A Vanishing Breed

How the Decline in U.S. Farm Laborers Over the Last Decade Has Hurt the U.S. Economy and Slowed Production on American Farms

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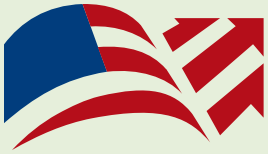

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EXECUTIVE SUMMARY

In the last few years, many Americans have heard stories about the difficult labor situation faced by many U.S. farmers. Despite unemployment rates remaining high in some parts of the country, news reports have described farmers in Texas losing dozens of acres of carefully cultivated squash due to a lack of available field hands.[1] In Georgia, blackberries have been left to rot in the field,[2] while in California, asparagus and cantaloupe farmers have been forced to abandon fields of otherwise healthy crops, even during a time of drought when crop yields are unusually low.[3] Past research from the Partnership for a New American Economy (PNAE) and the Agriculture Coalition for Immigration Reform has found such labor challenges have created a frustrating reality in the U.S. farming industry: At a time when more Americans are trying to eat fresh and locally grown produce, farmers don't have the labor they need to expand their operations and keep pace with rising demand. From 1998 to 2012, in fact, the share of American fresh produce that was imported grew by more than 79 percent.[4]

In this report, we examine more closely the main source of the issue—the declining supply of labor available to American farmers. Although farmers cultivating labor-intensive crops such as fresh fruits, vegetables, and tree nuts have long worried about the supply of available workers, few national studies have documented the scale of the decline in crop laborers that has occurred in recent years on American farms. In this report, we tackle that gap in the scholarship, relying on data from the National Agriculture Workers Survey, the U.S. Department of Agriculture's Farm Labor Survey (FLS), and the Census of Agriculture to produce robust estimates of how the agricultural workforce has shifted in the last decade.

> **"To lose a healthy crop solely because of labor is pretty agonizing."**
>
> BRUCE TALBOTT
> Orchard and Vineyard Manager, Palisade, Colorado

Our work presents a troubling picture for American farms—and reiterates what many U.S. farmers have long known. In the last decade, as fewer young agricultural workers have come to the United States, the number of field and crop laborers available to farms has been rapidly declining. This drop has created a severe labor shortage in many key parts of the country vital to American farmers and iconic crops. It has also had an impact far beyond rural America: The lack of workers has not only hurt the ability of U.S. farms to grow and expand, it has cost our economy tens of thousands of jobs in related industries like trucking, marketing, and equipment manufacturing. When the drought on the West Coast ends and crop production returns to normal levels, the labor shortages documented here could be even more dramatic—producing greater economic pain for the region and the country as a whole.

1 Rivers, Rebecca. 2013. "Lack of workers prove costly to local producers." Fox 34 News: Lubbock, Texas, August 6.

2 Schneider, Craig. 2011. "Farm owners, workers worry about immigration law's impact on crops." *The Atlanta Journal Constitution,* June 3.

3 Gonzalez, Jonathan. 2013. "California's new drought: Labor shortage in the fields." *Bakersfieldnow.com,* Nov. 20.

4 Bronars, Stephen G. and Zeitlin, Angela Marek. 2014. "No Longer Home Grown." Partnership for a New American Economy and the Agriculture Coalition for Immigration Reform. (Available online.)

Key findings:

The supply of workers available to U.S. farmers has been rapidly declining.

Between 2002 and 2014, the number of full-time equivalent field and crop workers has dropped by at least 146,000 people, or by more than 20 percent. Wage patterns indicate that this caused a major labor shortage on U.S. farms.

The labor shortage has hurt our country's ability to produce labor-intensive fruits, vegetables, and tree nuts.

Had labor shortages not been an issue, production of these crops could have been higher by about $3.1 billion a year. Given that farm revenues often trickle down to other industries in our economy, that $3.1 billion in additional farm production would have led to almost $2.8 billion in added spending on non-farm services like transportation, manufacturing, and irrigation each year. That spending would have created more than 41,000 additional non-farm jobs in our economy annually.

The number of potential farmworkers immigrating to the United States has greatly slowed over the last decade.

Between 2002 and 2012, the number of new field and crop workers immigrating to the United States fell by roughly 75 percent. This led to a drop in the number of entry-level workers available for difficult jobs like hoeing, harvesting, and planting.

Some parts of the country were particularly hard hit by the recent labor decline.

The number of full-time equivalent field and crop workers in California declined by about 85,000 people between 2002 and 2014. The vast majority of this decline happened before the drought started in 2011. The southeastern part of the United States was also hard hit. Alabama, Georgia, and South Carolina lost about 8,500 workers total, or more than one in four of the crop workers employed in 2002. Colorado, Nevada, and Utah lost 36.7 percent of their full-time equivalent field workforce, or 7,029 people.

Today's field and crop workers are rapidly aging, signaling even greater potential future challenges when the current generation of workers retires.

While 36.1 percent of field and crop workers during the 1998–2002 period had arrived in the United States within the past five years, just 11.5 percent were in that situation by 2008–2012. Because many new immigrant farmworkers tend to be young, this has caused the workforce to age dramatically. While 14.2 percent of farmworkers were 45 years old or older in the 1998–2002 period, by 2008–2012, that figure had more than doubled, reaching 27.1 percent.

U.S.-born workers are not filling labor gaps on American farms.

From 2002 to 2014, the increase in U.S.-born workers offset less than three percent of the dramatic decline in field and crop workers on U.S. farms caused by dwindling foreign-born workers.

This report makes clear that the manpower challenges faced by U.S. farmers should be a major concern for American policymakers. The 41,000 non-farm jobs that could have been created each year by solving the farm labor shortage would have provided a valuable boost to the U.S. economy during a time when the country struggled to produce enough jobs. The ongoing labor troubles faced by farmers also present major questions about how sustainable it will be for small farmers to continue growing the most labor-intensive fruit and vegetable crops for the long term. Anecdotally, many farmers say they have already shifted some of their acreage to mechanically harvested commodities like corn, alfalfa, and wheat.[5] These crops on average require fewer workers, generate less revenue for the community,[6] and create fewer ancillary jobs.[7] . Between 2002 and 2012, some 300,000 acres of farmland previously used to grow fresh fruit, vegetables, and tree nuts were taken out of production altogether.

Despite the unsustainable situation faced by U.S. farmers and ranchers, however, little has been done in recent years to address the underlying labor issue. Key industry groups such as the American Farm Bureau Federation and Western Growers have long advocated for bills that would allow farmers to bring in hundreds of thousands temporary farmworkers during times of high labor need.[8] The current temporary farm guest worker program is so cumbersome, expensive, and unworkable that as recently as 2012, it was used by just 6 percent of all hired farmworkers.[9] For the last decade, however, Congress has failed to pass any sort of concrete temporary visa program for the industry, and mandatory employer verification programs in some states have placed many workers already here out of reach. As this report demonstrates, farmers today are greatly hindered by a situation that forces them to compete for the dwindling supply of workers interested and able to do farm work. Whether the agriculture industry can escape this cycle—and continue to expand and provide for the needs of American families—may very much depend on what happens going forward in Washington.

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5 Ibid.

6 Informa Economics. 2007. "An Analysis of the Effect of Removing the Planting Restrictions on the Program Crop Base," p. 13.

7 United States Department of Agriculture, Economic Research Service. 2015. "Agricultural Trade Multipliers." February 26. Available online: http://www.ers.usda.gov/data-products/agricultural-trade-multipliers/effects-of-trade-on-the-us-economy.aspx#.Uxv4zty4mll.

8 American Farm Bureau Federation. 2015. "Agricultural Labor Reform: Introduction,", accessed May 3, 2015. http://www.fb.org/index.php?action=issues.aglabor

9 Patrick O'Brien, John Kruse, and Darlene Kruse, WAEES and the American Farm Bureau Federation. 2014. "Gauging the Farm Sector's Sensitivity to Immigration Reform via Changes in Labor Costs and Availability."

PART I
INTRODUCTION

Last year, Bruce Talbott, a farmer in Palisade, Colorado, was having a major issue on the roughly 400-acre farm that had been in his family since the early 1900s: Finding enough workers to bring in his fruit. Talbott, whose main crop is peaches, has an intense season. During the early part of the peach harvest, in July, trees must be picked every 48 hours to ensure fruit comes off at the perfect level of ripeness. When the season started last year, however, 20 of the 60 crop laborers he needed to do the work were nowhere to be found.

Talbott says that the labor problems he faced last season crept up on him gradually. In the last decade, he says the flow of new, young, immigrant workers that used to join his crew each year slowed first to a trickle and then stopped altogether. Without them, Talbott had to rely on the same workers to return year after year, but many retired or took up jobs in other industries. "I've got a lot of workers older than 50, and one guy who's in his 70s," Talbott says. While those workers continue putting in time on the farm, many of them struggle to work the 10 or 11-hour days sometimes required during peak harvest season. "We welcome these guys back each year like family," Talbott says, "But I'm 56 years old, and I can't do what I did when I was 30, and it's the same with them."

Talbott has dug deep in recent years in an attempt to find workers from other sources. He used teams of prisoners on work release, some of which struggled with the more delicate, skilled aspects of the work. And Talbott says any Coloradan unemployed from another industry "who could walk in the door" was offered a job on the spot. That rarely led, however, to long-time employees: Over several seasons, Talbott had 60 such workers come out at the start of the season, but most dropped out after one or two days, and only two made it through to the end of their contracts. "This is hard, hot work in the sun," Talbott says, "And when you hire guys from other industries, when they get a chance to go back to their old line of work, that's what they do."

Last season those labor shortages wound up taking a toll on Talbott's farm. He had to leave about 100 bins of peaches in the field, or more than 50 tons of product. It was the first time his farm, Talbott Mountain Gold, had actually lost otherwise healthy fruit due to labor issues. "We try to look at the harvest like a war: Sometimes you lose the battle, and you have to go on to the next one," Talbott says, "But to lose a healthy crop solely because of labor is pretty agonizing." The harvest is also a particularly critical time for him: His farm makes 70 percent of its revenue during its 40 days of peak harvest.[10]

In this report, we explore data on the labor challenges that have made the last decade so difficult for fresh fruit and vegetable growers like Talbott. Consistent with Talbott's recent experience, we find that in the last decade there has been a huge drop in the number of new young farm laborers joining the U.S. workforce. In fact, in the parts of the country where the most labor-intensive fresh fruits and vegetables are grown, the size of the full-time equivalent workforce has shrunk by almost a fifth. This has created fierce competition among U.S. farmers for the dwindling number of field laborers that are left—driving up farm wages, leaving huge holes in the workforce, and pushing smaller farms out of business altogether. It has also changed the face of today's farmworkers: Currently, more than one out of every four field laborers is older than age 45, leaving many farmers worrying the situation may only worsen in the coming years as more workers find less physically demanding jobs or retire.

To get a full picture of the current labor issues facing U.S. farms, our analysis relies on several federal data sources. We use data from the United States Department of Agriculture's Farm Labor Survey (FLS) and the U.S. Census of Agriculture to determine how the number of full-time equivalent field and crop workers has dropped in recent years, both nationally and in individual regions. Using data from the National

10 Bruce Talbott, interview by Angela Marek Zeitlin, May 13, 2015.

Agricultural Workers Survey, a survey administered by the U.S. Department of Labor, we are able to show that much of this recent decline is due to fewer new immigrants joining the workforce. We also rely on a recent study from the USDA to project the impact that the farm labor situation has had on our broader economy in the last decade.

Our work produces troubling results that have implications not just for our country's $400 billion agriculture industry, but the U.S. economy overall.[11] Considering that experts estimate every farm job supports three additional jobs in related, often higher-paying fields like trucking, irrigation, and marketing, it is little surprise that the precipitous drop in the supply of laborers has had much broader repercussions.[12] We estimate that the dire labor situation affecting U.S. farms has cost our economy almost $3 billion in spending outside of the farming sector each year, and as many as 41,000 non-farm jobs annually.

Talbott says that in his pocket of Western Colorado he has seen the labor situation temper farmers' expansion plans and push many out of the business. While there were about 250 growers in his region when he started 30 years ago, today there are just roughly 60. "Labor played a big role in that," he says. For now, however, he says he will continue trying to find ways to eke out another harvest this year, and hope that Congress overcomes its gridlock and creates a feasible guest worker program that will allow our farmers adequate labor to meet the country's food production needs. "You can't be in agriculture unless you're an optimist," he says, "but the longer things stay unchanged in Washington, it gets harder and harder to be an optimist each year."

11 Randy Schnepf. 2015. "U.S. Farm Income Outlook for 2015" (Feb. 18, 2015), Congressional Research Service, p. 12. Available Online: https://www.fas.org/sgp/crs/misc/R40152.pdf.

12 Holt, James. 2007. Testimony to Committee on Agriculture, U.S. House of Representatives on October 4, 2007, page 5.

PART II
BACKGROUND

The goal of this report is to document how dramatically the number of laborers available to U.S. farmers has declined in recent years—particularly the workers needed to harvest the most labor-intensive crops. Before discussing these trends, however, it is necessary to understand some background on the nature of agricultural production.

For many fresh fruits and vegetables, mechanized harvesting is not feasible, meaning growers are dependent upon less-skilled and semi-skilled workers to pick produce by hand.[13] This is far different from commodity crops like corn, soybeans, and wheat that can often be harvested by as few as one or two employees using machines. For this reason, fresh produce growers are often among the first to feel any contraction in labor supply—and they feel it most acutely. We focus on these growers in this report.

In many parts of our analysis, we also discuss the labor declines that have occurred nationally for the farm sector, and specifically for the areas of the country where most of the fresh produce and tree nuts are grown. To produce the latter figures, we exclude some Midwestern states such as Kansas, North Dakota, South Dakota, Iowa, and Nebraska, where commodity crops make up a large share of crop production.[14] In Iowa, for instance, less than .08 percent of the agricultural products sold in 2012 were fresh fruits, tree nuts, vegetables, or melons.[15] The state, however, led the country in terms of its corn production.[16] Such states have far different labor needs than areas such as the southeastern United States or California, which are heavily populated by fresh produce growers. Moreover, any decreases in the agricultural labor force in states that specialize in mechanized crops are likely to reflect other trends, such as increased mechanization or more efficient machines.

On farms, workers can take on a variety of job functions, serving as field or crop workers, livestock workers, graders and sorters, equipment operators, inspectors, or managers. In this report, however, we often focus specifically on field and crop workers. This is largely because this position is the most common one on U.S. farms and is also particularly important to fresh produce or nut growers that are dependent upon hand harvesting. It is also the position most likely to be impacted by any slowdowns in arrivals of young, foreign-born workers in our economy or at the border. From 1998 to 2000, for instance—a period largely before the major shortage farmers are experiencing now—about 80 percent of all field and crop workers in the country were foreign-born, and more than 60 percent of those workers were recent immigrants who had been in the country for fewer than 10 years.[17] This compares to the just over half of all agriculture workers who are generally immigrants.[18]

13 Although some crops such as blueberries, baby leaf lettuce, and pungent onions with lower water content can be picked by machine, this statement still holds true for the majority of fruits and vegetables for the fresh market.

14 United States Department of Agriculture, Economic Research Service. 2013. "Corn: Overview." Last modified: May 16. Available Online: http://www.ers.usda.gov/topics/crops/corn.aspx.

15 U.S. Department of Agriculture. 2015. "2014 State Agriculture Overview: Iowa." Accessed June 10, 2015. Available here: http://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=IOWA.

16 Ibid.

17 U.S. Department of Labor, Employment and Training Administration. National Agricultural Workers Survey, 1998–2000.

18 U.S. Census Bureau; American Community Survey, 2009–2013 American Community Survey.

PART III

THE SCALE OF THE DECLINE

To assess how the number of field and crop workers has declined in recent years, we rely primarily on the USDA's Farm Labor Survey (FLS), which reports farm employment separately by broad occupations. The survey finds that from 2002 to 2014, the total number of full-time equivalent field and crop workers hired by farms declined by 21.8 percent. In other words, the size of the workforce farmers had to draw from dropped by more than a fifth. A drop was seen among both full-year field and crop workers and seasonal workers involved in shorter harvest seasons. From 2002 to 2014, the number of full-year field and crop workers dropped by 22.8 percent, while the number of full-year equivalent seasonal employees dropped by 18.5 percent.

Of course, a drop in the total number of field and crop workers does not tell us the whole story, as a smaller pool of workers could be putting in more hours on the job. To answer this concern, we also examined this variable, looking at the number of hours worked by field and crop workers.[19] Once again, we found that in 2014, field and crop workers as a group put in roughly 80 percent of the hours they worked as recently as 2002. Specifically, we found that the aggregate number of hours worked by such farm employees fell by 22.4 percent.

While the shortage is already dramatic in percentage terms, the figures are equally powerful when translated into the number of farm laborers missing from the 2014 labor force. Using FLS data and the U.S. Census of Agriculture, we can estimate how the recent drop in the labor supply has impacted the total supply of full time equivalent field and crop workers in the country. Figure 1 indicates that between 2002 and 2014, the number of full-time equivalent field and crop workers in the United States declined by between 146,000 and 164,000 people.[20] Even after excluding states in the Midwest—where mechanized agriculture is most likely to replace manual farm labor—the decline in full-time equivalent employment during the period was between 130,000 and 139,000 workers. That represented a decline of almost 20 percent in the parts of the country where the most labor-intensive crops are grown—a major shock to the supply of available field and crop workers.

"Two years ago, the situation got so bad, we were barely keeping our heads above water."

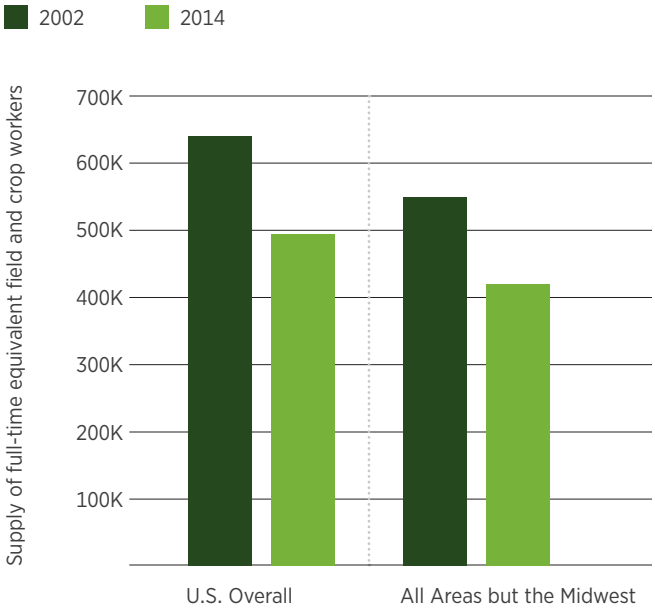
GARY WISHNATZKI
owner of Wish Farms, Plant City, Florida

Farmers who have worked in the industry for decades say that in recent years they have experienced the most severe labor shortages of their careers. That is certainly what Gary Wishnatzki, the owner of Wish Farms in Plant City, Florida, says he has seen recently. To bring in the harvest on his 1,500-acre farm, Wishnatzki typically needs 700 or 800 workers. Strawberries, his primary crop, are incredibly labor-intensive, requiring pickers to revisit each bush every three days to pick the rapidly ripening fruit. "Two years ago, the situation got so bad, we were barely keeping our heads above water," Wishnatzki recalls. That year, despite extensive recruiting, he had only 500 of the

19 The Farm Labor Survey reports hours worked per week and number of employees in each of the four survey weeks per year. The results reported in Figure 1 are based on the average across all four weeks of the survey.

20 To ensure that our figures accurately reflect the dynamics at play on U.S. farms, our estimates come from two federal data sources, the USDA's Farm Labor Survey and the U.S. Census of Agriculture. The two surveys use different benchmarks to establish the number of fulltime equivalent field and crop workers in 2002. Baseline employment is somewhat higher in the Census of Agriculture, leading the estimates of decline to appear somewhat larger from that source.

Figure 1: Supply of Full-Time Equivalent Field and Crop Workers, 2002–2014



workers he needed. He lost about a fifth of his crop, an event he says cost him hundreds of thousands of dollars.

Wishnatzki says that because the situation has not improved since then, he's had to substantially cut back on his active acreage. This year, he's harvesting just 500 acres of strawberries, despite demand for his product rising dramatically in recent years. With a lighter crop load, Wishnatzki was able to find enough workers this year to get the job done, but he still has major struggles. "We are so desperate for workers, we can't really put any requirements on the people who show up," Wishnatzki says, "We tolerate absenteeism; our workers pretty much come and go as they please. As an employer, you feel like you've pretty much lost control of the labor force." He says he hopes Congress passes some sort of guest worker bill before the situation deteriorates further. "I worry that Congress isn't going to act until the farming industry is in a full-blown crisis," he says, "but by then, it might be too late."[21]

21 Gary Wishnatzki, interview conducted by Angela Marek Zeitlin, May 19, 2015.

PART IV

ANALYZING THE FARM LABOR SHORTAGE BY REGION

While the employment of full-time equivalent field and crop workers declined in the United States overall from 2002 to 2014, there was substantial variation in employment changes across regions. Table 2 presents the change in the number of field and crop workers employed in each of the 18 regions identified in the Farm Labor Survey (FLS) between 2002 and 2014. The table also includes figures from the Census of Agriculture to show that the declines are reflected across data multiple sources. As the table shows, the declines in some areas have been particularly dramatic. California leads all the regions in terms of the percentage scale of the recent decline. Between 2002 and 2014, the state lost 87,219 total field and crop workers, according to the FLS, shrinking its workforce by close to 40 percent. The drop in the number of farmworkers was similarly dramatic in the Mountain II region, an area including Colorado, Nevada and Utah. That region lost more than one out of three of its field and crop workers. The southeastern United States, including Alabama, Georgia, and South Carolina, saw its field and crop workforce shrink by almost 27 percent.

Once again, we looked at the aggregate hours worked by all field and crop workers to get a sense of the scale of the decline. We display those figures for each region in Table 1. In 15 of the 18 regions, the number of hours worked by field and crop workers has declined in the last 12 years. And in six regions, the drop in the total number of hours worked by field and crop workers was large enough to exceed 20 percent. In the southern plains region, an area including Texas and Oklahoma, the number of hours worked declined by 23.3 percent. A collection of northeastern states, including New Jersey, Pennsylvania, Delaware, and Maryland, saw the number of hours worked decline by 21 percent. And once again, employment declines in California were sizeable: The number of hours worked by field and crop workers there dropped by close to 42 percent over a 12-year period.

Between 2002 and 2014, the southeastern United States, including Alabama, Georgia, and South Carolina, saw its field and crop workforce shrink by almost 27 percent.

There is no doubt that the drought in California has played a role in farmers' recent agricultural employment and production decisions.[22] However, most of the decline in the number of hired field and crop workers in California occurred before the drought began in 2011. The number of field and crop workers hired in California declined by about 40 percent between 2002 and 2011 but by less than 3 percent between 2011 and 2014. In other words, the adjustments to hiring decisions made by growers and farmers in California in the years leading up to the drought were much larger than the employment changes that occurred afterwards.

Because of California's role as an outlier case, we also considered another possible explanation for some of the labor decline in the state: The recent shift that many California

22 See, for instance: Strom, Stephanie. 2014. "California's Thirsting Farmland." *New York Times,* April 20. Available Online: http://www.nytimes.com/2014/04/21/business/energy-environment/californias-thirsting-farmland.html?_r=0

farms have made away from fresh fruit and vegetable harvesting into popular tree nuts such as almonds and pistachios. It is important to note that the vast majority of U.S.-produced tree nuts tracked by the USDA are grown in California, and the shifting of acreage into such crops is a phenomenon largely unique to the state.[23] Such crops, however, do require less labor, and therefore could theoretically explain some of the recent labor decline in the number of laborers. One study from the University of California- Davis, for instance, estimated that the average acre of almonds, one of the more commonly grown tree nuts, requires about as third as much labor to harvest as an acre of fresh produce.[24]

However, the numbers clearly show that California's shift towards tree nuts cannot explain the majority of the recent decline in field and crop workers. Based on the acreage shifts we saw in the 2002 to 2014 period, we estimate that the move towards tree nuts led to a 9.3 percent decline in the labor needs of California farmers. At the high end, that means that about 20,600 of the missing field and crop workers could be explained by the gravitation towards more tree nuts in the state. Even after accounting for that factor, however, California still saw its supply of full time equivalent field and crop workers fall by 66,600 people—or roughly 30 percent.

As noted earlier, employment changes vary substantially by region. When looking at the impact of shifts in available labor supply on production and hiring decisions for labor-intensive crops, it is important to once again separate the Midwest (the Northern Plains, Corn Belt and Lake regions) from the rest of the United States. Although as Table 2 shows, some regions in the Midwest experienced a decline in the number of hired field and crop workers, overall agricultural employment, including workers hired in other job titles such as equipment operators, tended to increase in these regions.[25] It is also important to note here that in one non-Midwestern region in our analysis, the Pacific Northwest, the number of field and crop workers hired from 2002 to 2014 actually grew by 12.7 percent. Although it is difficult to pinpoint the exact reason for this increase, some of it may be due to the milder climate in the area or local growers having some moderate success recruiting U.S.-born farmworkers.[26]

Table 1: Change in the Number of Hours Worked by Field and Crop Workers, 2002–2014

Region	States	Change in Annual Hours Worked
Northeast I	CT, ME, MA, NH, NY, RI, VT	-16.4%
Northeast II	DE, MD, NJ, PA	-21.0%
Appalachian I	NC, VA	-3.8%
Appalachian II	KY, TN, WV	-15.0%
Southeast	AL, GA, SC	-26.3%
Lake	MI, MN, WI	-8.1%
Cornbelt I	IL, IN, OH	-25.5%
Cornbelt II	IA, MO	-18.3%
Delta	AR, LA, MS	-13.5%
Northern Plains	KS, NE, ND, SD	1.5%
Southern Plains	OK, TX	-23.3%
Mountain I	ID, MT, WY	2.8%
Mountain II	CO, NV, UT	-22.0%
Mountain III	AZ, NM	-10.1%
Pacific	OR, WA	19.4%
Florida	FL	-15.3%
California	CA	-41.9%
Hawaii	HI	-5.8%
Overall	**-**	**-22.4%**

23 US Department of Agriculture, National Agricultural Statistics Service. "California Agricultural Statistics, Crop Year 2013." 2014. (See page 43.) Available here: http://www.nass.usda.gov/Statistics_by_State/California/Publications/California_Ag_Statistics/Reports/2013cas-all.pdf.

24 University of California Cooperative Extension. "Sample Costs to Produce an Orchard and Produce Almonds." 2012. Available here: http://aic.ucdavis.edu/almonds/cost%20studies/AlmondSprinkleSV2012.pdf.

25 This increase in other employment categories can be seen in the Census of Agriculture.

26 Although this may be a factor in the Northwest, it is difficult to say with any certainty. In the NAWs we see some evidence that the number of U.S.-born field and crop laborers working in the Northwest appears to have grown in recent years. From 1998 to 2000, 12.87 percent of the full time equivalent field and crop workers in the Northwest region were native-born. Ten years later, in 2008–2012, that figure had risen to almost 20 percent. This occurred during a period when we know that Washington and Oregon were gaining more field and crop workers overall. In the NAWs, however, the Northwest region is defined somewhat differently than it is in the Farm Labor Survey we use for the bulk of the report. In the NAWs, the region includes the states Montana, Idaho, Colorado, Utah, and Nevada in the "Northwest" region, making exact comparisons between the two difficult.

Table 2: The Magnitude of the Decline in Employment of Full-Time Equivalent Field and Crop Workers Nationally and by Region

Region	States	Change in Number of Field/Crop Workers Employed 2002–2014		Percent Change
		Farm Labor Survey	Census of Agriculture	
California	CA	-87,219	-85,301	-39.4%
Mountain II	CO, NV, UT	-4,244	-7,029	-36.7%
Cornbelt I	IL, IN, OH	-9,043	-14,235	-31.7%
Southeast	AL, GA, SC	-6,956	-8,667	-26.9%
Appalachian II	KY, TN, WV	-4,777	-6,170	-25.4%
Cornbelt II	IA, MO	-3,619	-6,100	-24.5%
Northeast II	DE, MD, NJ, PA	-5,716	-7,243	-19.5%
Florida	FL	-8,504	-9,196	-18.5%
Northeast I	CT, ME, MA, NH, NY, RI, VT	-5,027	-5,926	-17.9%
Southern Plains	OK, TX	-5,669	-7,133	-17.6%
Delta	AR, LA, MS	-3,950	-4,803	-17.0%
Lake	MI, MN, WI	-4,434	-7,412	-14.9%
Mountain III	AZ, NM	-1,853	-2,860	-14.0%
Appalachian I	NC, VA	-3,798	-4,431	-13.4%
Mountain I	ID, MT, WY	233	309	2.1%
Northern Plains	KS, NE, ND, SD	1,129	2,000	6.3%
Pacific	OR, WA	7,595	9,838	12.7%
Overall	**-**	**-145,851**	**-164,361**	**-21.8%**

Source: Farm Labor Survey and U.S. Census of Agriculture

PART V

EVIDENCE THAT THE DECLINE IN WORKERS LED TO A LABOR SHORTAGE

The steep decline in the number of available farm laborers between 2002 and 2014 on its own does not indicate that a labor shortage actually occurred. Could the decline in the number of workers be the result of more machines taking the place of workers in the agriculture industry? Or could it be due to farmers choosing to take more of their land out of production altogether? In this section, we discuss recent wage data for farm laborers, and how trends in those statistics indicate that the driving force behind the recent declines was a drop in the labor supply, which caused shortages on U.S. farms.

To understand what the wage data means it is useful to first understand the labor patterns on American farms, and in particular, fresh produce operations. U.S. agriculture relies heavily on seasonal and part-year employment because of the nature of agricultural production.[27] Typically, crops must be harvested within a narrow time frame or the considerable investment in the season's harvest will be squandered or lost. According to the 2012 U.S. Census of Agriculture, 63.5 percent of farm jobs in the United States are seasonal, lasting fewer than 150 days during the course of the year. In the case of field and crop workers, who are so essential to fresh produce operations, the season is often far shorter. Based on 2012 Agricultural Census data, we estimate that the average duration of a seasonal farm job is about six weeks. (See the Methodology Appendix for more detail on how we arrived at this and other estimates.)

One consequence of the reduced supply of available farm labor is that it has become much more expensive for farms to hire seasonal farmworkers, a development that has placed a strain on many U.S. farms. Studies have shown that foreign-born farmworkers are much more likely to hold seasonal jobs than U.S.-born field and crop workers, who make up a small share of the industry.[28] It should be little surprise then that in recent years—as immigration has slowed—wages for seasonal positions have increased. What is surprising, however, is by how much such wages have grown. Using Census of Agriculture data, we estimate that the average payroll cost per seasonal employee increased by 89 percent between 2002 and 2012 while the average cost per full-year employee increased by 33 percent in nominal, non-inflation adjusted, terms. This has meant that seasonal workers have increasingly taken up a larger and larger share of total farm payroll costs. In 2012, 42 percent of growers' payroll costs were being used to pay for seasonal labor, compared to just 36 percent in 2002.

It is worth noting that some of the wage increase that occurred between 2002 and 2012 is likely due to longer duration seasonal jobs. Using U.S. Census of Agriculture data, we estimate that in 2002 the average seasonal job lasted four or five weeks, compared to the six-week average duration in 2012. The addition of one or two weeks to the average seasonal worker's schedule, however, cannot alone explain the full wage increase that has occurred in recent years. Offering jobs with a longer duration may also be a sign that farmers are trying to better compete for a limited number of workers, who can be more selective about the jobs they choose.

To understand the different dynamics at play in the farm sector, it is useful to look at how the real, inflation-adjusted, wages of field and crop workers changed compared to the real wages of other less-skilled jobs during the 2002 to 2014 period. Figure 2 shows that between 2002 and 2014 the average hourly wage of field and crop workers increased by 7.9 percent. While that figure might sound small on the surface, it is notable how much it differs from the eight other occupations considered,

27 We use the terms seasonal work and part-year work interchangeably.

28 For example see: Martin, Philip L. and Taylor, J. Edward. 2000. "For California farmworkers future holds little prospect for change," *California Agriculture*, January-February, p. 19–25.

Figure 2: Hourly Wages of Field and Crop Workers Have Risen Faster than Wages for Other Less-Skilled Positions

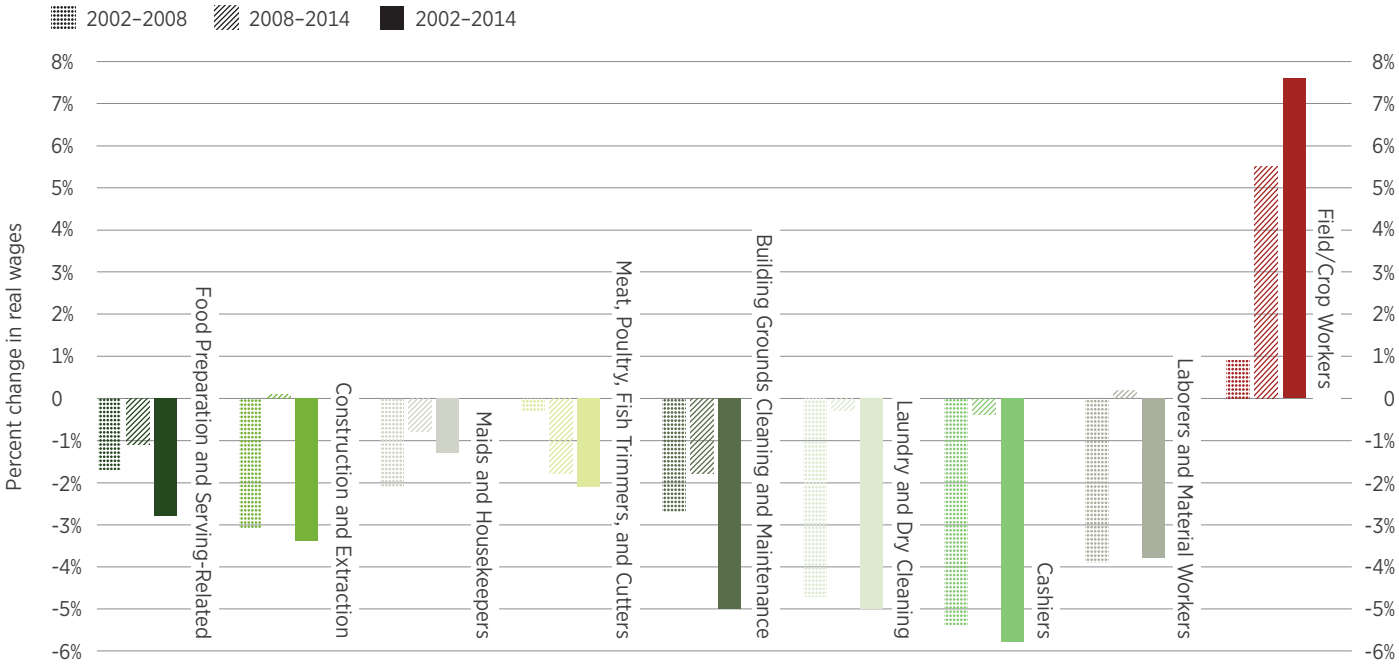
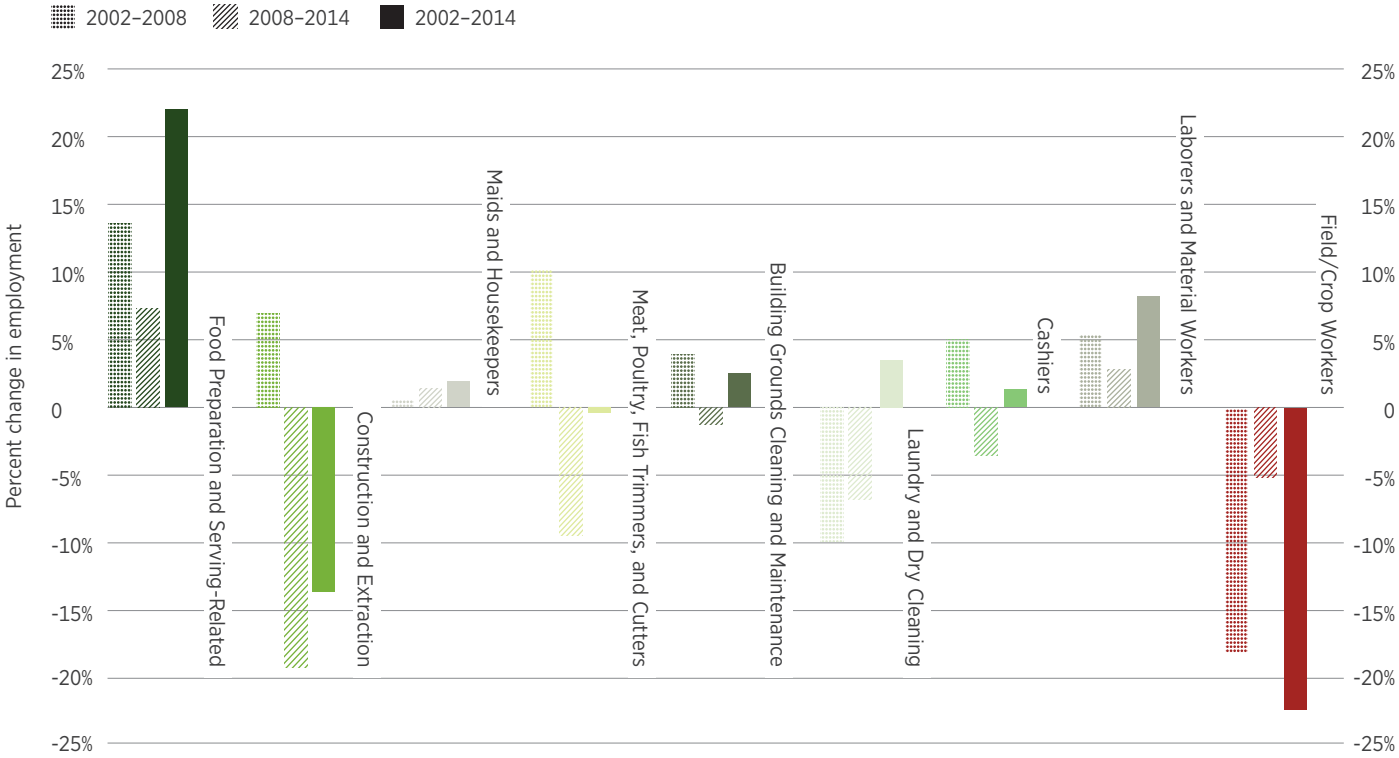


Figure 3: Employment of Field and Crop Workers Has Declined More than Other Less-Skilled Positions



Source: U.S. Farm Labor Survey and Bureau of Labor Statistics, Occupational Employment Statistics

which represent a wide range of less-skilled jobs across a number of industries, theoretically drawing from similar pools of workers. In all the other occupations, real, hourly wages actually *declined* between 2002 and 2014, in come cases, quite notably. The wages for cashiers, for instance, shrunk by 5.8 percent between 2002 and 2014, while the wages of laundry and dry cleaning workers dropped by 5.0 percent. Comparatively then, field and crop workers saw their wages grow roughly 13 to 14 percent faster than less-skilled workers in those three occupations during the 2002–2014 time period.

While field and crop workers represent the only occupation that experienced real wage growth during the period we consider, the divergence between wage patterns for the field and crop sector and other industries becomes more pronounced beginning in 2008. This indicates that as the economy has improved and employment has increased, employers in non-agricultural industries have been able to find enough workers to fill job vacancies without upward pressure on wages. Farmers, on the other hand, faced a hard time finding sufficient numbers of laborers and have had to bid up wages to attract and retain workers.

One sign of how acute the situation has been in recent years for growers is that farmers have raised the wages of field and crop workers despite a variety of outside pressures that have made it difficult for them do so. Between the 1998 and 2012, the amount of fresh fruits and vegetables imported into the United States grew by 94.6 percent. The amount of fresh fruits grew by 58.1 percent.[29] That surge in imports—and the downward pressure they placed on prices—hindered the ability of farmers to raise the cost of their goods. From 1998 to 2012, for instance, the price of fresh fruits in the country grew by 39.0 percent— almost 2 percentage points slower than inflation.[30] The price of fresh vegetables grew by 41.5 percent.[31] Had prices grown more rapidly, it would have been easier for farmers to raise wages for their workers; as it is, they had to do so despite it being potentially harmful to the bottom line.

While fruits and vegetables are still largely harvested by hand, machines, of course, improve each year, and farmers gain access to tools that can at least somewhat lessen their reliance on labor. This was certainly true in the 2002 to 2012 period considered here,[32] a time when some crops, such as baby leaf lettuce, became more widely machine harvested.[33] However, wage and employment data indicates that the available supply of field and crop workers has declined *even more* than any decline in demand for labor that has occurred since 2002 due to mechanization. Figure 3 shows that the employment of field and crop workers has declined more rapidly than the employment of of other less-skilled workers since 2002.[34] A decline in the demand for field and crop workers due to mechanization would reduce both their employment and relative wages. In contrast, a reduction in the available supply of needed field and crop workers would reduce their employment *but increase* their relative wages substantially. Looking at Tables 3 and 4 together, it is clear that is what has happened, indicating that a real shortage occurred.

It is also worth noting that we observe both a 19 percent decline in employment and a 14.5 percent increase in relative wages over the period 2002 to 2014 for field and crop workers outside the Midwest.[35] If the demand for field and crop workers remained stable over this period, the correlation described above is consistent with a labor demand "elasticity," or relationship between wages and employment, of 1.3 percent. Put simply, this elasticity means that each 1.3 percent drop in the available supply of labor results in a one percent increase in the wages paid to field and crop workers. These co-movements in field and crop worker wages and employment are consistent with economic theory and existing studies of the demand for farm labor.[36] The co-movements in wages and employment of field and crop workers that we observe are well within the range of elasticity estimates found in a large meta-study on farm labor shortages conducted by researchers at Clemson University and Colorado State University in 2000.[37]

29 This is based on calculations using U.S. Department of Agriculture Yearbook data. The volume of fresh fruits and vegetables imported is measured in weight. The fresh fruit category excludes some more exotic fruits that are rarely grown in America, such as bananas, limes, and mangoes, which generally do not translate into increased competition for U.S. farmers.

30 Overall inflation figures were calculated using the Bureau of Labor Statistics Inflation CPI Inflation Calculator. Accessed on July 6, 2015. Available here: http://data.bls.gov/cgi-bin/cpicalc.pl.

31 USDA, Economic Research Service. 2014. "Fresh Fruit and Vegetable Price Spreads." Last updated January 22, 2015. Calculated using data from the Bureau of Labor Statistics and the National Agricultural Statistics Service.

32 From 2009 to the 2012, for instance, The Food, Conservation, and Energy Act of 2008 made $230 million in federal funding available to address five key issues facing the fresh fruit and vegetable industry. One issue considered was how to better mechanize the harvesting of some crops—the first time the government invested in such research since the 1980s. See: Calvin, Linda and Martin, Philip. 2010. "The U.S. Produce Industry and Labor," United States Department of Labor, p. 11.

33 Ibid, p. 40.

34 These data are from the Farm Labor Survey, which reports hours worked per week and number of employees for four survey weeks per year. The results reported in Figure 2 are based on the average across all four survey weeks.

35 While Figure 2 presented evidence on real wage changes (wage changes relative to price changes) for purposes of evaluating the impact of the shift in supply of farm labor we measure changes in the relative wage of farm workers. Between 2002 and 2014 wages of field and crop workers outside the Midwest increased 14.5 percent more than wages of other less-skilled, blue-collar workers.

36 The theory of labor demand and the idea that a shift in labor supply due to a decline in immigration causes co-movements in wages and employment along a labor demand curve is routinely covered in labor economics textbooks. See, for example, Contemporary Labor Economics (10th edition) by McConnell, Brue and MacPherson, McGraw Hill.

37 Espey, Molly and Thilmany, Dawn D. 2000. "Farm Labor Demand: A Meta-Regression Analysis of Wage Elasticities," *Journal of Agricultural and Resource Economics,* 25(1), p. 252-266.

PART VI

HOW IMMIGRATION IS DRIVING THE SHORTAGE AND CHANGING THE PROFILE OF U.S. FARMWORKERS

One reason why farmers today struggle to fill field and crop laborer jobs has to do with a simple reality: In recent years, fewer young immigrants have come to the United States and entered into farm work. Some of this likely has to do with a slowdown in the number of undocumented immigrants attempting to enter the United States in the aftermath of the Great Recession. In the years since 2008, the number of Mexicans apprehended trying to cross the border has hit historic lows, an indicator that immigration is slowing. While the Border Patrol apprehended 1.6 million such immigrants in 2000, the figure hit just 229,000 in 2014.[38] That drop-off has hurt an industry that historically has relied on immigrant workers to fill jobs that Americans have little interest in or expertise in performing. In 2001, before the labor decline, as much as 78 percent of the U.S. crop workforce was made up of immigrants, and 53 percent of all crop workers lacked authorization to work in the United States.[39]

As this section demonstrates, the slowdown in the arrival of young, immigrant farmworkers in the last decade has placed a major strain on American farms. The results in this section use data from the National Agricultural Worker Survey (NAWS), a survey conducted by U.S. Department of Labor that collects information about field and crop workers by surveying farmworkers at their place of work. Because most farmworker jobs are seasonal, and many farmworkers are migrant laborers, the NAWS conducts its survey at the farmworker's place of work rather than his or her household.

The slowdown in the arrival of young, immigrant farmworkers in the last decade has placed a major strain on American farms.

Due to the relatively small sample size of the NAWS, we divide the sample into three separate time periods, 1998–2002, 2003–2007, and 2008–2012. Figure 4 shows the distribution of foreign-born field and crop workers by their foreign-born status and length of time since first arriving in the United States for these three time periods. From 1998 to 2002, more than 36 percent of field and crop workers were immigrants who had been in the United States for less than five years. Five years later (from 2003 to 2007), the field and crop workers who arrived in the United States within the past five years had dropped to 26.7 percent. The decline in recent arrivals of immigrants and guest workers accelerated even further in the final set of years we consider. By the 2008–2012 time period,

38 Krogstad, Jens M. and Passel, Jeffrey S. 2014. "U.S. Border Apprehensions of Mexicans Fall to Historic Lows," Pew Research Center, December 30.

39 U.S. Department of Labor, Employment and Training Administration. National Agricultural Workers Survey 2001–2002.

only 11.5 percent of field and crop workers had been in the United States for less than five years—an almost 25 percentage point drop from the figures just one decade years earlier.

The other notable trend in Figure 4 is the increase in the share of field and crop workers who are foreign-born individuals who have lived in the United States for long time periods. During the 1998–2002 period, only 6.5 percent of field and crop workers were immigrants who had arrived in the United States at least 25 years ago. By 2008–2012, more than 15.2 percent of field and crop workers fell into that category, or almost one in six of them. The decline in recent immigrant field and crop workers was partially offset by the increase in employment among foreign-born workers who had been in the United States for at least 25 years. However, for each additional foreign-born field and crop worker in the United States for at least 25 years there were 5.3 fewer workers who recently arrived from a foreign country—showing that the decline in immigration was far greater than more experienced workers could effectively compensate for.

In Table 3 we bring together some of the figures described above to produce hard estimates of how the field and crop worker population has declined in recent years among immigrants in the United States for various time periods. These figures show that almost *all* of the decline in field and crop workers in the United States can be explained by the lack of recent immigrant arrivals. Specifically, from 2002 to 2014, the number of foreign-born, full-time equivalent field and crop workers who have been in the United States for less than five years has declined by roughly 170,000 to 190,000 people. At the same time, the number of foreign-born field and crop workers who arrived in America between five and 25 years ago declined modestly, while the number of foreign-born field and crop workers in the United States for longer than 25 years increased by roughly 35,000 people, slightly offsetting the decline in other immigrant categories.

The slowdown in the number of new, immigrant workers has had an impact on farms all across the country. Table 4 shows that the trend towards fewer recent arrivals of foreign-born workers is apparent in all six of the geographic regions included in the NAWS. (It is worth noting here that the NAWS divides the country into only six regions, whereas the FLS we used earlier to estimate the size of the decline by region divides the country into 18 areas, making their figures not directly comparable.)[40]

40 In the NAWS, the East includes North Carolina, Virginia, Kentucky, Tennessee, West Virginia, Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont, Delaware, Maryland, New Jersey, and Pennsylvania. The Southeast includes Arkansas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, and Florida. The Midwest includes Illinois, Indiana, Ohio, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Michigan, Minnesota, and Wisconsin. The Southwest includes Arizona, New Mexico, Oklahoma, and Texas. The Northwest includes Idaho, Montana, Wyoming, Colorado, Nevada, Utah, Oregon, and Washington.

Figure 4: U.S. Field and Crop Workers by Foreign Born Status and Length of Time in United States, 1998–2012

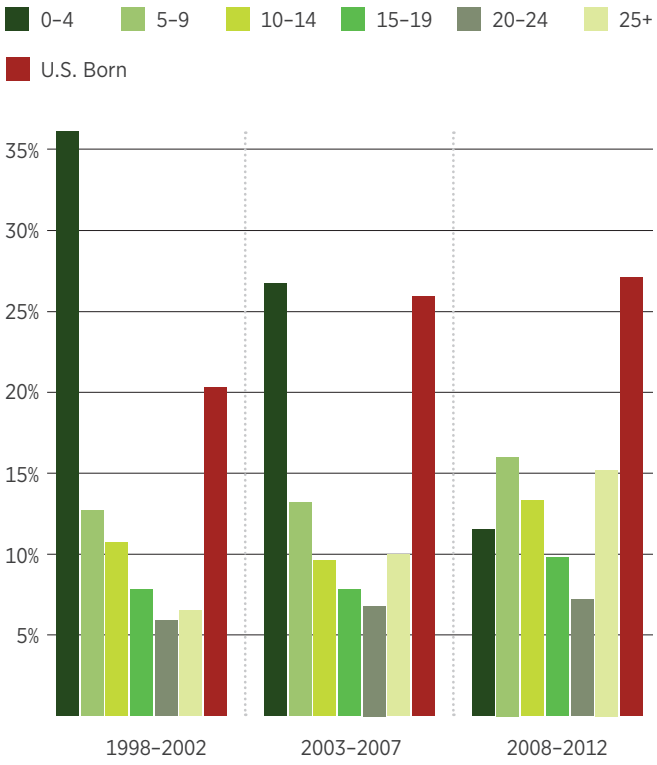


Table 3: All of the Decline in Employment of Field and Crop Workers has Been due to an Immigration Slowdown

	Change in Full-Time Equivalent, Foreign-Born Field/Crop Workers, 2002–2014	
Years in U.S.	Farm Labor Survey	Census
0 to 4	-169,123	-190,586
5 to 9	-3,145	-3,544
10 to 14	-3,372	-3,800
15 to 19	-1,875	-2,112
20 to 24	-2,667	-3,005
25+	31,635	35,650
U.S. Born	2,695	3,037
Total Change	-145,851	-164,361
Total Change Foreign-Born	-148,546	-167,398

Table 4: Distribution of Foreign-Born Field and Crop Workers by Length of Time in the United States by Region, 1998–2012

	Foreign-Born 0 to 4 years in the U.S.	Foreign-Born 5 to 9 years in the U.S.	Foreign-Born 10 to 14 Years in the U.S.	Foreign-Born 15 to 19 Years in the U.S.	Foreign-Born 20 to 24 Years in the U.S.	Foreign-Born 25+ Years in the U.S.	U.S.- Born
East							
1998–2002	39.41	13.29	8.16	3.82	2.18	2.32	30.83
2003–2007	26.07	11.94	6.88	4.4	4.35	3.96	42.39
2008–2012	13.7	15.54	8.8	6.83	4.43	10.74	39.96
Southeast							
1998–2002	45.56	10.72	8.01	5.11	3.02	1.66	25.91
2003–2007	26.95	13.79	8.08	6.97	4.48	4.39	35.33
2008–2012	13.66	16.22	14.66	10.69	4.98	8.38	31.41
Midwest							
1998–2002	22.01	8.49	8.73	5.89	5.84	5.47	43.57
2003–2007	13.96	9.07	5.81	4.84	3.51	7.55	55.26
2008–2012	5.95	10.4	11.64	6.54	3.15	6.38	55.95
Southwest							
1998–2002	24.74	8.27	14.07	11.16	7.33	12.33	22.09
2003–2007	17.4	8.49	6.12	8.49	11.6	17.36	30.55
2008–2012	6.42	9.35	9.38	8.34	9.55	22.32	34.62
Northwest							
1998–2002	33.69	18.27	14.39	6.82	7.07	6.89	12.87
2003–2007	18.92	18.08	13.91	11.03	9.07	12.72	16.27
2008–2012	7.46	17.28	14.51	13.72	9.31	18.09	19.64
California							
1998–2002	41.32	14.51	11.96	11.26	8.19	9.5	3.26
2003–2007	38.33	14.97	12.36	9.78	8.48	12.98	3.09
2008–2012	16.49	20.45	16.01	11.13	10.13	22.13	3.67

According to the NAWS, the largest relative declines in the share of recent arrivals occurred in the Northwest and the Southeast regions. The largest relative increase in foreign-born workers who arrived in the United States at least 25 years ago occurred in the Southeast and the East.

While the trend towards fewer recent immigrants might seem like a positive development for U.S. farms, particularly if it meant that employers would have access to more experienced and skilled workers, the change has actually translated into meaningful staffing challenges and shortages, particularly for entry-level positions. The length of time that a foreign-born worker has lived in the United States is highly correlated with the length of time the individual has been working in U.S. agriculture. Inexperienced field and crop workers, a group largely comprised of recent immigrants, tend to work on certain entry-level tasks. Table 5 shows that harvest work is the most common task performed by foreign-born workers who have been in the United States for less than five years, followed by pre-harvest tasks. Pre-harvest work includes hoeing, thinning, and transplanting crops, while harvest tasks are typically the hand picking of crops. With fewer new immigrants arriving, these are the positions farmers often have the most trouble filling.

More experienced workers, on the other hand, tend to work in semi-skilled tasks, which include more technical jobs such as pruning and irrigating. Semi-skilled work is also

Table 5: Fraction of Foreign-Born Field and Crop Workers Performing Various Farming Tasks, 1998–2012

1998–2002				
Years in U.S.	Pre-Harvest	Harvest	Post-Harvest	Semi-Skilled
0 to 4	26.7%	45.1%	9.9%	18.4%
5 to 9	19.9%	38.3%	12.8%	29.1%
10 to 14	19.5%	36.6%	12.9%	31.0%
15 to 19	19.6%	34.9%	11.1%	34.4%
20 to 24	17.8%	33.4%	8.9%	39.9%
25+	19.1%	41.0%	4.7%	35.2%

2003–2007				
Years in U.S.	Pre-Harvest	Harvest	Post-Harvest	Semi-Skilled
0 to 4	28.6%	43.6%	15.0%	12.8%
5 to 9	21.0%	40.3%	18.3%	20.4%
10 to 14	22.1%	34.7%	20.5%	22.6%
15 to 19	22.5%	36.0%	18.8%	22.7%
20 to 24	19.1%	34.6%	13.9%	32.4%
25+	21.4%	30.5%	13.9%	34.2%

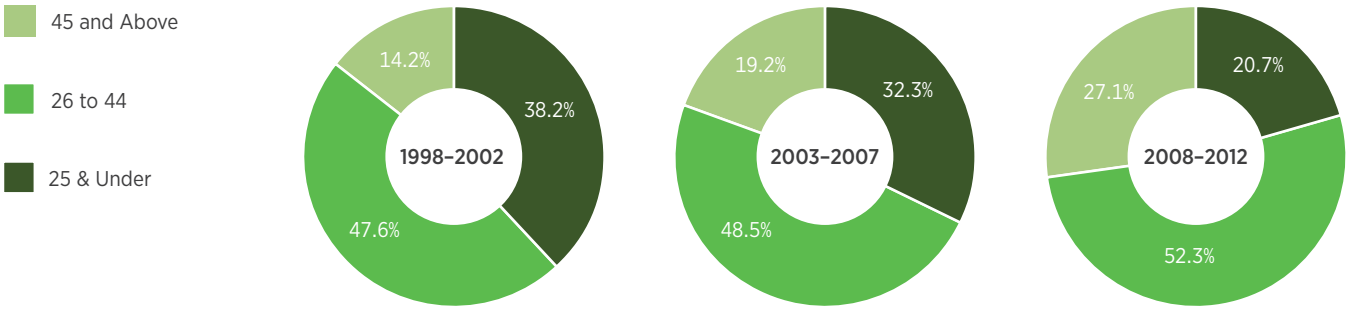
2008–2012				
Years in U.S.	Pre-Harvest	Harvest	Post-Harvest	Semi-Skilled
0 to 4	35.8%	28.8%	16.3%	19.1%
5 to 9	37.8%	24.3%	17.9%	20.0%
10 to 14	32.0%	25.5%	17.7%	24.9%
15 to 19	30.9%	23.9%	22.7%	22.5%
20 to 24	30.0%	19.8%	19.0%	31.2%
25+	24.5%	23.0%	16.6%	35.9%

more likely to involve some farm equipment. The other type of work represented in Table 5 includes post-harvest tasks, which can include the sorting and grading of crops, and even packing of the crops if it occurs in the field.

The recent trends in the agricultural workforce have also led to a sharp decrease in the number of migrant farmers. Recent arrivals are more than twice as likely as those who have been in the United States 25 years or more to work as migrant farmworkers, or workers who "follow the crop" throughout the year. Figure 6 shows that almost half of recent immigrant field and crop workers are migrant workers. The definition of a migrant farmworker in the NAWS data is someone who works on a farm that is at least 75 miles from their residence. Only about a quarter of foreign-born workers who have been in the United States for 25 years or more work as migrant laborers. This is likely because foreign-born field and crop workers who are long-term residents of the United States are older and more likely to be assimilated to their communities. However, it does not match the reality of the U.S. farming sector, where many jobs include short harvests in relatively remote parts of the country. Chalmers Carr, the owner of Titan Farms, the East Coast's largest peach growing operation, says that in recent years, he's seen the supply of migrant farmworkers moving north through his area start to dry up. "It used to be that you'd see guys who'd finished the citrus season in Florida moving North as far as New Hampshire and New York to pick apples and blueberries," says Carr, whose farm is based in Ridge Spring, South Carolina, "You can't really count on that anymore."[41]

41 Chalmers Carr, interview conducted by Angela Marek Zeitlin, May 18, 2015.

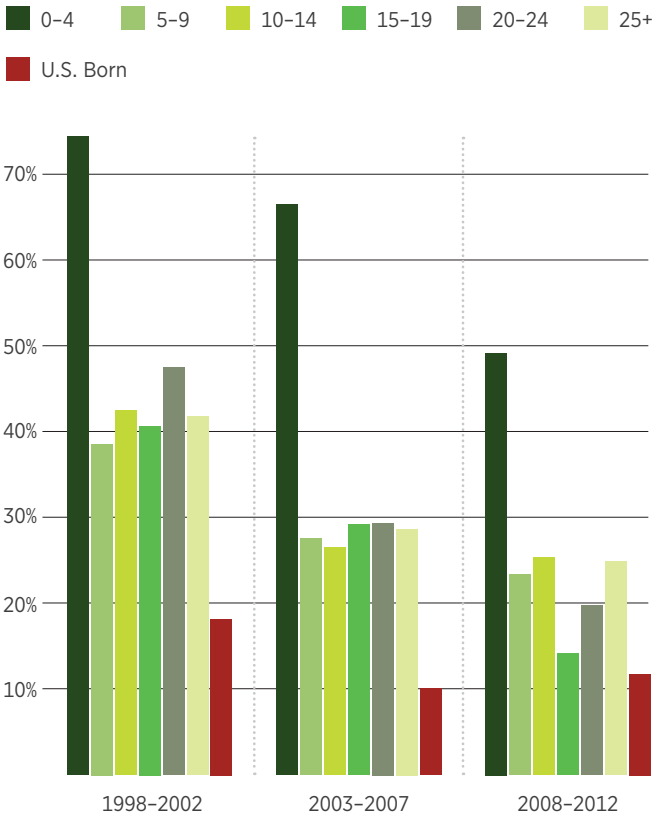
Figure 5: Age Distribution of Foreign-Born Field and Crop Workers, 1998–2012



Given that many outside agriculture often argue that unemployed, U.S.-born workers should be filling American farm jobs, it is worth examining this issue by presenting information about the role U.S.-born workers played filling field and crop positions during the period examined in this study. According to the NAWS data, in the 1998-2002 period, about 20 percent of field and crop workers were born in the United States. By 2008-2012, that figure had risen to roughly 27 percent. As discussed in Section III, this occurred during a period when overall employment of field and crop workers dropped by more than a fifth. Using the distribution of field and crop workers by foreign-born status from the NAWS, we estimate that the increase in employment of U.S.-born field and crop workers offset only 2.7 percent of the decline in field and crop workers that occurred between 2002 and 2014. Our findings echo what growers often say anecdotally—that many native-born workers are unwilling or unable to do farm jobs.

In California, the state that saw the greatest decline in full-time equivalent field and crop workers, U.S.-born farm laborers played a very different role. In the 1998–2002 period, U.S.-born workers made up 3.26 percent of California's field and crop workforce. By the 2008–2012 period, that figure had risen only marginally, growing to 3.67 percent. That growth in the *share* of field and crop workers born in the United States, however, only occurred because of the dramatic decline in the number of foreign-born workers coming into California in the 2002 to 2014 period. In reality, the total number of U.S.-born field and crop workers in California from 2002 to 2014 declined by 31.8 percent. That means that in the state where they were arguably needed most, native-born workers played no role offsetting the labor decline—in fact, they only exacerbated it.

Figure 6: Fraction of Field and Crop Workers in Migrant Jobs by Foreign Status and Time Period



The U.S.-born farmworkers who have entered agriculture in recent years are also not likely to have filled the labor-intensive field and crop jobs that are the focus of this study. U.S.-born field and crop workers tend to gravitate towards the same types of semi-skilled tasks that often attract the most experienced foreign-born workers.[42] Native-born farmworkers are also unlikely to fill migrant-farming jobs, seasonal jobs, and the "follow the crop" jobs that have typically been filled by recent foreign-born arrivals. As Figure 6 demonstrates, just 12 percent of all the field and crop workers employed in migrant-farming jobs in 2008 to 2012 were born in America.

Another interesting consequence of the recent slowdown in the arrival of immigrant farmworkers: The data shows that today's field and crop workers are significantly aging. Figure 5 shows that 38.2 percent of foreign-born workers in 1998–2002 were age 25 and under, and only 14.2 percent were older than age 45. By 2008–2012 the fraction of foreign-born field and crop workers age 25 and under had dropped to 20.7 percent and the fraction of foreign-born workers age 45 and above had nearly doubled to 27.1 percent. The aging of the workforce is a worry to many U.S. farm owners: Unlike other industries, where older workers may be capable of producing more due to their increased experience, studies have consistently found that farm workers pick and process less as they age, likely due to the physically strenuous nature of the work.[43] One study, for instance, found that the productivity of farm workers overall peaks at around age 35 or 45, and declines steeply afterwards.[44] The aging of field and crop workers also poses the threat that in the coming years, retirement may worsen the labor shortage described in this report still further.

Bruce Frasier, a farmer who grows onion plants and cantaloupes on a 2,200-acre farm in southern Texas, knows full well the implications of having an older workforce. Frasier says it has been three years since he's had a new person join the 100-person team of laborers that harvests his fields during the high season. Without new, young workers joining the ranks, Frasier says his workforce has aged dramatically. Today, he estimates that 65 percent of the workers on his farm are older than age 50, and one in five is 60 plus. "We love our workers and have tons of respect for them," Frasier says, "but as they get older, their capacity starts to diminish." Frasier says some of his older workers put in just two or three hours before heading home to rest—and that can make the harvest difficult. "When the onions are ripe in our region," he says, "they can't really wait."

Frasier says the lack of new workers has created some real labor challenges for his operation and the many onion farms that surround him. "Last year, everyone who was employable in our area was basically employed," Frasier says. That left the onion farms in his area fiercely competing for a small group of experienced and available farmworkers. Frasier says his farm tried raising wages partway through the season to compete with nearby oil fields and other onion operations. In the end though even that wasn't enough. Frasier's farm, Dixondale Farms, still lost 25 to 30 percent of its onion plants. "It's hard to describe the feeling until you experience it," Frasier says, "but it felt like a state of depression." Despite strong demand this year, he says he is turning down about 25 percent of the orders he receives. "We should be expanding," he says, "but we have to be realistic in this labor market."[45]

42 This statement is based on tabulations of the National Agricultural Worker Survey from 1998 to 2012.

43 See: Tauer, Loren W. 1984. "Productivity of Farmers at Various Ages," North Central Journal of Agricultural Economics, Vol. 6, No. 1. January, and Weigel, M.M., R.X. Armijos, and O. Beltran. 2014. "Musculoskeletal Injury, Functional Disability, and Health-Related Quality of Life in Aging Mexican Immigrant Farmworkers," Journal of Immigrant Minority Health, Vol. 16

44 Tauer, ibid.

45 Bruce Frasier, interview conducted by Angela Marek Zeitlin, May 14, 2015.

PART VII

THE IMPACT ON THE ECONOMY

The sharp decline in immigrant labor described above, coupled with the small number of U.S.-born workers who have taken up farm jobs, has caused the supply of field and crop workers available to farmers to shrink substantially. The resulting reduction in farm laborers is equivalent to a decline of at least 130,000 full-time equivalent field and crop workers in states and regions outside the Midwest—the areas where the most labor-intensive crops are grown. The question we address in this section is: How much higher would the value of crops produced by U.S. farms in recent years have been if growers had had access to an adequate number of workers? And also, how much would our economy have benefitted from that higher production on American farms?

To gain a better understanding of the potential for farm output today, and the loss in farm production experienced over the last decade, it is useful to compare the amount of fruits, vegetables, melons, and tree nuts sold by U.S. farms during the 1992–2002 and 2002–2012 time periods. We focus on these crops because they are the most labor-intensive and therefore the products most likely to be adversely affected by a sharp decline in labor supply. Table 6 shows that between 1992 and 2002 the number of acres harvested for these labor-intensive crops increased by 4.3 percent. In addition, output per acre[46] for fruits, vegetables, melons, and nuts increased by 10.2 percent during the period. Finally, it is important to note that over this time period the number of hours worked by field and crop workers was also increasing, growing by 5.6 percent.[47]

These trends were quite different in the decade from 2002 to 2012, indicating the potential impact of recent labor challenges. First, the number of acres harvested for fruits, vegetables, melons, and tree nuts declined by more than 300,000 acres, falling 5.0 percent. For some crops, the acreage declines were particularly steep: The number of acres devoted to fruits and melons during that period, for instance, fell by 14.6 percent, while growers cut the number of acres they were devoting to vegetables by 13.8 percent. In addition to these declines, output per acre for these labor-intensive crops increased by only 7.4 percent over the period—almost 3 percent less than in the previous decade.

"The labor situation in the fresh produce industry is probably the most bleak it has ever been. And the future is not looking much better."

JOE MARINO
Owner, Sun Valley Orchards, Swedesboro, New Jersey

Some of the productivity increase in the 2002–2012 decade, as measured by output per acre, can be explained by the already-mentioned shift to grow more tree nuts in California. We estimate that roughly a third of the increase in productivity during that decade can be explained by that factor alone. The productivity on acres used to grow fresh fruits and melons as well as vegetables increased by just 5.0 percent during the period—meaning the impact of any increased mechanization for such crops was fairly minimal. The decline in harvested acreage and the slowdown in

46 This is a weighted average using the number of pounds of agricultural output of each product produced per acre in 2002, as tracked by the USDA in its "Fruit and Tree Nut Yearbook" and its "Vegetable Yearbook." See the Methodology Appendix for more details on calculations and methods.

47 Aggregate hours worked are based on the Farm Labor Survey.

Table 6: Change in Acres Planted and Output for Various U.S. Crops, 1992–2012

	Change in Acreage		Change in Output		Change in Output/Acre	
Crop	1992–2002	2002–2012	1992–2002	2002–2012	1992–2002	2002–2012
Fruit and Melons	5.5%	-14.6%	12.5%	-12.4%	6.6%	2.5%
Tree Nuts	30.1%	48.7%	67.3%	82.1%	28.5%	22.5%
Vegetables	10.1%	-13.8%	19.0%	-5.6%	8.1%	9.6%
Total	4.3%	-5.0%	22.4%	3.4%	10.2%	7.4%

Source: USDA Fruit and Tree Nut Yearbook and USDA Vegetable and Melon Yearbook.
Note: Both the output change and the output per acre change are based on weighted averages.

productivity growth occurred during a decade when hours worked by field and crop workers fell by about 22 percent.[48]

The absence of an available and reliable supply of farm labor is an important reason for the decline in harvested acres for fresh fruits, vegetables, melons, and tree nuts. Had the number of harvested acres of fruits, vegetables, melons and tree nuts increased between 2002 and 2012 at the same rate as it did from 1992 to 2002, output of these crops would have been higher by 9.5 percent. The inability of farmers and growers to hire field and crop workers, especially in the peak hiring seasons in the summer and fall, is a leading explanation for this output gap. The USDA estimates that the value of fresh fruits, vegetables, melons and tree nuts is about $32.9 billion.[49] A 9.5 percent increase in the output of those farm products then would raise the value of the crops produced by about $3.1 billion per year.

Numerous studies have indicated that the farm sector plays an important role in the American economy.[50] Much of this has to do with how much other industries are intertwined and dependent upon the products produced by American farms. For example, as the amount of fresh fruits and vegetables produced by a farm drops, spending on the transportation of the farm's produce from farm to market, the marketing and sale of produce, and the production and maintenance of any equipment used in the process will also decline. A recent USDA study found that every dollar in fresh fruits, vegetables or tree nuts that a farm is able to produce results in 89 cents of additional economic activity in the broader economy.[51]

Using the USDA study, it quickly becomes clear that the $3.1 billion in missed production of fresh fruits and vegetables in the 1998–2012 period had a notable impact on the broader U.S. economy. Had U.S. growers produced $3.1 billion more of those labor-intensive products between 1998 and 2012, the U.S. economy would have experienced $2.8 billion in additional spending on goods and services outside of agriculture each year. Over a 12-year period, that spending would have totaled $33.6 billion.

That additional spending would have also resulted in more job creation, particularly in the trade, transportation, and service sectors. The USDA estimates that each billion dollars of fresh fruits produced by American growers creates 2,301 additional, non-farm jobs in the economy.[52] The numbers of non-farm jobs produced as a result of a billion dollars of additional vegetable or tree-nut production are 7,386 and 33,149, respectively.[53] Assuming that the 9.5 percent increase in fresh produce and tree nut production mirrors current trends regarding the share of sales devoted to each type of crop, we estimate that the United States missed out on creating 41,300 non-farm jobs each year as

48 The reason why a 22 percent decline in employment resulted in a modest slowdown in output per acre is due to increasing mechanization of crops, a shift from more labor-intensive fruits to less labor-intensive nuts, and the fact that the biggest drops in employment were for the least skilled and experienced farmworkers.

49 U.S. Department of Agriculture. 2014. "Fruit and Tree Nut Yearbook." Available Online: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1377. See also, U.S. Department of Agriculture. 2014. "Vegetable and Melons Yearbook". Available Online: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1212

50 See, for instance: Joint Economic Committee, United States Congress. "The Economic Contribution of America's Farmers and the Importance of Agricultural Exports" (September 2013); or Daniel Sumner, Jose E. Bervejillo, and Nicolai V. Kuminoff. 2003. "The Measure of California Agriculture and its Importance in the State's Economy." In *California Agriculture Dimensions and Issues,* ed. J. Siebert: University of California Giannini Foundation of Agricultural Economics. Division of Agriculture and Natural Resources.

51 United States Department of Agriculture, Economic Research Service, "Effects of Trade on the U.S. Economy" (Feb. 13, 2014). Accessed March 5, 2014. Available here: http://www.ers.usda.gov/data-products/agricultural-trade-multipliers/effects-of-trade-on-the-us-economy.aspx#.Uxv4zty4mll.

52 Custom figures produced using the app available here: "Agricultural Trade Multipliers: Overview," United States Department of Agriculture, last modified February 2, 2015, http://www.ers.usda.gov/data-products/agricultural-trade-multipliers.aspx.

53 Ibid.

a direct result of the missed production growth that would have been possible without a labor shortage. Over a 10-year period, that would have translated into more than 400,000 new farm jobs—a meaningful job boost to our economy that would have occurred even during the recent recession.

Joe Marino, the owner of Sun Valley Orchards in Swedesboro, New Jersey, runs a large growing, packing, sales and transporting business that is the largest fresh produce operation in New Jersey—and among the largest on the East Coast. Given the scale of his operation, he says he has no doubt that the labor struggles he's had in recent years have had a trickle down effect on other industries in his area, and beyond. Last summer, a period when his 3,000-acre farm was in the height of its bell pepper, asparagus, and cucumber harvest, Marino says that he didn't have "anywhere near" the 200 to 250 workers he typically needs for hand harvesting. Marino says that without those workers, he and his partners had to look at what crops were selling best, and decide which ones to give up on and leave in the field. They gave up on a cucumber harvest two weeks early to shift workers over to do maintenance on the bell pepper crop. "It's a horrible feeling to know that you can be the best and brightest farmer in the world, and do everything right, but still not be able to pick your crop because of labor," Marino says, "It's hard to comprehend sometimes."

Marino says that because of the triage approach to farming he had to adopt last year, the "financial impact on us was just huge." And that impacted his plans for this year. Marino wound up putting off the purchase of two large tractors he had planned to buy this year, hurting the local dealership. He also cut down his spending on fertilizer and put off a planned upgrade to his on-site repair shop, where mechanics service the various equipment used on the farm. Much of the money he was going to is instead being channeled into fees to comply with the H-2A program, a temporary visa program that Marino is trying to use this year to bring in farm laborers. Many farmers say it is expensive and unworkable, and Marino estimates that "conservatively" he is spending about $1,000 per employee this year to comply with its rules. "It really hurts farms like mine," Marino says, "You can't tack a labor surcharge on a box of cucumbers of bell peppers—the price has hardly changed in the last 15 years—so it hurts our bottom line." More frustratingly, he says his farm was paying "a substantial wage" before joining the program, higher than the starting wage at the local Wal-Mart or Starbucks.

Marino is a fourth generation farmer, and he says what he is seeing now in his industry is unprecedented. "The labor situation in the fresh produce industry is probably the most bleak it has ever been," he says, "And the future is not looking much better." Marino says that if Congress doesn't give the industry some sort of viable guest worker program in the future, he may seriously consider telling his four children to pursue work outside of the family business. "I wouldn't want the sort of worry for them we've faced," he says, "It's a heavy burden to carry."[54]

54 Joe Marino, interview conducted by Angela Marek Zeitlin, May 18, 2015.

PART VIII

CONCLUSION

Analyzing a variety of federal data sources, this study demonstrates the real and pressing labor problem that confronts U.S. growers of fresh produce. Between 2002 and 2014, the supply of field and crop workers in the United States available to farmers dropped by more than a fifth. This has placed extreme pressure on farms from one end of the country to another. In California, growers already worried about drought or other challenges saw their supply of labor drop by almost 40 percent. In Florida and the Southeastern parts of the United States, roughly 17,800 full-time equivalent field and crop workers essentially vanished from the workforce—a painful blow for almost any industry.

In this report, we demonstrate that immigration played an inescapable role in this decline. Between 2002 and 2014, the number of very recent immigrant field and crop workers in the United States, or those who had arrived within the last five years, dropped by as much as 190,000 people. Although older farmworkers and a small number of U.S.-born workers stepped in to slightly offset the decline, growers in the United States were still left short as many as 167,000 field and crop workers. This left huge holes in entry-level positions such as hand harvesting and hoeing, and also made it increasingly difficult for farmers to find migrant farmworkers.

Given the labor situation growers have faced in recent years, many in the industry say it is more important than ever that our country provide a workable visa for temporary farm laborers. The H-2A program for agricultural workers that exists now is expensive and burdensome.[55] Farmers frequently complain that workers arrive too late, shaving weeks off their harvest. The visa's lack of portability also means that growers must often commit to pay workers for a longer period than they actually need them. As recently as 2012, just 5 percent of farmworkers in the country were on the H-2A program.[56] In recent years, however, as the labor situation has worsened, more growers have turned to the H-2A program as a last resort: Between 2010 and 2014, the number of H-2A positions certified by the Department of Labor swelled by almost 38,000, growing the number of new H-2A workers by 50 percent.[57]

Entering the H-2A program, however, will not be a long-term solution for many farms. The costs alone threaten some smaller growers. And for the large share of farms outside the program, the labor issue itself further straps many operations, raising costs and making it more difficult for them to reliably get the labor they need to succeed at arguably their core task—the harvesting of crops. This report shows that the labor shortage farmers have described in recent years is a real and pressing concern, and one that has not improved as wages have risen, providing a potential incentive to American unemployed workers to join the industry. Congress should not wait for this situation to deteriorate further to take action to protect U.S. farms. Our report shows that inaction on this issue is already costing American businesses roughly $3.1 billion in non-farm income and more than 41,000 potential new non-farm jobs each year. Fixing the farm labor shortage would provide a valuable boost to our broader economy, and ensure that America's growers can expand—and feed the evolving needs of consumers—in the years ahead.

55 Patrick O'Brien et al. 2014. "Gauging the Farm Sector's Sensitivity to Immigration Reform via Changes in Labor Costs and Availability."

56 Ibid.

57 United States Department of Labor, Office of Foreign Labor Certification Performance Data. 2014. "H-2A Temporary Agricultural Labor Certification Program- Selected Statistics, FY 2014." Available here: http://www.foreignlaborcert.doleta.gov/pdf/H-2A_Selected_Statistics_FY2014_Q4.pdf; and United States Department of Labor, Office of Foreign Labor Certification Performance Data. 2010. "H-2A Temporary Agricultural Labor Certification Program- Selected Statistics, FY 2010." Available here: http://www.foreignlaborcert.doleta.gov/performancedata.cfm.

METHODOLOGY APPENDIX

Using the Farm Labor Survey to Determine the Number of Field and Crop Workers by Region

The primary data source used to document the decline in field and crop workers is the quarterly Farm Labor Survey (FLS) administered by the U.S. Department of Agriculture. The FLS reports data for particular "survey" weeks in January, April, July, and October. The FLS is a survey of employers and does not contain demographic information about the workforce (including whether or not the worker is foreign-born). The FLS reports data for 18 regions, but three of the "regions" are individual states: California, Florida, and Hawaii. The FLS should be viewed as a snapshot of the number of hired farm employees at work in a particular week. Although the FLS had reported the number of unpaid family workers on farms during the 1980s and early 1990s those workers are no longer reported by the FLS. The FLS also does not include contract labor, i.e. farmworkers who are paid by the agency who contracted for their services and who are not paid by the farms directly. For these reasons, the FLS understates the number of farmworkers.

In this report we assume that the snapshot picture of employment in each of the four quarterly reports are in place for the entire 13-week period for that quarter. Based on this assumption, we can measure the number of full-time equivalent employees by aggregating the four quarterly reports into an annual total.

It is important to note that the full-time equivalent total employment is comprised of many seasonal employees who rotate in and out of the workforce. More stable employment totals in the FLS are divided into two groups: workers who are expected to be employed for 150 days or more during the year and seasonal employees who are expected to be employed for no more than 149 days.

The FLS does not report employment totals for field and crop workers separately, but does report wages for livestock and field and crop workers separately, and a combined wage for livestock and field and crop workers. We use these wage reports in the FLS to decompose the employment totals into field and crop workers and livestock workers for each region and each quarterly report.

For example, in California in October 2014, livestock workers had a reported average wage of $12.05 and field and crop workers were paid $11.45, on average. The FLS also reports a combined wage for field and livestock workers of $11.56. Because the combined wage is 11 cents higher than the field and crop worker wage—and there is a 60-cent differential between the livestock wage and the field and crop worker wage—we can conclude that 11 out of 60 of the combined employees are livestock workers and 49 out of 60, or 81.7 percent, of the combined employees are field and crop workers. The FLS reports 169,000 hired workers on California farms in October 2014, including 133,000 long-term employees and 36,000 workers who expect to be employed for fewer than 150 days. Our methodology allows us to determine that about 138,000, or 81.7 percent, of these hired employees are field and crop workers, with 108,600 longer-term employees and 29,400 working for the short term.

We then aggregated these results across quarters in the same calendar year and examined trends in employment of field and crop workers. Hours worked per week are not reported separately for field and crop workers and other occupation groups. Therefore we had to assume that the average length of the workweek was the same for all farmworkers, regardless of occupation.

Using the Census of Agriculture to Benchmark the Farm Labor Survey

The Census of Agriculture is conducted every five years. We were therefore able to compare the counts of hired labor between the Census of Agriculture and the FLS. There are important differences between the surveys that make it a challenge to compare employee counts between the two data sets. The Census of Agriculture counts all hired labor who ever worked on a farm over the course of the entire year. Therefore although the Census reported 3,036,470 hired employees on farms in 2002, this does not represent the number of full-time

equivalent employees. The Census reports that 2,108,762 of these hired workers were employed for 149 days or less.

The Census does not report how long the seasonal employees, or those working 149 days or fewer per year, are employed in a given year. If we knew this variable, it would be straightforward to convert seasonal employees to full-time equivalent employees and compare the FLS with the Census figures. The Census does report, however, different annual wages for full-year and seasonal employees, and for farms that hire only full-year or part-year workers. For example, in 2002 the Census reports that average part-year employee earned just 8.5 percent of the average full-year employee. We used that ratio to adjust the employment figures for the 1,010,892 part-year employees on farms that employ both part-year and full-year employees. This factor means that the 2,108,762 part-year hired workers in 2002 translate into 179,719 full-time equivalent employees or 8.5 percent of the total full-year equivalent workers on farms.

The calculations described above are done for individual states and then are aggregated into the same 18 regions as are designated by the FLS. The Census does not report employment totals for field and crop workers separately so we use the weights from the FLS to adjust the full-time equivalent employment totals. The Census data includes both labor hired directly and labor hired through contractors. It is therefore not surprising that we estimate there are 138,223 more full-time equivalent crop workers under the Census than the FLS numbers. (Our Census estimates produce 640,192 full-time equivalent field and crop workers while the FLS produces 778,415.) While workers hired directly by farms are not surveyed by the Department of Labor and the Bureau of Labor Statistics, farmworkers hired by contractors are included in BLS surveys, which we referenced to cross-check our numbers. The BLS Occupational Employment Statistics survey for 2002 indicates that contractors hired 158,280 field and crop workers that year.

In other words, combining this different data sets and methods yields totals of field and crop workers both directly hired by farms and hired by contractors of about 778,415 using the Census of Agriculture or 798,472 if we combined the BLS and FLS data. The difference between the employment totals we produce using these two quite different methods diverge by only about 2.5 percent, giving us added confidence in our estimates.

Wage Changes

We used the Farm Labor Survey to track wage changes for field and crop workers over time. These wages are reported for field and crop workers quarterly in the FLS and we used weighted averages to obtain the annual overall average.

We also compared wage changes in the FLS to wage changes imputed from the Census of Agriculture. The Census of Agriculture reports total payroll and number of employees for farms that only hired seasonal employees, hired only hired full-year employees, and hired both. We use the ratio of pay of farms that hired only full-year employees and the only seasonal employees to decompose payroll of the farms that hire both types of labor into full-year and part-year labor costs. This is how we determined that seasonal labor costs per employee increased by 89 percent between 2002 and 2012 compared to 33 percent for full-year employees.

Changes in Foreign-Born Population of Crop Workers

We used the National Agricultural Worker Survey to measure the shares of field and crop workers by place of birth and length of time in the United States. While the NAWS contains weight factors that allow us to combine observations across regions and years, the public-use data does not include variables that would allow us to count the number of foreign-born crop workers directly from the NAWS. We obtained counts of foreign-born workers by combining the percentages from the NAWS with the hard counts from the FLS. So, for example, if the FLS data reports that there were 138,000 hired field and crop workers in the state of California and the NAWS indicates that 3.67 percent of field and crop workers in California were born in the United States, we would report that about 5,100 hired field and crop workers in California were native-born. We assumed that the NAWS data for 2009 to 2012 (with respect to foreign-born status) was applicable to 2014. If the trend in fewer foreign-born recent arrivals continued, this means our estimate of the drop in farm labor is likely conservative.

Acreage Utilization and Agricultural Output

We used the USDA's Fruits and Tree Nut Yearbook data tables and the Vegetable and Melon data tables to measure the number of acres devoted to three major types of crops: fresh fruits and melons, fresh vegetables, and tree nuts. We used these tables to obtain the production totals for each major crop type as measured in thousands of pounds. Our measures of increased production are within each major crop type but do not control for price differences among fresh fruits or fresh vegetables, for example. Our earlier work in this area indicated

Appendix Table 1: Weights Used to Construct Total Change in Output and Output Per Acre of Fruit, Melons, Vegetables, and Tree Nuts, 2002–2012

	Share of Acreage in 2002
Fruits and Melons	57.5%
Tree Nuts	14.7%
Vegetables	27.7%

Source: Vegetables, 2004 Summary, U.S. Department of Agriculture, January 2005 and Fruit and Tree Nut Yearbook Tables, USDA Economic Research Service.

that measures of changes in output over time are robust to whether more disaggregated controls are used. The changes in total output and output per acre that we computed from 1992 to 2002 and from 2002 to 2012 hold constant the share of acreage devoted to each of the three major crop categories. (See that information in Appendix Table 1 below.) Finally, in assessing the economic impact of more agricultural production, we used USDA estimates of the total dollar value of production of fresh fruits, vegetables, melons, and tree nuts.

Length of the Average Seasonal Job

To produce estimates of how the length of seasonal jobs has changed in recent years, we compared the payroll expenses for full-time and part-time farm labor reported in the Census of Agriculture. In 2002 payroll costs per seasonal employee were 8.5 percent of full-year employees, implying that their work year was 8.5 percent as long as full-year workers, or about 4.4 weeks. In the 2007 Census, however, the seasonal to full-year cost ratio was 9.3 percent, which is consistent with a seasonal job duration of about 4.8 weeks. By 2011, the ratio had jumped to 11.8 percent, leading us to estimate that seasonal jobs lasted 6.2 weeks that year.

Estimating How Much U.S.-Born Workers Offset the Labor Decline

As mentioned in the text, we combined the NAWS data on the share of field and crop workers by place of birth and length of time in the United States with the Farm Labor Survey data on full-time equivalent employment of field and crop workers to estimate the number of native-born field and crop workers. We then compared the changes in native-born field and crop workers over time to the decline in foreign-born workers over the same time period.

For example, we found that outside the state of California, the increasing share of native-born field and crop workers translated to an increase of full-time equivalent workers of 6,300 from 2002 to 2014. The declining share of foreign-born workers translated into a decline of full-time equivalent workers of 64,900 over the same period. Because 6,300 is 9.7 percent of 64,900, we conclude that outside the state of California the increase in domestic labor supply offset 9.7 percent of the decline in labor supply caused by the slowdown in the flow of immigrant labor.

As noted in the report, for the country overall, U.S.-born workers offset less than 3 percent of the total labor decline. That is because native-born employment in California fell by 2,300 people, reducing the national gain in native-born field and crop workers to 4,000 full-time equivalent field and crop workers, or an increase of 3.4 percent over 2002 levels. The increase of 4,000 native-born workers also amounts to just 2.7 percent of the decline in foreign labor supply between 2002 and 2014.

Estimating the Share of Hired Farm Workers on the H-2A Visa Program in FY 2014

In its publicly available data, the U.S. Department of Labor reports certifying 116,689 H-2A positions in the FY 2014 period. To produce our estimate that roughly 6 percent of the hired farm labor workforce was in the country that year on H-2A visas, we then divide the number of certified H-2A workers by an estimate of the number of people working in hired farm labor positions in 2014.

To determine the number of hired farm workers in the country in 2014, we start with the U.S. Census estimate that there were 2.655 million hired farm jobs in the country that year. We know, however, that many of those jobs are seasonal or of short duration and some workers may hold multiple jobs throughout the course of the year. Using NAWS, we estimate that the average farm worker holds 1.293 jobs per year. That allows us to then estimate that 2.054 million people hold hired farm positions annually. We use that figure to determine the share of hired farm workers in the country on H-2A visas.

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