

CTE: THE KEY TO ECONOMIC DEVELOPMENT

Agriculture and related industries added

\$775.8 billion
to the U.S. economy in 2012¹



U.S. agricultural exports increased annually by **8.9 percent**, on average, between 2000 and 2013²

More than **21 million** U.S. workers cultivate, process and sell food and fiber products³

What is the pathway to these fulfilling and essential careers?

Career and Technical Education!



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Agriculture, Food and Natural Resources

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

- includes agribusiness systems; animal systems; environmental science; food products and processing; natural resources; plant systems; power, structural and technical systems; and biotechnology
- is considered a vital sector for many states
- increasingly employs middle- and high-skilled workers

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

Cutting-edge research and development, technology and agribusiness principles have brought this sector firmly into the 21st century. There are several sub-fields in the Agriculture, Food and Natural Resources Career Cluster[®] that will grow by impressive margins through 2018. Jobs in forestry and conservation are projected to increase by up to 13 percent, while career opportunities in veterinary medicine are expected to grow by 20 percent and environmental engineering and technician occupations by a remarkable 30 percent.⁴ In addition, efforts to increase and improve the food supply through higher yields and food safety standards will lead to greater opportunities for animal scientists and for food scientists and technologists.⁵

Workers in agriculture, food and natural resources with a high school diploma can make relatively high wages, while median earnings for those with a bachelor's degree in these fields are about \$50,000, which is above the U.S. average.⁶ Earnings are particularly strong for individuals with education and training in fields such as conservation science, forestry, agricultural management and oil and gas extraction.⁷

By 2018, 44 percent of jobs in agriculture, food and natural resources will require some postsecondary education; licenses and industry-recognized certifications are assets to many workers in this sector.⁸ Occupations in this sector incorporate academic, technical and employability skills for such tasks as managing natural resources, cultivating plant life, caring for animals and analyzing the quality of food and agricultural products, among many others. Not all jobs involve working in the open air; jobs in research and development, marketing, sales and business management are conducted in laboratories and offices. The following is a small sample of occupations available:

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



Endnotes

1. U.S. Department of Agriculture Economic Research Service. (2014). *Ag and Food Statistics: Charting the Essentials*. Retrieved from <http://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials.aspx>.
2. Ibid.
3. American Farm Bureau Federation. (n.d.). *Fast Facts About Agriculture*. Retrieved from <http://www.fb.org/index.php?fuseaction=newsroom.fastfacts>.
4. 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.
5. Ibid.
6. Ibid.; Carnevale, A.P., Strohl, J. & Melton, M. (2011). *What's It Worth?: The Economic Value of College Majors*. Washington, DC: Georgetown University Center on Education and the Workforce.
7. 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.
8. Ibid.
9. York, L. (2012). "Case IH Internships: Real-World Experiences and Opportunities." *Be Ready*, October 9, 2012. Retrieved from <http://beready.caseih.com/from-the-editor/case-ih-internships-real-world-experiences-and-opportunities>.
10. National FFA Organization. (n.d.). *The National FFA Agriscience Fair*. Retrieved from <https://www.ffa.org/programs/awards/agrisciencefair/Pages/default.aspx>.
11. Penn State College of Agricultural Sciences. (n.d.). *Associate Degree in Agricultural Business*. Retrieved from <http://aese.psu.edu/majors/associate-agribusiness>.
12. Curriculum for Agricultural Science Education. (n.d.). *Mission and Vision*. Retrieved from <http://www.case4learning.org/index.php/about-case/vision>; Tomlinson, P. (2012). "Stow Creek's Dale Cruzan Jr. wins agricultural teaching award." *South Jersey Times*, September 3, 2012. Retrieved from http://www.nj.com/cumberland/index.ssf/2012/09/local_man_wins_agricultural_te.html; additional information from Allentown staff.
13. Front Range Community College. (n.d.). *Forestry Degree*. Retrieved from <http://www.frontrange.edu/Academics/Fields-of-Study/Forestry-Wildlife-Natural-Resources-Degree;Forestry-High-School-Program>. Retrieved from <http://www.frontrange.edu/Academics/High-School-Programs/Larimer-Campus/Career-Pathways/Wildlife,-Forestry---Natural-Resources.aspx>; additional information from FRCC staff.

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 turf and landscape management, animal nutrition, agribusiness management, agricultural mechanics, forestry management and more, all integrated with rigorous academics
- work-based learning experiences, such as internships at CASE IH, a leading agricultural equipment firm, which has an intern-to-hire ratio of 56 percent⁹
- career and technical student organization enrichment experiences, such as the National FFA Organization's Agriscience Fair, in which students conduct research in agriculture and food science and present their findings to a panel of judges¹⁰
- opportunities to earn stackable certificates, industry-recognized certifications and degrees, such as Penn State's associate degree in agricultural business, which includes many courses that count toward a bachelor's degree in agribusiness management and other majors¹¹

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

The agricultural science program at **Allentown Regional High School** in Monmouth County, New Jersey, prepares students for high-demand, high-wage careers and higher education related to agriculture, food and natural resources. Allentown's agriscience program incorporates the Curriculum for Agricultural Science Education (CASE), a rigorous national curriculum that integrates, emphasizes and enhances academics, STEM and technical skills with a focus on project-based learning and intensive professional development for educators. In addition to CASE-certified courses in Introduction to Agriculture, Food and Natural Resources; Principles of Agricultural Science—Animal; Principles of Agricultural Science—Plant; and Animal and Plant Biotechnology, Allentown students can also study agricultural mechanics; greenhouse, nursery and landscape management; veterinary and equine science; and aquaculture and wildlife science. Students gain hands-on experience by operating school greenhouses and, through strong business partnerships, pursue work-based learning opportunities at local nurseries, veterinary clinics and farms as well as in agribusiness/retail settings. Allentown has articulation agreements with Mercer County Community College and Rutgers University, and is working to expand articulation with other postsecondary institutions. The FFA chapter at Allentown is ranked in the top 10 percent of FFA chapters by the National FFA Organization.¹²

At Colorado's **Front Range Community College** (FRCC) Larimer campus, students can earn stackable credentials in forestry and natural resources, including certificates in natural resources GIS, wildland fire and wildlife and fisheries management. Both the Associate of Applied Science degree in forestry, natural resources and wildlife and the Associate of General Studies degree prepare students to transfer to the Warner College of Natural Resources at Colorado State University. Students gain field experience through such activities as timber cruising, soil studies and snowshoe hare counts at Red Feather Lakes' 100-acre school forest, and wildlife habitat management and fisheries research at Swift Ponds. Opportunities are also available for sawyer training for forest management. In addition, students can take courses to qualify them for Red Card certification for fighting wildfires through FRCC's collaboration with Larimer County Emergency Services. FRCC also hosts a high school program, in which students can earn up to nine credits and a forestry certificate.¹³