

Labor Market Analysis: 0103.00/Plant Science

Plant Science (Associate of Science (A.S.) degree; Certificate requiring 8 to >16 semester units)
Los Angeles Center of Excellence, March 2023

Summary

Program Endorsement:	Endorsed: All Criteria Met <input type="checkbox"/>	Endorsed: Some Criteria Met <input checked="" type="checkbox"/>	Not Endorsed <input type="checkbox"/>
Program Endorsement Criteria			
Supply Gap:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Living Wage: (Entry-Level, 25th)	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Education:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Emerging Occupation(s)			
	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

The Los Angeles Center of Excellence for Labor Market Research (LA COE) prepared this report to provide regional labor market supply and demand data related to four middle-skill occupations:

- **Farmers, Ranchers, and Other Agricultural Managers (11-9013)** Plan, direct, or coordinate the management or operation of farms, ranches, greenhouses, aquacultural operations, nurseries, timber tracts, or other agricultural establishments. May hire, train, and supervise farm workers or contract for services to carry out the day-to-day activities of the managed operation. May engage in or supervise planting, cultivating, harvesting, and financial and marketing activities.¹
- **Agricultural Technicians (19-4012)** Work with agricultural scientists in plant, fiber, and animal research, or assist with animal breeding and nutrition. Set up or maintain laboratory equipment and collect samples from crops or animals. Prepare specimens or record data to assist scientists in biology or related life science experiments. Conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects.²
- **Pesticide Handlers, Sprayers, and Applications, Vegetation (37-3012)** Mix or apply pesticides, herbicides, fungicides, or insecticides through sprays, dusts, vapors, soil incorporation, or chemical application on trees, shrubs, lawns, or crops. Usually requires specific training and state or federal certification.³
- **First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)** Directly supervise and coordinate the activities of agricultural, forestry, aquacultural, and related workers.⁴

¹ [Farmers, Ranchers, and Other Agricultural Managers : Occupational Outlook Handbook: : U.S. Bureau of Labor Statistics \(bls.gov\)](#)

² [Agricultural and Food Science Technicians : Occupational Outlook Handbook: : U.S. Bureau of Labor Statistics \(bls.gov\)](#)

³ [Pesticide Handlers, Sprayers, and Applicators, Vegetation \(bls.gov\)](#)

⁴ [First-Line Supervisors of Farming, Fishing, and Forestry Workers \(bls.gov\)](#)

Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.⁵ This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations.

Based on the available data, there appears to be a supply gap for these middle-skill plant science occupations in the region. While entry-level wages are lower than the self-sufficiency standard wage in both Los Angeles and Orange counties, the majority of the workforce has completed some college/associate degree or less education. **Therefore, due to some of the criteria being met, the LA COE endorses this proposed program.** Detailed reasons include:

Demand:

- **Supply Gap Criteria** – Over the next five years, **413 jobs are projected to be available annually** in the region due to retirements and workers leaving the field, **which is more than the three-year average of 157 awards conferred** by educational institutions in the region.
- **Living Wage Criteria** – Within Los Angeles County, all four occupations have entry-level wages **below** the self-sufficiency standard hourly wage (\$18.10/hour).⁶
- **Educational Criteria** – Within the greater LA/OC region, **87% of the annual job openings** for occupations related to plant science **typically require a high school diploma or equivalent.**
 - National-level educational attainment data indicates **between 21% and 36% of workers in the field have completed some college or an associate degree;** however, between 71% and 85% have completed some college/associate degree or less education.

Supply:

- There are **8 community colleges** in the greater LA/OC region that issue awards related to plant science, conferring an average of **80 awards annually** between 2018 and 2021.
- Between 2017 and 2020, there was an average of **77 awards conferred annually** in related training programs by non-community college institutions throughout the greater LA/OC region.

⁵ The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

⁶ Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California. For more information, visit: <http://selfsufficiencystandard.org/california>.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these middle-skill plant science occupations. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to decrease by 2% through 2026. However, there will be more than 400 job openings per year through 2026 due to retirements and workers leaving the field.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties⁷

Geography	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Annual Openings
Los Angeles	2,407	2,443	36	1%	312
Orange	852	758	(93)	(11%)	101
Total	3,259	3,201	(58)	(2%)	413

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these middle-skill plant science occupations in Los Angeles County as they relate to the county's self-sufficiency standard wage. Orange County wages are included below in order to provide a complete analysis of the greater LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County—All four occupations have entry-level wages below the self-sufficiency standard wage for one adult (\$18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between \$14.00 and \$16.62. Experienced workers can expect to earn wages between \$29.53 and \$31.21, which are higher than the self-sufficiency standard.

Exhibit 2: Earnings for Occupations in LA County

Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Farmers, Ranchers, and Other Agricultural Managers (11-9013)	\$14.00	\$17.14	\$30.89	\$35,600
Agricultural Technicians (19-4012)	\$16.34	\$20.79	\$31.08	\$43,300
Pesticide Handlers, Sprayers, and Applicators, Vegetation (37-3012)	\$16.62	\$21.30	\$29.53	\$44,300
First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)	\$16.35	\$23.12	\$31.21	\$48,100

*rounded to the nearest \$100

⁷ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Orange County—All four occupations have entry-level wages below the self-sufficiency standard wage for one adult (\$20.63 in Orange County). Typical entry-level hourly wages are in a range between \$14.00 and \$17.92. Experienced workers can expect to earn wages between \$25.94 and \$29.32, which are higher than the self-sufficiency standard.

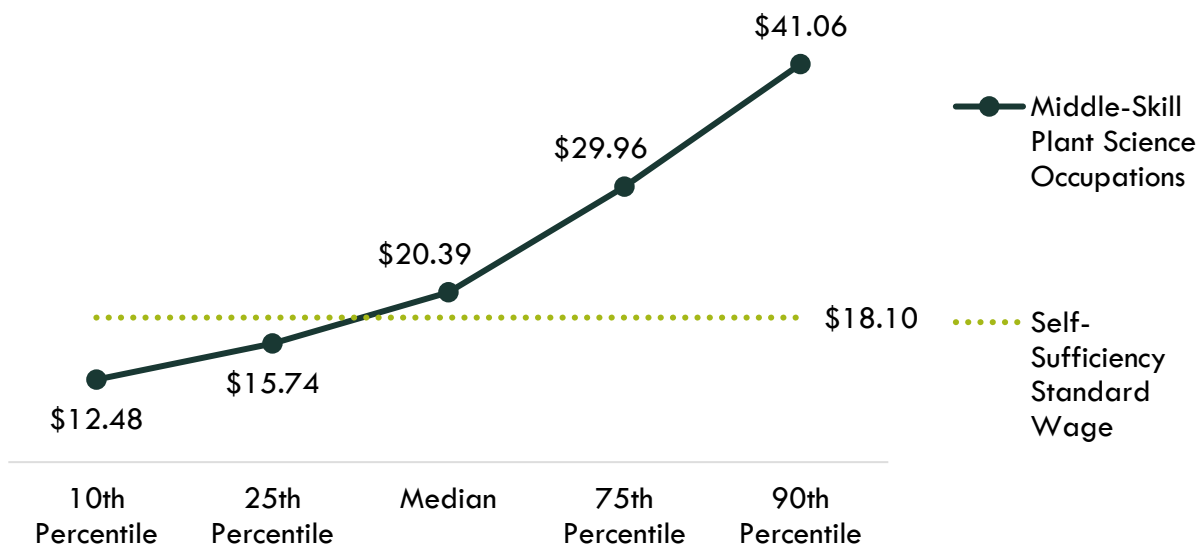
Exhibit 3: Earnings for Occupations in Orange County

Occupation	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)	Median Annual Earnings*
Farmers, Ranchers, and Other Agricultural Managers (11-9013)	\$14.00	\$16.65	\$29.11	\$34,600
Agricultural Technicians (19-4012)	\$15.34	\$18.59	\$25.94	\$38,700
Pesticide Handlers, Sprayers, and Applicators, Vegetation (37-3012)	\$17.92	\$21.99	\$29.05	\$45,700
First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)	\$15.53	\$21.84	\$29.32	\$45,400

*rounded to the nearest \$100

On average, the entry-level earnings for the occupations in this report are \$15.74; this is below the living wage for one single adult in Los Angeles County (\$18.10). Exhibit 4 shows the average wage for the occupations in this report, from entry-level to experienced workers.

Exhibit 4: Average Hourly Earnings for Middle-Skill Plant Science Occupations in LA/OC

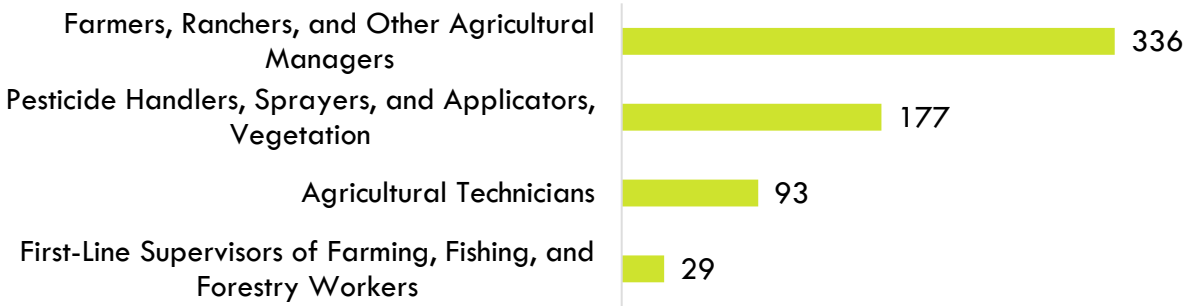


Job Postings

There were 635 online middle-skill job postings related to plant science listed in the past 12 months. Exhibit 5 displays the number of job postings by occupation. The majority of job postings (53%) were for *farmers, ranchers, and other agricultural managers*, followed by *pesticide handlers, sprayers, and applicators, vegetation* (28.5%) and *agricultural technicians* (15%). The highest

number of job postings were for lawn care specialists, conservation technicians, spray technicians, farm managers, and agricultural technicians. The top skills were landscape and agricultural irrigation, knowledge of cannabis, warehousing, invoicing, and pruning. The top three employers, by number of job postings, in the region were TruGreen, Traditional, and Brightview.

Exhibit 5: Job postings by occupation (last 12 months)



Educational Attainment

The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

- **Associate degree:** *Agricultural technicians*
- **High school diploma or equivalent:** *Farmers, ranchers, and other agricultural managers; Pesticide handlers, sprayers, and applicators, vegetation; First-line supervisors of farming, fishing, and forestry workers*

In the greater LA/OC region, the majority of annual job openings (87%) typically require a high school diploma. The national-level educational attainment data indicates between 21% and 36% of workers in the field have completed some college or an associate degree; however, between 71% and 85% have completed some college/associate degree or less education. Of the 38% of plant science-related job postings listing a minimum education requirement in the greater Los Angeles/Orange County region, 49% (119) requested high school or vocational training, 1% (3) requested an associate degree, and 45% (110) requested a bachelor’s degree.

Educational Supply

Community College Supply—Exhibit 6 shows the annual and three-year average number of awards conferred by community colleges in programs that have historically trained for the occupations of interest. The colleges with the most completions in the region are Saddleback, Mt. San Antonio, and Orange Coast.

Exhibit 6: Regional community college awards (certificates and degrees), 2018-2021

TOP	Program	College	2018-19 Awards	2019-20 Awards	2020-21 Awards	3-Year Average
0101.00	Agriculture Technology and Sciences, General	LA Pierce	1	2	-	1
		Mt San Antonio	3	3	-	2
		LA Subtotal	4	5	-	3
Supply Subtotal/Average			4	5	-	3
0103.00	Plant Science	Mt San Antonio	1	3	5	3
		Pasadena	-	-	1	0
		LA Subtotal	1	3	6	3
Supply Subtotal/Average			1	3	6	3
0103.10	Agricultural Pest Control Adviser and Operator (Licensed)	Mt San Antonio	3	-	2	2
		LA Subtotal	3	-	2	2
Supply Subtotal/Average			3	-	2	2
0109.00	Horticulture	El Camino	1	10	6	6
		LA Pierce	5	6	3	5
		Long Beach	4	8	7	6
		Mt San Antonio	7	3	5	5
		LA Subtotal	17	27	21	22
		Fullerton	-	2	1	1
		Orange Coast	15	23	10	16
		OC Subtotal	28	42	58	43
Supply Subtotal/Average			45	69	79	64
0109.30	Nursery Technology	Mt San Antonio	8	1	5	5
		LA Subtotal	8	1	5	5
		Fullerton	4	4	1	3
OC Subtotal			4	4	1	3
Supply Subtotal/Average			12	5	6	8
Supply Total/Average			65	82	93	80

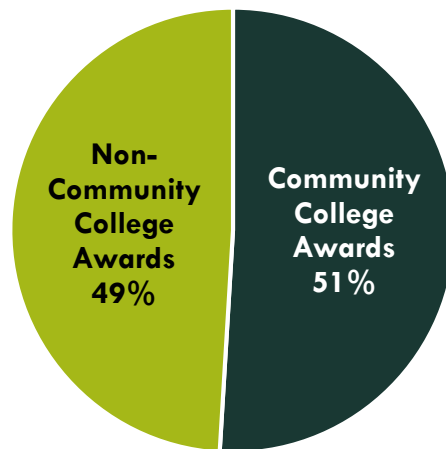
Non-Community College Supply—For a comprehensive regional supply analysis, it is important to consider the supply from other institutions in the region that provide training programs for plant science occupations. Exhibit 7 shows the annual and three-year average number of awards conferred by regional institutions in relevant programs. Due to different data collection periods, the most recent three-year period of available data is from 2017 to 2020. Between 2017 and 2020, non-community college institutions in the region conferred an average of 77 bachelor’s and sub-baccalaureate awards. Sub-baccalaureate awards include associate degrees, postsecondary awards, and other academic awards that typically take fewer than four years to complete.

Exhibit 7: Regional non-community college awards, 2017-2020

CIP	Program	Institution	2017-18 Awards	2018-19 Awards	2019-20 Awards	3-Year Average
01.0102	Agribusiness/Agricultural Business Operations	Cal. State Polytechnic University-Pomona	48	32	27	36
01.1105	Plant Protection and Integrated Pest Management	Cal. State Polytechnic University-Pomona	50	29	45	41
Supply Total/Average			98	61	72	77

Exhibit 8 shows the proportion of community college awards conferred in LA/OC compared to the number of non-community college awards for the programs in this report. About half of the awards conferred in these programs are awarded by community colleges in the LA/OC region.

Exhibit 8: Community College Awards Compared to Non-Community College Awards in LA/OC Region, 3-Year Average



Appendix A: Occupational demand and wage data by county

Exhibit 9. Los Angeles County

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Farmers, Ranchers, and Other Agricultural Managers (11-9013)	1,392	1,413	21	2%	156	\$14.00	\$17.14	\$30.89
Agricultural Technicians (19-4012)	236	264	29	12%	41	\$16.34	\$20.79	\$31.08
Pesticide Handlers, Sprayers, and Applicators, Vegetation (37-3012)	367	324	(43)	(12%)	47	\$16.62	\$21.30	\$29.53
First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)	413	442	29	7%	68	\$16.35	\$23.12	\$31.21
Total	2,407	2,443	36	1%	312	-	-	-

Exhibit 10. Orange County

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Farmers, Ranchers, and Other Agricultural Managers (11-9013)	471	368	(103)	(22%)	45	\$14.00	\$16.65	\$29.11
Agricultural Technicians (19-4012)	77	86	9	11%	13	\$15.34	\$18.59	\$25.94
Pesticide Handlers, Sprayers, and Applicators, Vegetation (37-3012)	150	156	6	4%	21	\$17.92	\$21.99	\$29.05
First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)	153	148	(5)	(3%)	22	\$15.53	\$21.84	\$29.32
Total	852	758	(93)	(11%)	101	-	-	-

Exhibit 11. Los Angeles and Orange Counties

Occupation (SOC)	2021 Jobs	2026 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	% Age 55 and older*	Typical Entry-Level Education
Farmers, Ranchers, and Other Agricultural Managers (11-9013)	1,863	1,781	(82)	(4%)	201	44%	HS diploma or equivalent
Agricultural Technicians (19-4012)	313	350	37	12%	54	28%	Associate degree
Pesticide Handlers, Sprayers, and Applicators, Vegetation (37-3012)	518	480	(37)	(7%)	69	27%	HS diploma or equivalent
First-Line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)	566	589	24	4%	89	34%	HS diploma or equivalent
Total	3,259	3,201	(58)	(2%)	413	38%	-

*The average percentage of workers age 55 and older across all occupations in the greater LA/OC region is 27%. These occupations have a larger share of older workers, which typically indicates greater replacements needs to offset the amount of impending retirements.

Appendix B: Sources

- O*NET Online
- Lightcast (formerly Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor’s Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women’s Welfare, University of Washington
- Chancellor’s Office Curriculum Inventory (COCI 2.0)

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