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1st Quarter 2012| 27(1)

WILL LOCAL FOODS INFLUENCE AMERICAN DIETS?

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JEL Classifications: Q1, I1, H3

Keywords: Dietary Guidelines, Consumer Behavior, Local Foods, Fruit and Vegetable Production

There are a number of indicators that illustrate the increasing public attention and food supply chain responses to consumers choosing to “Go Local.” Included are the number of food retailers adopting new local procurement policies, the persistent, double digit growth in farmers markets throughout the United States as tracked by USDA Agricultural Marketing Service, and the more recent emergence of urban food systems in and near metropolitan areas (Martinez et al., 2010; Lockeretz, 1986). Onozaka, Nurse, and Thilmany McFadden (2010) found that a sizable number of buyers connect local food purchases with outcomes that may impact their environment, local economy, and of particular relevance to this theme, public health. But, some of the connections between local foods and issues of public importance are difficult to assess. In this article, we begin exploring the linkages between relocation and an increased propensity for households to integrate the USDA’s dietary guidelines into their lifestyles. This includes, in particular, those households facing health risks, but also, the broader public.

The Era of Food System Relocalization

Before local foods came to the forefront of new policy initiatives at the state and Federal level, there were other USDA programs that may have indirectly created opportunities for more localized food systems. These included the Specialty Crop Block Grant Program, the Farmers Market Promotion Program and the Federal State Marketing Improvement Program, all administered by USDA’s Agricultural Marketing Service; and the USDA National Institute of Food and Agriculture’s (NIFA) regional research committees and competitive grants focused on the competitiveness of small and mid-size farms (Stevenson and Pirog, 2008). Perusing funded projects from these programs shows that place-based production models and marketing strategies were being explored and implemented with increasing frequency throughout the start of this century.

The local food segment was first officially defined by the United States Congress in the 2008 Food, Conservation, and Energy Act, with the following criteria: the total distance that a product can be transported and still be considered a “locally or regionally produced agricultural food product” is less than 400 miles from its origin, or within the state (Martinez et al., 2010). The intended outcomes used to support more localized initiatives were primarily to improve competitiveness of producers and support local economies. One specific example is the recent modification of the USDA Rural Development Value-Added Producer Grants program to designate local marketing as a form of value-added having equal importance with processing raw products into higher value goods.

To consider any potential connections between local food initiatives and the implications of USDA dietary guidelines, it is important to examine the public health community’s engagement in local food efforts as part of strategies to affect consumer behavior, as it relates to diet. Using the justification that food-related chronic diseases have become a serious burden on our national economy, the 2020 Healthy People initiative of the U.S. Department of Health and Human Services aims to increase the U.S. consumption of fruits and vegetables by 37% and 80% respectively by 2020, while reducing the number of outbreaks of food borne illnesses in fruits and vegetables by 10% (U.S. Department of Health and Human Services, 2010). This is an interesting goal because it connects a dietary goal with another public food safety goal that relates more to food supply chains and distribution models, inferring there are trade-offs in shifting the average diet of consumers. However, there seems to be no scientific evidence linking these two food system outcomes.

Most of the focus on food-based behavioral trends in the United States is on those that reverse the rates of overweight status and obesity. These include individuals’ shift in diet toward energy-dense foods high in fat and sugars but low in vitamins and micronutrients—junk, snack and fast food—and a trend toward lower levels of physical

activity due, in part, to changes in workplace behaviors and types of transportation used (Colorado Department of Public Health and Environment, 2010).

Do Producers See New Opportunities for Fresh, Local Produce?

The number of farms with direct sales to consumers grew by 39% between 1997 and 2007 according to the Census of Agriculture. An increasing number of producers market at least some share of their products through local marketing channels. As mentioned in the introduction, there are a variety of programs that have sought to support new models of agricultural production that involve a more diverse set of producers.

Here we are focused on the linkage between the health outcomes and demand for locally produced fruits and vegetables. The important question is whether this demand is associated with financially viable production and marketing strategies for producers.

Regional Variation in Local Food Demand and Health Outcomes

Table 1

Correlation between population-level health outcomes and measures of local food marketing and production

Pearson correlation coefficient	Obesity, % of adults	Cardiovascular disease mortality rate
US Country Totals		
Direct Sales*	-0.21	-0.15
Number of CSA's	-0.19	-0.16
Number of Farmers' Markets	-0.27	-0.14
Fruit and vegetable sales over total farm sales*	-0.18	-0.09

Sources: * data from Census of Agriculture (2007)

Number of farmers' markets from USDA-ERS Food Environment Atlas (2010)

Cardiovascular mortality calculated using CDC Mortality Tape (98-00 and 03-05)

Notes: Correlations for 2990 U.S. counties for which data were available, all correlations are statistically significant ($p < 0.001$)

For U.S. counties, direct sales of food, the prevalence of farms with Community Supported Agriculture arrangements (CSAs), and the number of farmers' markets are negatively correlated with poor health outcomes, including the adult obesity rate and the cardiovascular disease mortality rate, at the county level (Table 1). These health outcomes are also negatively correlated with the share of agricultural sales from fruits and vegetables. This means that in counties where fruits and vegetables—healthy, edible farm products—represent a higher share of total agricultural sales, the adult obesity rate is lower, and a smaller share of deaths are due to cardiovascular disease. These correlations should be interpreted carefully, as they may suggest that regional variations in obesity and cardiovascular disease are somehow aligned with the types of foods available in local markets, but further research that integrates income, education, or cultural factors is necessary before any causal relationship is defined.

There is considerable regional variation in fruit and vegetable production, in part, due to different growing conditions, infrastructure, and market access. Regional consumption rates also vary, suggesting regional demand varies. In 2009, 26.3% of U.S. adults consumed vegetables three or more times per day and 32.5% of adults consumed fruit two or more times per day, but according to the Center for Disease Control and Prevention (2010) this rate varied regionally. Rates were highest in Florida, Colorado, and the Northeast and West of the continental United States. Regional data on local sales of fruit and vegetables, specifically, is not available. However, from the most recent Census of Agriculture we find the value of county-level fruit and vegetables sales and direct sales, are positively correlated (0.50). Counties

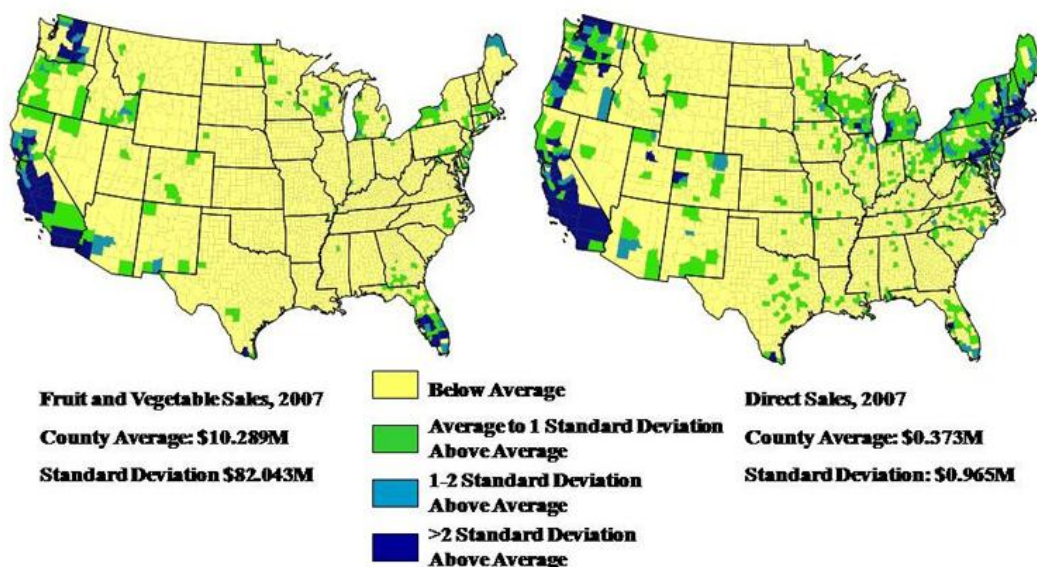
with above average sales in both characteristics exhibit positive spatial correlation (Figure 1); where direct sales are relatively high compared to fruit and vegetable sales, direct sales of livestock products is probable. In 2008, farms classified as fruit, nut, or vegetable farms represented only 6% of U.S. farms but accounted for 43% of all local food farms and generated 65% (\$3 billion) of total local food sales in 2008 (Low and Vogel, 2011).

Local Food Farm Financial Performance

Low and Vogel (2011) find sales per acre is highest for fruit and nut and vegetable farms selling locally (\$1,338 per acre on an average of 76 acres) when compared to that of all local food farms (\$590 per acre) and all farms (\$304 per acre) on average. Sales per acre for fruit, nut, and vegetable farms selling locally vary considerably with the type of local food marketing channels utilized. Farms using only direct marketing channels, such as farmers' markets or

CSAs, averaged sales of \$640 per acre. Farms using both direct and intermediated marketing channels, defined as sales to middlemen like grocers, restaurants, and regional distributors, averaged \$1,310 per acre. Farms using intermediated marketing channels exclusively, which tend to be the largest farms, averaged \$3,100 per acre. These data suggest local food farms generate the highest sales per acre when they focus on production, not on time-intensive direct marketing. Small farms are most likely to exclusively use direct marketing channels while large farms are more likely to utilize intermediated marketing outlets. This implies that larger farms using intermediated local marketing channels have the potential to generate relatively high sales per acre compared to other local food farms, increasing their financial viability and ability to produce affordable fruits and vegetables to be marketed locally.

Figure 1: Regional Variation of Fruit and Vegetable Sales and Direct Sales



Note: The standard deviation is a measure that shows how much variation exists from the average
Source: Authors' calculations using 2007 Census of Agriculture data

It is reasonable to assume that local food farms must be financially viable if they are to continue making fresh fruits and vegetables available within their community. Information on the financial performance of farms selling local foods is sparse, however, due to the sensitive nature of the data. Low and Vogel (2011) calculate two farm financial performance measures for both local food farms and all farms. They found that the share of farms earning positive profits was equivalent for local food farms and all farms. They also found that the mean operating expense ratios—the ratio of total cash expenses to gross cash farm income—were similar between the two groups. The ratio, however, was lower for mid-sized local food farms than all mid-sized farms (sales of \$10,000 to \$250,000); the lower ratio of expenses to income suggests that mid-sized local food farms may reach profitability at a lower gross sales point.

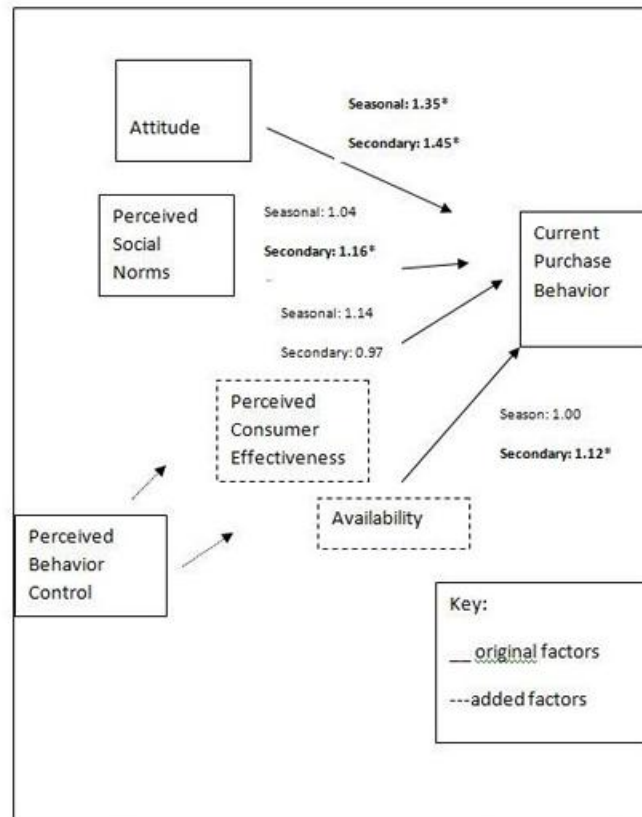
It is likely that farms with local food sales are motivated by more than profitability. For example, Low and Vogel find that small- and medium-size local food farm operators were more committed to farming than the average equivalently-sized farm operator in that they were more likely to identify their primary occupation as farming and in devoting more time to their farm operation. Among large farms, with gross annual sales over \$250,000, these differences were not observed.

Consumer Perspectives on Local Markets and Consumers

Producers responding to new food policies that call for more specialty crop production and marketing channels that may be more financially viable are only one part of this discussion. Even if more fresh fruits and vegetables become available, one must consider how local procurement and marketing will influence to what extent consumers adopt new dietary recommendations, and the role of food in their lifestyles. Supermarkets are still the dominant shopping choice for most consumers, yet it is important to understand the motivations of consumers who stray from the conventional behavior. The consumer psychology literature posits that market choices may be viewed as a way to mitigate the “gap” between intentions and behavior (Vermeir and Verbeke, 2006). The Theory of Planned Behavior (TPB) links attitudes and behaviors and generally posits how a consumer's choices may be shaped by beliefs and persuasion, so in this context it could be used to evaluate the role of social norms and other beliefs on purchase choices and willingness to pay (WTP) (illustrated in Figure 2). In this case, a consumer may be socially persuaded or

believe that their personal efforts—or higher shopping costs of seeking out directly sourced foods—can contribute to the solution of a problem, including improving their own health.

Figure 2: Relationship between Secondary and Seasonal Direct Market Shoppers and Theory of Planned Behavior Factors (Attitude, Social Norms, PCE and Availability) on Self-Reported Participation in Direct Markets



Notes: This figure illustrates that participation in direct markets was significantly predicted by the attitude, social norms, and PCE components of the expanded TPB model, but varied between those that used direct markets as a secondary source of fresh produce (at least 25% of all purchases) vs. those that primarily shop in more conventional food stores and shop only seasonally in direct markets.

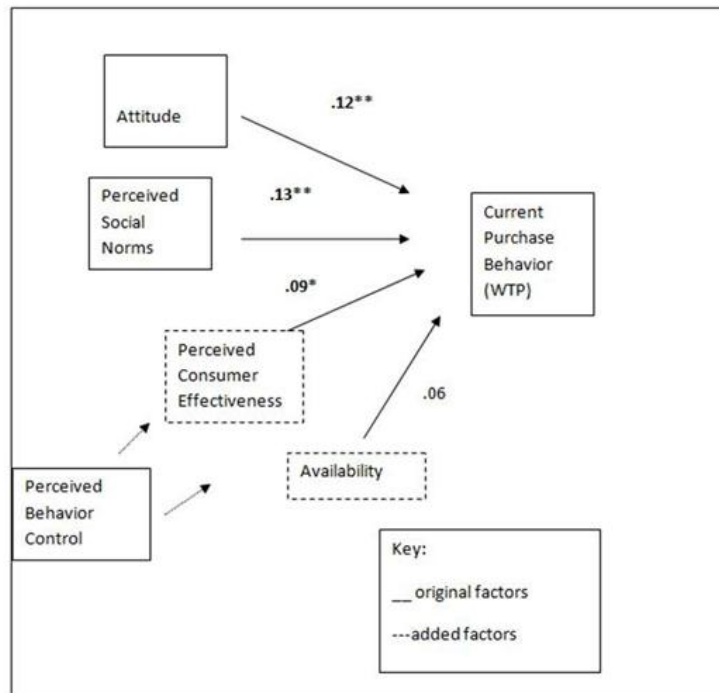
In an earlier *Choices* theme on local foods, Onozaka, Nurse, and Thilmany McFadden (2010) concluded that one of the factors driving growth in the local foods segment was the buyers' perceptions that they were more likely to realize a series of Theory of Planned Behavior's intended outcomes related to their health, environment and community—among others—if they made purchases through shorter supply chains, like direct markets. Here we revisit that attitude-behavioral link, with a particular focus on perceived consumer effectiveness (PCE). In essence, PCE is a measure of self-efficacy, and the consumer psychology literature believes such efficacy is an important precursor to behavioral change (Nurse, 2009).

Of importance to producers is whether those who shop in direct markets are willing to pay a premium to account for additional marketing costs the producer may bear by selling direct. And, among the public health community, there should be interest about the specific motivations that drive consumers to purchase from more localized, direct markets. This is particularly the case if the public health community believes that procurement of local foods impact the consumers' health and may lead them to be more committed to changing their food choices.

In a study that reported consumer's WTP for directly marketed apples and tomatoes was significantly higher than for conventional apples, researchers also found consumers value the "local" label higher than the "organic" label (Onozaka, Nurse, and Thilmany McFadden, 2011). The same study found that perceived consumer effectiveness

about outcomes was influential on willingness to pay for organics and imports, and social norms were more important for local food. In contrast, for a sample of college students, Nurse (2009) found those who would pay more for apples that were labeled locally grown was significantly predicted by the attitude, social norms, and perceived consumer effectiveness components of the expanded TPB model (Figure 3). In short, producers selling in direct markets may gain some revenue from a subgroup of buyers' perceptions that buying direct is looked upon favorably by their peers, and supports any "consumer activism" they intend with their purchases, such as supporting the local economy.

Figure 3: Relationship between Theory of Planned Behavior Factors and WTP for Locally Grown Apples.



Adapted from Nurse (2009)

Notes: This figure illustrates that those who would pay more for apples that were labeled locally grown was significantly predicted by the attitude, social norms, and PCE components of the expanded TPB model with all participants included

Among the public health community, there is probably less concern about price premia, and more about how different shopping behavior relates to a buyer's confidence and intentions to affect health outcomes. In further analysis of a 2008 national survey reported in the 2010 *Choices* theme, Nurse (2009) decomposed the perceived consumer effectiveness variable into component parts, and found that health outcomes scored the highest among variables. This would be expected given that health outcomes may be easier to control and evaluate compared to the influence any one buyer might have on the environment, on the economy, or preserving farmland. But, more interestingly, respondents' perceived consumer effectiveness was highly correlated with marketing channels, with those who commonly use food cooperatives and direct markets reporting the highest perceived consumer effectiveness for health outcomes. The reasons cannot be probed further, but one could expect this result is because those venues offer a higher share of raw, nutrient dense foods, thereby constraining buyers from less healthful choices.

Can Local Food Systems Influence Consumer Behavior?

A visible example of a public-health driven initiative linking to local markets is Wholesome Wave (<http://wholesomewave.org/>). Wholesome Wave was established in 2007 to connect local and regional food systems in order to increase access to and affordability of fresh, locally grown food. Their mission and programming efforts are multi-faceted as they simultaneously address food insecurity, through enhancing the dollars given to at-risk households, while also supporting farm viability through targeting those new dollars to local marketing channels. For example, their Double Value Coupon Program (DVCP) provide a direct linkage to local markets and potential benefits to producers who are serving those markets. The DVCPs were implemented in 26 states, 200 farmers markets and 1700 participating producers in 2011. Evaluation of 2010 efforts show:

- As a result of shopping at the markets in 2010, 87% of DVCP consumers increased or greatly increased their consumption of fresh fruits and vegetables.
- Over 90% of DVCP consumers agreed or strongly agreed that the amount of fresh fruits and vegetables they bought at the market made a big difference in their or their family's diet.
- Producers perceived benefits as well, and 55% said the extra sales and nonmonetary benefits of DVCP will lead them to continue with participating markets.
- Many producers were making enterprise changes in response to DVCP programs, with 15% reporting increased acreage, 12% diversifying crops and 10% making investments for season extension.

LiveWell Colorado is an organization that focuses on policy, environmental and lifestyle changes that remove barriers and increase access to healthy behaviors. Through one of their strategic initiatives, they have targeted several regional communities to grow the community and educational programs that target food-related health issues. These two programs, Wholesome Wave and LiveWell Colorado, also dovetail well with each other. The Greeley farmers market, located in Weld County, Colorado, was recruited into Wholesome Wave's program based on criteria such as low-income households, prevalence of childhood obesity, and designation as a food desert. In cooperation, these two programs have made strides towards their individual goals. The designation of Weld County as a LiveWell Community (<http://livewellcolorado.org/>) may explain why several public health reports show improvement, from a relatively low baseline, in that community's health outcomes (Thilmany and Hoffman, 2011).

Concluding Remarks

This overview of the evidence connecting local food systems with the outcomes intended by new dietary guidelines is more of a starting point than a summary of what we know. We hope it begins to outline the needs for research and program evaluation of whether innovations in the marketing of foods—promotion of fresh produce through shorter supply chains, incentives to visit direct markets—have played a role in improving public health outcomes.

By integrating key concepts from the consumer psychology field, and what is known about stimuli to behavioral change, Figure 3 shows that social norms and availability of local produce are important drivers of purchase decisions, such as the choice of conventional versus organic or direct purchases. Therefore, current efforts by public health-oriented organizations to improve access through redevelopment of local food systems seem warranted. But another message is clear from the previous example of how an organization is innovating and evaluating efforts to use more community-based production and marketing models to influence the food choices of at-risk populations: evaluation metrics could be refined and more broadly analyzed if, new data initiatives are put into place.

For More Information

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