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Food Safety Standards for the U. S. Fresh Produce Industry

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A number of microbial contamination incidents led to questions regarding the safety of the U.S. food supply and the need for improved food safety control initiatives and standards by both the private and public sectors (Palma et al., 2009). Of particular concern to this paper are microbial contamination incidents in fresh produce such as the 2006 *Escherichia coli* (*E. coli*) *O157:H7* associated with the consumption of bagged spinach; the 2008 *Salmonella* outbreaks associated with cantaloupes imported from Honduras, and the 2008 Mexican Jalapeño and Serrano pepper salsa incident, which was initially attributed to tomatoes.

These recent outbreaks are not unique. According to the Centers for Disease Control (CDC), more than 76 million people are affected and 5,000 die as a result of food-borne illness outbreaks every year. The most common food-borne illnesses are *Campylobacter*, *Cyclospora*, *Salmonella*, and *E. coli*. Over the past 12 years, all of the 22 reported leafy green associated *E. coli O157:H7* incidents indicated a California source. Since the mid-1990s, outbreaks in produce also occurred that were linked to raspberries, green onions, and strawberries.

As a reaction to these incidents, there have been increased efforts to enhance food safety by the government and industry groups. In addition to the long-standing zero tolerance for pathogens, there is increased surveillance and third-party testing for conditions leading to microbial contamination. Increasingly, process standards are being specified that recommend or prescribe Good Agricultural Practices (GAP) standards for production, Good Handling Practices (GHP) standards for handling products, and Good Management Practices (GMP) for responsibilities in overseeing production and handling operations. These standards are designed to reduce the potential for contamination. They increasingly resemble the detailed Pathogen Reduction Hazard Analysis Critical Control Point (PR/HACCP) procedures that have been adopted for processed meat and poultry products. However, livestock PR/HACCP procedures are firm specific and incorporate specific corrective actions when problems are identified in the enclosed packing plant, while the produce practice standards apply generally and focus on preventive steps to head off potential contamination in various stages including outdoor production.

The principal issues addressed in this article are: (1) What should be the comparative roles of the public and private sectors in setting these standards? (2) Should these good practice standards for produce mirror the application of PR/HACCP-type procedures mandated for the handling of meat and poultry products? (3) What are the options for producers and policy makers in dealing with these issues?

What Standards?

Standards for food safety can be private or public. A private standard is one set by a firm or group of firms. Public standards are authorized by law through a regulatory or rule-making process. Private or public standards may be either voluntary or mandatory.

The regulation of food safety began in 1906 with the enactment of the Pure Food and Drug Act, followed in 1907 with the Meat Inspection Act; the contemporary food safety regulatory revolution began in 1992 with *E. coli* contamination of improperly cooked hamburgers. This and subsequent incidents involving *E. coli* and *Salmonella* bacteria led to revolutionary changes in state and federal meat and poultry inspection policies. The most significant of these changes was the federally-mandated adoption of HACCP procedures for the slaughter and handling of fresh meat and poultry. Briefly, HACCP specifies Good Manufacturing Practices (GMP) must be in place and used to identify potential contamination points and then imple-

ments strategies to reduce the likelihood of harmful microbial contamination incidents (HACCP, 2009). Missing from the HACCP procedure is a requirement for being able to trace the origin of microbial contaminants from the farm to the table, an essential element for a safe food supply.

The hamburger food safety incident and the subsequent produce microbial contamination incidents indicate that the extent to which HACCP-type procedures should be applied to additional segments of the food supply chain is an important current food safety policy issue. Such a policy change could include application of HACCP-like principles to all segments of the food supply chain from farm production through sales at retail. This may already be happening in substance, although not in name. A related issue involves the potential adoption of standards requiring a labeling system whereby the origins of microbial contamination could be traced to the farms where the products are grown. For both HACCP and trace-back, there is the issue of how the responsibility for food safety should be divided between the public and private sectors.

A great many private and public sector resources are being invested in developing systems and often diverging standards that address food safety concerns at all levels of the supply chain. The proliferation of these standards, guidelines, and certification programs has created a situation that some have likened to an "arms race" to prove who is providing the safest food. For some private sector advocates and marketers, this race is designed to foster and capitalize on consumer perceptions of what constitutes safe, whether scientifically valid or not.

In the absence of one universally accepted set of standards, producers and food providers are often faced with having to comply with a different set of standards for different customers. This results in increased costs with little evidence of a corresponding increase in compensation in the form of higher product prices. The current labyrinth of food safety and protection standards includes, but is not limited to, those being promoted by international organizations, governments, producers, and food retailers—particularly supermarket and fast-food chains.

U.S. Government Standards

In the U.S. federal government, the responsibility for food safety is distributed among FDA, USDA, CDC, EPA, and the Department of Homeland Security (DHS). USDA's food safety responsibilities center on meat, poultry, and processed egg products inspection, certification of safe process practices in production and marketing, controlling plant and animal diseases that affect safety, and generating technological progress in dealing with food safety and disease issues. Most of USDA's food safety inspection and disease control functions are performed on a mandatory basis. FDA's responsibilities center on processed foods and fresh produce. Lacking mandatory authority, FDA issues food safety guidelines designed to prevent microbial contamination/adulteration of produce. Like USDA, FDA likewise does not have the authority to recall products found to be adulterated, but rather depends on the power of persuasion and damage to offending firms' reputations. CDC is responsible for helping to identify the sources of microbial and disease contamination of the food supply. EPA is responsible for regulating the safety of chemicals used in food production and processing and for dealing with issues of water quality as they affect food safety. The DHS works with other federal agencies to insure that imported products meet U.S. standards for food safety.

These federal agencies, to varying degrees, have state government counterparts that they delegate to and interact with to carry out their respective food safety responsibilities. In fact, state health departments have frequently been on the cutting edge of identifying and reporting to CDC food-borne illnesses.

Producer/Industry Standards

While *E. coli* contamination of hamburger precipitated USDA to mandate PR/HACCP regulations to be applied to meat and poultry inspection, the *E. coli* outbreak in spinach is often cited as the cause for an aggressive response by industry to establish and "impose" stringent HACCP-like food safety standards upon their own members. While many growers already had their own very high food safety standards, in 2007 the California leafy green industry came together to establish the California Leafy Green Products Handler Marketing Agreement (LGMA). In 2009, nearly 99% of the volume of California leafy greens was grown with practices that fall within the standards of this voluntary grower, packer, and shipper initiative. Under the terms of the LGMA, members are required to verify compliance with a specific set of food safety practices by submitting to mandatory government audits. The leafy green system is currently being used as a model for other states and commodities to utilize in dealing with food safety issues.

The process guidelines used by LGMA are GAP standards for production and GHP standards for the harvest of lettuce and leafy greens, while processing (consumer packaging) remains with FDA. These standards are provided to all members in regularly updated publications (California Leafy Greens Products, 2007). The process standards include requirements for a Best Practices Plan developed by each member that regulate:

- Water quality
- Soil amendments
- Control of environmental factors such as runoff from animal feeding operations

- Work and field sanitation practices
- Up-to-date growers list for handlers
- Handler compliance with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, including the traceability requirements—farms are exempt from the act
- 24-hour contact information for responsible individuals in case of food emergencies
- Regular audits to monitor and assure compliance

Details covering each requirement are provided, as well as special guides, for in-depth coverage of water surveys; technical baseline information; product testing protocol; and preparation for the process-compliance audits.

Private Sector Retail Buyer/Seller Standards

While not explicitly linked to the spinach outbreak, a group of large buyers and retail sellers of produce published their own set of safety standards in 2007. In an apparent effort to have their suppliers conform to uniform codes of conduct, a consortium of firms, the Food Safety Leadership Council (FLSC), published their On-Farm Produce Standards on September 10, 2007. The FLSC is composed of, among others, Darden Restaurants (owner-operators of Olive Garden, Red Lobster, the Capital Grill, and others); McDonald's Corporation; Publix Super Markets; Wal-Mart Stores, Inc.; Walt Disney World Company; and Avendra LLC (a food service procurement company).

The FLSC standards demonstrate the complexity of the issues that emerge when an influential buyer group sets its own food standards with which suppliers are expected to comply. While the FLSC standards provide details for practices in much the same fashion and for almost an identical set of activities and areas as the LGMA, the specifics of the standards vary in some categories. For example, the FLSC water quality standards are far more restrictive than those of the LGMA. Additionally, required buffer distances of fields from animals lack uniformity. Such conflicting standards are confusing, annoying, and expensive for individual producers who strive to adhere to multiple GAP and GHP standards to satisfy their customers.

The increasing globalization of the food supply has resulted in an attempt to develop food safety standards that are recognized across national boundaries. International food marketers such as Wal-Mart, Costco, and Carrefour require the ability to source products from around the world to provide their customers with a daily supply of fruits and vegetables that are not always in season or available from local producers. In sourcing products globally, the ability to have confidence in product safety is essential and a distinct competitive advantage. Recognition of uniform standards among traders is the motivation behind the development of the GlobalGAP system of insuring food safety through third-party audits that guarantee production practices in accordance with detailed guidance criteria.

The evolution to GlobalGAP was designed to help prevent confusion in the growing world of food safety standards. However, by expanding GAP and GHP coverage into the environmental arena, its process standards began to include lifestyle GAP practices that fell outside the realm of being science-based from a food safety perspective. GlobalGAP now has established programs in over 80 countries around the world. Its accredited certification program covers a broad range of crops, livestock, aquaculture, compound feeds, and plant propagation materials. Growers are required to comply with a series of specific practices and are audited by accredited agents consistent with the International Standards Organization (ISO) 62 and 65 guidelines for certification programs. In addition, auditors must have undergone training according to ISO 9000 quality management or ISO 14000 environmental management standards.

The Global Food Safety Initiative (GFSI, 2000), in April 2000, was the product of discussions among a group of international retailers who identified the need to enhance food safety, ensure consumer protection, strengthen consumer confidence, and set standards for food safety schemes that would hopefully improve cost efficiency throughout the food supply chain. The GFSI was officially launched in May 2000 and is facilitated by the Food Business Forum. The GFSI vision of being once certified, accepted everywhere has been adopted by Carrefour, Tesco, Metro, Migros, Ahold, Wal-Mart, and Delhaize. These major international food retailers have agreed to reduce duplication in the supply chain through the common acceptance of any of the four GFSI benchmark systems. To accomplish this task GFSI's food standards were aligned with HACCP, Codex Alimentarius, IS0 9000 and the National Advisory Committee on Microbiological Criteria for Foods.

This brief review of the current state of food safety standards illustrates the various programs that growers and handlers face as they attempt to qualify their products for acceptance by today's food supply chain. Increasing consolidation on the buyer side and concerns over the liability associated with food-borne illness events create demands on producers to be in line with specified standards or to face exclusion from the marketplace. At the same time, knowing which standards to accommodate, for what buyer, and for what product is increasingly challenging.

The ability to source products with known food safety attributes provides flexibility of movement for global supply chains and potential benefits on the seller side. For grow-

ers, having one set of specific standards for specific products would simplify management decisions and should reduce the cost of compliance. It may be desirable for the industry and its associations at the state, regional, national, and international levels to work collaboratively to establish a uniform set of standards. However, because of the difficulties of working across boundaries—firm, country, commodity, etc.—it may be difficult to accomplish this goal within an industry or market structure. Ultimately it may require agreement among government agencies at the national level or an international body to establish uniform standards. In the meantime, the industry will continue to go forward, in large part, because governments move too slowly to accommodate the current concerns of consumers, the perceived market requirements, and the potential risk of a failure to address food safety issues throughout the supply chain.

Alternative Roles for Producers

Producers are facing serious pressure from retailers, government, and consumers to not only adhere to product standards but to also improve their management practices to conform to evolving process standards. In order to remain in business, they must change and adapt to what the industry and consumers are demanding. However, complying with these new sets of standards adopted by FDA, GlobalGAP, LGMA, GFSI, FLSC, or by individual food retailers, imposes costs on retailers, handlers, and producers.

Producers are likely to be the hardest hit by these extra costs, and some producer groups undoubtedly will be hit harder than others. It is simplistic to assert that it is a matter of weighing the costs and the benefits. The benefits to growers accrue not only from taking leadership to prevent occurrence of microbial contamination incidents that disrupt revenue flows but also from adjusting the organization of their operations to be in compliance with process standards. These benefits may be in the form of higher product prices, maintaining and growing sales in existing markets, expanding to new markets, reducing the adverse revenue effects of an incident, reducing legal liability and insurance costs, and improving operational efficiency. While the benefits accrue over time and are uncertain, the costs of compliance are upfront and in many cases are required to participate in a preferred market. Information on costs is more anecdotal than resulting from careful economic analysis, indicating a clear need for research.

Three alternative types of initiatives will be discussed in this section: individual, cooperative, and public sector support.

Individual Initiatives

Producers can take it upon themselves to comply or not with the set of standards. It may be easier for large producers to comply if most of the costs associated with complying with the new standards are fixed costs. For example, HEB—a large regional food retailer—requires that all of its U.S. and Mexican suppliers attend produce food safety training courses and comply with the LGMA-type requirements.

For producers who choose not to comply or are unable to comply, there may be other niche markets. For example, USDA and various interest groups have initiated substantial efforts to promote, as a matter of public policy, local farmers' markets and other direct marketing approaches. The number of farmers' markets has increased substantially over the past few years. According to AMS/USDA, since 1994 the number of farmers' markets has grown by nearly 3,000, reaching a U.S. total of 4,685 in August 2008 (USDA, 2008). Although farmers' markets are gaining popularity, they are usually seasonal and the volume they handle is limited in the total sales of produce. These markets are not subject to the food safety process standards that are being required by GlobalGAP, LGMA, GFSI, FLSC, or by supermarket food retailers which are designed to deal with large volume markets. Some consumers may feel that lack of such process standards make these markets inherently less safe, though there is little or no empirical evidence to support this concern. For these reasons, all producers will need to seriously consider the potential consequences of not taking actions to embrace process standards that assure large retailers the safety of products they market.

Cooperative Marketing Agreement/ Order Initiatives

Groups of growers could also follow the lead of the California leafy green producers and use the LGMA as their guidelines and requirements, or alternatively develop their own similar set of guidelines. Coming up with their own set of food safety guidelines may provide more flexibility for producers from a given region or producing similar products. However, this may limit their marketing options and will add another layer to the already diverse set of guidelines established by different sectors of the produce industry, food retailers, and government.

A more viable approach might be to take advantage of the guidelines established by LGMA as a base document that is applicable for fruit and vegetable producers in a specific region or those supplying product to a particular food retailer. For international marketers, the guidelines set up by GlobalGap should also be taken into consideration. U.S. producers could also take the lead and push for a single international standard for food safety. This would not be an easy task, but the potential payoffs may make the effort worthwhile.

Public Sector Support

The public sector can and does play a very important role in assuring a safe

food supply. It has performed this function quite effectively in the case of processed foods and in providing inspection services for restaurants. This is seen in the complex federal and state regulatory systems that exist for meat and poultry inspection, which continue to evolve in developing systems for tracing the origins of particular disease problems. Dealing with food safety issues related to fresh food continues to pose challenges. Short of mandating a specific regulatory system for fruits and vegetables, these facilitating roles could be useful because of the potential for conflicting objectives of producers and retailers and the relative imbalance in market dominance between producers and large retailers. The following is a list of the alternative functions that governments could perform:

- The public sector could work with producers to harmonize differing standards developed by producer organizations, retailers, and government. A key issue, for example, is what constitutes science-based guidelines for assuring a safe fruit and vegetable supply. In this role, rather than actually setting the standards, the government could serve as a facilitator between parties in the supply chain that have producers and retailers with different interests and degrees of market influence.
- Government agencies, such as extension services, could be mandated to provide additional educational services and assistance to producers on good agricultural practices to assure fresh produce safety.
- Government agencies could provide third-party audit procedures for determining if agreed upon science-based food safety guidelines are being met. For example, the AMS/USDA provides an audit-based verification service that attests participants' voluntary adherence to GAP and GHP, which is referred to as the GAP/GHP Audit Program.
- Government agencies could provide cooperative and producer organizational and technical assistance in establishing group action programs that share the cost of assuring that food safety GAP/GHP guidelines are met.
- Government agencies could provide infrastructure assistance where, for example, water and sanitation projects are needed to assure fresh produce safety. They could also provide assistance in determining how the cost of abiding by the new food safety standards could to be equitably shared among producers and retailers.

Implications

The bottom line is the need for a common set of science–based standards and regulations that protects fresh produce safety. While every new microbial contamination incident appears to move the industry further in the direction of a HACCP-type system, probably along with traceback, there are also diverging trends designed to take advantage of the lifestyle-based political agenda and consumer wants and desires that have little or no relation to food safety—organics, local markets, and environmental concerns. The challenge involves finding a mix of private and government sector initiatives that facilitate the development of a single science-based standard and an equitable sharing of the costs of assuring a safe food supply, as well as complement the standards for other important food characteristics.

For More Information

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