

Surface Irrigation

Watering corn by furrow or surface irrigation has been practiced for almost as long as people have irrigated corn. Since water flows downhill and most fields have some slope, furrow irrigation can be accomplished at a relatively low cost on many soil types and situations.

The disadvantages of poorly managed furrow irrigation include low application efficiency, poor application uniformity across the field, and high labor requirements. Excess water can leach nitrogen and other soluble agricultural chemicals below the root zone where they may contaminate ground water. Poor uniformity can result in inadequate water for corn growing on the lower end of the field and over-irrigation in other areas, increasing the potential for salinity problems. Low efficiency systems require more water to meet a crop's water needs, adding further complications during dry years. However, furrow irrigation can be managed to minimize these impacts through a variety of technologies and techniques, see Table 25.

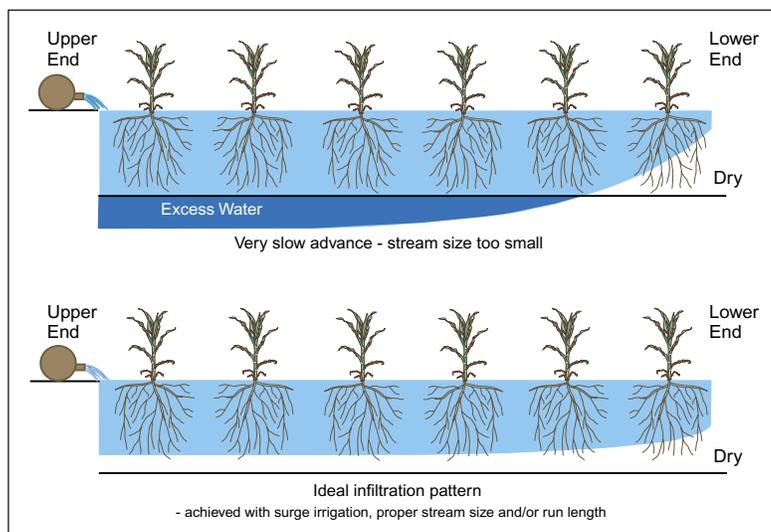


Figure 31. Low efficiency and poor uniformity lead to deep percolation of irrigation water below the root zone, especially at the upper end of the field.

Table 25. Growers should choose a variety of these techniques based upon site-specific conditions, experience, and budget. All these adjustments can improve or decrease uniformity depending upon how they are implemented and on field conditions.

Practice	Benefit(s)	Management notes
Row length	Proper row length improves uniformity.	Leveled fields should be approximately 660' on coarse and 1300' on fine textured soils.
Stream size	Should be adjusted for slope and texture, and rate doubled when using PAM.	Easy management to adjust with both siphon tube and gated pipe.
Length of set	Allows irrigator ability to control volume of application.	Should be adjusted for stream size and run length. 12-hour standard is convenient, but not appropriate for many situations.
Furrow packing	Can increase advance rate 15 – 20 % on some soils.	More effective when using a designed furrow forming/packing tool than when driven with tractor.
Alternate row irrigation	Reduces gross irrigation by 46%, net by 29%. Allows for rainfall storage in dry row.	Not appropriate for steep slopes or soils with infiltration problems.
Surge irrigation	Can greatly improve uniformity and can improve efficiency by 10 - 30%	Once learned, reduces labor requirement.
Crop residue	Increases infiltration. Reduces erosion.	Furrow irrigation can be accomplished under conservation tillage with appropriate management changes.*
Polyacrylamide (PAM)	Reduces erosion by up to 90%. Increases lateral wetting and infiltration.	Must increase stream size to maintain advance times. PAM concentration should be 10 parts per million (ppm) in advancing water for optimum results.

*See Guidelines for Using Conservation Tillage Under Furrow irrigation TR02-6 at <http://www.colostate.edu/Depts/AES/>