

Horticulture- Greenhouse

Inland Empire/Desert Region (Riverside and San Bernardino counties combined)

This workforce demand report uses state and federal job projection data developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.

Summary

- This report provides greenhouse occupational data related to the California Community College horticulture (TOP 0109.00) program. Three occupations are community college-level and two are no degree-level.
- Four of these occupations are considered essential **critical infrastructure occupations**.
- Regional employment for community college-level occupations expected to **increase by 6% between 2019 and 2024**. A total of **364 annual job openings** will be available each year over the five-year timeframe.
- The **median-level, 50th percentile, hourly wages** for the community college-level occupations are between **\$16.28 and \$22.18 per hour**. The median wage for **two of these occupations exceeds the \$21.78 per hour self-sustainable standard** for a single adult with one child.
- Two regional community colleges conferred an annual average of **50 awards** in horticulture programs over the last three academic years.

Introduction

This report provides greenhouse occupational data related to the California Community College horticulture (TOP 0109.00) program. This program prepares students for employment through the instruction of the production of flowers, foliage, and related plant materials in fields and greenhouses for garden and ornamental purposes (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by horticulture programs lead to the following five occupations, collectively referred to as the greenhouse occupational group in this report. The occupations are separated into community college-level and no degree-level occupations.

Community College-level occupations

- Agricultural and Food Science Technicians (SOC 19-4011)
- First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)
- Floral Designers (27-1023)

No Degree-level occupations

- Landscaping and Groundskeeping Workers (SOC 37-3011)
- Farmworkers and Laborers, Crop, Nursery, and Greenhouse (45-2092)

No degree-level occupations, occupations that typically require no formal education to enter employment, are included in this report because they represent a significant share (30.1%) of the employment in crop production (NAICS 111) industry. The community college-level occupations represent 0.3% of the employment in this industry.

Except for *floral designers*, all of the occupations listed above are considered essential critical infrastructure occupations as identified by the Public Policy Institute of California. This classification of occupations is vital in supporting California's basic economic and safety needs (Bohn et al.). Despite the ongoing pandemic, employment demand should continue due to these occupations' critical nature and social distance ability.

Job Opportunities

In 2019, there were 2,913 community college-level jobs in the greenhouse occupational group in the Inland Empire/Desert Region. The community college-level greenhouse occupational group is projected to have 364 annual job openings to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). This occupational group is expected to increase employment by 6% through 2024, which is more than the 2% job growth in the previous five years (2014-2019). Exhibit 1 displays five-year projected job growth for the community college-level greenhouse occupational group.

Exhibit 1: Five-year job projections, 2019-2024

Community College-level Occupation	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	2,220	2,382	7%	1,704	284	25%
Floral Designers	434	440	1%	278	46	31%
Agricultural and Food Science Technicians	260	268	3%	200	33	24%
Community College-level Total	2,913	3,089	6%	2,182	364	26%

Source: Emsi 2020.4

In 2019, there were 31,078 no degree-level jobs in the greenhouse occupational group in the Inland Empire/Desert Region. The no degree-level greenhouse occupational group is projected to have 4,799 annual job openings to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). This occupational group is expected to increase employment by 6% through 2024. Exhibit 2 displays five-year projected job growth for the no degree-level greenhouse occupational group.

Exhibit 2: Five-year job projections, 2019-2024

No Degree-level Occupation	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Landscaping and Groundskeeping Workers	22,482	24,239	8%	20,151	3,359	25%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	8,596	8,727	2%	8,645	1,441	25%
No Degree-level Total	31,078	32,966	6%	28,797	4,799	25%

Job Advertisements

A search of online job advertisements was conducted to provide real-time insight on the number of job ads posting during the last 12 months, along with the average time to fill for the greenhouse occupational group. This search was limited to job advertisements that included the keyword 'greenhouse' in the ad. To ensure generalizable job advertisement data was available for analysis, this search was expanded to include all California advertisements since the region alone yielded only five total results. There were 159 advertisements posted over the last 12 months for the entire greenhouse occupational group in the state. The statewide average time to fill for the community college-level greenhouse occupational group was 53 days and 48 days for no degree-level jobs.

Exhibit 3: Job ads and time to fill

Community College-Level Occupation	Job Ads	California Average Time to Fill (Days)
Agricultural and Food Science Technicians	31	54
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	2	38
Floral Designers	0	-
Community College-Level Total	33	53

Source: Burning Glass – Labor Insights

Exhibit 4: Job ads and time to fill

No Degree-level Occupation	Job Ads	California Average Time to Fill (Days)
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	105	47
Landscaping and Groundskeeping Workers	21	51
No Degree-level Total	126	48

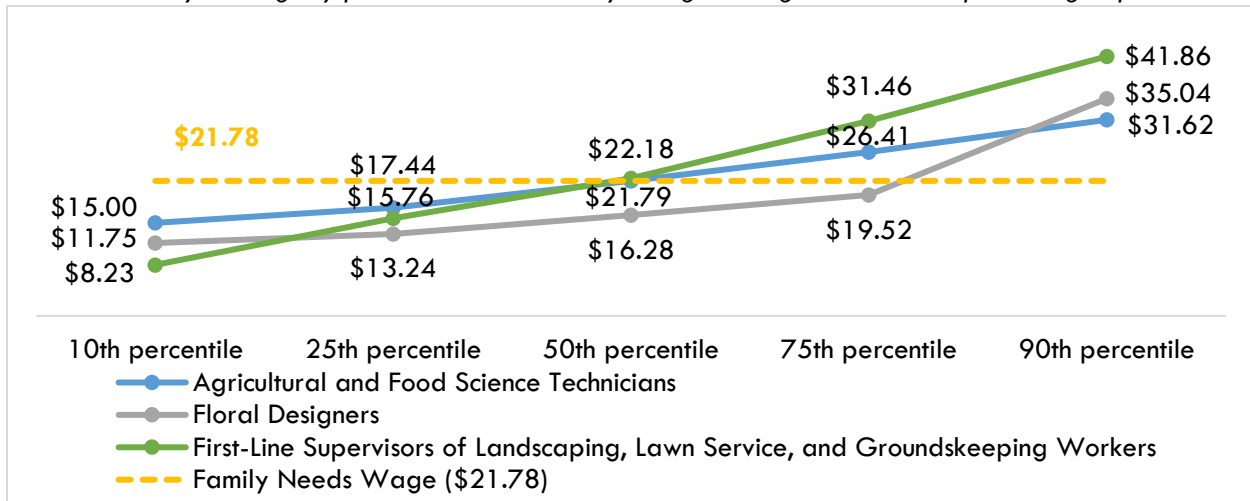
Source: Burning Glass – Labor Insights

Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a self-sustainable level of income. The Family Needs Calculator estimates that a self-sustainable wage for a single adult with one school-age child is \$21.78 per hour or \$45,992 annually in Riverside County, \$21.24 per hour or \$44,867 annually in San Bernardino County (Pearce, 2020). For this study, the higher hourly wage requirement in Riverside County is adopted as the self-sufficiency standard for the two-county region.

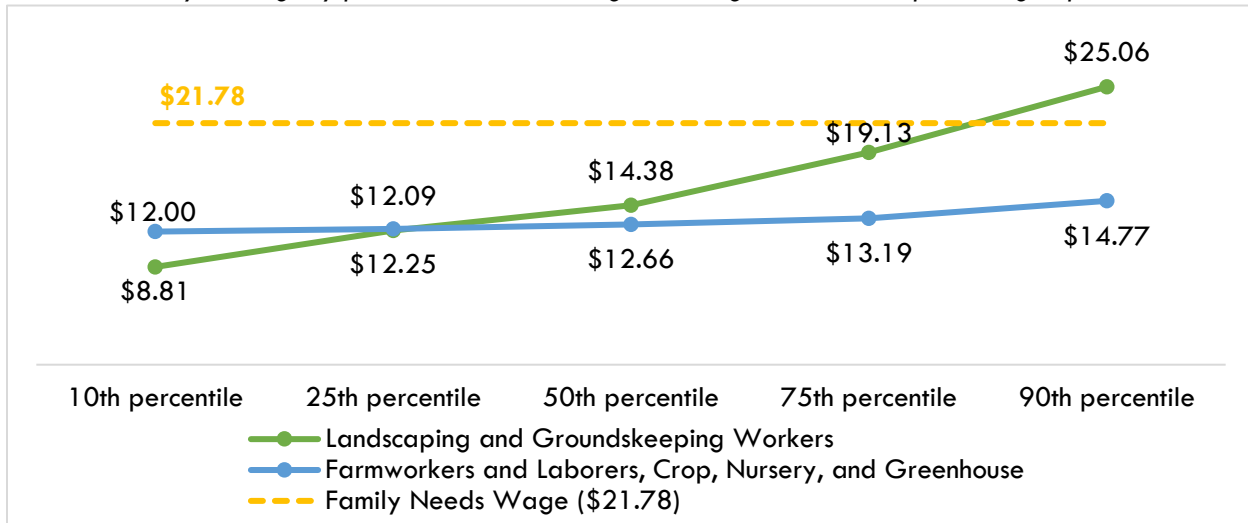
The median wages for *agricultural and food science technicians* and *first-line supervisors of landscaping, lawn service, and groundskeeping workers* exceed the Family Needs Calculator self-sustainability rate. Wages for *floral designers* and *landscaping and groundskeeping workers* do not surpass the self-sustainability rate until the 90th percentile, indicating that only the top 10% of workers earn a self-sustainable wage. The 90th percentile wage for *farmworkers and laborers, crop, nursery, and greenhouse*, \$14.77 per hour, is below the self-sustainability rate. Exhibits 5 and 6 display the hourly earnings for each occupation in this study.

Exhibit 5: Hourly earnings by percentile for community college-level greenhouse occupational group



Source: Emsi 2020.4

Exhibit 6: Hourly earnings by percentile for the no degree-level greenhouse occupational group



Source: Emsi 2020.4

Benefits information is only available for *farmworkers and laborers, crop, nursery, and greenhouse*. Benefits for *farmworkers and laborers, crop, nursery, and greenhouse* are uncommon, although some employers may offer sick leave, paid vacation, and health benefits (Detailed Occupational Guides, 2020).

Reviewing salary information from online job ads revealed that more than half (57%) of employers provided salary information. The salary figures are prorated to reflect full-time, annual wage status. There were too few postings for *first-line supervisors of landscaping, lawn service, and groundskeeping workers* and *floral designers* to obtain accurate salary information. Exhibits 7 and 8 display advertised salary data from online job ads over the last 12 months.

Exhibit 7: Advertised salary information for community college-level greenhouse occupational group

Job Title	Real-Time Salary Information					Average Annual Salary
	Number of job postings	Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
Agricultural and Food Science Technicians	22	32%	54%	14%	-	\$39,000
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	2	N/A	N/A	N/A	N/A	N/A
Floral Designers	0	N/A	N/A	N/A	N/A	N/A

Source: Burning Glass – Labor Insights

Exhibit 8: Advertised salary information no degree-level greenhouse occupational group

Job Title	Real-Time Salary Information					Average Annual Salary
	Number of job postings	Less than \$35,000	\$35,000 to \$49,999	\$50,000 to \$74,999	More than \$75,000	
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	50	56%	32%	12%	-	\$43,000
Landscaping and Groundskeeping Workers	16	38%	56%	6%	-	\$40,000

Source: Burning Glass – Labor Insights

Employers, Skills, Education, and Work Experience

Exhibits 9 and 10 display the employers posting the most online job advertisements for greenhouse positions listed in the state over the last 12 months. There were too few advertisements for *first-line supervisors of landscaping, lawn service, and groundskeeping workers* and *floral designers* to obtain reliable employer information.

Exhibit 9: Employers posting the most job ads, community college-level greenhouse occupations

Occupation	Employers
Agricultural and Food Science Technicians (n=31)	<ul style="list-style-type: none"> University of California, Davis Cooperative Agricultural Support Services Authority (CASS)
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (n=2)	<ul style="list-style-type: none"> N/A
Floral Designers (n=0)	<ul style="list-style-type: none"> N/A

Source: Burning Glass – Labor Insights

Exhibit 10: Employers posting the most job ads, no degree-level greenhouse occupations

Occupation	Employers
Farmworkers and Laborers, Crop, Nursery, and Greenhouse (n=105)	<ul style="list-style-type: none"> California Greenhouses: OC Succulents Go Green Agriculture Cal Poly Pomona Foundation
Landscaping and Groundskeeping Workers (n=21)	<ul style="list-style-type: none"> McEvoy Ranch Odiyan Retreat Center

Source: Burning Glass – Labor Insights

Exhibits 11 and 12 display a sample of specialized and employability skills employers seek when looking for workers to fill greenhouse positions. Specialized skills are occupation-specific skills that employers are

requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job postings may be utilized to guide curriculum development. There were too few advertisements for *first-line supervisors of landscaping, lawn service, and groundskeeping workers* and *floral designers* to obtain reliable skills information.

Exhibit 11: Sample of in-demand skills from employer online job ads, community college-level greenhouse occupations

Occupation	Specialized Skills	Employability Skills
Agricultural and Food Science Technicians (n=30)	<ul style="list-style-type: none"> • Quality Assurance and Control • Data Entry • Herbicides • Environmental Science 	<ul style="list-style-type: none"> • Physical Abilities • Research • Organizational Skills • Communication Skills
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (n=2)	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A
Floral Designers (n=0)	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • N/A

Source: Burning Glass – Labor Insights

Exhibit 12: Sample of in-demand skills from employer online job ads, no degree-level greenhouse occupations

Occupation	Specialized Skills	Employability Skills
Farmworkers and Laborers, Crop, Nursery, and Greenhouse (n=96)	<ul style="list-style-type: none"> • Scheduling • Fertilizers • Cleaning • Irrigation 	<ul style="list-style-type: none"> • Organizational Skills • Research • Detail-Oriented • Teamwork/Collaboration
Landscaping and Groundskeeping Workers (n=16)	<ul style="list-style-type: none"> • Repair • Cleaning • Plant Identification • Irrigation Systems 	<ul style="list-style-type: none"> • Physical Abilities • Detail-Oriented • Organizational Skills • Preventive Maintenance

Source: Burning Glass – Labor Insights

Exhibits 13 and 14 display the entry-level education typically required to gain employment in the greenhouse occupational group according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with "some college, no degree" and an "associate degree" according to the U.S. Census (2016-17) and the real-time minimum advertised education requirement from employer job ads. There were too few advertisements for *first-line supervisors of landscaping, lawn service, and groundskeeping workers* and *floral designers* to obtain reliable minimum advertised education information.

Exhibit 13: Typical entry-level education, educational attainment, and minimum advertised education requirements, community college-level greenhouse occupations

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Agricultural and Food Science Technicians	Associate degree	37%	21	52%	5%	43%
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	High school diploma or equivalent	33%	2	N/A	N/A	N/A
Floral Designers	High school diploma or equivalent	28%	0	N/A	N/A	N/A

Source: Emsi 2020.4, Burning Glass – Labor Insights

*Percentage of incumbent workers with a community college award or some postsecondary coursework

Exhibit 14: Typical entry-level education, educational attainment, and minimum advertised education requirements, no degree-level greenhouse occupations

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	No formal education requirement	14%	24	75%	25%	-
Landscaping and Groundskeeping Workers	No formal education requirement	20%	1	N/A	N/A	N/A

Source: Emsi 2020.4, Burning Glass – Labor Insights

*Percentage of incumbent workers with a community college award or some postsecondary coursework

Exhibits 15 and 16 display the work experience typically required for the greenhouse occupational group and the real-time work experience requirements from employer job ads. There were too few advertisements for *first-line supervisors of landscaping, lawn service, and groundskeeping workers* and *floral designers* to obtain reliable work experience requirement information.

Exhibit 15: Work experience required and real-time work experience requirements, community college-level greenhouse occupations

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of Job Ads	0 – 2 years	3 – 5 years	6+ years
Agricultural and Food Science Technicians	None	15	67%	33%	-
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	Less than five years	2	N/A	N/A	N/A
Floral Designers	None	0	N/A	N/A	N/A

Source: Emsi 2020.4, Burning Glass – Labor Insights

Exhibit 16: Work experience required and real-time work experience requirements, no degree-level greenhouse occupations

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of Job Ads	0 – 2 years	3 – 5 years	6+ years
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	None	48	67%	33%	-
Landscaping and Groundskeeping Workers	None	7	57%	29%	14%

Source: Emsi 2020.4, Burning Glass – Labor Insights

Student Completions and Program Outcomes

The community college horticulture (TOP 0109.00) program is offered at two regional community colleges. While colleges do not provide programs that train students to work in greenhouses specifically, regional horticulture programs may equip students with the skills needed to work in greenhouses. These programs have collectively awarded an annual average of 50 associate degrees and certificates over the last three academic years. Exhibit 17 displays the annual average awards for this program.

Exhibit 17: 2016-19, Annual average community college awards for the horticulture programs in the Region

0109.00 - Horticulture	Associate degree	Certificate requiring 30 to <60 semester units	Certificate requiring 18 to <30 semester units	Certificate requiring 6 to <18 semester units	Total CC Annual Average Awards, Academic Years 2016-19
Desert	3	6	27	-	37
Victor Valley	12	-	-	1	13
Total	16	6	27	1	50

Source: MIS Data Mart

California program outcome data may provide a useful insight into the likelihood of success for the proposed program. A higher share of students exiting this program achieved a living wage in the region (58%) than students in the state as a whole (49%). Community college student outcome information based on the selected TOP codes and region is provided in Exhibit 18. The outcome methodology is available in the appendix section of this report. Dashes indicate there were too few students from which to obtain program outcome information.

Exhibit 18: 0109.00 – Horticulture strong workforce program outcomes

Strong Workforce Program Metrics: 0109.00 – Horticulture Academic Year 2017-18, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2018-19)	261	5,127
Completed 9+ career education units in one year (2018-19)	38%	30%
Perkins Economically disadvantaged students (2018-19)	84%	68%
Students who attained a noncredit workforce milestone in a year (2018-19)	-	20%
Students who earned a degree, certificate, or attained apprenticeship (2018-19)	23	141
Transferred to a four-year institution (transfers)	-	210
Job closely related to the field of study (2016-17)	-	75%
Median annual earnings (all exiters)	\$26,748	\$32,566
Median change in earnings (all exiters)	47%	26%
Attained a living wage (completers and skills-builders)	58%	49%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Recommendation

This report provides greenhouse occupational data related to the California Community College horticulture (TOP 0109.00) program. Three occupations are community college-level, and two are no degree-level. The community college-level occupations are: 1) agricultural and food science technicians, 2) first-line supervisors of landscaping, lawn service, and groundskeeping workers, and 3) floral designers. Except for floral designers, the college-level occupations are considered essential critical infrastructure occupations. Despite the ongoing pandemic, employment demand should continue due to these occupations' critical nature and social distancing ability. Regional employment for community college-level occupations expected to increase by 6%, and a total of 364 annual job openings will be available each year over the five-year timeframe. The median-level, 50th percentile, hourly wages for the agricultural and food science technicians and first-line supervisors of landscaping, lawn service, and groundskeeping workers occupations

exceed the \$21.78 per hour self-sustainable standard for a single adult with one child. Floral designers do not exceed the self-sustainability standard until the 90th percentile.

Two regional community colleges conferred an annual average of 50 awards in horticulture programs over the last three academic years. Strong Workforce metrics indicate the median annual earnings for all exiters in this program is \$26,748, and 58% attained a living wage.

The COE **cautiously recommends** expanding existing horticulture programs due to the low growth and low annual job openings for two out of the three community college-level occupations identified in this report. Training that leads to the first-line supervisor of landscaping, lawn services, and groundskeeping occupation appears to be the best option. A review of online job ads revealed limited evidence of regional demand for greenhouse workers; see the Appendix section for notes on online job ads analysis. Colleges considering this program should partner with local employers to document the skills and certifications needed to close the self-sustainable wage gap shortly after entering employment in this field.

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References

- Bohn, S., Cuellar Mejia, M., Lafortune, J. (2020). Essential Workers and COVID-19 - Public Policy Institute of California. Retrieved from <https://www.ppic.org/blog/essential-workers-and-covid-19/>
- Burning Glass Technologies. (2021). *Labor Insights/Jobs*. Retrieved from <https://www.burning-glass.com/>
- California Community Colleges Chancellor's Office. LaunchBoard. (2021). *California Community Colleges LaunchBoard*. Retrieved from <https://www.calpassplus.org/Launchboard/Home.aspx>
- California Community Colleges Chancellor's Office. LaunchBoard. (2021a). *Strong Workforce Program Metrics Data Element Dictionary*. Pg. 3. Retrieved from <https://www.calpassplus.org/MediaLibrary/calpassplus/launchboard/Documents/SWP-DED.PDF>
- California Community Colleges Chancellor's Office. (2021). *Chancellor's Office Curriculum Inventory (COCI), version 3.0*. Retrieved from <https://coci2.ccctechcenter.org/programs>
- California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2021). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>
- California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6th Edition, Corrected Version*. Retrieved from <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Digital-Innovation-and->

[Infrastructure/Research/Files/TOPmanual6200909corrected12513.ashx?la=en&hash=94C709CA83C0380828415579395A5F536736C7C1](https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf)

Carnevale, A. P., Jayasundera, T., & Repnikov, D. (n.d.). Understanding Online Job Ads Data. Retrieved from <https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf>

Economic Modeling Specialists International (Emsi). (2021). *Datarun 2020.4*. Retrieved from <https://www.economicmodeling.com/>

Labor Market Information Division. Employment Development Department of California. (2021). *Detailed Occupational Guides*. Retrieved from <https://www.labormarketinfo.edd.ca.gov/OccGuides/Search.aspx>

National Center for O*NET Development. (2021). O*NET OnLine. Retrieved from <https://www.onetonline.org/>

Pearce, D. University of Washington. (2020). *Self Sufficiency Standard – California*. Retrieved from <http://www.selfsufficiencystandard.org/california>

Appendix: Occupation definitions, sample job titles, five-year projections for greenhouse occupations

Community College Level Occupations

Agricultural and Food Science Technicians (19-4011)

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.

Sample job titles: Agricultural Research Technician, Agricultural Research Technologist, Agricultural Technician, Laboratory Technician (Lab Tech), Research Assistant, Research Associate, Research Specialist, Research Technician, Seed Analyst

Entry-Level Educational Requirement: Associate degree

Training Requirement: Between one and twelve months of on-the-job training

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 37%

Floral Designers (27-1023)

Design, cut, and arrange live, dried, or artificial flowers and foliage.

Sample job titles: Designer, Floral Artist, Floral Clerk, Floral Department Specialist, Floral Designer, Florist, Flower Shop Laborer/Designer, Wedding Decorator

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: Between one and twelve months of on-the-job training

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 28%

First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)

Directly supervise and coordinate activities of workers engaged in landscaping or groundskeeping activities. Work may involve reviewing contracts to ascertain service, machine, and workforce requirements; answering inquiries from potential customers regarding methods, material, and price ranges; and preparing estimates according to labor, material, and machine costs.

Sample job titles: Field Manager, Golf Course Superintendent, Grounds Crew Supervisor, Grounds Foreman, Grounds Maintenance Supervisor, Grounds Manager, Grounds Supervisor, Groundskeeper Supervisor, Landscape Manager, Landscape Supervisor

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 33%

No degree-level Occupations

Landscaping and Groundskeeping Workers (37-3011)

Landscape or maintain grounds of property using hand or power tools or equipment. Workers typically perform a variety of tasks, which may include any combination of the following: sod laying, mowing, trimming, planting, watering, fertilizing, digging, raking, sprinkler installation, and installation of mortarless segmental concrete masonry wall units.

Sample job titles: Gardener, Greenskeeper, Grounds Maintenance Worker, Grounds Person, Grounds Worker, Grounds/Maintenance Specialist, Groundskeeper, Landscape Specialist, Landscape Technician, Outside Maintenance Worker

Entry-Level Educational Requirement: No formal educational credential

Training Requirement: Less than one month on-the-job training

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 20%

Farmworkers and Laborers, Crop, Nursery, and Greenhouse (45-2092)

Manually plant, cultivate, and harvest vegetables, fruits, nuts, horticultural specialties, and field crops. Use hand tools, such as shovels, trowels, hoes, tampers, pruning hooks, shears, and knives. Duties may include tilling soil and applying fertilizers; transplanting, weeding, thinning, or pruning crops; applying pesticides; or cleaning, grading, sorting, packing, and loading harvested products. May construct trellises, repair fences and farm buildings, or participate in irrigation activities.

Sample job titles: Farm Laborer, Field Irrigation Worker, Gardener, Greenhouse Worker, Grower, Harvester, Nursery Worker, Orchard Worker, Picker, Propagation Worker

Entry-Level Educational Requirement: No formal educational credential

Training Requirement: Less than one month on-the-job training

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 14%

Appendix: Program Completion and Outcome Methodology

Exhibit 17 displays the average annual California Community College (CCC) awards conferred during the three academic years between 2016 and 2019, from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three in this case to calculate an annual average. This is done to minimize the effect of atypical variation that might be present in a single year.

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from records provided by California's Employment Development Department's Unemployment Insurance database. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2021a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2021a).

Job postings data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job postings often do not reveal the hiring intentions of employers; it is unknown if employers plan to hire one or multiple workers from a single online job posting, or if they are collecting resumes for future hiring needs. A closed job posting may not be the result of a hired worker.

Table 1: 2019 to 2024 job growth, wages, education, training, and work experience required for CC-level occupations, Inland Empire/Desert Region

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)	2,220	162	7%	284	\$8.23 to \$41.86	\$22.18	\$52,900	High school diploma or equivalent & None	Less than 5 years
Floral Designers (27-1023)	434	6	1%	46	\$11.75 to \$35.04	\$16.28	\$44,200	High school diploma or equivalent & 1-12 months	None
Agricultural and Food Science Technicians (19-4011)	260	8	3%	33	\$15.00 to \$31.62	\$21.79	\$49,700	Associate degree & 1-12 months	None
Total	2,913	176	6%	364	-	-	-	-	-

Source: Emsi 2020.4

Table 2: 2019 to 2024 job growth, wages, education, training, and work experience required, no degree-level, Inland Empire/Desert Region

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Landscaping and Groundskeeping Workers (37-3011)	22,482	1,757	8%	3,359	\$8.81 to \$25.06	\$14.38	\$35,900	No formal educational credential & 1 month	None
Farmworkers and Laborers, Crop, Nursery, and Greenhouse (45-2092)	8,596	131	2%	1,441	\$12.00 to \$14.77	\$12.66	\$27,000	No formal educational credential & 1 month	None
Total	31,078	1,887	6%	4,799	-	-	-	-	-

Source: Emsi 2020.4