

Evaluating Mineral Supplementation for Hawaii Beef Production

Risk Scenario Planning Analytics | RightRisk



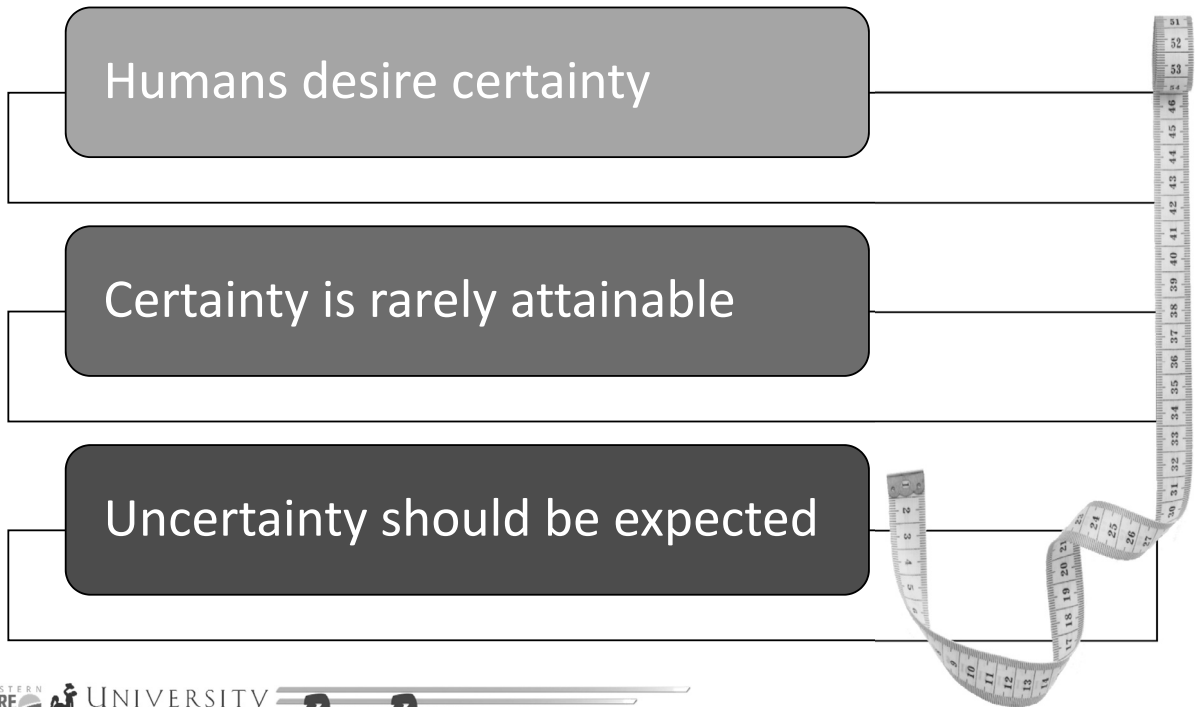
John P. Hewlett – University of Wyoming
Department of Agricultural & Applied Economics

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



Known future and unknown future

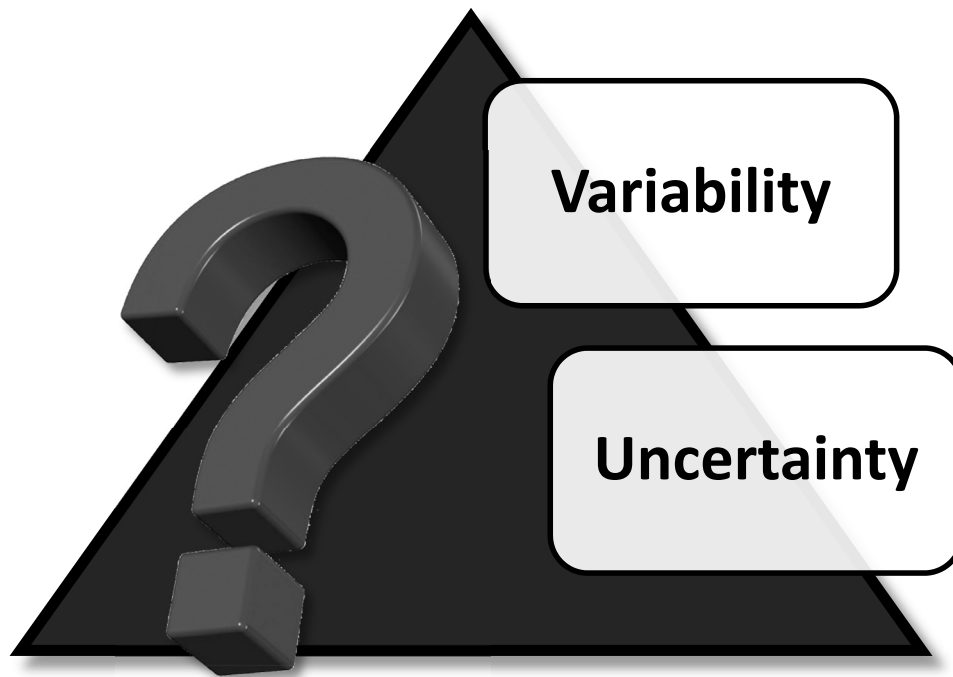
Future is influenced by:

- ❖ Risk
- ❖ Attitudes and
- ❖ Other factors



RISK

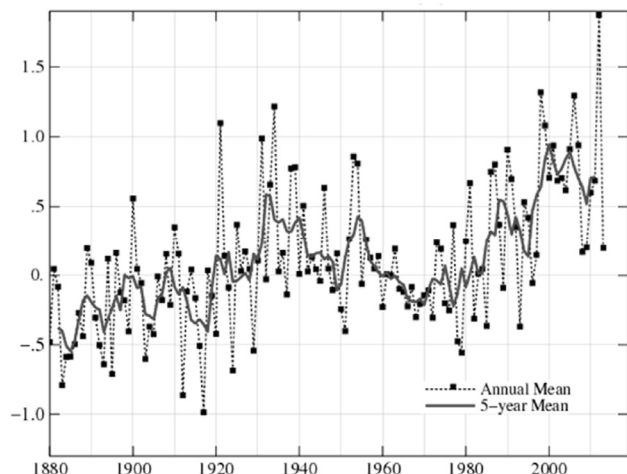
Future events are unknown



Future events are unknown

VARIABILITY:

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



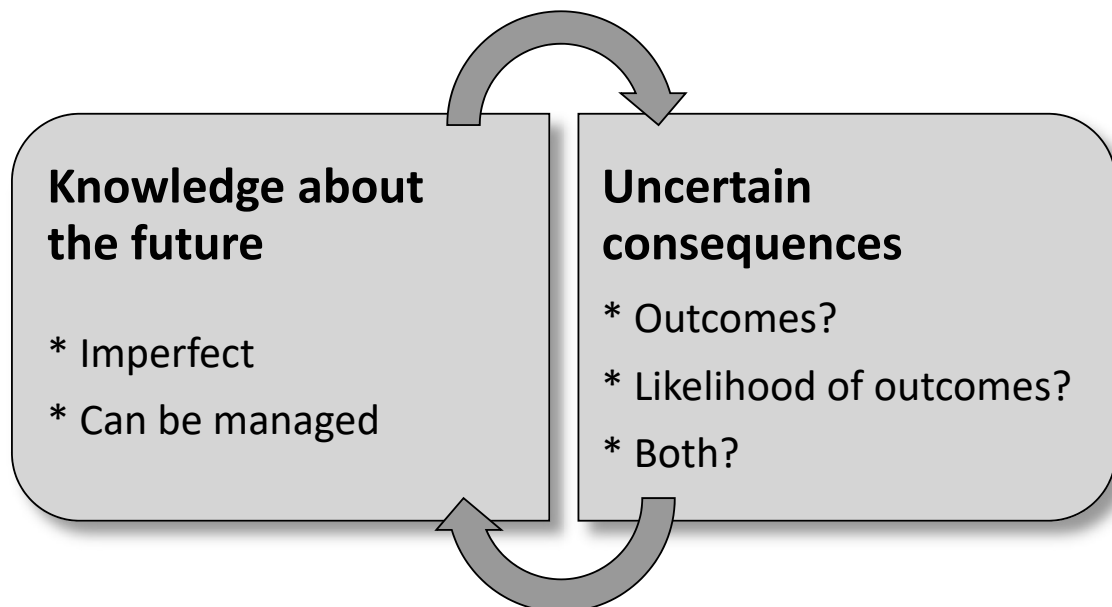
Future events are unknown

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

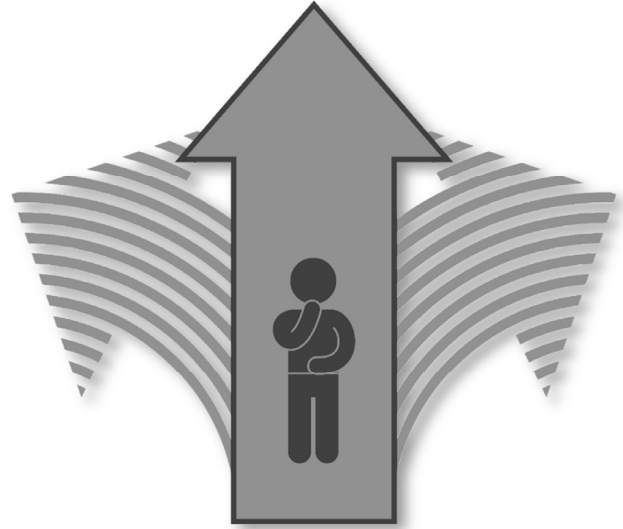
- ✓ Influences of risk may be
 - ❖ Distinctly separate
 - ❖ Additive
- ✓ Risk versus opportunity
 - ❖ Not all risk is bad
 - ❖ Agricultural producers speculate on risk
 - ❖ Risk offers potential rewards (profit)



Risk management strategies

RISK MANAGEMENT

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



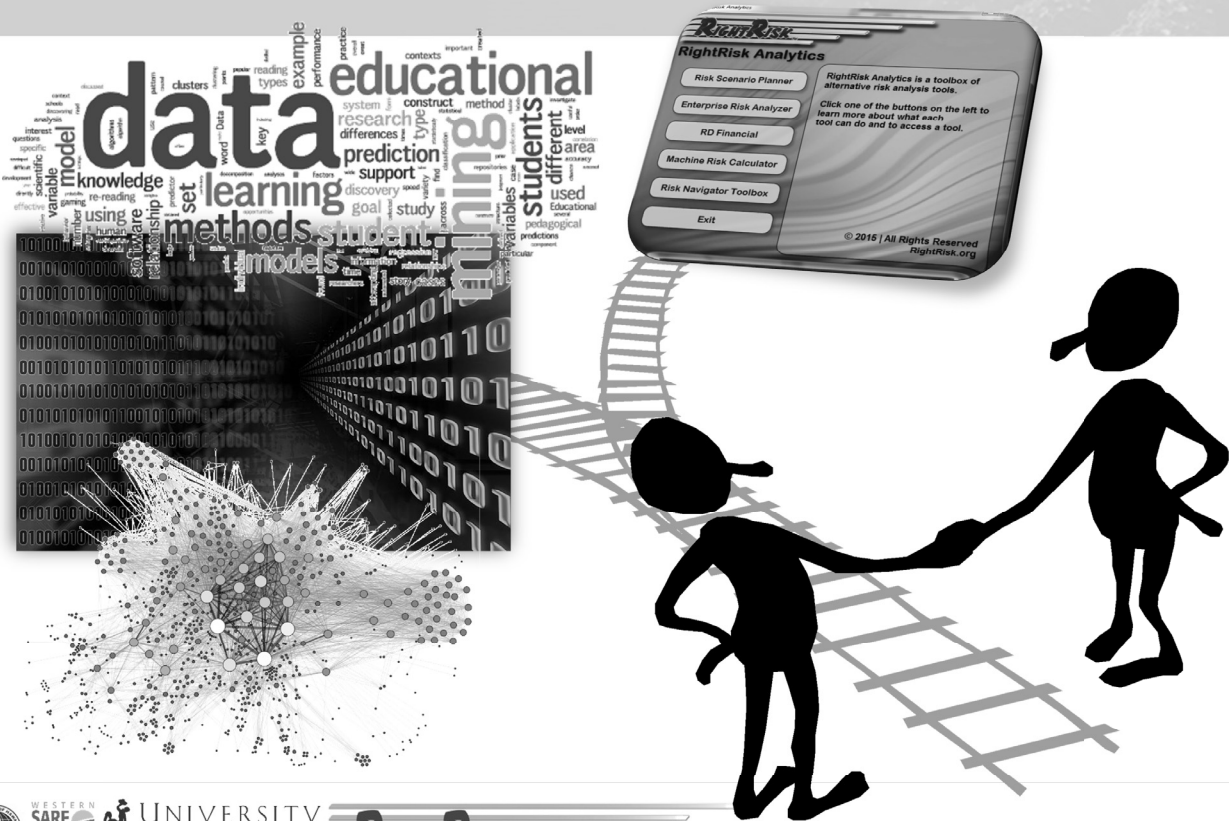
Risk management strategies

STRATEGIES

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

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

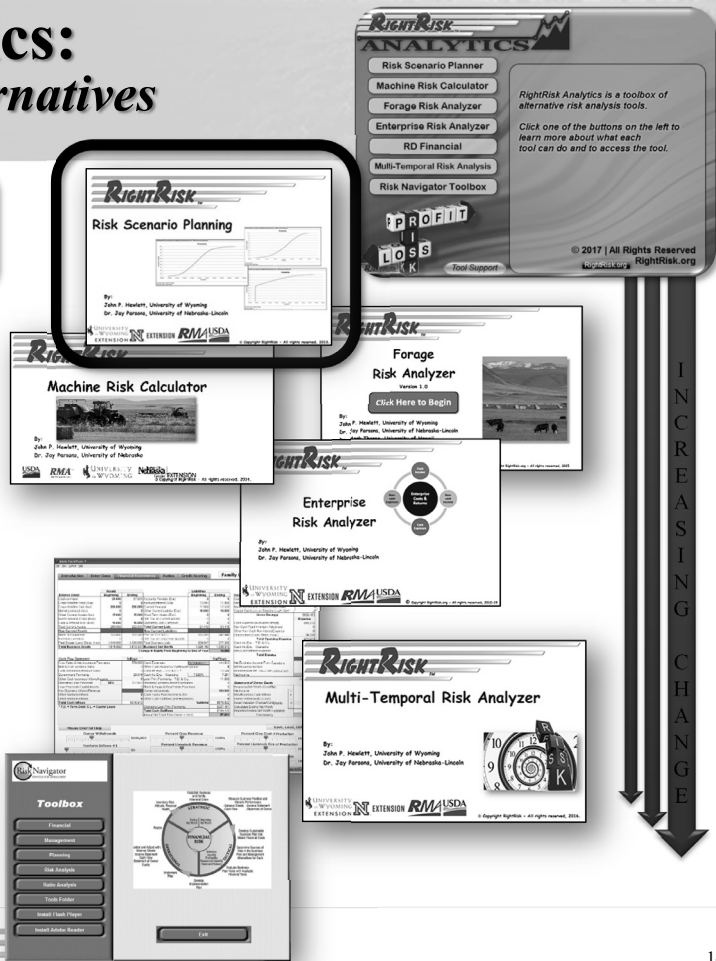
Evaluating Alternatives



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

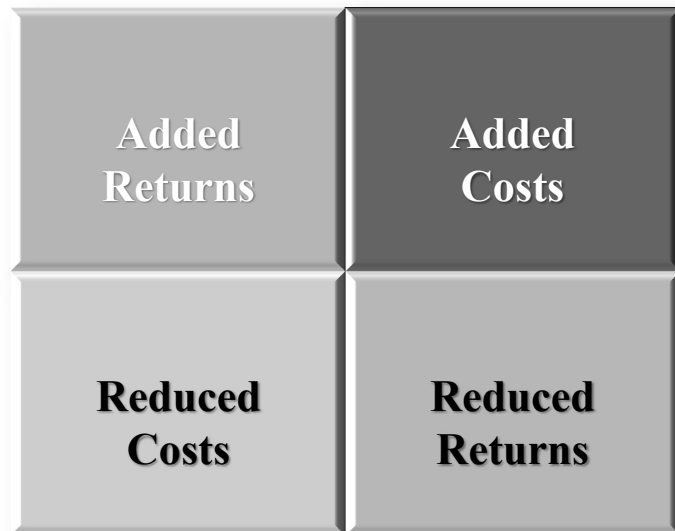
A partial budget is a tool used to analyze the **financial effect** of simple management changes

- **Positive Effects**

- *Added Returns*
- *Reduced Costs*

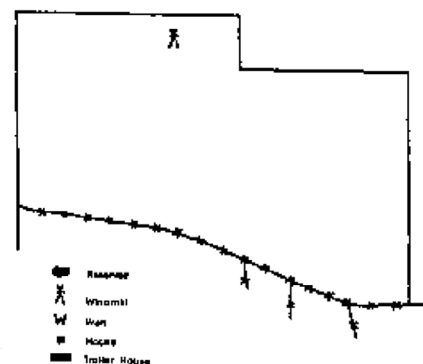
- **Negative Effects**

- *Added Costs*
- *Reduced Returns*



Case 1: Convert to Commercial Mineral Mix

- JR Land and Livestock, a 200 cow/calf operation near Koloa, 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)		\$	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		<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.

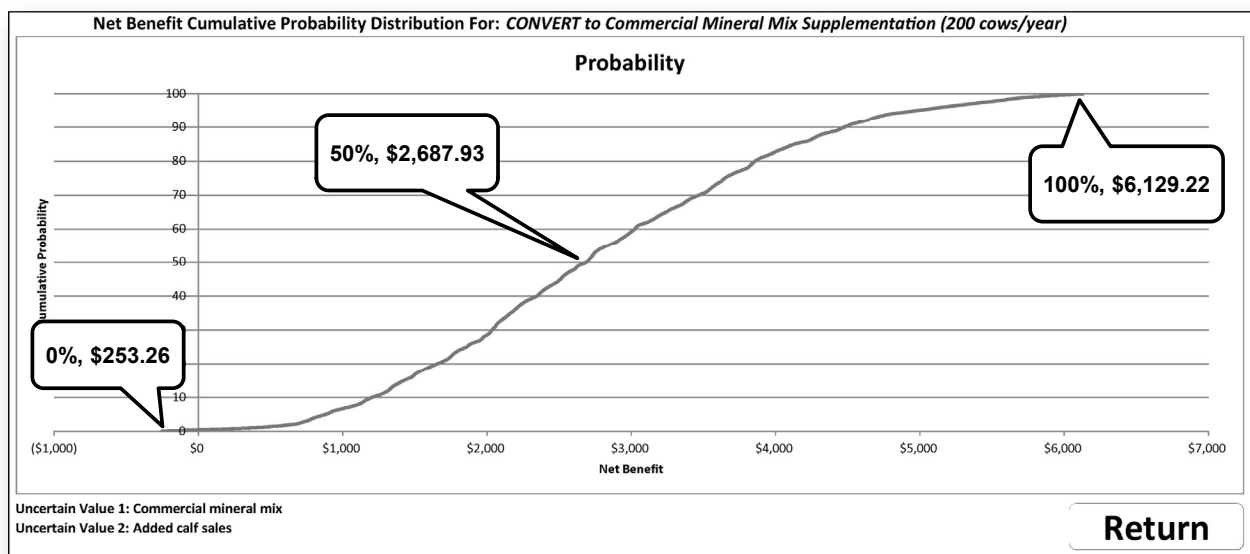
Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

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.

Questions?

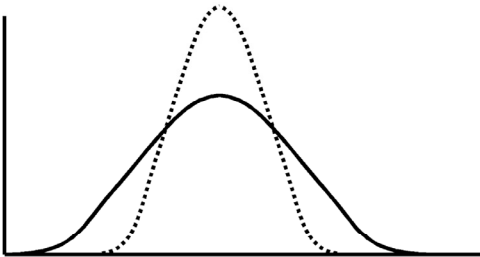


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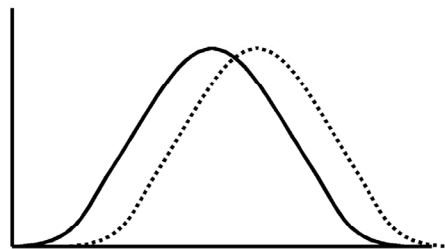
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Strategy Impacts

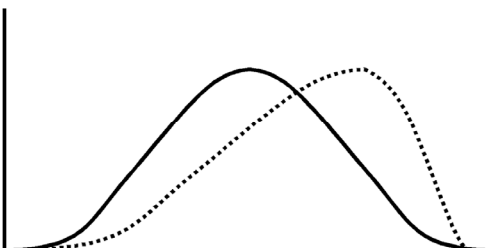
Panel 1: Same Mean, Less Dispersion



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)

LIKELIHOOD (Probability) How likely is the event to occur at some time in the (Linear 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 No Emitt Damage << \$1,000 Damage	Some First Aid required Low Emitt Damage << \$10,000 Damage	External Medical Medium Emitt Damage << \$100,000 Damage	Extensive Injuries High Emitt Damage << \$1,000,000 Damage	Death or Major Injuries Toxic Emitt 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 (70%)	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 - only 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.

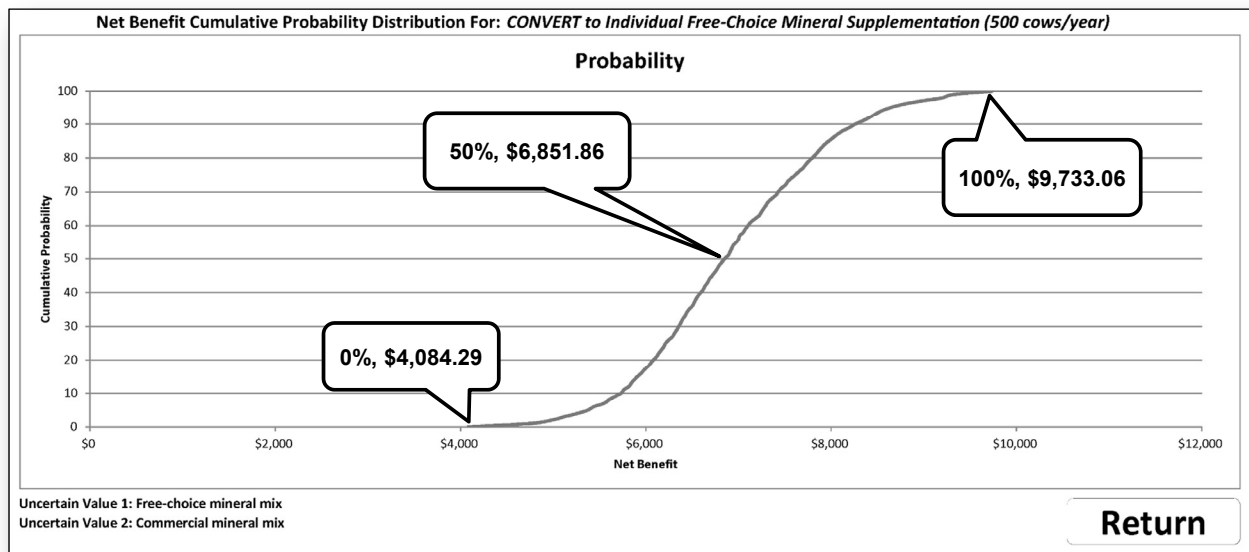
Case 2: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

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

Case 2: Covert to Free-Choice Mineral Supplementation

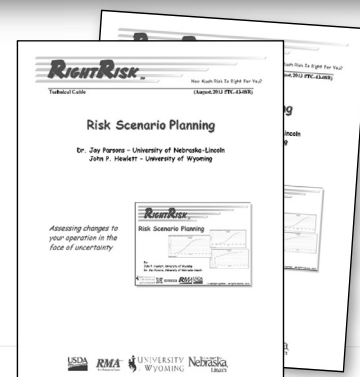
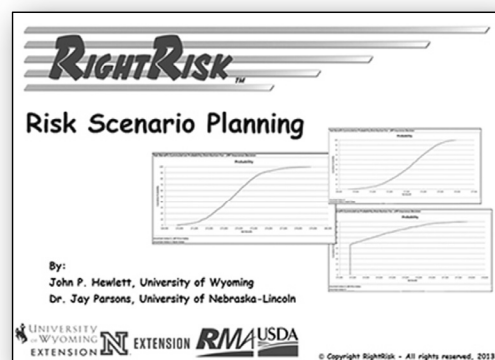


- A cumulative distribution graph gives the probability of earning a net return at or below any certain value.

Summary

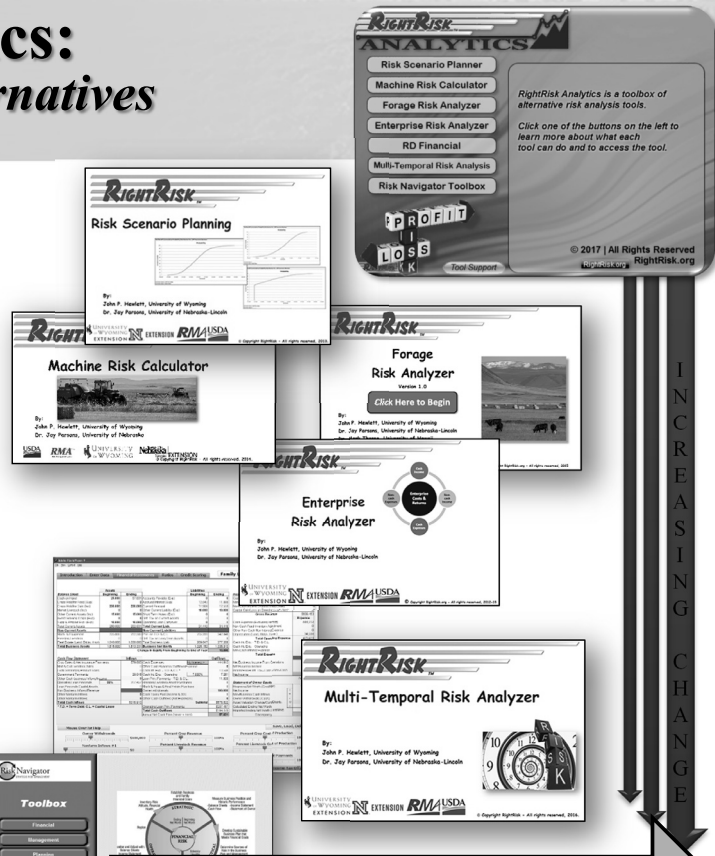
The Risk Scenario Planning tool:

- 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
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larger enterprise-level, enterprise mix changes
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partial budgets incorporating time, risk analysis
- **Risk Navigator**
strategic risk planning and analysis



<http://RightRisk.org> > tools



<http://RightRisk.org> > courses

Risk Management Profiles



RISK MANAGEMENT PROFILES



Benchmarking in Agriculture

Paul was home from college on break and was talking to his parents about a class he had just completed. He told his parents that he learned about a powerful management tool called benchmarking that is becoming popular for agricultural producers to use.

He pointed out how benchmarks allow producers to measure both their financial and production performance compared to previous years and/or other producers and agricultural businesses.

Jack, Paul's dad, said that he had just read about benchmarks in a recent farm magazine. The magazine article compared benchmarks in agriculture to going to a doctor's office for a check-up. When you go to the doctor, they

gather information, such as your blood pressure, your pulse, your temperature, and other information they deem necessary for determining your medical health. Each measurement has some general guideline of what the measure should be.

For example, the temperature for a healthy adult should be between 97.8 and 98.1 degrees F. Anything outside this range might indicate a potential health problem. Being outside the range does not specify what the problem is, but it gives the doctor and patient an indicator that some action may be necessary.

Jack said the magazine article identified several financial benchmarks or industry guidelines that have been established for agricultural businesses to use to help them identify strengths and weaknesses in their business.

Paul told his dad that that is exactly what they talked about in his class as well as how they used benchmarking to measure performance. The final steps are to plan and introduce changes based on what is learned.

- Liquidity Benchmark**
The Current Ratio: Measures cash flow and ability to pay bills on time
Current Ratio = Current Farm Assets divided by Current Farm Liabilities
Source of Information: Balance Sheet
Benchmark: Greater than 1.5
- Solvency Benchmark**
Debt to Asset Ratio
Measures long-term ability to repay all financial obligations
Debt to Asset Ratio = Total Farm Liabilities divided by Total Farm Assets
Source of Information: Balance Sheet
Benchmark: Less than 0.30 or Less than 30 percent
- Profitability Benchmark**
Rate of Return on Assets:

RMP-201412-001
R. Sharp-RightRisk, J. Parsons-University of Nebraska-Lincoln, J. Taran-Coronado State University and J. Hewlett-University of Wyoming

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



RightRisk Newsletter

NOVEMBER 2013
VOLUME 1, ISSUE 11

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 fall seeded crops and forage
- December 1, 2013: NAP application deadline for fall seeded crops and forage

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 variability, 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 grazingland.

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 pastures, rangeland and native hay forage crops to qualify 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 (for extension of the 2008 Bill) but are uncertain until new legislation is passed by Congress.

Recent bulletins that outline how these programs fit 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 are found in the Western Risk Management Library located at <http://riskmg.org>.

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

RISK MANAGEMENT PROFILE

VI-PRF pilot insurance minimizes feed risk for Z-F
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.

RightRisk News is brought to you by the RightRisk Team

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