

RISK SCENARIO PLANNING and Analysis of Alternatives for Sustainable Beef Production



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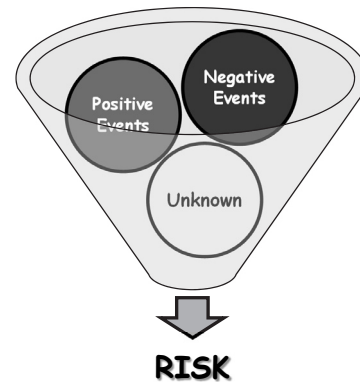
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**NEW
THINKING NEEDED**



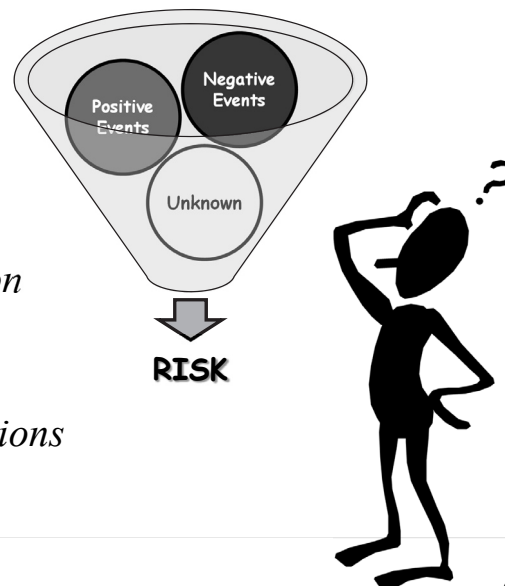
What is RISK?

- **Certainty**- lack of doubt
- **Uncertainty**- doubt about future events
- **RISK**- potential variation in the outcome of future events



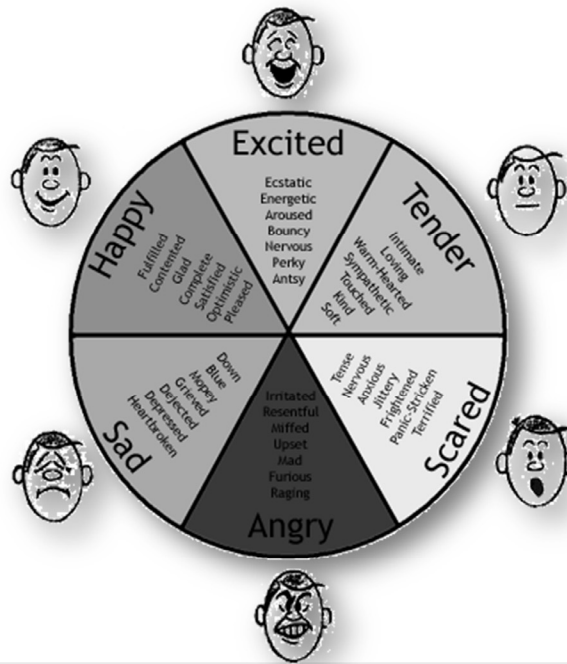
What is RISK?

- **Cost of Loss**
 - *Income*
 - *Resources*
 - *Productive capacity, etc.*
- **Cost of Uncertainty**
 - *Worry, doubt, fear, misallocation of resources, etc.*
 - *With potential for gain or loss comes moral or ethical implications*



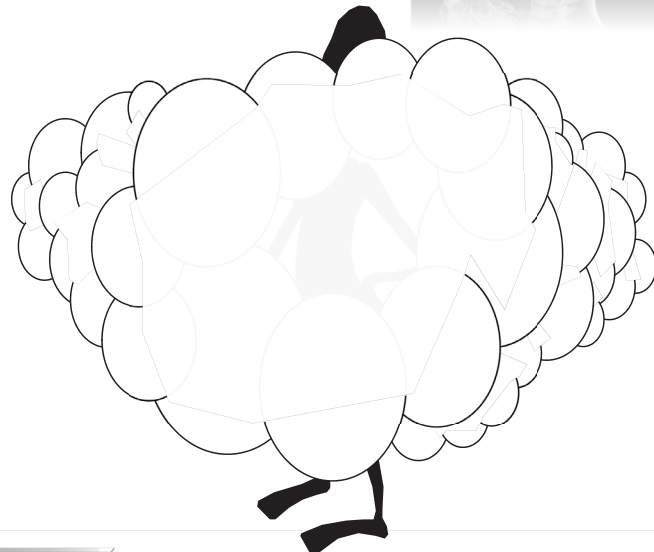
HUMAN Dimension of Risk Management

EMOTION

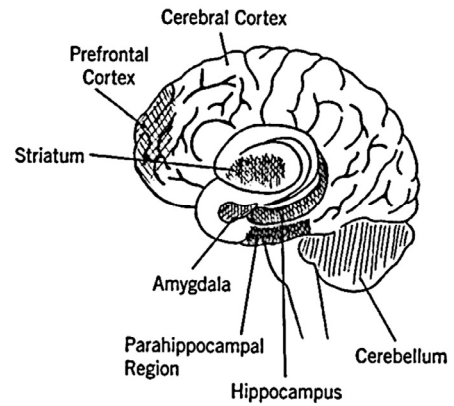


The HUMAN Dimension of Risk

- Emotionally we avoid risk (uncertainty) to avoid the shame of:
 - *Failure,*
 - *Being wrong,*
 - *Being laughed at*
 - *Being made fun of,*
 - *Loosing the farm, etc.*



Risk Tolerance: Emotional Style*



* The Emotional Life of Your Brain, Davidson and Begley, 2012.



Risk Biases

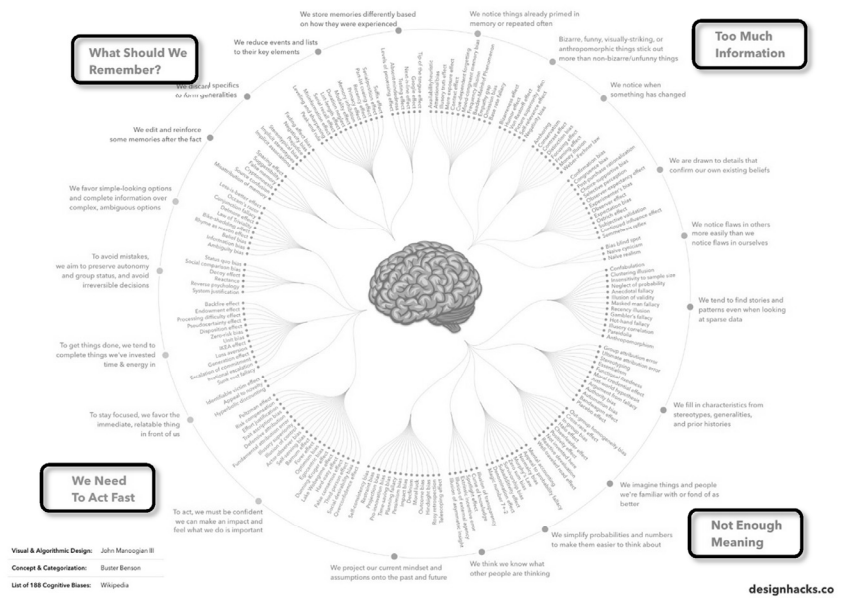
Visual & Algorithmic Design: John Manoogian III

Concept & Categorization: Buster Benson

List of 188 Cognitive Biases: Wikipedia

- Thinking *fast*
 - Thinking *slow*
- Kahneman
Tversky
1979

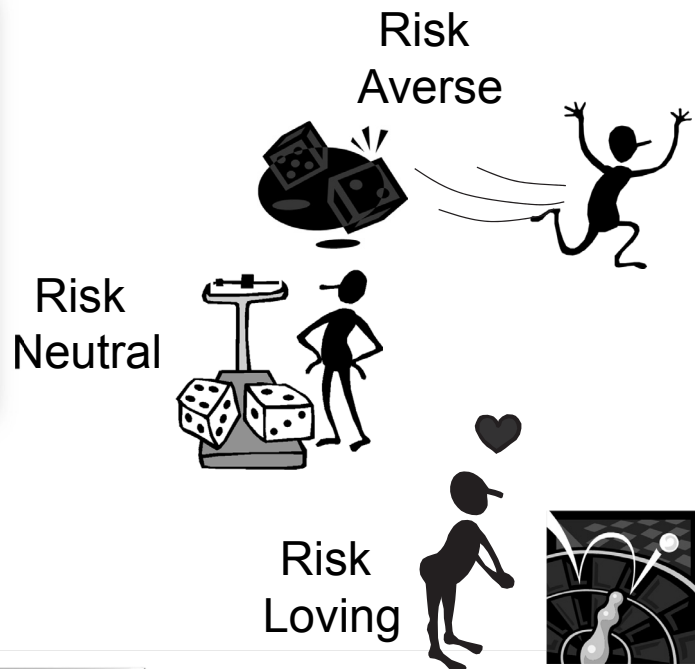
COGNITIVE BIAS CODEX



Visual & Algorithmic Design: John Manoogian III
 Concept & Categorization: Buster Benson
 List of 188 Cognitive Biases: Wikipedia



Types of Risk Preference



Personal Perspectives on Risk

- Generational differences
- Gender differences
- Life stage/family differences
- Life experiences

These are dynamic and change over time



Risk Tradeoffs

***Profits are
returns for
taking risks***



- **Upside:** Greater risk taking usually leads to greater wealth over time
- **Downside:** Losses from risk taking can potentially be devastating
- Managing risks are a matter of **evaluating tradeoffs**
- How much **risk** (uncertainty) are you willing to accept for **possible higher returns?**

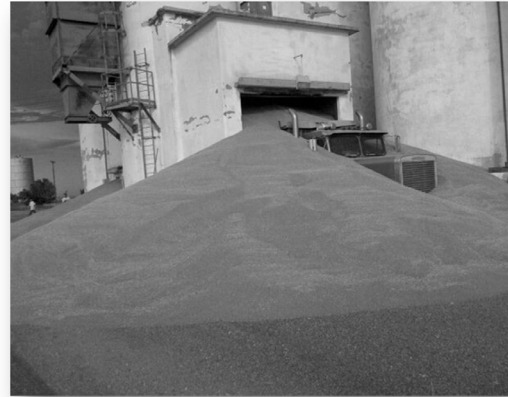
Sources of Risk in Agriculture – *Ag Risk 5*

1. Marketing/Price Risk
2. Production Risk
3. Institutional/Legal Risk
4. Human Risk
5. Financial Risk

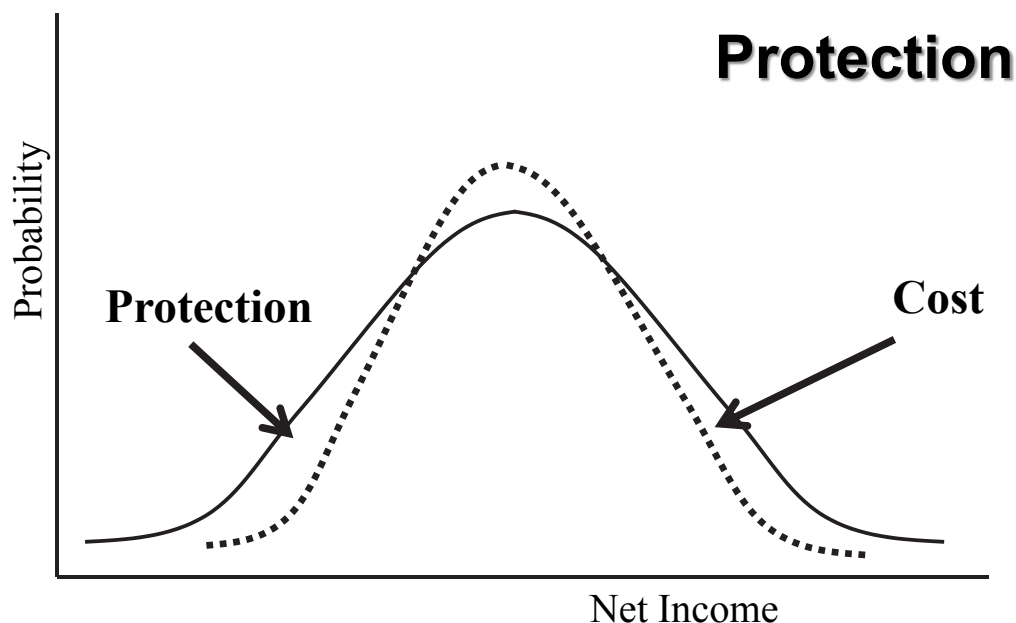


Strategies for Managing Risk

1. **Avoid it**
2. **Reduce it**
 - a) *Reduce the probability it will happen*
 - b) *Reduce the impact if it does happen*
3. **Transfer it outside the business**
 - a) *Insurance*
 - b) *Contracting*
4. **Increase capacity to bare**
 - a) *Increase reserves*
 - b) *Maintain flexibility*
5. **Accept it**



How much risk is right for you?

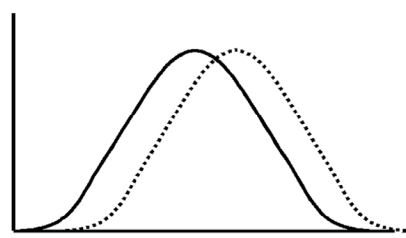


Strategy Impacts

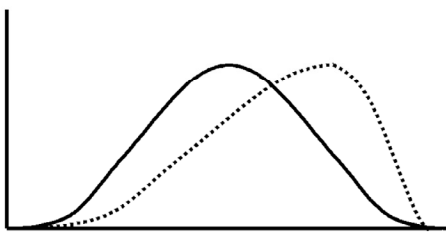
Panel 1: Same Mean, Less Dispersion



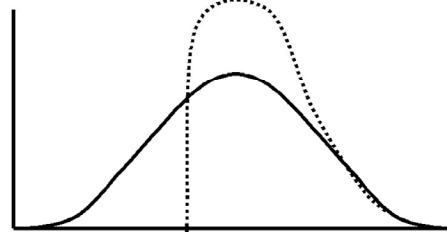
Panel 2: Same Dispersion, Higher Mean



Panel 3: Skewing the distribution



Panel 4: Truncating the Distribution



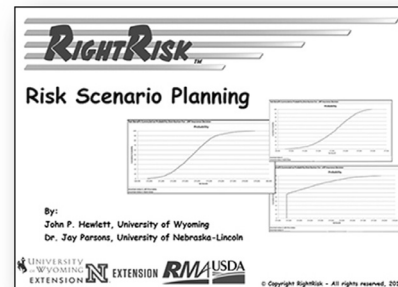
Risk Treatment

- 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)	CONSEQUENCES				
	What is the Severity of injuries / potential damages / financial impacts (if the event actually occurs)? (Logarithmic Scale, property industry specific matrix)				
How likely is the event to occur at some time in the (Linear scale time specific matrix)	Insignificant	Minor	Moderate	Major	Catastrophic
No injuries First Aid required No Envir. Damage -- \$1,000 Damage		Some First Aid required Low Envir. Damage -- \$10,000 Damage	External Medical Medium Envir. Damage -- \$100,000 Damage	Extensive injuries High Envir. Damage -- \$1,000,000 Damage	Death or Major injuries Toxic Envir. 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 only in exceptional circumstances (0.01%)	LOW RISK	LOW RISK	MODERATE RISK	MODERATE RISK	HIGH RISK

Risk Scenario Planner Description

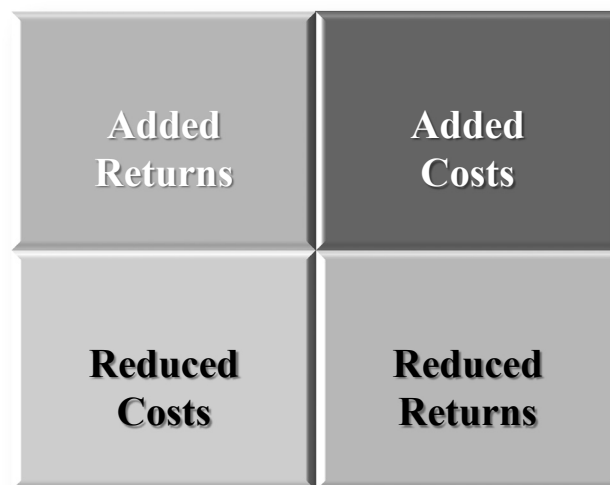
- The Risk Scenario Planner (RSP) Tool is designed to provide financial analysis of management strategies and decisions involving **risk**
- Examples include: changes in production practices, adding and subtracting operating inputs, or other management alternatives that are fairly straight forward to define and evaluate
- The RSP tool uses a **partial budget framework** for collecting data to reflect one or more decisions for analysis



Partial Budget Framework

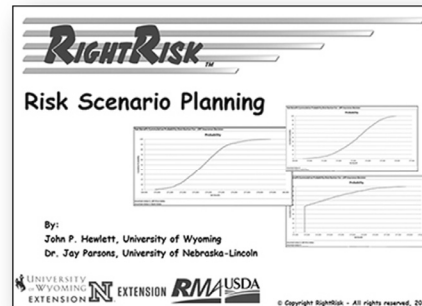
A partial budget is a tool used to analyze the **financial effect** of simple management changes

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



RSP Tool

- The RSP tool goes beyond a partial budget by taking **risk** (change over time) into consideration
- The RSP tool allows one or possibly two of the input values to be **uncertain numbers** for any alternative analyzed
- This should lead to a more complete understanding of **possible outcomes** if the change is implemented



RSP Input Page

RIGHTRisk		<i>Partial Budget For:</i>				<i>Enter description of action/concern here</i>				
<i>Positive Effects</i>					<i>Negative Effects</i>					
Added Returns	Quantity	Value	-	\$	Total	Added Costs	Quantity	Value	-	\$
Added return #1	0	\$	-	\$	-	Description of added cost #1	0	\$	-	\$
Added return #2	0	\$	-	\$	-	Description of added cost #2	0	\$	-	\$
Added return #3	0	\$	-	\$	-	Description of added cost #3	0	\$	-	\$
					\$					\$
					\$					\$

Reduced Costs	Quantity	Value	-	\$	Reduced Returns	Quantity	Value	-	\$
Description of reduced cost #1	0	\$	-	\$	Description of reduced return #1	0	\$	-	\$
Reduced cost #2	0	\$	-	\$	Description of reduced return #2	0	\$	-	\$
Reduced cost #3	0	\$	-	\$	Description of reduced return #3	0	\$	-	\$
				\$					\$
				\$					\$

RSP Input Page

Decision Description

RIGHT RISK Partial Budget For: Enter description of action/concern here

Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	Total
Description of added return #1	0	\$ -	\$ -	Description of added cost #1	0	\$ -	\$ -
Description of added return #2	0	\$ -	\$ -	Description of added cost #2	0	\$ -	\$ -
Description of added return #3	0	\$ -	\$ -	Description of added cost #3	0	\$ -	\$ -
Description of Change			\$ -				\$ -

Reduced Costs	Quantity	Value	Total	Reduced Returns	Quantity	Value	Total
Description of reduced cost #1	0	\$ -	\$ -	Description of reduced return #1	0	\$ -	\$ -
Description of reduced cost #2	0	\$ -	\$ -	Description of reduced return #2	0	\$ -	\$ -
Description of reduced cost #3	0	\$ -	\$ -	Description of reduced return #3	0	\$ -	\$ -
Description of Change			\$ -				\$ -

Expected Total Net Benefit

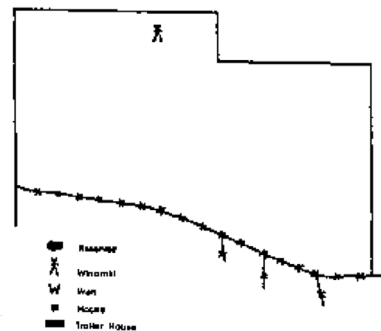
TOTAL Positive Effects (Added Returns + Reduced Costs)	\$ -	-	TOTAL Negative Effects (Added Costs + Reduced Returns)	\$ -
Net Benefit of:				
				\$ -

TOTAL Positive Effects

TOTAL Negative Effects

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

- Based on past prices, they find that the *commercial mineral mix* prices have varied between \$29.46 and \$39.86/cow/year.
- Lastly, after some market research, they feel that *calf prices* are likely to range between \$120 and \$165/cwt. over the next few years.

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)	Total Negative Effects (Added Costs + Reduced Returns)
\$ 114.71	\$ 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 <input checked="" type="checkbox"/> Include	
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.

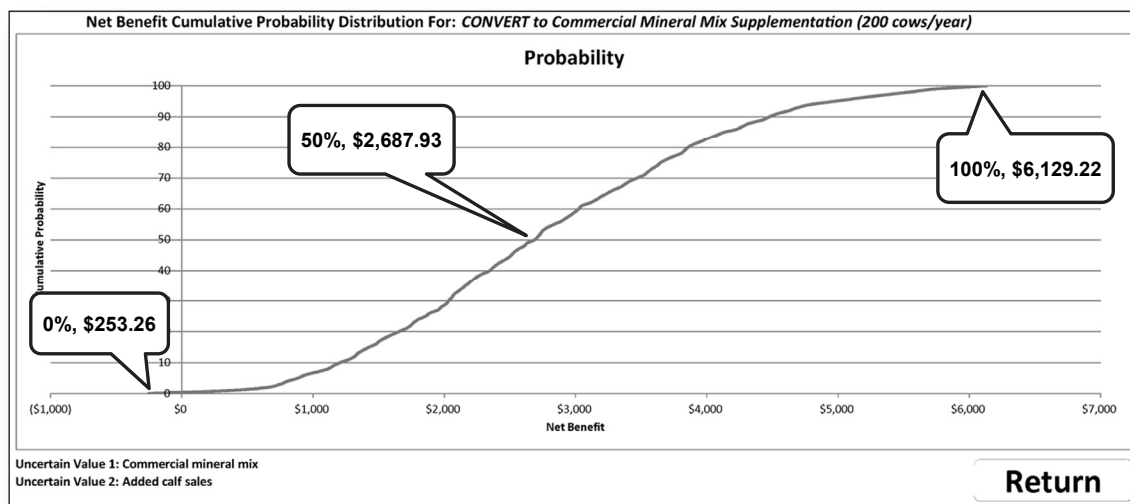
Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

Uncertain Value 1		<input checked="" type="checkbox"/> Include	Uncertain Value 2		<input checked="" type="checkbox"/> Include
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

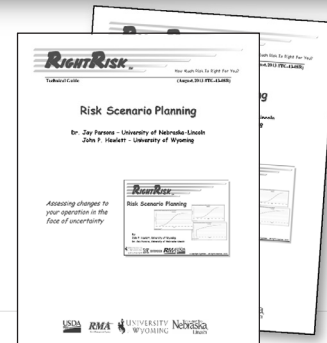
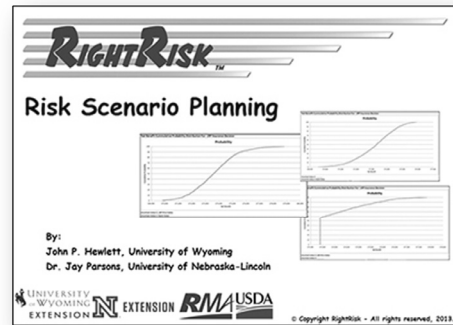


- A cumulative distribution graph gives the probability of earning a net return at or below any certain value.

Summary

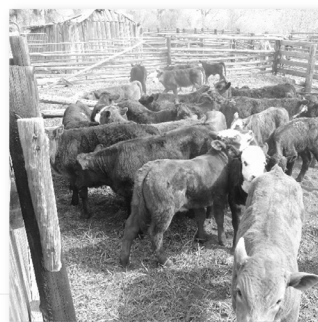
The Risk Scenario Planning tool:

- 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



Case 2: Convert to Free-Choice Mineral Supplementation

- The X Bar Ranch, a 500 cow/calf operation 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 1: 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.

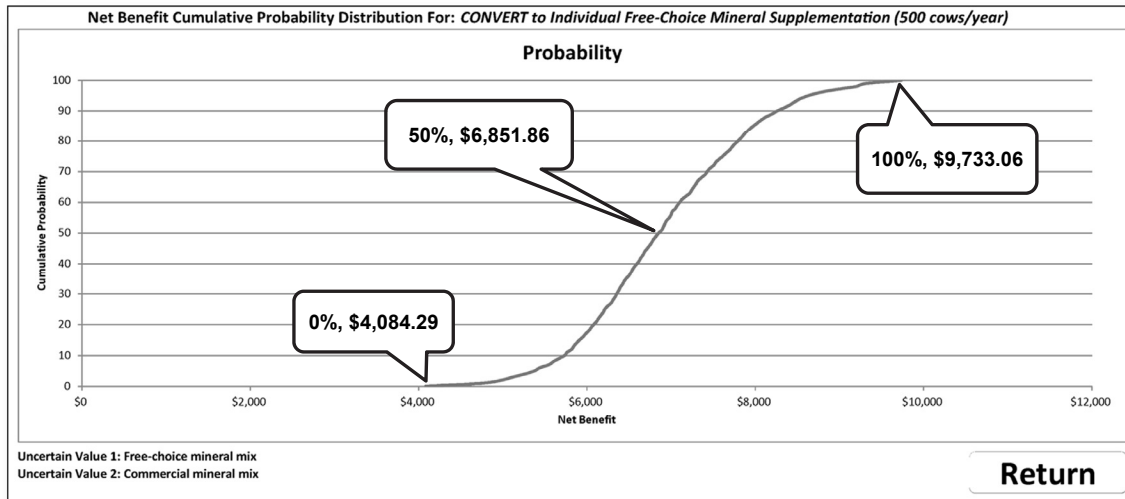
Case 1: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

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,
- \$29.46 as a possible minimum value, and
- \$39.86 as a possible maximum value.

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.



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

RightRisk ANALYTICS

- Risk Scenario Planner
- Machine Risk Calculator
- Forage Risk Analyzer
- Enterprise Risk Analyzer
- RDFinancial
- Multi-Temporal Risk Analysis
- Risk Navigator Toolbox

RightRisk Analytics is a toolbox of alternative risk analysis tools. Click one of the buttons on the left to learn more about what each tool can do and to access the tool.

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INCREASING CHANGE

<http://RightRisk.org > tools>



VOLUME 1, ISSUE 11
NOVEMBER 2013

RightRisk
RIGHTRISK NEWS

DATES TO REMEMBER

- November 15, 2013: Pasture, Rangeland, Forage Insurance (PRF)
- November 15, 2013: Apiculture
- November 15, 2013: Noninsured Crop Disaster Assistance Program (NAP) acreage reporting deadline for forage crops including grazing
- December 1, 2013: NAP application deadline for fall seeded crops and forage

How Much Risk is Right for You?

Risk Management Strategies for Livestock Producers

Livestock and bee producers have several risk management options to manage forage production risk. Given recent periods of extreme drought and price volatility, managers might consider addressing forage risks using one or more insurance tools. Programs are available and can help protect against serious production losses, while helping to guarantee revenue levels.

Pasture, rangeland, forage (PRF) and Apiculture insurance protect against a decline in an index. The index is designed to serve as a proxy for pasture, range, and hay production in a specific area of land or grid.

The Noninsured Crop Disaster Program (NAP), administered by the Farm Service Agency (FSA) is designed to provide low cost catastrophic loss coverage to producers when federal crop insurance is not available.


NAP coverage may be used separately but not in conjunction with PRF and Apiculture insurance to provide protection against low yields, loss of inventory or prevented planting that occur due to natural disasters for a typical ranch such as: grains planted for hay (and not insured as grain), native (grass) hay and certain mixed forages, and grazing.

Coverage begins 30 days following sign-up. NAP covers losses of 50 percent or greater of expected production, at 55 percent of the market price (set by the state committee).

The 2008 Farm Bill required that livestock and apiculture producers enroll under either NAP coverage or crop insurance for all pasture, rangeland and native hay forage crops by quality for certain disaster assistance programs including the Livestock Forage Disaster Program (LFP) and Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish Program (ELAP). These requirements are expected under the new Farm Bill or extension of the 2008 bill but are uncertain until new legislation is passed by Congress.


Recent bulletins that outline how these programs work for operators include: "Production Risk Management Options for Wyoming Ranches: Crop Insurance, Federal Disaster Programs" and "Risk Management Programs for Honey Bee Producers in Wyoming" and programs in the Western Risk Management library located at <http://riskmgmt.uwyo.edu>.

More information is available for the programs mentioned in this article on the Internet at: www.rightrisk.org; www.fsa.usda.gov; or www.fsa.usda.gov.



RISK MANAGEMENT PROFILE

VI-PRF pilot insurance minimizes feed risk for Z-F Ranch. Early fall 2010 on the Z-F Ranch found owners Bob and Betsy Zomer assessing risk management strategies for their cow-calf and yearling operation. The Zomers are situated on 12,000 acres of pasture and 200 acres of native hay in Fremont County, Wyoming. Both husband and wife were concerned about the coming production year. This year's late summer and early fall had been dry, and they were worried it would carry over into next year.




To read more see:
RightRisk.org > Resources > Risk Mgt Profiles

HIGHLIGHTED COURSE

The Pasture, Rangeland, Forage (PRF) Pilot Insurance Program course available at RightRisk.org offers a step-by-step approach to learn more about PRF insurance and how PRF can demonstrate application to real-world examples.

Course materials provide maps to assist in first deciding the type of PRF insurance available in the area. Links to appropriate Web pages help determine the grid identification numbers for individual grids. The next two sections in the course go into greater depth on Vegetative and Rainfall Index policies.

A section of the PRF course explains how to go online to the RMA website and make the most of the cost estimator. Finally, users are encouraged to compare their own yield/historical experience for their grids with that presented in the online decision tool/cost estimator Web pages.



RightRisk helps decision-makers discover innovative and effective risk management solutions.


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