

CTE: THE KEY TO ECONOMIC DEVELOPMENT

Agriculture and
related industries added

\$992 billion

to the U.S. economy in 2015¹

In 2016, **\$136 billion**
in American agricultural products
were exported globally ²

Farm, forestry, fishing and
related occupations account for

3.6 million

U.S. jobs³

What is the pathway to these
fulfilling and essential careers?

Career and Technical Education!



Proud supporters of ACTE.



Association for Career and Technical Education
1410 King Street, Alexandria, VA 22314
Phone: 800-826-9972 // Fax: 703-683-7424
www.acteonline.org // Connecting Education and Careers

Agriculture, Food and Natural Resources

Agriculture, food and natural resources is a
diverse sector that:

- includes agribusiness; animal and plant systems; environmental science; food products and processing; natural resources; power, structural and technical systems; and biotechnology
- forms a vital part of the economy for many states
- increasingly employs middle- and high-skill workers

What jobs are available in agriculture, food and
natural resources?

The Agriculture, Food and Natural Resources Career Cluster® continuously evolves in response to changes in food consumption patterns, environmental and weather conditions, and agricultural production techniques. STEM-focused occupations are projected to grow at a pace well above average. Jobs for veterinary technologists and technicians will increase by 20 percent through 2026, while jobs for technicians in environmental science and engineering will grow around 12 percent.⁴ Growth is also predicted for precision agriculture specialists, e-commerce managers, marketers, ecosystem managers, agriscience educators, crop advisors and pest control specialists.⁵

Workers in agriculture, food and natural resources with a high school diploma can make relatively high wages, while median income for those with a bachelor's degree is about \$56,000.⁶ Jobs for environmental engineering and science technicians, which require an associate degree, pay a median of \$44,000-\$49,000 annually.⁷ Earnings are particularly strong for individuals with education and training in conservation science, food science, forestry, agricultural and natural resources management, and agricultural economics.⁸

By 2018, 44 percent of jobs in agriculture, food and natural resources will require at least some postsecondary education; licenses and industry-recognized certifications are assets to many workers in this sector.⁹ These occupations incorporate academic, technical and employability skills for managing natural resources, caring for plant and animal life, and analyzing food quality, among many other activities. The following is a small sample of occupations available:

- agricultural equipment operators
- agricultural managers
- conservation scientists and foresters
- veterinary technicians
- agriscience educators
- animal and food science technicians
- soil scientists and agronomists
- agricultural product salespeople



Endnotes

1. U.S. Department of Agriculture Economic Research Service. (2017). *Ag and Food Sectors and the Economy*. Retrieved from <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy>.
2. American Farm Bureau Federation. (2017). *Fast Facts About Agriculture*. Retrieved from <https://www.fb.org/newsroom/fast-facts>.
3. U.S. Department of Agriculture Economic Research Service. (2017). *Ag and Food Sectors and the Economy*. Retrieved from <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy>.
4. U.S. Bureau of Labor Statistics. (n.d.). *Veterinary Technologists and Technicians*. Retrieved from <https://www.bls.gov/ooh/healthcare/veterinary-technologists-and-technicians.htm>; U.S. Bureau of Labor Statistics. (n.d.). *Environmental Engineering Technicians*. Retrieved from <https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineering-technicians.htm>; U.S. Bureau of Labor Statistics. (n.d.). *Environmental Science and Protection Technicians*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/environmental-science-and-protection-technicians.htm>.
5. Purdue University. (n.d.). *Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources, and the Environment: United States, 2015-2020*. Retrieved from <https://www.purdue.edu/usda/employment>.
6. Carnevale, A. P., Smith, N., Stone III, J. R., Kotamraju, P., Steuernagel, B., & Green, K. A. (2011). *Career Clusters: Forecasting Demand for High School Through College Jobs*. Washington, DC: Georgetown University Center on Education and the Workforce; Carnevale, A. P., Cheah, B., & Hanson, A. R. (2015). *The Economic Value of College Majors*. Washington, DC: Georgetown University Center on Education and the Workforce.
7. U.S. Bureau of Labor Statistics. (n.d.). *Environmental Engineering Technicians*. Retrieved from <https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineering-technicians.htm>; U.S. Bureau of Labor Statistics. (n.d.). *Environmental Science and Protection Technicians*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/environmental-science-and-protection-technicians.htm>.
8. Carnevale, A. P., Smith, N., Stone III, J. R., Kotamraju, P., Steuernagel, B., & Green, K. A. (2011). *Career Clusters: Forecasting Demand for High School Through College Jobs*. Washington, DC: Georgetown University Center on Education and the Workforce; Carnevale, A. P., Cheah, B., & Hanson, A. R. (2015). *The Economic Value of College Majors*. Washington, DC: Georgetown University Center on Education and the Workforce.
9. Carnevale, A. P., Smith, N., Stone III, J. R., Kotamraju, P., Steuernagel, B., & Green, K. A. (2011). *Career Clusters: Forecasting Demand for High School Through College Jobs*. Washington, DC: Georgetown University Center on Education and the Workforce.
10. The Arnold Arboretum at Harvard University. *Norfolk County Agricultural High School Practicum at the Arnold Arboretum*. Retrieved from <https://www.arboretum.harvard.edu/education/horticultural-training-at-the-arboretum/norfolk-agricultural>.
11. National FFA Organization. (n.d.). *Agriscience Fair*. Retrieved from <https://www.ffa.org/agrisciencefair>.
12. Fox Valley Technical College. (n.d.). *Natural Resources Technician*. Retrieved from <https://www.fvtc.edu/program/agriculture-horticulture-natural-resources/natural-resources/10-057-1/natural-resources-technician>; Fox Valley Technical College. (2017). *2017 Graduate Employment Research Report of 2015-16 Graduates: Natural Resources Technician*. Retrieved from <https://www.fvtc.edu/DesktopModules/FVTCPOSProgramLanding/API/GradEmploymentPDF/Get?programNumber=100571>.
13. Advance CTE. (n.d.). *Tulare Joint Union High School District Farm: 2016 Award Winner, Excellence in Action: Agriculture, Food & Natural Resources Career Cluster*. Retrieved from https://cte.careertech.org/sites/default/files/Tulare_Final_1.pdf.
14. Horry Georgetown Technical College. (n.d.). *Golf Course Management*. Retrieved from https://www.hgtc.edu/academics/academic_departments/Natural_Resources/Golf_Course_Management.html; Blondin, A. (2017, August 14). "Local college students among those who helped beautify PGA Championship." *Sun News*. Retrieved from <http://www.myrtlebeachonline.com/sports/golf/article167213847.html>; Cipriano, G. (2016, November 15). "Meet your next assistant." *Golf Course Industry*. Retrieved from <http://www.golfcourseindustry.com/article/horry-georgetown-turf-students>; Horry Georgetown Technical College. (2016). *Gainful Employment: Golf Course Management*. Retrieved from https://loon1.hgtc.edu/wavenet/documentsforweb/public_disclosure/GolfCourseManagement/gedt.html.



Association for Career and Technical Education

1410 King Street, Alexandria, VA 22314

Phone: 800-826-9972 // Fax: 703-683-7424

www.acteonline.org // Connecting Education and Careers

How does CTE prepare the agriculture, food and natural resources workforce?

Career and technical education prepares high school, postsecondary and adult students for careers in agriculture, food and natural resources through:

- the national Career Clusters Framework—including Career Clusters and pathways in agriculture, food and natural resources; STEM; business management and administration; and marketing and sales—which outlines course progressions that help students explore career options and prepare for college and career success
- CTE courses in plant, animal and soil science as well as agribusiness management, agriculture mechanics, veterinary science, agricultural production and processing, forestry management and more, all integrated with rigorous academics
- work-based learning experiences, such as Norfolk County Agricultural High School's four-week horticulture internships at Harvard's Arnold Arboretum, including biotechnology studies at Massachusetts Bay Community College¹⁰
- career and technical student organization enrichment experiences, such as the National FFA Agriscience Fair, in which students conduct research in agriculture and food science and present their findings to a panel of judges¹¹
- opportunities to earn stackable certificates, degrees and industry-recognized certifications, such as Wisconsin's Fox Valley Technical College associate in applied science degree for natural resources technicians—100 percent of the class of 2016 was employed within six months of completion, with a median salary of \$32,100¹²

What are promising programs in agriculture, food and natural resources?

At **Tulare Joint Union High School District Farm** in California, a 2016 Advance CTE Excellence in Action award winner, students can choose one of five areas of focus: agricultural business management, agricultural science, agricultural mechanics, animal science or ornamental horticulture. A local advisory board participates in developing and revising courses and curriculum, and serves as guest speakers. On site, students can work on the school dairy, supported by partner Land O'Lakes, or on an almost 100-acre farm and learning lab. Off site, students participate in a 40-hour-long Supervised Agricultural Experience with partners in milk processing plants, agriculture engineering firms and veterinary clinics. Six courses articulate with the College of the Sequoias, which also provides instructors, facilities and equipment to support Tulare. The entire 2014-15 class graduated, with 94 percent headed to postsecondary education.¹³

Horry Georgetown Technical College in Conway, South Carolina, offers the only associate degree program in golf and sports turf management in the state. Located near the many golf courses of Myrtle Beach, program curricula ranges from turf, soil and pest topics to courses in business and human resources. Students participate in internships and assist at golf tournaments such as the PGA Championship. Graduates are qualified for jobs in golf course and turf management, sod production, park management and turf products sales. There has been an upsurge in opportunity in the field, according to professor Charles Granger, and 100 percent of 2014-15 graduates were continuing their education or had relevant jobs within a year of graduation, in positions such as golf course superintendent.¹⁴

This sector sheet is the focus of one of ACTE's Microdocs!

To learn more, visit WWW.ACTEONLINE.ORG/MICRODOCS



Proud supporters of ACTE.