

## Long-term risk assessment using the Multi-Temporal Risk Analyzer – part 2

Most major decisions in production agriculture are either generally long-term or have long-term consequences.

Appropriate risk analyses should be considered for any lasting endeavor. Not accounting for the ongoing aspect of major decisions is often a challenge for managers, who tend to look at major decisions or changes in operations in terms of short-term adjustments rather than examining long-term effects.

The way to account for uncertainty is estimating a conservative rate of return or opportunity cost using the time value of money approach. This may not accurately account for how expense and revenue streams interact over time. The Multi-Temporal Risk Analyzer (MTRA) helps decision makers examine the long-term impacts of their decisions in a partial budget framework.

### IRRIGATION CONVERSION EXAMPLE DECISION

Consider northern Wyoming producer Bob Mills\*, who is exploring a change from gravity-flow flood irrigation to center pivot irrigation on 90 acres of alfalfa. Like many producers his age, Bob is trying to cut down on the manual labor in

Sprinkler Expenses	
6-tower pivot	\$95,000
pipeline	\$25,000
electrical installation	\$25,000
	Subtotal \$145,000
NRCS Cost share (50%)	\$72,500
Project cost after cost share	\$72,500
Estimated Yearly Payment	
Payment (10 yrs, 5% interest)	(\$9,389)

Proposed Change:	Interest Rate:	5.00%
Convert from flood to center pivot irrigation	Most Likely VALUE	Expected Low/High Value
<b>Added Returns</b>		
4th cutting of alfalfa	\$ 13,500	\$ - Low \$ 18,000 High
Increased yield, existing acres (10%)	\$ 6,750	\$ 6,750 Low \$ 6,750 High
	\$ -	\$ - Low \$ - High
	\$ -	\$ - Low \$ - High
<b>Reduced Costs</b>		
Flood irrigation labor	\$ 1,350	\$ 1,080 Low \$ 1,620 High
Ditching/corrugating	\$ 900	\$ 720 Low \$ 1,080 High

**Figure 1.** This table in the Multi-Temporal Risk Assessment tool accounts for added returns and reduced costs.

Added Costs		
Pivot Payment	\$ 9,389	\$ 9,389 Low \$ 9,389 High
Pivot Maintenance	\$ 2,000	\$ 1,000 Low \$ 5,000 High
Utilities, pumping cost	\$ 10,000	\$ 7,500 Low \$ 15,000 High

**Figure 2.** Low and high estimates are put into the Added Costs field.

the operation; he views the main benefits of the project as decreased labor and management in eliminating the ditch-based system and better yields resulting from faster, more efficient irrigation.

His quote for installing the new center pivot to irrigate is \$145,000, including the pivot, pipeline, and required electrical installation. After a Natural Resources Conservation Service (NRCS) cost-share of 50 percent, the cost is estimated at \$72,500, resulting in 10 years of annual payments of \$9,389.

### MTRA TOOL DATA ENTRY

Using the partial budget format of the MTRA tool to evaluate the project, we first divide Bob's expected revenues and expenses into the partial budget format of the MTRA tool.<sup>1</sup>

We enter the fourth cutting under added returns by assuming 1 ton-per acre yield at \$150/per ton, giving a total added return of \$13,500 over the 90 acres. To account for variability in both price and yields, we enter \$0 for the low value, as Bob knows that in some years a fourth cutting won't be possible, and \$18,000 for a high value assuming \$200/ton for the hay. Bob assumes a 10 percent increase in yields from the sprinkler for the other three cuttings (0.5 ton per acre at \$150/ton or \$6,750 total). See Figure 1.

Under reduced costs, we enter the costs of labor and ditching: \$15/acre for labor and \$10/acre for the ditching. We expect values to vary about 20 percent above/below these estimates and enter those as high and low values.

In the added costs section, we enter the pivot payment of \$9,389 as the most likely/high/low values or no variation as the payment will be constant over the 10 years. Additional expenses include maintenance and repairs totaling \$2,000, varying from \$1,000 to \$5,000 per year, and utilities (electricity) to pump the water and operate the pivot at \$10,000 per year. Bob believes these will vary greatly from year to year due to weather and electricity prices. As a result, we enter \$7,500 for the low value and \$15,000 for the high value. See Figure 2.

Our next installment will highlight the results and risk analytics generated by the MTRA tool.

*\*The Mills' operation is a case study example created to demonstrate RightRisk tools and their applications. No identification with actual persons (living or deceased), places, or agricultural operation is intended nor should be inferred.*

<sup>1</sup>This example has been simplified for illustrative purposes and space requirements. Several in-depth examples (as well as a user guide) are available on the MTRA tool page at [RightRisk.org](http://RightRisk.org).

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**FOR MORE INFORMATION**

The Multi-Temporal Risk Analyzer is just one of the many partial budgeting resources available as part of the Risk Analytics toolbox at [RightRisk.org](http://RightRisk.org).

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