

As food safety challenges pile up, technology strives to offer solution

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Inside a Silicon Valley company's windowless vault, massive servers silently monitor millions of heads of lettuce, from the time they are plucked from the dirt to the moment the bagged salad is scanned at the grocery checkout counter.

That trail can be traced in seconds, thanks to tiny high-tech labels, software programs and hand-held hardware. Such tools make it easier for farmers to locate possible problems -- a leaky fertilizer bin, an unexpected pathogen in the water, unwashed hands on a factory floor -- and more quickly halt the spread of [contaminated food](#).

This Dole Food Co. project and similar efforts being launched across the country represent a fundamental shift in the way that food is tracked from field to table. The change is slow but steady as a number of industry leaders and smaller players adopt these tools.

Much of the farming community has yet to follow suit, and federal food-safety legislation is stalled in Congress. But proponents of this digital transformation said it was inevitable given public outrage over the recent scandal over contaminated eggs. They said technology could simplify the nation's highly complicated [food-safety system](#), helping prevent or contain the harm caused by recalled food.

"The driving force in all this is the recalls," said Ashish Chona, chief executive of InSync Software in San Jose, whose technology is used by Dole. "A recall can bring a company to its knees. Everyone knows it."

It's also a potential economic bonanza for California, which has been on the leading edge of this convergence between two of the state's largest and most powerful industries: technology and agriculture.

IBM Corp. is in talks with a leading growers association in California to roll out a computerized tracing system for its members. Last week, Intellex Corp. of Santa Clara, Calif., attached tracking labels to plastic food bins so the Hawaii Department of Agriculture can keep an eye on tomatoes, pineapples and other produce grown and sold on the islands.

YottaMark Inc. in Redwood City, Calif., is helping more than 2,000 farms in North America track their yams, berries and other produce from the field to the store. Lotpath Inc. in Fresno, Calif., has been hired by farmers eager to watch over their peaches and nectarines. Infratab Inc., a smart-chip and logistics firm in Oxnard, Calif., is working with grape growers in the Golden State and ensuring that more of the fruit arrives at its peak and less is lost to spoilage.

In general, such trace-back systems work in a way that's similar to how Federal Express tracks its packages. On the [farm](#), animals and crop sections are given a "smart" label with a unique identifying number. The label is then attached to a bin, crate or container used for transport.

Workers then can use a hand-held computer or smart phone to scan the labels and record key information, such as date, time, location, workplace temperature and which truck hauled the food away. The information is usually uploaded to a central online database, where it is stored and can be accessed via the Web.

Each time the food moves or is handled by someone new, the data can be updated and recorded.

"If computers can be used to track individual bottles of drugs throughout

the supply chain in the pharmaceutical industry, then why not food?" asked Paul Chang, who heads IBM's traceability initiative.

The Armonk, N.Y., company, in addition to talking to the California growers association, is working with Thailand's Ministry of Agriculture to track the production of mangos and chickens for export to the U.S.

But some farmers and suppliers aren't sold on the idea. They argue that such technology can be costly and gives only a partial snapshot of what's happening in a barn or field.

There are also cultural barriers to overcome. Many farmers, comfortable with cutting-edge tools in the field and processing factory, are still rooted in the tradition of using pen and paper in the office.

"The attitude is, 'I'm not having problems on my farm, so why spend money fixing something that already works?' " said Mike Dodson, chief executive of traceability software firm Lotpath.

Agriculture, by its very nature, is transitory. An apple can make five stops before a consumer takes a bite. The fruit is picked from a grove, trucked to a sorting center, boxed at a packing company, sent to a distribution warehouse, and finally unloaded and placed on display counters at a grocery store. Each location would have a different method for recording and storing data.

Add to that the sheer volume of food consumed: 6 billion cases of produce travel across the U.S. each year -- and that's just fruits and vegetables.

What's currently in place is a logistics nightmare. When the federal government enacted the Bioterrorism Act of 2002, the agriculture and food industries were required to put into place "one-up, one-down"

traceability. That means each company is supposed to know what's going on inside its four walls, where its raw materials came from and where its products were being sent.

That way, in theory, the nation's food-supply chain could be connected, making it relatively easy to track a recalled food, such as eggs. In practice, it can take weeks or months for federal investigators to hunt down such information.

As a result, food recalls in the U.S. are often overly broad, and safe food gets tossed out by harried retailers and nervous consumers. Other recalls take so long to get launched that they're essentially too late to be effective. Of the 69 voluntary food recalls the U.S. Department of Agriculture's Food Safety and Inspection Service initiated in 2009, 57 came up short in recovering contaminated products.

This summer's egg recall served as a clear example. It took federal investigators weeks to wind through public health databases, mountains of paperwork and antiquated accounting systems before finally unearthing the source of the contamination. (The salmonella outbreak sickened more than 1,600 people and led to the recall of 550 million Iowa eggs.)

In fact, it was a massive recall of spinach that persuaded some of the country's largest vegetable farmers to put down their clipboards and go digital.

In 2006, a nationwide E. coli O157:H7 outbreak killed five people and sickened more than 200 in 26 states. Investigators traced the spinach to a 50-acre field in California's San Benito County leased by Mission Organics. The most likely source of the contaminant was wild pigs. The spinach was sold under a Dole label. In April 2007, Dole and two other firms agreed to confidential settlements in the deaths of three women.

Dole's fresh-vegetables division reached out to Chona of InSync Software, whose technology had been developed to help computer manufacturers track the distribution of electronic parts.

"They said, 'We should be able to figure out where every bin of lettuce is harvested and where it goes,' " Chona said.

Dole called other tech firms too. Over time, the agribusiness giant pieced together a system that married several existing technologies, including scanning equipment, mobile phones and global positioning system navigation. Now officials can trace the GPS coordinates of a field where the lettuce was picked, pinpointing the location to within about 100 feet.

They haven't had a contamination problem since the system was put into place, Dole Food spokesman Marty Ordman said.

"We've expanded it to our spring mixes and are expanding to more products," Ordman said. "For the (farmers) that are part of our growing program, they share and track this information too."

The spinach recall also was a wake-up call for Growers Express in Salinas, Calif., a leading produce growing and packing company. Three of the company's growers were initially implicated in the outbreak.

Chief Executive Jamie Strachan recalled how, at the time, he looked out his office window one morning and "every spot was filled with dark vans, and guys getting out with FBI jackets on. Most had guns."

Though the growers were later cleared, sales still plummeted as the public's appetite for spinach soured.

Strachan hired TrueTrac, a Salinas firm that sets up tracing systems for farmers. Last summer the firm started training Growers Express

foremen on how to use the hand-held scanners and print out labels in the field. A year of testing followed.

Strachan said he discovered some unexpected benefits. The production process worked more smoothly. Warehouse managers were able to go online and figure out how much produce was coming out of a particular field, with little hassle.

Still, such technology has drawbacks. Human error can clog the system. So can fraud.

And the technology's not cheap. Although radio frequency ID, or RFID, tags generally cost less than a quarter each, that small sum adds up quickly for operations handling millions of bags of lettuce or cartons of eggs. Bar code labels, on the other hand, cost less than half a cent each. But each has to be manually scanned, a labor-intensive process.

California Olive Ranch, the nation's largest olive grower, spent half a million dollars two years ago to switch from a paper-based tracking system to a digitized one. It annually costs an additional \$100,000 to \$200,000 to operate, CEO Gregg Kelley said.

But the marketing benefits pay off, Kelley said. He's launching a website that allows consumers to see where the olives inside their bottles were grown and when they were crushed.

"We know people want to know where their food comes from," Kelley said, and some will pay a premium for that knowledge.

Few companies understand that consumer trend better than Germany's Metro Group. Over the past three years it has rolled out a farm-to-fork tracking system for 1,500 Star Farm products carried in its Metro Cash & Carry stores in China -- a country of recurring food scares, including

the 2008 discovery of melamine in milk powder that sickened thousands of children and killed at least six.

Company officials said that if farmers want to sell their products to Metro, they must print out identification labels on each bin shipped and electronically submit tracking data to the retailer's online database. So far, 11,700 farmers and 80 suppliers have joined the program. The stores also have kiosks that let consumers scan a package's bar code and see where an apple was picked or which day a chicken arrived at a slaughterhouse.

Silvester Macho, Metro's chief information officer, said by phone from Dusseldorf that its Star Farm line had seen double-digit sales growth year over year.

Suppliers and industry sources say a small but growing number of retailers in Asia and elsewhere are talking about requiring their suppliers to use digital trace-back systems that can be accessed online.

Back in the U.S., federal and state lawmakers have proposed a variety of legislation to set traceability standards, though such efforts have lagged in recent months.

The U.S. Department of Agriculture, trying to improve food-safety efforts, is networking its various computer systems that store field test results and inspection data -- but currently don't talk to one another. This Public Health Information System, slated to roll out by year's end, should let investigators "see trends as they're occurring" and react faster, said Al Almanza, administrator of the USDA's Food Safety and Inspection Service.

Eager to avoid government regulation, the industry itself is trying to take the lead. So far, the results are piecemeal.

Western Growers Association, which represents 3,000 fruit, nut and vegetable producers in California and Arizona, is holding digital tracking workshops for its members to see what gear is available. Produce trade associations in the U.S. and Canada joined forces and rolled out the Produce Traceability Initiative. Among other things, the effort calls for standardized traceability. The goal is to have the voluntary plan adopted industrywide by 2012.

Ultimately it may come down to retailers forcing the industry to change; many are frustrated by the legal and public relations fallout of food-safety problems. Several grocery chains, including the Southeast and mid-Atlantic grocery chain [Food Lion](#), are refusing to do business with suppliers who don't comply with the Produce Traceability Initiative by the 2012 deadline.

"Even if lawmakers can't get a bill passed, the movement is afoot," said John Ryan, an administrator with the Hawaii Department of Agriculture.

Last year, Ryan said, officials from Starwood Hotels came to his office pleading for food-safety tracing standards. The hoteliers, Ryan said, didn't want tourists getting sick and further harming their business, already hard-hit by the country's sour economy.

"They can drag their feet all they want," Ryan said. "One way or another, traceability is coming."

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