

Evaluating Mineral Supplementation for Hawaii Beef Production

Risk Scenario Planning Analytics | RightRisk



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Challenges of predicting the future

- ✓ People are not "Risk Savvy"
- ✓ Risk management alternatives need not be complex
- ✓ Risk management is difficult



Known future and unknown future

Humans desire certainty

Certainty is rarely attainable

Uncertainty should be expected



Known future and unknown future

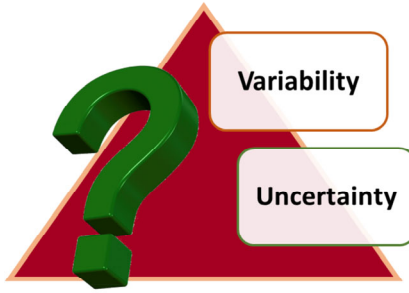
Future is influenced by:

- ❖ Risk
- ❖ Attitudes and
- ❖ Other factors



RISK

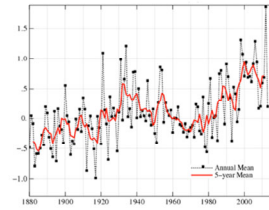
Future events are unknown



Future events are unknown

VARIABILITY:

- ✓ Different possible outcomes
 - ❖ Due to chance
 - ❖ Cannot be reduced
- ✓ Variability equals risk
- ✓ Not all risk is a substantial risk



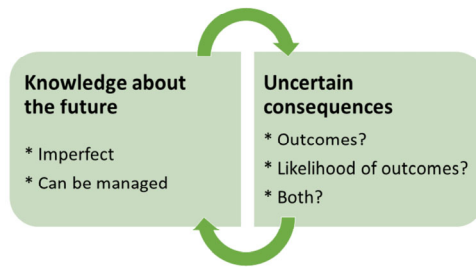
Future events are unknown

UNCERTAINTY:

- ✔ A lack of knowledge of the future
 - ❖ Meaning of future events
 - ❖ Implications of future outcomes
- ✔ May represent subjective nature of the individual
- ✔ Uncertainty = indeterminability or ambiguity



Imperfect knowledge versus uncertain consequences



Known risk versus unknown risk

- **KNOWN RISK**
 - ❖ Outcomes are known
 - ❖ Likelihood of occurrence is known
- **UNKNOWN RISK**
 - ❖ Uncertainty
 - ❖ Indeterminability



Risk in agriculture

- ✔ Influences of risk may be
 - ❖ Distinctly separate
 - ❖ Additive
- ✔ Risk versus opportunity
 - ❖ Not all risk is bad
 - ❖ Agricultural producers speculate on risk
 - ❖ Risk offers potential rewards (profit)



Risk management strategies

RISK MANAGEMENT

- ✔ Reduce bad outcomes
- ✔ Increase likelihood of good outcomes



Risk management strategies

STRATEGIES

- Reduce risk
- Transfer risk
- Increase ability to bear risk

Transfer It Reduce It Avoid It Accept It
RISK MANAGEMENT
Build Capacity to Bear It

Evaluating Alternatives



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*

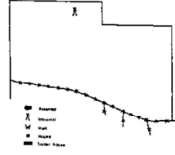
- **Negative Effects**

- *Added Costs*
- *Reduced Returns*

Added Returns	Added Costs
Reduced Costs	Reduced Returns

Case 1: Convert to Commercial Mineral Mix

- JR Land and Livestock, a 200 cow/calf operation near Waimea, 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.

RSP Input Page

The screenshot displays the 'RiskRise' software interface, specifically the 'Pastor Budget For' window. The spreadsheet is divided into several sections: 'Added Items', 'Deleted Items', and 'Total'. Each section has columns for 'Quantity', 'Value', and 'Total'. The 'Added Items' section lists various budget categories with their respective values. The 'Deleted Items' section lists items to be removed from the budget. The 'Total' section shows the net result of the changes. At the bottom of the spreadsheet, there are summary rows for 'Total Positive Effects' and 'Total Negative Effects', both showing a value of \$0. The 'UNIVERSITY OF WYOMING' logo is visible in the bottom left corner, and the 'RISKRISE' logo is in the bottom right corner.

SHOULD JR L&L make the change?

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

Partial Budget For:			CONVERT to Commercial Mineral Mix Supplementation (200 cows/year)				
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	
Cal gains 40 cows @ \$10/cow/year	200	\$ 100	\$ 1,400.00	Commercial mix \$2.10/cow/year	200	\$ 420.00	
				Commercial mix - \$4.20/cow/year	200	\$ 840.00	
				Other replacement feed supplement \$0.50	200	\$ 100.00	
				Other feed costs \$0.50/cow/year	200	\$ 100.00	
				Supplementary vitamins \$0.34/cow/year	200	\$ 68.00	
				Added manure \$2.25/cow/year	200	\$ 450.00	
				Integrations and marketing fee		\$ -	
				40 added calves @ 2.68/cow/year	200	\$ 536.00	
Reduced Costs	Quantity	Value	Total	Reduced Returns	Quantity	Value	
Cal and heifer feed \$40/cow/year	200	\$ 80	\$ 620.00	Cal feed costs - \$10/cow/year	200	\$ 2,000.00	
Supplements and marketing fee		\$ -				\$ -	
Other feed savings \$1.25/cow/year	200	\$ 250	\$ 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

RightRisk			CONVERT to Commercial Mineral Mix Supplementation (per cow/year)		
Partial Budget For:			Per cow/year		
Added Returns			Added Costs		
Quantity	Value	Total	Quantity	Value	Total
4000 head of 2.00 cows/year	\$ 8,000	\$ 8,000	4000 head of 2.00 cows/year	\$ 11,200	\$ 11,200
1	\$ -	\$ -	Mineral labor, 0.50 cows/year	\$ 4,200	\$ 4,200
1	\$ -	\$ -	Stock replacement, 0.50 cows/year	\$ 1,200	\$ 1,200
1	\$ -	\$ -	Owner feed costs, 0.50 cows/year	\$ 6,200	\$ 6,200
1	\$ -	\$ -	Supplemental mineral, 0.50 cows/year	\$ 1,200	\$ 1,200
1	\$ -	\$ -	Added equipment, 0.50 cows/year	\$ 1,200	\$ 1,200
1	\$ -	\$ -	Supplemental mineral, 0.50 cows/year	\$ 1,200	\$ 1,200
1	\$ -	\$ -	4000 head of 2.00 cows/year	\$ 2,000	\$ 2,000
1	\$ -	\$ -	4000 head of 2.00 cows/year	\$ 2,000	\$ 2,000
Reduced Costs			Reduced Returns		
Quantity	Value	Total	Quantity	Value	Total
4000 head of 2.00 cows/year	\$ -	\$ 3,000	0.50 cows/year	\$ 10,000	\$ 10,000
4000 head of 2.00 cows/year	\$ -	\$ 3,700	0.50 cows/year	\$ -	\$ -
1	\$ 3,700	\$ 3,700	0.50 cows/year	\$ -	\$ -
Total Positive Effects (Added Returns + Reduced Costs)			Total Negative Effects (Added Costs + Reduced Returns)		
\$ 114,711			\$ 102,040		
Net Benefit of: CONVERT to Commercial Mineral Mix Supplementation (per cow/year)			\$ 12,671		

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

Risk Scenarios		Uncertain Value 1	<input 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.

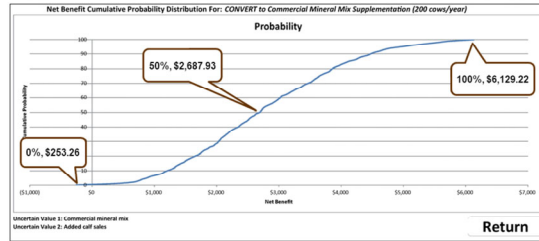
Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

Uncertain Value 1		Uncertain Value 2	
Description	Cell	Description	Cell
Commercial mineral mix	D28	Commercial mineral mix	D28
Current Value (Most Likely)	135	Current Value (Most Likely)	135
Minimum Value	120	Minimum Value	120
Maximum Value	150	Maximum Value	150

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.

Questions?



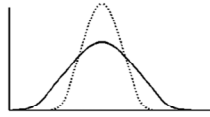
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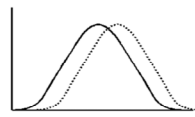


Strategy Impacts

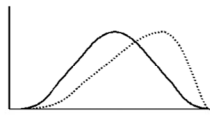
Panel 1: Same Mean, Less Dispersion



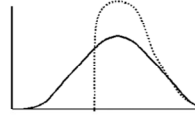
Panel 2: Same Dispersion, Higher Mean



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)

RISK		CONSEQUENCES			
What is the severity of injuries/property damage? (Residual severity of the risk, not actual severity) (Agreement: State property severity specific values)		Significant	Minor	Minimal	Acceptable
Risk Category		High Risk Range (1-1000000)	Medium Risk Range (100000-1000000)	Low Risk Range (10000-1000000)	Very Low Risk Range (1000-1000000)
High	High	High	High	High	High
High	Medium	High	High	High	High
High	Low	High	High	High	High
High	Very Low	High	High	High	High
Medium	High	High	High	High	High
Medium	Medium	High	High	High	High
Medium	Low	High	High	High	High
Medium	Very Low	High	High	High	High
Low	High	High	High	High	High
Low	Medium	High	High	High	High
Low	Low	High	High	High	High
Low	Very Low	High	High	High	High
Very Low	High	High	High	High	High
Very Low	Medium	High	High	High	High
Very Low	Low	High	High	High	High
Very Low	Very Low	High	High	High	High

Case 2: Convert to Free-Choice Mineral Supplementation

- The X Bar Ranch, a 500 cow/calf operation near Waimea, 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

- Based on past prices, they find that the *free-choice mineral mix* could be expected range between \$12.90 and \$19.19/cow/year.
- After further reflection, they realize that *commercial mineral mix* prices have varied between \$29.46 and \$39.86/cow/year.

RSP Input Page

RiskSP Enter description of contribution item
Period Budget For:

Added Returns			Added Costs		
Quantity	Value	Total	Quantity	Value	Total
1	100	100	1	100	100
2	200	200	2	200	200
3	300	300	3	300	300
4	400	400	4	400	400
5	500	500	5	500	500
6	600	600	6	600	600
7	700	700	7	700	700
8	800	800	8	800	800
9	900	900	9	900	900
10	1000	1000	10	1000	1000
Total Added Costs			Total Added Costs		
1000			1000		
Total Positive Effects			Total Negative Effects		
Added Returns - (Reduced Costs)			Added Costs - (Reduced Returns)		
\$ 1000			\$ -		
Risk Benefit Ratio			Risk Benefit Ratio		
1.0			1.0		

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

RightRisk Partial Budget For:				CONVERT to Individual Free-Choice Mineral Supplementation (500 cows/year)				
Added Returns		Quantity	Value	Total	Added Costs		Quantity	Value
		1	\$ -	\$ -	Free choice mineral feed	1000	\$ 3,310	\$ 3,310.00
		2	\$ -	\$ -	Mineral labor costs	100	\$ 3,120.00	\$ 3,120.00
		3	\$ -	\$ -	Other mineral feed vehicle mineral cost	1	\$ 1,000.00	\$ 1,000.00
		4	\$ -	\$ -	Mineral feed cartage	5	\$ 100.00	\$ 500.00
		5	\$ -	\$ -	Transportation charges	100	\$ 10.00	\$ 1,110.00
		6	\$ -	\$ -	Added management	10	\$ 10.00	\$ 500.00
Reduced Costs		Quantity	Value	Total	Reduced Returns		Quantity	Value
Increased mineral	1000	\$ -	\$ 15,945.00				\$ -	
Mineral labor	100	\$ 3,120.00	\$ 2,880.00				\$ -	
Other mineral feed (management, etc.)	1	\$ 1,000.00	\$ 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

Partial Budget For:				CONVERT to Individual Free-Choice Mineral Supplementation (per cow/year)			
Reduced Costs				Added Costs			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	Total
				Free-choice mineral (1.0) 10.00/cow/year	1	\$ 11.00	\$ 11.00
				Mineral labor costs (0.20) 20.00/cow/year	1	\$ 2.25	\$ 4.24
				Other expenses (0.01) 1.00/cow/year	1	\$ 1.00	\$ 2.00
				Mineral April costs (0.20) 20.00/cow/year	1	\$ 1.00	\$ 1.00
				Transportation (0.01) 1.00/cow/year	1	\$ 0.10	\$ 0.10
				Added management (0.20) 20.00/cow/year	1	\$ 1.00	\$ 1.00
Reduced Costs	Quantity	Value	Total	Added Returns	Quantity	Value	Total
Mineral cost (1.0) 10.00/cow/year	1	\$ 11.00	\$ 11.00			\$ -	\$ -
Mineral labor (0.20) 20.00/cow/year	1	\$ 2.25	\$ 4.15			\$ -	\$ -
Other expenses (0.01) 1.00/cow/year	1	\$ 1.00	\$ 1.00			\$ -	\$ -
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.

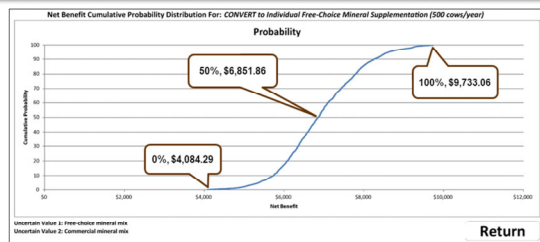
Case 2: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

Uncertain Value 1		Uncertain Value 2	
Description	Cell	Description	Cell
Commercial mineral mix	D28	Commercial mineral mix	D28
Current Value (Most Likely)	\$31.89	Current Value (Most Likely)	\$31.89
Minimum Value	\$29.46	Minimum Value	\$29.46
Maximum Value	\$39.86	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.

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



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

INCREASING CHANGE

<http://RightRisk.org> > tools



Risk Management Profiles



RISK MANAGEMENT PROFILES



Benchmarking in Agriculture

Producers have been comparing their own performance to others in the industry for years. The RightRisk benchmarking program provides a comprehensive set of metrics to help producers understand their own performance and compare it to others in the industry. The program is designed to be a useful tool for producers to improve their own performance and to identify areas for improvement.



The final steps are to share and evaluate strategies across the world community.

Liability Benchmark

The Current Ratio: Measures cash flow and ability to pay bills on time
 Current Ratio = Current Farm Assets divided by Current Farm Liabilities

Solvency Benchmark

Debt to Asset Ratio: Measures long-term ability to make all financial obligations
 Debt to Asset Ratio = Total Farm Liabilities divided by Total Farm Assets

Profitability Benchmark

Return on Assets: Measures the ability to generate profit from assets
 Return on Assets = Net Income divided by Total Farm Assets

<http://RightRisk.org> > RM Profiles


RightRisk Newsletter



RightRisk NEWS
Risk Management Techniques for Livestock Producers

Issue 1, March 11, 2010

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

- **Education**
- **Consulting**
- **Research**

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Risk Management Profile

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Questions??



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