

By J. Edward Taylor

**Abstract:** *Agriculture has long been a flashpoint in international trade negotiations. But a shrinking and aging hired farm workforce is set to change the face of farming in North America. As a result, farmers in the U.S. and Mexico are taking steps to grow more food with fewer workers by improving technologies and farm labor management strategies. The competitiveness of U.S. agriculture, as well as the welfare of farmworkers and of the communities in which they live, depends on how we as a society adapt to a new era of farm labor scarcity.*

U.S. farmers can no longer count on rural Mexico to provide a steady supply of low-wage workers. The factors pulling Mexicans out of farm work, such as rising education and growing service economies, are at play in other developing countries as well. Instead, as farmworker wages rise, farmers in the U.S. and Mexico are taking steps to grow more food with fewer workers by improving technologies and farm labor management strategies. The big question for farmers and researchers is whether new labor-saving technologies will make up for the shrinking farm labor supply, and what the implications will be for farm workers and the communities in which they live.

Until recently, U.S. farmers had access to an abundant supply of farmworkers, mostly from rural Mexico. But the hired farm workforce is shrinking and aging, as fewer people in rural Mexico are growing up to be farmworkers. A new UC Davis study estimates that the number of farmworkers from rural Mexico is decreasing by 150,000 per year. This means U.S. and Mexican farmers have to compete for a shrinking number of farmworkers.

There are three major reasons for this declining farm workforce. First, rural Mexicans are becoming more educated. Average schooling is 4.9 years for rural Mexicans fifty or older; for people in their twenties it is 9.7 years. Better-educated children eschew farm work in Mexico, just as they do in the United States. Second, Mexican families are getting smaller. In the 1960s, Mexican women had nearly seven children each. Today they have just over two—about the same as women in the U.S. Third, Mexico's workforce is shifting out of agriculture and into a service-based economy, just like the U.S. workforce did several decades ago. In short, what is good for rural Mexico in this case creates challenges for U.S. farmers.

These findings have far-reaching implications for farmers and policy makers. U.S. farmers can no longer count on rural Mexico to provide a steady supply of low-wage workers. Immigration will not be a solution to U.S. farm labor problems in the future. Guest worker programs are only a short-term option: They will have to recruit from an ever-smaller pool of available farmworkers in Mexico. There is little hope of recruiting enough farm workers from other countries to take the place of Mexican workers. U.S. farmers would have to seek workers from more distant countries. Mexico has a new program to import farmworkers from Guatemala, but the Central American farm workforce is far too small to meet farm labor demands of the United States, Mexico, and Central America. The factors pulling Mexicans out of farm work, such as rising education and growing service economies, are at play in other developing countries as well.

U.S. farmers could respond to farm labor shortages by growing fewer fresh fruits and vegetables that require large amounts of labor, but consumers' demand for these foods is growing. Instead, as farmworker wages rise, farmers in the U.S. and Mexico are taking steps to grow more food with fewer workers by improving technologies and farm labor management strategies. The big question for farmers and researchers is whether new labor-saving technologies will make up for the shrinking farm labor supply, and what the implications will be for farm workers and the communities in which they live. There are already many technology success stories, including mechanical wine-grape harvesters, dry-on-the-vine raisins, and shake-and-catch nut harvesters. Mechanical engineers are teaming up with information and technology startups in Silicon Valley and elsewhere to develop robotic solutions such as artificial intelligence-assisted weeding and thinning machines and even robotic fruit harvesters that pick only the ripe fruit.

Research and development, infrastructure, and the farm workforce itself will have to change in this era of farm labor scarcity. Federal and state governments, social science researchers, and nonprofit foundations will have to think about the roles they ought to play to keep agriculture competitive while ensuring that farmworkers and rural communities benefit. As universities and the private sector collaborate to invent novel ways to confront the farm labor challenge, farmers will have to learn about new technologies. The internet will have to reach out into farmers' fields. A teched-up agriculture requires a teched-up workforce. Our educational system, including high schools, community colleges, and universities, will have to prepare a new generation of workers with the skills to manage new crop technologies. Rather

than importing low-skilled farmworkers, the U.S. might well import agricultural engineers from Mexico, whose universities currently produce many more engineers per capita than U.S. universities do.

Technologies make farmworkers more productive, and this makes it possible for farmers to pay higher wages in a new age of labor scarcity. Some crops and tasks are easier to mechanize than others. Rising wages benefit farmworkers and the communities where they live only if workers have the skills demanded by new technologies, and if lower-skilled workers can shift their labor from newly mechanized crops and tasks to others that are more difficult to mechanize. Innovations that keep an aging farm workforce employed and productive are needed while researchers develop robots that can perform tasks that seem simple for humans but are challenging for machines. Some of those innovations are not so high-tech, such as growing berries on platforms in the fields that save workers' backs, or power-assisted pruning shears for orchards.

The competitiveness of U.S. agriculture, as well as the welfare of farmworkers and of the communities in which they live, depends on how we as a society adapt to a new era of farm labor scarcity. One thing is certain: One way or another, farmers will have to adjust, and if we could step in and out of H.G. Wells' time machine, we would see that both farms and the farm labor force will look very different in the not-so-distant future.

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### **Additional Readings on the End of Farm Labor Abundance**

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