SECTOR PROFILE

Agriculture, Water & Environmental Technologies

NOVEMBER 2025

CENTER OF EXCELLENCE FOR LABOR MARKET RESEARCH
BAY AREA

BACCC BAY AREA
COMMUNITY COLLEGE CONSORTIUM

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Introduction

To support the planning and development of career education programs and provide insights into various sector pathways, the Bay Region Center of Excellence (COE) has developed a series of sector profiles. These profiles highlight labor market trends and the postsecondary education and workforce implications within each sector in the Bay Region. They categorize jobs into three skill levels: below middle-skill, middle-skill, and above middle-skill jobs. Middle-skill occupations typically require more than a high school diploma, but less than a bachelor's degree—except in cases where a bachelor's degree is required, but more than one-third of the workforce has less than a bachelor's degree. These occupations play a crucial role in the labor workforce and contribute to the economic vitality of the 12-county Bay Region, which includes Alameda County, Contra Costa County, Marin County, Monterey County, Napa County, San Benito County, San Francisco County, San Mateo County, Santa Clara County, Santa Cruz County, Solano County, and Sonoma County.

This agriculture, water & environmental technologies profile summarizes key findings on current and projected workforce demand, hourly wages for occupations within the sector by career pathway, and program information from community colleges in the region that offer training programs in agriculture, water & environmental technologies. This report is intended for use by decision-makers and practitioners to support funding and grant proposals, the development of key courses and pathways, and the alignment of programs between K-12, community colleges, and four-year institutions. Workforce professionals in the sector can also use the data to gain valuable insights into employment trends and educational preparation within this pathway.

What Pathway Makes Up the Agriculture, Water & Environmental Technologies Sector?

This profile highlights the labor market for agriculture, water & environmental technologies, focusing on three key career pathways. The labor market data presented in this profile includes in-demand occupations within these pathways that are related to education and training programs offered at community colleges across the Bay Region.

The agriculture, water & environmental technologies career pathways listed below offer a range of opportunities for employment and advancement across various skill levels. The agricultural and environmental sciences pathway spans occupations that boost the productivity and sustainability of agricultural practices, with roles such as pest control workers, forest and conservation workers, animal scientists, and foresters. The agricultural business and operations pathway focus on production, processing, and distribution of agricultural products and businesses, including careers such as farmers, ranchers, and other agricultural managers, farmworkers and laborers (crop, nursery, and greenhouse), and veterinarians. The agricultural technology and engineering pathway includes occupations ranging from food science technicians, environmental engineers, and agricultural technicians. Please note that this list does not include all occupations within the agriculture, water & environmental technologies sector.

AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES CAREER PATHWAYS
Agricultural and Environmental Sciences
Agricultural Business and Operations
Agricultural Technology and Engineering

Quick Facts About Agriculture, Water & Environmental Technologies in the Bay Region

Quick facts provide data related to the agriculture, water & environmental technologies sector (see below), featuring labor market projections between 2023 and 2028 in the Bay Region, as well as community college program information for the program years 2021-22 to 2023-24. Enrolled students include all general admit students who were enrolled in at least one term of the selected year at a Bay Region community college.[1]

The agriculture, water & environmental technologies sector accounted for approximately 111,060 jobs in the Bay Region in 2023, and is projected to grow by 6% between 2023 and 2028. During this five-year period, the occupations specified in this report are expected to account for 17,720 annual job openings, and an average of 81% of job openings in the pathway are replacement openings. Note that all numbers related to labor market data in this report are rounded to the nearest tenth.

Agriculture, water & environmental technologies programs were offered at 15 community colleges in the Bay Region (see Table 8 for the agriculture, water & environmental technologies programs included). An average of more than 4,810 students enrolled in agriculture, water & environmental technologies programs annually at a Bay Region community college during the program years 2021-22 to 2023-24, and an average of 409 students completed a degree or certificate each year. As for demographics, approximately 24% of students who enrolled between program years 2021-22 to 2023-24 were between 20 and 24 years old. Females were predominantly represented among students who enrolled in agriculture, water & environmental technologies programs (53%), as well as students who identify as White (42%) or Hispanic (36%).

Bay Region Quick Facts

111,060

Number of Jobs in Pathways, 2023

6%

5-year Pathway Job Growth, 2023-2028

17,720

5-year Avg. Annual Job Openings, 2023-2028

15

Community Colleges (CC) Offering Agriculture, Water & Environmental Technologies Programs

4,810

Students Enrolled in CC Agriculture, Water & Environmental Technologies Programs (2021-22 to 2023-24)

409

CC Degrees/Certificates Awarded on Average in Agriculture, Water & Environmental Technologies (2021-22 to 2023-24)

[1] This term was updated in DataVista from "non-special admit students" used in previous reports. General admit students are defined as all students who enrolled as first-time in higher education general admit credit students in at least one primary term of the selected year with a minimal credit enrollment at the selected college who are tracked for one, two, three, four and six years from first term of enrollment. https://datavista.cccco.edu/metrics/126.

Projected Employment for the Agriculture, Water & Environmental Technologies Sector

Industry Employment Demand

The agriculture, water & environmental technologies sector includes sub-sectors and industries classified under North American Industry Classification System (NAICS) codes 11, 22, 31, 42, 54, 56, and 81 (see Appendix A: Methodology for the six-digit NAICS codes used to define the sector). A two-digit NAICS code can represent multiple sub-sectors and industry groups within the broader sector. These codes are used to organize and categorize industries within the job market.

Table 1 shows that the number of jobs in the agriculture, water & environmental technologies sector is projected to grow by 2% in the Bay Region over the next several years (2023-2028). In 2023, approximately 258,632 workers were employed in agriculture, water & environmental technologies related industries in the region, and this number is projected to increase to 264,922 workers by 2028.

Table 1: Industry Demand for the Agriculture, Water & Environmental Technologies Sector

2023 JOBS	2028 JOBS	JOB CHANGE	% CHANGE
258,632	264,922	6,290	2%

Source: Lightcast, Projected Number of Industry Jobs for Agriculture, Water & Environmental Technologies, 2023-2028 [2025.3].

Occupational Demand

To connect overall industry trends with specific roles, the following section examines occupational demand in more detail. When examining demand for the agriculture, water & environmental technologies career pathways, Table 2 summarizes the number of workers employed in this pathway in 2023 and the total projected openings between 2023 and 2028 in the Bay Region. The agriculture business and operations pathway employed 95,850 workers in 2023, and is projected to have 78,180 total openings across the five-year period.

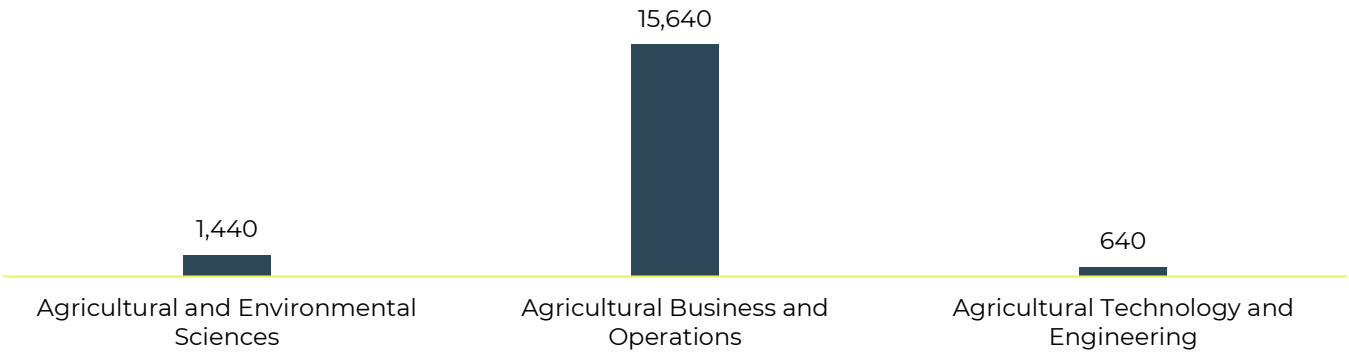
Table 2: Number of Jobs and Total Openings for Agriculture, Water & Environmental Technologies Career Pathways (2023-2028)

PATHWAY	2023 JOBS	2023 - 2028 TOTAL OPENINGS*
Agricultural and Environmental Sciences	10,350	7,190
Agricultural Business and Operations	95,850	78,180
Agricultural Technology and Engineering	4,860	3,270

Source: Lightcast, Number of Jobs and Total Openings, 2023-2028 [2025.3].
*2023-2028 total openings are new job openings and replacement job openings across the five-year period. Replacement openings are created as workers switch jobs, retire or leave for other reasons.

In terms of average annual openings, Figure 1 shows the projected average annual job openings for the agriculture, water & environmental technologies career pathways. More than 15,640 average annual job openings are projected for occupations in the agriculture business and operations pathway between 2023 and 2028, followed by over 1,400 average annual openings for the agriculture and environmental sciences pathway.

Figure 1: Average Annual Job Openings for Agriculture, Water & Environmental Technologies Career Pathways (2023-2028)



Source: Lightcast, Average Annual Job Openings, 2023-2028 [2025.3].

Occupations and Skill Levels by Agriculture, Water & Environmental Technologies Career Pathways

When examining specific occupations within the agriculture, water & environmental technologies pathway, Table 3 below presents data on employment and projected demand by occupation, grouped by career pathway and skill level. The agricultural business and operations pathway is the largest, with 23 occupations. Please note that the figures in Table 3 are rounded to the nearest tenth, and totals represent the summed averages. On average, 81% of job openings in the pathway are replacement openings. Replacement openings occur when workers switch jobs, retire or leave for other reasons. Please refer to Appendix A: Methodology for more information on how the pathways were defined.

SKILL LEVEL LEGEND

• = Below Middle-Skill **• • = Middle-Skill** **• • • = Above Middle-Skill**

Table 3: Occupations and Projected Demand for Agriculture, Water & Environmental Technologies (2023-2028)

Skill Level	Occupation	Avg. Annual Openings	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Annual Replacement Jobs	Replacements as % of Openings
Agricultural and Environmental Sciences							
•	Pest Control Workers	330	2,370	100	4%	300	82%
•	Refuse and Recyclable Material Collectors	480	3,540	200	6%	430	84%
• •	Pesticide Handlers, Sprayers, and Applicators, Vegetation	80	520	0	-2%	70	85%
• •	Forest and Conservation Workers	110	480	-10	-3%	90	89%
• • •	Animal Scientists	90	400	220	57%	40	73%
• • •	Food Scientists and Technologists	70	930	-150	-16%	60	86%
• • •	Soil and Plant Scientists	80	630	140	22%	50	63%
• • •	Zoologists and Wildlife Biologists	50	490	40	7%	40	72%
• • •	Conservation Scientists	110	660	190	29%	70	67%
• • •	Foresters	30	330	-90	-28%	20	70%
	TOTAL	**1,440**	**10,350**	**640**	**6%**	**1,170**	**77%**
Agricultural Business and Operations							
•	Farm Labor Contractors	0	40	10	7%	0	89%
•	Tree Trimmers and Pruners	340	2,480	70	2%	310	89%

Skill Level	Occupation	Avg. Annual Openings	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Annual Replacement Jobs	Replacements as % of Openings
•	Animal Caretakers	1,910	8,680	1,310	15%	1,640	86%
•	Animal Breeders	20	50	30	53%	10	71%
•	Graders and Sorters, Agricultural Products	410	1,920	370	19%	330	79%
•	Agricultural Equipment Operators	580	3,200	280	9%	510	90%
•	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	7,500	44,570	1,950	4%	6,960	98%
•	Farmworkers, Farm, Ranch, and Aquacultural Animals	860	5,270	10	0%	820	93%
•	Agricultural Workers, All Other	530	3,370	-60	-2%	510	97%
•	Fishing and Hunting Workers	40	270	-30	-10%	40	89%
•	Fallers	10	50	0	-8%	10	85%
•	Logging Equipment Operators	30	190	0	2%	30	87%
•	Log Graders and Scalers	10	30	0	-9%	0	87%
•	Logging Workers, All Other	0	10	0	-23%	0	96%
• •	Farmers, Ranchers, and Other Agricultural Managers	1,260	11,320	0	0%	1,200	96%
• •	Floral Designers	170	1,480	-220	-14%	160	95%
• •	Veterinary Technologists and Technicians	330	2,360	430	18%	240	74%
• •	Veterinary Assistants and Laboratory Animal Caretakers	820	3,910	330	8%	730	89%
• •	First-Line Supervisors of Farming, Fishing, and Forestry Workers	530	3,240	290	9%	470	92%
• •	Agricultural Inspectors	40	160	30	15%	30	81%
• •	Farm Equipment Mechanics and Service Technicians	80	820	60	7%	70	85%
• • •	Farm and Home Management Educators	40	230	50	22%	20	69%
• • •	Veterinarians	130	2,200	300	14%	60	53%
	TOTAL	**15,640**	**95,850**	**5,210**	**5%**	**14,150**	**86%**
Agricultural Technology and Engineering							
• •	Environmental Engineering Technologists and Technicians	40	390	0	0%	30	83%
• •	Agricultural Technicians	170	920	90	10%	140	85%
• •	Food Science Technicians	150	1,070	-80	-7%	140	92%
• •	Forest and Conservation Technicians	120	650	110	17%	90	84%

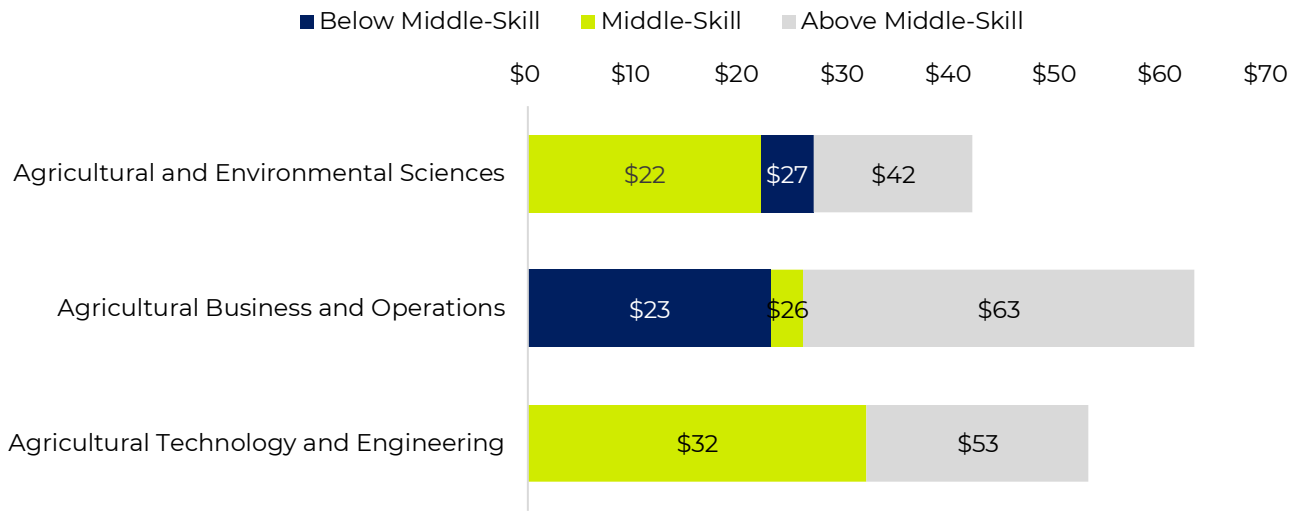
Skill Level	Occupation	Avg. Annual Openings	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Annual Replacement Jobs	Replacements as % of Openings
• • •	Agricultural Engineers	10	70	40	51%	10	74%
• • •	Environmental Engineers	70	950	30	3%	60	82%
• • •	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	80	810	150	18%	50	68%
	TOTAL	**640**	**4,860**	**340**	**7%**	**520**	**81%**
	AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES TOTAL	**17,720**	**111,060**	**6,190**	**6%**	**15,840**	**81%**

Source: Lightcast, Projected Demand for Agriculture, Water & Environmental Technologies Occupations, 2023-2028 [2025.3].

Occupational Wages by Agriculture, Water & Environmental Technologies Pathway

In the Bay Region, the living wage is $46 per hour for one adult and one school-aged child, though it varies by subregion (see Table 12 in the Appendix for details). Figure 2 presents the average median hourly earnings for below middle-skill, middle-skill, and above middle-skill jobs by career pathway. Table 4 provides a summary of wages by the 25th percentile, median, and 75th percentile hourly earnings for each occupation. All earnings represent the median across the 12-counties in the Bay Region. The 25th percentile wage represents entry-level earnings, while the 75th percentile wage reflects the earnings of experienced workers.

Figure 2: Average Median Hourly Earnings by Agriculture, Water & Environmental Technologies Career Pathways



Source: Lightcast, Median Hourly Wages by Agriculture, Water & Environmental Technologies Career Pathways [2025.3].

Table 4: Hourly Earnings for Occupations by Agriculture, Water & Environmental Technologies Career Pathways

SKILL LEVEL LEGEND

• = Below Middle-Skill **• • = Middle-Skill** **• • • = Above Middle-Skill**

Skill Level	Occupation	25th Pct. Hourly Earnings	Median Hourly Earnings	75th Pct. Hourly Earnings
Agricultural and Environmental Sciences				
•	Pest Control Workers	$20	$23	$28
•	Refuse and Recyclable Material Collectors	$27	$31	$39

Skill Level	Occupation	25th Pct. Hourly Earnings	Median Hourly Earnings	75th Pct. Hourly Earnings
• •	Pesticide Handlers, Sprayers, and Applicators, Vegetation	$20	$23	$26
• •	Forest and Conservation Workers	$16	$22	$27
• • •	Animal Scientists	$34	$45	$75
• • •	Food Scientists and Technologists	$36	$43	$56
• • •	Soil and Plant Scientists	$32	$42	$59
• • •	Zoologists and Wildlife Biologists	$29	$41	$58
• • •	Conservation Scientists	$30	$41	$50
• • •	Foresters	$33	$41	$52
	TOTAL	**$28**	**$35**	**$47**
Agricultural Business and Operations				
•	Farm Labor Contractors	$24	$36	$48
•	Tree Trimmers and Pruners	$27	$32	$40
•	Animal Caretakers	$17	$18	$23
•	Animal Breeders	$19	$25	$31
•	Graders and Sorters, Agricultural Products	$16	$18	$20
•	Agricultural Equipment Operators	$17	$20	$26
•	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	$16	$17	$21
•	Farmworkers, Farm, Ranch, and Aquacultural Animals	$16	$18	$22
•	Agricultural Workers, All Other	$16	$20	$27
•	Fishing and Hunting Workers	$15	$21	$42
•	Fallers	$25	$29	$41
•	Logging Equipment Operators	$19	$28	$36
•	Log Graders and Scalers	$19	$27	$33
•	Logging Workers, All Other	$10	$18	$35
• •	Farmers, Ranchers, and Other Agricultural Managers	$16	$19	$32
• •	Floral Designers	$17	$21	$29
• •	Veterinary Technologists and Technicians	$25	$29	$33
• •	Veterinary Assistants and Laboratory Animal Caretakers	$20	$22	$26
• •	First-Line Supervisors of Farming, Fishing, and Forestry Workers	$18	$27	$37
• •	Agricultural Inspectors	$26	$32	$41

Skill Level	Occupation	25th Pct. Hourly Earnings	Median Hourly Earnings	75th Pct. Hourly Earnings
• •	Farm Equipment Mechanics and Service Technicians	$24	$35	$43
• • •	Farm and Home Management Educators	$32	$44	$48
• • •	Veterinarians	$56	$82	$104
	TOTAL	**$21**	**$28**	**$36**
Agricultural Technology and Engineering				
• •	Environmental Engineering Technologists and Technicians	$36	$42	$52
• •	Agricultural Technicians	$21	$28	$31
• •	Food Science Technicians	$23	$27	$33
• •	Forest and Conservation Technicians	$20	$31	$44
• • •	Agricultural Engineers	$30	$38	$45
• • •	Environmental Engineers	$46	$61	$72
• • •	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	$46	$59	$74
	TOTAL	**$32**	**$41**	**$50**
	AGRICULTURE, WATER & ENVIRONMENTAL TECHNOLOGIES TOTAL	**$27**	**$35**	**$44**

Source: Lightcast, 25th pct., Median, and 75th pct. Hourly Earnings for Agriculture, Water & Environmental Technologies Occupations [2025.3].

Job Postings for Agriculture, Water & Environmental Technologies Occupations

Job postings represent the number of online jobs advertised in the Bay Region for occupations in the agriculture, water & environmental technologies pathway specified in this report. Unique online job postings are deduplicated based on job title, employer, and region. Across occupations in the agriculture, water & environmental technologies pathway, there were 11,089 unique online job postings in the Bay Region from January 2024 to December 2024 (see Table 5). Table 6 highlights the top 10 skills sought by employers, categorized into specialized, soft, and technical skills.

Table 5: Unique Online Job Postings for Agriculture, Water & Environmental Technologies Occupations in the Bay Region, 2024

Unique Online Job Postings in the Bay Region
11,089

Table 6: Top Skills for Agriculture, Water & Environmental Technologies Occupations

Specialized Skills	Soft Skills	Technical Skills
Surgery	Communication	Microsoft Excel
Veterinary Medicine	Management	Microsoft Office
Pest Control	Customer Service	Microsoft Outlook
Anesthesia	Detail Oriented	Microsoft Word
Animal Care	Operations	Microsoft PowerPoint
Medical Records	Lifting Ability	Microsoft Access
Biology	Leadership	R (Programming Language)
Irrigation	Problem Solving	Google Workspace
Pruning	Sales	Spreadsheets
Safe Restraining Techniques	Compassion	Python (Programming Language)

Table 7 lists the top employers in the agriculture, water & environmental technologies sector in the Bay Region, which include pet hospitals, businesses, educational institutions, and veterinary services.

Table 7: Employers for Agriculture, Water & Environmental Technologies Occupations

Top Employers

- Banfield Pet Hospital
- VCA Animal Hospitals
- Ethos Veterinary Health
- PetCo
- The Davey Tree Expert Company
- Veterinary Emergency Group
- Foothill-De Anza Community College District
- Orkin
- Lap Of Love
- Clark Pest Control

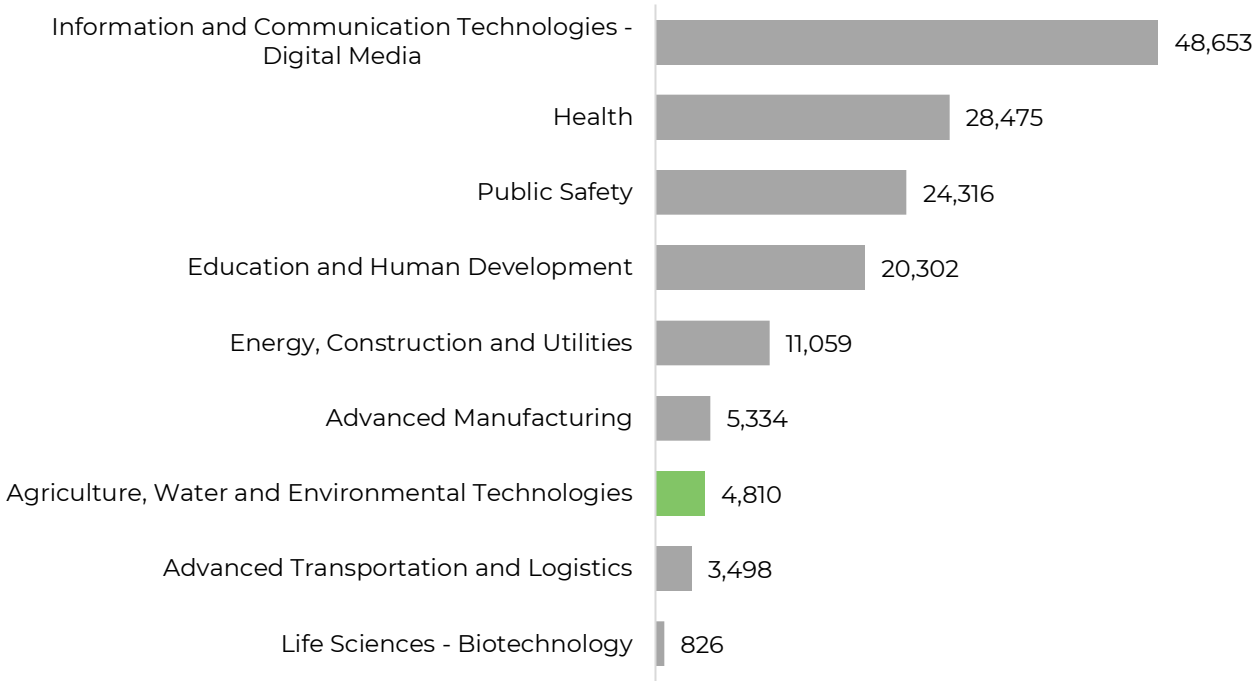
Source: Lightcast, Job Posting Analytics, January 2024-December 2024 [2025.3].

Agriculture, Water & Environmental Technologies Community College Programs

California community colleges offer a variety of programs in agriculture, water & environmental technologies. Colleges combine classroom instruction on campus, online, or through external work experiences. Of the 28 community colleges in the Bay Region, 15 offer a program related to agriculture, water & environmental technologies. These community colleges include Las Positas College, Merritt College, Ohlone College, Diablo Valley College, San Francisco City College, Napa Valley College, Solano College, Santa Rosa College, Hartnell College, Monterey Peninsula College, Cabrillo College, De Anza College, Foothill College, Mission College, and West Valley College.

Figure 3 shows the number of students enrolled by each of the Bay Region's nine sectors. These sectors refer to the priority sectors identified by the California Community Colleges Chancellor's Office. During program years 2021-22 to 2023-24, an average of more than 4,810 students enrolled in agriculture, water & environmental technologies programs each year. For more information about the selection of programs and data sources for student outcomes see the Appendix A: Methodology.

Figure 3: Students Enrolled* by Sector (3-YR Average, 2021-22 to 2023-24)



Source: DataVista. Program Years 2021-22 to 2023-24, Bay Region Community Colleges.
*All students who were enrolled as a general admit student in at least one term of the selected year.

Seventeen (17) Taxonomy of Program (TOP) codes related to agriculture, water & environmental technologies are presented in Table 8, and these TOP codes also have active or approved programs prior to October 2024 in Bay Region community colleges. This is based on information reported to the California Community Colleges Chancellor's Office Curriculum Inventory (COCI).

Table 8: Agriculture, Water & Environmental Technologies Programs at Community Colleges in the Bay Region

TOP6	TOP6 Program Title	# Colleges w/Programs
010900	Horticulture	8
010910	Landscape Design and Maintenance	6
010300	Plant Science	4
010400	Viticulture, Enology, and Wine Business	4
010930	Nursery Technology	4
010100	Agriculture Technology and Sciences, General	3
010920	Floriculture / Floristry	3
011200	Agriculture Business, Sales and Service	3
010210	Veterinary Technician (Licensed)	2
011500	Natural Resources	2
030300	Environmental Technology	2
010200	Animal Science	1
010240	Equine Science	1
010310	Agricultural Pest Control Adviser and Operator (Licensed)	1
011300	Food Processing and Related Technologies	1
011510	Parks and Outdoor Recreation	1
019900	Other Agriculture and Natural Resources	1

Source: California Community Colleges Chancellor's Office Curriculum Inventory (COCI). This list includes the programs under the TOP code that were currently active or approved in Bay Region community colleges prior to October 2024.

Tables 9 and 10 summarize educational supply by analyzing the number of certificates and degrees awarded in related TOP and Classification of Instructional Programs (CIP) codes, respectively. According to TOP data, an average of 409 awards were conferred at Bay Region community colleges between program years 2021-22 and 2023-24 (Table 9). The average number of awards in programs may include students who earned multiple degrees, certificates, or awards.

Table 9: Total Awards at Community Colleges in the Bay Region (2021-22 to 2023-24)

TOP6	TOP6 Title	Certificate	Associate Degree/ Associate for Transfer	Noncredit Award	Total Awards
010100	Agriculture Technology and Sciences, General	9	9	0	18
010200	Animal Science	0	2	0	2
010210	Veterinary Technician (Licensed)	37	26	0	63
010240	Equine Science	0	1	0	1
010300	Plant Science	0	30	1	31
010310	Agricultural Pest Control Adviser and Operator (Licensed)	1	0	0	1
010400	Viticulture, Enology, and Wine Business	17	22	0	39
010900	Horticulture	32	20	0	52
010910	Landscape Design and Maintenance	33	27	32	92
010920	Floriculture /Floristry	7	4	0	11
010930	Nursery Technology	6	1	0	7
011200	Agriculture Business, Sales and Service	2	28	0	30
011300	Food Processing and Related Technologies	12	0	0	12
011500	Natural Resources	14	7	0	21
011510	Parks and Outdoor Recreation	6	6	0	12
030300	Environmental Technology	12	5	0	17
	Total Awards	**188**	**188**	**33**	**409**

Source: CCCCO Data Mart. Program Years 2021-22 to 2023-24 Annual Awards, by TOP6 Code, Bay Region Community Colleges.

According to CIP data (Table 10), non-community college institutions in the Bay Region conferred an average of 232 awards each year between program years 2020-21 and 2022-23. The total number of awards for a given TOP or CIP code is calculated as a three-year average and summed across award types. Please note that these figures were not rounded.

Table 10: Awards* for Non-Community College Programs in the Bay Region (2020-21 to 2022-23)

CIP - CIP Program Title	Certificate	Associate Degree	Bachelor's Degree	Total Awards
01.0308 - Agroecology and Sustainable Agriculture	0	0	7	7
01.0505 - Animal Training	0	6	8	14
01.8301 - Veterinary/Animal Health Technology/Technician and Veterinary Assistant	34	79	0	113
03.0101 - Natural Resources/Conservation, General	0	0	98	98
Total Awards	**34**	**85**	**113**	**232**

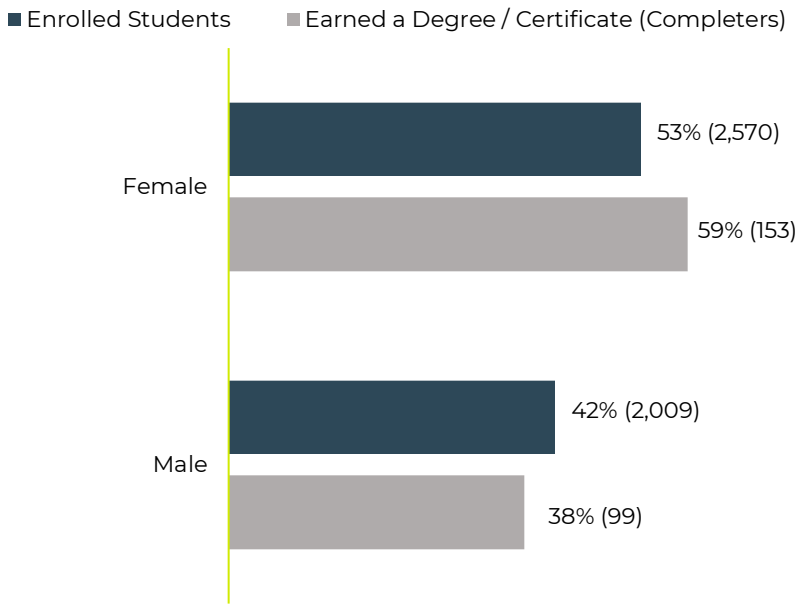
*Total awards do not include degrees higher than a bachelor's degree.
Source: Integrated Postsecondary Education Data System (IPEDS). Program Years 2020-21 to 2022-23 Annual Awards, by CIP Code, Bay Region Non-Community College Institutions.

Demographic Profile of Students in Community College Agriculture, Water & Environmental Technologies Programs

This sector profile also summarizes the demographics of community college students who enroll in and complete a degree or certificate in agriculture, water & environmental technologies programs. Figures 4 through 6 present data on students by gender, race/ethnicity, and age. Enrolled students include all general admit students[2] who were enrolled in at least one term of the selected year at a Bay Region community college. In terms of the number of students who earned a degree or certificate, it represents those that earned one or more of the following: Chancellor's Office approved certificate, associate degree, or non-credit awards.

On average, female students comprised 53% of enrollees and 59% of award earners, compared to 42% and 38% of male students, respectively. Students who identified as white (42%) and Hispanic (36%) represented the two largest racial/ethnic groups among enrolled students, and were also the largest groups that earned degrees (44% and 38%, respectively). Students aged 20 to 24 were the most represented age group among those who enrolled (24%) and earned degrees (34%). Students aged 35 to 39 were the least represented age group among those who enrolled (8%). The figures below provide greater detail on the demographic profiles of students who enrolled in and completed agriculture, water & environmental technologies programs in the Bay Region.

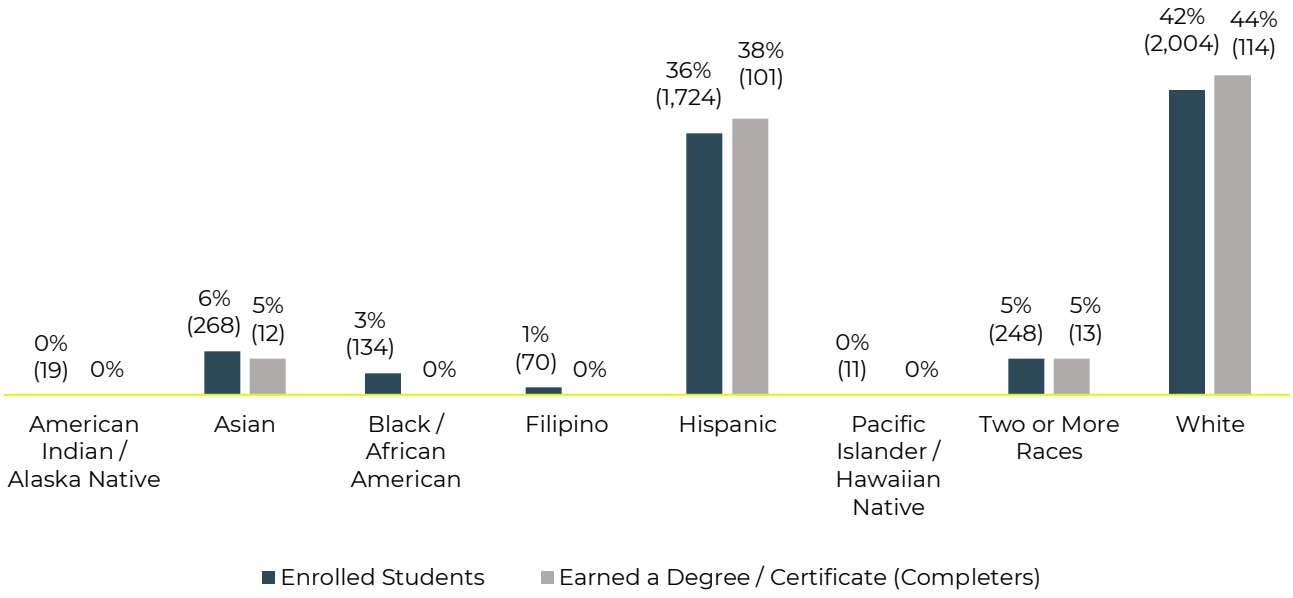
Figure 4: Gender of Students in Agriculture, Water & Environmental Technologies Programs in the Bay Region (2021-22 to 2023-24)



Note: May not total 100 percent due to non-respondent/non-binary.
Source: DataVista. Program Years 2021-22 to 2023-24 Programs, Bay Region Community Colleges.

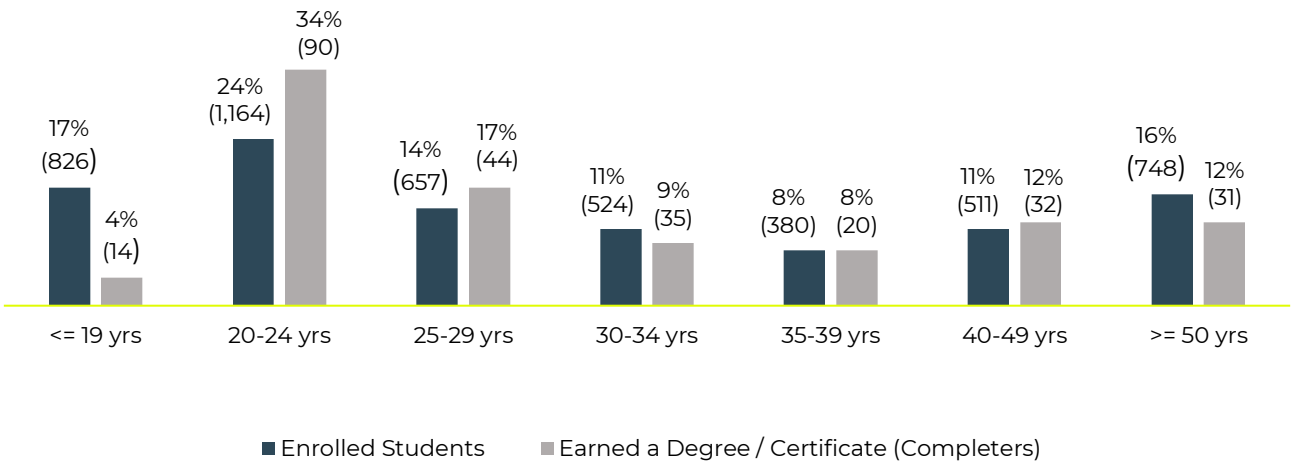
[2] This term was updated in DataVista from "non-special admit students" used in previous reports. General admit students are defined as all students who enrolled as first-time in higher education general admit credit students in at least one primary term of the selected year with a minimal credit enrollment at the selected college who are tracked for one, two, three, four and six years from first term of enrollment. https://datavista.cccco.edu/metrics/126.

Figure 5: Race/Ethnicity of Students in Agriculture, Water & Environmental Technologies Programs in the Bay Region (2021-22 to 2023-24)



Note: May not total 100 percent due to non-respondent/unknown/masked values.
Source: DataVista. Program Years 2021-22 to 2023-24 Programs, Bay Region Community Colleges.

Figure 6: Ages of Students in Agriculture, Water & Environmental Technologies Programs in the Bay Region (2021-22 to 2023-24)



Note: May not total 100 percent due to non-respondent/unknown/masked values.
Source: DataVista. Program Years 2021-22 to 2023-24 Programs, Bay Region Community Colleges.

Appendix A: Methodology

The Bay Region COE selected the occupations in this profile by examining job descriptions and skills listed in O*Net. Labor market and job postings data was sourced from Lightcast [data 2025.3]. Online job postings included all unique job postings from January 2024 to December 2024 in the 12-county Bay Region for occupations in the agriculture, water & environmental technologies pathway specified in this report. To evaluate industry data, the agriculture, water & environmental technologies sector included industries classified under North American Industry Classification System (NAICS) six-digit codes in Table 11. The COE selected these NAICS codes using inverse staffing patterns to determine the industries in which the occupations in this report were employed, and included industries related to agriculture, water & environmental technologies.

Table 11: NAICS codes for the Agriculture, Water & Environmental Technologies Sector

NAICS	Description
111000	Crop Production
112000	Animal Production
113310	Logging
114111	Finfish Fishing
114112	Shellfish Fishing
115112	Soil Preparation, Planting, and Cultivating
115113	Crop Harvesting, Primarily by Machine
115114	Postharvest Crop Activities (except Cotton Ginning)
115115	Farm Labor Contractors and Crew Leaders
115116	Farm Management Services
115210	Support Activities for Animal Production
115310	Support Activities for Forestry
221111	Hydroelectric Power Generation
221210	Natural Gas Distribution
221111	Hydroelectric Power Generation
221310	Water Supply and Irrigation Systems
221320	Sewage Treatment Facilities
311412	Frozen Specialty Food Manufacturing
311421	Fruit and Vegetable Canning
311991	Perishable Prepared Food Manufacturing
312120	Breweries
312130	Wineries

NAICS	Description
423820	Farm and Garden Machinery and Equipment Merchant Wholesalers
424130	Industrial and Personal Service Paper Merchant Wholesalers
424480	Fresh Fruit and Vegetable Merchant Wholesalers
424490	Other Grocery and Related Products Merchant Wholesalers
424590	Other Farm Product Raw Material Merchant Wholesalers
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers
424910	Farm Supplies Merchant Wholesalers
424930	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
541940	Veterinary Services
561710	Exterminating and Pest Control Services
561730	Landscaping Services
562111	Solid Waste Collection
562112	Hazardous Waste Collection
562119	Other Waste Collection
562211	Hazardous Waste Treatment and Disposal
562212	Solid Waste Landfill
562219	Other Nonhazardous Waste Treatment and Disposal
562910	Remediation Services
812910	Pet Care (except Veterinary) Services
813312	Environment, Conservation and Wildlife Organizations

The Bay Region COE selected agriculture, water & environmental technologies programs based on DataVista's Mapping of Taxonomy of Program (TOP) Codes to Sectors.[3] To evaluate active or approved programs in Bay Region community colleges we examined data reported to the California Community Colleges Chancellor's Office Curriculum Inventory (COCI). This report included active or approved programs prior to October 2024. Educational supply data was retrieved from Data Mart for TOP data and Integrated Postsecondary Education Data System (IPEDS) for CIP data. The total number of degrees awarded for a given TOP or CIP code was calculated as a three-year average.

[3] https://datavista.cccco.edu/resources/16.

Definitions

Average Annual Job Openings: In Lightcast, average annual job openings refer to the estimated number of job openings in a given occupation or group of occupations within a specific geographic area during the course of a year. When calculating this metric for more than a year, the average across those years is determined by adding the annual job openings over the period and dividing the total by the number of years (e.g., for a five-year period, this means adding the total openings across those five years and dividing that number by 5).

This metric is calculated based on:

- New Growth: Openings that arise due to the creation of new jobs as a result of industry or economic growth.
- Replacement Needs: Openings that occur because of workers leaving the occupation (e.g., due to retirement, career changes, or other factors).

Together, these components provide a comprehensive view of the total demand for workers in a specific role or field each year.

Average Annual Replacement Jobs: Average annual projected number of replacement job openings during 2023-2028.

CIP code: The Classification of Instructional Programs (CIP) is a taxonomic coding scheme, developed by the U.S. Department of Education's National Center for Education Statistics (NCES), used to classify and categorize academic programs for federal surveys and reporting of institutional data. Program data from CIP codes comes from the Integrated Postsecondary Education Data System (IPEDS). CIP codes are used to facilitate the alignment of similar programs offered by 2- and 4-year postsecondary institutions with the needs of the labor market.

Living wage: The living wage is the hourly rate that an individual in a household must earn to support themselves and/or their family, working full-time, or 2,080 hours per year. In the Bay Region the living wage is calculated as $46 per hour for one adult and school-aged child using the average median wages across the 12 counties in the Bay Region (Table 12).[4]

Table 12. Living Wage for an Adult + School-Aged Child by County

County	Living Wage	County	Living Wage
Alameda County	$46	San Francisco County	$50
Contra Costa County	$46	San Mateo County	$57
Marin County	$55	Santa Clara County	$51
Monterey County	$44	Santa Cruz County	$59
Napa County	$44	Solano County	$39
San Benito County	$42	Sonoma County	$42

[4] "Self-Sufficiency Standard," Center for Women's Welfare, University of Washington, 2023, accessed May 9, 2025, https://selfsufficiencystandard.org/California/.

NAICS codes: North American Industry Classification System (NAICS) codes are used to organize and categorize industries within the job market for this sector. A single two-digit NAICS code can represent multiple sub-sectors and industry groups within the broader sector.

Replacements as Percent of Openings: Percent of replacements of all job openings during 2023-2028.

Skill Level: Occupations are categorized into three skill levels: below middle-skill, middle-skill, and above middle-skill jobs. Classification is based on the typical entry-level education below.

Table 13. Skill Level Definition

Skill Level	Entry-Level Education
Below Middle-Skill	No formal education required
	High school diploma
Middle-Skill	Some college, no award
	Postsecondary certificate (non-degree award)
	Associate degree
	Bachelor's degree (selected occupations where ~33% or greater of positions are held by workers with less than a bachelor's degree)
Above Middle-Skill	Bachelor's degree (All other occupations not identified as middle-skill)
	Advanced degree

TOP code: The Taxonomy of Programs (TOP) is a system of codes used by the California Community College Chancellor's Office to compare differently named academic programs with similar outcomes across community colleges. Programs and courses offered by Community Colleges are assigned a TOP code to identify similar programs and their alignment with the labor market.

Unique Job Postings: Lightcast's deduplication process involves identifying duplicate job postings and counting them as a unique posting. The unique job posting count is the number of postings after the deduplication process has taken place. For example, multiple postings could list the same job, from the same company, and in the same region, and these multiple postings would be reduced to one unique job posting.

Sources

California Community Colleges Chancellor's Office Curriculum Inventory (COCI)
Chancellor's Office Management Information Systems (MIS) Data Mart
DataVista
Integrated Postsecondary Education Data System (IPEDS)
Lightcast
O*Net Online

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