

RIGHT RISK

Understanding Risk in Agriculture



Understanding Risk in Agriculture

- ❖ What is Risk?
- ❖ Does Risk Matter?
- ❖ Can Risk Be Managed?
- ❖ What Are the Challenges to Managing Risk?
- ❖ When is Risk Analysis Justified?
- ❖ How Are Risky Choices Evaluated?
- ❖ How is Risk Included When Making a Decision?





What is Risk?

Known future and unknown future

Future is influenced by:

- ❖ Risk
- ❖ Attitudes and
- ❖ Other factors



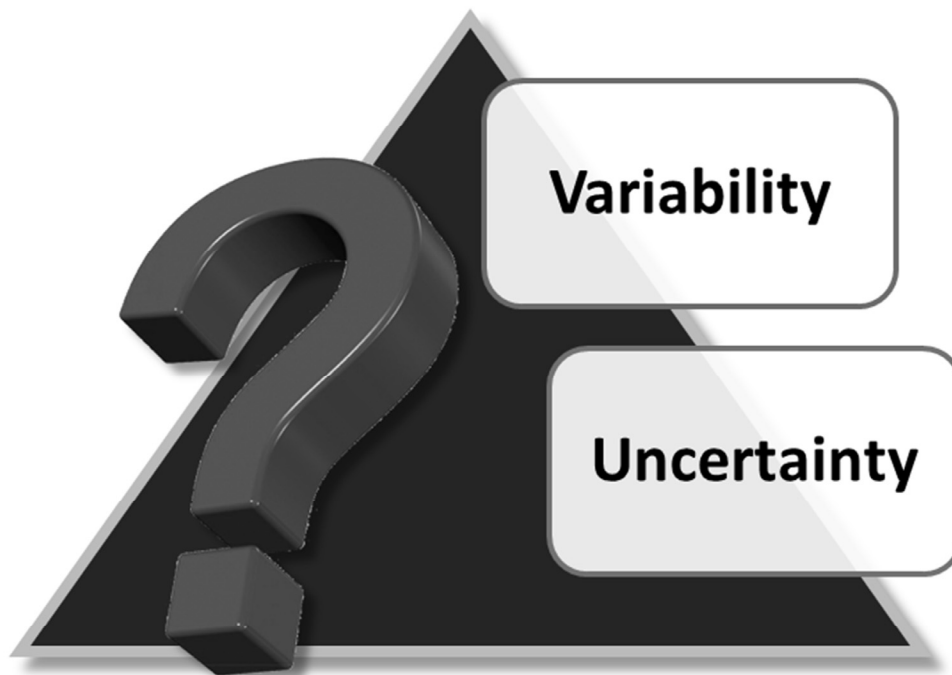
RISK

Challenges of predicting the future

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



Future events are unknown



Sources of risk in agriculture



Does Risk Matter?

When does risk matter?

RISK MATTERS when:

- ✔ When objectives are not met
- ✔ When objectives cannot be met
- ✔ When control is lost



Managing threats to the business

- ✔ Manage risks:
 - ❖ Having a larger potential effect
 - ❖ That are less known, less knowable
 - ❖ As negative consequences become more frequent





Managing risk

RISK MANAGEMENT is

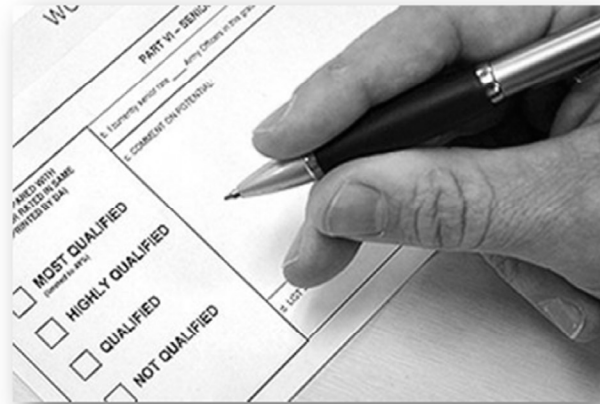
- ✓ Taking deliberate action to shape the variability of outcomes
- ✓ Shape the consequences and/or
- ✓ Shape both



Managing risk

- ✓ Risk management
 - ❖ Is necessary
 - ❖ Can be frustrating

- ✓ Risk management strategies should be:
 - ❖ Judged on information available at time of making the decision
 - ❖ Not evaluated on their results



What Are the Challenges to Managing Risk?

Attitudes about risk

Chosen response to variability and uncertainty



Emotion and risk behavior

- ✔ Choices are influenced by:
 - ❖ Feelings
 - ❖ Moods
 - ❖ Temperament
- ✔ Responses are shaped by many signals and factors
 - ❖ Signals and factors may conflict
- ✔ Doing nothing is a choice
 - ❖ Subconscious decision
 - ❖ Conscious decision



Challenges to managing risk

GOOD ERRORS

- ✓ Mistakes made through trial and error
- ✓ Mistakes made through modeling
- ✓ Learning from other's mistakes
- ✓ Lead to learning

BAD ERRORS

- ✓ Mistakes in judgement or perception
- ✓ Do NOT lead to learning

Challenges to managing risk

RISK AVERSION

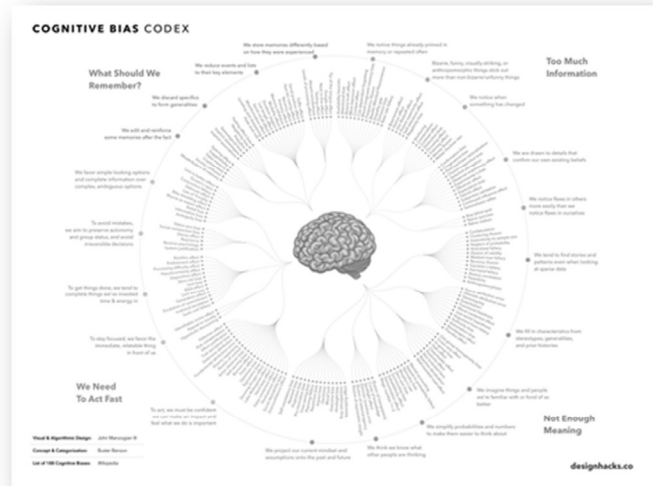
- ✓ People prefer certainty
- ✓ High need for certainty
- ✓ Fear of making a mistake



Challenges to managing risk

BIAS

- ✔ Influences consideration of alternative decisions
- ✔ Influences view of unknown future



Challenges to managing risk

BIAS - *As a failure of the human mind*

- ✔ Emotions and other human factors lead to poor decisions
 - ❖ Lack of time
 - ❖ Unfamiliarity with required analytical approach
 - ❖ Lack of knowledge about appropriate analysis



Challenges to managing risk

BIAS - *Leading to a response, even without analysis*

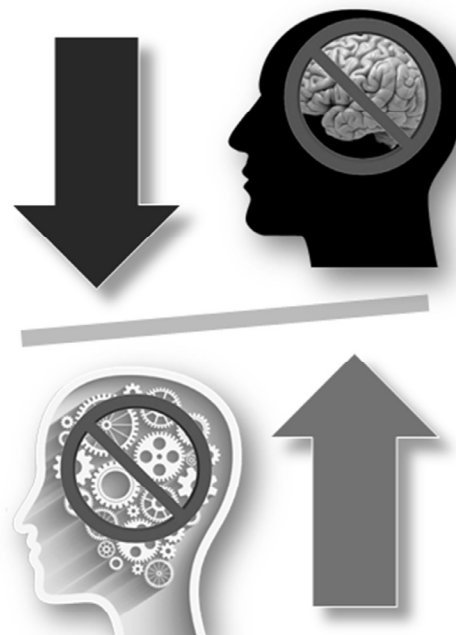
- ✓ Biases and responses to complex situations lead to a response even when analysis is not possible.
- ✓ Non-analytic responses can be timely and low cost.
- ✓ May lead to decision making mistakes.



Challenges to managing risk

BIAS cont.

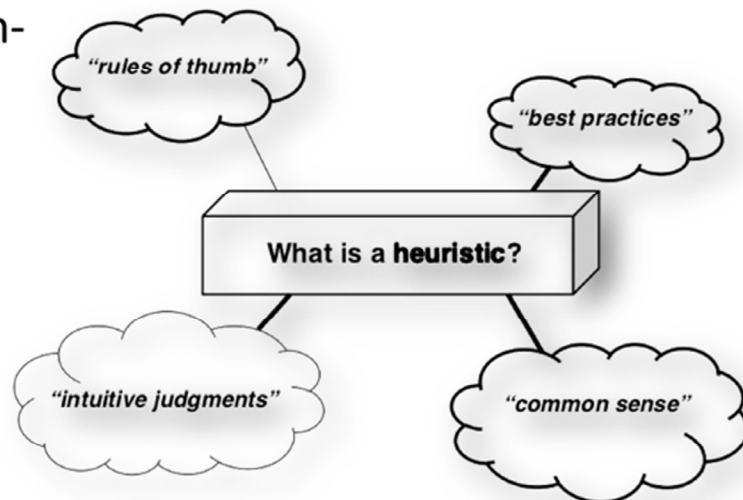
- ✓ Both concepts may be correct
- ✓ Not possible to have all needed information
 - ❖ Too costly
 - ❖ Too time consuming
- ✓ Best decisions are made with thought and effort



Challenges to managing risk

HEURISTICS

- ✓ “Rules of Thumb”
- ✓ Avoid long, drawn-out analysis



Challenges to managing risk

HEURISTICS *cont.*

- ✓ May be a source of bias
- ✓ May not lead to the best decision
- ✓ Formed from our:
 - ❖ Attitudes
 - ❖ Feelings
 - ❖ Biases
 - ❖ Level of uncertainty



Challenges to managing risk

MAKING A DECISION

Separate variability from uncertainty

- ✓ Variability – outcomes are due to chance
- ✓ Uncertainty – outcomes due to a lack of knowledge



When is Risk
Analysis Justified?

Making a decision

ANALYSIS?

Ask what is the:

- ✓ Risk?
- ✓ Purpose?
- ✓ Availability of Data?
- ✓ Time available?



Making a decision

Identify threats:

- ✓ That occur most often
- ✓ With highest likelihood of occurrence
- ✓ Happen first in time



Making a decision

List potential consequences –

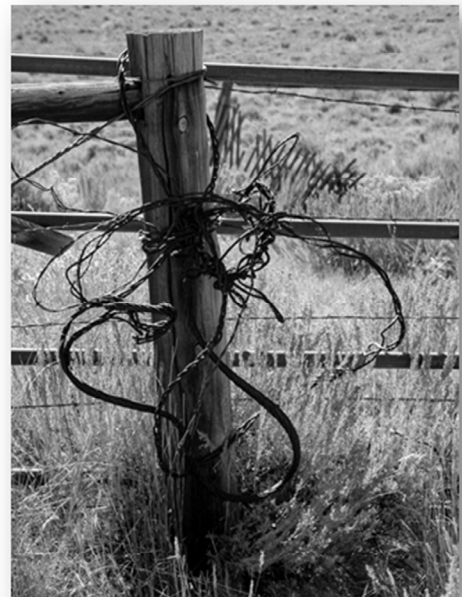
A single source of risk may have many consequences



Making a decision

Consider existing strategies:

- ✓ What controls are being used?
- ✓ Existing strategies not working as desired?
 - ❖ Possible to manage risk using selected controls
 - ❖ Risk analysis was not reasonable
 - ❖ Strategy was not properly implemented
- ✓ Known, but unused, strategies?





How Are Risky Choices Evaluated?

Making a decision

Risk management strategies:

- ✔ Help implement actions needed to -
 - ❖ Maximize opportunities
 - ❖ Control threats


- ✔ Opportunities may not be recognized when risk is the primary concern



Making a decision

Compare strategies:

- ✓ Resource costs and returns
- ✓ Management efforts needed
- ✓ Speed and ease of implementation
- ✓ Effectiveness

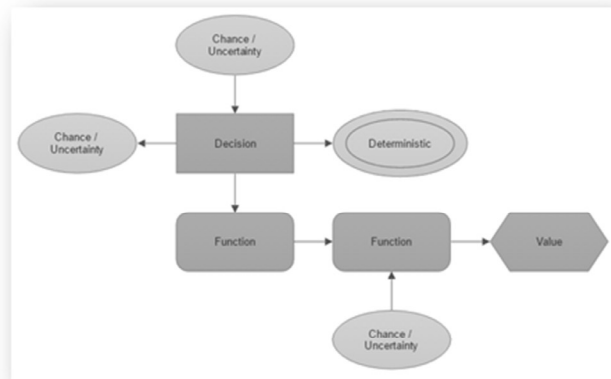


How is Risk Included
When Making a Decision?

Risk analysis tools

Influence diagram

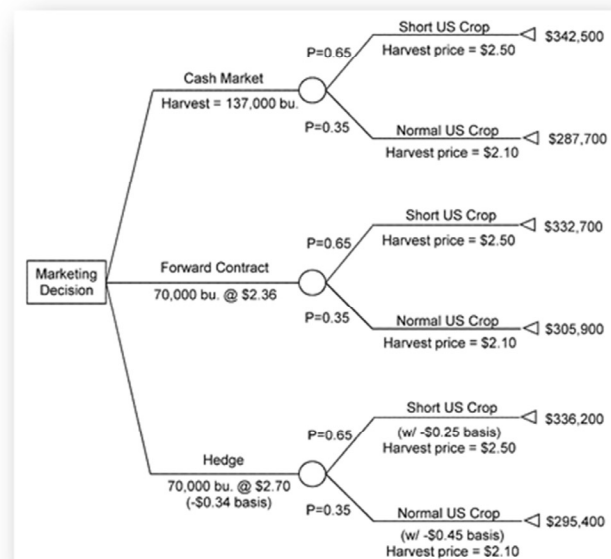
- ✓ Basic starting point
- ✓ Indicates:
 - ❖ Chances (ovals)
 - ❖ Decisions (boxes)
 - ❖ Consequences (diamonds)
 - ❖ Relationships (arrows)



Risk analysis tools

Decision tree

- ✓ Tree-like model
 - ❖ Quantitative data
- ✓ Involves:
 - ❖ Mathematics
 - ❖ Potential outcomes
 - ❖ Probabilities of outcomes
 - ❖ Description of events



Risk analysis tools

Payoff matrix

- ✓ Table of information
 - ❖ Similar to decision tree

Includes:

- ❖ Description of events
- ❖ Associated probabilities
- ❖ Corresponding payoffs

Risk Outcomes	Harvest Cash Price	Harvest Basis	Probability	Decision Alternatives		
				#1 Cash Market 137,000 bu.	#2 Forward Contract 70,000 bu. @ \$2.36	#3 Hedge 70,000 bu. @ \$2.70 (-\$0.34 basis)
Normal US Crop	\$2.10	-\$0.45	35%	\$287,700	\$305,900	\$298,200
Short US Crop	\$2.50	-\$0.25	65%	\$342,500	\$332,700	\$339,000
Expected Value				\$323,320	\$323,320	\$324,720
Standard Deviation				\$38,749	\$18,950	\$28,850

Risk analysis tools

Risk influence calculator

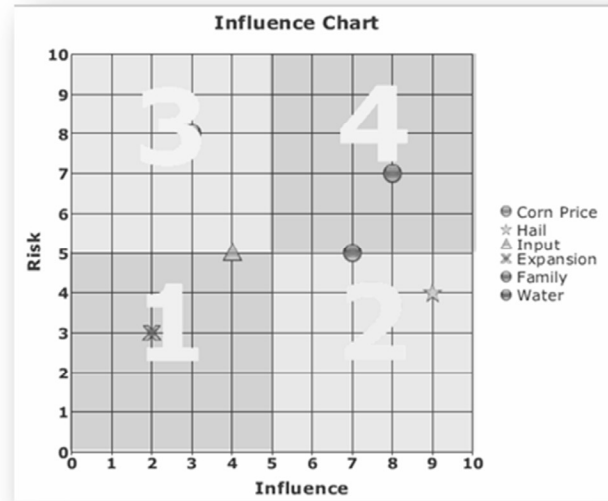
- ✓ Chart of information
 - ❖ Map of priorities
- ✓ Based on risk-influence matrix
- ✓ Ranks each risk by:
 - ❖ Impact
 - ❖ Management influences

Risk Category	Risk Type	Description	Probability	Impact	Risk	Influence
Market/Price	Corn Price	Will my price cover my costs?	4	10	7	8
Production	Hail	Will hail destroy half my crop?	1	7	4	9
	Input	Can quality corn seed be found?	6	4	5	4
Financial	Expansion	Can expansion costs be paid?	3	4	3	2
Human	Family	Will dad retire?	2	8	5	7
Institutional	Water	Will irrigation restrictions apply?	7	9	8	3

Risk analysis tools

Risk influence calculator cont.

- ✓ Helps prioritize threats for attention by management
- ✓ Useful for evaluating effectiveness of selected strategy
- ✓ Visual map of priority
 - ❖ Before treatment
 - ❖ After treatment



Risk analysis tools

Other tools

- ✓ Statistical techniques
- ✓ Mathematical functions depicted graphically
- ✓ Provide range of outcomes and probabilities

