

Water in the Heartland

Water is important for everyone and that includes farmers. Water is essential for growing the crops we eat every day. With agriculture using 42% of our available fresh water resources, farmers are doing their part to conserve water. Farmers are using the latest technologies available to make sure there are enough water resources for everyone and future generations.

1. Irrigation Scheduling

Smart water management is not just about how water is delivered but also when, how often, and how much water is applied. To avoid under or overwatering their crops, farmers carefully monitor the weather forecast. Some farms use weather monitoring stations in their fields that can send weather information from the field to their smart phones. *Soil probes and plant based sensors can be placed in the fields* to help monitor the soil and plant moisture. Farmers can adapt their irrigation schedule to the current conditions. Watering at night can help slow down evaporation, allowing water to seep down into the soil and replenish the water table. Farmers are also using technology that allow them to control their irrigation systems from their smart devices.

2. Drought-Tolerant Crops

Farmers are able to utilize the latest advancements in biotechnology allow crops to grow in regions that they were not able to be grown in the past. Scientists genetically engineer the seeds to produce plants that can withstand dryer conditions. With the use of genetic modification we can now grow corn in parts of the country where we have not been able to grow before because of access to water. In some areas of the country, dry farms don't irrigate. These farms rely on drought-tolerant crops, soil moisture and special tilling practices to produce their crops during the dry season.

3. Cover Crops

Farmers plant cover crops after their crop is harvested to protect soil that would otherwise go bare. Cover crops reduce weeds, increase soil fertility, and organic matter which in turn helps help prevent soil erosion and compaction. This allows water penetrate easier soil and improves the soil's water-holding capacity. Farmers use perennial grass and clover in their fields for building healthy soil. Farmers that have fields planted with cover crops can be more productive than conventional fields during years of drought. The ability for a farm to use cover crops is dependent on where the farm is located. Farmers have to decide if cover crops are appropriate for their region because cover crops do use some of the moisture stored in the soil and may not be as effective in dryer climates.

4. Soil management and Conservation Tillage

The Dust Bowl of the 1930s was created by a perfect storm of deep plowing and loss of perennial grasses followed by extreme drought and wind erosion. Modern farms use soil mapping and no till practices to help maintain the health of the soil and conserve water. Soil mapping is very important for the correct implementation of sustainable land use management.

Soil mapping provides important information about the characteristics and condition of the land. *This mapping* describes the condition of the soils *and* is key in guiding land owners on how to wisely manage their land. Conservation tillage uses specialized plows or other implements that partially till the soil but leave at least 30 percent of vegetative crop residue on the surface. Like the use of cover crops, these practices help increase water absorption and reduce evaporation, erosion, and compaction.

5. Irrigation Segmentation

Not every part of a farmer's field needs the same amount of water. Farmers rely on soil testing to let them know where to apply more and where to apply less. Some farms are able to divide their watering in their fields into fractional parts. As the center pivot irrigation system goes around in a circle each section, which looks like a slice of pie, can have different amounts of water applied to it. All of this is controlled by computer and changed as needed. For even more control, some irrigation systems can vary the flow of water from each individual spay nozzle. These nozzles are specially designed to apply just the right amount of water to just the right spot as the center pivot irrigation system goes around the field.

Not every region has the same amount of water resources available so farmers are developing ways to make sure not a drop of water is wasted when watering their crops. Continued monitoring of our ground water reservoirs with index wells is essential for maintaining our aquifers. With good conservation practices and the latest technology, we can make sure that our water natural resources are preserved well into our future.