Evaluating Mineral Supplementation for Hawaii Beef Production

Risk Scenario Planning Analytics | RightRisk

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

University of Wyoming RightRisk

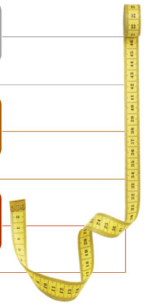
1

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



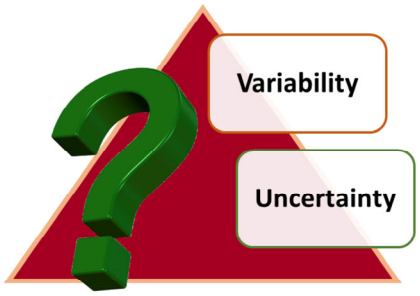
Known future and unknown future

Future is influenced by:

- Risk
- Attitudes and
- Other factors

RISK

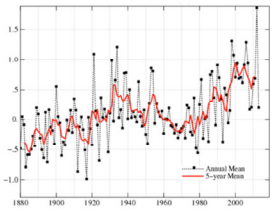
Future events are unknown



Future events are unknown

VARIABILITY:

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

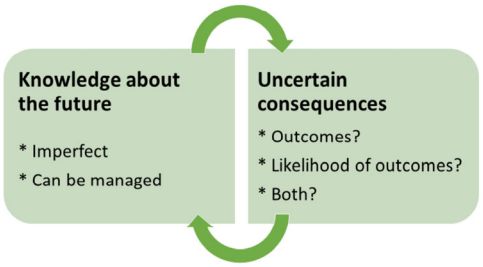


Future events are unknown

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

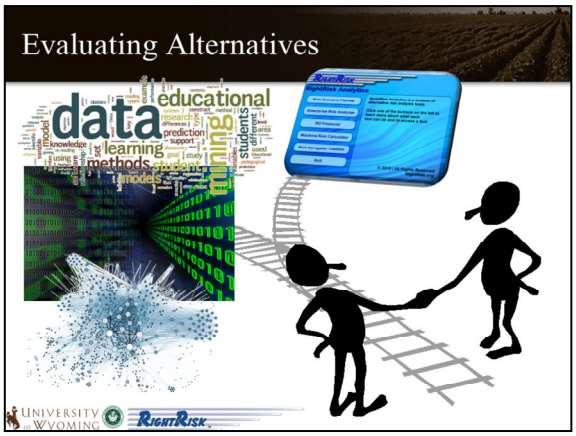
RISK MANAGEMENT

- Reduce bad outcomes
- Increase likelihood of good outcomes

Risk management strategies

STRATEGIES

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


Evaluating Alternatives
data
educational
learning
methods
mining
students
prediction
knowledge
models
University of Wyoming
RightRisk


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
University of Wyoming
RightRisk

Partial Budget Framework

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

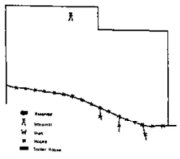
- **Positive Effects**
  - *Added Returns*
  - *Reduced Costs*
- **Negative Effects**
  - *Added Costs*
  - *Reduced Returns*

University of Wyoming RightRisk

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.



University of Wyoming RightRisk

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.

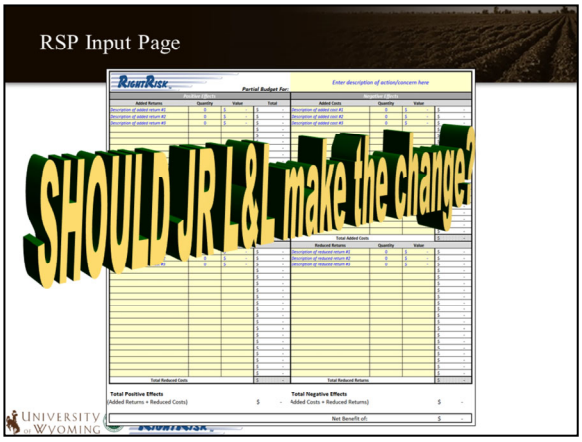
Case 1: Convert to Commercial Mineral Mix

- 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
SHOULD JR L&L make the change?
UNIVERSITY OF WYOMING

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
Calf sales: 40 head or 0.80 cwt/cow/year	160	$ 135.00	$ 21,600.00
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -

Added Costs	Quantity	Value	
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	
Vet and medicine: $3.01/cow/year	200	$ 3.01	$ 602.00
Transportation and marketing for			$ -
37 fewer cull females: $3.70/cow/year	200	$ 3.70	$ 740.00

Reduced Returns	Quantity	Value	
Cull female sales: $59.84/cow/year	200	$ 59.84	$ 11,968.00
			$ -
			$ -

Total Positive Effects (Added Returns + Reduced Costs)		Total Negative Effects (Added Costs + Reduced Returns)	
	$ 22,942.00		$ 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

Partial Budget For: *CONVERT to Commercial Mineral Mix Supplementation (per cow/year)*

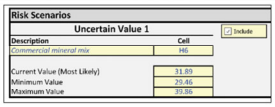
Positive Effects				Negative Effects			
Added Returns	**Quantity**	**Value**	**Total**	**Added Costs**	**Quantity**	**Value**	
Calf sales: 40 head or 0.89 calf/cow/year	0.8	$ 135.00	$ 108.00	*Commercial mineral: $31.89/cow/year*	1	$ 31.89	$ 31.89
			$ -	*Mineral labor: $4.20/cow/year*	1	$ 4.20	$ 4.20
			$ -	*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

University of Wyoming RightRisk

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



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.

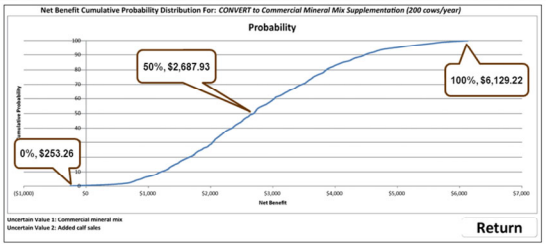
Case 1: Convert to Commercial Mineral Mix - RSP Input Screen

Risk Scenarios					
Uncertain Value 1		Include	Uncertain Value 2		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.

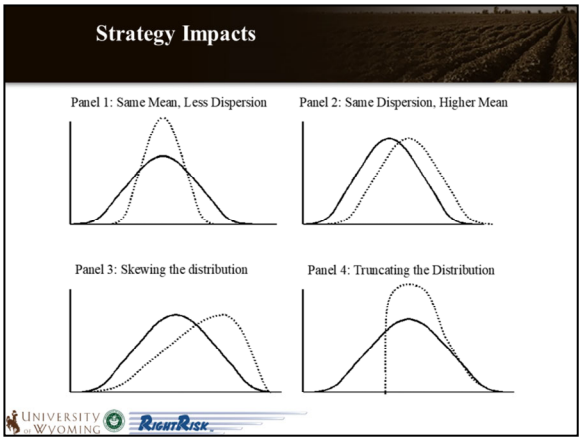
Case 1: Convert to Commercial Mineral Mix



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


Questions?
John Hewlett
hewlett@uwyo.edu
307.766.2166
HAWAII.eRightRisk.com
University of Wyoming
RightRisk
27

Strategy Impacts



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

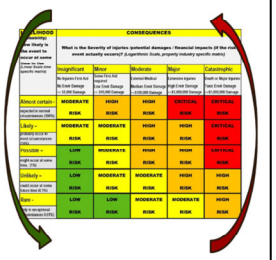
Not all options are mutually exclusive

Not all options are appropriate in every circumstance

UNIVERSITY OF WYOMING RightRisk

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)



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.

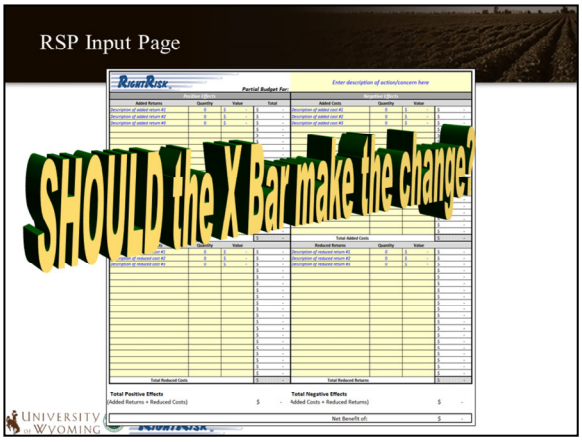
University of Wyoming RightRisk

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
SHOULD the X Bar make the change?
University of Wyoming

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

RightRisk

Partial Budget For: *CONVERT to Individual Free-Choice Mineral Supplementation (500 cows/year)*

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	$ 20.10	$ 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		Reduced Returns	Quantity	Value	
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

University of Wyoming RightRisk

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

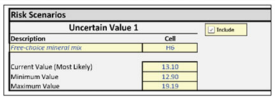
Partial Budget For: *CONVERT to Individual Free-Choice Mineral Supplementation (per cow/year)*

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		Reduced Returns	Quantity	Value	
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		Total Negative Effects	
(Added Returns + Reduced Costs)	$ 37.55	(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		Include
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.

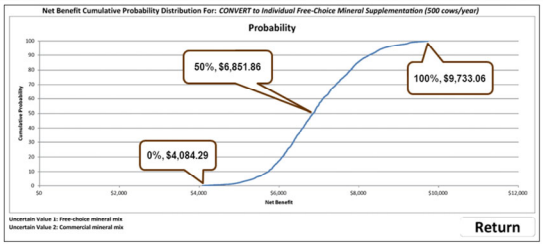
Case 2: Convert to Free-Choice Mineral Supplementation - RSP Input Screen

Risk Scenarios					
Uncertain Value 1		Include	Uncertain Value 2		Include
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	12.50		Minimum Value	29.46	
Maximum Value	15.19		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

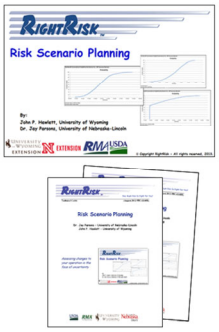


- A cumulative distribution graph gives the probability of earning a net return at or below any certain value.

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
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
University of Wyoming
RightRisk


RightRisk
Applied Risk Management in Agriculture
Dana L. Hoag, Editor
http://RightRisk.org > courses


Risk Management Profiles
RISK MANAGEMENT PROFILES
RightRisk
Benchmarking in Agriculture
Liquidity Benchmark
Solvency Benchmark
Profitability Benchmark
http://RightRisk.org > RM Profiles


RightRisk Newsletter
RightRisk News
Risk Management Profile
Highlighted Course
RightRisk helps decision-makers discover innovative and effective risk management solutions.
• Education
• Coaching
• Research
How much risk is right for you and your operation?
http://RightRisk.org/News


Questions?
John Hewlett
hewlett@uwyo.edu
307.766.2166
HAWAII.eRightRisk.com
University of Wyoming
RightRisk
45