**Sustainable Agriculture Occupations**

**Labor Market Information Report**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

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# Recommendation

Based on all available data, there appears to be an undersupply of Sustainable Agricultural workers for the Bay region and the Santa Cruz-Monterey sub-region (Monterey, San Benito and Santa Cruz Counties).

The exact gap is difficult to determine since the occupational cluster selected is defined at the eight-digit SOC code level for which traditional labor market information (LMI) to determine annual openings is not available. Therefore, the annual openings provided in this report overstate demand, since they are at the six-digit SOC code level and include occupations for which this proposed program does not appear to prepare/train students. However, supply in the region and sub-region on the TOP code selected (Agriculture Technology and Sciences, General programs - TOP 0101.00) is small with only 15 awards issued annually by Hartnell College, the only college awarding degrees or certificates on this TOP code.

In addition, the intent of this program is to train students in emerging agriculture technology. Often finding occupation (SOC) codes that match to these emerging careers is difficult. As stated in the LMI application, “The primary goal of this program is to create a program that gives students a core horticulture and plant science curriculum and also develops their skills in a broad range of agriculture technology topics including: data management, GIS mapping, networking technology tools on farm, producing plants in nutrient film technique, deep raft, ebb and flood, and substrate hydroponic production systems, electrical and hydraulic engineering basics, soil moisture sensing, and energy and water conservation. Upon completion, students will be prepared for emerging careers at the nexus of agriculture, technology, and sustainable food production including precision agriculture technicians, greenhouse managers, hydroponic growers, farmers, ranch or operations managers, field technicians and many more.”

This report also provides student outcomes data on employment and earnings for Agriculture Technology and Sciences, General programs (TOP 0101.00). It is recommended that this data be reviewed to better understand how student outcomes on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Cabrillo College and in the region.

# Introduction

This report profiles Sustainable Agriculture occupations in the 12 county Bay region and the Santa Cruz-Monterey sub-region (Monterey, San Benito and Santa Cruz Counties) for a proposed new Sustainable Agriculture program at Cabrillo College. As stated above, labor market information (LMI) is not available at the eight-digit SOC Code level. Therefore, the information shown in Tables 1, 2 and 5 are for the four SOC codes at the six digit SOC level. However, online postings data is available at the eight-digit level from Burning Glass in the other tables in this report.

* **Farmers, Ranchers and Other Agricultural Managers (SOC 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.
  + **Nursery and Greenhouse Managers (SOC 11-9013.01):** Plan, organize, direct, control, and coordinate activities of workers engaged in propagating, cultivating, and harvesting horticultural specialties, such as trees, shrubs, flowers, mushrooms, and other plants.
  + **Farm and Ranch Managers (SOC 11-9013.02):** Plan, direct, or coordinate the management or operation of farms, ranches, greenhouses, aquacultural operations, nurseries, timber tracts, or other agricultural establishments. May hire, train, or 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, financial, or marketing activities.

*Entry-Level Educational Requirement:* *High School Diploma or Equivalent*

*Training Requirement:* *None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 29%

* **Agricultural and Food Science Technicians (SOC 19-4011)**: Work with agricultural and food scientists in food, fiber, and animal research, production, and processing; and assist with animal breeding and nutrition. Conduct tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects. Includes technicians who assist food scientists or technologists in the research and development of production technology, quality control, packaging, processing, and use of foods.
  + **Agricultural Technicians (SOC 19**-**4011.01):** 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.

*Entry-Level Educational Requirement:* *Associate Degree*

*Training Requirement:* *Moderate-term-on-the-job training*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 39%

* **Life, Physical, and Social Science Technicians, All Other (SOC 19-4099)**: All life, physical, and social science technicians not listed separately.
  + **Precision Agriculture Technicians (SOC 19**-**4099.02):** Apply geospatial technologies, including geographic information systems (GIS) and Global Positioning System (GPS), to agricultural production or management activities, such as pest scouting, site-specific pesticide application, yield mapping, or variable-rate irrigation. May use computers to develop or analyze maps or remote sensing images to compare physical topography with data on soils, fertilizer, pests, or weather.

*Entry-Level Educational Requirement:* *Associate Degree*

*Training Requirement:* *None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 35%

* **First-Line Supervisors of Sustainable Agriculture, Fishing, and Forestry Workers (SOC 45-1011)**: Directly supervise and coordinate the activities of agricultural, forestry, aquacultural, and related workers.
  + **First-Line Supervisors of Agricultural Crop and Horticultural Workers (SOC 45-1011.07):** Directly supervise and coordinate activities of agricultural crop or horticultural workers.

*Entry-Level Educational Requirement:* *High School Diploma or Equivalent*

*Training Requirement:* *None*

*Percentage of Community College Award Holders or Some Postsecondary Coursework:* 24%

# Occupational Demand

**Table 1. Employment Outlook for Sustainable Agriculture Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-year Open-ings | Annual Open-ings | 10% Hrly Wage | Median Hrly Wage |
| Farmers, Ranchers & Other Agricultural Managers | 7,552 | 7,459 | (93) | (1%) | 2,959 | 592 | $9.48 | $13.86 |
| Agricultural & Food Science Technicians | 1,143 | 1,204 | 61 | 5% | 642 | 128 | $13.08 | $22.79 |
| Life, Physical & Social Science Technicians, All Other | 2,675 | 2,875 | 200 | 7% | 1,794 | 359 | $17.87 | $27.60 |
| First-Line Supervisors of Farming, Fishing & Forestry Workers | 2,614 | 2,635 | 21 | 1% | 1,789 | 358 | $12.74 | $19.55 |
| **Total** | **13,984** | **14,172** | **189** | **1%** | **7,183** | **1,437** | **$11.99** | **$18.28** |

*Source: EMSI 2018.1***Bay Region** includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

**Table 2. Employment Outlook for Sustainable Agriculture Occupations in SC-Monterey Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation | 2017 Jobs | 2022  Jobs | 5-Yr Change | 5-Yr % Change | 5-year Open-ings | Annual Open-ings | 10% Hrly Wage | Median Hrly  Wage |
| Farmers, Ranchers & Other Ag Managers | 321 | 298 | (23) | (7%) | 113 | 23 | $9.67 | $14.06 |
| Agricultural & Food Science Technicians | 345 | 365 | 20 | 6% | 196 | 39 | $14.29 | $23.44 |
| Life, Physical & Social Science Technicians, All Other | 591 | 658 | 67 | 11% | 425 | 85 | $18.02 | $27.75 |
| First-Line Supervisors of Farming, Fishing & Forestry Workers | 106 | 104 | (2) | (2%) | 70 | 14 | $14.18 | $17.78 |
| **Total** | **1,363** | **1,425** | **62** | **5%** | **804** | **161** | **$14.81** | **$22.66** |

*Source: EMSI 2018.1***SC-Monterey Sub-Region** includes Monterey, San Benito and Santa Cruz Counties

### Job Postings in Bay Region and SC-Monterey Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Mar 2017 - Feb 2018)**

|  |  |  |
| --- | --- | --- |
| Occupation | Bay Region | SC-Monterey |
| Farm and Ranch Managers (11-9013.02) | 80 | 10 |
| First-Line Supervisors of Agricultural Crop and Horticultural Workers (45-1011.07) | 79 | 9 |
| Agricultural Technicians (19-4011.01) | 31 | 3 |
| Nursery and Greenhouse Managers (11-9013.01) | 13 | 0 |
| Precision Agriculture Technicians (19-4099.02) | 5 | 0 |
| **Total** | **208** | **22** |

*Source: Burning Glass*

**Table 4. Top Job Titles for Sustainable Agriculture Occupations for latest 12 months (March 2017 - February 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Common Title | Bay | SC-Monterey | Common Title | Bay | SC-Monterey |
| Laboratory Management/Supervisor | 21 | 0 | Farm Manager | 6 | 4 |
| Manager | 15 | 0 | Grow | 6 | 0 |
| Viticulturist | 7 | 2 | Change Management Contractor | 4 | 0 |
| Biotechnician | 6 | 0 | Fuel Farm Operator | 4 | 0 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Sustainable Agriculture Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Industry – 6 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2017)** | **Jobs in Industry (2022)** | **% Change (2017-22)** | **% in Industry (2017)** |
| Crop Production (111000) | 7,944 | 7,864 | (1%) | 56.8% |
| Animal Production (112000) | 563 | 471 | (16%) | 4.0% |
| Colleges, Universities, and Professional Schools (State Govt) (902612) | 562 | 540 | (4%) | 4.0% |
| R&D in the Physical, Engineering, and Life Sciences (except Nanotech and Biotech) (541715) | 557 | 591 | 6% | 4.0% |
| Farm Labor Contractors and Crew Leaders (115115) | 538 | 589 | 9% | 3.8% |
| Temporary Help Services (561320) | 302 | 337 | 12% | 2.2% |
| Farm Management Services (115116) | 269 | 281 | 4% | 1.9% |
| Colleges, Universities, and Professional Schools (611310) | 266 | 290 | 9% | 1.9% |
| R&D in Biotech (except Nanobiotech) (541714) | 226 | 280 | 24% | 1.6% |
| Postharvest Crop Activities (except Cotton Ginning) (115114) | 214 | 256 | 20% | 1.5% |
| Federal Government, Civilian, Excluding Postal Service (901199) | 172 | 169 | (2%) | 1.2% |
| Wineries (312130) | 172 | 172 | 0% | 1.2% |
| Testing Laboratories (541380) | 140 | 147 | 5% | 1.0% |
| Soil Preparation, Planting, and Cultivating (115112) | 115 | 117 | 2% | 0.8% |
| Local Government, Excluding Education and Hospitals (903999) | 106 | 111 | 5% | 0.8% |

*Source: EMSI 2017.3*

**Table 6. Top Employers Posting Jobs in Bay Region and SC-Monterey for latest 12 months (March 2017 - February 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Employer** | **Bay** | **Employer** | **Bay** | **Employer** | **SC-Monterey** |
| E & J Gallo Winery | 9 | Div | 3 | University of California | 3 |
| Allied Search Partners | 3 | Syngenta | 3 | Dole Food Company Inc | 2 |
| Constellation Brands Inc | 3 | University of California | 3 | Smith Gardens | 2 |

*Source: Burning Glass*

# Educational Supply

**Table 7. Horticulture Programs on TOP 0101.00 – Agriculture Technology and Sciences, General in Bay Region**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| College | Sub-Region | CC Headcount | Transfer Students | Associate Degrees | Certificates or Other Credit Awards | Total Awards |
| Hartnell | SC & Monterey | 357 | 21 | 11 | 4 | 15 |
| Santa Rosa | North Bay | 317 | 10 | 0 | 0 | 0 |
| **Bay Region** | | **674** | **31** | **11** | **4** | **15** |
| **SC-Monterey Sub-Region** | | **357** | **21** | **11** | **4** | **15** |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: For Community Colleges, the annual average for Associate Degrees and Certificates is 2014-17. Headcount is for 2016-17, and transfer students are for 2015-16. There appears to be no programs at Other Educational Postsecondary Institutes based on a crosswalk of TOP to CIP codes.

# Gap Analysis

The labor market gap is significant in the Bay region for this cluster of occupation with total annual openings of 1,437 and annual supply of 15 awards. In the SC-Monterey sub-region, there is also a gap with total annual openings of 161 and annual supply of 15 awards. However, in the LMI application only SOC codes at the eight- digit level were selected. Therefore, the demand or annual openings number includes occupations for which this program area will not train, since LMI is only available at the higher six-digit level. For example, SOC code 19-4099.02 was selected for Precision Agriculture Technicians (under the six digit SOC code 19-4099 Life, Physical and Social Science Technicians, All Other). Therefore, the 359 annual openings in the region and 85 in the sub-region also include openings for 19-4099.01- Quality Control Analysts and 19-4099.03 - Remote Sensing Technicians. Therefore, the annual openings are overstated in the region and sub-region.

Online postings in the Agriculture Industry sector most likely under represent true demand by employers in the sector. There are only 208 annual postings in the region and 22 in the SC-Monterey sub-region for the more precise eight- digit level SOC codes selected in the LMI application (since LMI at the eight-digit level is possible for online postings). Therefore, it would seem that for the Bay Region annual demand is somewhere between the overstated 1,437 at the six-digit level and the understated 208 at the eight-digit online job posting level. In any case, it appears that there is an undersupply for this occupational cluster.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0101.00 – Agriculture Technology and Sciences, General**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2015-16** | **Bay Region (All CTE Programs)** | **Cabrillo (All CTE Programs)** | **State (0101.00)** | **Bay Region (0101.00)** | **Top College on TOP06 0101.00 in Bay Region** | |
| % Employed Four Quarters After Exit | 74% | 70% | 61% | 70% | Hartnell | 78**%**  (63 students) |
| Median Earnings Two Quarters After Exit | $10,130 | $8,390 | $6,440 | $9,120 | Hartnell | $9,510  (36 students) |
| Median % Change in Earnings | 46% | 54% | 81% | 25% | Hartnell | 32%  (42 students) |
| % of Students Earning a Living Wage | 63% | 55% | 46% | 63% | Hartnell | 64%  (44 students) |

*Source: Launchboard*

# Skill & Certifications

**Table 9. Top Skills for Sustainable Agriculture Occupations in the Bay Region (March 2017 - February 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Skill** | **Postings** | **Skill** | **Postings** | **Skill** | **Postings** |
| Scheduling | 37 | Fertilizers | 20 | Staff Management | 12 |
| Irrigation | 35 | Microsoft Powerpoint | 18 | Cancer knowledge | 11 |
| Microsoft Excel | 34 | Microsoft Office | 15 | Data Collection | 11 |
| Supervisory Skills | 32 | Repair | 15 | Farm Management | 11 |
| Budgeting | 30 | Record Keeping | 14 |  |  |
| Project Management | 22 | Microsoft Word | 13 |  |  |

*Source: Burning Glass*

**Table 10. Certifications for Sustainable Agriculture Occupations in the Bay Region (March 2017 - February 2018)**

Note: 81% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

|  |  |  |  |
| --- | --- | --- | --- |
| **Skill** | **Postings** | **Skill** | **Postings** |
| Clinical Laboratory Scientist (CLS) | 17 | Applicators License | 5 |
| Pest Control Applicator | 7 | Certified Pest Control | 5 |

*Source: Burning Glass*

**Table 11. Education Requirements in Bay Region**

Note: 56% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

|  |  |
| --- | --- |
| **Education (minimum advertised)** | **Latest 12 Mos. Postings** |
| High school or vocational training | 26 (28%) |
| Associate Degree | 6 (7%) |
| Bachelor’s Degree or Higher | 59 (65%) |

*Source: Burning Glass*

# Methodology

Occupations for this report were identified by use of skills listed in O\*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

# Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://www.calpassplus.org/Launchboard/)

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor’s Office MIS system

# Contacts

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