

RISK SCENARIO PLANNING

Evaluating Mineral Supplementation for Hawaii Beef Production

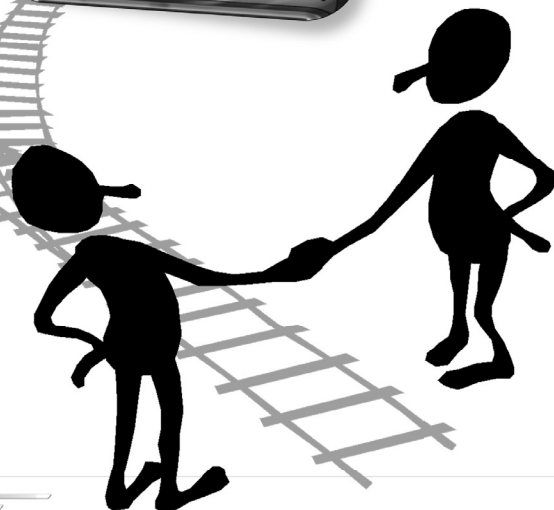
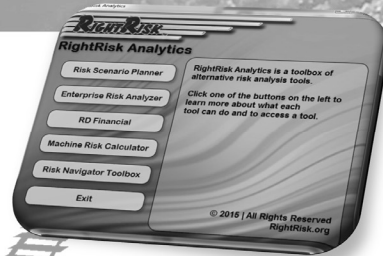


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Evaluating Alternatives



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RightRisk Analytics: ~ tools to evaluate alternatives

Risk Scenario Planner

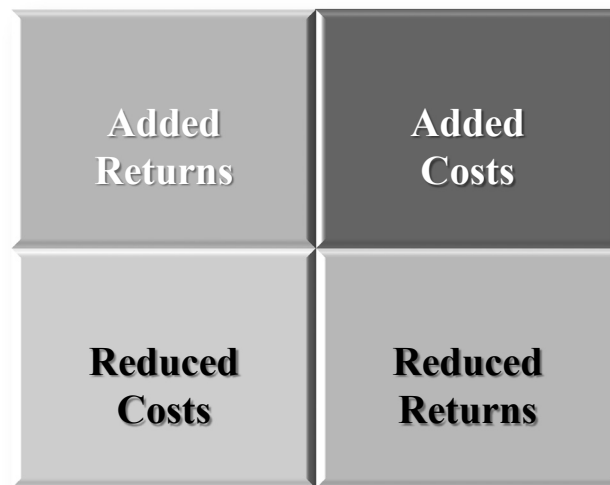
relatively minor changes, risk analysis

- **Machine Risk Calculator**
machine costs, custom rates, risk analysis
- **Forage Risk Analyzer**
lease arrangements, forage supply, housing costs
- **Enterprise Risk Analyzer**
larger enterprise-level, enterprise mix changes
- **RDFinancial**
substantial changes, whole farm budgets, financial analysis, credit scoring
- **Multi-Temporal Risk Analysis**
partial budgets incorporating time, risk analysis
- **Risk Navigator**
strategic risk planning and analysis

Partial Budget Framework

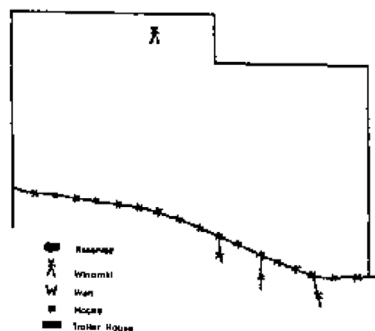
A partial budget is a tool used to analyze the **financial effect** of simple management changes

- **Positive Effects**
 - *Added Returns*
 - *Reduced Costs*
- **Negative Effects**
 - *Added Costs*
 - *Reduced Returns*



Case 1: Convert to Commercial Mineral Mix

- JR Land and Livestock, a 200 cow/calf operation has not followed any regular or organized program for mineral supplementation of their cattle over the past 15 or so years.
- Recent work by the UH Cooperative Extension Service has found that mineral program using a *commercial mineral mix* could provide much of the mineral supplementation they need at around \$31.89/cow/year.



Case 1: Convert to Commercial Mineral Mix

- **Labor** to distribute the mineral is expected to cost around \$20/hour, including all payroll taxes and benefits. They estimate that 3/4 of an hour per week or around 42 hours would be needed for the year.
- Two new *mineral bunks* (1 bunk/100 head) would be needed at an estimated cost of \$500 each and are expected to last 10 years. Currently they are paying about 7 percent interest on their operating capital.
- **Other expenses** for additional fuel, vehicle maintenance and miscellaneous costs are expected to increase about \$300/year.
- They also anticipate **management costs** will increase around \$250/year to manage the new mineral program.

Case 1: Convert to Commercial Mineral Mix

- After visiting extensively with one of the neighboring ranch families, JR L&L managers have learned that the benefits from supplementing the needed mineral should result in the ranch selling an additional 40 *weaned calves* at 6 months of age, weighing around 400 lbs/head. Prices are currently around \$135/cwt on these lighter calves.
- Furthermore, their annual *veterinary costs* (\$6,015) are expected to decrease by 10 percent (\$602) per year.

Case 1: Convert to Commercial Mineral Mix

- Another expected change is a cut in their culling rate. They expect to sell 17 fewer *cull females* each year, at a value of \$704/head. This is a reduction in revenue, but they would also save on *transportation and marketing costs* for these cull animals, usually costing the ranch around \$740/year.
- Finally, after some additional thought, the managers realize that they should expect an increase in *transportation and marketing cost* associated with the added calves. They estimate this additional cost at \$536/year.

Case 1: Convert to Commercial Mineral Mix – TOTAL/year

RIGHT RISK				CONVERT to Commercial Mineral Mix Supplementation (200 cows/year)			
Partial Budget For:							
Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	
Calf sales: 40 head or 0.80 cwt/cow/year	160	\$ 135.00	\$ 21,600.00	Commercial mineral: \$31.89/cow/year	200	\$ 31.89	\$ 6,378.00
			\$ -	Mineral labor: \$4.20/cow/year	200	\$ 4.20	\$ 840.00
			\$ -	Other expenses (fuel, maintenance, etc)	200	\$ 1.50	\$ 300.00
			\$ -	Mineral bunk costs: \$0.50/cow/year	200	\$ 0.50	\$ 100.00
			\$ -	Opportunity interest: \$0.18/cow/year	200	\$ 0.18	\$ 36.00
			\$ -	Added management: \$1.25/cow/year	200	\$ 1.25	\$ 250.00
			\$ -	Transportation and marketing for			\$ -
			\$ -	40 added calves: \$2.68/cow/year	200	\$ 2.68	\$ 536.00

Reduced Costs	Quantity	Value		Reduced Returns	Quantity	Value	
Vet and medicine: \$3.01/cow/year	200	\$ 3.01	\$ 602.00	Cull female sales: \$59.84/cow/year	200	\$ 59.84	\$ 11,968.00
Transportation and marketing for			\$ -				\$ -
17 fewer cull females: \$3.70/cow/year	200	\$ 3.70	\$ 740.00				\$ -

Total Positive Effects (Added Returns + Reduced Costs)	\$ 22,942.00	Total Negative Effects (Added Costs + Reduced Returns)	\$ 20,408.00
Net Benefit of: CONVERT to Commercial Mineral Mix Supplementation (200 cows/year)		\$ 2,534.00	

Case 1: Convert to Commercial Mineral Mix – Per COW/year

RIGHT RISK				CONVERT to Commercial Mineral Mix Supplementation (per cow/year)			
Partial Budget For:							
Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	
Calf sales: 40 head or 0.80 cwt/cow/year	0.8	\$ 135.00	\$ 108.00	Commercial mineral: \$31.89/cow/year	1	\$ 31.89	\$ 31.89
			\$ -	Mineral labor: \$4.20/cow/year	1	\$ 4.20	\$ 4.20
			\$ -	Other expenses (fuel, maintenance, etc)	1	\$ 1.50	\$ 1.50
			\$ -	Mineral bunk costs: \$0.50/cow/year	1	\$ 0.50	\$ 0.50
			\$ -	Opportunity interest: \$0.18/cow/year	1	\$ 0.18	\$ 0.18
			\$ -	Added management: \$1.25/cow/year	1	\$ 1.25	\$ 1.25
			\$ -	Transportation and marketing for			\$ -
			\$ -	40 added calves: \$2.68/cow/year	1	\$ 2.68	\$ 2.68

Reduced Costs	Quantity	Value		Reduced Returns	Quantity	Value	
Vet and medicine: \$3.01/cow/year	1	\$ 3.01	\$ 3.01	Cull female sales: \$59.84/cow/year	1	\$ 59.84	\$ 59.84
Transportation and marketing for			\$ -				\$ -
17 fewer cull females: \$3.70/cow/year	1	\$ 3.70	\$ 3.70				\$ -

Total Positive Effects (Added Returns + Reduced Costs)	\$ 114.71	Total Negative Effects (Added Costs + Reduced Returns)	\$ 102.04
Net Benefit of: CONVERT to Commercial Mineral Mix Supplementation (per cow/year)		\$ 12.67	

Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

Risk Scenarios	
Uncertain Value 1	
Description	Cell
Commercial mineral mix	H6
Current Value (Most Likely)	31.89
Minimum Value	29.46
Maximum Value	39.86

JR L&L wants to make the price of the *commercial mineral mix* uncertain:

- The current value of \$31.89/cow/year is in cell H6 of the Risk Scenario Planning tool. We enter “Commercial Mineral Mix” as the description and “H6” as the cell under Uncertain Value 1
- Then enter \$31.89 as the current value,
- \$29.46 as a possible minimum value, and
- \$39.86 as a possible maximum value.

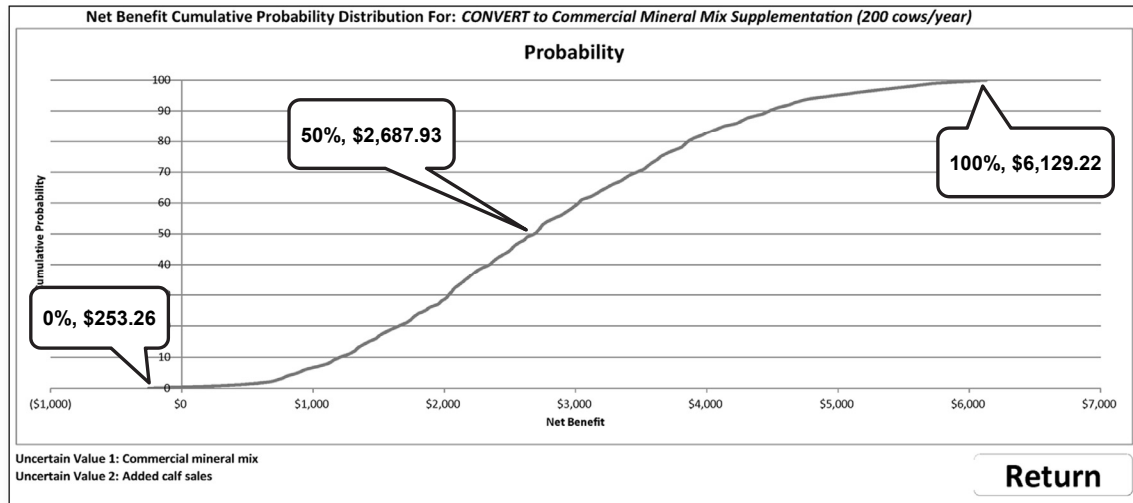
Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

Risk Scenarios			
Uncertain Value 1		Uncertain Value 2	
Description	Cell	Description	Cell
Commercial mineral mix	H6	Added calf sales	D6
Current Value (Most Likely)	31.89	Current Value (Most Likely)	135
Minimum Value	29.46	Minimum Value	120
Maximum Value	39.86	Maximum Value	165

JR L&L also wants to make the price of the *price of calves* uncertain:

- The current price of \$135/cwt is in cell D28 of the Risk Scenario Planning tool. We enter “Added calf sales” as the description and “D28” as the cell under Uncertain Value 1
- Then enter \$135 as the current value,
- \$120 as a possible minimum value, and
- \$165 as a possible maximum value.

Case 1: Convert to Commercial Mineral Mix

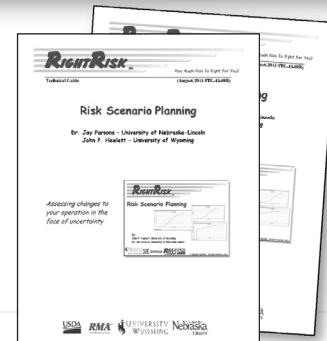
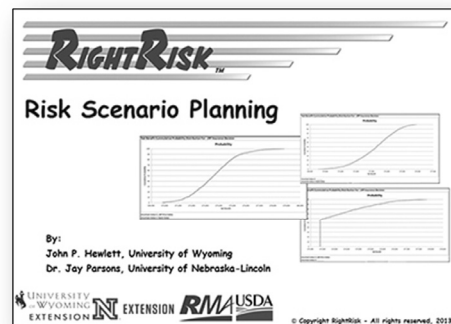


- A cumulative distribution graph gives the probability of earning a net return at or below any certain value.

Summary

The Risk Scenario Planning tool:

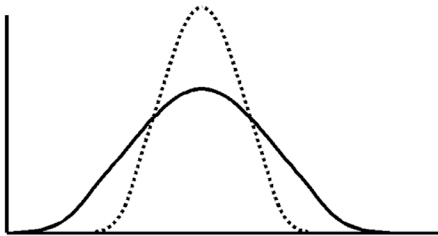
- Can be a useful tool for analyzing **management** strategies and decisions involving **risk**
- Represents a better way to handle the presence of **uncertainty** by thinking in terms of **distributions** of possible outcomes over time
- Results in more **informed** decision-making



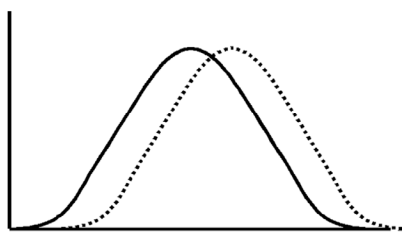


Strategy Impacts

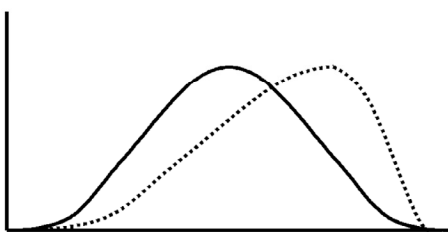
Panel 1: Same Mean, Less Dispersion



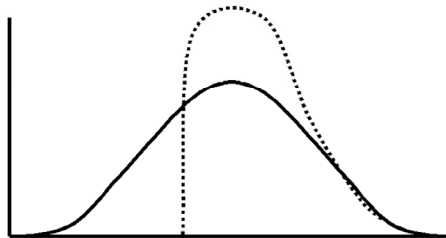
Panel 2: Same Dispersion, Higher Mean



Panel 3: Skewing the distribution



Panel 4: Truncating the Distribution



Risk Treatment: Options



- **Avoiding** the risk
- Deciding to **start** or **continue** an activity likely to create or enhance the risk
- **Removing** the source of the risk
- Changing the **nature** and **magnitude** of the likelihood
- Changing the **consequences**
- **Sharing** the risk with another
- **Retaining** the risk

***Not all options
are
mutually exclusive***

***Not all options
are appropriate
in every
circumstance***

Risk Treatment

- Selecting one or more **options for modifying risks** and implementing those options
- Involves a **cyclical process** of assessing a risk treatment and deciding whether residual risk levels are acceptable
- If not, then selecting a **new risk treatment** and assessing the effect of that treatment until the residual risk matches the risk goal(s)

LIKELIHOOD (Probability) How likely is the event to occur at some time in the future (Scale time specific matrix)	CONSEQUENCES What is the Severity of injuries / potential damages / financial impacts (if the risk event actually occurs)? (Logarithmic Scale, property industry specific matrix)				
	Insignificant	Minor	Moderate	Major	Catastrophic
No Injuries First Aid required No Emv. Damage -- \$1,000 Damage	Some First Aid required Low Emv. Damage -- \$10,000 Damage	External Medical Medium Emv. Damage -- \$100,000 Damage	Extensive injuries High Emv. Damage -- \$1,000,000 Damage	Death or Major Injuries Toxic Emv. Damage -- \$1,000,000 Damage	
Almost certain - expected in normal circumstances (100%)	MODERATE RISK	HIGH RISK	HIGH RISK	CRITICAL RISK	CRITICAL RISK
Likely - probably occur in most circumstances (20%)	MODERATE RISK	MODERATE RISK	HIGH RISK	HIGH RISK	CRITICAL RISK
Possible - might occur at some time (1%)	LOW RISK	MODERATE RISK	HIGH RISK	HIGH RISK	CRITICAL RISK
Unlikely - could occur at some future time (0.1%)	LOW RISK	MODERATE RISK	MODERATE RISK	HIGH RISK	HIGH RISK
Rare - might occur in exceptional circumstances (0.01%)	LOW RISK	LOW RISK	MODERATE RISK	MODERATE RISK	HIGH RISK

Case 2: Convert to Free-Choice Mineral Supplementation

- The X Bar Ranch, a 500 cow/calf operation near Koloa, has been supplementing their cattle with a commercial mineral mix for over the past 10 years.
- Current prices for commercial mineral mix runs about \$31.89/cow/year. Recent work by the UH Cooperative Extension Service has found that an individual, *cafeteria-style mineral program* may reduce the cost of supplementation to about \$13.10/cow/year.



Case 2: Convert to Free-Choice Mineral Supplementation

- Five new *mineral bunks* (1 bunk/100 head) would need to be constructed at an estimated cost of \$1,000 each and are expected to last 10 years. Currently they are paying about 7 percent interest on their operating capital.
- They anticipate they will spend an average of about 1 additional hour per week putting out mineral following the free-choice approach. *Labor cost* is around \$20/hour, including all payroll taxes and benefits.
- *Other expenses* for additional fuel, vehicle maintenance and miscellaneous costs are expected to increase about \$250/year.
- They also anticipate *management costs* will increase around \$500/year to manage the new mineral program.

Case 2: Convert to Free-Choice Mineral Supplementation – TOTAL/year

RIGHT RISK				CONVERT to Individual Free-Choice Mineral Supplementation (500 cows/year)			
Partial Budget For:							
Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	
			\$ -	Free-choice mineral mix:	500	\$ 13.10	\$ 6,550.00
			\$ -	Mineral labor costs:	156	\$ 20.00	\$ 3,120.00
			\$ -	Other expenses (fuel, vehicle maint., etc.):	1	\$ 1,000.00	\$ 1,000.00
			\$ -	Mineral bunk costs:	5	\$ 100.00	\$ 500.00
			\$ -	Opportunity interest:	500	\$ 0.35	\$ 175.00
			\$ -	Added management:	10	\$ 50.00	\$ 500.00

Reduced Costs	Quantity	Value	Total	Reduced Returns	Quantity	Value	Total
Commercial mineral:	500	\$ 31.89	\$ 15,945.00				\$ -
Mineral labor:	104	\$ 20.00	\$ 2,080.00				\$ -
Other expenses (fuel, maintenance, etc)	1	\$ 750.00	\$ 750.00				\$ -

Total Positive Effects (Added Returns + Reduced Costs)		\$ 18,775.00		Total Negative Effects (Added Costs + Reduced Returns)		\$ 11,845.00	
Net Benefit of: CONVERT to Individual Free-Choice Mineral Supplementation (500 cows/year)				\$ 6,930.00			

Case 2: Convert to Free-Choice Mineral Supplementation – Per COW/year

RIGHT RISK				CONVERT to Individual Free-Choice Mineral Supplementation (per cow/year)			
Partial Budget For:							
Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	
			\$ -	Free-choice mineral mix: \$13.10/cow/year	1	\$ 13.10	\$ 13.10
			\$ -	Mineral labor costs: \$6.24/cow/year	1	\$ 6.24	\$ 6.24
			\$ -	Other expenses (fuel, vehicle maint., etc.):	1	\$ 2.00	\$ 2.00
			\$ -	Mineral bunk costs: \$1/cow/year	1	\$ 1.00	\$ 1.00
			\$ -	Opportunity interest: \$0.35/cow/year	1	\$ 0.35	\$ 0.35
			\$ -	Added management: \$1/cow/year	1	\$ 1.00	\$ 1.00

Reduced Costs	Quantity	Value	Total	Reduced Returns	Quantity	Value	Total
Commercial mineral: \$31.89/cow/year	1	\$ 31.89	\$ 31.89				\$ -
Mineral labor: \$4.16/cow/year	1	\$ 4.16	\$ 4.16				\$ -
Other expenses (fuel, maintenance, etc)	1	\$ 1.50	\$ 1.50				\$ -

Total Positive Effects (Added Returns + Reduced Costs)		\$ 37.55		Total Negative Effects (Added Costs + Reduced Returns)		\$ 23.69	
Net Benefit of: CONVERT to Individual Free-Choice Mineral Supplementation (per cow/year)				\$ 13.86			

Case 2: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

Risk Scenarios	
Uncertain Value 1	
Description	Cell
Free-choice mineral mix	H6
Current Value (Most Likely)	13.10
Minimum Value	12.90
Maximum Value	19.19

The X Bar wants to make the price of the *free-choice mineral* mix uncertain:

- The current value of \$13.10/cow/year is in cell H6 of the Risk Scenario Planning tool. We enter “Free-choice Mineral Mix” as the description and “H6” as the cell under Uncertain Value 1
- Then enter \$13.10 as the current value,
- \$12.90 as a possible minimum value, and
- \$19.19 as a possible maximum value.

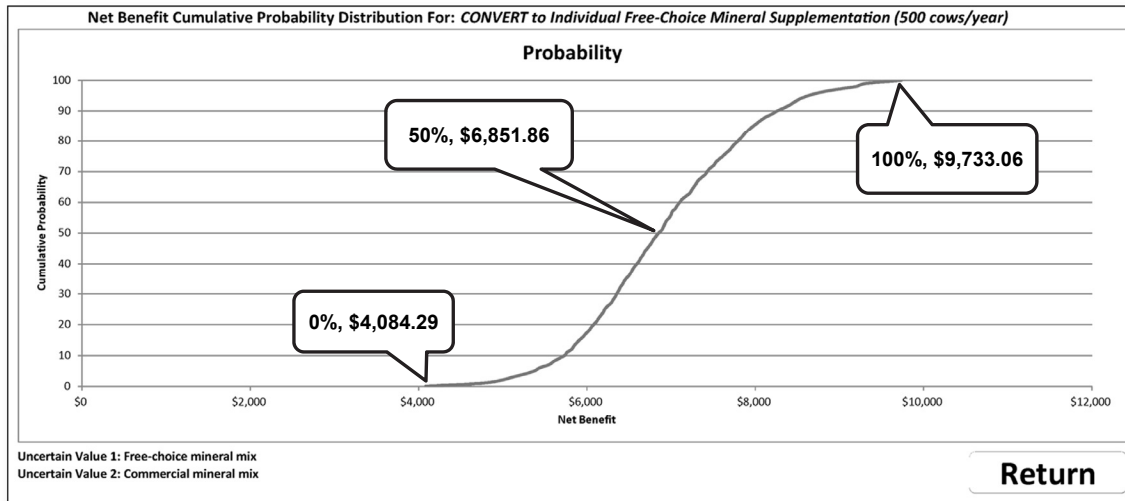
Case 2: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

Risk Scenarios			
Uncertain Value 1		Uncertain Value 2	
Description	Cell	Description	Cell
Free-choice mineral mix	H6	Commercial mineral mix	D28
Current Value (Most Likely)	13.10	Current Value (Most Likely)	31.89
Minimum Value	12.90	Minimum Value	29.46
Maximum Value	19.19	Maximum Value	39.86

The X Bar also wants to make the price of the *commercial mineral mix* uncertain:

- The current value of \$31.89/cow/year is in cell D28 of the Risk Scenario Planning tool. We enter “Commercial Mineral Mix” as the description and “D28” as the cell under Uncertain Value 1
- Then enter \$31.89 as the current value,
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Case 2: Covert to Free-Choice Mineral Supplementation

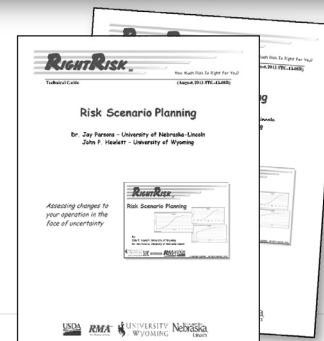
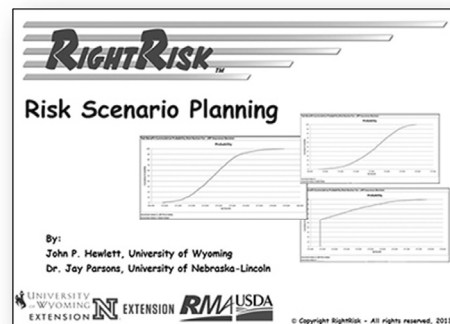


- A cumulative distribution graph gives the probability of earning a net return at or below any certain value.

Summary

The Risk Scenario Planning tool:

- Can be a useful tool for analyzing **management** strategies and decisions involving **risk**
- Represents a better way to handle the presence of **uncertainty** by thinking in terms of **distributions** of possible outcomes over time
- Results in more **informed** decision-making
- GUIDE offers **15-page** description of the tool and working examples
- Website offers examples for **download** and a place to get started



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- **Risk Scenario Planner**
relatively minor changes, risk analysis
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machine costs, custom rates, risk analysis
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Machine Risk Calculator
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Multi-Temporal Risk Analysis
Risk Navigator Toolbox

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INCREASING CHANGE

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