Fantasy Irrigation

DR. JOE HENNGLER

PORTAGEVILLE, MO.

In fantasy football, wannabe football coaches in TV-land are able to "draft" real football players to compile their dream-squad football team which they can clash on Sundays with other dream teams. Recently, in a similar mode, irrigation specialists from around the country got together on the Internet and developed a dream list of irrigation practices they felt would help US irrigators.

Starting off as a "Top Ten" irrigation practices list, the list soon expanded. The irrigation "coaches" came from AR (Chris Henry), MS (Lyle Pringle, Joe Massey and Jason Krutz), NM (Blair Stringham) and MO (Joe Henggeler). Here are some of the dream irrigation practices that they came up with.

Management

• Measure flow and the total amount of irrigation applied by installing a flow meter.

• If a permanent meter cannot be installed, borrow a portable flow meter, take a reading while at the same time linking it to some hour totalizer (e.g., on a power unit, panel control box, etc.). Seasonal hours of operation then can be used to obtain annual irrigation depth applied.

• Use newly collected data to give yourself an end-of-year report card by calculating your irrigation use efficiency (*IUE*). *IUE* is your irrigated yield minus your dryland yield divided by total inches of irrigation applied. Compare to published *IUE* values. For example, a typical *IUE* for corn is 11.9 bu/ac/inch of irrigation. If your *IUE*, however, was just 10.0 bu/ac/inch than you are 84 percent of the average – a solid "B", but definitely an "A", so you might want to investigate ways to improve you irrigation efficiency.

• Schedule irrigation with a computer-based program that uses weather data or with an atmometer (something like a mini pan evaporation pan on stilts).

• Better yet, use soil moisture sensors (ideally wireless) to schedule irrigation.

• Mistakes on irrigation often occur at the beginning and at the end of the season.

• For example, the computer program *Arkansas Scheduler* (AS), is a great tool that times irrigation based on a set amount of water used up in the top part of the soil profile (termed the *deficit*). However, early on when the plants' roots are still small, the deficit amount is actually too great. Normally, the mid-South receives some amount of rainfall around planting and thus problems don't occur. But when a dry spell occurs at planting, the ***AS*** won't call for irrigation as the deficit as not been met. I know this to be true, having learned it in the been-there-done-it school.

• Don't cut off irrigation too early. Water until the corn milk line is at the ½ to ¾ stage and soybeans are well into the R-6 stage, with some foliage showing yellowing and the beans in the pod are squared off touch each other.

• For both corn and beans obtain information on the test weight since late-season irrigation practices affect yield primarily by increasing seed mass and sometimes is a reflection of how right on the last irrigation was. Corn tests should be > 56 lbs/bu and normal soybeans should have a seed that when laid on a penny will cover Mr. Lincoln's face.

• Go to the air – aerial images of your irrigated fields could show irrigation-related problems (especially on pivots where they are easy to visualize as they show up as concentric rings). Use your yield monitor data (especially on furrow irrigated fields) to see if you can catch some irrigated-related problem, say weaker yields at the bottom (rows getting out too slow) or in the top half of the fields (possibly running water too long).

Tips for Furrow Irrigation

• When using poly-pipe, based the sizes of the punched holes by using computerized hole-sizing with *PHAUCET* (NRCS) or *Pipe Planner* (Delta Plastics). This ensures that outlet uniformity occurs and even adjusts for varying row lengths.

• Use surge valves. Surge irrigation can improve application efficiency up to 50 percent relative to conventional furrow systems. The *Bootheel Irrigation Survey* (*BIS*) showed that furrow irrigators using surge produced $98, $78, and $28/acre more on corn cotton and full season soybeans that furrow irrigators not using surge.

• Improve the points of distribution in your field by installing additional underground pipe. Cost share is available in some places. This commonly cited by people who have participated in various components of EQIP cost share, as being the item that has helped them the most.

• Weight the cost of reducing length of furrow versus the benefits received with shorter runs. Water will get to the end much quicker thus decreasing pumping costs and improving the down-row uniformity. Remember cost share to help. Averaging 6 furrow advance studies on the Internet, I found that when the furrow length is shortened to 80, 60 and 50 percent of the original length, the out-times are 35, 62, and 75 percent less, respectively.

• *Cut back flow* (running a large furrow stream early, allowing water to advance quickly to about ¾ of the field's length, and then "cut back" the engine RPM to reduce flow). Anybody say "Murphy switch"?

• Install a tail water recovery system to increase irrigation efficiency to capture runoff water from the furrows and reuse it.

Tips for Sprinkler Systems

• For sprinkler systems, evaluate the sprinkler nozzle package. Sprinkler nozzles older than 7 years should be checked annually. Nozzles can be checked for uniformity using catch cans or rain gauges. Some types of nozzles may wear out faster, especially if sand is entrained in the irrigation water source.

• Check the precipitation rate received underneath the lateral to that received underneath the end gun – they should be equal, but are often not so. The remedy is easy – change the orifice tip of end gun.

• While re-nozzling seek to reduce pressure (the last nozzle only needs to have 7 or 8 PSI). Pressure breaks up droplets causing increased wind drift. An added advantage is that lowering pressure reduces pumping costs.

• Choose nozzle types based on reducing drift. For example, a serrated splash plate that forms spider legs of water won't have as much drift as will flat splash plates. Rotator type sprinklers (again primarily because of large drop size) won't drift as much as impacts.

• Use drops; the lower ultimate placement of the nozzle, the better, especially in windy areas. While the nozzles need to clear the top of a corn crop, a drop to this level is better than the sprinkler being on top of the span.

Tips for Rice Irrigation

• Improve water savings by going to zero-grade or using multiple inlet irrigation in contour and precision graded fields. Zero-grade uses about 2/3 of the water of levee systems and multiple-inlet reduces water use by about 25 percent for contour and precision level system. Combine these with the use of rice flood depth gauges to further improve flood management, allowing for more-efficient rainfall capture and reduced over-pumping.

• Multiple-Inlet Rice Irrigation (factsheet): http://msucares.com/pubs/publications/p2338.pdf

• Multiple-Inlet Rice Irrigation (video): http://www.youtube.com/watch?v=XR2JNsp-MXkk

• Rice Flood Depth Gauge (factsheet): http://msucares.com/pubs/infosheets_research/i1358.pdf

• Follow current research on decreasing number of days with flood on the rice without hurting yield, and see if it might work for you.

• If running open discharge with an engine to keep a field flooded up, run at the RPM that produces the cheapest water. Obviously, the flood has to be maintained but do it at the RPM that has the lowest $/acre-inch. Δ

DR. JOE HENGGELER: Irrigation Specialist Commercial Agricultural Program, University of Missouri Delta Center