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## IMPACTS OF PRODUCE FOOD SAFETY EVENTS ON CONSUMER BEHAVIOR: EXPLORING PUBLIC PERCEPTIONS AND CONFIDENCE IN THE FOOD SYSTEM

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The recent increase in the number and the magnitude of food safety problems may have caused a drop in consumer confidence toward different actors in the food chain. While significant improvements have been made in making food safer by incorporating higher standards of food safety oversight, millions of people become ill each year and the economic cost is very high. It is thought that food borne contaminants cause millions of illnesses annually in the U.S. (Mead et al., 1999) and research from the USDA Economic Research Service reported that the economic burden of food borne illness was approximately \$357 billion annually (Roberts, 2007). Five of the pathogens that cause food borne illness include: *Campylobacter*, *Salmonella*, *E. coli* O157:H7, *E. coli* non-O157 STEC, *Listeria monocytogenes* (<http://www.ers.usda.gov/publications/foodreview/septdec00/>.) In broader terms, the FAO defines food safety as the harm that that food may cause to the health of consumers, and may be influenced by a number of stakeholders in the international food system.

Fresh produce represents both a fast growing and increasingly trade-dependent sector of the food system which is commonly linked to food safety concerns. For decades, consumers have gotten a consistent message about the health benefits associated with

fruits and vegetables. USDA reports indicate fruit and vegetable purchases have increased significantly over the past couple of decades (Blisard & Stewart, 2007). In response to this increased consumption and more stable domestic supplies, the volume of food imports have increased from 2.8 million shipments in 1997 to 8.2 million shipments in 2007, or triple the volume of imports (<http://www.fas.org/sgp/crs/row/RL34080.pdf>).

Due to the uncertainty surrounding potential risks consumers face, trust in business and government stakeholders is fairly critical. Many factors influence responses to food scares, including consumer trust in a supplier's reliability (Böcker & Hanf, 2000). Food safety problems associated with a particular food product usually lead to an immediate drop in demand followed by a slow recovery to previous levels. Decreases in consumer confidence in the overall food supply have been reported, but there is little information available on how food safety problems linked to particular types of fresh produce are influencing consumer attitudes and affecting purchasing decisions.

Given a number of high profile food safety events with significant media coverage in recent years, we seek to explore the changes in consumer

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perceptions, food shopping behavior and confidence in the food system. In this fact sheet, we explore how consumers shop for produce, differences in how they perceive fresh produce “quality” with respect to food safety, and any relationships between market choices and perceptions. Finally, using responses from a Fall 2008 survey that was distributed after a significant fresh produce food safety event, we measure awareness and changes in confidence related to major food system stakeholders. We find that, among the food system stakeholders mentioned, perceptions of international trade partners, the FDA, and the USDA were the most negatively impacted by changes in consumer confidence. Moreover, these changes in confidence appear to also have a direct relationship with consumer perceptions of local, domestic and international fresh produce quality.

### **Fruit and Vegetable Market Trends**

Health benefits associated with fruits and vegetables continue to gain recognition as more studies link their consumption with protective effects. The Dietary Guidelines for Americans has increased the recommended daily intake of fruits and vegetables and programs like *Fruits & Veggies More Matters* are aimed at raising public awareness of the importance of eating multiple servings of fruits and vegetables every day. In response, data from the United States Department of Agriculture (USDA), suggest that American consumers eat 5 to 13 servings of fruits and vegetables per day (Blisard & Stewart, 2007). According to the USDA, high-income consumers eat more and a wider variety of vegetables compared with low income consumers.

A CSU survey conducted in the fall of 2008 provided an opportunity to assess consumer attitudes toward fresh produce purchases in the aftermath of high profile outbreaks, and specifically, to explore recent changes in purchasing decisions. The survey was conducted by Knowledge Networks using online surveys distributed to a nationally representative sample of primary grocery shoppers with an oversample of residents in Colorado, New Mexico, and Salt Lake City metro areas. The data represent responses from 1,052 participants in late fall, 2008. Only those who purchased fresh produce, and specifically tomatoes and apples, were eligible to participate in the study. Results from this survey show that the total household average food expenditure is about \$94 per week, or approximately \$5,000 per year. Survey respondents reported spending an average of 16.9 percent of total household

grocery expenses on fresh produce items, but 34 percent of primary shoppers responded that they spent more than 20 percent of their household food expenses in this category.

Meanwhile, the volume of fresh produce imports grew between 1997 and 2005 from 17.4 to 24.9 billion (lbs) respectively ([http://www.pma.com/cig/intl/documents/FS - Imports 2007.pdf](http://www.pma.com/cig/intl/documents/FS_-_Imports_2007.pdf)). In contrast, there is evidence that more produce is being sold directly to consumers at farmers’ markets and through community supported agriculture subscriptions (USDA, 2008; Thilmany & Thomas, 2009). This suggests an increasingly fragmented marketplace with consumers who have diverse perceptions and preferences for produce. This is of little concern if one believes consumers will address their uncertainty by altering their food buying behavior, and we explore whether local and direct buyers are motivated by this concern. However, if uncertainty also mitigates public policy attempts to educate and increase fresh produce consumption, there may also be policy implications.

There is a belief that recent increases in the number of food borne illness outbreaks associated with fruits and vegetables may have a negative influence on consumer attitudes and purchasing behavior. Estimates from the FDA indicate increases in the number of food recalls from 4,670 to 5,778 cases between 2004 and 2008, respectively. Highly publicized outbreaks associated with spinach, lettuce, melons, tomatoes, and peppers, followed by recalls of peanut and pistachio products, may have raised the awareness of food safety issues to an all time high. A concern of the nutrition community is that impacts on consumer confidence in food safety can counteract health messages regarding the benefits associated with fresh produce consumption. Subsequent dietary changes that lead to inadequate fruit and vegetable intake can have consequences for both public health outcomes and health care costs (Bazzano, 2006).

### **Consumer Perceptions and Attitudes**

To assess attitudes surrounding fresh produce purchases, consumers were asked the relative importance of a variety of issues with regard to their fresh produce purchases, and these results are summarized in a companion fact sheet (<http://dare.colostate.edu/pubs>). Among all respondents, the statement, “That it has proven health benefits” was the highest rated factor in fresh produce purchasing decisions with 60 percent reporting it was of great importance, followed by

“that it supports the local economy” (49 percent) and “that farmers received fair share of economic returns” (46 percent). Although food safety may be inherently bundled with proven health benefits, the only claim that directly relates to food safety is pesticide-free.

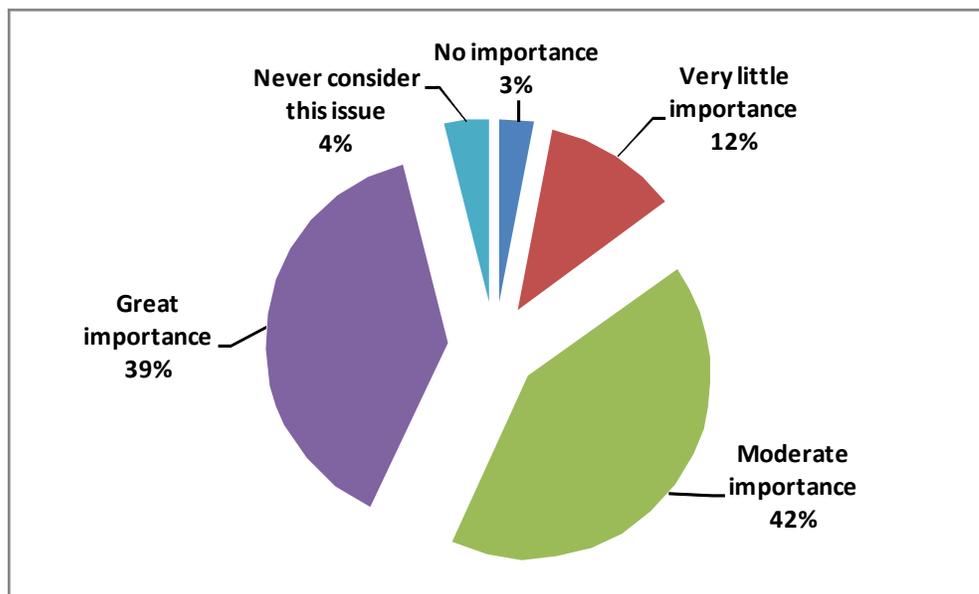
According to the Purdue Pesticide Programs, 2001, 4 out of 10 individuals consider that the potential risk of consuming fresh fruits and vegetables is too high compared to the health benefits that they may provide. Not surprisingly, when the surveyed shoppers were asked about pesticide use, nearly half of respondents (39 per cent) considered pesticide use to be of great importance in their fresh produce purchase decision (McFadden et al., 2009) (Figure 1).

Survey respondents were also asked a series of questions regarding their perceptions of the safety of local produce compared to produce grown in the U.S. but grown outside the local area. There is no universal agreement on the criteria of what is considered “locally grown” but for survey questions, local area was defined as “within a day’s drive” (7 hours drive or approximately 300 miles).<sup>2</sup> Figures 2 and 3 show that the majority of respondents that placed great importance on pesticide-free products also prefer local fresh products. In short, it appears that those consumers who

value pesticide-free products the most also believe that local fresh produce is superior to domestic products, and similarly, that domestic produce is superior to imported products.

### **Food Safety Awareness**

Before exploring changes in perceptions of food safety across food system stakeholders, the survey assessed general awareness in food safety events. Consumer cognition, which may be influenced by media coverage of food recall incidents, may influence the confidence consumers have with respect to food safety. So, in order to explore consumer awareness, we asked if they were aware of the occurrence of food safety issues since the beginning of 2008. Overall, the survey showed consumers were well informed with respect to the nature of food safety concerns. 60% of survey respondents replied yes, with over 50 percent claiming awareness of food safety problems associated with spinach, tomatoes, pet food, and hot peppers (Figure 4). As a control, we asked about unaffected products as well. From 2006 to 2008, there were no large outbreaks of food borne illness or food recalls associated with berries, apples, or shrimp, and consistent with this information, 95-97 percent of respondents reported they were not aware of food safety problems linked with these food items during 2008.



**Figure 1. Importance of “Pesticide Free” Claim**

<sup>2</sup> In an earlier, independent question, survey participants were asked about their opinion of local area and results showed the majority would use the 300 mile designation.

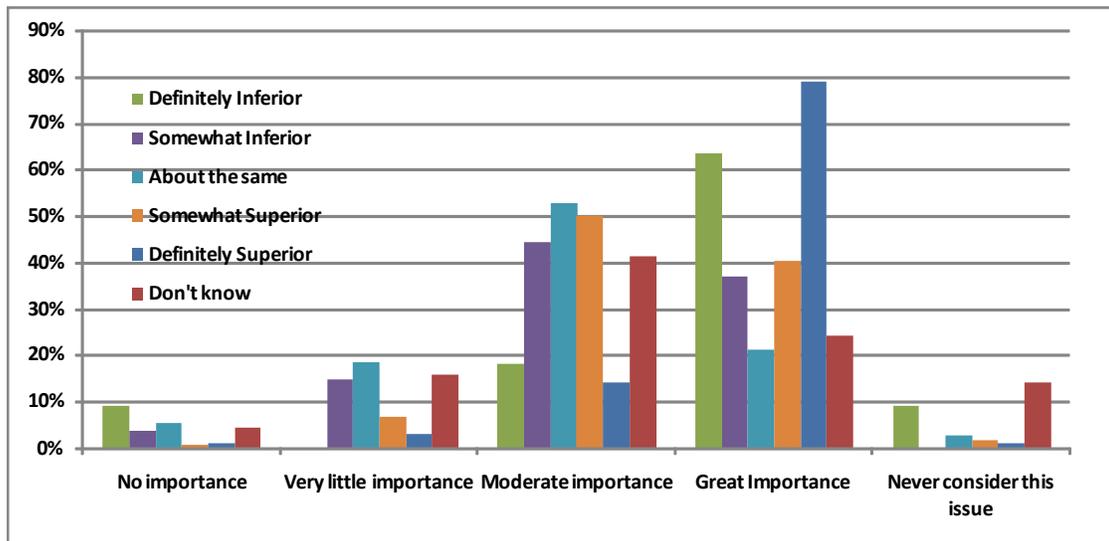


Figure 2. Perceptions of Local Produce (sorted by importance placed on pesticide free)

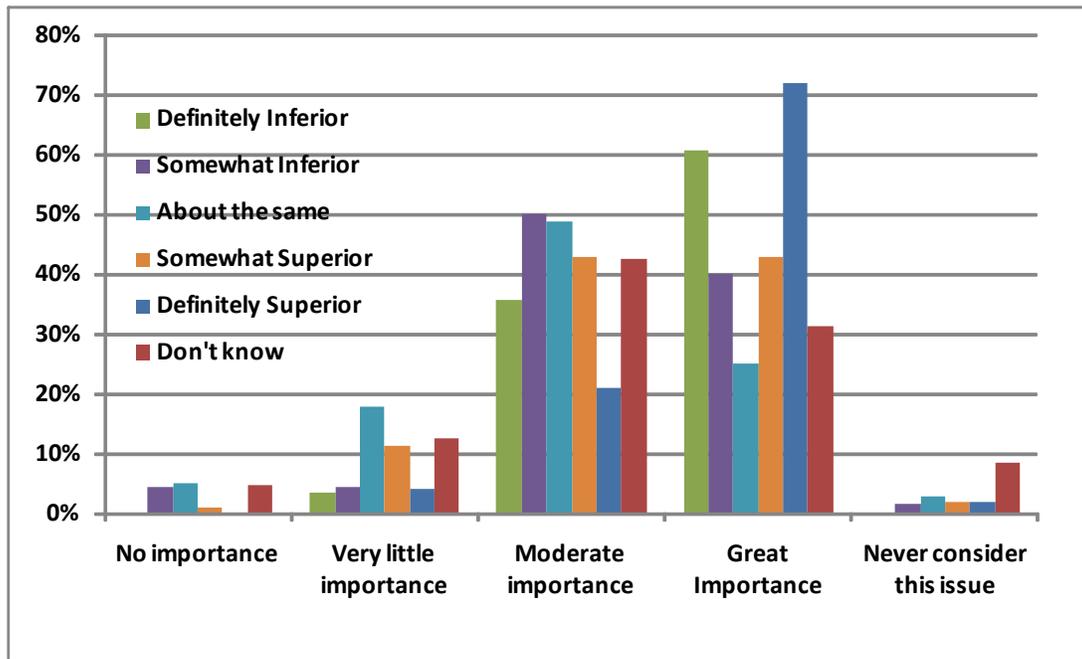


Figure 3. Perceptions of U.S. Produce (sorted by importance placed on pesticide free)

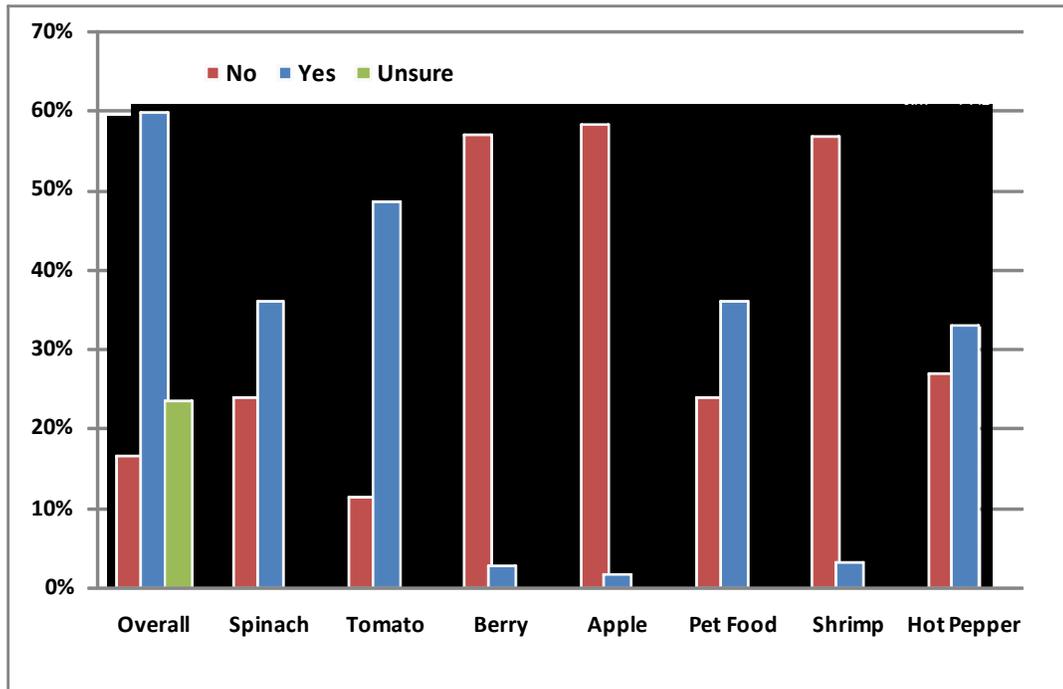
**Food Safety Perceptions relative to Fresh Produce**

Given the events that occurred in summer 2008 and the subsequent media coverage, it is not surprising that over 80% of respondents were aware of a tomato food safety issue in 2008. The media coverage for this incident was extensive during summer 2008, including: CNN, June 10th, “228 cases of illnesses

related to tainted tomatoes”; the New York Times, July 1<sup>st</sup> “Unsolved Mysteries: Tainted Tomatoes or Not?; Wall Street Journal, July 25<sup>th</sup>: “Tomato Industry Hopes to Recoup on Losses Caused by Salmonella Flap”; and USA Today, June 9, “Salmonella outbreak linked to raw tomatoes strikes about 150”.

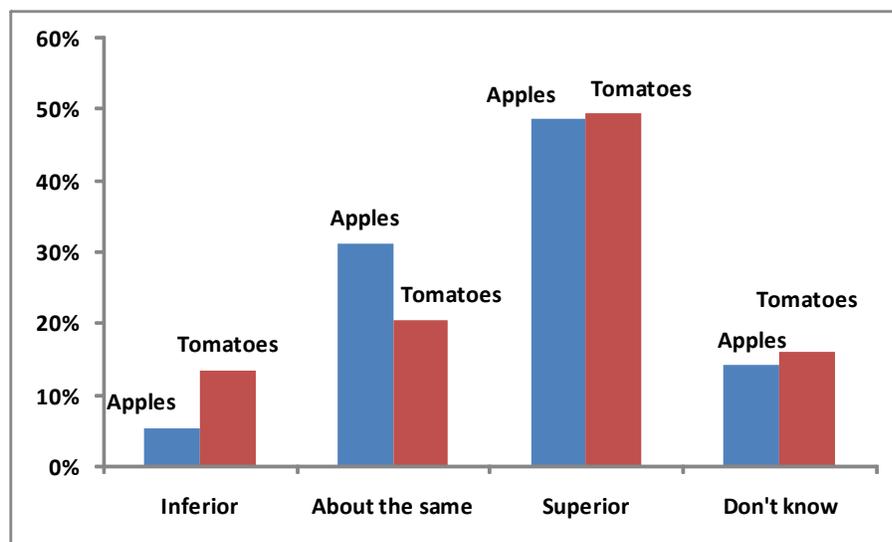
Meanwhile 98 percent reported they were not aware of a similar issue with apples (Figure 5). So, to follow up on Figure 2's findings on general food safety perceptions, we found that 49 percent of respondents indicated locally grown items were perceived as superior with respect to food safety (Figure 5) for both tomatoes and apples. In contrast, 14% felt locally grown tomatoes were inferior and 21% reported their perceptions

of food safety was about the same; in comparison, only 6 and 14 % felt local apples were inferior or the same, respectively. This may indicate that 2008's food safety event lowered confidence in the safety of tomato sources (relative to apples). When asked about changes in tomato and pepper purchases within the two months following the event (and preceding the fall 2008 survey), over 30 percent of respondents reported



Note: For specific foods, yes and no were the only choices given.

**Figure 4. Awareness of Food Safety Issues Associated with the Food Supply**



**Figure 5. Perceived Food Safety Concerns**  
(related to locally grown apples and tomatoes compared with non-local grown in the U.S.)

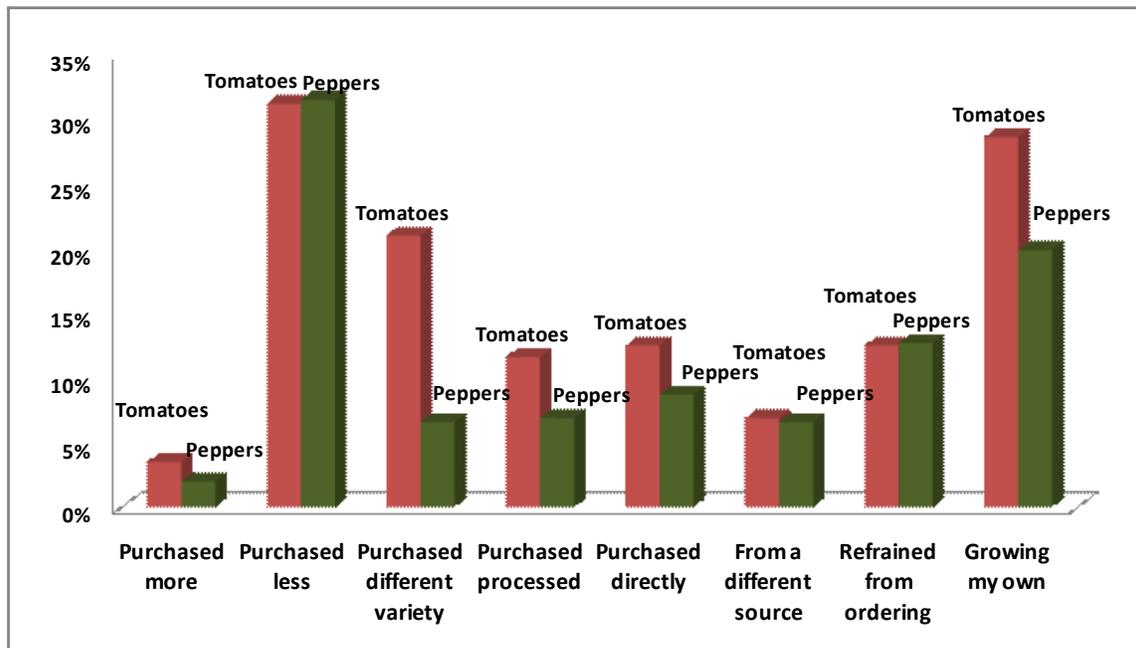
purchasing less. As a substitute supply, 20 and 29 percent of respondents reported growing their own peppers and tomatoes, respectively (Figure 6). There was also some shift in source of purchases, and a notable share of respondents switching to buying direct.

The Food Marketing Institute's survey of consumers in 2007, reported that consumer confidence fell from 82 percent in 2006 to 66 percent in 2007. ([http://www.fmi.org/docs/foodsafety/supermarket\\_perspective.pdf](http://www.fmi.org/docs/foodsafety/supermarket_perspective.pdf)). Our survey found some similar challenges for the food system, but delved further into what food system stakeholders were at the cause of lower confidence. Since the majority of consumer respondents were aware of summer 2008 outbreaks, we followed up by asking them to consider how their confidence has changed with respect to different stakeholders including: USDA, U.S farmers, food retailers, Food and Drug Administration (FDA), international trade partners (and their producers), restaurants, and food distributors and handlers. Overall the majority of respondents answered that their confidence has not changed for the stakeholders; however, the share of survey respondents that replied that their confidence has worsened attributed their concerns to international trade partners (46%), the FDA (36%), and the USDA (32%) (Figure 7). In contrast, for those who felt the event was handled well, they responded that U. S farmers and the USDA gave them more confidence than before.

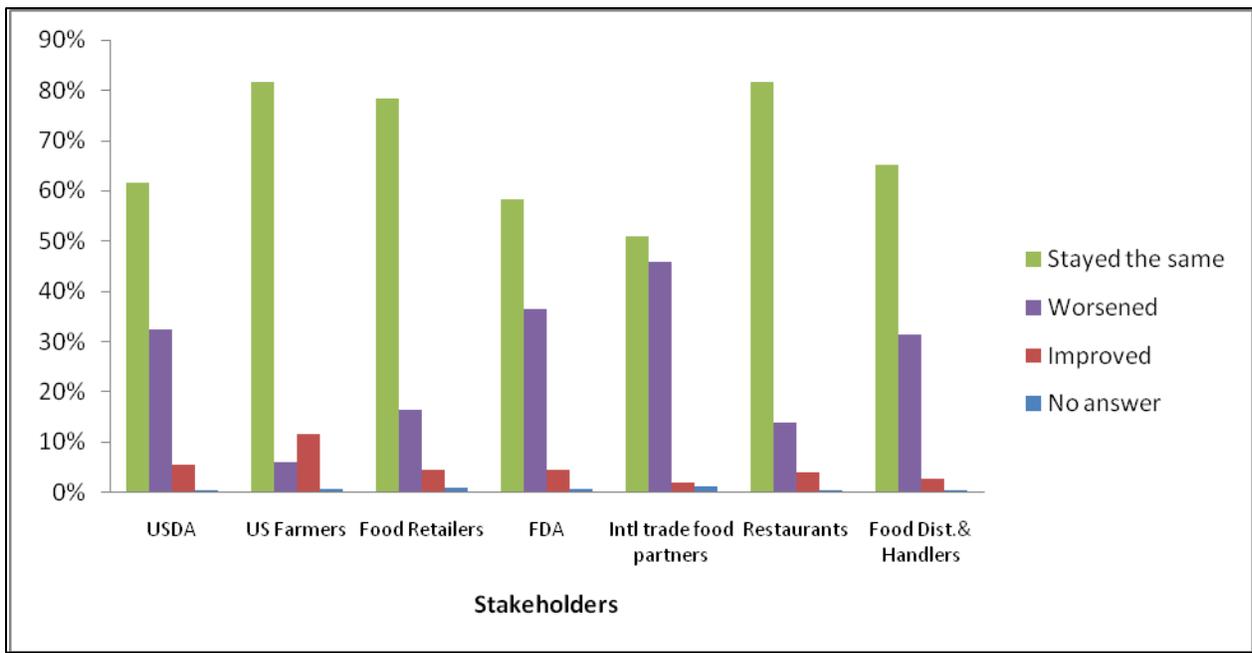
### *Do Food Safety Perceptions vary by Source of Fresh Produce?*

Figure 7 suggests that international trade partners, and to a lesser degree, US farmers have lost confidence in consumers' eyes. So, one may consider source of production as a new way to segment the food market, with varying perceptions of food safety among relatively closer sources. Figure 8 shows the respondents' perception about food safety from local sources compared to domestic fresh products as well as domestic compared to imported fresh produce sources, where a significant share of respondents considered that locally produced fresh products are definitely (22%) and somewhat (25%) superior to domestic products.

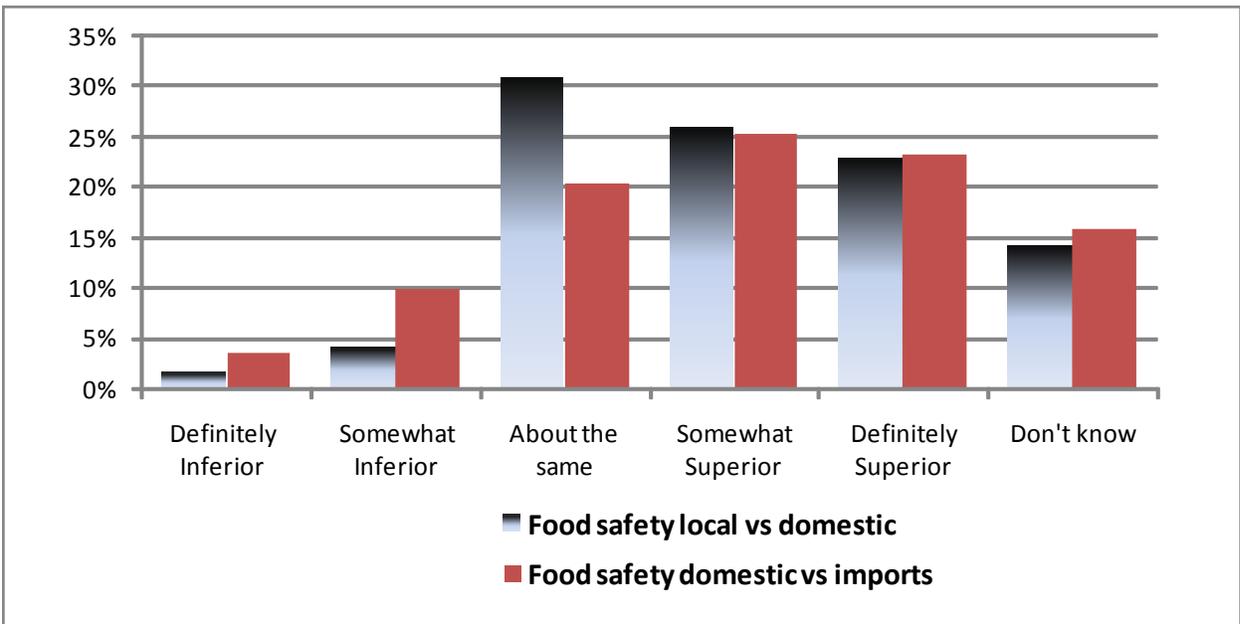
In addition, the share of surveyed respondents that answered definitely superior and somewhat superior to domestic produce compared to imported fresh products was similarly high. Interestingly, the share of respondents that considered food safety to be about the same for local vs. domestic fresh products is bigger than the share of respondents that responded that domestic are about the same as imported products, with a larger share having concerns on the quality of imports (and suggesting information on source of production is quite relevant to these consumers). From these results, one might conclude that country of origin labeling does seem relevant in our changing food system.



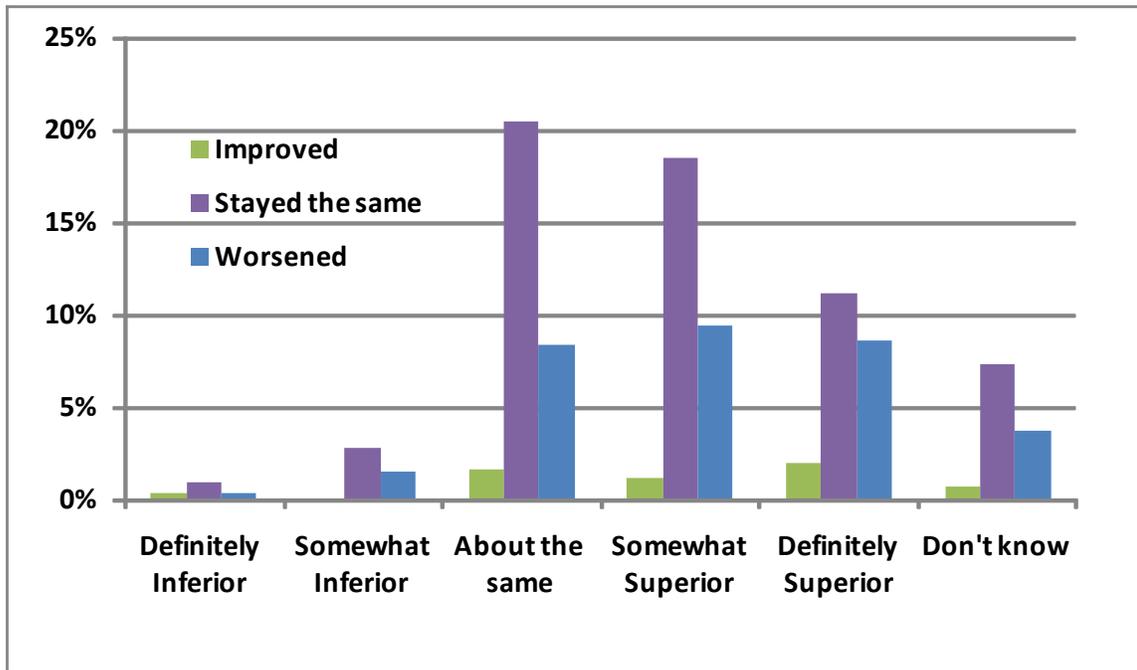
**Figure 6. Changes in Respondents' Purchases of Tomatoes and Peppers (in the two months preceding the Oct./Nov. 2008 survey).**



**Figure 7. How has Consumer Confidence Changed?**



**Figure 8. Food safety perceptions of local vs domestic & domestic vs imported fresh produce.**



**Figure 9. Perceptions of Food Safety Among Local vs. Domestic Fresh Produce (sorted by change in USDA consumer confidence).**

To connect changes in consumer confidence with perceptions of more local foods, Figure 9 shows that those respondents that reported that local products are superior to domestic products were more likely to answer that their opinion toward the USDA had worsened (so that federal oversight is compromised). But, in the broader context, the largest share of surveyed respondents have not changed their attitude, suggesting that confidence in the US food system remains quite strong. This study merely reflects how the market is reacting, and specifically, how concerned consumers may be shifting their purchases to emerging local markets.

**Marketing and Policy Implications**

Although this research on consumers sought to explore what motivations were fueling growth in local food systems, the food safety events of recent years provided an interesting context to explore how food safety issues influenced consumer behavior. It appears that consumer perceptions of the food system, and specifically food safety, do have some role in determining those who have started to seek out more local sources of fresh produce.

Some potential conclusions and implications for the food system include:

- Consumers are aware of food safety issues. Recent increases in the number of food recalls may have lowered consumer confidence. Given particularly significant drops in confidence for international trade partners, USDA’s new oversight of Country of Origin labeling is likely to be valued by US consumers.
- As a specific example, these results showed that 30% of consumers purchased less tomatoes after the summer 2008 food safety incident, and a similar proportion of consumer looked for tomatoes from an alternative source. Therefore, the economic cost from lower consumer confidence at the market level is potentially high, but may be mitigated with strengthening local food systems and labeling programs.
- Source of fresh produce appears to be important to consumers: local produce was considered superior to domestically produced items, which were themselves perceived as superior to imported produce with respect to food safety.

- Among the entities regulating the food chain, consumers showed a worsening attitude toward the USDA and FDA. Furthermore, with growing concerns about international trade partners and the increasing volume of fruit and vegetable imports to the U.S, some of the local food movement may be a market response from risk averse consumers.

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