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Labor Market Analysis

Agricultural Technology



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Prepared by the Central Valley/Mother Lode Center of Excellence

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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.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for agricultural technology. Three occupations related to agricultural technology were identified for Reedley College:

- 19-4011, Agricultural and Food Science Technicians
- 19-4099, Life, Physical, and Social Science Technicians, All Other
- 45-2011, Agricultural Inspectors

Key findings:

- **Occupational demand** — Nearly 1,590 workers were employed in jobs related to agricultural technology in 2020 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is agricultural inspectors with 602 workers, a projected growth rate of 0% over the next five years, and 99 annual openings.
- **Wages** — Life, physical, and social science technicians, all other earn the highest entry-level wage, \$20.89/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Mission Foods, Anthem Blue Cross, and Saputo.
- **Occupational titles** — The most common occupational title in job postings in the subregion is Quality Control Analysts. The most common job title is Quality Control Technician.
- **Skills and certifications** — The top baseline skill is communication skills, the top specialized skill is quality control analysts, and the top software skill is quality control technician. The most in-demand certification is a driver's license.
- **Education** — An associate degree is typically required for agricultural and food science technicians and life, physical, and social science technicians, all other. A bachelor's degree is typically required for agricultural inspectors.
- **Supply** — Analysis of postsecondary completions shows that on average 31 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 215 trained workers in the subregion and 340 workers in the region. The Center of Excellence recommends that Reedley College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of agricultural technology workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Reedley College to provide labor market information for agricultural technology. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the SCV/SML subregion is \$11.91/hour.¹ Analysis of the program and occupational data related to agricultural technology resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 19-4011, Agricultural and Food Science Technicians
- 19-4099, Life, Physical, and Social Science Technicians, All Other
- 45-2011, Agricultural Inspectors

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below. There was no O*NET data available for Agricultural and Food Science Technicians.

Agricultural Inspectors

Job Description: Inspect agricultural commodities, processing equipment, and facilities, and fish and logging operations, to ensure compliance with regulations and laws governing health, quality, and safety.

Knowledge: Customer and Personal Service, Administration and Management, Administrative, Law and Government, Mathematics

Skills: Quality Control Analysis, Active Listening, Monitoring, Reading Comprehension, Critical Thinking

Occupational Demand

The SCV/SML subregion employed 1,584 workers in agricultural technology occupations in 2020 (Exhibit 1). The largest occupation is agricultural inspectors with 602 workers. This occupation is projected to grow by 0% over the next five years and has the greatest number of projected annual openings, 99.

Exhibit 1. Agricultural technology employment and occupational projections in the SCV/SML subregion

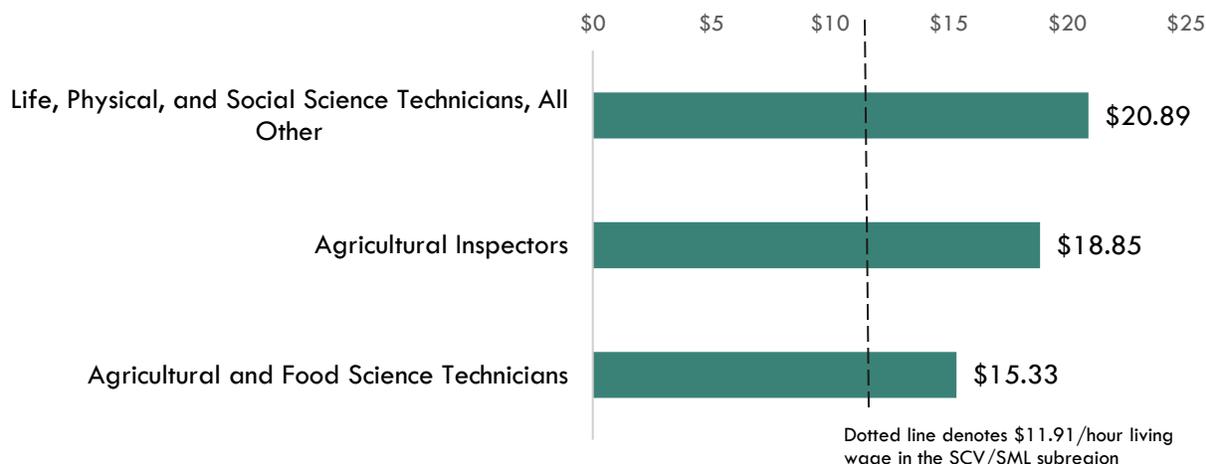
Occupation	2020 Jobs	2025 Jobs	5-Year Change	5-Year % Change	Annual Openings
Agricultural Inspectors	602	603	0	0%	99
Agricultural and Food Science Technicians	620	635	16	3%	86
Life, Physical, and Social Science Technicians, All Other	362	369	7	2%	46
TOTAL	1,584	1,607	23	1%	231

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Wages

Exhibit 2 shows the entry-level hourly wages of the agricultural technology occupations. Life, physical, and social science technicians, all other earn the highest entry-level wage, \$20.89/hour in the subregion².

Exhibit 2. Agricultural technology entry-level wages in the SCV/SML subregion



Job Postings

There were 267 job postings for the three occupations in the SCV/SML subregion from October 2021 to March 2022.³ The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of agricultural technology by number of job postings

Employer	Job Postings	% Job Postings
Mission Foods	7	4%
Anthem Blue Cross	6	3%
Saputo	6	3%
Ventura Coastal Llc	5	3%
Vulcan Materials Company	5	3%
state of california	5	3%
Pathways Of California	4	2%
Semios	4	2%
Western Milling	4	2%
Caro Nut Company	3	2%

Exhibit 4 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across six O*NET OnLine occupations. The occupational title Quality Control Analysts is listed in 208 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings

² Entry-level wages are derived from the 25th percentile.

³ Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

include Quality Control Technician in 39 job postings, Quality Assurance Technician in 27 job postings, and Quality Improvement Coordinator in six job postings.

Exhibit 4. Top occupational titles in job postings for agricultural technology

Occupational Title	Job Postings	% of Job Postings
Quality Control Analysts	208	78%
Agricultural Technicians	34	13%
Food Science Technicians	11	4%
Precision Agriculture Technicians	8	3%
Agricultural Inspectors	3	1%
Life, Physical, and Social Science Technicians, All Other	3	1%

Salaries

Exhibit 5 shows the “Market Salaries” for agricultural technology occupations. These are calculated by Burning Glass using a machine learning model built off of millions of job postings every year. This accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for agricultural technology occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$28,375
25th Percentile	\$32,953
50th Percentile	\$38,263
75th Percentile	\$47,438
90th Percentile	\$67,249

Education

Of the 267 job postings, 176 listed an education level preferred for the positions being filled. Among those, 60% requested high school or vocational training, 43% requested a bachelor’s degree, and 21% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.

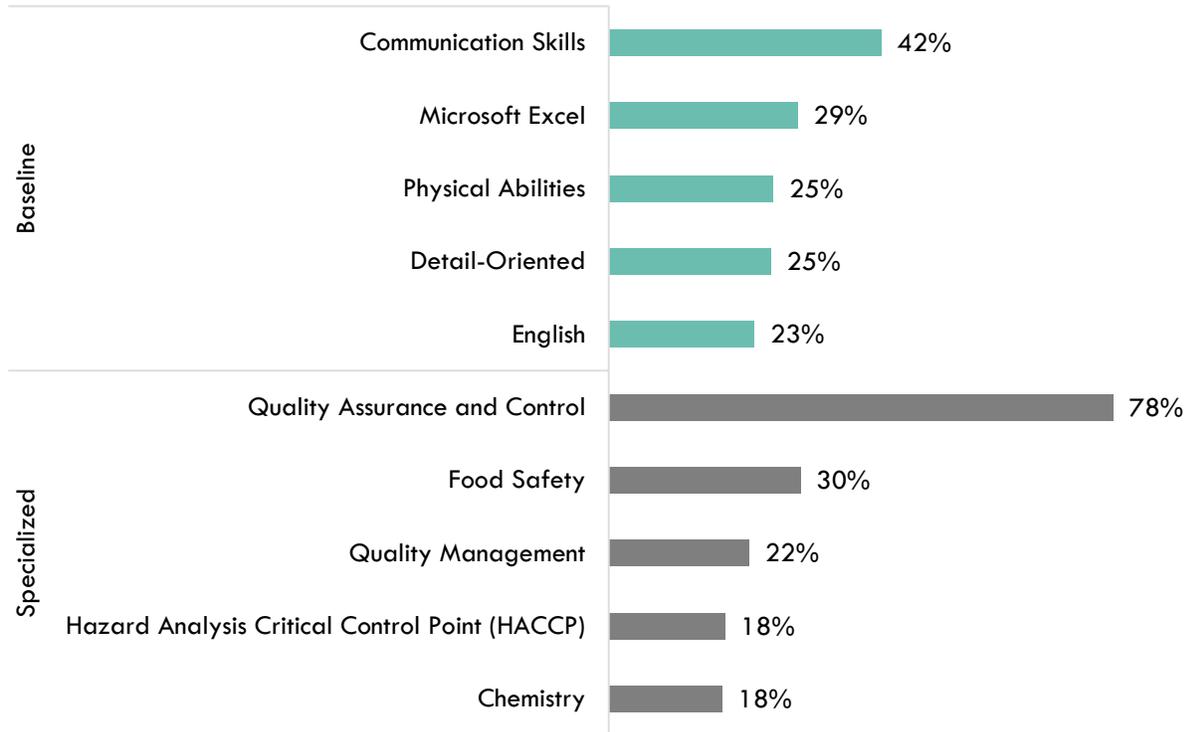
Exhibit 6. Education levels requested in job postings for agricultural technology

Education Level	Job Postings	% of Job Postings
High school or vocational training	106	60%
Bachelor's degree	75	43%
Associate's degree	37	21%
Master's degree	19	11%
Doctoral degree	2	1%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are communication skills, 42% of job postings, Microsoft Excel, 29%, and physical abilities, 25%. The top three specialized skills are quality control analysts, 78% of job postings, food safety, 30%, and quality management, 22%.

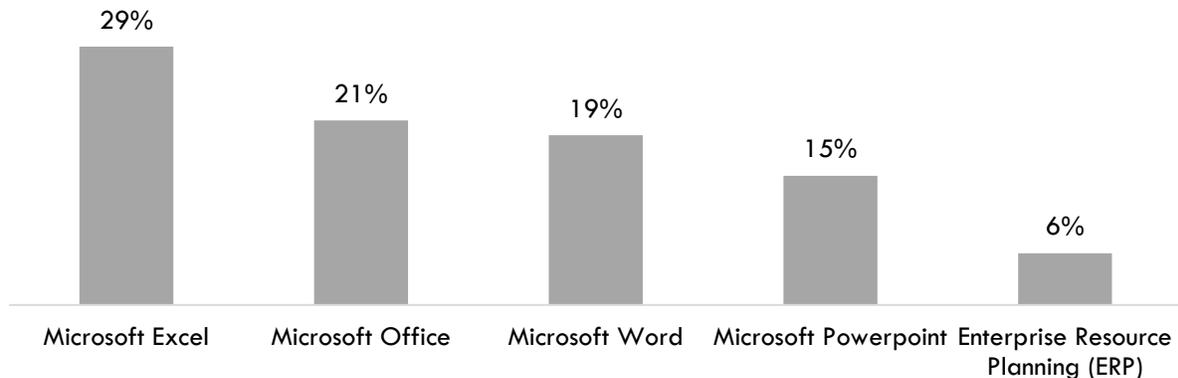
Exhibit 7. In-demand agricultural technology baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Excel and Office were the top two software skills identified in job postings (Exhibit 8).

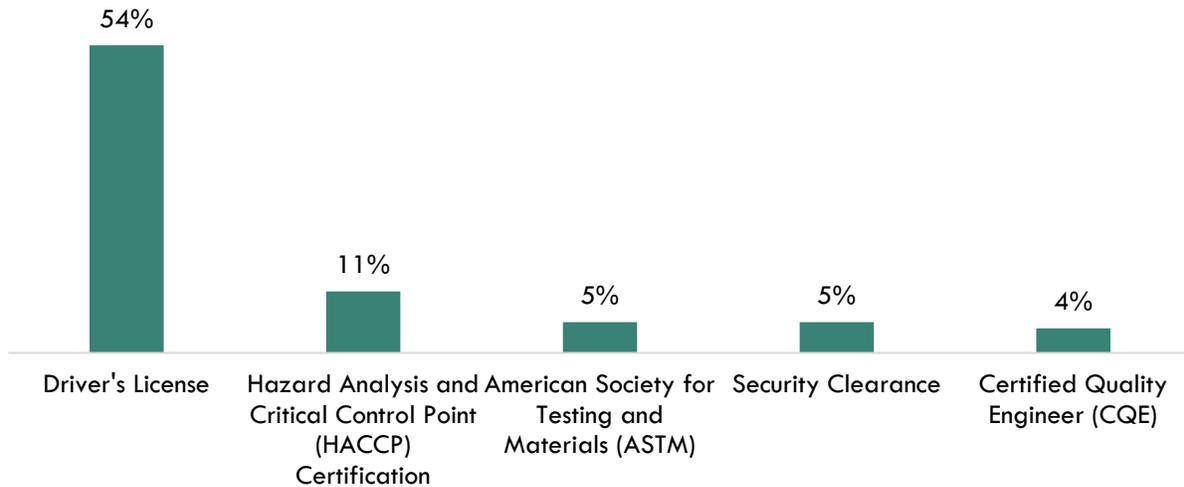
Exhibit 8. In-demand agricultural technology software skills



Certifications

Of the 267 job postings, 92 contained certification data. Among those, 54% indicated a need for a driver's license. The next top certifications are Hazard Analysis and Critical Control Point (HACCP) Certification and American Society for Testing and Materials (ASTM) (Exhibit 9).

Exhibit 9. Top agricultural technology certifications requested in job postings



Education, Work Experience & Training

An associate degree is typically required for agricultural and food science technicians and life, physical, and social science technicians, all other. A bachelor's degree is typically required for agricultural inspectors (Exhibit 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for agricultural technology occupations⁴

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Agricultural Inspectors	Bachelor's degree	None	Moderate-term	41.1%
Agricultural and Food Science Technicians	Associate's degree	None	Moderate-term	40.5%
Life, Physical, and Social Science Technicians, All Other	Associate's degree	None	None	36.6%

⁴ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

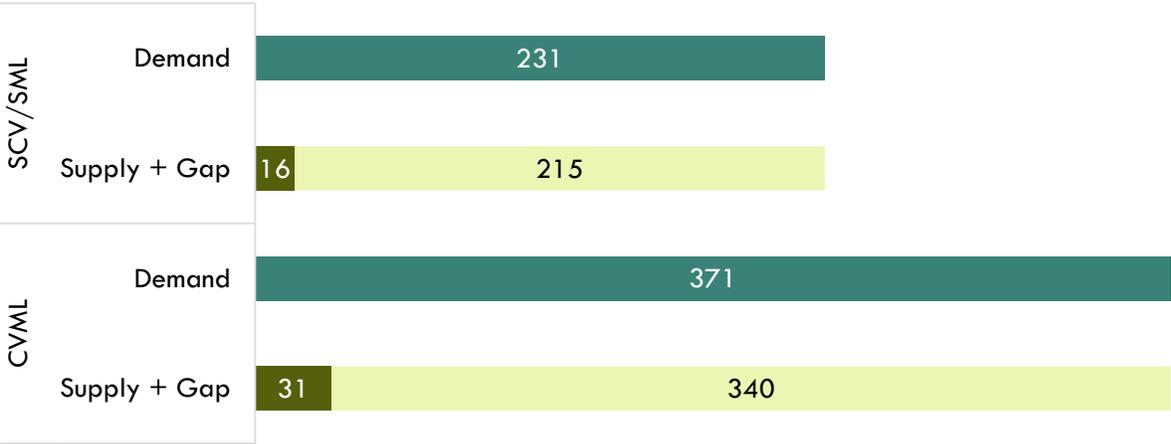
Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP code and title: 010100 - Agriculture Technology and Sciences, General. Analysis of the last three years of data shows that, on average, 31 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for agricultural technology occupations in the region

TOP/CIP Code- Title	College	Associate Degree	Certificate 18 < 30 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Subtotal
010100 - Agriculture Technology and Sciences, General	Merced	9				9
	Modesto	6			0	6
	Porterville	9				9
	Reedley College	1	1			2
	West Hills Coalinga	2	1	1		4
TOTAL		27	3	1	0	31

There is an undersupply of 215 agricultural technology workers in the SCV/SML subregion and 340 workers in the region (Exhibit 12).

Exhibit 12. Agricultural technology workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill gap in the SCV/SML subregion and region



Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor’s Cal-PASS Plus LaunchBoard for the TOP code related to agricultural technology. Of note, 15 students received a degree or certificate or attained apprenticeship journey status; 32 students transferred; 69% of students obtained a job closely related to their field of study; 18% had a median change in earnings; and 57% of students attained a living wage.

Exhibit 13. Regional metrics for the TOP code related to agricultural technology

Metric	Agriculture Technology and Sciences, General 010100
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	15
Number of Students Who Transferred	32
Job Closely Related to Field of Study	69%
Median Change in Earnings	18%
Attained a Living Wage	57%
* denotes data not available.	

Conclusion

The entry-level wages of the three occupations exceed the SCV/SML subregion's average living wage. There were 267 job postings in the past six months for occupations related to agricultural technology in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is communication skills, and the top specialized skill is quality control analysts.
- The top software skill is quality control technician.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 215 in the SCV/SML subregion and 340 in the region.

Recommendation

Based on these findings, it is recommended that Reedley College work with the regional director, the college's advisory board, and local industry in the expansion of programs to address the shortage of agricultural technology in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor’s Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). 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). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Burning Glass: burning-glass.com/ .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.