

Opinion: Is the world ready for the farmerless tractor?

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CES is the [trade show](#) for cool kids, where the future of technology struts its stuff for a few days in Vegas each year. So it's news when a star of this futuristic show is one of America's oldest industrial corporations — so old that cast iron is part of its innovation history.

John Deere was a [Vermont blacksmith](#) whose village failed in the economic misery of the 1830s. He followed his customers west to Illinois, where they discovered that Midwestern mud clung to their cast-iron plows. Stopping every few feet to free a plow was no way to get a crop in. Deere created a “self-scouring” steel plow — cutting-edge technology worthy of the name.

Almost two centuries later, Deere's corporate descendants were on the Strip, elbow to elbow with the crypto cowboys and mavens of the [metaverse](#), touting the company's [latest advance in tillage technology](#): an autonomous tractor. No farmer required. It runs via a smartphone app.

If that seems incongruous, think again. Farm equipment belongs at a technology fair. Arguably, no technology matters more. From the days of the Fertile Crescent, agriculture has pushed technology along. The changes wrought in recent generations are an object lesson for every industry, because the dynamics that have revolutionized farming are bringing dramatic changes for us all.

The autonomous tractor is a perfect symbol of those changes. Technology gives us farming without farmers — the end stage of a trend some 75 years in the making. Since 1948, total agricultural output in the United States has [more than doubled](#), while the number of self-employed and family farmworkers has [dropped](#) by roughly 75 percent. Put another way: One farmer today does the work of eight agricultural workers in the post-World War II generation.

And that's before the farmerless tractor.

This technological revolution has changed everything about rural America. There are now two kinds of farmers, broadly speaking: small-scale farmers, most of them working second jobs in nearby towns or cities, and large-scale operators able to afford the [\\$500,000 price tag](#) on John Deere's 8R 410 tractors with a 2430 chisel plow, as well as the estimated [\\$50,000 add-on package](#) of technology that will allow the machines to operate on their own.

Artisans and industrialists, with a dwindling world in between. According to a paper by the agricultural economist Jayson Lusk at Purdue University, two-thirds of the nation's farm output comes from operations with sales [above \\$1 million per year](#).

As a result, the wealth gap hit [farm country](#) early. U.S. spending on foods and fibers is robust, but the money goes into fewer hands.

Drive across the United States, and you'll see the result: The rural heartland is struggling. Small towns and crossroads have dwindled to almost nothing. Surviving communities struggle to hold on to their young people, whose labor is no longer needed. Rural health care is suffering as hospitals consolidate. School districts are starved for students. County governments serve fewer citizens and therefore provide fewer jobs.

Census data indicate that about 40 percent of Americans lived on a farm in 1900, and today the number is around 1 percent. That's not because there's no money in farming — there will be money in farming as long as humans need to eat. It's because there is so little work left for farmers.

As a society, we've not done a very good job of managing this tidal change, [Farm Aid](#) concerts notwithstanding. But can we learn from our mistakes? The change that has swept agriculture — the uncoupling of labor from wealth creation, radically fewer jobs to produce ever-more-profitable output — is coming to the economy as a whole.

Manufacturing is in the thick of it now, with effects visible in Rust Belt cities. Service industries from fast food to data processing to retail are rapidly entering the maw of transformation. Construction increasingly relies on tech-enabled prefabrication. Logistics operations — ports, railroads, warehouses — are automating as fast as they can. Even law firms and financial services are not immune.

We cannot hollow out the entire economy as we've allowed rural America to be hollowed. We need to become much more sophisticated and much more vigorous about lifelong learning, acquisition of new skills, support for workers in transition (and their families). We need to understand that education is no longer preparation for a career, but preparation for disrupted careers: High school and college graduates must excel in teamwork, skill-building and adaptation.

A species that can go from cast-iron to steel plows, and from there to autonomous tractors, is a problem-solving species. Which is a good thing, because the transformation of developed economies by technology is creating a whole lot of problems. We can do better with eventual, inevitable changes than we've done by rural America, but not without constant focus and the willingness to think and act in new ways. The future will not drive itself.

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