

# Technology in Irrigation

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Ground and surface water conservation is as important now as it has ever been. It is a key factor of economic stability and growth for any region in the world, with industry leaders from both the private and public sectors working to find more efficient ways to utilize water.

As with most industries, emerging technology plays heavily into irrigation. The following describes three irrigation system improvements today. The first two are more readily available and site-specific, while the third is a more recent introduction into irrigation management. The drawback to the third is increased expenses, requiring more knowledge and management of the data being generated. All three systems are utilized through center pivot and drip systems.

**1. Moisture Sensors** are not widespread but have been in use for about 10 years. They are gaining traction in certain areas, predominantly in areas where soil types change dramatically throughout a farm. *Example:* On a farm that has sandy soil on one side and heavier loamy soils on the other side, the sensors can change the pivot speed to apply more water on the areas that do not hold as much moisture. This could also apply to a farm that has sloping on one side and more level terrain on another side.

There are two types of moisture sensors:

- a. Tensiometric** — Measure how hard the roots must work to pull water into the plant. These do not need to be calibrated and are relatively inexpensive.
- b. Capacitance** — Measure the amount of water or readily available moisture in the soil. These require calibration for each area and are more expensive and provide quick information.

**2. Variable-Rate Irrigation** can be used in conjunction with the moisture sensors or can be used without sensors in a simple form. Farms that have obvious differences in soils or contours would be an example where sensors will not be utilized. An up-and-coming option is Dynamic Variable Rate, which is still in research. This technology allows real-time data transmission to the system, early results show 40% efficiency and 5-10% yield gains. Irrigation scheduling is available through an app that combines data from operator input, crop characteristics, weather, and sensors to form an irrigation plan. All of this can be controlled remotely through computers and mobile devices.

**3. Flux Towers** use a more complicated measuring system that measures CO<sub>2</sub>/H<sub>2</sub>O concentration, dust particles of different sizes, different types of radiation, Isotopes, the exchange of water vapor, plant transpiration, energy between soil, vegetation, and the atmosphere. Flux towers are the most comprehensive ways to measure moisture and availability. The use of a Flux Tower can cover larger areas and be used in combination with the sensors above to pinpoint use among specific irrigation systems in a large geographical area.

Here is a link to Nebraska and Iowa's towers: [Parallel41.Nebraska.edu](http://Parallel41.Nebraska.edu)

Here is a link to the government website showing North and South America locations: [Ameriflux.lbl.gov](http://Ameriflux.lbl.gov)

Major gains in efficiency over the years have evolved, from gravity flow open ditches to contained systems with irrigation pipe and conversion to center pivot systems and/or drip irrigation systems with minimal run off of excess water. By incorporating the systems above, we can further gain efficiency in the amount of water we use for food, fiber, and feed production. These irrigation advances are allowing us to be more proficient and sustainable, using less water than any other time in our history.

Responsibly managing our water and other natural resources is core to the Peoples Company Land Management model. For more information on how a Peoples Company Land Manager can maximize production on your farm while also protecting the environmentally sensitive acres, please visit [PeoplesCompany.com](http://PeoplesCompany.com) or email [LandManagement@PeoplesCompany.com](mailto:LandManagement@PeoplesCompany.com).