

## Viewpoint: Like it or not, technology is what gives us the crops that we eat

**I**n the past 50 years, farming has gone through a technological revolution. In that historical blink of an eye, tractors have gone from simple earth-movers to million-dollar mega machines, guided by onboard computers and GPS satellites. In just the past 25 years, genetic engineering, the ability to make changes in the DNA of seeds to give crops favorable traits, has become one of the most rapidly adopted technologies in the history of mankind. These technology-packed plants, such as beets, corn and cotton engineered to repel insects and make it easy for farmers to deal with weeds, [now blanket American fields](#) to the tune of 90 percent or more.

At the same time the American farm has been experiencing a burgeoning of technology, the number of products in the grocery store that advertise themselves as having nothing to do with technology has multiplied. On the farm, technology is inescapable, but step through the sliding glass doors of the American grocery store and suddenly the idea of “agricultural technology” has plausible deniability.

Browsing the produce at my local California grocery store, the most common word I see on packages is not “technological” but some version of “natural”: There’s NatureFresh peppers, Naturipe strawberries, and a bag of mandarin oranges advertised as “nature’s perfect fruit.” A packaged medley of colorful cherry tomatoes advertises itself as “Wild Wonders.” In the beverage section, Fiji water boasts it is “a gift from nature” and [claims](#) “it’s the best water known to man, because he had nothing to do with it.” This plus the growing number of organic and “non-GMO” products on the shelf and it all adds up to an anti-technology food trend. People want to believe that their food is “natural,” and anything that upsets this narrative is likely to be passed over.

You don’t have to dig very deep to see this “natural narrative” on food packaging for what it is: a complete fiction. Although food labels try to sell us on the idea that there is a gulf that separates what we call “food” from what we call “technology,” the reality is that the human touch is in every food in the grocery store. I’m reminded of a [headline](#) I ran across a couple of years ago: “A tomato contains more technology than an iPhone.” Nobody can look at an iPhone without recognizing that it took an incredible amount of technology to invent. When you look at a tomato or any of our modern grocery store products, you should see the same thing.

**wild 12 6 18** Take for example those “Wild Wonders” tomatoes. They may be wonderful, but there’s nothing wild about them. Tomatoes were domesticated in the 1600s; real wild tomatoes are pea-sized and [don’t taste very good](#). These were bred to be juicy, packed with flavor and to come in a variety of colors. The brown tomato in the bunch is the mini Kumato, a [patented](#) plant with a thirteen-page dossier. “Nature has given us a jewel of a fruit,” says the package about the Kumato. Not true. A human being invented these—the patent names that person specifically. And that’s only the beginning of the technology responsible for this tomato appearing in the grocery store. These tomatoes are grown inside [hydroponic greenhouses](#), designed to keep the wilderness firmly out. They’re also hybrids – hybridization is the century-old technology of combining two generations of highly inbred plants to create a vigorous plant that is much greater than the sum of its parents. The raw materials to create the technology we call “tomato” may have been discovered in nature in the year 1600, but these are no more a “gift of nature” than an

iPhone.

In the produce section, it's not just tomatoes — [examples of this](#) are all over the place. Corn began as a grass-like plant with tiny cob-like fruits. It wasn't very nutritious and was completely unrecognizable as the precursor of corn. Wild bananas are tiny, with pulpy flesh, riddled with seeds and encased in a tough peel. Before domestication, they were lean and mean. Kale, cauliflower, cabbage and broccoli all came from the same wild mustard plant, which more closely resembles an old stick than any of these modern vegetables.

Even something that sounds “natural” such as wild caught fish, relies on human technology. Somebody had to catch the fish, flash freeze it, package it in plastic and ship it to you. Fiji water is a similar example. It may not be literally touched by human hands, but human machines certainly touched it. In a sophisticated 110,000 square foot [bottling factory](#), plastic bottles zoom around on precisely timed conveyor belts. Plastic bottles are the product of human technology that transforms black oil into clear, sanitary and convenient plastic bottles. And airplanes, cargo ships, trucks, inventory systems and a whole lot of human ingenuity is responsible for the regular arrival of plentiful cases of the stuff in just about every grocery store in the country. [Despite their advertising](#), humans had everything to do with it.

The produce may look fresh, but a very stale lie is being used to entice customers to buy it: it's the idea that food will be safer and healthier to the extent human beings had nothing to do with it. Many shoppers believe this lie. The consequences are that good products that *actually* make food safer, healthier and cheaper are unfairly shunned, will never see the grocery store shelf, or, worse yet, will never even be created.

Take for example, the technology of irradiation, a process that uses high energy light or particles to sterilize food, such as raw meat. Like pasteurizing milk or canning vegetables, irradiation is used to kill dangerous pathogens and has the advantage of not requiring heat to do it. This “unnatural” technology is something moms should be clamoring for to protect their children from food poisoning. Instead, they clamor for organic foods, which don't allow it.

[Shoppers believe](#) that since organic food is supposed to be “natural,” that it will also be healthier, safer, and more nutritious than a product not carrying the seal. But these interpretations of the USDA organic seal don't stand up to scientific scrutiny.

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An [article](#) in the *American Journal of Clinical Nutrition* in 2009 reviewed 137 food nutrition studies, finding that “On the basis of a systematic review of studies of satisfactory quality, there is no evidence of a difference in nutrient quality between organically and conventionally produced foodstuffs.” Another more recent [study](#), came to much the same conclusion and further found that organic foods were not less likely to be contaminated by pathogenic bacteria like E. coli or Salmonella as compared to conventional. That finding [surprised](#) even the researchers. “When we began this project,” said researcher Dena Bravata, “we

thought that there would likely be some findings that would support the superiority of organics over conventional food.”

In fact, organic foods are highly susceptible to contamination. The FDA [keeps a list](#) of recalled foods on their website, which, considering that organic foods comprise just 5% or less of the market in the United States, are disproportionately represented. [According to](#) Bruce Chassy, professor of food science (emeritus) at the University of Illinois, who has looked extensively at food recalls, “organic foods are recalled 4 to 8 times more frequently than their conventional counterparts.”

The consequence is that moms who want to give their children the healthiest start in life are wasting their money on organic foods and supporting the thoroughly unscientific and dangerous idea that “natural is better.”

Another consequence of the natural food trend is that innovative products are not making it into grocery stores. [Arctic Apples](#), genetically engineered to not brown when sliced were invented over ten years ago. It took years of regulatory delays before the technology was finally released in 2016. Regulations for biotech enhanced foods are so onerous and delays so uncertain that Neal Carter, president of the then seven-person biotech company that invented the apple [remarked](#) that he didn’t hold out much hope for other small, innovative biotechnology start-ups. Regulatory paperwork has made innovation too expensive for all but the largest biotech and pharmaceutical companies.

The same is true for AquAdvantage Salmon, a fast-growing genetically engineered farm salmon. These fish have a tremendous advantage over conventional farm salmon — they mature in about half the time. They are the same nutritionally as conventional salmon and just as safe to eat, but consumer mistrust of food technology caused the inventors to [wait twenty years](#) for the FDA to give approval to bring their fish to market. When the paperwork was submitted back in 1995, the 28.8k dial-up modem and the Nokia 9000 cell phone (it weighed almost a pound and had a black and white screen) was released. The year before, Amazon.com was founded and a year later, the DVD became available. During the 20 years when innovations like these have gotten smaller, faster, more powerful or even gone obsolete to be replaced by something better, the genetically improved salmon sat in regulatory limbo. Technology isn’t one of those things that gets better by sitting on a shelf. There is still no hint of when this salmon might make it to the shelves.

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A start-up is a business based on an innovative idea that an

entrepreneur believes could work, with a lot of work and investment. Every time you pick up a food labeled “non-GMO” and place it into your cart, you are telling the next biotech entrepreneur not to bother—you are

telling him you don't want the next best thing and you'll support the movement that will crush him.

Scientists are feeling the crush too. Peggy Lemaux, a genetic engineer at UC Berkeley, boasts a hypoallergenic wheat among her list of inventions. It could allow those with a wheat allergy to consume bread and pasta. Lemaux says that "[w]hen people find out about it, they say, 'Oh! Where is it? I'd like to have it.'" But those seeds, along with others, are locked in the basement of the building where she works. Because of the fear and hysteria surrounding any new biotech invention and the exorbitant regulatory cost of bringing new innovations to market, they remain buried treasure. And Lemaux is just one such scientist of hundreds in the United States.

I want the technology of the future to make it into my grocery basket as soon as humanly possible. For that to happen, we need to support the human innovators responsible for making food safer, cheaper and better. It also means taking a scientific approach to judging food and steering your cart clear of non-GMO, organic and natural foods.

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