael Shuman had prepared for Bioneer's Dreaming New Mexico, published in early 2010, demonstrating the economic impact for food localization for the entire state of New Mexico.[1] The numbers were heartening. Then in December 2010, Shuman and his two colleagues, Leslie Schaller and Brad Masi, published the results of their major study for Northeast Ohio, the Greater Cleveland area of more than four million people, showing that 25% local food shift there could mean 27,000 new jobs, and could increase annual regional output by $4.2 billion. This persuaded us to enter discussions with Shuman to do a similar study for Boulder County.

In fall 2010, an individual inspired by the local food shift committed $1.5 million to help stimulate "Slow Money" type investment[2] in local food and farming enterprises, and placed those funds into the stewardship of Transition Colorado. In early 2011, we persuaded this individual—who wishes to remain anonymous—to devote a small amount of that money to help fund a food localization study like we saw for Northeast Ohio, and the commissioners of Boulder County contributed additional funds to help support the process. Thus, in February 2011 we were able to commission Shuman to undertake the first part of this study.

One of the significant perspectives to emerge from Shuman's report is that the total value of all agricultural products in Boulder County, even if they were entirely consumed locally, is only about 5% of the total value of all food consumed by households in the county. This helps to clarify the extent to which our local food economy is dramatically out of balance in favor of export-oriented commodity agriculture, with tens of millions of dollars leaking out of the local economy each year.

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1 "The 25% Shift: The Benefits of Food Localization for Northeast Ohio & How to Realize Them," available at http://www.neofoodweb.org/sites/default/files/resources/the25shift-foodlocalizationintheNEOregion.pdf.

2 Based on the principles outlined in "Inquiries Into the Nature of Slow Money," by Woody Tasch (Chelsea Green Publishing 2008). See www.SlowMoney.org for more information.

Shuman argues that the biggest downside of a non-localized food system is economic: "Every time you choose not to be self-reliant in a given good or service, you're giving away business opportunities. So you not only lose the income, wealth and jobs associated with that business, but all of the jobs and income and wealth that would have come from linked businesses, with the so-called multiplier effect as a dollar works its way through the economy from one local business to another. Figuring out how to bring those businesses back into the community is a key strategy for economic development."

Shuman also contends that the number one priority in food localization is local investment in food and farming enterprises. "We need to crack open funds that are being 100% invested in non-local business," he says, "and move them into local reinvestment." Transition Colorado is now in the process of establishing a variety of investment structures (including Slow Money investment clubs) which will help connect local investors with local food and farming enterprise.

DEVELOPING A BOULDER COUNTY FOOD LOCALIZATION PLAN

Many of us working towards the local food shift have long had some sense of how important food localization could be economically, but Shuman's current report provides—for the first time—explicit numbers about the potential magnitude of the benefits. These numbers begin to change the whole conversation about local food. What we're beginning to see is that the opportunities for growth and expansion in local food and farming enterprises are tremendous.

Shuman's report is the first part of the Boulder County Food Localization Plan. His report is mostly about economics, providing an economic baseline for understanding the potential impacts of a 25% local food shift and pointing to some of the rather generic possibilities (based on his earlier work in New Mexico and Northeast Ohio), covering three areas of geographic scope: [1] Boulder County itself, our primary area of focus; [2] the 13-county area of the Northern Colorado Front Range (including Denver); and [3] the entire state of Colorado.

But knowing what's possible economically is only the beginning. The next phase of the work is more challenging, for it is about assessing the strengths and vulnerabilities, problems and opportunities in our local foodshed, and charting a course—a realistic strategic plan—for actually achieving a significant amount of food localization in Boulder County. Toward this end, Transition Colorado is forganizing an ongoing community-based assessment and planning process, including:

- Formation and management of working groups focused on various food and farming sectors
- Oversight of feasibility studies for specific proposed food industry development
- Development of a public website as an interactive platform for communicating results of the process, sharing stories and documents, engaging the community
- Active engagement of a significant number of community members and stakeholders in the analysis and planning process
- Publication of a book that embodies the culmination of the study and plan

A key strategy in the process will be the deployment of several Working Groups around topics of common interest. These groups will contribute to our understanding of the multitude of viewpoints and ideas around how to advance localization efforts within the various food sectors in Boulder County and beyond. Working groups will be asked to conduct surveys and convene community discussions throughout the duration of the process, which in one form or another will cover these topics:

- Production and Processing, Small Grains and Beans
- Production and Processing, Poultry
- Production and Processing, Meat and Dairy
- Commodity Agriculture
- Consumer Education and Demand
- Community Engagement
- Feasibility Studies, Capitalization and Finance
- Food Security, Access, Sovereignty, and Justice
- Infrastructure: Distribution, Processing, and Warehousing
- Value-Added Food Production
- Government Policy
- Natural Resources (e.g., energy, water, soil)
- Urban Agriculture and Home Food Production
- Season Extension
- Orchards and Fruit Production
- Food and Health
- Local Food Shift Campaign
- Institutions and Food Localization
- Restaurants and Food Localization
- Retailers and Food Localization
- Land Access
- Supporting Businesses

REGIONAL FOOD LOCALIZATION

Shortly after Denver Mayor Michael Hancock took office in 2010, he appointed a 19-member Denver Seeds Task Force "to design a sustainable local food system that promotes access to healthy and affordable food for all of Denver's residents, creates jobs, and honors both people and the planet." This Task Force is now engaged in a community food assessment and planning process remarkably similar to what we began earlier in Boulder County, with a particular focus on food access, food security, and urban agriculture. Transition Colorado is now actively partnering with Denver Seeds to ensure that both efforts are proceeding with parallel goals and methodologies, with the explicit goal of maximizing food localization regionally.

The Mayor's Office has already contracted with Transition Colorado to commission Michael Shuman to provide a study on the economic impacts of 25% food localization in the City and County of Denver. Shuman's Denver report will help stimulate and coordinate regional food localization efforts.

CAVEATS

Shuman's calculations on the economic impacts of a 25% shift rely on the IMPLAN input-output model, which is widely used by economic development professionals around the country. We are well aware that these methods are open to critique, and Shuman himself offers his own qualifications for the analysis. We welcome constructive feedback. Meanwhile, we offer some of our own caveats and cautions.

The reality is that all the data available on the food part of our economy, whether from the federal government, the state, or IMPLAN, have weaknesses. The Ag Census on farming only comes out every five years, for example, and the most recent published data came out in 2007. All published data have gaps and mistakes. Nonetheless, Shuman's analysis draws from the most current and accurate data available, and he is careful to identify places where our Steering Group have raised questions about the data. For instance, USDA data famously depend on voluntary farm reporting, which many farmers are reluctant to transparently provide.

Even with these qualifications, however, the results of Shuman's analysis are both useful and compelling. With his work as a reference, we can confidently proclaim that food localization is a powerful and even essential strategy in building a healthy local economy. Moreover, by focusing on plugging the largest food "leaks" in our economy, we now know which business opportunities to prioritize for capitalization, entrepreneurship training, and other forms of economic development.

We note that Shuman assumes that county food exports will remain constant. In other words, the only changes he posits are in the behavior of local purchasers, and he then analyzes how that increased local demand will expand the size and number of local food businesses in the county. This is reasonable from an economist's perspective. However, he notes that there may be good reasons to shift scarce agricultural land in the county from production for export to production for local markets. Our Steering Group is actively exploring this possibility.

Finally, as Shuman himself notes, a 25% shift is largely about what's possible, not what's probable. No one associated with this study/plan anticipates that 25% localization is achievable in all food business sectors. Indeed, the 25% goal was chosen in part to reflect that for some sectors more localization will be possible, and in others less will be. Some areas of localization will require creating whole new industries. For instance, fish production will require development of aquaculture and the infrastructure to support it. Organic poultry will require building a complex value chain that includes seed development, feed production and milling, broiler production, processing, and distribution.

TOWARDS THE FUTURE

This report is meant to help frame the priorities for pursuing food localization in Boulder County and beyond—and to inspire and guide follow-on action. It is our hope that it will stimulate members of the community to join us in developing further analyses and, most importantly, to collectively arrive at realistic comprehensive strategies and specific plans for actually achieving 25% food localization. Similarly, we hope that other Colorado counties will take up their own studies, and undertake their own planning processes to achieve a significant amount of food localization.

Because our local food infrastructure has been totally dismantled in favor of chemical-based fossil-fuel-dependent corporatized globalized systems, we must now quickly rebuild that infrastructure in order to regain the capacity to provision our communities with locally-produced food. Here in Boulder County, we need scores of new farms, hundreds of new farmers, thousands more acres devoted to food production for local consumption, along with new food processing, storage and distribution systems to support the local food shift. Enormous amounts of capital will be required to achieve all this, but the potential benefits far outweigh the costs.

With this report, our intention is to provide policy makers, executive, entrepreneurs (from farmers to value-added producers), bankers, investors, and government officials with the perspective and data that will justify the policies, decisions, commitments, and investments that will be needed to meet the needs and unleash the enormous opportunities that are associated with a significant level of food localization in Boulder County and beyond.

Shuman makes the claim, "It is hard to find any economic development proposal for Boulder County, past or present, that would have as significant an impact as the 25% shift." We heartily concur, and we invite you to join us in growing Boulder County's role as one of the nation's leaders in the local food shift!

Lynette Marie Hanthorn, Executive Director
Michael Brownlee, Catalyst

Transition Colorado
2415 19th Street, Boulder, CO 80304
303-494-1921
www.TransitionColorado.org

About Michael Shuman

Michael H. Shuman is director of research for **Cutting Edge Capital** and lead author of *"Community Food Enterprise: Local Success in a Global Marketplace,"* published by the Wallace Center at Winrock International. His new book, *"Local Dollars, Local Sense: How to Shift Your Money from Wall Street to Main Street and Achieve Real Prosperity,"* has just been published by Chelsea Green Publishing as one of Post Carbon Institute's *"Community Resilience Guides." Shuman previously authored "Going Local: Creating Self-Reliant Communities in a Global Age"* and *"The Small-Mart Revolution: How Local Businesses Are Beating the Global Competition."*

For further information, contact:

Michael H. Shuman
Cutting Edge Capital
2203 Quinton Road, Silver Spring, MD 20910
202-669-1220
shuman@igc.org

Steering Group for Boulder County Food Localization Plan

(As of February 2012)

- David Bell, Boulder County Parks & Open Space
- Mikl Brawner, Harlequins Gardens
- Michael Brownlee, Transition Colorado
- Keith Frausto, Center for Resource Conservation
- Dave Georgis, Boulder County Farmer Cultivation Center
- Luther Green, Preserving Community
- Scott Gwozdz, Leeds Business School, University of Colorado
- Erik Johnson, Boulder County Food and Agriculture Policy Council
- Jim Ott, Food & Agriculture Industry Consultant
- Lauren Richardson, Agricultural Journalist, Scribe
- Paul Riederer, Facilitator
- Lisa Rogers, Feed Denver
- Rachel Zatterstrom, Naropa University Graduate Student

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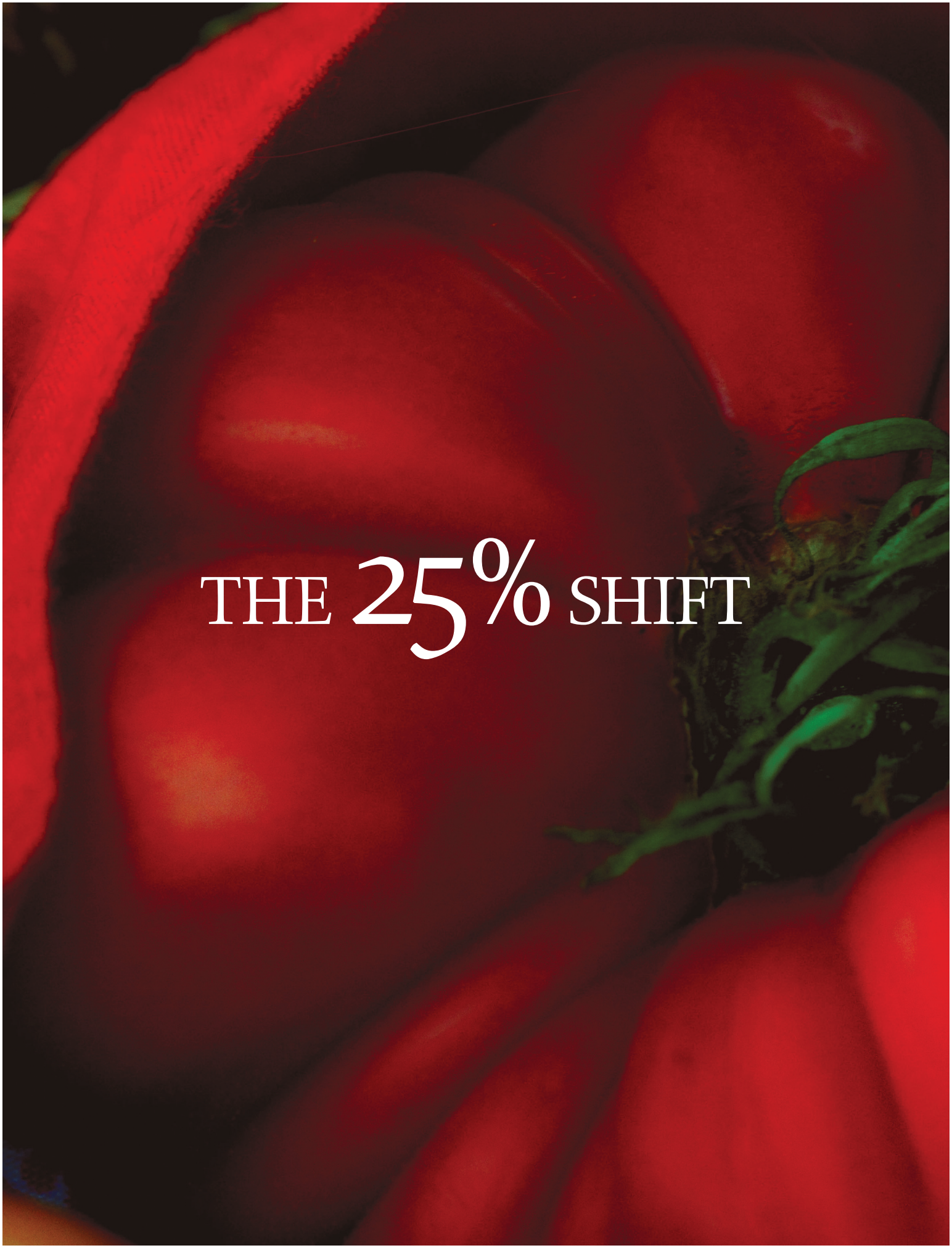
THE 25% SHIFT

Executive Summary

Attentive to recent trends like rising energy prices, Transition Colorado is leading a coalition of grassroots organizations to promote food localization in Boulder County. This effort includes: creating vehicles for local capital formation to support new or expanded local food businesses; underwriting an innovative local food-distribution enterprise; and commissioning this study and a linked strategic plan to help focus these initiatives.

The study begins by analyzing the food system in Boulder County, and then examines the economic impacts of the county moving a quarter of the way toward fully meeting local demand for food with local production, processing, and distribution. It suggests that this 25% shift could create 1,899 new jobs, providing work for more than one in seven unemployed residents. It could increase annual wages in the county by $81 million, gross county product by $138 million, and state and local business taxes by $12 million.

The analysis is then extended to North Central Colorado (representing two-thirds of the population in the state) and to the entire state of Colorado, and shows how a 25% shift could create 24,037 jobs and 31,022 jobs for these two areas, respectively.

At whatever scale the 25% shift is undertaken, it also delivers myriad other benefits, including: increasing the food security of people who suffer from obesity and Type-II diabetes; improving air and water quality and lowering the local carbon footprint; attracting tourists; supporting local entrepreneurship; and boosting civic pride.

Standing in the way of the 25% shift are formidable obstacles. New workforce training and entrepreneurship initiatives are imperative for the managers and staff of these new or expanded local food enterprises. Land must be secured for new farms. New capital is needed. And consumers in the region must be further educated about the benefits of local food and the opportunities for buying it.

Within Boulder County, the biggest challenge is land. For the full benefits of the 25% shift to be realized in Boulder County, it will probably be necessary to convert farmland from resource-intensive commodity agriculture to biointensive local food growing. A shift in local diets, towards less meat, also will help make the shift more feasible.

To overcome these obstacles, we offer several ideas for programs and investment priorities. In a period of fiscal austerity, we argue, the priority must be to create "meta-businesses" that can support the local food movement on a cash-positive basis. For example, to mobilize consumers in the region to buy local food, we suggest creating local debit, credit, and gift cards, and purchasing platforms that better connect local food businesses to one another and to government procurement agencies.

The final proposal we offer is a Boulder County Food Authority that might sell tax-exempt municipal bonds that in turn help to collateralize loans from local banks and credit unions to high-priority local food businesses.

Acknowledgments

The author wishes to thank Michael Brownlee and Lynette Marie Hanthorn, co-founders of Transition Colorado, for commissioning this work, as well as their Steering Group for providing ongoing feedback. Thanks also to Dr. Dawn Thilmany McFadden and Allie Gunter of Colorado State University, Ft. Collins, for helping design, undertake, and improve the IMPLAN calculations.

This study draws extensively from a similar paper done by the author for the greater Cleveland region. That paper, entitled "The 25% Shift: The Benefits of Food Localization for Northeast Ohio and How to Realize Them," was prepared for ParkWorks and the Cleveland Foundation with the assistance of Brad Masi and Leslie Schaller. Large sections of that paper—about the local food revolution generally and about meta-business solutions—appear here only slightly edited and updated. The data here, however, were calculated exclusively for the three study regions in Colorado.

Introduction

The Local Food Revolution

Any doubts about the importance of the local food movement in the United States were dispelled in May 2007, when the cover of Time magazine proclaimed "Forget Organic, Eat Local." That same year, the Oxford Dictionary called "locavore" one of its important new "words of the year." And Barbara Kingsolver's book *"Animal, Vegetable, Miracle,"* describing her family's efforts to embrace a 100-mile diet, became a national bestseller. Today, anyone who walks through an American city, suburb, or town will find at least one restaurant, supermarket, or farmers' market advertising its connection to local food. Even the U.S. Department of Agriculture is celebrating and promoting local food. And the movement is spreading worldwide. Slow Food International, for example, boasts more than 100,000 members in 132 countries.

The local food revolution has come to Boulder County, as is evident in the proliferation and success of farmers' markets, community-supported agriculture (CSA) networks, restaurants and grocery stores specializing in local food, new local food delivery businesses, farm-to-school programs, and local organic food standards—some of which have inspired similar initiatives around the country. Many County residents, however, do not yet recognize the full significance of this revolution. They appreciate that local food is aesthetically pleasing, tastes good, and supports the growth of enjoyable farmers' markets. However, many believe that local food is a luxury that's too expensive for residents living on tight budgets.

In fact, local food is becoming a powerful economic development strategy, its players in the many thousands, and its products and services increasingly competitive. Among its many benefits are the following:

Stronger Community Economies

Local food is a critical economic driver for local economies. Local food businesses can provide the region with thousands of new jobs and pay millions in new state and local taxes. Every loaf of bread unnecessarily imported means the leakage of bread dollars outside the local economy and the loss of local bread business that could contribute to community prosperity. But the case for locally-owned food businesses is even more compelling, because locally-owned businesses spend more of their money regionally than do comparable non-local businesses. Unlike outsider-owned businesses, local businesses tend to have local CEOs, advertise in local media, hire local accountants and attorneys, and reinvest profits in their community. Numerous studies have documented that a dollar spent on a local business yields two to four times the "economic multiplier"—the underlying source of income, wealth and jobs—as an equivalent non-local business.[3] Additionally, there is a growing body of evidence that local businesses are particularly good at attracting tourists and future entrepreneurs, promoting creative economies, and stimulating charitable contributions.[4]

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3 The best studies in this area have been done by two economists at Civic Economics based in Austin. See, for example: "Economic Impact Analysis: A Case Study," monograph (Civic Economics, Austin, Texas, December 2002); and "The Andersonville Study of Retail Economics," monograph (Civic Economics, Austin, Texas, October 2004). Both can be downloaded for free at www.civiceconomics.com.

4 Michael H. Shuman, *The Small Mart Revolution: How Local Businesses Are Beating the Global Competition* (San Francisco: Berrett-Koehler, 2006), pp. 39-62.

Ecological Sustainability

Local food promotes not only general economic development, but also sustainable economic development. Farmers, whether rural or urban, are among the most important stewards of the land. Because agriculture accounts for approximately 30% of the earth's land surface, environmentally sensitive production of foodstuffs is critical to maintaining healthy habitats, air, water, soil, and ecosystems needed to support healthy people.[5] To eat sustainably, moreover, means growing and processing foodstuffs in a sustainable manner, and doing so within a local ecosystem makes the effort all the more compelling. Any community on the planet that cannot sustainably feed itself necessarily places burdens on the ability of other communities to feed themselves. Put positively, business models that meet local food needs sustainably can, if shared and multiplied, teach communities in other parts of the world to feed themselves sustainably.[6] Moreover, since local businesses, including local food businesses, tend to spend their money locally, their "inputs" travel less, use less energy, and thereby emit fewer pollutants and less climate-disrupting carbon.

Better Nutrition and Health

Another dimension of economic development is the well-being of human capital, and here local food also has much to contribute. Because many foods lose nutrients over time, local food means quicker delivery of foodstuffs with generally greater nutritional value. Moreover, knowing a farmer or rancher tends to enhance a consumer's trust in the healthfulness of his or her products. Local foods also typically involve less processing, which means fewer chemicals and additives. While Boulder County has earned a reputation as one of the healthiest populations in the country, economist Ken Meter, using Centers for Disease Control data, reports that "49% of county residents are overweight (35%) or obese (14%)" and the "medical costs for treating these conditions in Colorado are estimated at $874 million per year."[7] Replacing processed food with fresh food, as author Michael Pollan argues, is a powerful way to improve consumer health and reduce the incidence of obesity and diabetes.[8] Every headline about a breakdown in the mainstream food system—outbreaks of *E.coli* in hamburger meat or peanut butter from distant suppliers, for example—is a reminder about the health value of purchasing food from producers they know and trust.

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5 World Resources Institute, *World Resource 2000-2001 People and Ecosystems: The Fraying Web of Life* (Washington: Elsevier Science, 2000), p. 56.

6 The growing, harvesting, raising, or capturing of specific foodstuffs are all dependent on many natural endowments—water, climate, ecology, genetics—that are not universally available. But technology is steadily leveling the playing field to the point where there are compelling examples of communities feeding themselves in every geographic locale—cold or hot, wet or dry, high or low, urban or rural. The development and spread of better and cheaper greenhouses, hydroponics, rooftop and backyard gardening, and urban farms will hasten this equalization. A further point is that even if a community is capable of producing no raw foodstuff, it still in theory can find, from other communities, excellent models for small-scale food processing, distribution, retail, and restaurants. And from a value-added standpoint, these may be by far more important than raw food production.

7 Ken Meter, "Boulder Couny Local Farm and Food Economy" (monograph) (Minneapolis, MN: Crossroads Resource Center, February 2009).

8 Michael Pollan, *In Defense of Food: An Eater's Manifesto* (New York: Penguin, 2008).

More Civic Engagement

A final important component of economic development, as Harvard sociologist Robert Putnam has argued in *Bowling Alone*, is civil society.[9] Anyone who has been to a farmers' market knows that the shopping experience is fundamentally different from that of a typical supermarket (let alone a Wal-Mart Supercenter). A supermarket is about finding and purchasing foods as quickly and efficiently as possible. A farmers' market is about consumers chatting among, learning from, and developing relationships with local food producers, and about neighbors interacting with one another. An entire sociology literature underscores that communities characterized by local business result in greater civic welfare, less social strife, and greater equality.[10]

It is true that, at the moment, local food tends to cost more than mainstream food. But two points are worth making here. First, one important reason local food prices are high is that demand exceeds supply. Additionally, a lack of distribution and aggregation infrastructure reduces efficiencies and cost savings in the local food system. As local food businesses grow and spread, prices will begin to adjust downward. Second, economic success does not just occur with provision of the lowest price goods and services. No one, for example, would criticize Starbucks as a failed model because its lattes are the most expensive in town. Consumers of all incomes are not only looking for the lowest priced food but also the best value for a given price. And in many ways, consumers—even low-income consumers—are finding that local food, even if it's nominally pricier, delivers better value.[11]

Still, for the local food movement to reach its full potential, the price gap between local and conventional food, where it exists, will have to shrink. This may well be on the verge of happening. At least five trends are likely to help local food undercut the global competition over the next decade:

Distributional Inefficiency

While the production costs of food can be brought down by moving factories to low-wage regions with few regulations, global distribution of food is becoming increasingly inefficient. Economist Stewart Smith of the University of Maine, for example, estimates that a dollar spent on a typical foodstuff item in the year 1900 wound up giving 40 cents to the farmer, with the

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9 Robert Putnam, *Bowling Alone* (New York: Simon & Schuster, 2000).

10 See, e.g.: C. Wright Mills and Melville Ulmer, "Small Business and Civic Welfare," in Report of the Smaller War Plants Corporation to the Special Committee to Study Problems of American Small Business, Document 135. U.S. Senate, 79th Congress, 2nd session, February 13. (Washington, DC: U.S. Government Printing Office, 1946); and Thomas A. Lyson, "Big Business and Community Welfare: Revisiting A Classic Study," monograph (Cornell University Department of Rural Sociology, Ithaca, NY, 2001), p. 3.

11 A recent study found that 500 South Carolina consumers were willing to pay 27% more for locally grown produce and 23% more for local animal products. Carlos E. Carpio and Olga Isengildina-Massa, "Intermediate Economic Evaluation of the South Carolina Agricultural Marketing and Branding Campaign," working paper, March 2008. Another study of residents in Maine, New Hampshire, and Vermont found that 17 to 40% of consumers in each state were willing to pay two dollars more to buy a locally-produced five-dollar food item. Kelly L. Giraud, Craig A. Bond, and Jennifer J. Keeling, "Consumer Preferences for Locally Made Specialty Products Across Northern New England" (Department of Resource Economics and Development, Durham, NH), p. 20. See also: "Decomposing Local: A Conjoint Analysis of Locally Produced Foods," Kim Darby, Marvin Batte, Stan Ernst and Brian Roe. American Journal of Agricultural Economics, 2008, vol. 90, issue 2, pp. 476-486; Gretchen Nurse, Yuko Onozaka, and Dawn Thilmany McFadden, "Understanding the Connections Between Consumer Motivations and Buying Behavior: The Case of the Local Food System Movement," Selected Paper, Southern Agricultural Economics Association 2010 Annual Meeting. http://ageconsearch.umn.edu/handle/56494 (Access date: November 5, 2010); and J.K. Bond, D. Thilmany, et al, "Direct Marketing of Fresh Produce: Understanding Consumer Purchasing Decisions," Choices: The Magazine of Food, Farm, and Resource Issues, American Agricultural Economics Association, Vol. 21 (2006), pp. 229-235.

other 60 cents split between inputs and distribution.[12] Today, about seven cents of every retail food dollar goes to the farmer, rancher, or grower, and 73 cents goes toward distribution. Whenever the distribution cost greatly exceeds the production cost, there are opportunities for cost-effective localization. Not just in the United States, but worldwide, local distribution offers opportunities for reducing the need for, and expense of, every component of distribution, including transportation, refrigeration, packaging, advertising, insurance, and middle people. The Oklahoma Food Coop, for example, is a no-frills Internet-based food distribution company that has reduced distribution costs to 18 cents on the dollar.

Rising Energy Prices

Long-distance food distribution will become more costly still when, as most analysts expect, global oil prices rise.[13] Adding to these market forces are political pressures to enact carbon taxes to slow global climate disruption. Because foodstuffs have a relatively low value per unit weight (except for a few products like expensive wines and spices), they are disproportionately vulnerable to rising energy prices and taxes.

Homeland Security

Global concerns about terrorism have focused the attention of security officials on scenarios that national food supplies could be contaminated or destroyed.[14] They are recognizing that the shorter supply lines and community self-reliance that come with local food can reduce these security risks. This is translating into a recalibration of government policies to impose higher insurance premiums on global food producers and to offer more assistance to local food businesses. Professor David Orr of Oberlin College, for example, is consulting with the Joint Chiefs of Staff at the White House on the connection between distributed and self-reliant local food on the one hand and energy systems and national security on the other.

Telecommunications

The spread of the Internet, affordable computers, and mobile phones provide local food entrepreneurs with information about market opportunities that once was only available to larger companies. Even the smallest food and farm entrepreneurs are experimenting with no- or low-cost social media tools to reach their customers. The millennials, as an emerging demographic cohort, are already mobilizing their purchasing power in favor of local food in their quest for authenticity.

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12 Stewart Smith, e-mail to Michael Shuman, 2 December 2005, updating Stewart Smith, "Sustainable Agriculture and Public Policy," Maine Policy Review, April 1993, pp. 68-78.

13 See, e.g., Christopher Steiner, *$20 Per Gallon: How the Inevitable Rise in the Price of Gasoline Will Change Our Lives for the Better* (New York: Grand Central Publishing, 2009).

14 Brian Halweil, *Home Grown: The Case for Local Food in a Global Market* (Washington, DC: Worldwatch Institute, 2003) (Worldwatch Paper #163).

Local Finance

One of the most formidable barriers to the expansion of regional food economies is the lack of accessible local capital. The financial crisis of 2008, caused by global banks and investment funds that hid high levels of real estate risk in exotic securities and derivatives, has given many people worldwide a powerful incentive to move their savings into local banks and credit unions and their investments into local businesses. Internet-based tools like Prosper.com and Kiva.org, which are connecting local lenders with local food business borrowers, will soon be joined by local stock exchanges connecting local investors with local food businesses.

A final factor increasing the competitiveness of local food is that local food businesses themselves are learning from their global brethren how to compete more effectively. In fact, in every food category of the North American Industrial Classification System (NAICS), there are more examples of successful small business than examples of successful large business. Economists tend to focus on the average scale of an enterprise in a given NAICS category. What matters, however, is finding the appropriate scale food enterprise for a particular place. And even in relatively centralized sectors, like poultry production, there are compelling examples of small-scale success throughout the United States that can provide invaluable guidance to Boulder's food entrepreneurs.

As pointed out in a recent study on Community Food Enterprise funded by the Kellogg and Gates Foundations, locally-owned businesses are deploying more than a dozen strategies—such as low-cost technology, the Internet, vertical integration, consumer ownership—to compete effectively against large-scale players.[15] Moreover, networks of local food businesses and non-food businesses are forming—creating joint procurement cooperatives, for example—that are improving their economies of scale. Many local food advocacy groups and intermediaries are deploying peer learning strategies and network "communities of practice" to more effectively diffuse innovation for model replication.

In short, the local food movement is here to stay and likely to become more powerful. And Boulder County is already well positioned to take advantage of it. But significant barriers abound, and the region will only be able to realize the full array of benefits it if undertakes the significant private, public, and civic initiatives.

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[15] See Michael Shuman et al., Community Food Enterprises (Wallace Center, December 2009).

What Is Local Food?

To many, local food is about proximity—that is, discriminating consumers demanding higher quality food grown, raised, caught, processed, cooked, distributed, and sold by nearby people they know and trust. But equally important is local ownership of the food businesses involved in a region's food-supply chains. Proximity and ownership, of course, are naturally interrelated. Locally-owned food businesses tend to focus on local markets, and locavores tend to favor locally-owned businesses. But this is not always the case. As locally-owned food businesses grow, they naturally begin to reach into non-local markets.[16] And large, non-local businesses, including Wal-Mart and Sysco, who fully understand the growing market opportunity, are now attempting to provide local food to their customers.

This report is primarily about the economic benefits that flow from reduced food miles, with Boulder County businesses growing, raising, processing, packaging, distributing, cooking, and serving Boulder County customers. It assumes that nearly all the new businesses involved will be small and locally-owned. However, involvement of non-local businesses as market partners or investors in these initiatives is welcomed and encouraged.

About the Study

This study aims to help Boulder County fully realize the benefits of the local food revolution. Its three sections aim to answer the following questions:

What's going on here? Section I presents economic data on the existing food system, not just Boulder County's but also two regions that encompass it: North Central Colorado and the entire state.

What would be the impact of expanding the movement? Section II sketches a scenario of moving 25% of the way toward complete food localization, analyzing the benefits that would flow from it, and highlighting the biggest obstacles that stand in the way.

How could Boulder County strengthen the local food movement? Section III presents a composite of suggestions about how to overcome the obstacles facing the 25% shift.

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[16] Some think local businesses exporting food is an oxymoron—or at least contradicts the goal of helping other communities become more food self-reliant. In fact, the goal of the local food movement is better understood as maximizing self-reliance in communities worldwide, with the understanding and appreciation that some foodstuffs still must come from trade. With the greater wealth that comes from food self-reliance, communities will increasingly have the purchasing power to import more exotic foodstuffs. Ironically, worldwide food localization could well expand global trade.

The Boulder County Food System

According to the U.S. Census Bureau, in 2010 Boulder County had 294,567 people—almost six percent of the 5 million people living in the state of Colorado. Over the last decade, while the state has seen dramatic population growth (17%), the population of Boulder County has remained fairly stable. Compared to other Coloradans, residents of Boulder County are more white, educated, and wealthy. Boulder's citizens, including its growing Hispanic community, are highly entrepreneurial. As of November 2011, according to Colorado's LMI Gateway, Boulder County has a labor force of 178,195, with 10,576 unemployed.[17] The county's unemployment rate of 5.9% compared favorably to the state's rate of 7.8%.

A comprehensive picture of the Boulder County economy is possible using IMPLAN, the Minnesota Input-Output Model deployed extensively by economic development agencies nationwide. IMPLAN corrects, unifies, and fills in gaps in various federal data sets.

The most recent data available from IMPLAN, for 2009, show that the total value added for the county—the local equivalent of the Gross Domestic Product—is about $18 billion per year.[18] Of that, $10.5 billion goes to employees in wages, $1.2 billion to proprietors as income, and $5.3 billion to property holders as rent, interest, or profit. Another $1.1 billion is paid by Boulder businesses in states and local taxes. On the demand side, households spend $11.6 billion per year, and state and local government purchase $5.9 billion worth of goods and services.

Food is about 5-10% of the overall economy (depending on how one measures the economy). The first way to understand the economic impacts of food is to look at the supply of food (and food services) produced in Boulder County, and then the demand for that same food (and food services) inside Boulder County and outside.

To estimate local demand for food, an excellent tool is the Consumer Expenditure Survey, published annually by the U.S. Bureau of Labor Statistics, which lays out how much residents spend on various kinds of food products. Chart 1 takes national data on consumer expenditures on food, and adjusts it to the population and income of Boulder County. As shown, consumers spent about $840 million per year on food in 2010—$477 on store-bought food, and $363 million on eating out.[19] Another $59 million is spent on alcoholic beverages.

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17 The labor force and unemployment rate each describe the status of residents within a given geographic area—in this case Boulder County. The jobs data describe positions within a given geographic area filled by residents and nonresidents.

18 As this study neared completion, IMPLAN released 2010 data. Because we found errors in the 2009 agriculture sectors, IMPLAN's management gave us updated 2010 data for those sectors.

19 Using a different federal database, the 2010 Northern Colorado Regional Food Assessment calculated the total food demand in Boulder County to be $957 million (see Section 2, p. 30). IMPLAN estimates Boulder County household food demand to be $904 million.

Chart 1
Boulder County Consumer Expenditures on Food (2010)

Food	$839,455,995.47
Food at home	$476,787,305.90
Cereals and bakery products	$63,971,211.79
Cereals and cereal products	$22,514,624.50
Bakery products	$46,499,212.48
Meats, poultry, fish, and eggs	$102,487,872.15
Beef	$30,329,371.94
Pork	$18,267,679.40
Other meats	$15,666,473.56
Poultry	$17,471,999.32
Fish and seafood	$14,870,793.47
Eggs	$7,183,713.24
Dairy products	$52,380,766.94
Fresh milk and cream	$17,471,999.32
Other dairy products	$30,832,738.92
Fruits and vegetables	$91,236,148.38
Fresh fruits	$29,866,142.44
Fresh vegetables	$29,866,142.44
Processed fruits	$15,330,911.26
Processed vegetables	$15,666,473.56
Other food at home	$166,080,272.45
Sugar and other sweets	$16,633,070.04
Fats and oils	$14,535,231.18
Miscellaneous foods	$85,982,469.31
Nonalcoholic beverages	$41,285,670.89
Food prepared by consumer unit on out-of-town trips	$6,512,588.65
Food away from home	$362,668,689.56
Alcoholic beverages	$58,988,903.49

On the supply side, several different data bases give a good sense of the local food economy. The 2007 Census of Agriculture, published by the National Agricultural Statistics Service (NASS) of the USDA, provides a snapshot of raw local food production (an updated version will be published later this year). In 2007, 746 farms were managing 137,668 acres, with the average farm having 185 acres. The total value of agricultural products sold was $34 million, $26 million of which went to crops (including nursery and greenhouses) and $8 million to livestock, poultry, and their products. Within the crop category, the largest allocation of farmland is for hay (26,451 acres), followed by much smaller allocations for wheat (4,620 acres), corn (2,499 acres), and barley (1,337 acres). Within the livestock category, NASS reported annual sales of 10,771 cattle and calves, 3,915 horses and ponies, 1,343 sheep and lambs, and 1,105 ducks.

Historically, agriculture in Boulder County favored dryland farming. Its farms relied on water pumped over the continental divide and that was then distributed through an elaborate system of ditches. Along with scarce water, climate and soil factors made the land better for growing grains and legumes, and worse for growing fruits and vegetables. Grasses and hay also have grown easily, with much of it fed to cattle for meat production.

Chart 2 summarizes the largest sales items crops and food stuffs. By value, the most important crops in 2007 were nursery trees, hay, cattle, and grains (such as wheat, barley, and corn), nearly all grown for export.[20]

Chart 2
Agricultural Products of Boulder County (2007)

$15,041,000	Nursery, Greenhouse, Floriculture, and Sod
$6,414,000	Other Crops and Hay
$4,343,000	Cattle and Calves
$2,354,000	Grains, Oilseeds, Dry Beans, and Dry Peas
$1,975,000	Vegetables, Melons, Potatoes, and Sweet Potatoes
$1,607,000	Horses, Ponies, Mules, Burros, and Donkeys
$235,000	Sheep, Goats, and Their Products
$163,000	Fruits, Tree Nuts, and Berries
$78,000	Other Animals and Animal Products
$46,000	Cut Christmas Trees and Short Rotation Woody Crops
$28,000	Hogs and Pigs

Comparing Charts 1 with the USDA Census data provides a broad sense of the mismatch between local supply and demand. The total value of all agricultural products, even if they were entirely consumed locally, is about 4% of the total value of all food consumed by households in the county. But this percentage is misleading in two ways. It understates the absence of self-reliance, because most items grown locally are exported. And it overstates the problem, because raw food is only a small part of the value of the overall food supply system. Among the other parts of the system are food processors, consolidators, packagers, haulers, distributors, wholesalers, retailers, grocers, restaurants, and caterers.

To understand the supply side of the Boulder County food system, a useful tool is the North American Industrial Classification System (NAICS), which has about 1,100 categories of business. Chart 3 shows the composition of business for 133 of these categories that are directly related to food.

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[20] These numbers will be updated again later this year. The Steering Group suspects that sales of oilseeds, vegetables, sugar beets, greenhouse plants, and cattle will be higher.

Chart 3
Food Establishments in Boulder County (2009)

Industry Code	Industry code description	Total Establishments	'1-4'	'5-9'	'10-19'	'20-49'	'50-99'	'100-249'	'250-499'
113210	Forest nurseries and gathering of forest produ	1	0	0	1	0	0	0	0
113310	Logging	2	2	0	0	0	0	0	0
115112	Soil preparation, planting, and cultivating	2	1	1	0	0	0	0	0
115210	Support activities for animal production	14	10	4	0	0	0	0	0
115310	Support activities for forestry	1	1	0	0	0	0	0	0
311111	Dog and cat food manufacturing	1	1	0	0	0	0	0	0
311330	Confectionery manufacturing from purchased	3	0	3	0	0	0	0	0
311412	Frozen specialty food manufacturing	3	0	1	1	0	0	1	0
311423	Dried and dehydrated food manufacturing	1	0	0	0	1	0	0	0
311513	Cheese manufacturing	1	0	0	0	1	0	0	0
311514	Dry, condensed, and evaporated dairy product	1	0	0	1	0	0	0	0
311520	Ice cream and frozen dessert manufacturing	1	0	0	1	0	0	0	0
311612	Meat processed from carcasses	4	1	2	0	1	0	0	0
311615	Poultry processing	1	0	0	0	0	0	0	1
311811	Retail bakeries	9	4	2	3	0	0	0	0
311812	Commercial bakeries	8	5	0	0	1	1	1	0
311830	Tortilla manufacturing	2	2	0	0	0	0	0	0
311911	Roasted nuts and peanut butter manufacturing	1	1	0	0	0	0	0	0
311919	Other snack food manufacturing	3	2	0	1	0	0	0	0
311920	Coffee and tea manufacturing	4	2	0	1	0	0	1	0
311942	Spice and extract manufacturing	1	0	0	0	1	0	0	0
311991	Perishable prepared food manufacturing	6	1	1	3	0	1	0	0
311999	All other miscellaneous food manufacturing	4	2	2	0	0	0	0	0
312120	Breweries	5	1	1	0	3	0	0	0
312130	Wineries	2	1	1	0	0	0	0	0
312140	Distilleries	2	2	0	0	0	0	0	0
424410	General line grocery merchant wholesalers	1	0	1	0	0	0	0	0
424420	Packaged frozen food merchant wholesalers	1	1	0	0	0	0	0	0
424430	Dairy product (except dried or canned) merch	2	1	1	0	0	0	0	0
424450	Confectionery merchant wholesalers	3	2	1	0	0	0	0	0
424470	Meat and meat product merchant wholesalers	1	1	0	0	0	0	0	0
424480	Fresh fruit and vegetable merchant wholesaler	1	0	1	0	0	0	0	0
424490	Other grocery and related products merchant	14	6	2	4	1	1	0	0
424510	Grain and field bean merchant wholesalers	2	1	1	0	0	0	0	0
424820	Wine and distilled alcoholic beverage merchar	9	7	0	2	0	0	0	0
424910	Farm supplies merchant wholesalers	3	1	0	0	2	0	0	0
424930	Flower, nursery stock, & florists' supplies mer	4	1	1	1	1	0	0	0
444220	Nursery, garden center, and farm supply store	18	9	2	2	5	0	0	0
445110	Supermarkets and other grocery (except conv	49	13	3	4	4	14	10	1
445120	Convenience stores	9	3	4	2	0	0	0	0
445210	Meat markets	2	1	0	1	0	0	0	0
445220	Fish and seafood markets	1	1	0	0	0	0	0	0
445230	Fruit and vegetable markets	2	1	0	0	1	0	0	0
445291	Baked goods stores	4	2	0	1	1	0	0	0
445292	Confectionery and nut stores	4	3	1	0	0	0	0	0
445299	All other specialty food stores	12	8	2	1	1	0	0	0
445310	Beer, wine, and liquor stores	61	29	22	8	1	1	0	0
446110	Pharmacies and drug stores	27	9	0	7	11	0	0	0
446191	Food (health) supplement stores	19	15	1	0	2	1	0	0
446199	All other health and personal care stores	5	3	2	0	0	0	0	0
722110	Full-service restaurants	307	69	44	50	101	39	4	0
722211	Limited-service restaurants	240	47	49	67	74	2	0	1
722212	Cafeterias, grill buffets, and buffets	4	2	1	0	1	0	0	0
722213	Snack and nonalcoholic beverage bars	118	26	30	45	17	0	0	0
722310	Food service contractors	20	9	5	4	0	1	1	0
722320	Caterers	17	8	2	3	3	1	0	0
722330	Mobile food services	5	4	1	0	0	0	0	0
722410	Drinking places (alcoholic beverages)	24	5	4	7	7	1	0	0
		1072	327	199	221	241	63	18	3

Note that NAICS data do not cover several categories important to food. For example, they do not include farmers. Nor do they include people who are self-employed. Most government employees also are not included.

Chart 3 shows that there are 1,072 food establishments in Boulder County. All of them have under 500 employees, which means that technically they are all small businesses. Nearly 1,000 establishments have under 50 employees. What's tricky, however, is that "establishments" represent branches, outlets, factories, or franchise operations of larger "firms." The government databases do not readily offer, at least at the county level, statistics about specific categories of firms.

It is possible to estimate the number of food employees working for non-local firms by looking at recently published data from the Edward Lowe Foundation (available in www.YourEconomy.org).[21] Chart 4 estimates that 6,067—about a third—of the 20,516 food employees in Boulder County work for firms that are not locally-owned.[22]

Chart 4
Employees in Local vs. Nonlocal Food Businesses in Boulder County (2009)

NAICS Code	Description	Employees	Colorado State % Nonresident	Employees in Nonresident Firms
11	Farming and Animal Raising	1,081	6.90%	75
31	Food Manufacturing	2,044	40.40%	826
44	Food Retail	3,720	47.00%	1,748
72	Food Restaurants and Services	13,671	25.00%	3,418
		20,516		6,067

IMPLAN is helpful in presenting a more accurate summary of the demand and supply sides of the overall food system. IMPLAN carves up the universe of business into 432 categories, some of which combine the 1,100 categories of NAICS. We focus here only on the categories that relate to food either exclusively or primarily.

On the demand side, IMPLAN includes not only consumer demand (as covered by the Consumer Expenditure Survey) but also demand by businesses, public agencies, and nonlocal purchasers. Chart 5 shows demand picture from the most recent IMPLAN data from 2009. It shows household demand for food at $904 million. This is almost identical to the $900 million we estimated in the Consumer Expenditure Survey (adding food and alcohol purchases). State and local government purchases of food are another $101 million, for everything from school lunches and prison meals to vending machines and commissaries in public buildings. IMPLAN's accounting system considers purchases of Boulder-made products as another demand. It shows that other parts of the United States are demanding $726 million of Boulder County's foodstuffs, and the rest of the world is demanding another $110 million (total exports are $826 million).

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[21] The data are derived from Dun & Bradstreet, which compiles data on every business operating in the state, including their sectors of activities, sales, jobs, and headquarters location. While it is possible to fine-tune these estimates for each six-digit NAICS category of food business, it would require purchasing the Dun & Bradstreet database, an expense beyond the budget of this study.

[22] The Lowe Foundation data present percentages of nonresident employees for two-digit NAICS codes statewide. We apply these percentages to the Boulder region. Additionally, we adjust the percentages, because Lowe Foundation data include self-employed individuals. We consider them separately.

Chart 5
Food Demand in Boulder County—IMPLAN Estimates (2009)

Demand Sources	Boulder County
Households	$903,692,248
Federal Government	$1,162,031
State & Local Government	$100,975,761
Capital	$7,668,299
Inventory	$450,512
Domestic Exports	$726,578,573
Foreign Exports	$110,086,459
Total	$1,848,710,348

Chart 6 summarizes the top exports by Boulder County food businesses. The most valuable exports are manufactured foodstuffs: coffee and tea ($209 million), beer ($104 million), cheese ($86 million), processed poultry ($63 million), frozen food ($37 million), milk and butter ($31 million), processed animals ($31 million), and bread and bakery products ($26 million). Also near the top of exports are "other crop farming" (probably hay, valued at $46 million), and retail store sales (probably mail-order sales, valued at $37 million). The processed poultry data are probably no longer valid, since a large turkey processing plant in Longmont recently closed.

On the supply side, IMPLAN includes not only NAICS data but also farmers, self-employed residents, and public employees. As shown in Chart 7, the "food economy" in Boulder County currently employs 20,228. Two-thirds of the workforce is in food service—primarily restaurants. About 18% work in groceries and food retail, 10% in manufacturing, and 4% in farming and primary food production.

Chart 7
Employment in Boulder County Food Businesses (2009)

	Jobs	% Breakdown
Primary Production	845	4%
Manufacturing	2,044	10%
Retail	3,720	18%
Eating Out	13,621	67%
	20,229	100%

Chart 6
Food Exports from Boulder County—IMPLAN Estimates (2009)

Description	Domestic Exports	Foreign Exports	Total Exports
Coffee and tea manufacturing	186,741,899	22,237,471	$208,979,369
Breweries	98,017,372	6,121,376	$104,138,748
Cheese manufacturing	84,212,337	1,884,242	$86,096,579
Poultry processing	53,589,549	9,651,131	$63,240,680
All other crop farming	3,559,492	42,010,908	$45,570,400
Retail Stores - Food and beverage	37,397,888	0	$37,397,888
Frozen food manufacturing	34,383,481	2,286,670	$36,670,151
All other food manufacturing	27,783,857	6,001,630	$33,785,487
Fluid milk and butter manufacturing	30,119,075	712,055	$30,831,130
Animal (except poultry) slaughtering, rendering	27,906,393	2,639,636	$30,546,029
Bread and bakery product manufacturing	25,272,489	705,944	$25,978,433
Dry, condensed, and evaporated dairy product	16,452,004	4,105,853	$20,557,857
Chocolate and confectionery manufacturing fro	14,519,005	4,440,001	$18,959,006
Food services and drinking places	13,685,123	1,104,385	$14,789,508
Snack food manufacturing	13,164,132	397,161	$13,561,293
Greenhouse, nursery, and floriculture productio	10,334,126	2,149,201	$12,483,328
Soft drink and ice manufacturing	9,322,384	771,999	$10,094,383
Confectionery manufacturing from purchased c	5,308,423	107,925	$5,416,349
Soybean and other oilseed processing	4,516,722	3,588	$4,520,310
Seasoning and dressing manufacturing	3,392,211	124,936	$3,517,147
Ice cream and frozen dessert manufacturing	2,586,908	46,897	$2,633,805
Dog and cat food manufacturing	2,404,889	209,025	$2,613,915
Cookie, cracker, and pasta manufacturing	2,402,025	79,650	$2,481,675
Grain farming	1,452,354	796,227	$2,248,581
Fats and oils refining and blending	2,210,301	2,337	$2,212,639
Wet corn milling	1,977,703	1,780	$1,979,483
Flavoring syrup and concentrate manufacturing	1,914,077	7,214	$1,921,291
Distilleries	1,568,429	269,605	$1,838,034
Poultry and egg production	1,790,135	0	$1,790,135
Cattle ranching and farming	1,250,484	33,429	$1,283,913
Animal production, except cattle and poultry ar	1,128,471	36,676	$1,165,147
Flour milling and malt manufacturing	1,147,426	1,528	$1,148,954
Other animal food manufacturing	1,093,411	1,771	$1,095,182
Breakfast cereal manufacturing	796,214	9,609	$805,823
Fruit and vegetable canning, pickling, and dryir	767,319	10,107	$777,427
Sugar cane mills and refining	742,442	0	$742,442
Wineries	32,893	492,325	$525,218
Nonchocolate confectionery manufacturing	336,783	3,041	$339,825
Oilseed farming	281,667	29,491	$311,158
Fruit farming	116,983	183,077	$300,060
Seafood product preparation and packaging	297,672	176	$297,848
Vegetable and melon farming	2	255,372	$255,373
Tortilla manufacturing	179,653	15,046	$194,699
Beet sugar manufacturing	141,099	39,750	$180,849
Dairy cattle and milk production	133,204	0	$133,205
Commercial logging	8,339	105,058	$113,398
Commercial Fishing	51,786	0	$51,786
Tree nut farming	50,962	0	$50,962
Commercial hunting and trapping	26,498	0	$26,498
Sugarcane and sugar beet farming	10,480	1,152	$11,632

Chart 8 breaks down the $503 million paid out in wages for food businesses. Food service, responsible for 67% of the jobs, pays only 55% of the wages, reflecting the low pay in the sector. Manufacturing, responsible for 10% of the jobs, pays 19% of the wages, reflecting the higher pay in that sector.

Chart 8
Wages in Boulder County Food Businesses (2009)

	Wages	% Breakdown
Primary Production	$11,559,354	2%
Manufacturing	$93,982,872	19%
Retail	$120,564,240	24%
Eating Out	$277,158,304	55%
	$503,264,770	100%

Chart 9 breaks out the $832 million in value-added by Boulder County food businesses. Relatively high value comes from manufacturing, and relatively low value-added comes from primary production.

Chart 9
Value Added in Boulder County Food Businesses (2009)

	Value Added	% Breakdown
Primary Production	$32,026,633	4%
Manufacturing	$175,048,178	21%
Retail	$203,720,402	24%
Eating Out	$422,066,950	51%
	$832,862,162	100%

Boulder County is just one of many possible geographic frameworks for looking at food localization. Because Boulder is also part of larger regions, we examined two other food systems: North Central Colorado and the state of Colorado. The red-shaded area of Chart 10 shows North Central Colorado, which includes 12 counties surrounding Boulder: Adams, Arapahoe, Broomfield, Clear Creek, Denver, Douglas, Ebert, Gilpin, Jefferson, Larimer, Park, and Weld. Together these counties account for 3.4 million people and a gross regional product of $198 million (that is, the total annual value of all goods and services sold). The state of Colorado has 5 million people and a gross state product of $264 million. From the perspective of food producers in Boulder County, these two regions offer substantially larger markets for selling local food and food services.

Chart 10
The Counties of North Central Colorado

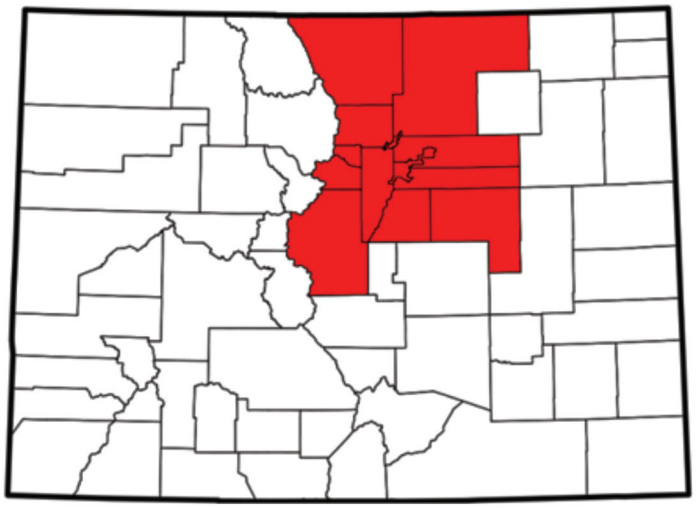

Chart 11 compares the demand for food in the three study areas (again, including export demand): $1.8 billion for Boulder County; $20.6 billion for North Central Colorado; and $30.1 billion for the state of Colorado.

Chart 11
Demand for Food—Regional Comparison (2009)

Demand Sources	Boulder County	North Central Colorado	Colorado State
Households	$903,692,248	$9,551,658,903	$13,896,984,384
Federal Government	$1,162,031	$14,303,919	$41,436,568
State & Local Government	$100,975,761	$1,669,966,561	$2,784,288,466
Capital	$7,668,299	$67,779,816	$98,375,595
Inventory	$450,512	$1,829,443	$2,383,012
Domestic Exports	$726,578,573	$8,512,027,461	$11,927,640,115
Foreign Exports	$110,086,459	$751,687,867	$1,300,685,307
Total	$1,848,710,348	$20,569,253,969	$30,051,793,447

Chart 12 compares the jobs associated with food production in the three areas: 20,466 for Boulder County; 201,243 for North Central Colorado; and 321,604 for the state. In all three study areas, about one in ten jobs is associated directly with food. Charts 13 and 14 show that the food-business component of all wages paid and all value-added is about 5% of the economy of each study area.

What would be the impacts in each of the three areas from food localization? The next section answers this question by examining the impact of a 25% shift toward local food in each area.

Chart 12
Food Business Jobs—Regional Comparison (2009)

	Boulder	NC Region	State
Total Jobs	211,720	2,210,973	3,118,088
Total Food Jobs	20,229	201,243	321,604
% Jobs in Food Sectors	10%	9%	10%
Oilseeds	6	87	244
Grains	93	2,831	12,653
Vegetables and melons	10	157	1,266
Fruit	3	9	119
Tree nuts	0	1	9
Greenhouse, nursery, and floriculture products	83	991	1,607
Sugarcane and sugar beets	32	540	825
All other crop farming products	233	2,721	5,697
Cattle from ranches and farms	115	4,005	13,968
Dairy cattle and milk products	1	990	1,696
Poultry and egg products	2	43	103
Animal products, except cattle, poultry and eggs	83	1,558	4,698
Fish	1	1	189
Wild game products, pelts, and furs	1	4	44
Agriculture and forestry support services	182	3,353	9,254
Dog and cat food	4	366	440
Other animal food	1	275	498
Flour and malt	1	141	148
Corn sweetners, corn oils, and corn starches	1	1	17
Soybean oil and cakes and other oilseed products	1	3	14
Shortening and margarine and other fats and oils products	1	17	17
Breakfast cereal products	1	36	65
Raw and refined sugar from sugar cane	1	1	1
Refined sugar from sugar beets	4	10	126
Chocolate cacao products and chocolate confectioneries	33	33	33
Chocolate confectioneries from purchased chocolate	17	93	831
Nonchocolate confectioneries	1	150	176
Frozen foods	152	350	350
Canned, pickled and dried fruits and vegetables	2	36	169
Fluid milk and butter	96	877	1,069
Cheese	98	168	637
Dry, condensed, and evaporated dairy products	32	32	32
Ice cream and frozen desserts	12	217	219
Processed animal (except poultry) meat and rendered byproc	69	5,317	7,777
Processed poultry meat products	471	480	480
Seafood products	1	16	19
Bread and bakery products	249	2,411	2,741
Cookies, crackers, and pasta	8	457	457
Tortillas	10	247	565
Snack foods including nuts, seeds and grains, and chips	24	627	655
Coffee and tea	326	377	420
Flavoring syrups and concentrates	1	112	112
Seasonings and dressings	8	147	147
All other manufactured food products	111	720	848
Soft drinks and manufactured ice	117	1,736	1,974
Beer, ale, malt liquor and nonalcoholic beer	159	3,098	3,245
Wine and brandies	27	46	153
Distilled liquors except brandies	7	14	15
Retail Services - Food and beverage	3,720	32,152	46,490
Restaurant, bar, and drinking place services	13,621	133,187	198,290
	20,229	201,243	321,604

Chart 13
Food Business Wages—Regional Comparison (2009)

	Boulder	NC Region	State
Total Wages	$10,490,426,321	$102,430,898,236	$138,934,923,909
Total Food Wages	$503,264,770	$5,251,259,963	$7,625,728,740
% Food Wages of Total Wages	5%	5%	5%
Oilseeds	$1,935	$46,760	$171,707
Grains	$70,046	$3,166,594	$23,205,322
Vegetables and melons	$264,244	$6,373,830	$37,544,244
Fruit	$118,261	$233,949	$2,779,135
Tree nuts	$12,186	$24,172	$235,773
Greenhouse, nursery, and floriculture products	$3,631,044	$55,690,260	$74,360,424
Sugarcane and sugar beets	$64,079	$2,107,690	$4,308,075
All other crop farming products	$4,012,155	$71,899,712	$109,916,432
Cattle from ranches and farms	$631,962	$33,721,072	$125,439,616
Dairy cattle and milk products	$7,375	$8,615,746	$13,781,230
Poultry and egg products	$110,528	$2,460,735	$4,964,597
Animal products, except cattle, poultry and eggs	$331,988	$9,505,102	$30,144,198
Fish	$8,013	$8,013	$175,265
Wild game products, pelts, and furs	$3,347	$15,466	$19,352
Agriculture and forestry support services	$2,292,191	$60,428,112	$143,750,192
Dog and cat food	$202,466	$48,015,472	$52,262,292
Other animal food	$54,121	$18,557,180	$29,957,804
Flour and malt	$61,007	$11,403,684	$11,935,329
Corn sweetners, corn oils, and corn starches	$90,375	$90,375	$873,456
Soybean oil and cakes and other oilseed products	$71,718	$136,284	$563,717
Shortening and margarine and other fats and oils products	$60,790	$581,268	$581,268
Breakfast cereal products	$76,779	$1,914,104	$2,955,210
Raw and refined sugar from sugar cane	$73,133	$73,133	$73,133
Refined sugar from sugar beets	$110,605	$513,733	$7,244,978
Chocolate cacao products and chocolate confectioneries	$2,136,110	$2,136,110	$2,136,110
Chocolate confectioneries from purchased chocolate	$707,591	$2,444,070	$25,924,716
Nonchocolate confectioneries	$53,645	$5,284,223	$5,728,812
Frozen foods	$4,381,468	$11,207,886	$11,207,887
Canned, pickled and dried fruits and vegetables	$58,105	$1,209,276	$5,956,529
Fluid milk and butter	$5,051,322	$58,483,612	$69,290,576
Cheese	$9,526,776	$13,812,167	$68,188,488
Dry, condensed, and evaporated dairy products	$4,621,611	$4,621,611	$4,621,611
Ice cream and frozen desserts	$603,540	$23,399,234	$23,491,864
Processed animal (except poultry) meat and rendered byproc	$2,216,123	$218,509,392	$296,652,128
Processed poultry meat products	$20,966,668	$21,300,004	$21,300,004
Seafood products	$43,003	$426,205	$472,445
Bread and bakery products	$7,620,833	$106,778,080	$113,232,472
Cookies, crackers, and pasta	$222,953	$26,003,142	$26,003,144
Tortillas	$171,634	$10,954,746	$22,629,702
Snack foods including nuts, seeds and grains, and chips	$1,038,019	$37,400,832	$38,414,088
Coffee and tea	$16,714,045	$21,053,524	$22,390,048
Flavoring syrups and concentrates	$137,485	$11,178,596	$11,178,596
Seasonings and dressings	$320,129	$7,335,384	$7,335,385
All other manufactured food products	$5,203,415	$34,217,316	$42,340,548
Soft drinks and manufactured ice	$4,145,188	$107,229,192	$115,998,256
Beer, ale, malt liquor and nonalcoholic beer	$6,704,875	$343,931,200	$352,926,912
Wine and brandies	$401,627	$1,045,171	$3,744,630
Distilled liquors except brandies	$135,713	$450,943	$457,937
Retail Services - Food and beverage	$120,564,240	$1,061,439,424	$1,523,234,688
Restaurant, bar, and drinking place services	$277,158,304	$2,783,826,176	$4,133,628,416
	$503,264,770	$5,251,259,963	$7,625,728,740

Chart 14
Food Business Value-Added—Regional Comparison (2009)

	Boulder	NC Region	State
Total Value-Added (GDP)	$18,151,725,908	$198,077,274,619	$263,837,503,091
Total Food Value Added (GDP)	$832,862,162	$9,640,004,927	$14,042,144,918
% Food of Total Value Added	5%	5%	5%
Oilseeds	$138,183	$3,396,469	$13,897,525
Grains	$458,658	$49,684,473	$379,420,444
Vegetables and melons	$923,214	$28,157,609	$138,339,609
Fruit	$539,294	$986,243	$13,123,512
Tree nuts	$28,118	$41,113	$581,437
Greenhouse, nursery, and floriculture products	$8,719,620	$109,608,525	$150,630,282
Sugarcane and sugar beets	$241,663	$9,162,292	$18,190,791
All other crop farming products	$14,418,421	$288,096,712	$426,658,012
Cattle from ranches and farms	$1,532,600	$101,080,072	$393,411,716
Dairy cattle and milk products	$29,174	$48,079,976	$77,716,709
Poultry and egg products	$323,718	$6,177,820	$13,838,917
Animal products, except cattle, poultry and eggs	$1,235,904	$37,983,575	$122,402,075
Fish	$34,127	$34,127	$9,608,471
Wild game products, pelts, and furs	$41,071	$251,377	$2,658,852
Agriculture and forestry support services	$3,362,868	$74,831,199	$192,212,475
Dog and cat food	$826,929	$168,344,078	$182,993,443
Other animal food	$118,221	$39,652,451	$64,995,150
Flour and malt	$125,358	$23,189,363	$24,236,965
Corn sweetners, corn oils, and corn starches	$195,604	$195,604	$1,926,725
Soybean oil and cakes and other oilseed products	$178,171	$345,633	$1,403,825
Shortening and margarine and other fats and oils products	$206,398	$1,959,139	$1,959,139
Breakfast cereal products	$284,005	$6,783,514	$10,896,068
Raw and refined sugar from sugar cane	$94,730	$94,730	$94,730
Refined sugar from sugar beets	$248,023	$759,460	$9,435,307
Chocolate cacao products and chocolate confectioneries	$3,089,363	$3,089,363	$3,089,363
Chocolate confectioneries from purchased chocolate	$1,547,348	$6,573,056	$52,217,631
Nonchocolate confectioneries	$87,911	$8,557,390	$9,345,140
Frozen foods	$6,243,012	$15,469,204	$15,469,204
Canned, pickled and dried fruits and vegetables	$120,407	$2,290,507	$10,912,364
Fluid milk and butter	$8,777,947	$99,083,440	$117,143,424
Cheese	$15,891,696	$23,358,410	$102,775,569
Dry, condensed, and evaporated dairy products	$9,744,665	$9,744,665	$9,744,665
Ice cream and frozen desserts	$1,084,239	$37,494,366	$37,644,644
Processed animal (except poultry) meat and rendered byproc	$3,575,784	$254,491,757	$346,661,655
Processed poultry meat products	$24,128,154	$24,496,495	$24,496,495
Seafood products	$48,643	$463,105	$536,136
Bread and bakery products	$9,741,459	$131,366,485	$140,188,557
Cookies, crackers, and pasta	$494,702	$49,215,916	$49,215,918
Tortillas	$302,003	$16,078,937	$33,183,978
Snack foods including nuts, seeds and grains, and chips	$3,464,163	$110,370,958	$113,524,607
Coffee and tea	$31,352,981	$39,247,350	$42,040,343
Flavoring syrups and concentrates	$1,288,200	$103,979,698	$103,979,698
Seasonings and dressings	$483,978	$9,602,787	$9,602,788
All other manufactured food products	$8,344,363	$54,354,443	$66,935,572
Soft drinks and manufactured ice	$5,594,173	$138,777,227	$150,276,850
Beer, ale, malt liquor and nonalcoholic beer	$35,644,216	$1,392,882,892	$1,430,843,029
Wine and brandies	$650,017	$1,655,204	$5,859,441
Distilled liquors except brandies	$1,071,315	$3,492,052	$3,545,645
Retail Services - Food and beverage	$203,720,402	$1,843,250,592	$2,625,820,024
Restaurant, bar, and drinking place services	$422,066,950	$4,261,723,072	$6,286,460,000
	$832,862,162	$9,640,004,927	$14,042,144,918

A Localization Scenario

What's a plausible scenario for food localization for Boulder County, North Central Colorado, and the state of Colorado? We propose a 25% shift. What we mean is that the localization gap in each food-business sector—that is, the gap between the level of local supply that exists today and the level needed to achieve self-reliance in that sector—is closed a quarter of the way.[23] We envision this shift occurring over a decade. We believe that this goal—a 25% shift in 10 years—is big enough to inspire regional mobilization of the business, policymaking, and grassroots communities, but not so big as to be wildly unrealistic. We consider it the local equivalent to John F. Kennedy's speech proposing to put a man on the moon by the end of the 1960s.

In the following pages, we begin by suggesting what the 25% localization scenario would look like in theory. We then explore the impacts of this scenario—on jobs, on the economy, on carbon-dioxide emissions, and on public health. Finally, we explore the challenges to achieving this scenario.

Economic Impacts of 25% Shift

To analyze the impacts of a 25% shift toward total food localization, we assume that food exports remain constant. Instead, the only changes we envision are in the behavior of local purchasers—that is, local residents, businesses, and government institutions. Increased local demand expands the size and number of local food businesses in the region. Later, we revisit this assumption.

The principal tool we use to measure the impacts of this shift is the IMPLAN input-output model. The model draws from state and national economic patterns to model where every dollar of spending goes, and how every dollar is in turn re-spent. IMPLAN can therefore model how a change in demand can lead not only to direct new jobs in expanded business activity, but also how the new spending by this business creates new jobs (indirect effects) and how the new spending by new employees in all these businesses creates even more new jobs (induced effects).

A hypothetical example illustrates what this methodologically looks like.[24] (The following numbers are made up.) Suppose tea manufacturers in Boulder County were producing $100 million worth of tea, $10 million of which was sold locally and $90 million of which was exported. Further suppose total demand for tea in the County was $200 million, which means that the region was importing $190 million worth of tea. Total self-reliance would mean that the region would need to produce $200 million worth of tea, if all local production went entirely to local demand. But since we assume that exports are constant—in this case $90 million—potential output is $290 million and potential output expansion is actually $190 million. Getting a quarter of the way to this would imply $47.5 million of new output.

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23 Percentages applied to food localization turn out to be very tricky. The percentage of fresh foodstuffs in any region grown locally is, again, a very small number, typically 1-3%. The percentage of businesses involved in food that are locally-owned is typically very high, well over 50%. And most regions tend to have similarly high percentages of locally-owned grocery stores and restaurants. Our measure of localization, which cuts across all sectors including farming, aims to create a uniform yardstick based on dollars of sales.

24 Formally, the Regional Purchasing Coefficient (RPC) within IMPLAN estimates how much of Total Gross Demand is currently met by local industry. The demand figure includes both local and nonlocal consumption. Multiplying Total Gross Demand by 1-RPC shows how much additional industry is possible to meet local demand (without reducing production for export).

Before sharing the results of a 25%, it's important to emphasize again that the data show what's possible. What's possible ultimately must be screened for what's plausible, which we do in Section D.

Chart 15 below shows the summary of the results of the IMPLAN model after ramping up the demand in each of the food-related sectors. A total of 1,899 jobs would be created—928 directly, 424 through new business spending (indirect effects), and 547 through new consumer spending (induced effects). To put this in perspective, these jobs would be able to put between one-in-six and one-in-seven unemployed residents of the county back to work. Additionally, the 25% shift would generate $81 million in new annual wages, $138 million in additional value-added, and $360 million in additional output. It is hard to find any economic-development proposal for Boulder County, past or present, that would have as significant an impact as the 25% shift.

Chart 15
Impacts of a 25% Shift for Boulder County (2009)

ImpactType	Employment	Wages	Value Added	Output
Direct Effect	928	$36,088,440	$59,895,902	$231,487,651
Indirect Effect	424	$18,774,685	$34,837,972	$63,480,263
Induced Effect	547	$25,899,670	$43,586,741	$65,754,003
Total Effect	1,899	$80,762,795	$138,320,616	$360,721,917

Chart 16 presents a detailed roster of the job impacts in all the food sectors, compared to the existing number of jobs. Various degrees of local impact are shown, in case the reader prefers a more or less ambitious goal than 25%.

Chart 16
Job Impacts of Various Shifts in Boulder County Food Sectors (2009)

Category	Current Jobs	New Jobs with 100% Shift*	New Jobs 25% Shift*	New Jobs with 10% Shift*	New Jobs with 5% Shift*
Oilseeds	6	10	3	1	1
Grains	93	701	175	70	35
Vegetables and melons	10	126	32	13	6
Fruit	3	247	62	25	12
Tree nuts	0	0	0	0	0
Greenhouse, nursery, and floriculture produc	83	111	28	11	6
Sugarcane and sugar beets	32	82	20	8	4
All other crop farming products	233	103	26	10	5
Cattle from ranches and farms	115	377	94	38	19
Dairy cattle and milk products	0	0	0	0	0
Poultry and egg products	2	58	14	6	3
Animal products, except cattle, poultry and e	83	140	35	14	7
Fish	1	173	43	17	9
Wild game products, pelts, and furs	1	0	0	0	0
Agriculture and forestry support services	182	140	35	14	7
Dog and cat food	4		5	0	0
Other animal food	1	11	3	1	1
Flour and malt	1	19	5	2	1
Corn sweetners, corn oils, and corn starches	1	6	1	1	0
Soybean oil and cakes and other oilseed pro	1	4	1	0	0
Shortening and margarine and other fats and	1	6	1	1	0
Breakfast cereal products	1	14	4	1	1
Raw and refined sugar from sugar cane	1	7	2	1	0
Refined sugar from sugar beets	4	5	1	0	0
Chocolate cacao products and chocolate cor	33	26	7	3	1
Chocolate confectioneries from purchased ch	17	26	6	3	1
Nonchocolate confectioneries	1	7	2	1	0
Frozen foods	152	153	38	15	8
Canned, pickled and dried fruits and vegetabl	2	13	3	1	1
Fluid milk and butter	96	40	10	4	2
Cheese	98	47	12	5	2
Dry, condensed, and evaporated dairy produc	32	11	3	1	1
Ice cream and frozen desserts	12	17	4	2	1
Processed animal (except poultry) meat and	69	248	62	25	12
Processed poultry meat products	471	77	19	8	4
Seafood products	1	28	7	3	1
Bread and bakery products	249	240	60	24	12
Cookies, crackers, and pasta	8	50	12	5	2
Tortillas	10	12	3	1	1
Snack foods including nuts, seeds and grain	24	50	13	5	3
Coffee and tea	326	47	12	5	2
Flavoring syrups and concentrates	1	5	1	0	0
Seasonings and dressings	8	22	6	2	1
All other manufactured food products	111	100	25	10	5
Soft drinks and manufactured ice	117	31	8	3	2
Beer, ale, malt liquor and nonalcoholic beer	159	15	4	1	1
Wine and brandies	27	51	13	5	3
Distilled liquors except brandies	7	48	12	5	2
Retail Services - Food and beverage	3,720	70	17	7	3
Restaurant, bar, and drinking place services	13,621	508	127	51	25
Other Indirect Jobs	0	1,000	250	100	50
Other Induced Jobs	0	1,786	447	179	89
Total	20,228	7,065	1,772	706	353

*Includes Indirect & Induced Jobs in Those Sectors

Chart 17 summarizes the jobs impacts by broad sectors: farming and animal growing, manufacturing, food service, indirect, and induced. Very few new jobs come from food service, because the area already has a full array of local grocery stores and restaurants. The rest of the jobs are split fairly evenly between the other four categories. From a wage standpoint, this is encouraging, since food service jobs pay relatively low wages.

Chart 17
Summary Job Impacts of a 25% Shift for Boulder County (2009)

	Jobs	Percentage
Farming & Animal Raising - Direct	524	28%
Food Manufacturing - Direct	350	18%
Food Service - Direct	54	3%
Indirect	424	22%
Induced	547	29%
	1,899	100%

Farming and animal-raising jobs also have relatively low pay, though people tend to enter these professions because of other perceived benefits (e.g., being close to the land). Significantly, about three-quarters of all new jobs are in high-wage manufacturing or spread across the entire economy.

Charts 18 and 19 look at the "Top 40" direct job opportunities, ranked by jobs and wages, respectively. These rankings are important, because they indicate the priorities for localization initiatives. Based on these rankings, the top seven food localization priorities should be:

Farming

The agriculture sectors with the greatest potential for creating new jobs are: grains (175 jobs), fruit (62 jobs), vegetables and melons (31 jobs), greenhouse crops (27 jobs), and "other crops" (25 jobs). Support activities for agriculture and forestry could generate another 173 jobs.

Value-Adding Manufacturing

The directly grown items above could be fed into local bakeries (60 jobs), frozen food (37 jobs), snack food (12 jobs), "cookies, crackers, and pasta" (12 jobs), distilleries (12 jobs), wineries (12 jobs), flour milling (5 jobs), breakfast cereals (4 jobs), breweries (4 jobs), tortilla manufacturing (3 jobs), fruit canning (3 jobs), and evaporated milk (2 jobs). These jobs tend to pay well.

Chart 18
Top 40 Opportunities from a 25% Shift for Boulder County—By Direct Jobs (2009)

Total	**928**
Grain farming	175
Dairy cattle and milk production	90
Animal (except poultry) slaughtering, rendering, and	62
Fruit farming	62
Bread and bakery product manufacturing	60
Food services and drinking places	54
Commercial Fishing	43
Frozen food manufacturing	37
Vegetable and melon farming	31
Greenhouse, nursery, and floriculture production	27
All other crop farming	25
All other food manufacturing	25
Animal production, except cattle and poultry and eg	21
Poultry and egg production	14
Poultry processing	14
Snack food manufacturing	12
Cookie, cracker, and pasta manufacturing	12
Support activities for agriculture and forestry	12
Distilleries	12
Wineries	12
Coffee and tea manufacturing	12
Cheese manufacturing	11
Sugarcane and sugar beet farming	10
Cattle ranching and farming	10
Fluid milk and butter manufacturing	8
Soft drink and ice manufacturing	7
Seafood product preparation and packaging	7
Chocolate and confectionery manufacturing from ca	6
Confectionery manufacturing from purchased choco	6
Seasoning and dressing manufacturing	6
Dog and cat food manufacturing	5
Flour milling and malt manufacturing	5
Ice cream and frozen dessert manufacturing	4
Breakfast cereal manufacturing	4
Breweries	4
Fruit and vegetable canning, pickling, and drying	3
Other animal food manufacturing	3
Tortilla manufacturing	3
Oilseed farming	3
Dry, condensed, and evaporated dairy product man	2

Chart 19
Top 40 Opportunities from a 25% Shift for Boulder County—By Wages (2009)

Total	$36,078,150
Fruit farming	$7,981,104
Animal (except poultry) slaughtering, rende	$2,990,000
Greenhouse, nursery, and floriculture prod	$2,581,845
Vegetable and melon farming	$2,199,380
Bread and bakery product manufacturing	$2,061,606
All other food manufacturing	$1,285,234
Cheese manufacturing	$1,275,288
Food services and drinking places	1,264,743.8
Poultry and egg production	$1,234,021
Frozen food manufacturing	$1,226,272
Commercial Fishing	$1,069,786
All other crop farming	$1,063,542
Dairy cattle and milk production	$780,537
Poultry processing	$674,976
Snack food manufacturing	$659,211
Coffee and tea manufacturing	$646,349
Fluid milk and butter manufacturing	$494,619
Chocolate and confectionery manufacturin	$465,615
Cookie, cracker, and pasta manufacturing	$442,987
Grain farming	$406,394
Dog and cat food manufacturing	$376,304
Seafood product preparation and packagin	$336,789
Confectionery manufacturing from purchas	$318,721
Flour milling and malt manufacturing	$315,225
Dry, condensed, and evaporated dairy proc	$313,639
Breakfast cereal manufacturing	$306,660
Seasoning and dressing manufacturing	$299,081
Soft drink and ice manufacturing	$284,153
Support activities for agriculture and forest	$278,982
Ice cream and frozen dessert manufacturir	$264,920
Distilleries	$247,223
Tree nut farming	$238,692
Breweries	$207,463
Wineries	$195,942
Flavoring syrup and concentrate manufactu	$166,198
Other animal food manufacturing	$163,189
Wet corn milling	$147,133
Sugar cane mills and refining	$135,972
Fruit and vegetable canning, pickling, and	$121,073
Nonchocolate confectionery manufacturing	$107,551

Dairy
There are large job opportunities for more dairy cattle (90 jobs), cheese production (11 jobs), and milk production (8 jobs).

Other Manufacturing
Even if the primarily feedstocks are not available locally, job-creating opportunities are possible in the following sectors: soft drinks and ice (7 jobs), chocolate (6 jobs), candy (6 jobs), seasoning and dressings (6 jobs), and pet food (5 jobs). Again, these jobs are especially desirable because they pay well.

Meat & Poultry
There are huge jobs opportunities in expanding meat slaughter (62 jobs), poultry and egg production (14 jobs), and broiler slaughter (14 jobs). These jobs pay well.

Food Service
Even though Boulder County is already rich in food service, the local demand is so huge that another 54 jobs are possible.

Fish
Boulder is not near a large body of water with a natural fish population. Nevertheless, there are opportunities for creating jobs from local growing of tilapia, trout, and other hatchlings via aquaculture (43 jobs) and related packaging (7 jobs).

The numbers of potential jobs from these food localization initiatives are limited by the selection of Boulder County as the relevant locale. Many more jobs would be possible were Boulder businesses to meet local demands in North Central Colorado or the entire state.

Chart 20 shows the degree to which local businesses are meeting local demand in all three areas of study. Outside the categories of food service and food retail, where one would expect a very high degree of self-reliance, almost every sector offers opportunities for growing the economy and plugging economic leaks.

Chart 21 shows the economic impacts of a 25% shift regionally. Accomplishing this in North Central Colorado leads to 24,037 new jobs, $987 million in annual new wages, and $1.6 billion in annual new value-added production. Doing this in the entire state of Colorado leads to 31,022 new jobs, $1.3 billion in annual new wages, and $2.2 billion in new value-added production.

Chart 21
Economic Impacts of 25% Shift—Regional Comparison (2009)

	Jobs	Wages	Value Added	Business Taxes
Boulder County	1,899	$80,762,795	$138,320,616	$11,755,657
North Central Colorado	24,037	$987,301,210	$1,643,627,616	$151,762,632
State of Colorado	31,022	$1,306,080,325	$2,199,715,255	$197,981,682

Chart 20
Food Business Leakages—Regional Comparison (2009)

	% Self-Reliant		
Description	**Boulder**	**NC Region**	**State**
Oilseeds	0%	4%	17%
Grains	0%	0%	3%
Vegetables and melons	6%	22%	63%
Fruit	1%	1%	6%
Tree nuts	0%	0%	0%
Greenhouse, nursery, and floriculture products	5%	19%	21%
Sugarcane and sugar beets	43%	78%	84%
All other crop farming products	0%	7%	11%
Cattle from ranches and farms	72%	78%	95%
Dairy cattle and milk products	0%	77%	92%
Poultry and egg products	0%	7%	12%
Animal products, except cattle, poultry and eggs	34%	29%	45%
Fish	0%	0%	0%
Wild game products, pelts, and furs	100%	97%	99%
Agriculture and forestry support services	49%	33%	48%
Dog and cat food	6%	63%	62%
Other animal food	0%	80%	80%
Flour and malt	0%	15%	15%
Corn sweetners, corn oils, and corn starches	0%	0%	2%
Soybean oil and cakes and other oilseed products	0%	0%	0%
Shortening and margarine and other fats and oils products	0%	0%	1%
Breakfast cereal products	0%	7%	11%
Raw and refined sugar from sugar cane	0%	0%	0%
Refined sugar from sugar beets	83%	17%	81%
Chocolate cacao products and chocolate confectioneries	3%	2%	2%
Chocolate confectioneries from purchased chocolate	8%	8%	23%
Nonchocolate confectioneries	1%	15%	16%
Frozen foods	21%	14%	12%
Canned, pickled and dried fruits and vegetables	1%	2%	3%
Fluid milk and butter	68%	80%	80%
Cheese	22%	14%	35%
Dry, condensed, and evaporated dairy products	87%	28%	26%
Ice cream and frozen desserts	24%	62%	53%
Processed animal (except poultry) meat and rendered byproc	1%	21%	26%
Processed poultry meat products	82%	20%	16%
Seafood products	0%	0%	0%
Bread and bakery products	25%	55%	48%
Cookies, crackers, and pasta	3%	39%	32%
Tortillas	49%	99%	99%
Snack foods including nuts, seeds and grains, and chips	7%	47%	40%
Coffee and tea	61%	33%	32%
Flavoring syrups and concentrates	8%	72%	63%
Seasonings and dressings	1%	7%	6%
All other manufactured food products	11%	28%	27%
Soft drinks and manufactured ice	88%	90%	93%
Beer, ale, malt liquor and nonalcoholic beer	68%	82%	87%
Wine and brandies	35%	6%	14%
Distilled liquors except brandies	1%	3%	3%
Retail Services - Food and beverage	100%	98%	100%
Restaurant, bar, and drinking place services	98%	89%	93%

Another impact of the 25% shift is additional business taxes of $12 million for Boulder County, $152 million for North Central Colorado, and $198 million for the state. These findings seem especially relevant for guiding public policy. For example, state and local government initiatives to achieve the 25% shift costing less than $12 million per year would actually lead to generate net new government revenue.

Chart 22 shows that a 25% shift would have the same, powerful reemployment effects at the regional and state levels.

Chart 22
Employment Impacts of the 25% Shift—Regional Comparison (2009)

	Jobs	Unemployed	% Re-Employed
Boulder County	1,899	11,873	16.00%
North Central Colorado	24,037	154,461	15.56%
State of Colorado	31,022	230,147	13.48%

There are other economic benefits of this 25% shift that are harder to quantify, but nevertheless are worth mentioning:

Branding
Boulder has already established itself as a global leader in organic and natural food products. Also making the the region a leader in the local food renaissance would boost its attraction of eco-tourists.

Attraction & Retention
While the value of economic development agencies essentially bribing non-local businesses to come or stay in the region has been largely discredited, there is no question that being a fabulous dynamic region that naturally attracts and retains non-local businesses—Richard Florida's notion of a creative economy—is economically valuable.

Entrepreneurship
As noted, nearly all of the food businesses in the region right now are small. Indeed, except for a few food-processing businesses, the vast majority of food enterprises, such as farms and food service operations, can be started by a good entrepreneur with modest levels of capital (though there may be water and land constraints, discussed shortly). The 25% shift would lead to a region-wide entrepreneurship revolution, with positive spillovers throughout the economy.

Public Assistance
Increased employment and entrepreneurship would lead to dramatic reductions in public assistance outlays in unemployment, food stamps, housing vouchers, health subsidies, and other government supports.

Fiscal Health
Reduced government outlays and increased tax revenues would improve the fiscal health of various county and local governments in the region. This would improve their credit worthiness, lower the cost of capital, and reduce payments on existing and future bonds and other debts.

Rural Economies

The 25% shift provides a stimulus for the rural communities in and around Boulder County to expand existing farms, diversify farm economies, and revive farms that have gone bankrupt or otherwise been abandoned. By connecting urban demand with nearby rural supply, food localization could lead to a renaissance of rural economic life.

Economic Security

Diversification of the local food system could help inoculate the region against sudden cutoffs in food that could occur because of contamination, war, terrorism, or global shortages.

Non-economic Benefits of a 25% Shift

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The 25% shift would also generate a host of other benefits concerning the environment, public health, and quality of life. Again, these benefits are difficult to quantify in strictly dollar terms, but they are nevertheless worth weighing.

1 Environmental Benefits

Our data suggest that a big part of food localization is the expansion of farming in the region. Well-managed farms can improve water retention, prevent floods, sequester carbon, and improve habitat for natural species. Nothing guarantees, of course, that increased farming from food localization will be well-managed, and expansion of commodity-oriented agriculture dependent on pesticides and fertilizers could arguably cause greater environmental problems for the region. But commodity agriculture, by definition, is focused on export. The rise of farms diversified with many fruits and vegetables and with a variety of animals is more consistent with cutting-edge agriculture practices that minimize the use of pesticides and fertilizers. And while there is also no automatic link between local food and organic food, consumers who favor one also tend to have greater interest in the other.

Another important environmental benefit of local food is a lower carbon footprint. While there is some controversy over whether local food saves carbon consistently and what the magnitude of the savings are, the preponderance of the evidence suggests that the savings are significant.[25]

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[25] Compare, for example, a 2007 study at the University of Washington in Seattle with another study completed that year by two professors at Carnegie-Mellon University. The UW-Seattle study looked at total emissions of foodstuffs over its lifetime, and found that a local plate with four food items—salmon, apples, asparagus, and potatoes—had about two thirds the total carbon emissions of an equivalent non-local plate. Daniel Morgan et al., University of Washington Program of the Environment, "Seattle Food System Enhancement Project: Greenhouse Gas Emissions Study" (monograph) (2007). The Carnegie-Mellon Study found that transportation as a whole accounts for only 11% of the nation's carbon emissions, and final delivery costs from producer to retailer only 4%. Christopher L. Weber and H. Scott Matthews, "Food-Miles and the Relative Climate Impacts of Food Choices in the United States," Environmental Science & Technology, 42:10, pp. 3508-3513. The Carnegie-Melon Study in particular has been cited as suggesting that the carbon-reducing impact of local food is trivial. The study itself says: "[S]hifting less than one day per week's worth of calories from red meat and dairy products to chicken, fish, eggs, or a vegetable-based diet achieves more GHG reduction than buying all locally-sourced food." However, even a 4-11% reduction in carbon is not insignificant. Moreover, the calculations in the study reflect the relative impact of existing practices, many built around cheap oil and non-local inputs. Serious localization would reduce the embedded energy costs not only in food but in all non-food inputs. A third study published by a team of researchers in Belgium, suggest two other big factors can dominate the overall carbon emissions. One is how someone shops. Taking an inefficient SUV on two or three special trips to the CSA or farmers' market is enormously wasteful. So is the decision to consume any produce if it is out of season or if it comes from local greenhouses heated by fossil fuels. Shopping for in-season produce by bicycle, in contrast, is a carbon-minimizing home run. Annelies Van Hawermeiren et al., "Energy Lifecycle Inputs in Food Systems: A Comparison of Local versus Mainstream Cases," Journal of Environmental Policy & Planning, 9:1, March 2007, pp. 31-51.

Researchers from Carnegie Mellon estimated that carbon generated by food consumption by the typical household in the United States is 8.1 metric tons. Given that there were 1.9 million households in Colorado, the total carbon emissions associated with all food would be 15 MMt. Under the Carnegie Mellon calculations, all food transportation in the state would therefore amount to 1.6 MMt, and only a fraction of that could be saved through localization.

To realize even this goal, localization initiatives should follow some of the following guidelines:

Encourage residents to grow, buy, cook, and eat seasonally available produce.

Introduce growing in greenhouses only if they are passively heated or using renewable energy inputs.

Revamp intrastate hauling with vehicles fueled from locally available biomass, preferably using agriculture and forestry waste products as feed stocks for cellulosic conversion.

Encourage Boulder County food shoppers to take advantage of the numerous bike and walking paths, and to use mass transit systems like buses.

Encourage farming techniques that maximize the sequestration of atmospheric carbon in soils and plant bio-mass.

2 Public Health Benefits

Another clear benefit of local food is improved public health. A growing scientific literature underscores that Americans have become fatter and unhealthier with their increasing consumption of processed foods. According to the Centers for Disease Control, household eating habits have shifted from fresh foods bought at a grocery store to ready-to-eat processed food at corner stores, gas station mini-marts, and fast-food restaurants. This has led an epidemic of Type II diabetes and obesity, even in small children. As noted earlier, even though Boulder County is one of the "leanest" counties in the country, the CDC estimates that almost half its residents are overweight or obese. By raising the availability and value of fresh fruits, vegetables, grains, eggs, meats, and dairy products, food localization is becoming almost universally recognized as a critically important tool for improving public health.

A growing body of evidence indicates that Americans' health outcomes vary widely by income, race, and geography.[26] Access to healthy foods is one of the primary predictors of disparities in health outcomes. A majority of studies indicates that people who have regular access to full-service supermarkets tend to have lower incidences of obesity.[27] While the verdict is not without controversy, several studies have demonstrated that neighborhoods with greater access to convenience stores—so called "food deserts"—have higher rates of obesity.[28] A study of 10,000 adults living in four comparable geographic areas found that those census tracts with good access to supermarkets had the lowest rates of obesity (21%). Conversely, the highest obesity rates were found in census tracts without supermarkets, with 34-40% of residents suffering from obesity.[29]

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[26] Larson, Nicole, PhD, et al. "Neighborhood Environments: Disparities in Access to Healthy Foods" in the U.S. Published in the American Journal of Preventative Medicine, 2009. Published by Elsevier, Inc. Page 74.

[27] Ibid, p. 74. [28] Ibid, p. 75. [29] Ibid, p. 76.

Arguably Boulder County has only one neighborhood, Clear Creek Canyon, that qualifies as a food desert. But the statistics suggest that the problem is more widespread. A recent survey of 748 residents of Longmont found that 62% report it "challenging to eat five servings of fruits and vegetables consistently each day."[30]

According to the American Public Health Association, food security for many communities in the United States is made more difficult by a U.S. Farm Policy that offers huge incentives for production, not of fruits, vegetables, or grassfed meats, but of foods containing high levels of sugars and fats and of grain-fed meats. This policy contradicts the USDA's 2005 Dietary Guidelines for Americans.[31] Current agricultural incentive programs encourage the over-production of commodity crops that are processed into high fructose corn syrup and soy-based oils present in most processed foods, enabling these sweets and fats to be convenient and inexpensive for consumers. Further, 60% of the U.S. corn crop and 47% of the soy crop are used to produce grain for livestock, not counting what is utilized for fish or poultry.[32] Meat from corn and soy fed animals is high in Omega 6 fatty acids compared to grass-fed animals that have a much higher concentration of healthier Omega 3 fatty acids. Studies show that western diets of grain-fed meats have more than 16 times the optimal Omega 6 to Omega 3 ratio. High ratios are associated with adverse health outcomes, including cardiovascular disease, cancer, osteoporosis, and inflammatory auto-immune diseases.[33]

There are a number of other health impacts from the industrialized system of food production that also warrant mention:

Industrialized animal production is a major source of pathogens affecting food borne illnesses.[34]

More than 70% of all U.S. antibiotics are routinely fed to hogs, poultry, and beef cattle. This leads to a greater prevalence of antibiotic-resistant pathogens, which contributes to antibiotic resistance of pathogens affecting humans.[35]

The conventional food system has high reported occupational injury, illness and death and, in 2002, meat processing had the highest rates of reported occupational injuries of any industrial sector in the country.[36]

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30 "LiveWell Longmont Survey & Community Listening: Report of Findings," December 2010, p. 3.

31 American Public Health Association, Toward a Healthy, Sustainable Food System, Policy Statement # 200712 published 11/6/2007.

32 Ibid.

33 Simopoulos AP. Evolutionary aspects of diet, the Omega-6/Omega-3 ratio and genetic variation: nutritional implications for chronic diseases. Biomed Pharmacother. 2006;60:502–507.

34 Pimentel D, Pimentel M. Sustainability of meat-based and plant-based diets and the environment. Am J Clin Nutr. 2003;78(suppl): 660S–663S.

35 Gilchrist MJ, Greko C, Wallinga DB, Beran GW, Riley DG, Thorne PS. The potential role of concentrated animal feeding operations in infectious disease epidemics and antibiotic resistance. Environ Health Perspect. 2007;115:313–316.

36 US Bureau of Labor Statistics. Table SNR02. Highest incidence rates of nonfatal occupational injury and illness cases with days away from work, restricted work activity, or job transfer, private industry, 2002. Available at: www.bls.gov/iif/oshwc/osh/os/ostb1233.pdf. Accessed February 22, 2007.

3 Quality of Life Benefits

A final benefit worth mentioning is the synergistic impact of a 25% shift on quality of life. The clear benefits from localizing one part of the economy—food—will inevitably lead to creative initiatives to localize others, such as energy, finance and even manufacturing. Localization initiatives in energy, for example, are already well underway in Longmont (which owns its own electrical grid) and Boulder (which is trying to follow suit), and will benefit from the 25% shift in food. The sociology literature, moreover, suggests that as a region becomes more dependent on local small businesses, it experiences a stronger civil society, less social strife and less welfare dependency.[37] Political science research similarly suggests that this kind of transformation, by making people feel like they have a stake in the region's future, moves residents to vote more regularly and volunteer more often.[38]

Caveats about the Model

Like all economic models, IMPLAN needs to be treated critically. Some parts of the model may well understate the potential benefits of a 25% shift. Other parts may overstate them. Above all, a model is no better than an educated guess about an uncertain future.

Here are considerations that suggest that IMPLAN understates the potential benefits of from localization:

First, IMPLAN draws no distinction between locally-owned businesses and non-local ones. The multipliers of each sector are drawn from national, state, and regional aggregates of all businesses, local and non-local. If some chain businesses were replaced by local ones—a likely eventuality if the state embraced a comprehensive plan for food localization—the economic benefits would be much higher.

Second, no effort has been made here to model the impacts of a growing population over the ten years envisioned for the shift. A larger population will mean that, in absolute numbers, the benefits of localization will be proportionally larger as well.

Third, the model has not been adjusted for the probable price increases of non-local foods. These rises, already front-page news in recent years, are likely to accelerate, as will the benefits of localization.

Finally, as noted above, movement to localize one sector will naturally lead to a localization of other sectors as well, and no effort has been made here to model these spillover effects.

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37 See note 7, infra.

37 Harvard political scientist Robert Putnam has identified the long-term relationships in stable communities as facilitating the kinds of civic institutions—schools, churches, charities, fraternal leagues, business clubs—that are essential for economic success. Robert Putnam, *Making Democracy Work* (Princeton: Princeton University Press, 1993). As one group of scholars recently concluded after reviewing the social science literature: "[T]he degree to which the economic underpinnings of local communities can be stabilized—or not—will be inextricably linked with the quality of American democracy in the coming century." Thad Williamson, David Imbroscio, and Gar Alperovitz, *Making A Place for Community: Local Democracy in a Global Era* (New York: Routledge, 2003), p. 8. An economy with many long-term homegrown businesses is more likely to contribute to such stability than the boom-and-bust economy created by place-hopping corporations.

At the same time it's worth noting other factors that could reduce the predicted benefits from localization:

As various economic factors such as labor, land, and capital are increasingly put to use in the state, their own relative prices will rise. For example, greater demand for farmers could raise the incomes of farmers—and the costs of food. This could lead to local pockets of inflation and reduced spending power for residents.

Some economic factors, such as land and water, might simply be unavailable to achieve the levels of self-reliance sought (as elaborated in the next section).

Increasing economic benefits envisioned here will likely attract more people to move into the state, which could bring down per capita income.

Challenges

Envisioning the 25% shift, of course, is easier than making it happen. In this section we enumerate some of the challenges. Fully understanding these challenges is critical, because they underscore the importance of the initiatives, private and public, discussed in Section III.

1 Economic Reality

Mainstream economists are skeptical about localization, arguing that what exists today is the natural result of supply and demand curves efficiently intersecting. This view assumes that the market is perfectly efficient. It assigns no weight to the myriad public policies, laws, and subsidies that have decidedly tilted markets against local business.[39] It assumes that consumers have perfect information, even though they turn out to be relatively uninformed about local goods and services (because local businesses are poor advertisers). It further assumes that businesses themselves have perfect information about how to structure themselves efficiently, while in fact innovation diffuses more slowly with local businesses (how many small business proprietors can afford to attend summer programs at Harvard Business School?).

As noted in the Introduction, however, there are a number of factors that are likely to shake apart the existing food system. Existing global food systems have high distribution costs, and local competitors are learning how to bring them down. Rising oil prices will hasten this shift. Public demand for local food is rising, in part because of rising concerns about the untrustworthiness of food from distant places like China and the health benefits of eating locally. And local entrepreneurs are making huge strides, some working alone and others working in partnerships and cooperatives, in improving the competitiveness of local food businesses.

Nevertheless, localization of some food sectors should be regarded skeptically because of natural resource constraints like land, water, and weather. A good way to ascertain this is to determine if there are some categories of food business in which there is no present activity. For the state of Colorado, this turns out to be the case for only two of the 57 food sectors in IMPLAN: tobacco farming and cotton farming, both of which arguably have only marginal connection to food anyway. We therefore assume no localization of these sectors is possible.

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[39] A forthcoming study by the author, looking at the three largest state economic development programs in fifteen states finds that 90 percent of these programs spend most of their money—often well over 90 percent—on attracting or retaining nonlocal business.

For all the other sectors in which there are some business activities already, we ought to remember two considerations. The first is that if even a small amount of economic activity is present, then the adage of the noted late economist Kenneth Boulding, who taught at Univeristy of Colorado at Boulder, should apply: "Anything that exists is possible." The second is that choosing a 25% shift rather than 50% or 75% reflects our being mindful of localization obstacles within each sector.

Are there sectors where local food businesses possible in Colorado might nevertheless be impossible in Boulder County? Perhaps. There are more than two food sectors that IMPLAN registers as having no activity in Boulder County right now. According to the model, there is barely any growing of fruit, oil seeds and tree nuts, and arguably the climate and geography of Boulder is not hospitable for them. There is hardly any raising of chickens or dairy cows, because of limitations on land use. A dozen food-manufacturing categories are also empty.

Yet there are important counter-arguments as well. Several small orchards and berry crops have been planted in Boulder County in recent years. Ollin Farms will be test-planting nut trees next spring. Sunflower seeds are currently grown on private and county acreage, although processing takes place in Kansas. If beef cattle can be raised locally, there's no reason, in principle, dairy cattle or chickens cannot be raised. And the absence of certain manufacturing businesses is probably more a reflection of the presence or absence of specific entrepreneurs, rather than locational issues. Again, exemplary businesses in Colorado actually can be found in every food manufacturing sector.

2 Human Capital

One undeniable obstacle to the 25% shift is people. Can enough entrepreneurs be found with the skills to lead this revolution? And are there enough skilled workers to be employed by them? With unemployment in the region still running high—10,500 in Boulder County, 154,000 in North Central Colorado, and 230,000 in the state—there are ample numbers of people to fill the new jobs associated with a 25% shift. Recall, again, that the 25% shift alleviates about a sixth or a seventh of the unemployment problem. But do today's unemployed have the necessary skills? Do they have the desire for the taxing demands of farming? Or can they be trained to fill the emerging new jobs?

To effect the 25% shift, Boulder County would need 435 more people working as farmers or animal raisers, 350 more people in food manufacturing, and 54 more people in food service. The remainder of the jobs, induced or indirect, are spread evenly across the entire economy. Given that most of the food-manufacturing and food-service jobs are low-skill, there's no reason these positions could not be filled with existing workforce-development and training programs. The biggest challenge is primary production.

Can 435 new people be recruited into farming and raising domestic animals? In the competitive world of high-tech agriculture, today's farmers must excel at a wide-range of skills: setting up and managing a farm business, raising crops and animals, selling their outputs directly or through attractive intermediaries, maintaining and using proper tools and technology, and preparing sophisticated financial and marketing plans.[40]

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[40] The New England Small Farm Institute has prepared extension self-evaluation processes for potential farmers which are available at: http://www.smallfarm.org/main/for_service_providers/tools_and_resources_for_working_with_new_farmers

Moreover, different demographic groups have different needs. Immigrant populations may have extensive knowledge and experience in traditional farming, but may need support in finance and marketing. Those laid off from a manufacturing job, with no background in agriculture, require more comprehensive training. Women and non-whites may especially need support entering a profession that historically has been dominated by white men. The good news is that beginning farmers represent a growing fraction of farmers across the United States, and they are increasingly women and non-whites.[41] The growing Hispanic population in Boulder County could provide an excellent pool for new farmers.

Disaggregating the new jobs in the primary production sector also illuminates the specific challenges:

> A third of the jobs (175) are in agriculture and forestry support services, which are basically input suppliers. The skills required for these jobs are not very high.
>
> 43 jobs are projected for local fish production. There may be challenges in expanding local aquaculture, but training employees to work for these enterprises is probably not one of them.
>
> Some expansions are very modest: 14 poultry growers, 10 more cattle ranchers, 10 more sugar-beet growers, 3 more oilseed farmers, and so forth. Small changes like these seem easy to accomplish.
>
> Only three other primary production numbers seem potentially challenging: 175 grain growers, 90 dairy workers, and 62 fruit growers.

There is much support available for training farmers through resources like Colorado State University Extension, which has a beginning farmer program (with several classes already graduated) that also covers farm business development. The Farmer Cultivation Center focuses on new farmer incubation. Also relevant are local small business centers, master gardeners classes, and mentorships with area farmers.

What about training new entrepreneurs? Dozens, perhaps hundreds, of new food businesses will be necessary in Boulder County, which will certainly strain the existing entrepreneurship and small-business support programs in the region. Among the resources available are the Deming Center for Entrepreneurship at Colorado University, the State Office of Economic Development, various chambers of commerce in the county, Naturally Boulder, and operating food-business incubators in Ft. Collins and Grand Junction.

These challenges would grow as the 25% shift takes root in North Central Colorado. The number of new jobs and enterprises grows by more than an order of magnitude, and workforce and entrepreneurship programs are likely to be less available in less affluent areas outside Boulder County. That said, another potential area of job growth within Boulder County could be to take a leadership role in meeting these regional needs through its new programs and schools.

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[41] "Beginning Farmers and Ranchers," Mary Ahearn and Doris Newton. Available from the USDA at http://www.ers.usda.gov/Publications/EIB53/

3 Land

As is the case for jobs, land requirements for the 25% shift are modest for food manufacturing, food service, indirect, and induced jobs. The challenge, again, is for expanding primary production.

To get a sense of the land requirements for, say, Boulder County, let's look again at the five largest job numbers: grain and oilseeds (178 jobs), dairy (90 jobs), fruit farming (62 jobs), vegetable farming (31 jobs), "other crop" farming (25 jobs), and cattle ranching (10 jobs). Using data from IMPLAN and the 2007 Agriculture Census, Chart 23 shows that the total land required for this shift is about 102,000 acres.

Chart 23
Land Impacts from 25% Shift for Boulder County (2007, 2009)

	Colorado Employees	Colorado Farms	U.S. Acres Per Farm	Colorado Acres	Acres Per Employee	25% Shift Employees	25% Shift Land (acres)
Grain & Oilseed Farms	12,897	3,394	789	2,677,866	208	178	36,959
Dairy Farming	1,696	267	371	99,057	58	90	5,257
Fruit Farming	119	644	124	79,856	671	62	41,606
Vegetable Farming	1,266	429	228	97,812	77	31	2,395
Other Crop Farming	5,697	11,399	240	2,735,760	480	25	12,005
Cattle Ranching	13,968	9,598	573	5,499,654	394	10	3,937
							102,159

While all land use in Boulder County is subject to competing demands, expanding farming by 102,000 acres will be challenging. Total land use by all farms in the county, according to the 2007 Agriculture Census, is 137,688, so 102,000 acres represents a 75% expansion of farmland. With the land mass of Boulder County being about 475,000 acres, this would require rededication of nearly one in five acres in the county toward agriculture. Given that 60% of this land is mountainous, and much of the rest cannot be irrigated or is already developed, the land challenge will be difficult to overcome.

New land for local farming could come from several different sources, including:

Land leased from private landowners who wish to contribute to the 25% shift. It's worth noting that 40% of the land required is for fruit growing, which many residential landowners may regard as a desirable new use of their properties (instead of wasteful lawns).

City and county owned open space.

Additional government purchases of open space with agricultural potential and of water rights.

Schools, churches, and apartment buildings that could have their properties deployed or leased for small-scale farming.

While wheat and dairy farming tend to require larger parcels of land, other forms of agriculture could be done in greenhouses. Pioneering work around the world growing gardens on rooftops (in Toronto, for example), alongside highways, and in the walls of green buildings suggests that the full potential for small-scale agriculture is barely understood. In the analogous field of renewable

energy, assessments of these omissions have all but put to rest concerns about land availability for urban photovoltaics. A more comprehensive inventory of possible county land for gardening needs to be assembled.

Those just entering farming in recent years have shown an interest in applying new intensive growing methods on significantly smaller plots. There is some evidence, including a soon-to-be-published report on urban farming in Denver, that these methods can increase yields per acre, and profits, by one or two orders of magnitude.

In the end, though, the only way the 25% shift assuredly can happen in Boulder County is by relaxing our assumptions that food exports and per-capita consumption remain constant. Shifting agriculture away from the commodity crops that dominate farming today in the County to fruits, vegetables, nuts, and grains, which would reduce exports, could increase the income of existing farmers and meet local demand for a healthier diet without necessarily requiring more land. Additionally, shifting diets in the Boulder region to require less meat would also bring down the land requirements of the 25% shift.

4 Financial Capital

Farmers and small businesses always have some difficulty getting credit, but the challenges have become especially acute during the recent financial crisis. Even companies with terrific track records for borrowing and repaying are having difficulty today obtaining credit from mainstream banks, thrifts, or credit unions.

How much additional capital might be needed for the 25% shift? The 2012 Statistical Abstract estimates the "Net Stock of Private Fixed Assets" in the country in different industries.[42] Chart 24 shows these values nationally for food businesses, and then scales them by population for our three study areas. Assuming that the food system has a constant relationship between jobs and capital, the additional capital required for the 25% shift is $103 million for Boulder County, $1.5 billion for North Central Colorado, and $1.8 billion for Colorado state. These numbers could be higher if new businesses turn out to be relatively more capital intensive.

Chart 24
Capital Requirements for 25% Shift (2010)

Private Assets for Food Businesses ($millions)				
	United States	Boulder County	North Central Colorado	Colorado State
Agriculture	$493,000	$473	$5,474	$8,069
Food Manufacturing	$238,000	$228	$2,643	$3,895
Food Retail & Wholesale	$154,000	$148	$1,710	$2,521
Food Services	$269,000	$258	$2,987	$4,403
Total	$1,154,000	$1,107	$12,814	$18,888
Existing Food Jobs		20,466	201,243	321,604
Additional Jobs with 25% Shift		1,899	24,037	31,022
Percent Expansion		9.28%	11.94%	9.65%
Additional Capital Requirements		$103	$1,530	$1,822

42 Table 781, for the year 2009. Food-related wholesale is assumed to be 10% of the total.

There's no question that this capital, in theory, is available in the region, as shown in Chart 25. In Boulder County, for example, residents have approximately $7.5 billion of savings in short-term accounts and $26 billion in long-term accounts. Reallocating just one percent of the former or three-tenths of one percent of the latter could fully finance the 25% shift. That said, the practical difficulties of shifting capital now are profound. Unless banking institutions feel confident to lend their savings to local food businesses, they cannot be employed for the 25% shift. Equity capital for small business today is virtually nonexistent. Of the nation's 7,500 mutual funds, none focus on local small business.

Chart 25
Estimated Household & Nonprofit Capital (2010)

		$ million	
Short Term Savings	**Boulder**	**NCC Region**	**State**
Checking	$287	$3,181	$4,798
Savings	$5,994	$66,383	$100,141
Money Markets	$1,287	$14,254	$21,502
	$7,568	$83,818	$126,441
Long-Term Savings	**Boulder**	**NCC Region**	**State**
Corporate Stock	$7,317	$81,028	$122,233
Corporate Bonds	$2,155	$23,861	$35,995
Mutual Funds	$4,070	$45,073	$67,995
Pension Funds	$11,714	$129,716	$195,681
Insurance Funds	$1,218	$13,483	$20,339
	$26,474	$293,161	$442,243

Because local small business accounts for about half of all business in the United States (by jobs and output), an efficient capital market would allocate half of these savings to local business. In fact, almost no savings are being invested in local businesses. This is largely because of outdated securities laws (which make it difficult and expensive for 98% of investors to place money in small business) and outdated investment institutions (which were built for very large companies traded on global stock exchanges). All of this is changing now, which means that, over time, Boulder County could allocate as much as $16 billion dollars (half of residents' short-term and long-term savings) for new or expanded local business—more than a hundred times greater than what is needed to finance the 25% shift.

5 Consumers

Another challenge for the 25% shift is to convince consumers, including business and public agency consumers, to buy more local foodstuffs. The general consensus right now is that local food demand exceeds local food supply. Demand for locally-grown food in the past five years has grown for consumers, businesses, institutions, schools, and municipalities. The supply capacity for locally-grown foods can grow, though the other constraints facing the 25% shift will need to be overcome.

While a variety of surveys across the country (including those done by Dr. Dawn Thilmany and her colleagues at Colorado State University) suggest that consumers are interested in local food and willing to pay more for it, a 25% shift will require broader participation among lower and medium-income consumers. Expanding these markets will require greater emphasis on locally processed food and locally prepared meals that meet price points competitive with Wal-Mart and other food stores.

Shifting a quarter of all purchasing will not be easy. For individual consumers, it will require broad education about the health, environmental, and economic benefits of local food, about which stores are locally-owned, and about which foodstuffs are locally produced. For businesses, institutions, and other mainstream food purchasers this will require greater ease in purchasing bulk food items, prepared foods, and partially processed foods (i.e. chopped or diced vegetables). Aggregation will also be critical to enabling larger-volume buyers to access the products of local producers. For public agencies or institutions such as schools, this will require an overhaul in procurement practices. As the epicenter of the nation's natural foods industry, Boulder has the people and institutions (like Naturally Boulder) that could lead marketing efforts to help change consumer behavior.

Achieving the 25% Shift

How can Boulder County maximize the probability of achieving the 25% shift over the next decade? While there's an almost infinite "to-do list" that one can come up with on an unlimited budget, the most challenging reality right now—in an era of financial crisis, government budget cutting, and philanthropic exhaustion—is to focus on initiatives that cost little or no money. This section, therefore, offers a list of "meta-businesses"—cash-flowing vehicles, like a local gift card, that can promote a wide variety of local food businesses. We then highlight a specific class of local food businesses—those tying together consumers and producers—that we believe could be particularly catalytic and deserve special attention. Finally, we offer some concluding thoughts about how the region might strategically pursue these multiple objectives through a new institution we call the Food Authority.

Key Meta-Business Tools

A By "meta-business," we mean a cash-flowing business design that supports a variety of local food businesses. Whereas many ideas proposed by future working groups will cost money—private money, foundation money, or public money—a meta-business design makes money. And cash flow from the first metabusinesses, if well designed, can then support additional metabusinesses—and ultimately many of the other initiatives enumerated in the previous section. Philanthropic and government support can provide the capacity building and start-up resources, but ultimately we need initiatives that can sustain themselves through the generation of their own income.

Below are brief descriptions of meta-businesses that the Boulder region could consider launching that could address the five major challenges discussed in Section II:

How can Boulder County consumers be mobilized to buy more local food?

How can local food businesses improve their competitive advantage?

How can more land be made available for new local farming?

How can investment into local food businesses be stimulated?

How can new local food entrepreneurs be developed?

1 Consumer Mobilization

The first challenge is consumer demand. If residents of Boulder County demand local food, supply will follow (though at some point, scarce supplies of land, water, and talented labor may well limit primary production). For this to happen, consumers must be educated about the benefits of local food. They must be able to identify easily which foods and which vendors are local. And they must be able to access local food affordably.

An example of a meta-business that could moblize consumer demand is a directory (on-line and in print) of local food businesses. In fact, such directories already exist in Boulder County, though their content and audience could expand. Directories like these help residents conveniently find food from local farmers and locally-owned groceries, food processors, and restaurants. They can also mobilize tourists to spend more money in locally-owned food businesses. Cash flow can come from advertising sales and from selling the directory in participating businesses, tourism bureaus, or local bookstores.

Other meta-businesses that also could mobilize local demand for local food include:

Intermediaries that help government and business purchasing agents source local food, and then collect finder's fees for successful contracts.

A free monthly or weekly newspaper that circulates to Boulder residents, each with an updated and expanding directory of local food businesses, supported by advertising.

Local credit, debit, loyalty, or gift cards that reward consumers for buying food or food services locally.

2 Local Business Competitiveness

A second challenge is to ensure that local food businesses are competitive with non-local food businesses. As noted earlier, the presence of some competitive Colorado businesses in almost every one of the food sectors in IMPLAN underscores that there are compelling models. But for local food businesses to succeed, the best models must be spread.

Perhaps the best example of where this kind of peer learning and support is occurring is in the networks of the Business Alliance for Local Living Economies (BALLE), now operating in 80 communities in North America. Transition Colorado, which commissioned this study, is a BALLE network, supported in part through membership dues.

But beyond just creating miniature—and more effective—Chambers of Commerce, local food businesses in the Boulder region could undertake more ambitious meta-businesses that could increase their competitiveness. Consider three models where valuable services provided could be covered by participating businesses through an annual fee or per-use charge:

A network of local food businesses, like Tucson Originals, could purchase foodstuffs, kitchen equipment, and dishes in bulk, bringing down costs.

Local food businesses could create their own local business mall, like Pike's Place in Seattle, which has served as a tremendous anchor for tourists and regional consumers.

Local food businesses could set up a direct delivery service, as is being done right now in Edmonton, Canada, which is especially valuable for consumers who are single parents, elderly, or sick—all of whom have a very limited ability to leave their homes and shop.

3 Local Land

A third challenge is to provide enough land for new farms and farmers. One meta-business idea worth exploring here is to create a commercial land trust, incorporating some of the innovations of the Burlington (Vermont) Community Land Trust, which would make it easier to provide urban farmers with long-term leases, and also create a better framework for attracting capital (perhaps attracting the endowments of community foundations through program-related investments). As a commercial entity, the land trust would have an incentive to buy adjacent parcels of land to create appropriately scaled-farms and urban food districts. Additionally, a well-endowed land trust like this would be in a better position to negotiate easements onto urban and suburban properties. It could, for example, buy and lease "gardening rights" on the lawns of interested subdivisions.

There are a number of other promising sources for land for a Boulder commercial land trust. The city and county could lease or donate some of the land in their open space programs. Commodity farmers, whose average age is now 60, could donate land when they retire (taking a large tax writeoff). An important priority of the land trust would be to restore the health of the soil in these parcels.

4 Local Investment

A fourth challenge is to provide the capital needed to expand existing local food businesses and to grow new ones. Around the country, chapters of Slow Money are forming to create new vehicles for funneling investment dollars to promising local food businesses. With the founder and chair of Slow Money now a new resident of Boulder, the region has the potential to become a vibrant laboratory for best practices in local investment. As noted in the Forward, Transition Colorado is initiating a $1.5 million investment fund focused on food businesses that is one of the largest of its kind in the United States.

A wide range of investment vehicles could support local food businesses and themselves become viable meta-businesses by charging participating investors and businesses fees or by taking small percentages of the resulting profits. Among these vehicles are community loan funds, angel-recruitment services, small-stock creation companies, local stock markets, and investment clubs. Moreover, through self-directed IRAs, these investment vehicles can receive tax-deferred money from Boulder residents. These ideas are elaborated in two recent books: *Locavesting*, by Amy Cortese; and *Local Dollars, Local Sense*, by the author of this report.

5 Local Entrepreneurship

A fifth challenge is to create a new generation of food entrepreneurs. There are number of potential meta-business approaches here. A mentorship network can be set up linking new or struggling food entrepreneurs with established businesspeople who are asked, via charitable contributions, to underwrite the program. Either alone or in partnership with existing programs (such as cooperative extension programs or community colleges), the Boulder region could set up entrepreneurship courses appropriate for local food businesses and recruit participants throughout North Central Colorado. Community kitchens and incubators (described below) can be set up on a fee-for-service basis.

Local Food Infrastructure

Customer demand for local food is expanding, but farmers in Colorado are unable to meet it. One reason is the inadequate regional infrastructure for local processing, storage, aggregation, and distribution. Energetic entrepreneurs on both the demand and supply sides are trying to bridge this gap, but they need help.

In recent years the "food incubator" and "shared-use commissary kitchen" have resurfaced as a promising economic development tools. Boulder County Parks and Open Space is considering a facility like this at the Boulder County Fairgrounds. This renewed interest reflects a growing concern by economic development professionals that the region's agricultural base needs to be stabilized and its manufacturing base expanded. Plus, local food production, marketing, and distribution strategies are recession proof.

To understand possible arrangements that could be created throughout the region, we review below three different models (and several variations on each) for nurturing food-infrastructure businesses.

1 Kitchen Incubators

Over the past 20 years kitchen incubators have become a key tool for expanding food and agricultural businesses. The kitchen incubator usually provides shared equipment, offices or work spaces, and storage, along with access to technical assistance. They have the most impact on local food economies when, in addition to low-cost access to equipment, they provide three other services: a needs assessment for entrepreneurs in the community; a collaborative network among entrepreneurs so they can collaborate and gain economies of scale; and tools of market access so that entrepreneurs generate substantial sales and profits.

Many kitchen incubators have had only limited success, but their shortcomings suggest important lessons. They should target start-up underserved food and farm entrepreneurs who are transitioning from home-based operation. They should expand opportunities for both farmers and entrepreneurs to process or value-add to raw product. Their facilities should be situated in low-wealth urban neighborhoods or rural communities to provide jobs to residents who need them. Their equipment should be put to productive use over all four seasons.

Here are some specific types of kitchen incubators:

> Community kitchens provide citizens with access to commercial grade facilities where they can learn culinary skills and about nutrition, food preservation, and food safety. Often extension and Health Department classes are taught there. Farm gleaning and food processing are sometimes made available as charitable donations. The facilities also might be rented for farmers off hours who wish to undertake value-added incubation and processing.
>
> Commissary kitchens and farmer food-processing centers cater to farmers interested in value-adding periodically to their specialty crops, and to new food entrepreneurs who are experimenting with local food markets. They offer specialty food processors, farmers, and caterers a relatively inexpensive place to license food processing equipment. Kitchen clients

are charged only for the time they use the facility. They benefit from the technical knowledge of other tenants using the kitchen, particularly those with extensive food processing, marketing, and business experience. Facilities can range in size from 3,000 to 15,000 square feet, depending on prospective tenants' operations, on the proximity to market partners, and on other revenue generation opportunities. The incubators can also provide a more cost-effective way for farmers or small entrepreneurs to comply with current and future regulations guiding safe food handling and processing techniques.

Community food enterprise incubators embrace a comprehensive approach to preparing entrepreneurs for the marketplace. These facilities should be licensed to allow food manufacturing, food service, food handling, and aggregation, with enough dedicated space for processing, packaging, mixed-use operations, and warehousing. When selecting the location, attention should be paid to highway access, ingress/egress turn radius for trucks, ample parking, and several docks for shipping and receiving. Because the food-service and the food manufacturing industry are highly regulated and intimately affected by strict food safety requirements, local food entrepreneurs in an incubator setting need comprehensive technical assistance on the alphabet soup of FDA regulations: GAP (Good Agricultural Practices), GMP (Good Manufacturing Practices) and HACCP (Hazardous Analysis and Critical Control Points). Entrepreneurs also need to be trained to operate commercial equipment and follow safe food handling practices. This kind of facility might add retail or dining space to create the diversified income streams needed to operate and manage these facilities year round.

University food innovation centers, as the name implies, are usually housed at a land grant university, which provides business and technology expertise to the startup and establishes food companies that are, it is hoped, linked permanently to the state. They harness statewide research and industry resources to assist food processors in business development, market research, product and process innovation, food science, workforce development and training, regulations and compliance support, and quality assurance and food safety systems.

For-profit shared-use kitchens operate in urban settings, are privately operated, and rent out space for caterers, bakers, food-cart vendors, and prepared-food entrepreneurs. Many of these facilities are run by food service professionals. The kitchens target start-up entrepreneurs needing licensed commercial kitchens, and offer them areas for preparing, packaging, catering, and baking. Some of these facilities also offer cooking classes, nutrition training programs, and "pop up" restaurants to attract other aspiring food entrepreneurs.

2 Local Food Value Chain Hubs

A new model in local food incubation has recently emerged to assist agricultural producers who wish to recruit wholesale buyers into "buy fresh, buy local" programs. Food hubs enable farmers to aggregate, pack, store, and distribute fresh produce, often under a common brand name. Community-based food hubs address the distribution gaps within low-wealth communities and provide small- and mid-size farmers the ability to aggregate for direct, restaurant, and wholesale markets. Prospective anchor tenants and users of these facilities tend to be underserved rural farmers, urban

farmers, urban market growers, farmer and producer cooperatives, value chain market-producer partnerships, and marketing cooperatives. Two variations on this theme have become common:

> Healthy food hubs consist of businesses, social services, and safe public spaces that mutually support each other. The anchor is usually a major food business, perhaps a grocery store or public market. The hub allows for ambitious public-private partnerships.
>
> Regional food hubs typically need more facility space, between 20,000 and 100,000 square feet depending on the wholesale markets being targeted. They should be licensed for processing, packaging, fresh cut preparation, vacuum packing, and flash freezing. Depending on operational uses, the facilities should have ample capacity for walk-in coolers and freezers, temperature controlled warehousing, highway access, accessible ingress/egress with good turn radius for semis and tractor trailers, ample parking for tenant employees, and four-to-six docks for dedicated shipping and receiving.

3 Shared-Use Facility Collaborations

In almost every community commercial kitchens exist, both public and privately owned, but local food entrepreneurs are unable to access them. These might be in central warehouses, food terminals, emergency food relief facilities, or public markets. To meet their start-up needs, entrepreneurs might develop mutually beneficial collaborations with the operators of these facilities, and thereby eliminate barriers to processing, aggregation, and distribution facing even the smallest enterprises. The model might involve entrepreneurs unable to meet co-pack minimum runs, local food brand marketing associations, or producer cooperatives in need of centralized warehousing. There is a need to explore the legal and governance structures necessary for this access. Mixing private and nonprofit uses with school property, for example, can be difficult.

The legal, insurance, and financial structures surrounding publicly owned facilities need to be adapted to meet the needs of food and farm entrepreneurs. Users, for example, may need extensive training and orientation and need to be managed. Neighborhood-based facilities such as churches and public food programs might vary in size from 5,000 to 10,000 square feet. Larger public or private facilities including terminal markets, private central warehouses, and food banks might range in size from 10,000 to 50,000 square feet. Licensing and regulatory requirements of the facilities need to match the operational uses of the prospective shared-use tenants or leases.

Food banks are an especially promising institution for this kind of arrangement. Across the country food banks are looking for new ways to meet the growing demands placed upon them. Food Lifeline is one of the largest nonprofit food distributors in King County, Washington, and is now opening up its own food-processing plant to handle contributions from area farmers. The food bank community knows that the food is out there—the USDA estimates that a quarter of all the food grown goes to waste. New partnerships like these could expand the capacity of Boulder County's food bank system.

4 Low Infrastructure Ideas

The CSA model also could provide a low-cost infrastructure platform. If each CSA member convinces a neighbor, friend, or family member to join a CSA, they could split CSA pickups, effectively doubling the CSA market while halving the carbon footprint. The CSA model can be applied to all kinds of food businesses, including the ones mentioned above, as a way of minimizing infrastructure investments and building community.

Next Step: A Boulder County Food Authority

No one entity can carry out the myriad initiatives laid out here. Many entities—private businesses, nonprofit groups, and public agencies—will need to work creatively side by side. Yet there remains a need for ongoing leadership and coordination.

To remedy these limitations, we propose the creation of the Boulder County Food Authority (BCFA), an entity that would provide loans to and mobilize in-kind support for those local enterprises with the greatest catalytic potential in helping the region realize the 25% shift. Specifically, we envision the BCFA prioritizing assistance for:

Meta-businesses that support a number of local businesses in the region;

Infrastructure businesses described above, including incubators, food hubs, and shared-use facilities;

Clusters of businesses involving one or more food businesses, such as industrial ecology operations where the waste of one business serves as the input to another;

Clusters of businesses from multiple counties that span the supply chain; and,

Any other local food business that, if it succeeds, can strengthen the value-chains and bottom lines of many food businesses in the region.

We use the word "Authority" to indicate that the proposed entity should have some kind of official support from local and county governments. It could be charged to lead initiatives that can better account for the public and private benefits of local food initiatives, such as increased tax collections, improved public health, greater tourism, and lower welfare and unemployment expenses. Official support of the BCFA could range from oversight and financing to just loose endorsement. We are reluctant, without further public discussion, to recommend one specific structure. We suggest that there's value in exploring the relative merits of making the entity a nonprofit, a private for-profit, a cooperative, a business development corporation, a public body, or a hybrid of all of these.

The ultimate choices about structure will influence, among other things, what kinds of funds are sought for initial capitalization. Among the most promising funding streams available are:

Grants and program-related investments from foundations;

Grants, loans, and loan guarantees from federal, state, and local economic development programs;

Proceeds from bond sales, the interest of which might be tax exempt;

Regional funds that administer New Markets Tax Credit monies;

Capital from banks seeking to improve their Community Reinvestment Act performance; and

Individual and institutional investors in the region.

While the BCFA could make loans directly to promising entities, we suggest it might be easier to work with existing banks, credit unions, and revolving loan funds to administer each loan. The BCFA could provide a loan guarantee or even place funds on deposit to serve as collateral, and then pay the lending institution a fee for servicing the loan. Loans therefore would only be issued to food businesses that received two approvals—one from the BCFA and another from the administering institution.

Consider just one of many plausible scenarios for launching the BCFA. Start-up funding of $1 million, for example, might come from a combination of state and local economic-development funds and program-related investments from foundations in the region. Another $5 million might come from a direct public offering (DPO), in part to raise public awareness of the viability of this kind of emerging financing option for other local food businesses. Just the selling of the shares in the region would provide enormous opportunities for raising consciousness in the region about the potential benefits of the 25% shift. Shares could be bought for $100, and the aim would be to sell these to 50,000 purchasers in North Central Colorado. The $5 million obtained from shareholders would provide the first tranche of capital for lending. The BCFA might then seek to leverage its equity capital of $6 million by a factor of five—to $30 million—through additional sources described earlier, such as municipal food bonds. As a publically traded company, its board would need to comport with Colorado business laws. Board meetings would be open to shareholders and the books and quarterly performance would be open to public review.

With a healthy cash flow from interest payments on its loans, the BCFA could begin to undertake some of the other activities envisioned in this report. It could support new farmers and food entrepreneurs with technical assistance, market studies, product evaluations, managerial mentors, and financial analysis. It could steadily grow the financial assets available to entrepreneurs by continually recruiting private and public sector support and bringing to the region more angel, venture, and hedge fund investors interested in food business. It could help expand the land bank capacity of the region. And it could inform policymakers about the most urgent areas for reform.

It is possible that Localization Partners LLC—which has already received $1.5 million in startup funding—could take on this role in North Central Colorado.

While there is no one entity in the country that serves as a precise model for the BCFA, many are at least partially analogous. For example, there are thousands of public or quasi-public authorities around the country overseeing ports, airports, highways, water systems, electricity, waste management—anything with a significant public purpose. In the Pacific Northwest, EcoTrust operates a loan fund for sustainable businesses including community food enterprises, which in turn finances many other initiatives, including policy reforms. There are proposals around the country being seriously discussed that also resemble the BCFA. The Food Commons, proposed by Jim Cochran and Larry Yee in California, envisions regional land banks, food-finance funds, incubators, and food hubs.

The one recommendation we wish to underscore for immediate action is to catalyze a broad discussion of the BCFA and commission a business plan around it. With public support and a detailed business plan, leadership in the region might be able to obtain seed funding.

As this report lays out, the case for the 25% shift is a powerful one, and a critical mass of talented business people, social entrepreneurs, and policymakers in the region are eager to implement it. While capital is not the only challenge standing in the way of the shift, it probably is the biggest. Providing loans to the most promising business ideas could unleash the creative potential of hundreds, perhaps even thousands, of new entrepreneurs.

For further information, contact:

MICHAEL H. SHUMAN

Cutting Edge Capital
2203 Quinton Road
Silver Spring, MD 20910

202-669-1220

shuman@igc.org