

CONSIDERATIONS WHEN CONVERTING TO PRECISION IRRIGATION

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Summary

Decisions to make when considering converting from surface irrigation to another form can be overwhelming. What type of irrigation should I switch to? What changes will I need to make to my management? How do I make this as easy as possible?

This paper will focus on suggested steps and the irrigation equipment considerations that will make the transition easier, more efficient, and more cost effective when a farmer decides to change from surface to mechanical move irrigation.

Introduction

The profitability of converting from surface irrigation to precision irrigation has been discussed many times in the central plains states (Dhuyvetter, 1996) with the focus on differing pumping capacities on crop yield and revenue. In most of these cases, the items considered include the cost of the pumping and irrigation systems, changes to production costs, and potential on yield. To a lesser extent, some discussion has focused on potential labor savings. The studies date back for years and include, but are not limited to, Dhuyvetter 1996, Lamm, et.al. 1997. These studies focused on the impact of sprinkler irrigation capacity on corn yield potential, as well as economics. Some manufacturers offer information for the conversion (Lindsay, 2003 and Valmont, 2003).

In recent years, with the help of the EQIP program, economics have changed and farmers are considering conversion from surface flooding to other forms of irrigation, in order to reduce farm water use. Another incentive for conversion is water limitations, either through availability or regulation. This is becoming more of a consideration throughout the central plains states. Grain prices also have a significant impact on conversion considerations. Corn futures are now closing over \$5.00 per bushel, as compared to corn prices in past studies of \$2.50 per bushel (O'Brien, 1998).

For a grower today who is considering conversion to a form of precision irrigation, the following questions need to be taken into consideration: What steps can be taken to ensure the best long-term solution? How might a I proceed? What should be part of the considerations when making a major irrigation change in my operation?

Discussion

To begin the process, one should consider the following steps before talking with an irrigation supplier. This prepares the grower, and helps them focus on the items of particular importance to their operation. Also, the irrigation dealer and/or consultants should help encourage the grower to follow through a decision-making process to reach the optimum decisions regarding conversion. The crop consultant may be of assistance at several points throughout the decision-making process in order to provide data and/or recommendations about the production plan.

- 1) Start with a review of current management and cropping plans
 - a. Does conversion fit into the long-term plan for the operation?
 - i. Cropping/rotation plans
 - ii. Expansion
 - b. What are the primary reasons for making a change?
 - i. Labor availability
 - ii. Water availability
 - iii. Overall profitability
- 2) Perform a field resource inventory (the crop consultant may have good input at this stage)
 - a. Available water supply
 - b. Available power supply
 - c. Soil types
 - d. Field size and shape
 - e. Field “problems” – is there an area that has never yielded the way the grower would like? Do challenges that would hinder a conversion such as buildings, power lines or topography exist?
 - f. Changes that will be needed to existing farm equipment if conversion is completed
- 3) Consider irrigation equipment options that may be a best fit. (At this stage, do not rule out any options.)
 - a. Drip or SDI
 - b. Mechanized irrigation
- 4) Select a partner to help with the conversion process
 - a. Interview potential irrigation equipment suppliers
 - i. Explain what is being considered and your needs

- ii. Show the information that has been collected
 - b. Look for a partner who:
 - i. Is open to listening to you
 - ii. Understands your needs and your field
 - iii. Understands the value of converting to your operation
 - iv. Has product options for consideration
 - v. Does not immediately jump to make a quotation
 - vi. Has finance options and understands cost share programs
 - c. Consider more than just the sales person of the dealership
 - i. Long term support in service and parts
 - ii. Experience with the options presented
 - iii. Talk with your neighbors about their experiences with the dealer
 - d. Request a proposal to use as part of the comparison. Look for:
 - i. Does the proposal offer options?
 - ii. Is financing and cost share information presented?
 - iii. Is operating cost addressed?
 - iv. Is the proposal addressing the overall farms needs?
- 5) Once the partner is selected, review goals. Is it to:
 - a. Maximize the area covered in the field?
 - b. Maximize returns from the field?
 - c. Maximize returns for the farm?
 - d. Minimize investment?
 - e. Minimize labor?
 - f. Minimize operational expense?
- 6) Review the management plans and agricultural practices anticipated for the new precision irrigation system
 - a. Crops
 - b. Application of crop production products such as nutrients, herbicides, insecticides, etc
 - c. Tillage practices
- 7) Review the options presented by the irrigation dealer
 - a. Type of irrigation equipment
 - i. Area covered
 - ii. Options on the equipment
 - iii. Ease of use
 - b. Initial investment
 - i. Financing plans
 - ii. Cost share programs
 - c. Operating costs
 - d. Life expectancy of the equipment
 - e. Labor requirements
 - f. Ability to automate

- 8) Take the time to consider the long term impacts of the decision
 - a. Well manufactured, designed and applied mechanized irrigation equipment should last for at least twenty years
 - b. Conversion to precision irrigation should make life easier and not harder
 - c. Realize it may take two years to begin to reach your goals

At this point, a grower should be ready to make a decision on how they want to proceed. But before proceeding, consideration should be given to the specific type of irrigation equipment. Many times, one automatically assumes the best solution for their situation is a center pivot, as it may well be. But a grower should consider other options, and look for an irrigation equipment supplier who is open to considering such options.

Whether the primary goal is maximizing the area irrigated, minimizing operating costs, or maximizing profits, several options are available for consideration:

- Drip and SDI
 - Advantages
 - Maximizes area covered in irregularly shaped fields
 - Disadvantages
 - Initial investment
 - Germination of crop
- Towable center pivot
 - Advantages
 - Maximizes the area covered by using one center pivot over multiple fields
 - Can always add a fixed pivot in the future
 - Disadvantages
 - Labor – will require time to go to the field, prepare the center pivot for towing, actual towing and switching back from tow to operation
 - Pumping rate – flowrate needs to be more than what is required for the areas irrigated to allow for downtime and towing
- Center pivot with corner arm
 - Advantages
 - Maximize the area covered – corner arm can be folded in and out to dodge obstructions
 - Uniform watering over the entire field
 - Disadvantages
 - Initial investment
 - In some situations may have more wheel track issues

- Linear
 - Advantages
 - Will maximize the area covered in a square or rectangular field
 - Wheel tracks may fit cropping plan better
 - Disadvantages
 - Initial investment
 - If a hose drag, may require labor to switch the hose
 - If a ditchfeed, ditch maintenance is required

- Options to consider for all mechanical move irrigation equipment
 - Floatation options (not available for towable machines) – to minimize the wheel tracks and avoid getting stuck
 - Sprinkler package – to maximize productivity from the crop and the soil
 - Pipeline materials – different options available depending on the crop production products used
 - Automation capabilities
 - Control panel for off-peak operation
 - Automatic changes to manage water applied for different sectors of the field
 - Remote monitoring and/or control options
 - High speed operation to allow for minimal water applications for germination and application of crop production products.

Conclusions

Decisions to make when considering converting from surface irrigation to another form of irrigation can be overwhelming. What type of irrigation should I switch to? What changes will I need to make to my management? How do I make this as easy as possible?

This discussion has focused on eight steps to consider in order to help make the decision-making process simpler. It is critical for the grower to have a goal in mind, such as why to convert, and then follow through to see that this goal is achieved. Options need to be considered in order to determine the best equipment solution for the situation. Remember depending on the grower's specific situation, numerous options exist to meet the farmer's expectations and goals.

References

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