

# Irrigation Systems

The USDA Natural Resources Conservation Service (NRCS) is working with farmers across Arkansas to improve water quality and quantity.

The majority of irrigation water use is ground water. Due to continued withdrawals, long-term ground water levels are declining at a rate which is not sustainable. Because of these issues, The Arkansas Natural Resources Commission recently designated two additional areas of the alluvial aquifer as a Critical Ground Water Area.

NRCS is addressing this issue by encouraging the conversion of ground water systems to surface water systems.

Through technical and financial assistance, NRCS is helping producers develop Irrigation Water Management (IWM) Plans that address their needs and benefit resource concerns.

In the state-designated critical ground water region of Arkansas, two irrigation systems work together to increase irrigation efficiency.

A surface irrigation system is composed of irrigation practices that supply surface water to fields at the best locations and times. These practices include but are not limited to: Irrigation (Embankment) Reservoir, Irrigation Pipeline, Pumping Plant, Irrigation Land Leveling, Irrigation Water Measurement and Irrigation Canal or Ditch.

An irrigation tailwater recovery system collects runoff and excess irrigation water in a reservoir that can be pumped through the surface irrigation system. The tailwater system is composed of other irrigation practices including: Surface Drain, Field Ditch; Surface Drain, Main or Lateral; Grade Stabilization Structures; Structure for Water Control; Irrigation (Excavated) Reservoir and Pumping Plant.

These two systems function together by collecting excess irrigation water or rainfall on a farm through a system of ditches which direct the excess water back to a central location. The



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water is then pumped into a storage structure (irrigation reservoir – embankment) where it can be stored until it is needed and then distributed through a surface irrigation system.

There are several types of conveyance systems, the most common being underground irrigation pipeline. Above ground polyethylene tubing is close behind in use.

When evaluating a farm operation, NRCS looks at the resource concerns that a landowner is facing to determine the most beneficial form of treatment through conservation practices to apply.

There are two resource concerns receiving benefit from these systems:

❑ **Water Quality Degradation** due to excessive sediment in surface waters. The irrigation tailwater recovery system improves water quality by collecting, slowing down and storing excess irrigation water and rainfall runoff. During this slow down and storage, pathogens and sediment have a chance to settle out in the ditches and storage structures instead of being carried into rivers and streams.

❑ **Excess/Insufficient Water** due to inefficient use of irrigation water sees improvements from the utilization of a surface irrigation system by using surface water collected instead of ground water. With the correct design and system many landowners only use ground water under severe drought conditions creating a huge savings in ground water.

IWM planning ties the systems together. IWM is an inventory, evaluation and data collection of the irrigation system.

By evaluating the data gathered through IWM planning, producers can apply the correct amount of water at the best time to benefit their crop.

To learn more about NRCS programs, contact the local USDA field service center or visit [www.ar.nrcs.usda.gov](http://www.ar.nrcs.usda.gov).

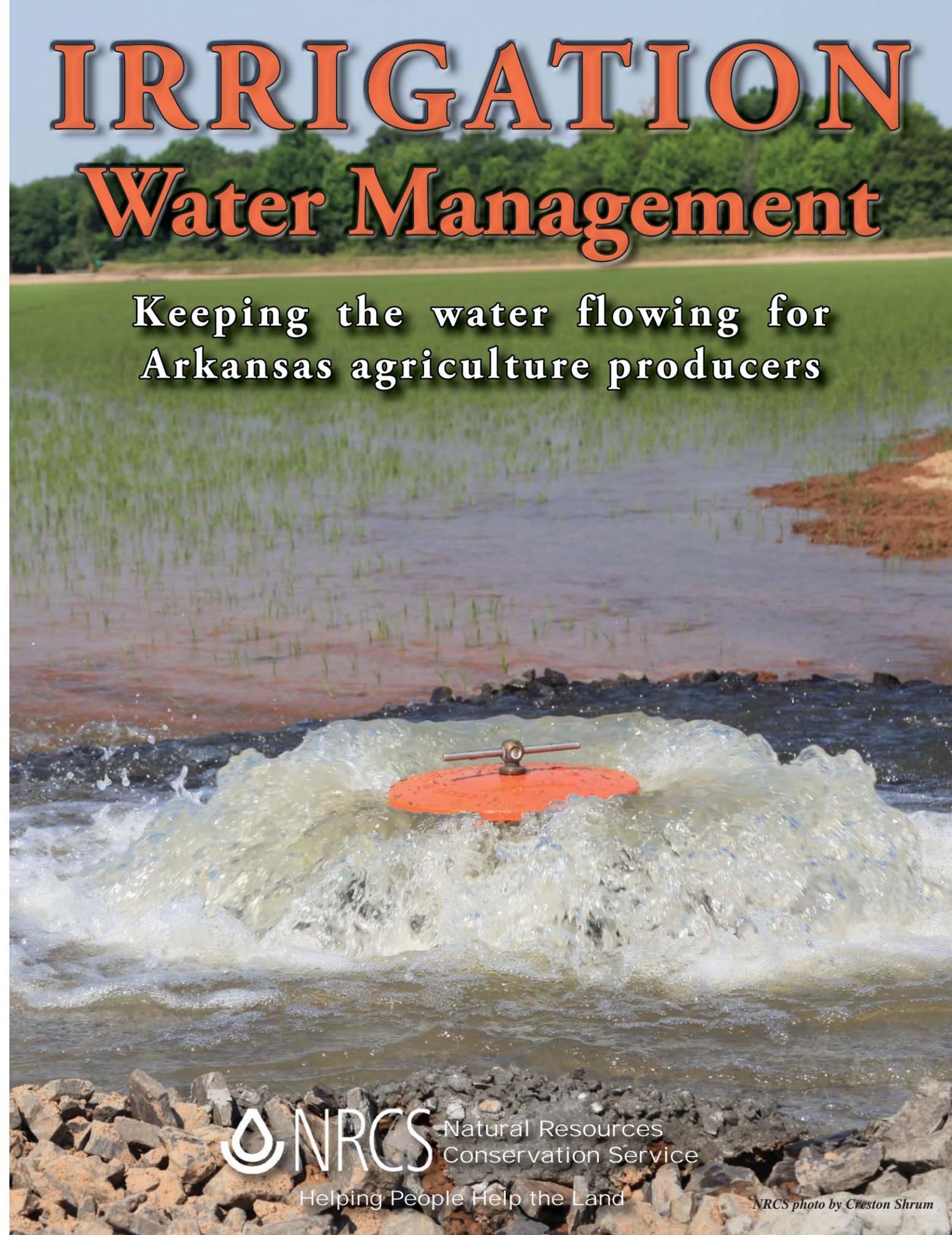
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# IRRIGATION Water Management

## Keeping the water flowing for Arkansas agriculture producers



 NRCS Natural Resources  
Conservation Service

Helping People Help the Land

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# Components of an Irrigation Water Management System



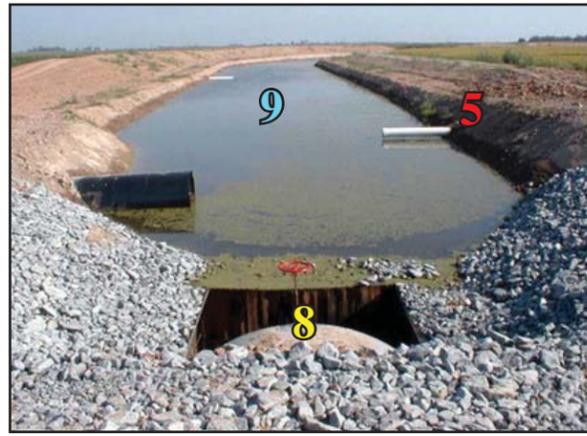
**1 -- Irrigation Reservoir (embankment)**  
Reservoirs are constructed to conserve water by holding it in storage until it is needed for irrigating crops. The reservoirs are filled by using runoff from fields that is diverted through ditches (6, 7) and irrigation reservoirs (9). The water is then pumped (2) into pipelines (3) when needed during the growing season.



**2 -- Pumping Plant**  
Pumping plants pump water from the excavated reservoirs (9) into the embankment reservoir (1) and then to the fields through pipelines (3) or from the excavated reservoirs directly to the field through pipelines.



**3 -- Irrigation Pipeline**  
Underground pipelines convey water from the irrigation reservoir (1) throughout the farm. Water is released onto fields through risers, sprinkler systems or side inlets (gated above ground pipes).



**9 -- Irrigation Reservoir (excavated)**  
Reservoirs collect and store water for a relatively short period of time. They provide a temporary pumping pool for pumping plants (2).

**8 -- Structure for Water Control**  
These structures convey water, control the direction or rate of flow and maintain a desired surface elevation to create adequate pumping pool levels for pumping plants (2). They can also be used for water quality control, such as sediment reduction, temperature regulation and as an outlet for excess water during heavy rainfall events.

**5 -- Grade Stabilization Structure**  
These structures stabilize the slopes of field (6) or lateral (7) ditches and control erosion as they allow water to flow off the fields into the ditches for collection and reuse on agricultural fields.



**4 -- Irrigation Land Leveling**  
Field surfaces are leveled to permit uniform and efficient application of irrigation water and stop water runoff.



**6 -- Surface Drainage, Field Ditch**  
Field ditches collect excess irrigation water from a field and direct it into a surface drainage, main or lateral (7) before collecting in an irrigation reservoir (9) in order to reuse the water for irrigation at a later time.



**7 -- Surface Drainage, Main or Lateral**  
Main or lateral ditches are constructed to collect excess irrigation surface water and deliver it back to a central area for storage where it can be reused on the fields throughout the growing season.

