

# Week of April 6-10, 2020

# COON

All of these assignments are on google classroom. You must pick one of the 3 listed and complete by next Monday, April 13 for credit. If you would like to use google docs to complete the work that would be most efficient. However, paper copies can be returned to the school.

<b>Class</b>	<b>Choice 1</b>	<b>Choice 2</b>	<b>Choice 3 (Enrichment)</b>
Ag Science	Anatomy of Animal Reproduction Systems Part 1	Reproductive Development of Animals Part 2	FFA journal
Ag Business Mang	Personal Finances	Time Value of Money	Chart work experiences
BSAA	Heredity and DNA	Animal Growth and Development	Animal Nutrition
Landscape Design	Turf Grass part 1	Turf Grass part 2	Analyzing a Landscape
Intro To Ag	History of Ag part 1	History of Ag part 2	Supervised Ag Experience Part 1
Ag Mech.	Principles of Small Engines	Small Engines and their components	Small engines tear down

April 6-10th

Mr. Coon Intro to Ag

Date

Name

History of Ag part 1

Checking Your Knowledge:

1. How did Native Americans practice agriculture?
2. How did early colonists adapt to agriculture in America?
3. Who were major agricultural innovators in the 1700s?
4. What were major developments in agriculture during the 1800s?
5. Who were major agricultural innovators in the 1800s?

# History of U.S. Agriculture Up to the 20th Century

**N**EARLY every American school child is introduced to the first Thanksgiving meal attended by Native Americans and Pilgrims in New England in 1621. Furthermore, students are told of how a Native American named Squanto helped the colonists recover from an extremely hard first winter by teaching them the native method of maize cultivation, which involved burying local fish in the soil to fertilize crops. This unit looks at agriculture then and up to 1900.

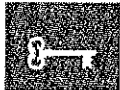


## Objective:



Describe agricultural developments and innovations in the United States up to 1900.

## Key Terms:



Leonard Andrus  
Robert Bakewell  
Gail Borden  
Luther Burbank  
George Washington  
Carver  
John Chapman  
John Deere  
William Deering  
domestication  
George Esterly

John Froelich  
Joseph Glidden  
Daniel Halladay  
James Hargreaves  
Homestead Act of 1862  
Thomas Jefferson  
John Kay  
John Lane  
Sir John Lawes  
Louisiana Purchase  
Cyrus McCormick

Andrew Meikle  
Gregor Mendel  
Thomas Moore  
Morrill Act of 1862  
Charles Newbold  
"three sisters"  
Charles Townshend  
Jethro Tull  
Eli Whitney  
Jethro Wood

# Early American Agriculture

Agriculture in the United States has been heavily influenced by Native Americans and European colonists. Native Americans inhabited much of North America before the arrival of Europeans.

## NATIVE AMERICAN AGRICULTURE

Native Americans began to occupy the Mississippi River basin some 7,000 years ago, relying on the cultivation of sunflowers, cucurbits, and edible seeds as food. Evidence indicates that the cultivation of additional plants began about 3,000 years ago. These early Americans developed sophisticated agricultural practices. It is believed by 5,000 years ago, Mesoamericans had domesticated maize (corn) from a grass plant called teosinte. Mesoamerica roughly encompasses the region from central Mexico south to Belize, Guatemala, El Salvador, Honduras, Nicaragua, and northern Costa Rica. By A.D. 1000, maize was produced throughout much of North America. The plant was grown in large plots. Europeans called maize *corn*, a general term for cereal grains.

Native Americans used fire to clear fields for the production of maize, beans, squash, and other crops. Corn, beans, and squash, called the “**three sisters**,” were planted together in the same mounds by Native Americans. This widespread practice was a sophisticated, sustainable system that provided long-term soil fertility and a healthy diet.

Though plant cultivation was underway when the colonists arrived, most Native Americans still depended on hunting and gathering to meet their food, clothing, and shelter needs.

At least 1,000 years ago, Hawaiians practiced aquaculture, or fish farming.

## EARLY EUROPEAN INFLUENCE

In 1493, Christopher Columbus introduced calves, goats, sheep, pigs, hens, citrus, melons, and several kinds of vegetables to settlements in the Caribbean.

The first permanent settlement of colonists in present-day United States was at Jamestown, Virginia, in 1607. From here, settlers eventually moved westward and southward. They cleared land and used it for crops (tobacco, amaranth, cotton, and grains) without regard to soil fertility. When the soil was no longer productive, they moved, seeking new areas to clear.

Colonists from Europe also settled in the Northeast. Plymouth Colony was established in 1620 in present-day Massachusetts. Along the eastern seaboard, the colonists found fields cleared of forests for agricultural purposes. Native Americans practiced a form of agriculture in which they would farm a field until yields dropped. Then, they would move on to another area, allowing the soils of the previously used field to recover fertility. European explorers and traders noted that the land left fallow appeared abandoned. Also, diseases, such as measles and smallpox, had a devastating effect on Native American populations before European settlers arrived. This left lands somewhat unoccupied. Consequently, European colonists were able to gain a foothold with minimal conflict.

Initially, Europeans struggled to survive. Crops that had been staples in Europe often did poorly in the New World. The survival of the colonists depended on adopting the agricultural practices employed by the Native Americans.

Colonists brought domesticated livestock to early settlements in Virginia and Massachusetts. **Domestication** is the taming, confinement, and breeding of animals and plants for human use. A great many farmers, particularly those inland, practiced subsistence farming, whereby they consumed what they produced.

Many of the crops grown by the early settlers were obtained from the Native Americans. These included corn (maize), sweet potatoes, tomatoes, pumpkins, gourds, squashes, watermelons, beans, grapes, berries, pecans, black walnuts, peanuts, maple sugar, tobacco, and cotton.

Crops from Europe included clover, alfalfa, timothy, small grains, and fruits and vegetables.

Grain and sweet sorghum, melons, okra, and peanuts were introduced to the New World as a result of the slave trade between Africa and the colonies.

Tobacco was the first important export crop and the chief cash crop of the South. In fact, the demand for tobacco provided the funding to keep the Jamestown colony afloat. Southern plantation agriculture focused on export crops. Tobacco is labor intensive, and slaves were essential for its production on larger farms.

## KEY DEVELOPMENTS AND EVENTS IN THE 1700s

Since the earliest times, agriculture has held a vital place in the American economy and culture. Farming was an important aspect of Native American cultures and trade between peoples.

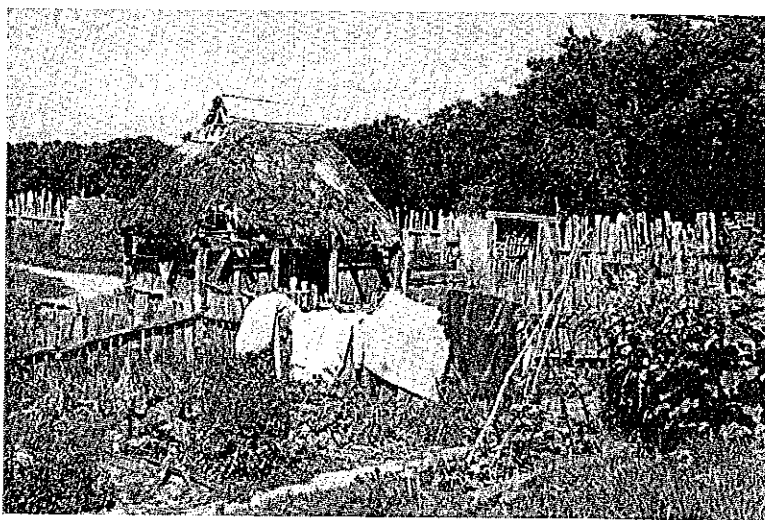


FIGURE 1. Europeans in Plymouth Colony struggled to produce enough food to survive.



FIGURE 2. Tobacco is a labor-intensive crop and was the first important export crop from the colonies.

The arrival of European settlers increased the level of farming. In the mid-1700s, about 90 percent of Americans were farmers.

In the 17th and 18th centuries, oxen and horses provided some power in agriculture. Human power was also required. At the time, farming was very labor intensive. Using a crude wooden plow, sowing seed by hand, cultivating by hoe, cutting hay and grain with a sickle, and threshing with a flail were common. Key developments and events occurred in the United States in the 1700s that improved agricultural production.

## ***Innovations***

Innovations during the 1700s reduced hand labor and improved productivity.

- ◆ In 1701 **Jethro Tull** invented the seed drill, which allowed corn to be sown in regular rows.
- ◆ Following 1730, British agriculturalist **Charles Townshend** aided the European agricultural revolution by popularizing a four-year crop rotation with wheat, barley, turnips, and clover. In the United States, **George Washington Carver** promoted his science of crop rotation to the farmers and saved the farming resources of the South.
- ◆ In 1733 **John Kay** invented the flying shuttle, which allowed weavers to produce wider pieces of cloth faster.
- ◆ In 1750 **Robert Bakewell** experimented with selective breeding of livestock (breeding from the finest animals).
- ◆ In 1764 **James Hargreaves** invented the spinning jenny, which allowed spinners to produce more yarn.
- ◆ In 1786 Scotsman **Andrew Meikle** invented a threshing machine that separated ears of corn from stalks.
- ◆ In the 1790s, the scythe and cradle used to reap grain was introduced. It limited waste and made it easier to weed crops.
- ◆ In the 1790s **John Chapman**, also known as Johnny Appleseed, traveled the frontier as an American pioneer nurseryman and introduced apple trees to large parts of Pennsylvania, Ohio, Indiana, and Illinois, as well as the northern counties of present-day West Virginia.
- ◆ In 1793 future President **Thomas Jefferson** designed a plow, “the moldboard of least resistance.” The moldboard is the wooden part of the plow that lifts and turns over the

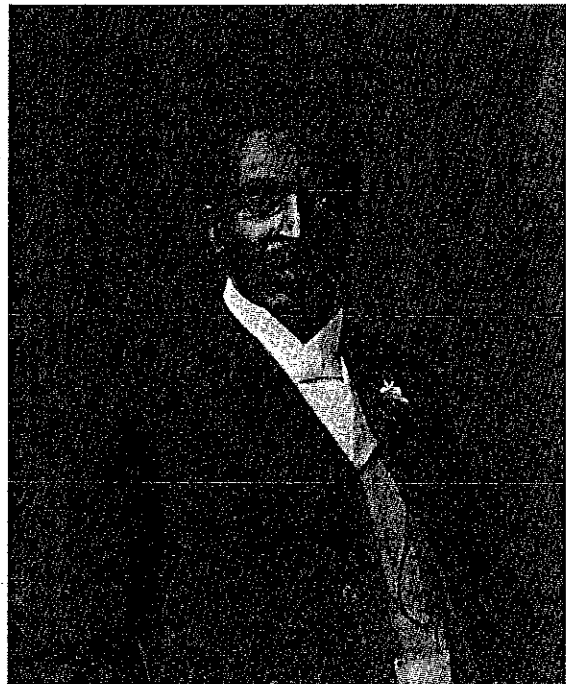


FIGURE 3. Botanist and inventor George Washington Carver promoted crop rotation to the farmers.



## FURTHER EXPLORATION...

### ONLINE CONNECTION: Life on a 1700s Farm

Life on a 1700s farm was a lot of work. In fact, the work never ended. Always something had to be done. Crops and livestock needed to be tended. Clothing had to be maintained. Shelters had to be built and repaired.

You can learn more about what life was like by visiting the following sites:

<http://www.history.org/foundation/journal/spring05/agriculture.cfm>

<https://www.noahwebsterhouse.org/discover/kids-corner/life-in-1700s.htm>

[http://historyisfun.org/pdf/colonial-life/colonial\\_life.pdf](http://historyisfun.org/pdf/colonial-life/colonial_life.pdf)

sod cut by the iron share and coulter. Jefferson's design made that lifting and turning action more efficient, allowing the plow to be pulled through the soil with less force.

◆ In 1794 **Eli Whitney** invented the cotton gin. It allowed for quicker and easier separation of cotton fibers from their seeds than manual cotton separation. Cotton was a Southern cash crop.

◆ In 1797 **Charles Newbold** received the first patent for a cast-iron plow. However, it did not sell well because many farmers feared that the iron from the plow would poison the soil.



FIGURE 4. Eli Whitney invented the cotton gin. It allowed for quicker and easier separation of cotton fibers from their seeds. Cotton was a Southern cash crop.

## KEY DEVELOPMENTS AND EVENTS IN THE 1800s

Agriculture powered America's economic development. Plentiful food supplies provided by farmers freed workers to devote their energy to mills, factories, and shops that were essential to America's industrialization.

### *Developments*

Major developments during the 1800s advanced agriculture and have an impact on agriculture to this day.

In 1803 the United States, in what is known as the **Louisiana Purchase**, acquired from France approximately 827,000 square miles of land west of the Mississippi River. The price was \$15 million. This transaction, during the term of President Thomas Jefferson, provided land for expansion.

During the period 1805 to 1815, cotton began to replace tobacco as the chief southern cash crop, and during the period 1815 to 1830, it was the most important cash crop in the Old South.

It is estimated that in 1850 about 75 to 90 labor-hours were required to produce 100 bushels (2½ acres) of corn using a walking plow, a harrow, and hand planting.

By 1860 the nation's 2 million farms produced farm products that made up 82 percent of the country's exports.

On May 15, 1862, Abraham Lincoln established the independent U.S. Department of Agriculture to be headed by a commissioner without Cabinet status.

The first of a series of Homestead Acts, the **Homestead Act of 1862**, signed by President Abraham Lincoln on May 20, 1862, provided a grant of 160 acres of public land in the West to any person who:

- ◆ Was a citizen of the United States (or had filed a declaration of intention to become one)
- ◆ Had never taken up arms against the U.S. government or aided or comforted its enemies
- ◆ Was 21 years or older or the head of a family

The **Morrill Act of 1862** allowed for the creation of land-grant colleges that would teach military tactics, engineering, and agriculture. Professor Jonathan Baldwin Turner of Illinois College led the push. Representative Justin Smith Morrill of Vermont introduced the bill in congress, and President Abraham Lincoln signed it into law on July 2, 1862.

Following the end of the Civil War in 1865, technology on the farm changed from hand power to horse power to cut hay, plant corn, and bind oats.

By 1890, 35 to 40 labor-hours were required to produce 100 bushels (2½ acres) of corn with the two-bottom gang plow, disk and peg-tooth harrow, and two-row planter. Forty to 50 labor-hours were required to produce 100 bushels (5 acres) of wheat with the gang plow, seeder, harrow, binder, thresher, wagons, and horses.



FIGURE 5. The Louisiana Purchase involved 827,000 square miles of land west of the Mississippi River.



## Innovations

Innovations during the 1800s greatly improved farm efficiency and productivity.

- ◆ In 1801 **Thomas Moore** of Maryland invented the icebox refrigerator, allowing agricultural and fishery products to be transported in any season under even the hottest conditions.
- ◆ In 1819 **Jethro Wood** patented an iron plow with interchangeable parts.
- ◆ During 1819 to 1825, the U.S. food-canning industry became established.
- ◆ In 1834 **Cyrus McCormick** invented a horse-drawn mechanical reaper to harvest grain.
- ◆ In 1834 **John Lane** manufactured plows faced with steel saw blades.
- ◆ In 1837 partners **John Deere** and **Leonard Andrus** began manufacturing steel plows and patented a practical threshing machine.
- ◆ In 1843 **Sir John Lawes** founded the commercial fertilizer industry by developing a process for making superphosphate.
- ◆ In 1844 the first practical mowing machine was patented.
- ◆ In 1853 **Gail Borden** developed condensed milk.
- ◆ In 1854 **Daniel Halladay** patented the self-governing windmill. The windmill turned automatically to face changing wind directions and maintained a uniform speed by changing the pitch of its sails. Windmills were used to grind grain, draw water, and power machines.
- ◆ In 1856 **George Esterly** patented the two-horse straddle-row cultivator, making it easier to work the soil.
- ◆ In 1858 Mason jars used for home canning were invented.
- ◆ During the period 1865 to 1875, gang plows and sulky plows came into use, allowing a farmer to accomplish much more behind a team of horses.
- ◆ In 1866 **Gregor Mendel** showed that traits were passed from parents to offspring, the foundation of modern genetics.
- ◆ In 1868 steam tractors are tried out.
- ◆ In 1869 the spring-tooth harrow for seedbed preparation appeared.
- ◆ During the 1870s, silos for the storage of fodder or forage and deep-well drilling came into use.

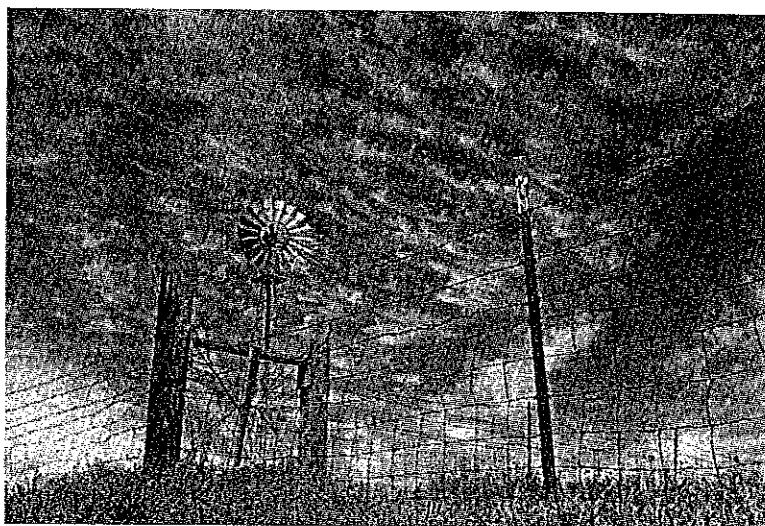


FIGURE 6. The self-governing windmill patented in 1854 and barbed wire patented in 1874 were agricultural innovations. (Courtesy, Natural Resources Conservation Service, USDA)

- ◆ In 1872 **Luther Burbank** developed the Russet Burbank potato, followed by many improved vegetables, fruits, and flowers.
- ◆ In 1874 **Joseph Glidden** patented barbed wire, which allowed fencing of rangeland and ended the era of unrestricted, open-range grazing.
- ◆ In 1880 **William Deering** put 3,000 twine binders on the market. The twine binder was used with small-grain crops. It would tie the stems into small bundles, or sheaves, that were then “shocked” into conical stooks resembling small tepees, to allow the grain to dry for several days before being threshed.
- ◆ In 1881 two varieties of corn were crossed by detasseling one of them, hybridizing the corn for the sole purpose of using the vigor of the first-generation hybrid to increase production.
- ◆ During the period 1884 to 1890, horse-drawn combines were used to harvest Pacific Coast wheat areas.
- ◆ In 1888 the first long-haul shipment of goods in a refrigerated freight car was made from California to New York.
- ◆ During the period 1890 to 1895, cream separators came into wide use. Before then, separation was done by letting milk sit in a container until the cream floated to the top and could be skimmed off by hand.
- ◆ In 1892 **John Froelich** built the first gasoline tractor.

## Summary:



Agriculture in the United States has been heavily influenced by Native Americans and European colonists. By A.D. 1000, maize was produced throughout much of North America and was grown in large plots. Corn, beans, and squash, called the “three sisters,” were planted together in the same mounds by Native Americans.

The first permanent settlement of colonists in present-day United States was at Jamestown, Virginia, in 1607. Plymouth Colony was the second successful colony, established in 1620 in present-day Massachusetts. Initially, Europeans struggled to survive. Crops that had been staples in Europe often did poorly in the New World. The survival of the colonists depended on adopting the agricultural practices employed by the Native Americans.

In the 17th and 18th centuries, oxen and horses provided some power in agriculture. Human power was also required. At the time, farming was very labor intensive. Using a crude wooden plow, sowing seed by hand, cultivating by hoe, cutting hay and grain with a sickle, and threshing with a flail were common. Key developments and events occurred in the United States in the 1700s that improved agricultural production.

Major developments during the 1800s advanced agriculture and have an impact on agriculture to this day. Innovations during the 1800s greatly improved farm efficiency and productivity.

## Checking Your Knowledge:

---



1. How did Native Americans practice agriculture?
2. How did early colonists adapt to agriculture in America?
3. Who were major agricultural innovators in the 1700s?
4. What were major developments in agriculture during the 1800s?
5. Who were major agricultural innovators in the 1800s?

## Expanding Your Knowledge:

---



Use print media and/or the Internet to read and learn more about the history of agriculture and the role of agricultural technology. Consider how agricultural practices evolved in your region of the country.

## Web Links:

---



### Aboriginal Farming in New England

<http://nativeamericannetroots.net/diary/1393>

### Growing a Nation: The Story of American Agriculture

<http://www.agclassroom.org/gan/timeline/>

### History of American Agriculture

<http://www.teach1.cses.vt.edu/Hist3124/ch2.html#top>

### Plantation Farming

<http://www.landofthebrave.info/plantation-farming.htm>

### Agricultural Career Profiles

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

*April 6-10th*

Mr Coon  
History of Ag Part 2

Intro to Ag

Date

Name

Checking Your Knowledge:

1. What was the purpose of:

a. The Smith-Lever Agricultural Extension Act of 1914?

b. The Smith-Hughes Vocational Education Act of 1917?

c. The American Farm Bureau Federation?

2. Why are the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA) important?

3. What were major developments in agriculture from 1900 to 1950?

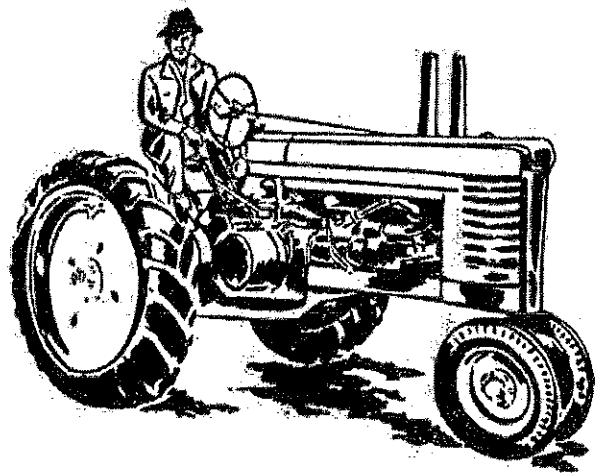
4. What were major developments in agriculture from 1950 to 2000?

5. What were major developments in agriculture from 2000 to today?



# History of U.S. Agriculture from the 20th Century to Today

**D**OES THE YEAR 2000 seem like a long time ago to you? Does the year your parents were born or the year your grandparents were born seem long ago? What changes in agriculture have occurred in your life or their lives, and what has been the impact of those changes? This unit looks at some of the most significant changes since 1900.



## Objective:



Investigate key events that had an impact on the agriculture industry between 1900 and today.

## Key Terms:



General Agreement on Tariffs and Trade (GATT)  
North American Free Trade Agreement (NAFTA)  
Smith-Hughes Vocational Education Act of 1917  
Smith-Lever Agricultural Extension Act of 1914

## U.S. Agriculture from the 20th Century to Today

Certain events and innovations have made agricultural production increasingly more efficient since the beginning of the 20th century.

Developments in agriculture are often categorized in one of three revolutions. In this context, *revolution* means a significant change that occurs due to discoveries, inventions, or new technologies.

The first agricultural revolution is characterized as simple farming with cultivation. It involved subsistence and sustainable farming and shifting cultivation. It occurred along with

the rise of the first cities. This type of farming was practiced by Native Americans and early colonists.

The second agricultural revolution is associated with an increase in mechanization and commercialization through the development of new inventions and technology. It occurred along with the industrial revolution in the 18th and 19th centuries. It is also marked by a massive expansion of urban centers.

The third agricultural revolution is sometimes called the green revolution and occurred primarily between the 1940s and 1960s. During this period, more advanced technology was used for farming, resulting in increased farming yields.

Another revolution in agriculture is the blue revolution, which is the rapid development of aquaculture, or fish farming.

## **1900 to 1950**

---

The developments in agriculture in the United States between 1900 and 1950 were significant.

The **Smith-Lever Agricultural Extension Act of 1914** was legislation passed to establish a link between the state land-grant colleges and farmers. The Cooperative Extension Service grew from this.

The **Smith-Hughes Vocational Education Act of 1917** was legislation that provided federal aid to schools, particularly for vocational agricultural education.

The American Farm Bureau Federation was formed, with the goal of education for its members and commercial and political activities on behalf of agriculture.

### ***Innovations Between 1900 and 1950***

Innovations in agricultural equipment and practices accelerated in the early 20th century.

- ◆ In 1900 the average farm size was 147 acres.
- ◆ From 1900 to 1910, George Washington Carver served as director of agricultural research at Tuskegee Institute. His research found new uses for peanuts, sweet potatoes, and soybeans, thus helping to diversify agriculture, particularly in the South.
- ◆ Between 1910 and 1915, big open-g geared gas tractors came into use in areas of extensive farming.
- ◆ Between 1915 and 1920, enclosed gears were developed for tractors.
- ◆ In 1918 a small prairie-type combine with an auxiliary engine was introduced.
- ◆ In 1921 the first commercial double-cross corn hybrid was released and recommended by the Connecticut Agricultural Experiment Station.
- ◆ In 1922 International Harvester introduced a device that allowed power from a tractor engine to be transmitted to attached harvesting equipment.
- ◆ In 1926 the cotton stripper for harvesting was developed for the High Plains.
- ◆ In 1926 a successful light tractor was developed.

- ◆ In 1930 one farmer supplied 9.8 persons in the United States and abroad.
- ◆ In 1930, 15 to 20 labor-hours were required to produce 100 bushels (2½ acres) of corn with a two-bottom gang plow, 7-foot tandem disk, four-section harrow, and two-row planters, cultivators, and pickers.
- ◆ In the 1930s an all-purpose, rubber-tired tractor with complementary machinery came into wide use.
- ◆ In the 1930s, conservation practices were put into place because of the Dust Bowl created by severe drought and bare soil in the southwestern Great Plains. Wind erosion damaged both the environment and agriculture.
- ◆ In 1932 the first baler attached to a tractor was developed to pick up cut hay in a field; it shaped bales and tied them with twine.
- ◆ In 1935 the Rural Electrification Administration (REA) was created with the primary goal of promoting rural electrification.
- ◆ In 1935 the demand for hybrid seed in the Corn Belt exceeded production, and the hybrid seed industry developed rapidly.

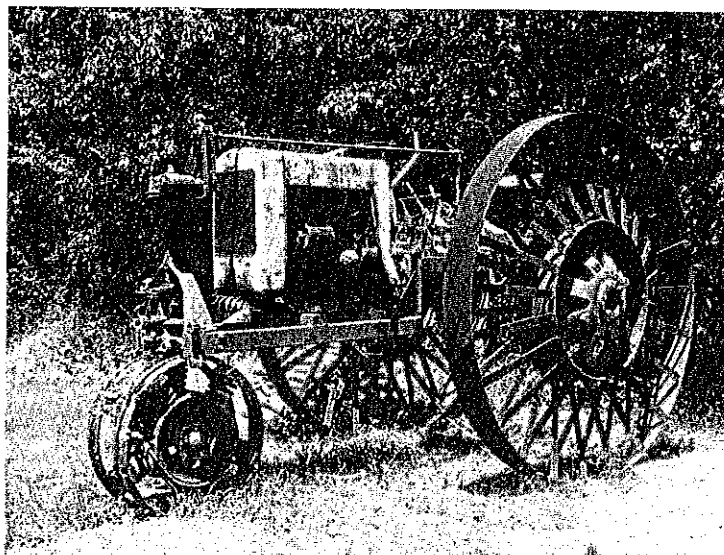


FIGURE 1. Early farm tractors did not have rubber tires.

## FURTHER EXPLORATION...

### ONLINE CONNECTION: The Dust Bowl

Go to <http://www.history.com/topics/dust-bowl> and <https://www.youtube.com/watch?v=CM3ZHMBhP2k>. Click on and watch the films. As you are watching, ask yourself what impact the period had on agriculture. Do you think it still has an impact today?

Also, it is often said the American farmer produces enough food to feed many people in the world. Watch the film "The Great Famine" at <http://www.pbs.org/wgbh/americanexperience/films/2/>. How did American farming alleviate the famine?



A "black roller" moves through the Dust Bowl of the Great Plains, carrying soil blown from unprotected farmland. (Courtesy, Natural Resources Conservation Service, USDA)



- ◆ In 1940 one farmer supplied 10.7 persons in the United States and abroad.
- ◆ From 1940 to 1949, the average annual consumption of commercial fertilizer grew from 6,599,913 tons in 1930 to 1939 to 13,590,466 tons.
- ◆ During the period 1941 to 1945, frozen foods were popularized.
- ◆ In 1942 the spindle cotton picker began to be produced commercially.
- ◆ In 1945, 10 to 14 labor-hours were required to produce 100 bushels (2 acres) of corn with a tractor, three-bottom plow, 10-foot tandem disk, four-section harrow, four-row planters and cultivators, and two-row pickers.

## 1950 to 2000

Since 1950, the agricultural industry has grown bigger and more efficient. Many American farms have gotten larger and have consolidated their operations to improve efficiency. American agriculture has become progressively more of an *agribusiness*, a term that reflects the big, corporate nature of many farm enterprises in the modern U.S. economy. Agribusiness includes a variety of farm businesses and structures, from small one-family corporations to huge conglomerates or multinational firms that own large tracts of land or that produce goods and materials.

Agribusiness has meant larger but fewer farms. The large farms are highly mechanized and require fewer farm hands. In 1940 there were 6 million farms, averaging 165 acres each. By the late 1990s, there were only about 2.2 million farms, averaging 470 acres each. During roughly this same period, farm employment declined dramatically. In 1930, 12.5 million people were employed on farms. By the 1990s, only 1.2 million were employed on farms. In 1900, farmers made up 50 percent of the labor force in the United States, but by the end of the 20th century, they accounted for only 2 percent.



FIGURE 2. By the late 1990s, farms averaged 470 acres each.

### Trade Agreements

After World War II, important international measures were undertaken by the United States and its allies to liberalize trade and payment. These trade agreements had an impact on the agriculture industry.

The **General Agreement on Tariffs and Trade (GATT)**, originally passed in 1947, is a set of trade agreements aimed at the elimination of quotas and the reduction of tariff duties among the participating nations. It was readopted in 1994. GATT includes the following provi-

sions: (1) It obligates each country to accord nondiscriminatory, most-favored-nation treatment to all other contracting parties with respect to tariffs. (2) It prohibits the use of quantitative restrictions on imports and exports. (3) It provides special provisions to promote trade of developing nations.

The **North American Free Trade Agreement (NAFTA)** is a treaty entered into by the United States, Canada, and Mexico with the goal of opening trade between the three nations. It was enacted on January 1, 1994. It is a comprehensive trade agreement that improves virtually all aspects of doing business within North America. NAFTA eliminates tariffs completely and removes many of the non-tariff barriers, such as import licenses, that have helped to exclude U.S. goods from the other two markets, especially Mexico.

### ***Innovations Between 1950 and 2000***

During this period, innovations in agriculture occurred at an increasing rate.

- ◆ From 1945 to 1970, the change from horses to tractors and the adoption of a group of technological practices characterized the second American agricultural revolution.
- ◆ The 1940s and 1950s are sometimes referred to as the “pesticides era” because of the widespread use of new chemical pesticides.
- ◆ In 1950 one farmer supplied 15.5 persons in the United States and abroad.
- ◆ In the 1950s, the positive effects of crossbreeding cattle first came to light.
- ◆ In the 1950s, food technology became mechanized, and frozen foods on the market increased rapidly.
- ◆ From 1950 to 1959, the average annual consumption of commercial fertilizer was 22,340,666 tons.
- ◆ In 1954 the number of tractors on farms exceeded the number of horses and mules for the first time.
- ◆ From the late 1950s through the 1960s, anhydrous ammonia was increasingly used as a cheap source of nitrogen, spurring higher yields.
- ◆ In 1960 one farmer supplied 25.8 persons in the United States and abroad.
- ◆ From 1960 to 1969, the average annual consumption of commercial fertilizer was 32,373,713 tons.



**FIGURE 3.** In 1954 the number of tractors on farms exceeded the number of horses and mules for first time. (Courtesy, Natural Resources Conservation Service, USDA)

- ◆ In 1965, 99 percent of sugar beets were harvested mechanically.
- ◆ In 1966 electronic monitoring devices for farmers were introduced to control number and spacing of seeds planted.
- ◆ In 1968, 96 percent of cotton was harvested mechanically.
- ◆ In 1970 one farmer supplied 75.8 persons in the United States and abroad.
- ◆ In the 1970s, no-tillage agriculture became increasingly popular.
- ◆ In the 1970s, a world energy crisis in which prices soared resulted in higher costs for farming and, thus, higher food prices.
- ◆ By 1972 pesticide use had increased 50-fold since 1950, and 2.3 million tons of industrial pesticides were used each year.
- ◆ By 1973 soybeans had become America's number one cash crop and leading export commodity, ahead of both wheat and corn. This was due in part to advances in breeding and herbicides.
- ◆ In 1975 three labor-hours were required to produce 100 bushels (1 acre) of corn with a tractor, five-bottom plow, 20-foot tandem disk, planter, 20-foot herbicide applicator, 12-foot self-propelled combine, and trucks.
- ◆ In 1978 the first commercial product arising from the use of recombinant DNA technology gene transfer was synthetic insulin.
- ◆ In the 1980s more farmers used no-till or low-till methods to curb soil erosion.
- ◆ The 1980s saw a dramatic shift in the capital structure of American agriculture and the ownership of its assets, resulting in many previously successful farmers going out of business and the agricultural land market hitting rock bottom.
- ◆ In 1987, 2<sup>3</sup>/<sub>4</sub> labor-hours were required to produce 100 bushels (1 acre) of corn with a tractor, five-bottom plow, 25-foot tandem disk, planter, 25-foot herbicide applicator, 15-foot self-propelled combine, and trucks.
- ◆ In 1988 the first enzyme, rennin, was produced from genetically modified yeast and approved for use in food.
- ◆ In 1989 more farmers began to use low-input sustainable agriculture (LISA) techniques to decrease chemical application.
- ◆ In the early 1990s, civilian operators were able to use GPS receivers for precision farming activities.
- ◆ In 1994 the first genetically modified crop, the FlavrSavr tomato, was approved for sale in the United States.
- ◆ In 1996 The Roslin Institute in Scotland produced a sheep, Dolly, the first mammal cloned from a cell of an adult animal.
- ◆ In 1996 Roundup Ready soybeans were introduced to the U.S. market.
- ◆ In 1998 Monsanto introduced Roundup Ready corn.
- ◆ In 1999 Texas A&M University scientists cloned the first bull.

## THE 21st CENTURY

The 21st century agriculture industry has seen larger farms, larger and more sophisticated equipment, and more reliance on biotechnology.

### *Innovations from 2000 to Today*

Some modern developments follow.

- ◆ In 2000 a pig was cloned.
- ◆ In 2002, 11 percent of the U.S. corn crop was used for fuel production.
- ◆ In 2013 the first commercial cellulosic ethanol plants opened.
- ◆ As biotechnology and the use of chemicals have increased, so has organic farming, or production without genetically modified organisms or synthetic chemicals.
- ◆ Robots are being increasingly used in agriculture. Fruit-picking robots, driverless tractor/sprayers, and sheep-shearing robots are being designed to replace human labor.
- ◆ Closed ecological systems in which any waste products from one species are used by at least one other species are being adopted.
- ◆ Use of precision agriculture, or site-specific crop management, is increasing. This farm management concept is based on observing, measuring, and responding to variability in crops.
- ◆ Combines can harvest 16 rows and planters can sow 48 rows of seed at a time.
- ◆ Cameras and sensors allow detailed scrutiny of fields and can distinguish weeds from crops.
- ◆ Today the average farm size is 441 acres, as opposed to 147 acres in 1900.



FIGURE 4. Bales of corn stover collected near York, Nebraska, have potential as a feedstock for cellulosic ethanol production. (Courtesy, Agricultural Research Service, USDA)



FIGURE 5. Adding sensors and computers to farm implements such as these can help farmers run more cost efficient and environmentally sound precision agriculture operations. (Courtesy, Agricultural Research Service, USDA)

## Summary:



Certain events and innovations have made agricultural production increasingly more efficient since the beginning of the 20th century. Developments in agriculture are often categorized in one of three revolutions.

The Smith-Lever Agricultural Extension Act of 1914, the Smith-Hughes Vocational Education Act of 1917, and the formation of the American Farm Bureau Federation were important developments.

Since 1950 the agriculture industry has grown bigger and more efficient. Many American farms have gotten larger and have consolidated their operations to improve efficiency. American agriculture has become progressively more of an agri-business.

Two trade agreements that had impact on the agriculture industry were the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA).

The 21st century agriculture industry has seen larger farms, larger and more sophisticated equipment, and more reliance on biotechnology.

## Checking Your Knowledge:



1. What was the purpose of:
  - a. The Smith-Lever Agricultural Extension Act of 1914?
  - b. The Smith-Hughes Vocational Education Act of 1917?
  - c. The American Farm Bureau Federation?
2. Why are the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA) important?
3. What were major developments in agriculture from 1900 to 1950?
4. What were major developments in agriculture from 1950 to 2000?
5. What were major developments in agriculture from 2000 to today?

## Expanding Your Knowledge:



Interview an elderly member of your family or an elderly friend of the family who has experience in the agriculture industry. Be prepared to ask thoughtful questions. Record the interview so it can be shared with other family members and kept as part of your family's history.

## Web Links:

---



### **Comparing Agriculture of the Past with Agriculture of Today**

<http://animalsmart.org/animals-and-the-environment/comparing-agriculture-of-the-past-with-today>

### **Corporatization of American Agriculture**

<http://web.missouri.edu/ikerdj/papers/SFT-Corporatization%20of%20Am%20Ag%20%287-10%29.htm>

### **Timeline of Farming in the United States**

<http://www.pbs.org/wgbh/amex/trouble/timeline/>

### **Agricultural Career Profiles**

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

April 6-10th

Mr. Coon      Intro to AG      Date      Name

1. What is the difference between an employee and an employer?

2. What are the four FFA degrees that a member can receive?

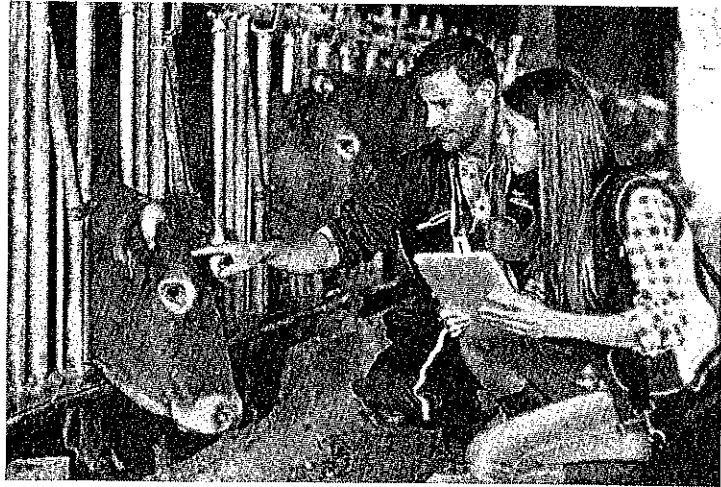
3. How can obtaining you State and American FFA degrees benefit your future employment opportunities?

4. Explain how entrepreneurship and placement SAEs differ.

5. Approximately how much grant money is given away each year to begin or improve SAE programs?

# Understanding Benefits of an SAE Program

**H**AVE YOU THOUGHT ABOUT your future recently? Where are you going to live? What job are you going to hold? What are your career aspirations? All of these questions can be daunting while you are in high school. In this unit, we are going to explore how a supervised agricultural experience program allows you to explore your career interests while you are still in high school and gather valuable work-place skills for your future.



## Objective:

---



Describe supervised agricultural experience programs and their benefits.

## Key Terms:

---



agricultural education three circle model  
agricultural proficiency award  
employee  
employer  
entrepreneurship  
grant  
placement  
real-world experience  
supervised agricultural experience (SAE)



# The Value of Supervised Agricultural Experience Programs

Supervised agricultural experience programs are very beneficial for numerous reasons. When participating in an SAE, you can gain valuable workplace skills as well as real-world experiences which will put you a step ahead of others in your future career field. Nearly 20 percent of American jobs are related to agriculture. Take a look around your classroom. One in every five people will be working in the agricultural industry. Supervised agricultural experience programs will provide you with skills that you will use the rest of your life.

## SUPERVISED AGRICULTURAL EXPERIENCE PROGRAMS

A **supervised agricultural experience (SAE)** is a student work experience focused in agriculture conducted outside of the classroom setting. An SAE program is an integral part of an agriculture program; it is conducted under the supervision of the agriculture teacher and the student's parents or employer.

An SAE program serves as a way for students to pursue a **real-world experience** or hands-on activities in various career fields. This type of experience serves as an opportunity for students to explore possible career interests. An SAE can lead to students earning money for their work. An SAE program serves as an example of "Doing to Learn," as mentioned in the FFA motto.

SAEs are part of the agricultural education three circle model. The **agricultural education three circle model** consists of classroom/laboratory instruction, FFA, and SAE. During classroom instruction you will plan your SAE; discover what type of SAE best suits you; learn valuable workplace skills; and collaborate with your parents, teacher, and employer. An **employer** is a person or business that hires workers in exchange for wages.

Being involved in the National FFA Organization with your SAE allows you to develop specific skills through career development events, attain leadership skills through conference opportunities, and earn awards for your success in FFA and SAE programs.

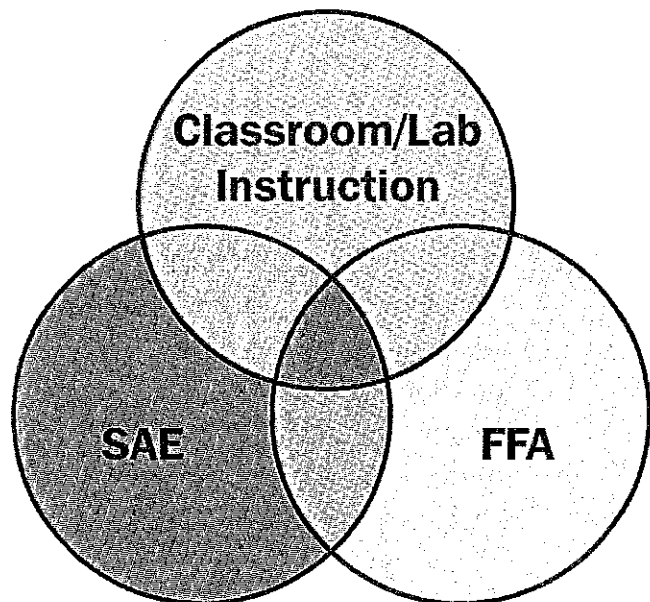


FIGURE 1. The agricultural education three circle model.

## BENEFITS OF A SUPERVISED AGRICULTURAL EXPERIENCE PROGRAM

---

An SAE program is beneficial to the student, school, and community. An SAE provides the school and community with students who are willing to work to gain valuable experience toward their future careers. This provides community businesses with a steady labor force and potential full-time employees. An **employee** is a person working for wages or a salary.

An SAE benefits you by providing you with opportunities to explore various career fields in agriculture. By working at a young age, you will gain workplace skills (e.g., customer relations, critical thinking skills, and workplace ethics). Also, you will obtain self-confidence in the job interview process. This will make applying and interviewing for a job in the future much easier. These skills will help you to stand out from other applicants.

Your future will benefit from an SAE program because you already have developed the record-keeping and money-management skills needed as an adult. An SAE is a way for you to apply the knowledge you learned in school in a real-world setting. This could lead to potential employment after you graduate. In addition, an SAE is a way for you to earn wages and get a head start on paying for college or making a big purchase, such as a vehicle.

## SUPERVISED AGRICULTURAL EXPERIENCE PROGRAM AWARDS

---

Many opportunities exist to receive awards and recognition through SAE programs. These opportunities include agricultural proficiency awards, FFA degrees, and various grant opportunities.

### *Agricultural Proficiency Awards*

According to the National FFA Organization, **Agricultural Proficiency Awards** honor FFA members “who, through their SAEs, have developed specialized skills that they can apply toward their future careers.” There are 49 proficiency award areas at the national level each with two categories: entrepreneurship and placement. **Entrepreneurship** is the act of orga-



## FURTHER EXPLORATION...

### ONLINE CONNECTION: Careers in Agriculture

Do you see your future career in the agriculture field? Not sure what to expect? MyCaert.com has compiled a detailed description of many careers in agriculture to help you get a better idea of what to expect. Using the Web site below, explore numerous careers in agriculture. See what it is that you may be doing in the career field, what schooling is needed, and the salary range for the job. Tell your teacher if you are interested in the agriculture career field, and he or she can answer questions you may have.

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

nizing and managing a personal business. **Placement** is a situation (e.g., SAE) when a person is working for someone else. In either category, wages may or may not be earned.

FFA members compete in these 49 categories against many others at the chapter, section, district, state, and national levels. These competitions include having accurate and up-to-date records of the SAE and an interview demonstrating the knowledge learned through the work experiences. Some state associations, colleges, businesses, and schools offer scholarships for the winners of each proficiency award area.

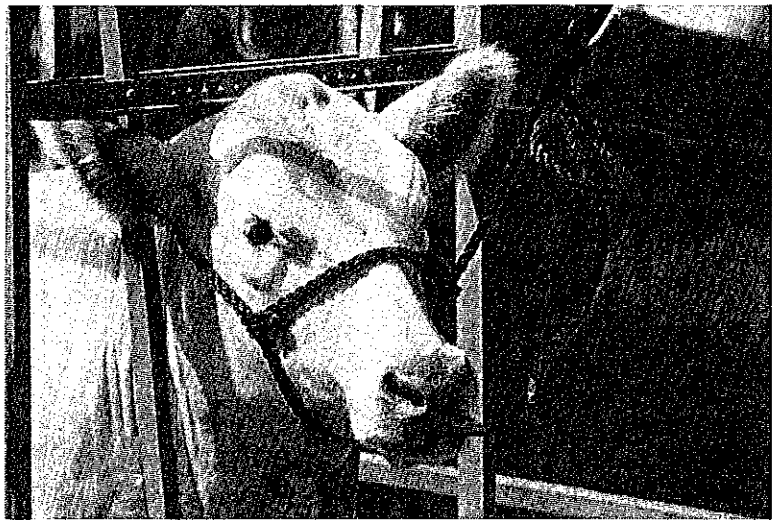


FIGURE 2. These cattle are being shown as part of an SAE program.

## FFA Degrees

An FFA member can advance through the ranks of the FFA by achieving FFA degrees. A member cannot advance through the FFA without an SAE program because the National FFA Organization requires a certain amount of wages earned or hours worked to achieve each degree level. Degrees are Greenhand, Chapter, State, and American.

- ◆ The Greenhand degree is the beginning level of the FFA degrees. It is meant for freshman or first-year members in agriculture classes. To receive the Greenhand degree, you must have plans to begin an SAE program.
- ◆ The Chapter degree is the second level of FFA degrees. Typically, it is given to second-year FFA members in agriculture as long as they meet the SAE requirement. To achieve the Chapter degree, you must have earned and productively invested \$150 into your SAE or worked at least 45 hours.
- ◆ The State degree is the highest honor that can be presented to an FFA member at the state level. The State FFA degree requires that a member earn and productively invest \$1,000 or work at least 750 hours in the SAE outside of classroom instruction. Members that obtain their State FFA degree have an advantage in the agriculture industry when it comes to obtaining employment. Agriculture companies understand the dedication and hard work that goes into getting the state degree and recognize the skills recipients have that other applicants may not.
- ◆ The highest degree that can be obtained in the National FFA Organization is the American degree. To receive the American degree, a student must earn and productively invest \$7,500 or \$2,000 while working 2,500 hours outside of classroom instruction. Each year

only around 3,500 FFA members receive their American degree—approximately 0.0057 percent of the total FFA membership.

## ***Agricultural Grants and Scholarships***

Many grants are available to students with SAE programs. A **grant** is a sum of money that does not have to be repaid. Each year, the National FFA Organization has grants available to help students start up or improve their SAE program. The grants are available through the Web site (<https://www.ffa.org/home>) and the Ag Career Network (AgCN) starting Sept. 1 of each year and due Nov. 15. The grants totaled \$75,000 last year.

### **Summary:**



Supervised Agricultural Experience programs are student work experiences focused in agriculture and happen outside of the classroom setting. They provide real-world experiences that coincide with the agricultural education three circle model.

SAE programs are beneficial because they allow you to gain workplace skills and self-confidence that will help you stand out against other applicants for future careers. The record-keeping and money-management skills will help you be a fiscally responsible adult.

There are many rewards for having an SAE program. Some of these include being able to compete in agricultural proficiency awards and obtaining your FFA degrees. Grant opportunities exist to start and improve your supervised agricultural experience.

### **Checking Your Knowledge:**



1. What is the difference between an employee and an employer?
2. What are the four FFA degrees that a member can receive?
3. How can obtaining you State and American FFA degrees benefit your future employment opportunities?
4. Explain how entrepreneurship and placement SAEs differ.
5. Approximately how much grant money is given away each year to begin or improve SAE programs?

## Expanding Your Knowledge:

---



Work with your agriculture teacher and parents to determine a possible supervised agriculture experience program for you. Explore the 49 agricultural proficiency award categories to see which category best fits you. Think about what you are already doing at home that could be considered an SAE program.

## Web Links:

---



### The National FFA Organization

<https://www.ffa.org/Pages/default.aspx>

### AgCareers.com

<http://www.agcareers.com/>

### MyCaert.com Career Profiles

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