

# Irrigation Management for Dairymen

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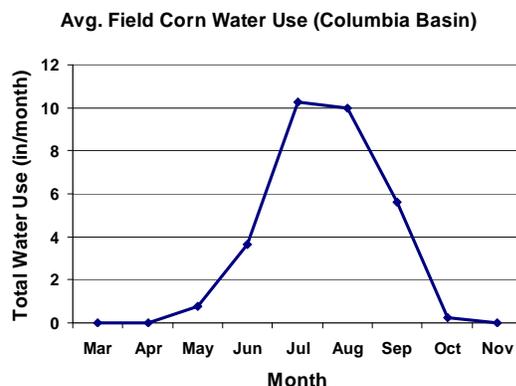
Water is still the best fertilizer. The relationship between good management of irrigation water with yields and farm profits is well established. Too little water or poor timing that causes drier periods leads to depressed yields. Too much water results in excessive pumping costs, poor soil aeration, and promotes infection by multiple crop diseases. This will mean higher costs as well as depressed yields.

## *Soil's Role in Water Management*

The soil serves as a little reservoir for water and nutrients. The size of the reservoir depends on the soil type and crop rooting depth. A common misperception is that sandier, or coarser textured soils require more water and nutrients. This is not true. The plants need the same amount of water and nutrients regardless of the soil. A sandy soil just can't hold as much water or nutrients (smaller reservoir to pull from) as a silt-loam soil and therefore needs to be irrigated and fertilized (refill the reservoir) more frequently but in smaller amounts.

## *Changing Water Needs*

Crop water needs change drastically over a season. For example, alfalfa typically needs about twice as much water in July as it does in May or September. Typical corn water needs for the Columbia Basin are shown below. It is important to vary the amount of water applied with the water use needs of the crop.



## *How Much Water, When?*

There are many ways to do irrigation scheduling, but the most important thing is to at least gather some sort of data to indicate when to water and how much. Using the same schedule all season, just guessing, or kicking the dirt to examine the top half inch of soil will often result in poor irrigation management decisions and therefore depressed yields and profitability. Using the plants as an indicator is also not ideal because by the time the plants show stress a yield loss has already taken place. Using the look and feel method (digging a hole and palming the soil), doing the checkbook method using water use models ([weather.wsu.edu](http://weather.wsu.edu)), and/or monitoring soil moisture using sensors are vastly preferred methods. It may be worth your while to hire a consultant to help with irrigation scheduling.



## *Big Guns and Booms*

Big guns on hose reels are popular in western Washington because they meet the need for a flexible and highly mobile means of providing supplemental irrigation water during the middle of the summer. When using a big gun, it is usually better to space the pulls apart at a distance that is somewhat less than the maximum throw diameter of the big gun. Although this means more sets (pulls), this will provide a little overlap on



each side and improve the uniformity of the water application and the overall yield and quality of the crop being grown. The efficiency and water application uniformity is also greatly improved if a big gun is operated during times of low wind speeds. Don McMoran (WSU Skagit Co. Extension Agent) and Troy Peters (WSU Extension Irrigation Specialist) did some comparisons of big guns and booms and found that a boom is more efficient (about 85%) than a big gun (about 60%) and applies water much more uniformly. Because a boom loses less water, and because it operates at a much lower pressure, there is a fairly large pumping energy savings. In an economic analysis it was found that over the life of the equipment this energy savings could pay for the additional cost of a boom if a diesel pump was being used, but not if an electric pump was being used.

### ***Center Pivots***

Center pivots are the most common method of irrigating large fields in the Northwest. Although pivots greatly simplify irrigation water management, they come with their own challenges. The biggest challenge is that they are limited by the infiltration rates of the soils. Soils can take up large amounts of water if they are given enough time. A wheel line may apply up to 3 inches of water at a time, but the soil is usually given 24 hours to soak up that water. As a pivot's end tower passes by a particular point in a field a large amount of water is being applied in a very short amount of time.

Therefore most pivots can only put on a maximum 0.25 to 0.40 inches of water at a time without causing runoff at the end of the pivot (these numbers will vary depending on the soil, crop cover, and the pivot sprinkler package). Running a pivot too fast is not beneficial either since the frequent wetting will result in a larger portion of the water lost to evaporation instead of being stored in the soil and therefore poor irrigation efficiency. In general pivots should be operated at the speed (% timer setting) just above that where water does not pond and run off past the end tower. Because sandy soils have higher infiltration rates they are more suited to center pivots since a pivot excels at more frequent applications of smaller amounts of water.



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