

# LABOR MARKET ANALYSIS

FOR PROGRAM RECOMMENDATION



**C·O·E**

CENTERS OF EXCELLENCE  
FOR LABOR MARKET RESEARCH

## AGRICULTURAL TECHNOLOGY & SCIENCES

IN THE GREATER SACRAMENTO REGION

North (Greater Sacramento)  
Center of Excellence

**OCTOBER 2022**

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## SUMMARY

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The North (Greater Sacramento) of Excellence for Labor Market Research prepared this report to provide a labor market analysis of educational supply and occupational demand for middle-skilled career pathways in the North (Greater Sacramento) subregion. This report aims to determine if demand in the local labor market is unmet by the supply from existing community college programs and other postsecondary training providers.

This report primarily focuses on training that leads to jobs in middle-skilled occupations - jobs that typically require education beyond a high school diploma but less than a bachelor's degree - but may include higher-skilled occupations for training pathways that lead to a bachelor's degree. Lowered skilled occupations are rarely considered in this analysis due to the lessened barriers for entry-level work, such as no formal education and on-the-job training requirements.

Key findings include:

- The North (Greater Sacramento) subregion held 3,764 Agricultural Technology & Sciences jobs in 2021. These jobs are projected to increase by 6% over the next five years, adding 237 new jobs to the subregion by 2026.
- Over the next five years, Agricultural Technology & Sciences jobs will have 459 annual openings in Greater Sacramento.
- Analysis of wage data shows that most Agricultural Technology & Sciences occupations earn more than the single adult living wage of \$14.53 per hour.
- Awards data analysis shows that North (Greater Sacramento) training providers conferred an average of 36 awards (certificates and associate degrees) in Agricultural Technology & Sciences programs over the last three academic years.

Recommendations include:

- The North (Greater Sacramento) Center of Excellence recommends working closely with employers to develop new Agricultural Technology & Sciences programs.
- The North (Greater Sacramento) Center of Excellence also recommends moving forward with modifications to existing Agricultural Technology & Sciences programs.

# INTRODUCTION

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The North (Greater Sacramento) Center of Excellence (COE) was asked to provide labor market information for a proposed program at a regional community college. This report focuses on the following Standard Occupational Classification (SOC) occupations and codes:

- These middle-skill occupations require more education and training beyond a high school diploma but less than a four-year degree:
  - Farmers, Ranchers, and Other Agricultural Managers (11-9013)
  - Agricultural Technicians (19-4012)
    - Includes the sub-occupation Precision Agriculture Technicians (19-4012.01)
  - Food Science Technicians (19-4013)
  - First-line Supervisors of Farming, Fishing, and Forestry Workers (45-1011)
- Students who transfer and earn a four-year degree could pursue the following high-skill occupations:
  - Soil and Plant Scientists (19-1013)

A review of related programs revealed the following Taxonomy of Programs (TOP) title(s) and code(s) are appropriate for inclusion in this report:

- Agriculture Technology and Sciences, General (0101.00)

The corresponding Classification of Instructional Program (CIP) title(s) and code(s) are:

- Agriculture, General (01.0000)

# OCCUPATIONAL DEMAND

Exhibit 1 summarizes the five-year projected job growth for middle-skill and high-skill occupations in the North, North/Far North, and California.

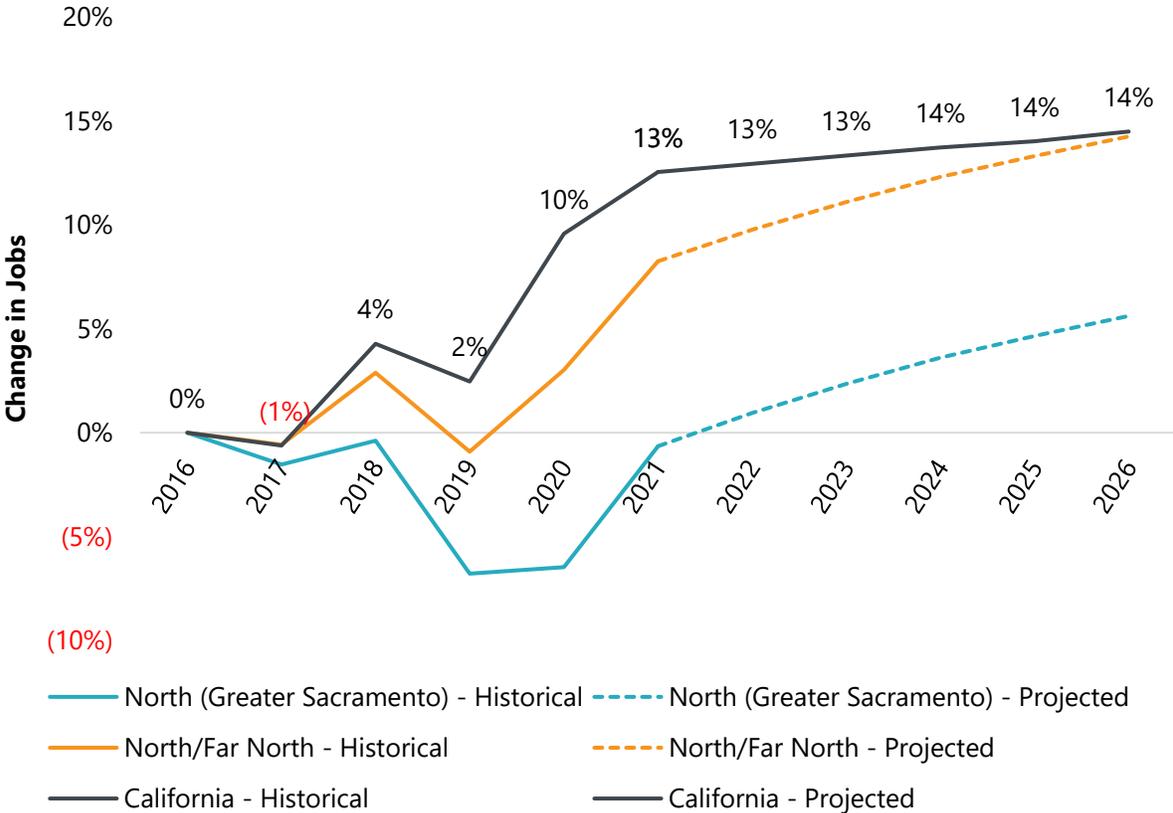
**Exhibit 1. Employment and projected demand, 2021-2026**

Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	2021-2026 Annual Openings
Farmers, Ranchers, and Other Agricultural Managers	2,726	2,913	187	7%	309
First-Line Supervisors of Farming, Fishing, and Forestry Workers	602	630	28	5%	92
Agricultural Technicians	201	209	8	4%	27
Soil and Plant Scientists	164	172	8	5%	19
Food Science Technicians	71	78	6	9%	11
<b>North (Greater Sacramento)</b>	<b>3,764</b>	<b>4,001</b>	<b>237</b>	<b>6%</b>	<b>459</b>
Farmers, Ranchers, and Other Agricultural Managers	6,422	6,774	352	5%	721
First-Line Supervisors of Farming, Fishing, and Forestry Workers	1,378	1,461	84	6%	218
Agricultural Technicians	311	323	11	4%	43
Soil and Plant Scientists	204	217	13	6%	25
Food Science Technicians	144	153	9	6%	21
<b>North/Far North</b>	<b>8,459</b>	<b>8,928</b>	<b>469</b>	<b>6%</b>	<b>1,027</b>
Farmers, Ranchers, and Other Agricultural Managers	65,787	66,639	852	1%	6,844
First-Line Supervisors of Farming, Fishing, and Forestry Workers	14,255	14,716	461	3%	2,169

Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	2021-2026 Annual Openings
Food Science Technicians	2,237	2,246	10	0%	294
Agricultural Technicians	2,141	2,204	63	3%	291
Soil and Plant Scientists	2,045	2,155	110	5%	242
<b>California</b>	<b>86,464</b>	<b>87,960</b>	<b>1,496</b>	<b>2%</b>	<b>9,839</b>

Exhibit 2 compares the percent change in jobs between 2016 through 2021 and the projected changes through 2026. The rate of change is indexed to the total number of jobs in 2016.

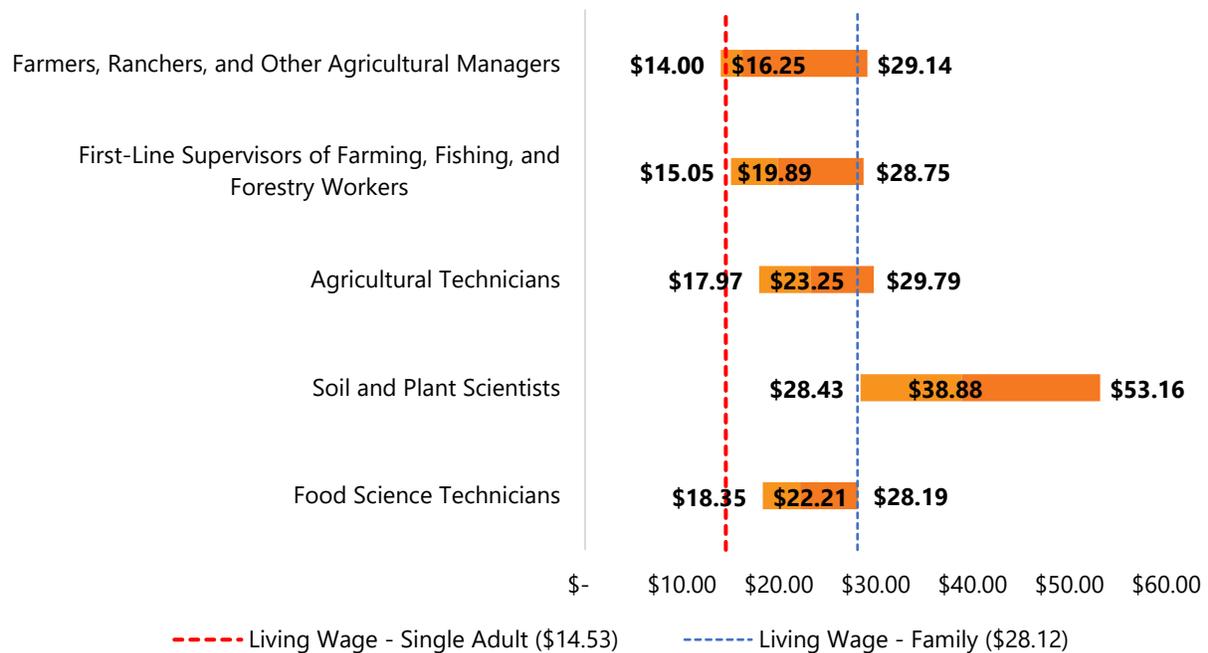
**Exhibit 2. Changes in employment, 2016-2026**



# WAGES

Exhibit 3 compares the entry-level, median, and experienced wages for the selected occupations to the North (Greater Sacramento) living wage<sup>1</sup> for a single adult (\$14.53 per hour) and a small family<sup>2</sup> (\$28.12 per hour).

**Exhibit 3. Comparison of wages by occupation, 2021**



# JOB POSTINGS

This section analyzes recent data from online job postings (real-time LMI). Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical trends.

The North COE identified 331 online job postings for the selected occupations in the Greater Sacramento subregion. Job posting data comes from Lightcast (formerly EMSI Burning Glass) and represents new listings posted online within the last year, from October 1, 2021, to September 30, 2022.

<sup>1</sup> Living wage is defined as the level of income a single adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. Please note that the 25th-percentile and 75th-percentile hourly wages are used as proxy for entry-level and experienced-level wages.

<sup>2</sup> A small family is defined as a single adult and one school aged child (between the ages of 5 and 12 years).

## Occupations and Job Titles

Exhibit 4 details the number of online job postings for the selected occupations.

### Exhibit 4. Number of job postings by occupation

Occupation	Job Postings	Share of Job Postings
Farmers, Ranchers, and Other Agricultural Managers	152	46%
Agricultural Technicians	98	30%
Soil and Plant Scientists	45	14%
First-Line Supervisors of Farming, Fishing, and Forestry Workers	28	8%
Food Science Technicians	8	2%
<b>Total Job Postings</b>	<b>331</b>	<b>100%</b>

Exhibit 5 shows the top 10 job titles with the most job postings and the share. All job postings included a job title.

### Exhibit 5. Top jobs titles

Job Title	Job Postings	Share of Job Postings
Agricultural Technicians	48	15%
Botanists	17	5%
Fisheries Technicians	15	5%
Conservation Technicians	13	4%
Farm Managers	12	4%
Farmers Market Managers	12	4%
Fish and Wildlife Technicians	12	4%
Organic Farmers	8	2%
Animal Husbandry Technicians	7	2%

Job Title	Job Postings	Share of Job Postings
Soil Scientists	6	2%

## Employers

Exhibit 6 shows the top 10 employers with the most job postings for the selected occupations.

### Exhibit 6. Employers with the most job postings

Employer	Job Postings	Share of Job Postings
Hawx Services	17	5%
Ecological Farming Association	12	4%
State of California	12	4%
University of California	10	3%
California Department of Food and Agriculture (CDFA)	7	2%
Cramer Fish Sciences	7	2%
SeaQuest Management	7	2%
City Of Trees Ventures	6	2%
University Of California, Agriculture and Natural Resources (UC ANR)	6	2%
ICF International	5	2%

## Certifications, Skills, and Experience

Exhibit 7 shows the most relevant certifications requested by employers for the selected occupations.

### Exhibit 7. Most in-demand certifications

Certification	Job Postings	Share of Job Postings
Certified Crop Advisor	6	2%
Pesticide Applicator License	5	2%
Certified Professional Agronomist	4	1%
Certified Professional Soil Scientist	4	1%
Certified Professional In Erosion And Sediment Control (CPESC)	2	1%

Exhibit 8 shows the top 10 skills across three categories for the studied occupations: specialized, human-centered, and technical skills.

### Exhibit 8. Most in-demand specialized skills

Top 10 Specialized Skills	Top 10 Human-Centered Skills	Top 10 Technical Skills
Irrigation (Landscaping and Agriculture)	Management	Microsoft Excel
Agriculture	Valid Driver's License	Microsoft Office
Biology	Communications	Geographic Information Systems
Pruning	Lifting Ability	Global Positioning Systems
Weed Control	Operations	Microsoft Outlook
Data Collection	Research	Microsoft Access
Botany	Detail Oriented	Microsoft Word
Cannabis	Customer Service	ArcGIS (GIS Software)
Soil Science	Microsoft Excel	ArcMap

Top 10 Specialized Skills	Top 10 Human-Centered Skills	Top 10 Technical Skills
Transplanting	Verbal Communication Skills	Google Workspace

Exhibit 9 shows employers' minimum level of education for job postings for the selected occupations.

**Exhibit 9. Employer-preferred minimum education levels**

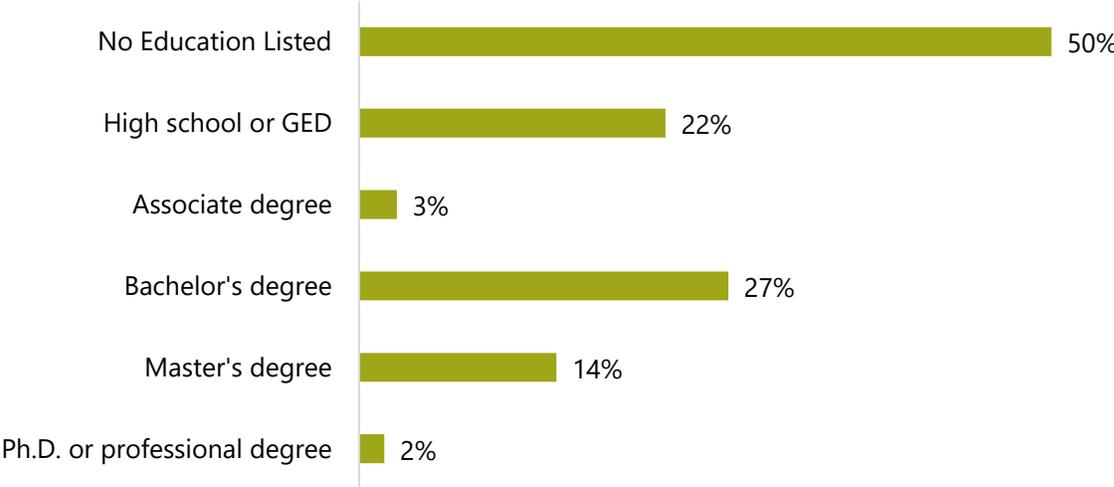
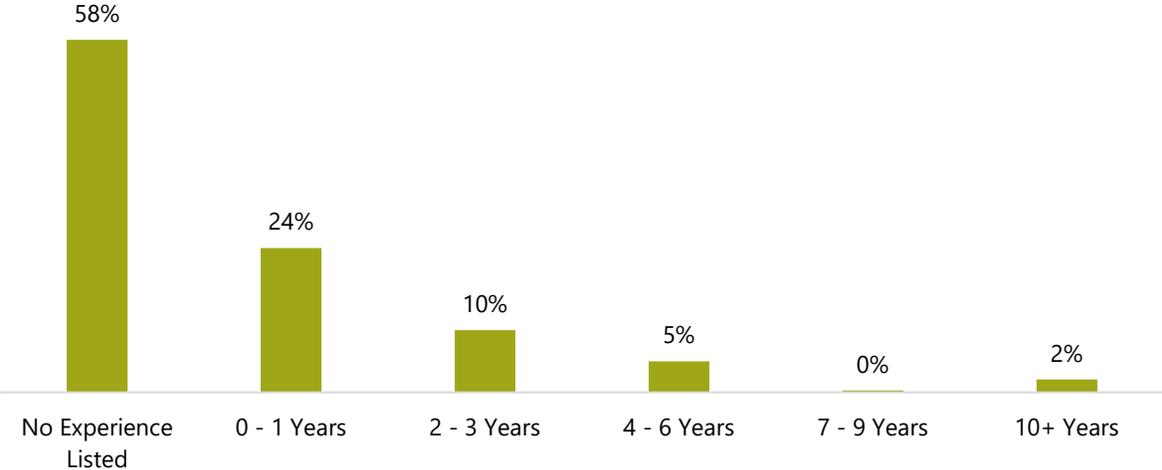


Exhibit 10 shows the experience levels required by employers for job postings for the selected occupations.

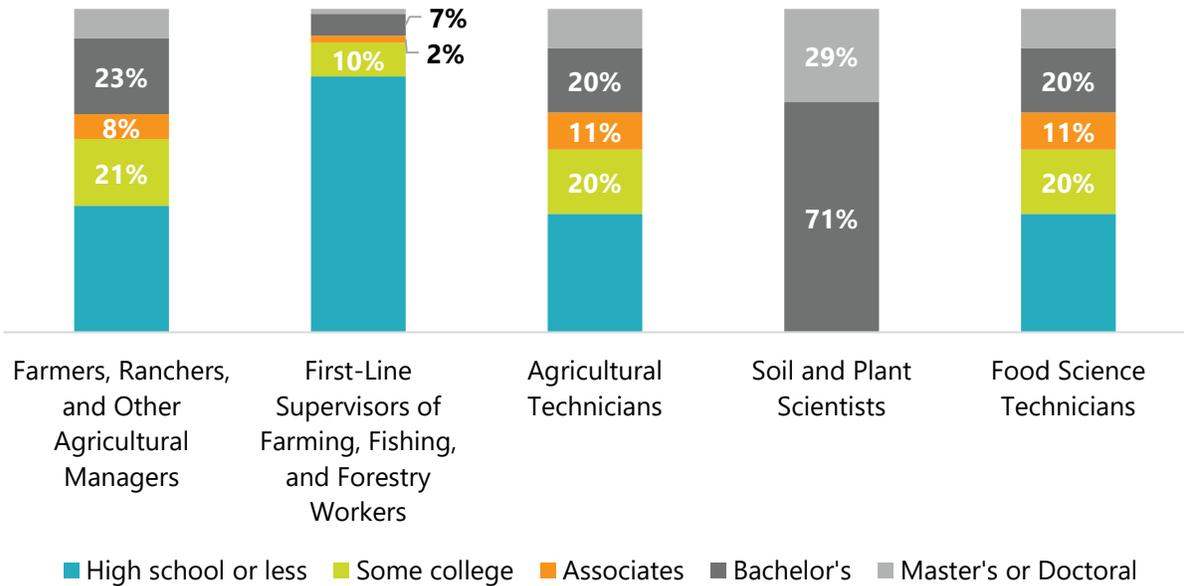
**Exhibit 10. Employer-preferred experience levels**



# EDUCATION AND TRAINING

The U.S. Census Bureau collects education data from workers employed in occupations. Exhibit 11 shows the state-level educational attainment of the current workforce in the selected occupations.

**Exhibit 11. California worker educational attainment for selected occupations, 2019**



The Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which the BLS publishes projections data. Exhibit 12 shows the selected occupations' entry-level job requirements.

**Exhibit 12. Typical education, work experience, and on-the-job training requirements**

Occupation	Typical Entry-level Education	Work Experience Required	On-the-job Training Required
Farmers, Ranchers, and Other Agricultural Managers	HS diploma or equivalent	5 years or more	None
First-Line Supervisors of Farming, Fishing, and Forestry Workers	HS diploma or equivalent	Less than 5 years	None
Agricultural Technicians	Associate degree	None	Moderate term
Soil and Plant Scientists	Bachelor's degree	None	None

Occupation	Typical Entry-level Education	Work Experience Required	On-the-job Training Required
Food Science Technicians	Associate degree	None	Moderate term

## EDUCATIONAL SUPPLY

Educational supply for an occupation can be estimated by analyzing the number of awards issued in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. Exhibit 13 shows the TOP and CIP codes related to the selected occupations for educational programs.

### Exhibit 13. TOP and CIP codes for training programs related to the selected occupations

TOP Programs and Codes	Aligned CIP Programs and Codes
Agriculture Technology and Sciences, General (0101.00)	Agriculture, General (01.0000)

### Community College Supply

Exhibit 14 lists the community college training programs in the Greater Sacramento area. These programs are sourced from The Chancellor's Office Curriculum Inventory System (COCI) and are active as of October 7, 2022.

### Exhibit 14. Greater Sacramento's Community College Agriculture Technology & Science Programs

TOP Code	College	Program Title	Awards Offered	
Agriculture Technology and Sciences, General (0101.00)	Cosumnes River	Agriculture, General	A.S. Degree	
	Sierra	Sustainable Agriculture	Certificate	
			A.S. Degree	
	Woodland	Agriculture Science	A.S. Degree	
			Sustainable Agriculture	Certificate
				Agriculture Research Technician
Yuba	Agriculture	A.S. Degree		

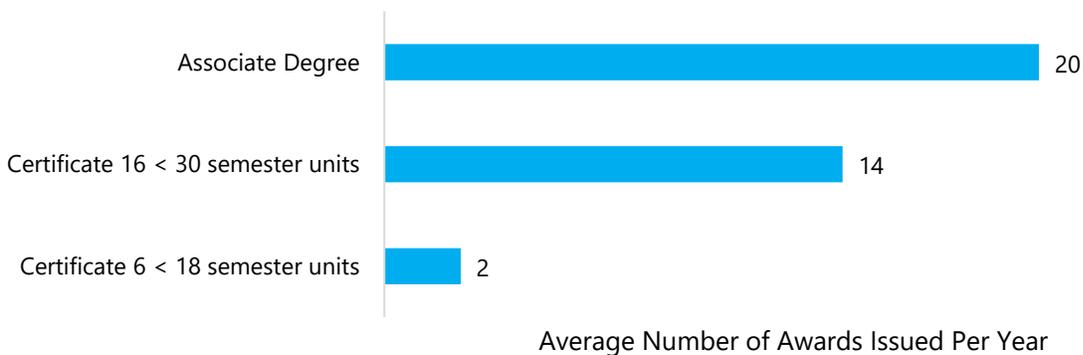
		Agriculture Technology	A.S. Degree
		Agricultural Technician	Certificate

Exhibits 15 and 16 compare the average number of certificates and degrees from selected community college programs over the last three academic years.

**Exhibit 15. Annual average community college awards by program**

Program - TOP Code	College	Annual Awards 2018-19	Annual Awards 2019-20	Annual Awards 2020-21	3-Yr Annual Awards Average
Agriculture Technology and Sciences, General (0101.00)	Cosumnes River	3	0	0	1
	Sierra	12	49	36	32
	Woodland	2	1	3	2
	Yuba	1	1	1	1
	<b>Grand Total</b>	<b>18</b>	<b>51</b>	<b>40</b>	<b>36</b>

**Exhibit 1. Annual average community college awards by type, 2018-19 through 2020-21**



**Other Postsecondary Supply**

There are no other postsecondary training programs under the Agriculture, General (01.0000) CIP code in the Greater Sacramento area.

However, there are several related agricultural programs at local public four-year institutions that may serve as transfer opportunities for students interested in pursuing careers requiring a

four-year degree, including but not limited to Agroecology and Sustainable Agriculture (01.0308), Plant Sciences (01.1101), Agronomy and Crop Science (01.1102), and Soil Science and Agronomy, General (01.1201). Since this report primarily focuses on middle-skill careers in Agricultural Sciences and Technology, these pathways are not considered in the supply analysis.

# FINDINGS

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- This report focuses on five occupations in the Agricultural Technology & Sciences pathway: Farmers, Ranchers, and Other Agricultural Managers (11-9013), Agricultural Technicians (19-4012), Food Science Technicians (19-4013), First-line Supervisors of Farming, Fishing, and Forestry Workers (45-1011), and Soil and Plant Scientists (19-1013).
- The North (Greater Sacramento) subregion held 3,764 Agricultural Technology & Sciences jobs in 2021. These jobs are projected to increase by 6% over the next five years, adding 237 new jobs to the subregion by 2026.
- Agricultural Technology & Sciences jobs are projected to grow faster in the Greater Sacramento subregion than in California.
- Over the next five years, Agricultural Technology & Sciences jobs will have 459 annual openings in Greater Sacramento.
- Analysis of wage data shows that most Agricultural Technology & Sciences occupations earn more than the single adult living wage of \$14.53 per hour. Entry-level wages range from a low of \$15 per hour for supervisors of farming, fishing, and forestry workers to a high of \$28 per hour for soil and plant scientists.
  - Farmers, ranchers, and other agricultural managers have entry-level wages below the subregional living wage but achieve a living wage at the median level or mid-career.
- According to real-time labor market information, there were about 331 online job postings for Agricultural Technology & Sciences occupations between October 1, 2021, and September 30, 2022. Nearly half of the job postings (46%) were for farmers, ranchers, and other agricultural managers.
- Between 12% and 31% of incumbent workers in Agricultural Technology & Sciences occupations have educational attainment levels consistent with community college offerings (some college or associate degrees). Another 7% to 23% of workers in these occupations hold a bachelor's degree.
  - The educational attainment of soil and plant scientists is aligned with the level of education needed for an entry-level job. The typical entry-level education for soil and plant scientists is a bachelor's degree, and 71% of incumbent workers in the occupation hold a bachelor's degree.
- Four North (Greater Sacramento) community colleges offer degrees and certificates in Agricultural Technology & Sciences. Together, these programs conferred an average of 36 awards (certificates and associate degrees) in Agricultural Technology & Sciences programs over the last three academic years (2018-19 through 2020-21).

- There are no other postsecondary training programs under the Agriculture, General (01.0000) CIP code in the Greater Sacramento area. However, there are several related agricultural programs at local public four-year institutions that may serve as transfer opportunities for students interested in pursuing careers requiring a four-year degree, including but not limited to Agroecology and Sustainable Agriculture (01.0308), Plant Sciences (01.1101), Agronomy and Crop Science (01.1102), and Soil Science and Agronomy, General (01.1201).

## RECOMMENDATIONS

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- Based on a three-year average of annual awards in North (Greater Sacramento) subregion Agricultural Technology & Sciences programs and projected yearly openings, the supply gap analysis shows that the region has room for additional training.
  - Community colleges and other postsecondary training providers issued an average of 36 awards over the last three years.
  - There are 459 projected annual openings for Agricultural Technology & Sciences jobs.

New Program Recommendation		
<b>Move forward with the new program</b>	<b>Proceed with caution</b>	<b>A new program is not recommended</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Program Modification	
<b>Move forward with program modifications</b>	<b>Program modifications are not recommended</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

# APPENDIX A. METHODOLOGY AND SOURCES

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This report identified Occupations using the Center of Excellence TOP-to-CIP-to-SOC crosswalk and O\*Net OnLine. This report's findings were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

Lightcast (Formerly EMSI/Burning Glass) 2022.3; QCEW Employees, Non-QCEW Employees, and Self-Employed. <https://www.economicmodeling.com/>. *Note: EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors).*

Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. <https://nces.ed.gov/ipeds/>.

Labor Market Information Division. California Employment Development Department. <https://labormarketinfo.edd.ca.gov/>.

Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor's Office. <https://datamart.cccco.edu/>.

O\*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOL ETA). <https://www.onetonline.org/>.

Public Use Microdata Sample (PUMS). U.S. Census Bureau American Community Survey (ACS). <https://www.census.gov/programs-surveys/acs/microdata.html>

Self-Sufficiency Standard Tool for California. The University of Washington. <http://www.selfsufficiencystandard.org/>

"Taxonomy of Programs." California Community Colleges Chancellor's Office. June 2012, 6<sup>th</sup> Edition. <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Educational-Services-and-Support/Academic-Affairs/What-we-do/Curriculum-and-Instruction-Unit/Files/TOPmanual6200909corrected12513pdf.ashx>

"TOP-CIP-SOC Crosswalk." Centers of Excellence for Labor Market Research. June 2021 Edition. <http://coecc.net/>

## APPENDIX B. GLOSSARY OF KEY TERMS

Key Terms	Definition
<b>Occupation</b>	Occupation refers to professions, or careers, in the workforce. Occupations differ from jobs in that jobs show the number of positions held in a given occupation.
<b>Jobs</b>	<p>A job is any position where a worker provides labor for monetary compensation.</p> <p>Job numbers include employees (those who work for businesses) and proprietors (those who work for themselves). Full- and part-time jobs are included and counted equally (i.e., not adjusted to full-time equivalents). Data for jobs, or employment, are annual averages.</p>
<b>Job Change</b>	Job change is the net increase or decrease of jobs over a given timeframe.
<b>Job Openings</b>	<p>Job openings are the projected number of positions available for workers entering an occupation.</p> <p>Openings include growth and replacement jobs. Growth jobs are the positive change in the total number of workers employed. Replacement jobs are the estimates of new workers needed to replace workers permanently leaving the occupation.</p>
<b>Wages</b>	Wages, or compensation, show workers' percentile and average earnings in a given occupation. The 25th-percentile and 75th-percentile hourly wages are used as a proxy for entry-level and experienced-level wages.
<b>Living Wage</b>	The living wage is the level of income a single adult with no children must earn to meet basic needs. The living wage is calculated using basic levels of allowances for food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs.
<b>Educational Attainment</b>	Educational attainment is the level of education achieved by workers in a given occupation. The data includes workers aged 25 years and older.
<b>Typical Entry-level Education</b>	The education level generally required for employment in an occupation. It may differ from the actual educational levels attained by workers in any given occupation.
<b>Work Experience Required</b>	The level of prior experience a worker needs to enter a job in a given occupation.
<b>On-the-job Training Required</b>	The level of on-the-job training a worker needs to obtain competency in a given occupation.
<b>Awards</b>	Awards are the number of certificates and degrees conferred for a specific course of study in a given year. Awards counts "papers" and, as a result, may be greater than the actual number of students who complete a program.

**COVID-19 Statement:** This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

**Important Disclaimer:** All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

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Centers of Excellence for Labor Market Research, Economic and  
Workforce Development Program



CENTERS OF EXCELLENCE  
FOR LABOR MARKET RESEARCH

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