CONSIDERATIONS IN SWITCHING FROM FURROW TO SPRINKLER SYSTEMS

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WATER SOURCE CHANGES

Will a new well be drilled with a need to abandon an existing canal/well/reuse system? Alternatively, pipe could be run from an existing well/canal with modifications made in the pump and power unit to match changed pressure/volume needs depending upon the sprinkler package chosen. These changes may also provide an opportunity to consider changing energy sources.

LAND USE CHANGES

What will be the changes in acres actually cropped and irrigated/dryland mix? Will some acres be more effectively irrigated resulting in expected yield changes on irrigated acres?

FIELD OPERATION CHANGES

Will furrowing be eliminated therefore saving a trip over the field? Will chemigation be used to substitute for tillage or the application of materials by other means? Managing/operating the irrigation system will likely be less demanding and more flexible. On the other hand, abandoning two wells (and systems) for a single pivot has implications in case of break down, particularly where the sprinkler may be stretched to meet crop needs in a timely fashion.

WATER APPLICATION

Per acre water application will usually be reduced under sprinkler irrigation resulting in reduced per-acre fuel costs. The effect upon draw down will depend upon changes in acres irrigated and per acre water use.

COST AND RETURN CHANGES

A change in the irrigation system can result in several possible related changes in costs and returns. Cost changes could include changes in fuel, repairs and ownership costs for tillage and irrigation equipment. Tillage costs may change, for example, if furrowing is eliminated. In addition, materials and labor costs will typically change. Less leaching may result in less nitrogen fertilizer required and chemigation would result in changes in other chemical costs. The cash flow requirements will also be affected and will depend in part upon the financing arrangements available for system components. Cost share may be available for some expenditures, for example, well abandonment and installation of buried pipe.

In the past, farm program payments depended upon irrigated acres and were a consideration when making changes that affected land use. Currently, however, deficiency payments are independent of whether the land is currently irrigated. Yields and returns may be affected, however, if the furrow irrigation system was not getting water to all of the crop or the sprinkler system is stretched in some years.

AN EXAMPLE

To illustrate the budgeting of a switch in irrigation systems consider the following example where two gravity systems serving 80 acres each are to be replaced by one center pivot serving 130 acres with 30 acres remaining dryland. Crop water use is 12 AI. The yield from irrigated acres is assumed the same for both systems. Also operating cost/acre excluding irrigation is assumed the same under pivot and gravity.

The data for this example suggest the irrigation cost savings ($4,657) exceeds the loss in net crop income ($3,030). This result will depend upon a number of factors including the number of acres each system serves.

	Gravity	Pivot	
Irrigated Acres	160	130	
Head	148 ft.	206 ft.	
Application Efficiency	50%	95%	
Acre-Inches pumped/acre	24	12.6	
GPM	1000	800	
Pumping Hours	1,728*	921*	
Repairs/hour	$0.78	$1.48	
Fuel and Lube/hour	$2.30	$2.80	
Operator Labor, hours/acre	1.5	0.4	
Annual Irrigation Costs			
Interest	$3,014	$1,901	
Depreciation	5,034	4,186	
Repairs	1,348	1,363	
Fuel and Lube	3,974	2,579	
Labor @ $7/hour	1,680	364	Irrigation Savings
Total	$15,050	$10,393	$4,657
Pivot Corners	Gravity	Dryland	
Corn Yield (bu)	145	65	
Price/bu	$2.25	$2.25	
Revenue/acre	$326	$146	
Operating Cost/acre**	154	75	
Net/acre	172	71	Crop Net Loss
30 Acres	$5,160	$2,130	$3,030

* Pumping hours are calculated based on 12 hours to pump 1 acre foot at 450 GPM. For example, for the gravity system:

$$12\ hours\ x\ \frac{450\ gpm}{1{,}000\ gpm}\ x\ 2\ AF\ x\ 160\ acres\ =\ 1{,}728\ hours$$

** Excluding irrigation costs.