

Can California's Fruit and Vegetable Industry Survive Higher Wages and Increasing Imports?

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CAL POLY

Motivation

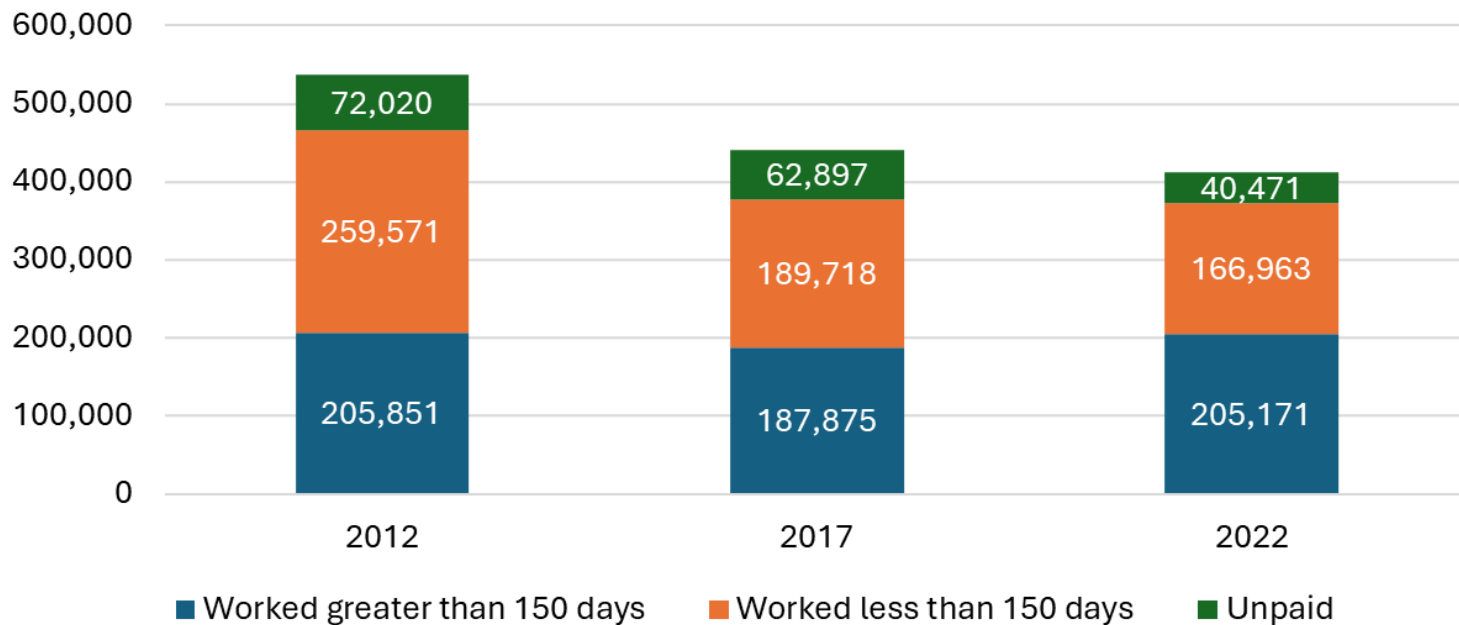
California's fruit and vegetable industries are under stress from reduced labor availability and higher labor costs.

=> Over 30 percent of U.S. agricultural labor costs occur in California

Is their capacity to increase prices constrained by rising imports?



California Ag Labor Declined by 28 Percent From 2012-2022



Source: U.S. Census of Agriculture

Rough Outline

Western Growers Association project

=> Estimated labor use in 9 crops

=> Estimated the capacity for labor-saving automation to reduce labor demand in the next decade

=> Review these findings

Imports are growing for all the crops addressed, why?

=> Examine the seasonality of imports

=> Do imports compete with or complement U.S. production?

Preliminary focus on three crops: strawberries, lettuce, and avocados



Western Growers Project

Nine crops: strawberries, table grapes, head lettuce, Romaine lettuce, broccoli, oranges, peaches, plums, and avocados

Methodology included:

- *Survey of current technology both in the market and under development*
- *Estimates of labor use by crop using CA COP reports*
- *Literature review*
- *Interviews with large producers*
- *Included some scenario estimates*



Significant Labor Use in Chosen Crops

Table. Estimates of Labor Hours Based on Cost of Production Surveys and 2022 Census of Agriculture (Hrs/Acre)

Crop	California COP Survey			2022 U.S. Census of Agriculture			Cultivation Labor (million hrs)	Harvest Labor (million hrs)	Total Labor (million hrs)
	Cultivation Labor (hrs/acre)	Harvest Labor (hrs/acre)	Total Labor (hrs/acre)	Sown Acres	Number of Farms	Acres/Farm			
Strawberries <i>(percent of total sample)</i> <i>(percent of total for crop)</i>	422	2,104	2,526	46,729	651	72	19.7	98.3	118.1
				7	3		65	83	80
							17	83	
Iceberg Lettuce <i>(percent of total)</i> <i>(percent of total for crop)</i>	50	176	225	102,143	571	179	5.1	17.9	23.0
				53	12		17	15	16
							22	78	
Avocados <i>(percent of total)</i> <i>(percent of total for crop)</i>	126	41	167	44,195	3,397	13	5.6	1.8	7.4
				23	74		18	2	5
							75	25	
Total in Sample <i>(percent of total)</i>				193,067	4,619	42	30	118	148
							20	80	

Total labor is roughly 81,42 FTEs

Strawberries = 118.1 million hours or 56,756 FTEs

Iceberg Lettuce -> 23 mhrs or 11,069 FTEs

Avocados -> 7.4 mhrs or 3,556 FTEs

Significant Labor Use in Harvesting

Table. Estimates of Labor Hours Based on Cost of Production Surveys and 2022 Census of Agriculture (Hrs/Acre)

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Labor in harvesting is 80 percent of total

Strawberries -> 83 percent

Iceberg Lettuce -> 78 percent

Avocados -> 25 percent

Other tree fruits have higher proportion of labor in harvesting

Small Number of Operators and Sown Acres

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With the exception of avocados, there are only a small number of operators and total sown acres is less than 200,000

Number of Farms:
Strawberries -> 651
Lettuce -> 571

Avocado -> 3,397

Harvesting Technology Not Widely Available

Results from Survey of 2023 FIRA Participants

Very little harvesting technology at FIRA.

Much technology developed in countries with more acute labor problems than California!

	<u>Type of Technology</u>			
	<i>Cultural</i>	<i>Harvesting</i>	<i>Drone</i>	<i>Other</i>
<i>Number</i>	17	3	4	17
<i>(Percent)</i>	<i>(41)</i>	<i>(7)</i>	<i>(10)</i>	<i>(41)</i>
	<u>Technology Availability</u>			
	<i>Available</i>	<i>Limited</i>	<i>Under Development</i>	
<i>Number</i>	29	2	10	
<i>(Percent)</i>	<i>(71)</i>	<i>(5)</i>	<i>(24)</i>	
	<u>Company Headquarters</u>			
	<i>California</i>	<i>United States (outside California)</i>	<i>Outside the United States</i>	
<i>Number</i>	18	5	18	
<i>(Percent)</i>	<i>(44)</i>	<i>(12)</i>	<i>(44)</i>	



Harvesting Technology Adoption will be Slower

=> Many articles on harvesting technology on the verge of revolutionizing the industry from 10-20 years ago!

=> Cultivation technologies can be used on multiple crops, but harvesting technologies are more crop-specific.

- *Each crop has limited number of producers*
- *Harvesting any individual crop is uniquely tricky*
- *Harvesting technology adoption typically in tandem with adoption of crop varieties or other agricultural practices*



Intermediary Technologies Reduce Incentives for Full Automation

**Strawberries and
Table Grapes:
Field Conveyance**



**Tree fruit: Mechanical
Harvest Platforms**



**Leafy greens:
Thinning and
Weeding
technologies**



Harvest Technology Adoption Depends on Crop Variety Development and Adoption

Strawberries: New varieties that are easier to pick

=> Goes against breeding for flavor and delicacy

Tree fruit: New varieties with dwarf trunks grown on trellises

=> This replacement will take a while as trees are production for many years!

Leafy greens: New varieties with longer stems

=> May not look the same as traditional varieties in supermarkets



Two More Things

Harvesting fresh produce is particularly hard to automate

- => Requires more delicacy than fruit or vegetables for processing*
- => We are supposed to eat more fresh produce!*

Recent Changes in H-2A:

- => New Methodology to Estimate Adverse Effect Wage Rate (AEWR).**
 - > Two separate skill levels (Skill Level I and Skill Level II)*
 - > CA rates go from \$19.97/hr to 16.90/hr.*
- => Housing subsidies to producers (?)**



California Fruit and Vegetable Producers Face Many Challenges

- => Labor availability and costs*
- => Compliance costs*
- => Other resource constraints*

What Role Do Imports Play for Producers Addressing These Challenges?

- => Compete with domestic production?*
- => Seasonally complement domestic production?*



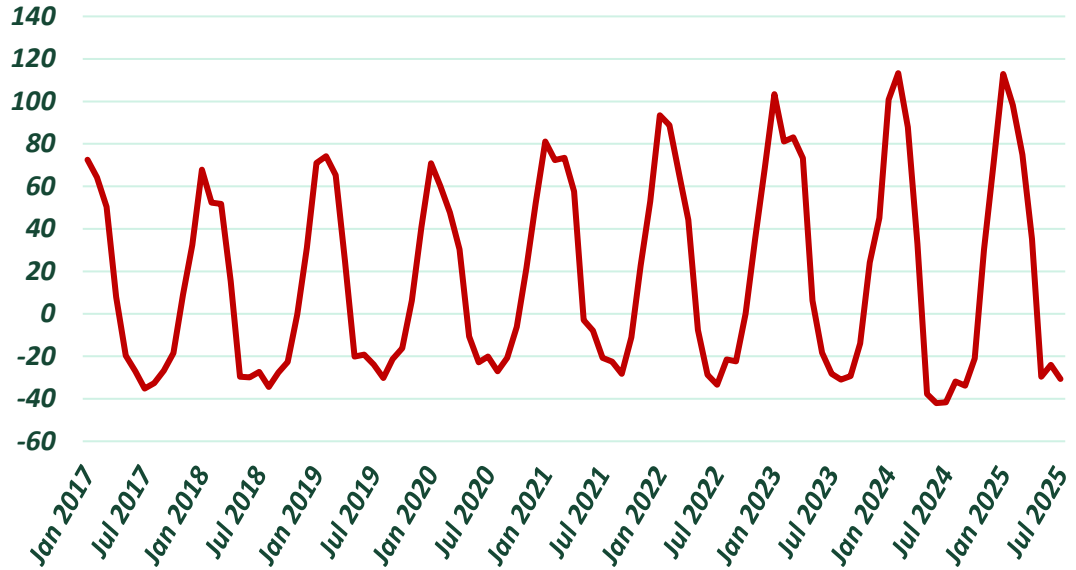
U.S. Strawberry Trade

=> Strawberry imports are growing but appear complementary

=> Import in the winter:
-> 20 percent of annual supply

=> Export in the summer:
-> 10 percent of total supply

U.S. Strawberry Net Imports: 2017-2025 (mlbs)



Source: USDA/ERS - Fruit Trade Data, no strawberries in Fruit Yearbook

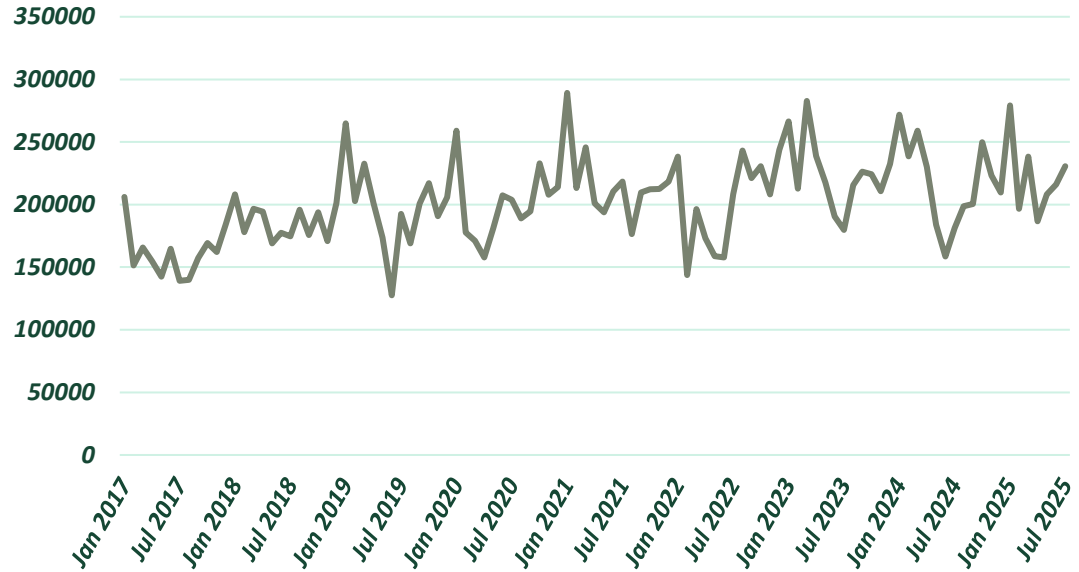
U.S. Avocado Trade

=> Roughly 90 percent of U.S. avocados are imported

=> U.S. is now the residual supplier in the U.S. market

=> Hass avocado trees are productive for 30-50 years!

U.S. Hass Avacado Net Imports: 2017-2025 (tlbs)



Source: USDA/ERS – Fruit Trade Data, imports not in Fruit Yearbook

Head Lettuce: U.S. Production and Trade Trends

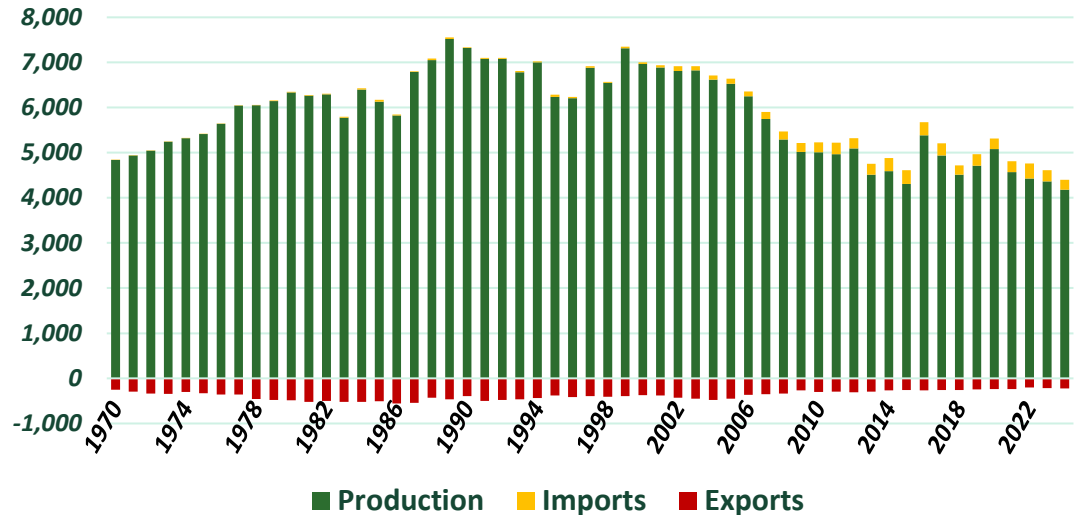
=> U.S. once a major net lettuce exporter

=> U.S. a net importer most years since 2014

=> Imports/exports less than 5 percent total

=> Production/consumption decreasing

U.S. Fresh Head Lettuce Production, Imports and Exports: 1970-2024 (cwt)



Source: USDA/ERS – Veg Yearbook

Romaine and Leaf Lettuce: U.S. Production and trade

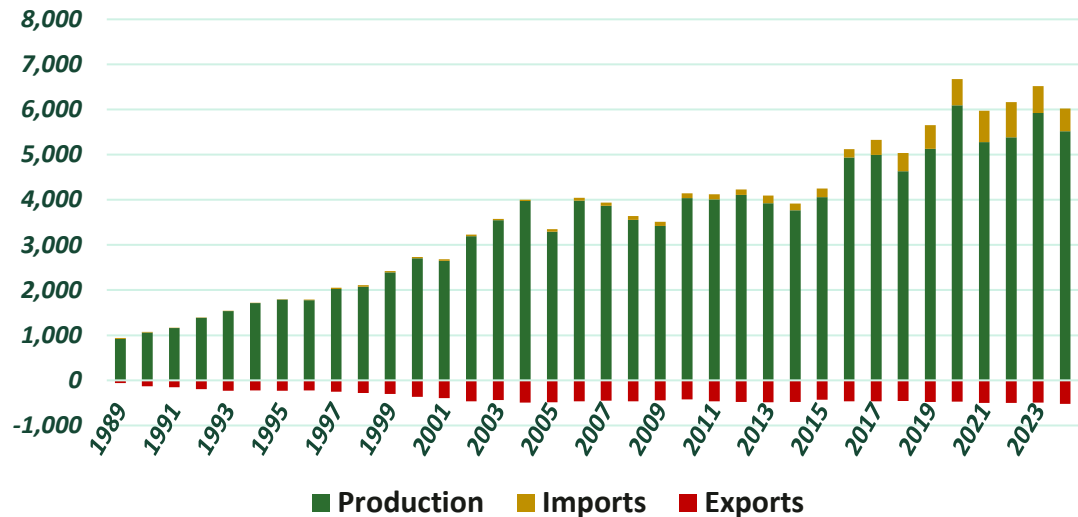
=> U.S. production and consumption is growing

=> Imports are growing

=> Exports have been steady steady

=> Both imports and exports roughly 10 percent of production in recent years

Romaine and Leaf Lettuce: U.S. Production, Imports and Exports 1989-2024 (cwt)



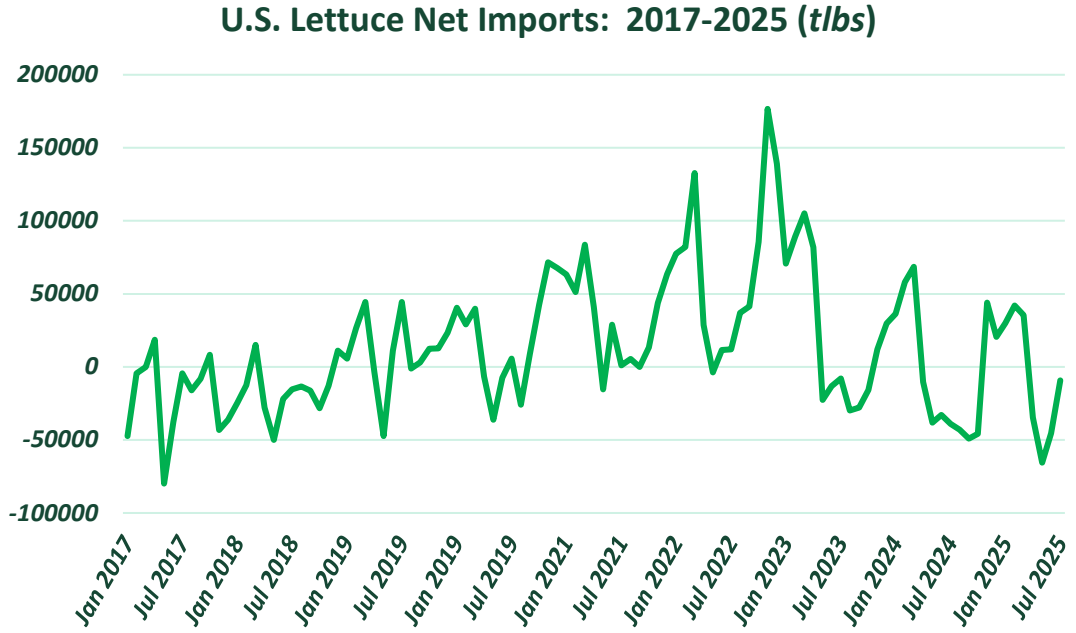
Source: USDA/ERS – Veg Yearbook

Total U.S. Lettuce Net Imports

Combined U.S. lettuce net imports show a cyclical pattern:

Import in the winter

Export in the summer



Source: USDA/ERS – Veg Trade Data

Preliminary Conclusions

Further automation in CA crops likely to come from more focus on harvesting.

Automated harvesting will be more difficult and adoption slower than for automated cultivation tasks for a variety of reasons.

Not only will automation reduce demand for labor, but it will also change the labor skill producers seek in their workers

Net imports are increasing but are largely complementary and help producers maintain supply throughout the year.

