Good Agricultural Practices

GAP Certification: *Is It Worth It?*

Increased concerns about foodborne illness from fresh produce and the attendant economic loss from foodborne illness have motivated many growers to voluntarily adopt good agricultural practices (GAPs). GAPs help reduce microbial contamination on their farms and improve food safety systems. However, GAPs won't increase consumer demand for fresh produce unless growers let buyers know that they have taken steps to improve food safety on their farms. Consumers usually have no way to know whether or not fresh produce is grown with GAP practices.

Third-party GAP certification offers a way for growers to let buyers know that they follow appropriate food safety practices on their farms. Third-party GAP certification is voluntary—it is not yet mandated by law. Growers must measure the economic cost against the benefits before deciding whether to pursue certification.

Economic Benefits

GAP adoption and certification offers two primary benefits: (1) economic risk reduction, and (2) improved market access opportunities.

Economic Risk Reduction

Although GAP and third-party certification do not guarantee food safety, they do reduce the risk that a foodborne disease outbreak will originate on the farm. The risk of large economic losses—such as a catastrophic drop in sales (especially if contaminated produce is traced to the farm operation), damage to the farm's reputation, and potential lawsuits—is also reduced with GAP adoption and certification. However, the benefit from risk reduction accrues to the grower only in the event of an outbreak. To more accurately estimate the economic benefit of GAP adoption certification, a grower needs to calculate the farm's potential economic losses in case of an outbreak, both with and without GAP certification. Accurately estimating the probability of an outbreak is practically impossible, so the benefit of GAP certification often depends on the grower's own perception of the outbreak risk.

Another important, but subtle, benefit of GAP adoption and certification is what economists call the "positive externality" effect to the entire fresh-produce industry. Each grower who becomes certified reduces his or her farm's risk of spreading foodborne illness and, therefore, lowers the risk of an outbreak that affects the entire community of growers. In contrast, if a grower does not adopt GAPs and doesn't become certified, when an outbreak is traced back to his or her farm, both the non-compliant producer and the industry as a whole suffer, which is known as the "negative externality" effect.

Improved Market Access Opportunities

GAP certification opens markets for producers to expand sales to major supermarket chains, school systems, restaurants, and other market outlets (Calvin, 2003). Many retailers and foodservice buyers now require third-party GAP certification as a condition of purchase.

In 1999, for example, Safeway, the third-largest U.S. food retailer, expanded its food safety program, requiring all suppliers of certain food commodities to verify that they follow government food safety standards and specifications in production and packing. Other large retailers have followed suit. Research covering a select group of U.S. fruit and vegetable shippers indicated that in 1999, almost half of those studied provided third-party audits for GAPs for at least one of their buyers. While shippers were not always happy about complying with this request, most indicated that they would implement verification programs in response to changing buyer preferences (Calvin et al., 2001). In this study, shippers tried to distance themselves from growers with no third-party GAP certification. These shippers recognized that they can reduce risk by requiring growers to provide third-party audits for GAP. Only growers with this type of third party certification can take advantage of the market opportunities these shippers offer.

Although growers could conceivably conduct their own food safety and GAP audits, third-party audits by reputable companies, individuals, or

NC State University
A&T State University
COOPERATIVE EXTENSION
Empowering People • Providing Solutions

groups are more credible. An important issue for growers is finding a reputable third party to do the GAP certification. There is no government oversight of third-party audit firms, an issue of concern in the fresh produce industry (The Packer, 2002). Standards may vary among auditing firms and the retailers requiring audits. Growers should choose the third party certifier carefully. North Carolina growers should contact the North Carolina Department of Agriculture and Consumer Services for information about credible third-party auditors. See the end of this document for contact information.

Economic Costs

Weighing against the potential benefits of GAP adoption and certification are the costs, which are often immediate and sometimes large. When a grower decides to have a third-party audit, the first step is to implement GAPs in the production process. Costs of adopting these GAPs can include large capital investments, such as water purification equipment, or more moderate expenditures, such as training workers to improve hygiene and upgrading record-keeping technologies. There is no "one-size fits all" set of practices that allow growers to become automatically GAP certified. Growers are free to choose the most cost-effective combination of practices to satisfy GAP requirements. Therefore, two growers in different areas with different environmental conditions could both adhere to GAP principles and be certified, but use different methods to do so.

Another important immediate cost of third-party GAP certification is hiring the certifier. Typically, growers hire third-party firms to first evaluate the food safety systems in their operations and suggest ways to meet GAP guidelines. In 2001, a U.S. Food and Drug Administration (FDA) report estimated the cost of third-party GAP evaluation at $300 to $500 per farm (FDA, 2001). An evaluation would include the documentation necessary to assure continuous compliance with GAPs. Once they implement GAPs, growers can decide to have their operations certified by third parties or periodically audited for compliance. In 2001, the FDA estimated that the typical cost of an audit and certification is similar to the cost of an evaluation: $300 to $500 per farm (FDA, 2001). Although not current, these figures provide an idea of the immediate certification costs. North Carolina growers can take advantage of a "cost-share" program that the state Department of Agriculture offers to help shoulder the cost of a third-party audit.

Case Studies: Outbreaks from Cantaloupes, Spinach, and Green Onions

Cantaloupes

In May 2002, an outbreak of *Salmonella poona* in the U.S. and Canada was traced to Mexican cantaloupe shipped through McAllen, Texas. Fifty-eight contaminated cases were identified. The importing firm immediately issued a voluntary recall. This was the third season of foodborne illness that was traced to Southern Mexico.

In October 2002, the FDA issued an alert against all cantaloupe imports from Mexico. Although the outbreaks had been traced to only two states in southern Mexico (Michoacan and Guerrero), the FDA justified the countrywide import alert because of samples showing *Salmonella* contamination from other states (Sonora, Jalisco, Colima, Coahuila, Mexico, and Tamaulipas). Also, the FDA was concerned

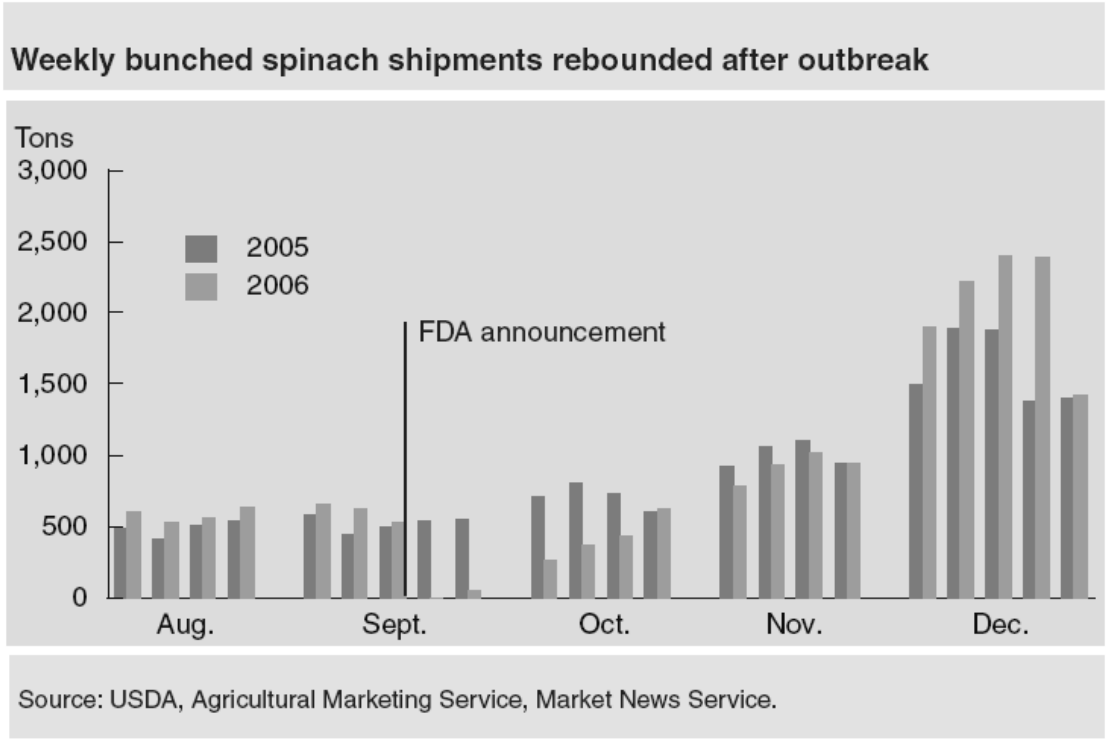

Figure 1. Bunched Spinach Shipments, August – December 2006

that melons from restricted regions could be commingled with melons from a non-restricted area.

To be removed from the countrywide import alert, each Mexican grower must formally petition FDA and provide documentation of their food safety practices. In response, the FDA will then conduct on-site inspections of the growing and processing areas to audit the validity of the information submitted. In this process, the FDA gives first priority to growers who have their operations inspected by a third-party institution with expertise in agricultural food safety processes.

A third-party audit showing compliance with GAPs will not guarantee removal from the import alert. But given that third-party certified growers are given priority, GAP-certified growers may recover faster from an illness outbreak than non- certified growers. GAP-certified growers would be inspected first by the FDA in this case, and if they pass the inspection, these growers would gain market access and the "first mover" advantage in the U.S. cantaloupe market. This case reflects the potential market access benefits of being GAP certified.

Spinach

On September 14, 2006, the FDA warned that consumers should not eat bagged spinach because of an illness outbreak caused by contamination with the potentially deadly bacterium *Escherichia coli* O157:H7 (commonly called *E. coli* O157:H7). Stores and restaurants immediately cleared bagged spinach from their shelves and menus. Spinach harvesting and marketing ceased. There were no U.S fresh spinach sales for five days, until the FDA announced spinach from some areas was safe to consume. Spinach from the main production area of California was off the market for an additional ten days.

The contamination was eventually traced to a load of spinach from one 2.8-acre field packed at one processing facility on August 15. This field was part of a 50.9-acre parcel of land leased by a firm for leafy greens production. The owner of the ranch used the rest of the property for grazing cattle. The leafy greens were grown with organic methods, but since the fields were only in the second year of the three-year transition to organic, the spinach was sold as conventional. Note that both organic and conventional operations must address the threat of microbial contamination.

According to the California Food Emergency Response team, the grower did not contract for a third-party audit for compliance with FDA's GAP food safety guidelines before the 2006 growing season began. Potential environmental risk factors at or near the field included the presence of wild pigs and irrigation wells near surface waterways that were exposed to feces from cattle and wildlife. The outbreak strain of *E. coli* O157:H7 was identified in samples of river water, cattle feces, and wild pig feces on the ranch; the closest contaminated sample was less than a mile from the spinach field. But the precise means by which the bacteria spread to the spinach remains unknown.

On September 29, 2006, the FDA announced that "spinach on the shelf is as safe as it was before the event." Sales began to pick up, but recovery varied by type of spinach: bunched versus bagged. Figure 1 shows that bunched spinach rebounded fairly quickly. In December, shipment volume was higher than in December of the previous year (Calvin, 2007). However, in the bagged spinach sector, retail sales recovered slowly. For the period from January 24 to February 24, 2007, five months after the outbreak, retail sales of bagged spinach, although improved, were still down 27 percent from the same period a year earlier (Figure 2). Dunlap (2007) also estimated that although spinach prices improved

In 2007, bagged spinach and salad retail sales values still lag

	Percent change in sales value from a year ago for:	
	January 24-February 24, 2007	August 24, 2006-February 24, 2007
	Percent	
Bagged spinach	-27	-43
Bagged salad with spinach	-24	-42
Bagged salad without spinach	-5	-8

Source: Perishables Group, *Facts, Figures & the Future*.

Figure 2. Bagged Spinach Retail Sales Value After the Outbreak

from October 2006 to December 2006, the price of spinach in December 2006 remained 54.8 percent lower than the price in the same month a year earlier (December 2005).

During the *E. coli* O157:H7 outbreak in the fall of 2006, all spinach growers—including those that were GAP certified—suffered from the decreased consumer demand for their product, even though only one grower's spinach was contaminated (the negative externality effect). Even if other spinach producers used third-party GAP certification, they were still affected by the outbreak.

Green Onions

On November 15, 2003, the FDA warned that hepatitis A outbreaks in September in Tennessee, North Carolina, and Georgia were associated with raw or undercooked green onions and that the green onions in the Tennessee case "appeared" to be from Mexico. One person in Tennessee died. On November 20, 2003, the FDA announced that green onions from Mexico were implicated in the Georgia outbreaks as well. The source of the green onions associated with the outbreak in North Carolina was never determined.

In late October and early November, before the initial announcement regarding contaminated green onions, another very large outbreak of hepatitis A occurred in Pennsylvania among diners at one restaurant. More than 500 people contracted hepatitis A, and three died (Dato et al., 2003). On November 21, the FDA announced that this outbreak was also associated with green onions from Mexico and named the four firms that grew the product, based on epidemiological and traceback evidence.

The FDA was not able to pinpoint where the produce became contaminated—at the farm, in the packing shed, or in the distribution chain as the produce made its way into the U.S. food system. However, the hepatitis A virus sequences from the outbreaks traced to Mexico were identical or very similar to sequences found in sick people living along the U.S.-Mexico border or returning from visits to Mexico.

Eventually, the FDA identified four growers as being associated with the outbreaks and issued an import alert, ordering border inspectors to reject all shipments of green onions from these farms. The four farms did not have third-party GAP certification for their summer operations (which is the season when the contaminated green onions were most likely produced). Soon after the outbreaks, the FDA went to Mexico to investigate these four farms and on December 9, 2006, issued a press release outlining the food-safety issues that may have contributed to the outbreak—poor sanitation, inadequate handwashing facilities, questions about worker health and hygiene, and the quality of water used in fields, packing sheds, and for making ice.

On December 10, 2003, green onion prices were down 72 percent compared to the day before the FDA outbreak announcement (Calvin, Avendaño, and Schwentesius, 2004). As demand for green onions dropped because of food safety concerns, supplies from Mexico dwindled. Prices then rose steadily from $5.73 on December 10 to $11.73 on December 31, 2003. Two weeks after the hepatitis outbreak announcement, shipments of green onions from Mexico also decreased by 42 percent. Shipments began to rebound during the first week of December 2003 and were at normal volume by the end of the month.

Overall, the estimated losses for Mexican green onion growers was $10.5 million due to lost sales and lower prices on actual sales (for the period November 16-29, 2003). Growers incurred additional losses when fields went unharvested due to low demand. In the last week of November, Mexican growers left 48 hectares of green onions in the fields. In December, an additional 317 acres were left unharvested. Green onion fields are planted every few weeks to provide a continuous supply for harvest. With the decline in demand, growers likely cancelled some plantings. The decline in harvest resulted in a decline in demand for labor, which had a serious impact on the local economy. Growers not named by the FDA as the source of contamination indicated that the negative market impacts of the hepatitis A

Table 1. Impact of Food Safety Outbreak on Mexican Growers, by GAP Status

GAP Status	Impact on:	
	Volume of green onion sales	**Demand for other products**
Partial GAPs	Down a bit	Some impact
No GAPs	Down by 50 percent	Down by about 30 percent
No GAPs and named by FDA	No sales and most fields plowed under	Shippers stopped selling all or almost all products from these growers

outbreak lasted from one to four months (Calvin, Avendaño, and Schwentesius, 2004).

As with the spinach case, all growers were affected by the general loss of consumer confidence in green onions and by lower prices, regardless if these growers were GAP-certified or not (again, the negative externality effect). However, interviews with a limited number of Mexican green onion growers in June 2004 indicated that those with third-party GAP certification had higher volumes of sales than other growers (See Table 1). If buyers needed green onions, they sought growers with the best food safety programs, although they did not pay more for the green onions. For these growers, green onion shipments did not decrease markedly, nor were their other crops affected.

Growers who were in the process of becoming GAP certified and requested audits to demonstrate their progress in improving food safety also fared reasonably well. Their shipments of green onions usually fell a bit, and demand for some of their other crops dropped slightly. For producers who were not GAP certified, green onion sales declined to about half the normal volume, and demand for other products sold by these firms declined by about 30 percent. For those growers who were not compliant with GAPs and were named by the FDA as associated with the contaminated green onions, the impact was catastrophic. Shippers did not want green onions or any of their other products. These growers plowed up most of their green onions and sold small amounts to the domestic Mexican market.

Although there is no hard data on the case, it is likely that GAP-certified spinach growers also suffered fewer losses and recovered more quickly than non-certified growers after the 2006 *E. coli* outbreak. This is because many California fresh produce handlers agreed in March 2007 to handle produce only from growers who had GAPs in place, giving those growers an immediate market access advantage over uncertified growers.

References and Further Information:

Calvin, L. 2003. "Produce, Food Safety, and International Trade: Response to U.S. Foodborne Illiness Outbreaks Associated with Imported Produce." In J. Buzby (ed.), International Trade and Food Safety: Economic Theory and Case Studies. AER-828, USDA-Economic Research Service, Washington, D.C.

Calvin, L. 2007. "Outbreak Linked to Spinach Forces Reassessment of Food Safety Practices." Amber Waves. Vol. 5, Issue 3, p. 24-31. USDA-Economic Research Service, Washington, D.C.

Calvin, L., B. Avendaño, and R. Schwentesius. The Economics of Food Safety: The Case of Green Onions and Hepatitis A Outbreaks. VGS-305-01, USDA-Economic Research Service, Washington, D.C.

Calvin, L., R. Cook, M. Denbaly, C. Dimitri, L. Glaser, C. Handy, M. Jekanowski, P. Kaufman, B. Krissoff, G. Thompson, and S. Thornsbury. 2001. U.S. Fresh Fruit and Vegetable Marketing: Emerging Trade Practices, Trends, and Issues. Ag. Econ. Report 795, USDA-Economic Research Service, Washington, D.C.

Dato, V, A. Weltman, K. Waller, M. Ruta, A. Highbaugh-Battle, C. Hembree, S. Evenson, C. Wheeler, and T. Vogt. 2003. "Hepatitis A Outbreak Associated with Green Onions at a Restaurant—Monaca, Pennsylvania, 2003." Morbidity and Mortality Weekly Report 52 (47):1155-1157. Centers for Disease Control and Prevention. November 28, 2003.

The Packer. 2002. "Someone should audit third-party auditors." The Packer, Shawnee Mission, KS, (April 8, 2002): p. B1.

U.S. Food and Drug Administration (FDA). 2001. "Analysis and Evaluation of Preventive Control Measures for Control and Reduction/Elimination of Microbial Hazards on Fresh and Fresh-Cut Produce." Center for Food Safety and Applied Nutrition, U.S. FDA, Washington DC.

For more information about third-party GAP audits in North Carolina contact:

NC GAP Certification Assistance Program
Division of Marketing
NC Department of Agriculture
and Consumer Services
Mailing Address: 1020 Mail Service Center,
Raleigh, NC 27699-1020
Physical Address: 2 West Edenton St.,
Raleigh, NC 27601
Tel. No.: 919-733-4216
FAX: 919-715-0155

Prepared by
Roderick M. Rejesus, Assistant Professor and Extension Specialist, NC State University

COLLEGE OF
AGRICULTURE & LIFE SCIENCES
ACADEMICS ▲ RESEARCH ▲ EXTENSION

NC STATE UNIVERSITY Published by North Carolina Cooperative Extension

AG-709 E08-51822
01/09—1M—VLB/SSS
1000 copies of this public document were printed at a cost of $831or $.83 per copy.