TECHNOLOGY HAS REVOLUTIONIZED AGRICULTURE.

The ability to collect large amounts of data through sensors has helped researchers and agricultural producers better understand the needs of crops and the land.

PRECISION AGRICULTURE is a farm management concept that prioritizes finding and measuring the variations in fields and crops and treating the field or crop according to those differences. Certain areas of a field may need less fertilizer, water, seeds, pesticides or other inputs than another area. By studying the field and understanding these differences, a producer can apply the proper amount of inputs to that field rather than placing the same amount everywhere. This form of management can save money and time. In the case of fertilizer, it can prevent excess nutrients from running off into waterways or leaching into groundwater.

Tools used for precision agriculture, such as GPS-guided tractors or unmanned aerial vehicles, or autonomous robots, can scout fields with sensors, apply pesticides and make other applications. Precision agriculture is a subset of digital agriculture. Digital agriculture includes data analytics, artificial intelligence and other high-tech tools that help agricultural producers better understand the needs of their crops and their land.

UNMANNED AERIAL VEHICLES (DRONES)

Drones can fly over fields to collect data using cameras or sensors. Specialized agricultural sprayer drones can also apply inputs, such as pesticides or ripeners, which help farmers harvest their crops.

TRACTOR GUIDANCE AND VARIABLE RATE TECHNOLOGY

Farm equipment guided by GPS or other satellite systems can vary the rates of fertilizer, seeds, pesticides and other inputs applied to a field. A computerized tractor implement, such as a fertilizer spreader or planter, can apply specific rates of fertilizer or seeds to an area according to a pre-loaded map or via sensors that analyze the field.

ROBOTS

AgCenter researchers are developing robots that can aid in sugarcane breeding by rolling through a field and analyzing varieties' important attributes like stalk count.

INTERNET OF THINGS SENSORS

Sensors can be placed in crops and in the soil to help remotely monitor moisture levels, temperature, plant stress and many other factors.

VIRTUAL FENCING AND ANIMAL SENSORS

Some cattle producers and others involved in animal agriculture use virtual fencing systems, which use GPS-enabled collars to move animals from one pasture to another. The collars emit a sound that moves the animals and can buzz or lightly shock them if they refuse to move. These collars can collect other health information, and additional sensors can monitor animal health through rumination, heart rates and other biometrics.