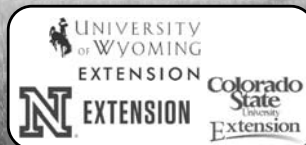




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John P. Hewlett, University of Wyoming Extension;  
Jay Parsons, University of Nebraska-Lincoln;  
Jeffrey Tranel, Colorado State University; and  
William Taylor, University of Wyoming Extension, emeritus

# Evaluating Risk Strategies



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## Introduction to Risk Strategies

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# Introduction to Risk

## Classical

*A special case of uncertainty where the outcomes and probabilities are known*



## Another Way

*Future events where the outcomes are uncertain<sup>1</sup>*

# RISK

## Popular Usage

*Future events where the outcomes are uncertain*

<sup>1</sup>ISO 31000:2009 Risk Management Principles and Guidelines. International Organization for Standardization, 2009

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# Sources of Risk

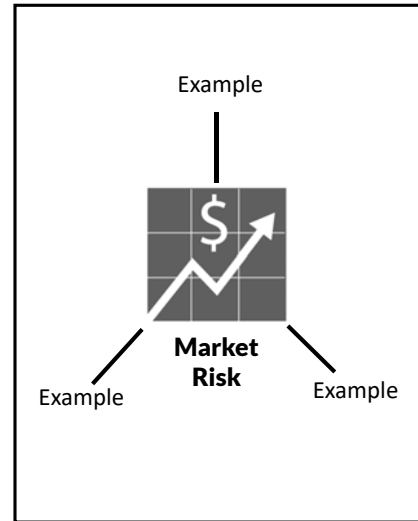
- ✓ Five distinct sources of agricultural enterprise risk
  - Market risk
  - Production risk
  - Institutional risk
  - Human risk
  - Financial risk





## Sources of Risk - Activity

- Form groups of 2-3 people.
- Your facilitator will assign you one of the types of risk.
- Take five minutes to generate a list of examples of your assigned risk type.
- Write these down on a piece of flip chart paper.
- Be ready to share your results.



## How is Risk Estimated?



- ✓ Many decision makers live in the reality of today and find forecasting the future difficult
- ✓ Risk is focused on uncertain outcomes
- ✓ It is difficult to describe how *likely* they are to occur or because it is difficult to determine the *quality* of the outcome

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## Discussion

**How do you typically assess risk when making decisions about your operation?**



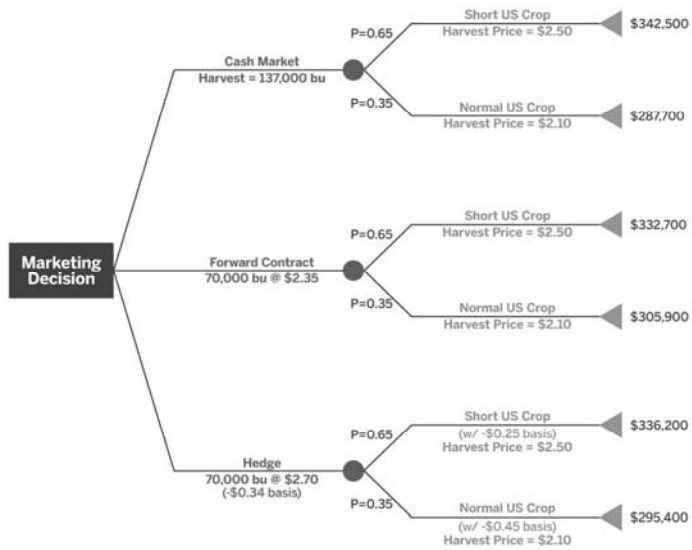
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## How is Risk Estimated?

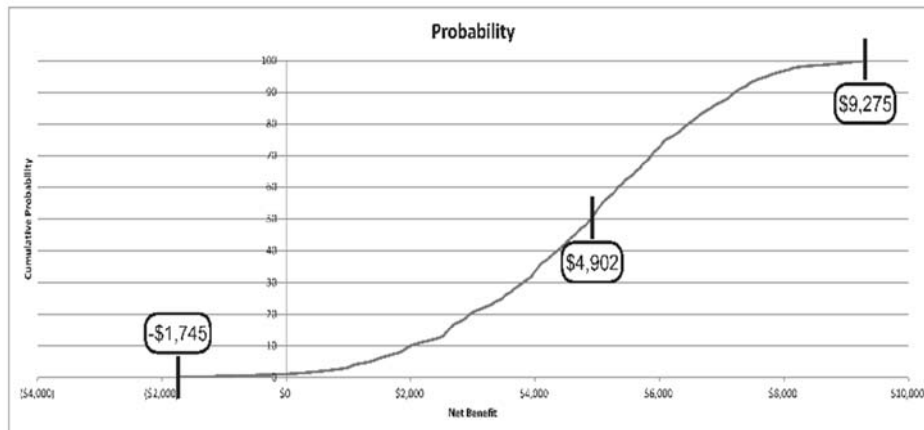
- ✓ Estimated by making projections about the probability and the potential impact
- ✓ Estimates can be used to prioritize the risks for management's attention
- ✓ Simple ratings of high/medium/low probability and associated impact can be presented in a 3x3 payoff table

	$s_1$	$s_1$	$s_1$
$d_1$	4	4	-2
$d_2$	0	2	-1
$d_3$	3	5	-1

# How is Risk Estimated?



# How is Risk Estimated?



Uncertain Value 1: Cover crop grazing AUM  
 Uncertain Value 2: Weed control reduction

Return

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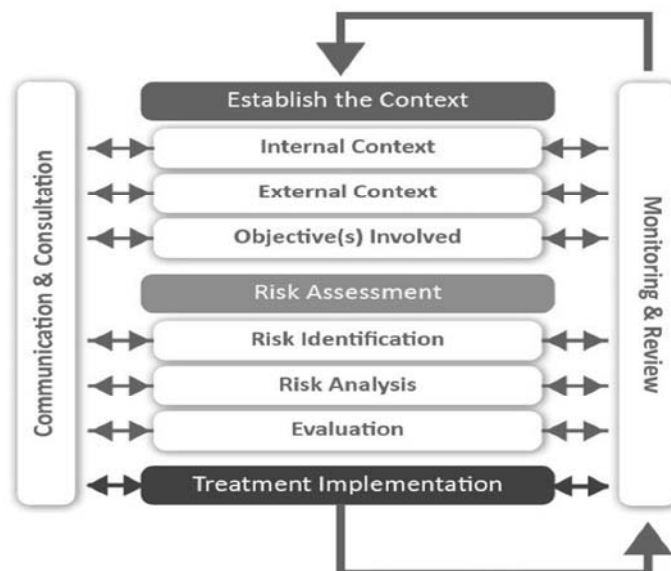
## What is Risk Management?

Risk management can be thought of as one or more strategies created with the goal of reducing the consequences of negative outcomes, or to increase the likelihood of positive outcomes.



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## Process for Risk Management





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## Risk Management Strategies

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## What is a Strategy?



- ✓ **Strategos** - a military general, or someone who commands a *stratos*, or army
- ✓ *A strategy should outline actions that utilize the resources available or provide a means of getting needed resources in order to accomplish a specific goal<sup>1</sup>*

<sup>1</sup>Strategic Action Planning NOW! Gates, 1998.)



## Strategy Self-Reflection & Discussion

1. Reflect on this question: *When was the last time you used a “strategy” to solve a problem or achieve a goal?*
2. Use the template provided to list your goal, the resources you used, and the actions you took to accomplish the goal.
3. Be prepared to share you answers with the group.

Strategic Self-Reflection	
1	Goal
	Resources Used
	Actions Taken



---

## Establishing Risk Management Goals & Objectives

- ✓ Setting goals and objectives are one method for describing what that future should look like
- ✓ Few farms/ranches have formal, written plans
- ✓ Formal goals provide the basis for
  - Monitoring business activity
  - Guide decision-making
  - Offer insights into appropriate contingency responses when external forces require mid-course corrections.<sup>2</sup>



<sup>2</sup>Applied Risk Management in Agriculture. Hoag, et al. 2010.)

---

## Establishing Risk Management Policies & Plans



- ✓ In the military, a strategy is a maneuver designed to defeat an enemy
- ✓ Requires all levels of management and labor to be aligned
- ✓ The same applies in managing your operation
- ✓ The desired outcome directs the risk management plan, which is a step-by-step approach used to reach that desired outcome

---

## Establishing Risk Management Policies & Plans



- ✓ Risk management plans are concerned with describing the specific steps and timetable required for reaching the goals
- ✓ *How* and *when* of the process
- ✓ Outlines activities that must be accomplished in order to achieve the risk goals
- ✓ Includes timing of these activities over the near term

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## Risk Management Strategies in Agriculture



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## 1. Avoid the Risk

- ✓ Concerned with **reducing or eliminating the possibility of events with unfavorable consequences**
- ✓ Accomplished when a manager makes an active decision to not engage in a particular activity due to the level of risk
- ✓ Avoiding risk is not doing something that exposes the business to the risk



*Coping with Risk in Agriculture, 2<sup>nd</sup> ed. Hardaker et al., 2004.*

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## 2. Transfer the Risk

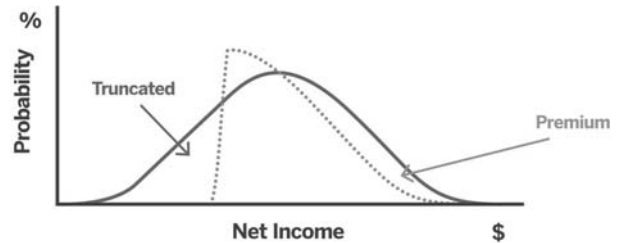
- ✓ An approach for shifting risk from one party to another, usually outside the business
- ✓ Can be accomplished through
  - Insurance policies
  - Contracting
  - Agreements with third-parties willing to share in the negative consequences in return for a premium paid in advance



---

## 2. Transfer the Risk - Insurance

- ✓ Risk is transferred from an individual to some other party that can tolerate the risk
- ✓ Purchaser pays more than the expected indemnity to avoid the risk
- ✓ The party accepting the risk earns income from the risk premiums
- ✓ Have the effect of truncating net income distribution on the downside in exchange for subtracting the insurance premium expense from every outcome



---

## 2. Transfer the Risk - Contracting

- ✓ An approach for transferring risk from one person/business to another
- ✓ Examples: Futures and options markets, forward contracts for livestock, selling grain to an elevator before harvest
- ✓ Has effect of squeezing the distribution of net income into a tighter range of possibilities
- ✓ Risk is transferred to the party on the other side of the contract, in exchange for a risk premium



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### 3. Control the Risk



- ✓ Most active form of managing risk
- ✓ Can be achieved by taking management action designed to change the outcomes for an event by:
  1. Making negative outcomes less likely
  2. Reducing the consequences should they occur

---

### Controlling Probability

- ✓ Reducing the chances of bad events happening is just good, common sense for most ag operators
  - Example: The risk of a machinery breakdown can be *controlled* by properly maintaining the machine
- ✓ With limited financial resources, most managers do spend time and effort to balance expenditures for chance-reduction against the benefits they expect those expenses to bring



---

## Controlling Impact



**Diversification**



**Increase Reserves**



**Maintain Flexibility**

---

## Controlling Impact



**Diversification**

- Following a practice of growing more than one crop or operating a farm with both crop and livestock enterprises can be a method for reducing the impact on the overall operation
- Banking at more than one bank
- Buying from more than one seed supplier
- Usually requires a unique set of costs

---

## Controlling Impact



**Diversification**



**Increase Reserves**

- Having extra cash reserves on hand will reduce the impact of poor revenue in a given year
- Must consider what it costs in potential income to keep cash reserves on hand versus the earnings they might bring in another use

---

## Controlling Impact

In some cases, a good strategy may be to commit to smaller changes following practices similar to what were used in the past, but retain the *flexibility* to make further change when it is clear it is warranted.



**Maintain Flexibility**



## Controlling Risk - Activity

- Working in a group of 3-4 people, use your flip chart and brainstorm a list of examples of how you or other producers have used the three methods of controlling impact on their operations.
- Make a three-column T-chart to list your ideas.
- Be prepared to share your ideas.

Diversification	Increase Reserves	Maintain Flexibility

## 4. Accept the Risk



- ✓ Some risks are too costly to control or the negative consequences may be too small to bother with managing
- ✓ In these cases, management may choose to simply choose accept the risk as a cost of doing business

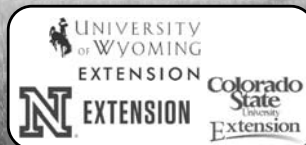




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# Evaluating Risk Strategies



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# Evaluating Strategies

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## Evaluating Decisions

*“Decision making is one of the basic cognitive processes of human behaviors by which a preferred option or a course of actions is chosen from among a set of alternatives based on certain criteria.”*

SOURCE: The Cognitive Process of Decision Making. *Int'l Journal of Cognitive Informatics and Natural Intelligence*. Wang and Ruhe. 2007

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## Evaluating Decisions



1. A direction has been previously selected



2. Not all decisions are equal in nature



3. Involve some type of management decision after considering the alternatives

---

## Evaluating Decisions - Activity



- How do you evaluate the decisions you are about to make on your operation?
- What metrics or criteria do you use?
- What is your process?

---

## Recognizing Strategic Decisions

- ✓ Sub-set of broader decisions focused on selecting where the business should go in the future
- ✓ Determining **direction** (goals)
- ✓ Selecting **how** forward progress is made (strategy)



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## Recognizing Strategic Decisions



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## Strategic Decisions – Poll & Discussion



Using the poll function on the webinar application, answer the following question:

**Do you currently utilize a strategic planning process throughout the year that is similar to the process we just outlined?**



---

## Strategic Planning: Too Constraining?

- ✓ Is strategic planning too constraining?
- ✓ Possible Reasons:
  1. Mismatch between the timing of strategy selection/planning and the process of decision making
  2. The process of reviewing the strategy is fraught with problems
  3. Most emphasis in the process is placed on budget and operating plans

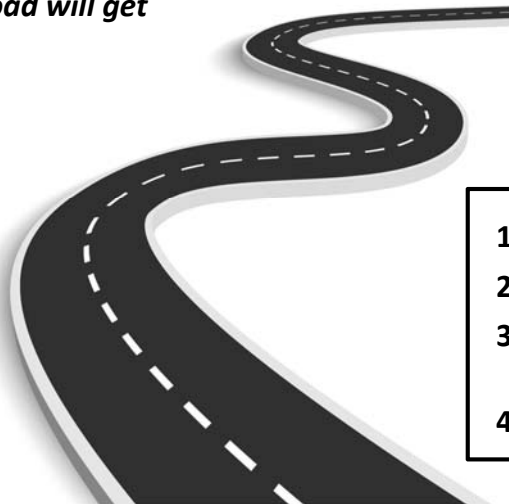


SOURCE: *Strategic Management*. Saloner, Shepard, and Podolny. 2001.

---

## Strategic Planning: It's Worth It!

*"When you don't know where you are going, any road will get you there."*



- |  |
|--|
| <ol style="list-style-type: none"><li>1. Define direction</li><li>2. Determine goals</li><li>3. Reconsider goals over time</li><li>4. Involve others</li></ol> |
|--|

---

## Commitment



- ✓ Management must commit to ensuring the quantity of resources is available at the time they are needed
- ✓ Requires continual monitoring and action at the appropriate time
- ✓ The level of commitment from management and various environmental factors will determine how completely the goals will be achieved

---

## Irreversibility

- ✓ Some decisions require a large quantity of resources and a larger number of implementation steps and management actions
  - Net result = cost of reversing may be quite high
- ✓ Choices concerning direction and resources committed should be reconsidered periodically



---

## Irreversibility

- ✓ Important element in recognizing the strategic aspect of a decision
- ✓ Does not make irreversible decisions strategic
- ✓ Conversely, the degree of irreversibility suggests that decisions that inform and guide irreversible decisions are more strategic



SOURCE: *A Formal Theory of Strategy. Management Science. Van den Steen. 2017.*

---

## Irreversibility



- Develop a list of alternatives
- Evaluate their cost
- Analyze potential benefits

---

## What Are Strategic/Tactical/Operational Choices?

**Strategic**

**Tactical**

**Operational**

- Decisions that choose direction for the business over a longer period of time
- Include:
  - Selecting the type of operation
  - Where to locate the business
  - What strategies to follow

---

## What Are Strategic/Tactical/Operational Choices?

**Strategic**

**Tactical**

**Operational**

- Focused on *how* the strategic decisions will be carried out
- Include details about:
  - Which resources to tap
  - When they will be needed
  - Who will have the responsibility for organizing and overseeing the actions, etc.



---

## What Are Strategic/Tactical/Operational Choices?

**Strategic**

**Tactical**

**Operational**

- Highlight the details needed for implementing the management actions
- Include:
  - Scheduling laborers
  - Coordinating work activities across enterprises
  - Monitoring performance
  - Ensuring that adequate resources are available

---

## What Choices Do You Make?



- Create a three-column, T-chart on a sheet of paper
- At the top of each column, write: Strategic, Tactical and Operational
- Think through your last week and the decisions you made
- Categorize these decisions and list them in the column
- Be prepared to share your results with the group

Strategic	Tactical	Operational

---

## What is a Decision? What is a Strategy?

### Decisions

- The outcome of a process that selects a preferred option or a course of action
- Made from among many alternatives, which may lead to the same outcome
- However, each alternative has its own unique set of resource requirements and oversight



### Strategies

- The means by which the business intends to use resources to reach the ends they desire
- Include one or more goals, resources, and a method or approach for action
- Require multiple decision points to bring them to conclusion



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## What is a Decision? What is a Strategy?



**Existing Operation**

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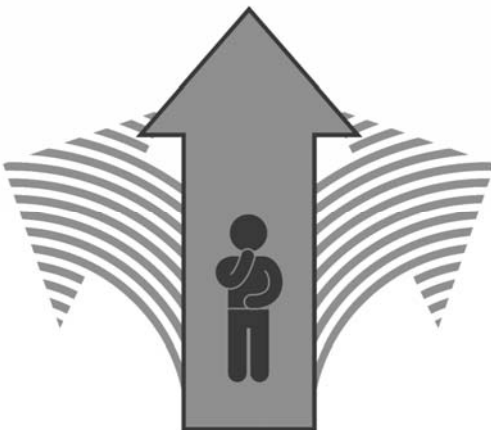
## What is a Decision? What is a Strategy?



**Proposed Change**

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## Making a Selection



- ✓ Alternatives are weighed and comparisons considered
- ✓ Important questions to ask:
  - What is the desired outcome from following the strategy?
  - How long will it take the strategy to demonstrate whether it is effective or not?
  - How do the costs of each alternative compare where the strategy may require transferring risk?

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## Evaluating Strategies

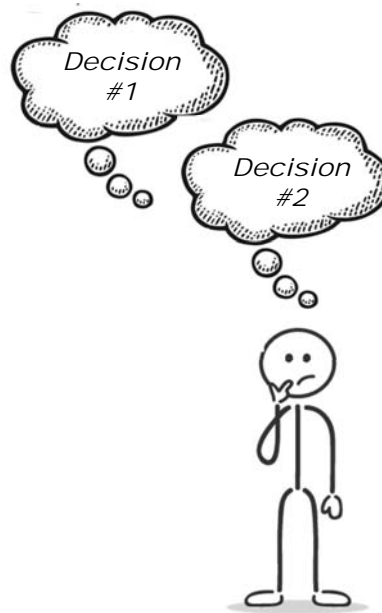
- ✓ Risk management is a necessary, but sometimes frustrating, activity
- ✓ Good risk management strategies can still lead to bad outcomes because of uncertainty



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## Evaluating Strategies

- ✓ Not carried out by a single decision
- ✓ Requires a series of decisions
- ✓ Failures are often the result of a lack of support across multiple decision points
- ✓ Good strategies often don't work
- ✓ Consider past results, but realize too much focus on the past can lead to biased decisions and poor results



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## Measuring Progress and Accomplishments

- ✓ Managing an agricultural business, with its inherent dependence on weather and associated production and market risks, can be very challenging
- ✓ Primary reason for difficulties is a reliance on past experiences to predict the future
- ✓ Many make decisions based upon the intention of **moving the business in a particular direction**, rather than focused around reaching a specific performance target

---

## Measuring Progress & Accomplishments

- ✓ Some management strategies have a greater chance of success
- ✓ Decisions with a high degree of **financial magnitude** or **reoccur frequently** should be considered with greater care
- ✓ Not all people view risk in the same way
- ✓ Challenging to reach consensus about goals and a definition of success



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## Measuring Progress & Accomplishments

- ✓ Critical for decision makers to reach consensus about risk goals, objectives and definition of success
- ✓ Risk can be measured in loose or very precise terms
- ✓ Time and effort to evaluate impact increases with level of detail
- ✓ Comparing strategies is easier where higher levels of analysis have occurred
- ✓ Level of detail and analysis is determined by needs of decision makers



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## Changing Strategies



- ✓ With each passing year, the manager gains additional experience in managing the resources employed in raising the crop or livestock
- ✓ Change for most operators is often introduced gradually

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## Incorporating Learning & New Technologies

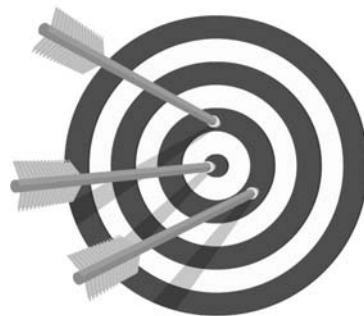
- ✓ Learning to manage seasonal variations in the production process requires an understanding of the relationship between the options available and the corresponding costs and expected benefits
- ✓ New advances in technology often provide greater flexibility in managing success and the associated variability
- ✓ Managers should continue to evaluate new approaches to remain competitive



---

## Updating Goals & Objectives

- ✓ Updating and revising management approaches may mean making decisions to drop or revise practices or change crops grown or livestock raised
- ✓ In other cases, goals and objectives might need to be changed



---

## Updating Policies & Plans



- ✓ New approaches and techniques may offer implications for resource management, the criterion used to evaluate performance, and may imply change for future planning
- ✓ Past approaches may no longer be best or are too expensive to continue
- ✓ Managers must devote time to evaluating alternatives, including:
  - New risk controls
  - Insurance options
  - Other risk transfer possibilities

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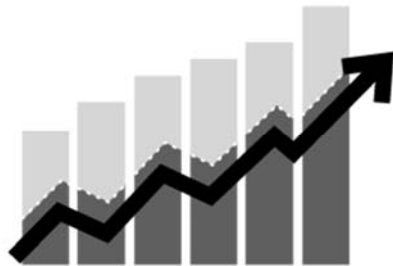
## Quantifying Variations in Outcomes

- ✓ Once a risk strategy has been selected, the decision maker should take time to assess how well the strategy is working
- ✓ Results of following a selected strategy are often variable
- ✓ It can be tricky to decide whether a good strategy was selected or if there might have been a better alternative available



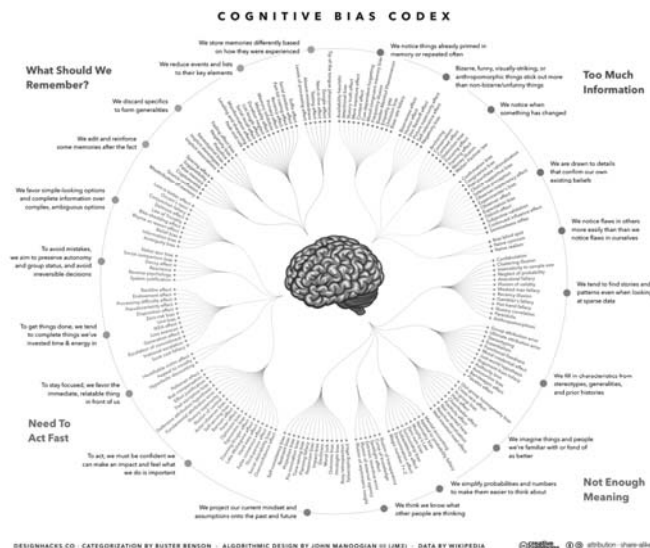


# Quantifying Variations in Outcomes



- ✓ It is important for decision makers to think through their responses to change that may work against their position
- ✓ Should develop an approach to assess decisions where the results are a set of variable outcomes
- ✓ Done by taking an average or by evaluating the range of results by measuring the variance or standard deviation
- ✓ Graphically, the data can provide similar, but more easily interpreted, information when depicted in a distribution

# Possible Bias



There are many sources of bias that influence the consideration of alternative decisions

# Possible Biases



Anchoring bias – when we rely too much on the first piece of information and do not consider newer data.



Availability heuristic – when we rely too much on the information at hand, rather than from wider sources.



Outcome bias – where we judge our choice based on the outcome rather than the choice process.



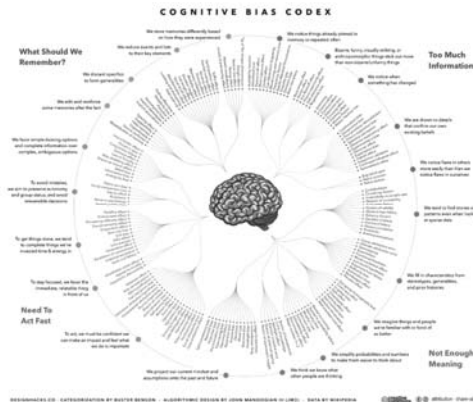
Overconfidence – where we take on more risk, overestimating our ability to handle it.

*There are many other risk biases beyond the examples given here.*

# Types of Biases: Self-Reflection

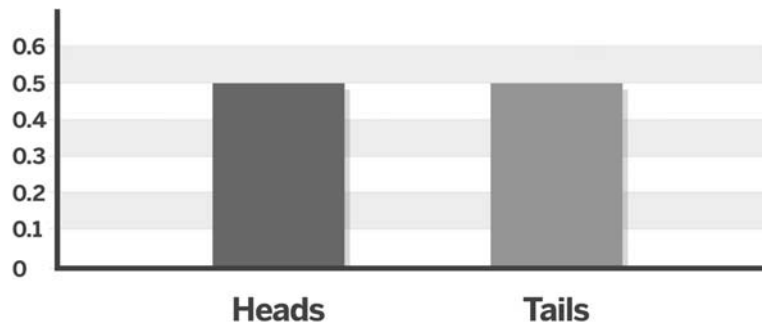


Looking at the diagram, what type of biases do you think you might be prone to as you begin to make strategic decisions? How could this compromise your decision making?



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## Describing Risk Outcomes

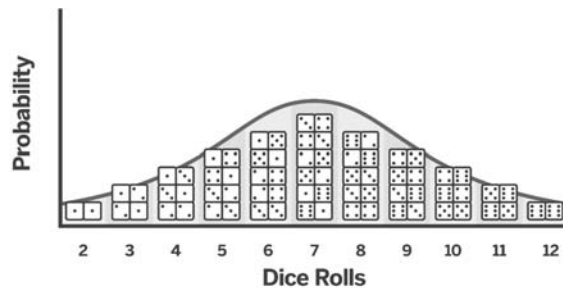


A histogram is simply a graph with a bar for each possible outcome that is as tall as its probability.

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## Describing Risk Outcomes with PDFs

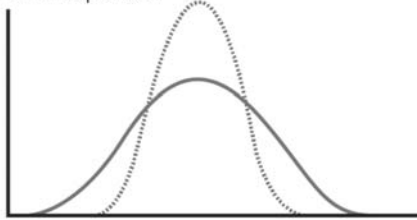
- ✓ A *probability density function* (PDF) is one way to describe risk outcomes and likelihoods
- ✓ Can be used to understand how risky a particular decision is
- ✓ Benefits can be weighed, too



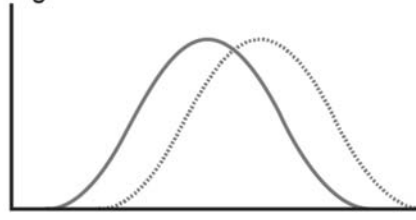
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## Describing Risk Outcomes With PDFs

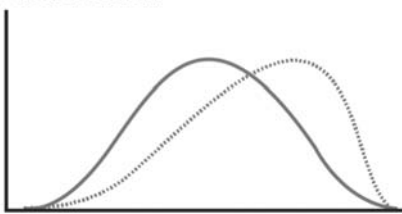
Same Mean,  
Less Dispersion



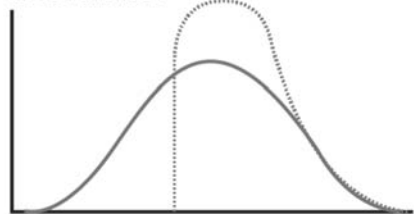
Same Dispersion,  
Higher Mean



**Skewing** the  
Distribution



**Truncating**  
the Distribution



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## Seven Characteristics of Good Decisions

1. **Appropriate Time Frame**
2. **Clear Values to Adhere to and Objectives to Accomplish**
3. **Creative Alternatives**
4. **Good Information**
5. **Clear Tradeoffs and Sound Reasoning**
6. **Choice alignment with Values and Objectives**
7. **Committed Implementation**

Sources:

Hammond, et al. (1999)

Spetzler et al. (2016)

Seven Characteristics of a Good Decision. *Cornhusker Economics*. Parsons. 2016

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## An Appropriate Time Frame

- ✓ Captures the context in which the decision is being made
- ✓ Includes both the internal environment and the external environment
- ✓ Also includes the objective(s) the decision maker is trying to accomplish



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## Clear Values to Adhere to and Objectives to Accomplish

- ✓ Objectives need to be clear and align with the decision maker's values
- ✓ Form the decision criteria
- ✓ Determine what information to seek
- ✓ Help explain decision choices to others
- ✓ Conclude how important the decision is
- ✓ Determine how much time and effort should be expended



---

## Creative Alternatives

### Key Principles

- ✓ The choice selected can never be better than the best of the alternatives available to choose from
- ✓ The decision maker can never choose an alternative not considered
- ✓ Generate a list of innovative alternatives
- ✓ Better to have too many bad alternatives than not enough good ones

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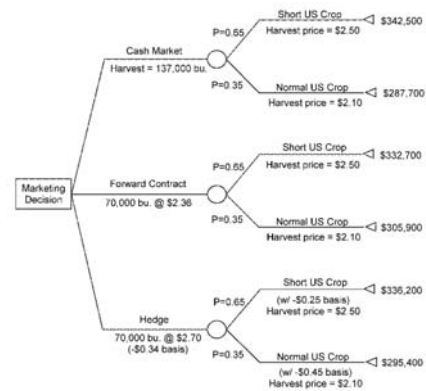
## Good Information

- ✓ A good decision uses reliable and relevant information, while properly accounting for uncertainties
- ✓ Focus on the objectives
- ✓ Good factual information only describes the present and the past
- ✓ Use experts wisely to help gather relevant information about what the future could look like, but do so with a realistic view concerning uncertainty



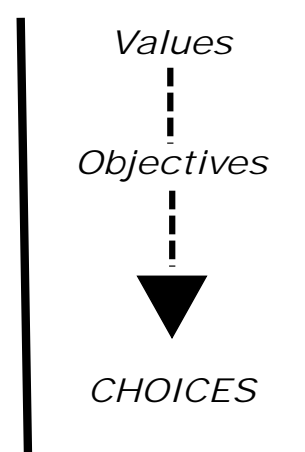
## Clear Tradeoffs and Sound Reasoning

- ✓ One of the most difficult challenges in making decisions is grappling with tradeoffs involving multiple objectives
- ✓ Requires sound reasoning
- ✓ Also extends to consideration of downstream decisions
- ✓ Decision trees can be useful in describing connections between alternative choices under consideration and the impact they have on downstream decisions
- ✓ Uncertainty must also be reflected in the process
- ✓ Appropriate scales should be used and the tradeoffs should reflect the accuracy of those scales



## Choice Alignment with Values and Objectives

- ✓ Good decisions are choices that are well-aligned with the decision maker's values and objectives
- ✓ These important factors may be forgotten when assessing alternatives or making a final selection
- ✓ A quick reflection on choice alignment with values and objectives can help prevent the decision from mirroring an imbalance among the priorities



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## Committed Implementation



- ✓ Must be accompanied by a commitment to implement it
- ✓ When the decision maker evaluates the decision, she/he should carefully consider how committed they are to fully implement the choice

---

## Is The Strategy Successful?

- ✓ Evaluation of the success or failure of a particular strategy is an exercise in weighing the result (benefit) versus the cost of that success
- ✓ Evaluating the success or failure of a strategy is not accomplished by looking at individual decisions, but rather by weighing everything together





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## Final Point

- ✓ Even if a strategy has been judged to be successful, there may be adjustments needed for that strategy to continue working
- ✓ Alternative strategies may also need to be considered
- ✓ Continued evaluation should take place periodically and involve other members of the management team