



# Risk Overview

Module Name: Risk  
Session Number: Session 1

## Module Objectives



- Define and quantify the risk for agricultural operations
- Introduce the application of computer decision tools to analyze risk and incorporate risk into decision making
- Enhance the understanding of risk management tools and their use on your operation

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# Outline Of This Session



- What is Risk
- Sources of Risk
- General Management Strategies
- Risk Preferences

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## What is Risk?



- Risk is the possibility of adversity or loss, and refers to “uncertainty that matters”
- Risk management involves choosing among alternatives to reduce the effects of risk
  - The objective is not to eliminate risk
  - Risk management is taking the right risks to optimize profit while reducing income variability and meeting financial obligations

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# Risk vs. Uncertainty



- Risk – a situation where the decision maker knows both the alternative outcomes and probabilities associated with each outcome
- Uncertainty – a situation where the decision maker does not know the probabilities of alternative outcomes, and may not even know the possible outcomes that can occur

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# Sources of Risk



- Production and technical risk (yields, productivity, etc.)
  - Weather
  - Diseases
  - Insects
  - Soil fertility
  - Genetics
  - Equipment

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# Sources of Risk



- Marketing and Price Risk
  - Output prices
  - Input prices
  - Market access
- Financial Risk
  - Liquidity
  - Leverage
  - Interest rate
  - Asset control

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# Sources of Risk



- Institutional risk
  - Government policy
  - Tax policy
  - Environmental regulation
  - Zoning
- Legal risk
  - Liability
  - Contract
  - Environmental damage
  - Tax and estate planning

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# Sources of Risk



- Personal risk
  - Illness
  - Injury
  - Death
  - Disability
  - Divorce
- Human resource risk
  - Availability
  - Worker Safety
  - Legal risk from employee relations
  - Employee behavior

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# Kansas Producer Ranking or Risk Exposure



- |  |     |
|--|-----|
| • Output price variability             | 4.7 |
| • Yield variability                    | 4.3 |
| • Changes in input costs               | 4.1 |
| • Changes in environmental regulations | 4.1 |
| • Operator injury, illness, or death   | 3.9 |
| • Changes in interest rates            | 3.9 |
| • Availability of skilled labor        | 3.8 |
| • Changes in machinery costs           | 3.7 |
| • Unforeseen litigation                | 3.6 |

Scale, 1= not important, 5 = very important

Source: Knutsen, et al, 1999

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# Ranking implies the following ordering of sources of risk



- 1. Marketing
- 2. Production
- 3. Institutional
- 4. Personal
- 5. Financial
- 6. Human resources
- 7. Legal

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## Relative Impact Of Factors On ROE Variability (Profit Risk)



- Research over the last several years has consistently revealed that producers (in survey responses) tend to
  - 1) over estimate the importance of marketing and production risk
  - 2) under estimate the importance of financial risk
- The question now on everyone's mind is has marketing risk (broadly defined) become more important

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# General Methods for Managing Risk



- Reduce
- Transfer - shift
- Avoid
- Retain – self insure
- Improve information and decision making

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## Management Strategies

### Responses to Risk

High Frequency Low Severity  <b>Avoid/Reduce/Retain</b>	High Frequency High Severity  <b>Avoid</b>
Low Frequency Low Severity  <b>Reduce/Retain</b>	Low Frequency High Severity  <b>Reduce/Transfer</b>

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# Management Strategies

- Production Risk
  - Enterprise Choice
  - Technology
  - Yield Insurance
  - Revenue Insurance
  - Contract Production
  - Diversification
  - Geographic Dispersion
  - Management
- Marketing Risk
  - Marketing Plan
  - Futures Contracts
  - Options Contracts
  - Cash Contracts
  - Revenue Insurance
  - LRP
  - Contract Production

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# Management Strategies

- Financial Risk
  - Debt Management
  - Record Keeping and Analysis
  - Interest Rate Hedging
  - Insurance
  - Family Living Cost
  - Transition and Estate Planning
- Legal Risk
  - Contracting
  - Insurance
  - Management
- Human Resource Risk
  - Planning
  - Cross Training
  - Transition and Estate Planning
  - Communication and Management

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# Which Strategies Are Right For You?



- Depends on
  - Ability to bear risk
  - Willingness to bear risk

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## Ability to Bear Risk



- Ability to Bear Risk
  - Depends on:
    - financial reserves
    - cash flow commitments
  - In general, farms with a low debt to asset ratio and high current ratio have more ability to bear risk.

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# Willingness to Bear Risk



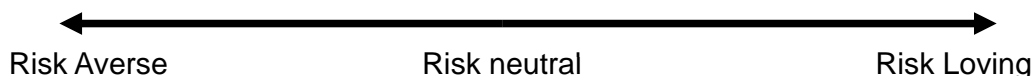
- Risk attitudes or Preferences
  - Individuals differ concerning their attitudes toward bearing risk.
  - These attitudes are a key factor in explaining why individuals choose different strategies when faced with similar risky decision problems
  - Risk preference surveys are available to help you get a handle on your risk preference

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## Risk Preferences



- Individuals can be categorized based upon their attitudes toward bearing risk



- Risk preferences/attitudes really need to be thought of as a continuum

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# Risk Preferences



- Willingness to Bear Risk
  - Factors that influence the amount of risk farmers are willing to take:
    - age
    - equity
    - financial commitments
    - past financial experiences
    - the size of gains and losses involved
    - familiarity with the risky proposition
    - other personal characteristics of manager

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# Risk Aversion



- Most people are risk averse
- Risk averse decision makers have preferences for less risky alternatives
- Risk aversion does not imply that the individual will accept no risk at all; only that he/she must be compensated for taking risks

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# Risk Aversion



- In general, risk averters will sacrifice some amount of expected income to reduce the probability of low incomes or losses
- For example, when choosing between a certain \$10 and a coin flip (\$20 for heads and \$0 for tails), they will choose the certain \$10
  - They would need a premium above the \$10 expected outcome to accept the risk
  - (\$22 for heads and \$0 for tails, for example)

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# Risk Preferring (loving)



- Risk preferring individuals have a preference for more risky alternatives
- They may not need a higher expected value in order to prefer a risky alternative, if there is some non-zero probability of a higher outcome even though they must accept some probability of lower outcomes as well
- They will not give up potential gains in order to eliminate the possibility of losses

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# Summary



- What is Risk
- Sources of Risk
- General Management Strategies
- Risk Preferences

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