MISSISSIPPI STATE UNIVERSITY EXTENSION

Tailwater Recovery and On-Farm Storage Reservoir: Water Savings

Why Save Water Using TWR Systems?

Row-crop irrigation is the primary use of **groundwater** in the Mississippi Delta region. Currently, withdrawals of water from the aquifer by irrigators is greater than the amount that is recharged (YMD, 2010). Figure 1 shows the Mississippi Delta region and magnitude of aquifer levels above mean sea level. The groundwater levels range from more groundwater (blue and light blue) to less groundwater (red and orange). Water levels in the aquifer under Sunflower and Leflore Counties are denoted with red because agricultural withdrawal is much greater than recharge. The annual groundwater deficit is estimated to be approximately 150,750 acre-feet (YMD, 2010; Barlow and Clark, 2011).

Several options are available for irrigators to reduce groundwater use. First, they can improve the efficiency of their water use, also known as “at-the-tap conservation” or “more crop per drop.” They can achieve this by using technologies including soil-moisture meters, center-pivot irrigation with drop lines and improved nozzles, or furrow irrigation with pipe planner programs with variable-hole-size selection and surge valves. Second, irrigators can use surface water. This can be done by installing a pump on an existing surface water source or by installing a tailwater recovery (TWR) system.

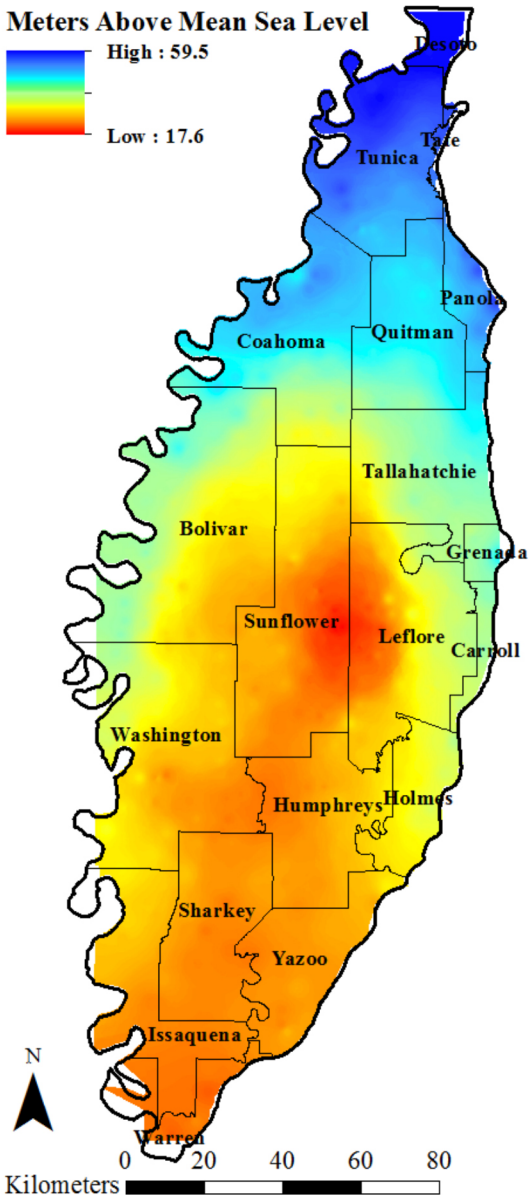
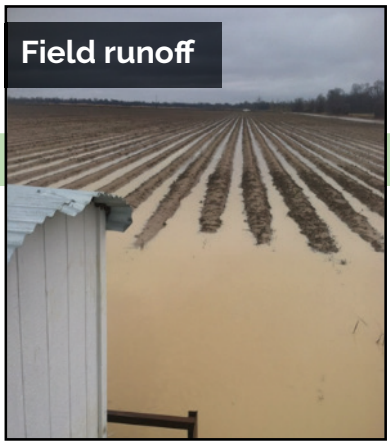


Figure 1. Ground water levels in the Mississippi Delta. Groundwater data were provided by Yazoo Mississippi Delta Joint Water Management District.

TWR SYSTEM OVERVIEW



TWR SYSTEMS are a combination of financially assisted NRCS conservation practices aimed at collecting runoff and storing that water for irrigation.

Figure 2. Water movement through a TWR system. Note that not all TWR systems have the same components. Some TWR systems are comprised of only a large TWR ditch and no OFS reservoir.

Tailwater recovery (TWR) systems store water on the landscape to provide an alternative irrigation source for producers. Water used by irrigators from tailwater recovery systems directly offsets the amount of groundwater withdrawn from the aquifer. Thus, TWR systems are a popular conservation practice in the Mississippi Delta region. It is important to document how much water is saved and lost using TWR systems.

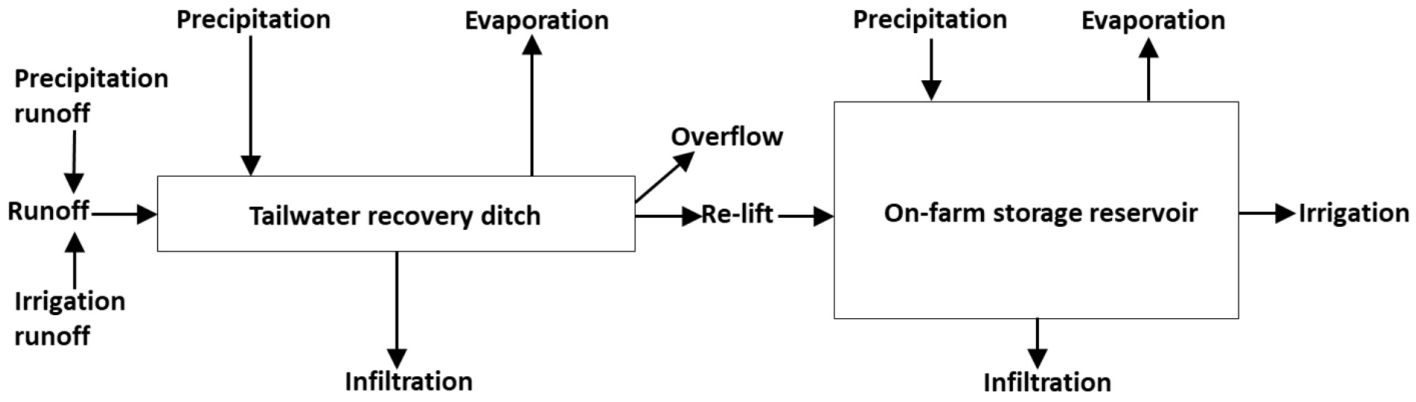


Figure 3. Gains and losses of water into and out of TWR systems. Figure from Omer et al. (2017).

TWR System Water Monitoring Results

Water Budgets

Irrigators can use surface water from TWR systems as an alternative to groundwater. Data from eight locations in the Mississippi Delta region indicate that TWR systems 1) store surface water from October through May; 2) supply irrigators with water from June through July; and 3) lose considerable water to evaporation from August through September.

TWR System Water Budget Results

Currently installed TWR systems have the capacity to offset aquifer depletion by 23,301 acre-feet a year by providing irrigators with an alternative to groundwater. Assuming each of the current TWR systems is installed on an individual farm, 2 percent of the farms in the Mississippi Delta region would reduce the groundwater deficit by 15 percent.

For More Information

Consult your county USDA Natural Resources Conservation Service agent for more details on conservation practices.

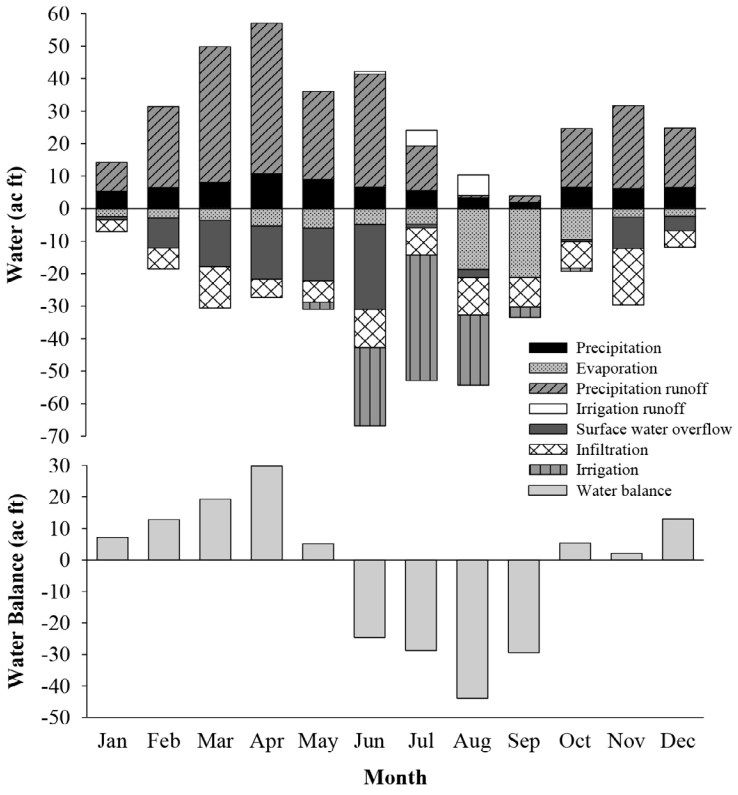


Figure 4. Mean (2013–16) quantity of water for each budget variable and water balance. From Omer et al. (2017).

Figure 5. TWR ditch in the Mississippi Delta region across four seasons.

References

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