

Unit A: General Agricultural Machinery

Lesson 1: Machinery and Equipment

Terms to Know

- Application equipment
- Baler
- Combine
- Crawler tractor
- Cultivator
- Drill
- Duster
- Geographic information system (GIS)
- Global Positioning System (GPS)
- Harrow
- Harvesting equipment
- Implement
- Mower
- Picker
- Planter
- Planting equipment
- Plow
- Sprayer
- Tillage equipment
- Tractor
- Wheeled tractor

Why are agricultural machinery and equipment important?

- Agricultural machinery and equipment help farmers produce the goods that consumers want and need.
- Without the proper machinery and equipment, farmers would not be efficient enough to provide the food, clothing, and shelter that we need.

Why are agricultural machinery and equipment important?

- Hundreds of years ago, the population was made up of primarily farmers and ranchers.
- Now, a very small percent of the population is responsible for producing the food and fiber used today.
- Machinery and equipment allow this to be possible.

Why are agricultural machinery and equipment important?

- Because of the high technology with machinery and equipment, in some countries one farmer produces enough food to feed over 100 people.
- Using power only from humans or horses would not produce nearly this amount.

Why are agricultural machinery and equipment important?

- Machinery and equipment reduce the amount of hard labor needed for farmers to do their work.
- Jobs are easier and take less time when machinery and equipment are used.

Why are agricultural machinery and equipment important?

- Machinery and equipment also help farmers produce larger amounts of higher quality livestock and grain products.

Where are machinery and equipment used in agriculture?

- Different machinery and equipment are used in every area of the agricultural industry.
 - Livestock production
 - Horticulture
 - Forestry
 - Crop production

Livestock Production

- Machinery and equipment can be used to help producers care for and manage their livestock.
- Milking machines, automated feeding and watering systems, incubators, egg candlers, tractors, computers, and many other types of machinery and equipment can be used by the producer to improve efficiency and quality of products.

Automated Feeding System



Incubator



Milking Machines



Loader (hauling manure)



Egg Candler



Automated Watering System



Horticulture

- Machinery and equipment are very important in the horticulture industry.
- Lawnmowers, tillers, sprayers, spreaders, irrigation systems, wood chippers, lawn rollers, leaf blowers, computers, and tractors are all vital pieces of machinery and equipment used by horticulturalists.

Pesticide Sprayer



Lawnmower with Utility Cart



Greenhouse Irrigation System



Wood Chipper



Rotary Tiller



Rotary Spreader



Forestry

- The forestry industry relies on machinery and equipment to function.
- Log trucks, skidders, loaders, cutters, harvesters, chainsaws, computers, and surveying equipment are all necessary for efficient forestry operations.

Log Truck



Harvester



Loader



Skidder



Chainsaw



Cutter



Crop Production

- Without the proper machinery and equipment, large-scale crop production would be impossible.
- Tilling, planting, applying pesticides and fertilizers, and harvesting all require specialized machinery and equipment.
- Plows, planters, drills, sprayers, spreaders, combines, balers, computers, tractors, grain trucks, and many other types of machinery and equipment are necessary to produce crops effectively.

Tractors



Planter



GPS Receiver



Spreader



Combine



Plow



What machinery and equipment are used in producing crops?

- Tractor
- Tillage equipment
- Planting equipment
- Application equipment
- Harvesting equipment
- Global Positioning System
- Geographic Information System

Tractor

- A *tractor* is a motorized vehicle that is used to pull heavy loads and to provide power to operate implements. A tractor can be used for many different jobs.
 - The first types of tractors ran on steam and were hard to maneuver.
 - Before tractors were invented, farmers would have to use horses to pull heavy equipment.
 - Because of their powerful engines and large tires, tractors are able to pull other pieces of machinery through fields.

Tractor

- Tractors can be used to pull and power some implements. An *implement* is a tool or piece of equipment used to do work.
- There are two main types of tractors—wheeled and crawler.
 - A *wheeled tractor* is a tractor that usually has four or more wheels that turn and move the tractor.
 - A *crawler tractor* is a tractor that has steel or rubber tracks fitted around the wheels that make the tractor move

Tractor



Tillage Equipment

- *Tillage equipment* is equipment used to plow or till the soil. It slices, breaks, or cuts the soil in order to prepare the ground, control weeds, or create mulch. The tillage equipment used depends on the type of soil and the crop that is to be grown. Tillage equipment includes plows, harrows, and cultivators.

Tillage Equipment

- A ***plow*** is an implement used to cut, lift, and turn over soil. It is commonly used to prepare the soil for planting. There are various types of plows and the one most commonly used in many countries is the moldboard plow.
- A ***harrow*** is an implement with spikes or disks that is used to cultivate the soil by pulverizing and smoothing it.
- A ***cultivator*** is an implement used to loosen the soil and control weeds between rows of growing crops.

Plow



Harrow



Cultivator



Planting Equipment

- *Planting equipment* is equipment used to place seeds in the soil for germination. It must be properly adjusted so the right amount of seed is planted at the proper depth in the soil. Planting equipment includes planters and drills.

Planting Equipment

- A *planter* is an implement used to place seeds in the soil at the proper rate, depth, and spacing.
 - The planter opens a small furrow, drops and covers the seeds, and lightly compacts the soil over the seeds.
 - Corn, cotton, and many vegetable crops are planted with planters.
 - Before this machine was invented, farmers would have to dig rows and plant the seeds by hand.

Planter



Planting Equipment

- A *drill* is an implement used to plant seeds for germination.
 - The drill opens the soil, places the seeds, and covers the seeds.
 - Drills can be used to plant seeds in plowed or unplowed land.
 - Soybeans, wheat, oats, and rye grass are examples of crops that are commonly planted with drills.

Drill



Application Equipment

- *Application equipment* is equipment used to apply fertilizer, pesticides, growth regulators, and other materials to crops. It must be properly calibrated and operated so the right amount of material is delivered. The equipment may use dry or liquid materials. Application equipment includes sprayers and dusters.

Application Equipment

- A *sprayer* is a piece of equipment that uses tanks, pumps, and nozzles to apply liquid materials.
- A *duster* is a piece of equipment used to apply dry powder materials.

Sprayer



Duster



Harvesting Equipment

- *Harvesting equipment* is equipment used to pick, reap, or otherwise gather crops. Different types of crops require different types of equipment. Harvesting equipment includes combines, pickers, balers, and mowers.

Harvesting Equipment

- A ***combine*** is a machine used to harvest crops as it moves across a field.
 - The head of the combine runs through the crop rows and cuts the stalks of the plants. The plants are then pulled through the machine and the grain is separated from the plant material.
 - Corn, soybeans, wheat, barley, and rice are typically harvested with combines.

Combine



Harvesting Equipment

- A ***picker*** is a machine used to harvest crops by picking. Cotton is the most common crop harvested with a picker.
- A ***mower*** is a piece of equipment used to cut standing vegetation. Mowers are used to harvest forage crops, such as grass and alfalfa. After mowing, the crop may be left in rows to dry and be picked up by a baler.

Picker



Mower



Harvesting Equipment

- A ***baler*** is a piece of equipment used to harvest forage crops that have been cut, dried, and placed in rows. The baler is pulled behind a tractor and picks the dried vegetation up off the ground. Inside the baler, the material is tightly packed or wound into round or rectangular bales. When the bale reaches the proper size, the machine wraps the bale with wire or twine to secure it.

Baler



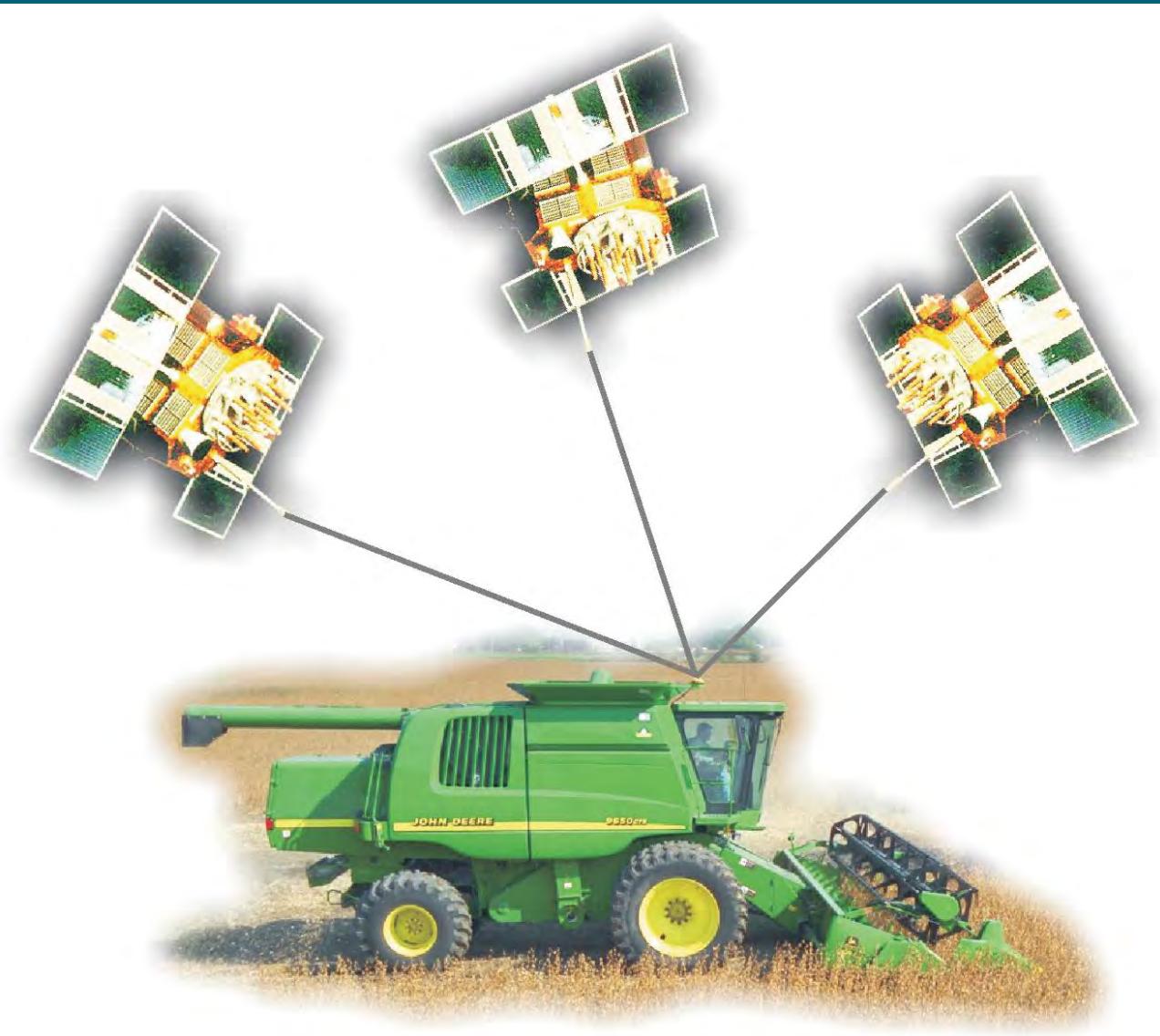
Global Positioning System

- A *Global Positioning System (GPS)* is a system that uses satellites and computers to tell a farmer his or her exact location in a field.
 - The earth is continually circled by 24 GPS satellites. At least four of these satellites are visible from any one point on Earth.
 - GPS uses three satellites that are connected by an electronic signal with a receiver on the ground. (A fourth satellite is used to verify that the information is accurate.)

Global Positioning System

- Distances from satellites to the receiver can be quickly measured. Computers calculate the exact location of the receiver.
- GPS receivers are generally located on equipment that moves over a field.
- GPS systems can precisely guide tractors and equipment through a field and program computers to deliver precise amounts of seed, fertilizer, or herbicide to plants in variable amounts.

Global Positioning System



Geographic Information System

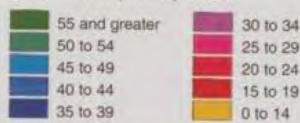
- A *Geographic Information System (GIS)* is a system used with GPS to make maps or grids of a field. These maps give a farmer data about soil conditions, crop yield, and other information so he or she can make decisions needed to improve the crops in the field.

Geographic Information System

Samuel Hawk
Hawk Plantation
North Field

Field Size: 360.00 Acres
Harvested Acres: 353.99
Yield: 38.54 BPA
Moisture: 11.6%

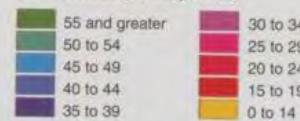
Low Wheat (White) Yield



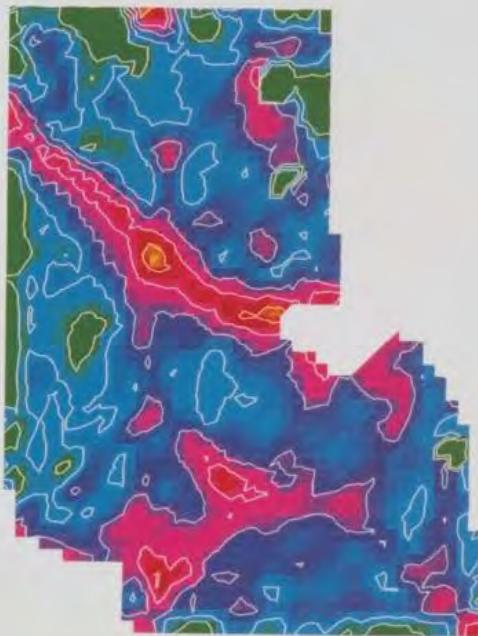
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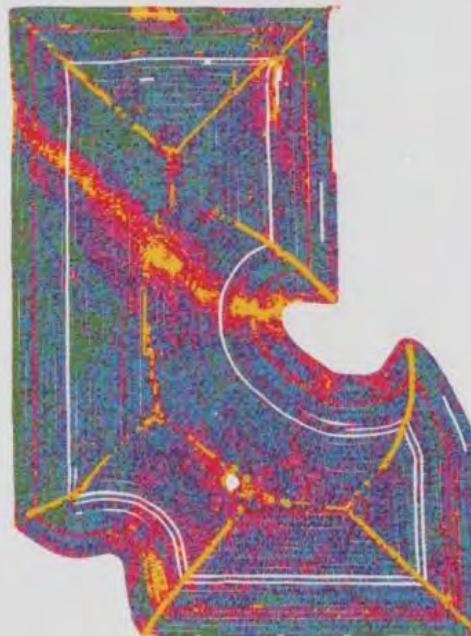
Low Wheat (White) Yield



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Review/Summary

- Why are agricultural machinery and equipment important?
- Where are machinery and equipment used in agriculture?
- What are some of the different types of machinery and equipment used for crop production?