

Careers in Plant and Soil Science

CAREERS related to plant and soil science make up a large portion of all agricultural employment. That may be fitting, seeing as our lives are dependent upon plants. Plants provide us with food, clothing, shelter, and oxygen. This unit looks at careers in plant and soil science.



Objective:



Describe the major career areas, educational opportunities, and employers in plant and soil science.

Key Terms:



agricultural mechanics and technology
arboriculture
associate's degree
baccalaureate degree
continuing education
doctoral degree
entrepreneur
entrepreneurship
exploratory SAE
floriculture
forestry
formal education

garden center
graduate degree
horticulture
landscape horticulture
master's degree
natural resources
nursery
olericulture
on-the-job training
ornamental horticulture
ownership SAE
placement SAE
plant science

pomology
postsecondary education
product marketing
production agriculture
research and experimentation SAE
soil science
supervised agricultural experience
supplies and services

Plant and Soil Science

Plant science is the study of the structure, functions, growth, and protection of plants. **Soil science** is the study of the structure, composition, fertility, use, and protection of soil.

OCCUPATIONAL CLUSTERS

Clustering occupations based on the nature of the work involves studying what people do in the work and relating these observations to the competencies needed to perform the work. Occupations involved in plant and soil science can be divided into seven major areas: production agriculture, supplies and services, product marketing, forestry, natural resources, agricultural mechanics and technology, and horticulture.

Production Agriculture

Production agriculture is concerned with the many areas in growing crops. It is often equated with farming. Examples of careers in production agriculture are farmer, plant breeder, biotechnologist, geneticist, agronomist, plant pathologist, and crop consultant.

Supplies and Services

The **supplies and services** area is concerned with the provision of inputs needed to produce crops. Examples of supplies are feed, seed, and fertilizer. Examples of services are custom harvesting, crop consulting, and pest control services. Some careers associated with supplies and services are fertilizer salesperson, pesticide applicator, and seed dealer.

Product Marketing

The **product marketing** area includes all the activities in the processing and marketing of crops



FIGURE 1. Production agriculture is a major area of plant and soil science. (Courtesy, National Cotton Council of America)



FIGURE 2. Most farmers rely on some sort of pest control to get the best yield from crops. (Courtesy, John Deere)

produced on farms. These activities involve getting the products to consumers in the desired forms. A few career titles are wholesaler, grain elevator manager, distributor, and feed mill manager.

Forestry

Forestry is concerned with the production of trees for various uses, such as lumber and paper products. It includes native forests as well as tree farms. Among forestry career titles are sawmill manager, arborist, logger, pulp mill manager, silviculturist, and forester.

Natural Resources

The **natural resources** area includes the conservation and protection of water, soil, air, and other natural resources, including wildlife. Environmental science in relation to natural resources can be included in this area. Careers in natural resources include fishery manager, water resources engineer, wildlife officer, soil and water conservationist, and range manager.

Agricultural Mechanics and Technology

Agricultural mechanics and technology includes the manufacture, repair, and operation of tractors, implements, and computer-based systems. Some careers related to agricultural mechanics and technology are agricultural engineer, farm equipment mechanic, farm equipment set-up mechanic, diesel service technician, and mechanics assistant.

Horticulture

Horticulture is the culture of plants for food, comfort, and beautification. The horticulture industry can be divided into three areas: ornamental horticulture, olericulture, and pomology. Each area is unique and includes many career opportunities. Some horticulture-related careers are horticulture teacher, landscape designer, vegetable researcher, garden center manager, turf farm manager, flower market manager, floral designer, landscape installer, greenhouse assistant, nursery crop propagator, vegetable picker, and greenhouse worker.

The growth and use of plants for their beauty is the area of horticulture known as **ornamental horticulture**. Ornamental horticulture involves the production and use of plants both indoors and outdoors. Two broad categories of ornamental horticulture are floriculture and landscape horticulture.



FIGURE 3. With today's complex equipment, a professional in agricultural mechanics and technology is often needed for set-up and repair.

Floriculture is the production, transportation, and use of flowering and foliage plants. It is associated with cut flowers, potted plants, floral design, and annual bedding plants.

The production and use of plants to beautify the outdoor environment is **landscape horticulture**. Landscape horticulture involves designing plans for landscapes, installing the landscapes as specified in the plans, and maintaining the landscapes. Landscape horticulture also takes in production nurseries, plant and seed producers, garden centers, arboriculture, turfgrass management, and botanical gardens. A **nursery** is a place that specializes in starting plants and growing them until they are ready to be transplanted to landscapes. A **garden center** is a retail outlet that sells plants grown in nurseries, along with garden supplies. **Arboriculture** is a segment of the horticulture industry that deals with the care of trees.

The area of horticulture that involves the production of vegetable food crops is olericulture.

Olericulture is the planting, harvesting, storing, processing, and marketing of vegetable crops.

Pomology is the planting, harvesting, storing, processing, and marketing of fruit and nut crops.



FIGURE 4. Greenhouse workers are an important part of the horticulture industry.

CAREER PREPARATION

Most careers found in the plant and soil science pathway require an individual to obtain at least some formal education. **Formal education** is the process of learning in a school setting. Some jobs require individuals with college degrees, whereas others require no specific level of education. Education can be broken down into three stages: primary education, secondary education, and postsecondary education. Continuing education is also important to career success.

Primary Education

Primary, or elementary, education consists of the first years of formal education. Typically, it begins with preschool followed by elementary school. Primary school usually extends through the eighth grade. Some districts have middle schools, which serve as a transition between primary education and secondary education. Students usually attend middle schools for grades 6 through 8. Other districts have junior high schools that encompass grades 7 through 9.

Secondary Education

Secondary education involves grades 9 through 12. The purposes of secondary education are to provide students with a general education, to prepare them for postsecondary education, and train them for vocations or specific areas of work.

One important way for students to gain insight and develop jobs skills is through supervised experience. Students enrolled in agriculture classes may gain additional training through participation in supervised agricultural experience programs. **Supervised agricultural experience** (SAE) refers to the application of class instruction in agriculture. It is a planned experience that may involve work in some agriculture-related business. The experience is tied to class content and the career interests of the student. The student, the student's parents or guardian, the agriculture teacher, and the business owner plan the experience jointly. Sometimes a student may be the owner of a production enterprise in which he or she produces a crop. Four types of SAE are exploratory, ownership, placement, and research and experimentation.

Exploratory SAE allows a wide range of experiences. It helps students define their interests and what they would like to study in greater detail.

Ownership SAE involves the ownership or management of an enterprise in agriculture or a related area. Ownership SAE is also referred to as entrepreneurship SAE.

Placement SAE involves gaining work experience in the agriculture industry. Students work for other people, who may or may not pay them.

Research and experimentation SAE involves science-based experience. It relates to using laboratory procedures to study a problem.

“Less than high school” refers to having attended high school but not having completed it. Individuals with less-than-high-school education are typically limited to low-level jobs; however, their work is important to the agriculture industry.

“High school level” refers to having completed high school but not having gone on for additional education. The jobs available for individuals with high-school-level education are usually at lower levels.

Postsecondary Education

Postsecondary education is education beyond high school. It may take place at a trade or technical school, a community college, a college, or a university.

A community college, sometimes called a junior college, offers an **associate's degree**, which is usually earned after two years of study. The training provided may be specialized so that individuals are able to fill jobs that require considerable responsibility.

Another postsecondary option is a college or university. Education at either institution typically requires four years of education and results in a **baccalaureate degree**. Jobs that require baccalaureate degrees are at the technical level.

Further education at a university can result in a **graduate degree**. In general, two years of graduate work may result in a **master's degree**. A **doctoral degree** is awarded to individuals who complete three to five years of postgraduate research and study, followed by the

submission of a thesis. Jobs that require this level of education are highly technical and involve significant responsibility.

Continuing Education

Continuing education is the education an individual obtains throughout his or her lifetime. Success and advancement on the job are often directly related to the amount of continuing education an employee receives. **On-the-job training** is a form of continuing education. Through on-the-job training, an employee can learn to perform important skills specific to the job.

EMPLOYERS IN PLANT AND SOIL SCIENCE

Many career opportunities exist in plant and soil science. Careers are available with private companies and with public institutions at the local, county, state, or national level. There are also vast opportunities for well-educated, well-organized, and hard-working individuals to create and operate their own businesses.

Private businesses are established to produce income for their owners. The owners of businesses risk losing what they have invested. The mission of a private business is to make a profit. Businesses established for profit-making purposes typically include farms and a wide range of other agricultural and horticultural businesses. Private businesses provide a multitude of jobs.

Entrepreneurship is the ownership and operation of a business. A person who owns a business is an **entrepreneur**. The goal is to produce goods or services resulting in a profit for the owner. Agricultural and horticultural businesses include farms, flower shops, soil testing services, seed and fertilizer businesses, and crop consulting firms, among others.

Public institutions include local, state, and federal government agencies. The goal of a public institution is to serve the public. The major agricultural agency of the federal government is the United States Department of Agriculture (USDA). Employment can also be found with public universities and colleges.

Summary:



The seven major areas of plant and soil science are production agriculture, supplies and services, product marketing, forestry, natural resources, agricultural mechanics and technology, and horticulture.

Formal education can be broken down into three stages: primary education, secondary education, and postsecondary education. Students enrolled in agricultural classes may gain additional training through participation in supervised agricultural experience programs. Four types of SAE are exploratory, ownership, placement, and research and experimentation.

Postsecondary education involves education beyond high school. It may take place at a trade or technical school, a community college, a college, or a university. Degrees awarded include the associate's degree, baccalaureate degree, master's degree, and doctoral degree.

Continuing education is the education an individual obtains throughout his or her lifetime. Through on-the-job training an employee can learn new job skills.

Careers in plant and soil science are available with private companies and with public institutions at the local, county, state, or national level.

Checking Your Knowledge:



1. What are the seven major areas of plant and soil science?
2. What levels of education are associated with formal education?
3. Why is supervised agricultural experience valuable?
4. What is continuing education?
5. Where are many careers in plant and soil science found?

Expanding Your Knowledge:



Prepare a short list of careers that interest you. Conduct research on the careers to determine the education and training required, the work environment, and the wages. During your research, pay attention to related fields that may surface of which you were unaware.

Web Links:



Careers in Soil Science

<http://www.soils.usda.gov/education/facts/careers.html>

Career Explorer

http://www.ffa.org/index.cfm?method=c_job.CareerSearch

Agricultural Careers

<http://www.agriculturaleducation.org/career/agricareer.asp>

Career Opportunities for Majors in Agricultural Science

<http://careerservices.rutgers.edu/agriculturalscience.html>

Agricultural Career Profiles

<http://www.mycart.com/career-profiles>