Technology

TECHNOLOGY IN AGRICULTURE—the use of scientific knowledge and tools to improve the efficiency, sustainability, and productivity of farming

DID YOU KNOW?

In the 1940s, one U.S. farm fed 19 people. Today, one U.S. farm can feed 169 people in the U.S. and abroad.

If today's farmers continue to use methods from the 1960s, they would require 2.5 billion acres more land than they are using with today's developed methods. This is more land than what is available today for farming in the U.S.!

In the 1850s, it took 83 hours of labor and just under 3 acres to grow 100 bushels of corn. With modern agriculture, it takes 2 hours of labor and less than 1 acre of land to grow 100 bushels of corn.

It is predicted that 80% of commercial drones produced will be used in farming in the future.

HISTORY TIMELINE

1701	Seed drill invented
1793	Cotton gin invented
1831	Mechanical reaper invented
1837	John Deere manufactured plows
1869	The Transcontinental Railroad completed
1879	First patented hand pump milking machine
1960s	The Green Revolution
1974	Roundup was introduced
1975	The first rotary combine was released
1990s	GMO products approved for consumption
1993	The World Wide Web became available
1994	Satellite technology became available to public
2010s	Growth in plant breeding and genome editing
2012	The first self-driving tractor was invented
2020s	Growth of Artificial Intelligence and robotics

HOW IT'S USED

PLANTS

- **Vertical farming** grows plants without soil or natural sunlight, allowing farmers to grow crops year-round in a controlled environment.
- **Bee Technology** uses commercially reared bees to provide crop treatment and pest and disease control through spreading powdered biocontrol agents during pollination.
- **Auto-steering and GPS systems** allow farming equipment to operate more efficiently, reducing skips and overlaps.
- **Laser scarecrows** use the power of light to deter birds away from farmers' crops.
- **Remote sensing technologies** use multiple types of imaging to identify forest types, monitor fires and detect hot spots, and track changes in growth and deprivation.
- **Genetic engineering** allows for improvements to crop varieties. The Arctic Apple is an example of a variety that uses this technology to remove the enzyme that makes cut apples turn brown.

ANIMALS

- **Rotary milking** parlors allow dairy farmers to collect milk using this efficient technology that slowly rotates while cows are being milked with automatic milkers.
- **Robotic dairies** allow farmers to get the genetic potential out of their cows by using robotic technologies like automatic brushes, sprayers, and lasers to clean and measure teat placement of the milker.
- **Electronic Identification Ear Tags (EID tags)** are small ear tags used in cattle that allow ranchers to track the performance and history of the animal's health.
- **Underwater Cameras** are used in fish farms to measure the population, growth, environmental changes, and provide farmers with early diagnosis and savings in production cost.
- **Autonomous Robots** are used in poultry houses to provide litter sanitizing treatments, bird health monitoring, and data analysis for farmers.
- **Embryo transfer and artificial insemination** allow ranchers to produce offspring with preferred genetic outcomes without requiring natural breeding.

BOTH

- **Drones** are used for crop mapping, livestock monitoring, surveying land, spraying, and dusting crops.
- **3-D printers** are used for printing machine parts, consumable food items, and even animal prosthetics.