IRRIGATION TIPS

The tips below are designed to help Growers reduce both tailwater drainage and the amount of deep percolation that contributes to high water tables and localized drainage problems. Most TID growers produce no tailwater. While these Irrigation tips are mainly intended for growers on the west side of the District who have access to area drains or use tile drainage systems, all growers can benefit during a drought. Following these tips may lead to changes in the layout of the checks in your fields and cultural practices for growing field crops. Improved irrigation also saves on fertilizer costs because less of the expensive nutrients are leached out of the soil with deep percolation of the unused irrigation water that passes the crop roots. A grower making these changes must reach a balance between field layouts based on production and labor needs and the goal to reduce tailwater drainage and deep percolation losses.

Water Saving Strategies to Reduce Drainage from Flood Irrigation

The key to reducing tailwater drainage and deep percolation is to irrigate very fast and control how long the water is on the field. Good irrigation practices can result in overall irrigation efficiencies of 75%. These irrigation strategies were developed with the U.C. Cooperative Extension during the 1987 to 1992 drought and they still apply to today's practices.

1. Reduce check size to irrigate as fast as possible, thus minimizing the volume of tailwater.
    a. Smaller or narrower checks irrigate better. For example: on sandy soils use 1 acre checks 65 to 55 feet wide by 700 to 800 feet long; on loamy soils use 1.5 to 2 acre checks 80 to 90 feet wide by 800 to 1000 feet long.
    b. On existing large checks, install a berm in the center to make 2 narrow checks.
2. Increasing the flow of water in the check results in a faster irrigation time.
    a. If the checks are already narrow, then run both valves into one check to maximize flow across check.
    b. If the existing check has been split by the addition of an extra berm (l b above), then irrigate only one check at a time. On most pipelines the flow of water from just one valve increases to nearly what two valves delivered.
    c. Plant crops with the check rather than across the check to speed the flow down the check.
3. Preparation of the field is critical to achieve a uniform flow of water across the check. A high uniformity of irrigation means all parts of the field have the same amount of water for the same time. This also reduces deep percolation losses.
    a. Laser level to insure cross slope is flat and check slope is uniform.
    b. A narrow check with normal slope of 1/10% irrigates more uniformly across the check than a wider check with a steeper slope of 2/10%.
4. Practice "cutback irrigation" by turning off the water before it reaches the end of the check. This will reduce ponding, deep percolation losses, and tailwater volume. Cutback irrigation works because the water on the upper portion of the check will continue to flow down the check after the shutoff and irrigate the remainder of the check.

a. Change shutoff times during season to match how soil seals between irrigations. Midseason cultivation will also change the shutoff time.

b. Shut off times will vary through the season. The first irrigation may require shutoff when the water reaches 90% of the distance down the check. By the third irrigation this shutoff time may be reduced to only 70% of the distance down the check.

5. Schedule irrigations to match crop needs and soil water-holding characteristics. To reduce drainage volume, how long you irrigate is just as important as how often.

   a. On sandy loam soils 1.25 inches of applied water fills 1 foot of soil; on sandy soil 1 inch of water fills 1 foot of soil. The plants can only utilize 50% to 60% of the water applied to the soil.

   b. Understanding the crop rooting depth can save water. Rooting depth of the crop varies with the stage of growth. The highest deep percolation losses occur early in the growth season for annual field crops when the roots are not well developed. For example, the depth of corn roots are typically 3 feet during the peak stage of crop growth. Each irrigation requires only 3 inches on a sandy soil. Since the irrigation efficiency is 75%) the total applied water is 4 inches, or 25% more than use by the crop.

   c. For winter oats the rooting depth in May is typically 18 inches while alfalfa roots can reach 5 feet.

6. How long to irrigate is critical to reducing tailwater and deep percolation, even if no changes are made to the size of the check. TID delivers large flows of water so every minute counts when practicing cutback or early shutoff irrigations.

   a. A 15 cfs flow applies .25 inches per acre per minute, so 16 minutes per acre applies 4 inches of water, just right for corn on a sandy soil. A 20 cfs flow applies .33 inches per acre per minute, so the irrigation should be only 12 minutes per acre on sandy soil.

   b. For a sandy loam soil and oats in May, only 2.5 inches of water should be applied and with a 20 cfs flow, the irrigation time would be only 8 minutes per acre.

7. How often to irrigate is based on how fast the plant uses the water in the soil. Use crop water use or evapotranspiration (ET) information will help determine how much water is taken from the soil between irrigations.

   a. A typical corn crop uses .27 inches of water per day at peak growth in early August. On sandy soil with 3 foot roots, there is about 60% of the 3 inches of water in the soil or 1.8 inches of water available for the plant between irrigations. To keep the soil moisture at optimum for best yields, irrigate every 7 days.

   b. For the same crop and soil in June, the corn uses only .l3 inches per day and irrigations could be 13 days apart.

   c. Crop ET varies seasonally. Use the current year ET values to schedule irrigations. The local CIMIS site is Denair #168.

8. Each Growers' field is different. To obtain optimum yield irrigation practices need to be tailored to specific situations. Your local Farm Advisor can be of assistance in developing these practices.