

**Defining Risk Management:**  
**What is it, and how does it apply to your business?**

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**Forward:**

The CEO of a major Alberta livestock company likes to say that he has only two goals for his business: (1) maximize profits, and (2) stay in business<sup>1</sup>. It's the second goal that deals with risk: making sure that you will be around to be in business tomorrow and in the future. Neither goal is more important than the other. If there are no profits, there is no sense in being in business, and if your business fails financially, there's no chance to earn profits. Risk and return tend to go together; you can't have one without the other. This paper and presentation will:

- Look at risk as a business management concept, and why it's important to understand why risk has both an upside and a downside.
- Look at why terms "risk" and "risk management" may be the most used and abused terms in the English language.
- Present and discuss the various types of risk
- Suggest some strategies that can help identify, measure, and manage risk, and...
- Provide you with some knowledge, skills and tools that you can use in your own businesses.

**Definitions of Risk**

The classic dictionary definition of risk says that risk is bad, when in reality it's neither good nor bad. Risk might be better described as necessary, because if risk did not exist, neither would opportunity. Here are some other ways to think about risk:

- Risk can be defined as the possibility of unexpected outcomes. It can also be defined as uncertainty, although some writers differentiate these two terms by stating that risk refers to variability that is predictable while uncertainty is unpredictable. So flipping a coin involves risk while the chances of lightning striking in any particular place would be defined as uncertainty.
- Risk exists because the future is unknown. Because there is uncertainty about the future, there is a chance of loss. Risk relates to the size of the potential loss (i.e. the severity of the loss) and to the likelihood that it will occur (i.e. the frequency of it occurring)<sup>2</sup>.
- For this paper, I have chosen a definition from David Hillson's paper<sup>3</sup> "Effective Strategies for Exploiting Opportunities." He writes, "...risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective..." The key points are that risk involves uncertain events and that effects may be either positive or negative.

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<sup>1</sup> Personal communication

<sup>2</sup> Bauer, Leonard and Bushe, Don. Managing the Modern Farm Business, The Risk Management Modules, University of Alberta, Faculty of Extension, 3<sup>rd</sup> edition, 2003. Available from AAFRD Business Management Innovations Branch in Olds.

<sup>3</sup> Hillson, David, Effective Strategies for Exploiting Opportunities, Proceedings of the Project Management Institute Annual Seminars & Symposium, November 1-10, 2001 • Nashville, Tenn., USA.

- The key to understanding risk and risk management is that risk can be both good and bad, has elements of impact and likelihood, and that without risk there would be no reward.

### **Risk as Positive and Negative**

Dr. David Hillson<sup>4</sup> suggests that risk can be divided into positive and negative sides. He suggests that the traditional definition of risk be broadened to mean positive as well as negative, and that the terms opportunity and threat be adopted to describe those conditions. In this follow-up paper, Dr. Hillson presents a mirror-image set of risk responses built around the division of risk into opportunities and threats.

Dr. Hillson's view has considerable merit, especially because his mirror-image approach handles the positive and negative aspects of risk so intuitively. It leads quite seamlessly into risk responses and risk response planning. And as a bonus, it fits extremely well with the familiar SWOT analysis (Strengths, Weaknesses, Opportunities, Threats).

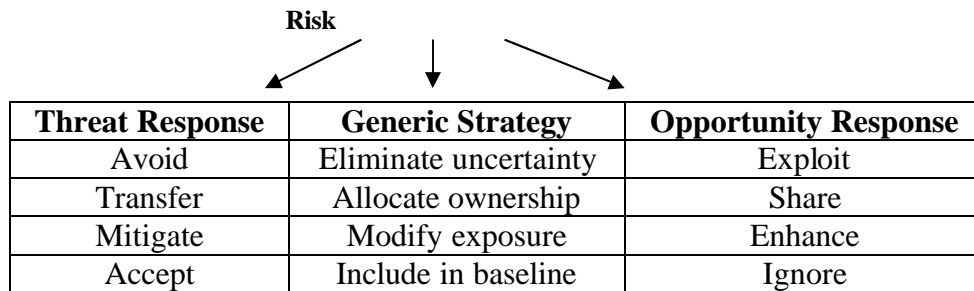
### **Risk Versus Return (the risk – return ratio)**

Projects that are inherently risky (contain a high degree of uncertainty) have a significant downside “threat” level. However, there is generally a significant upside “opportunity” as well. The same thing holds with comparatively risk-free endeavors: the risk of serious loss is low, but so is the prospect of significant gain. High risks promise high returns; low risks ensure low ones: hence the concept of a more-or-less constant risk – return ratio.

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<sup>4</sup> Hillson, David, Effective Strategies for Exploiting Opportunities. Proceedings of the Project Management Institute Annual Seminars & Symposium, November 1-10, 2001, Nashville Tennessee, USA. (Used with permission)

## Risk Responses and Risk Response Planning <sup>5</sup>



**The Risk Management Modules** – the balance of this paper is organized around four modules in Len Bauer and Don Bushe’s series entitled “Managing the Modern Farm Business.” The complete set of four modules include: Identifying Risk Attitudes, Identifying Risk Sources, Measuring Degrees of Risk, and Designing Risk Management Strategies.

### Identifying Risk Attitudes

Each of us has his or her own personal comfort level for risk. Some of us can’t sleep at night if we have \$20,000 left to pay on our house mortgages; others easily accept multi-million dollar debt levels. This anomaly can be partially explained by our differing risk tolerance profiles.

- Risk Averse - Risk averse individuals are more likely to avoid risk and accept a lower rate of return. Almost all of us exhibit some degree of risk aversion.
- Risk Loving – Risk lovers prefer a higher level of reward and they’re willing to accept an increased chance of failure achieve it. True risk-loving individuals are extremely rare.
- Risk Neutral – These people neither avoid nor embrace risk. They’re equally comfortable at both ends of the risk – return continuum. Again, this is unusual behaviour.

There are several other important points to consider here:

- No specific risk tolerance level is better or worse than another, but the assumption is that people display some degree of risk aversion. The important concepts are that the project or investment is consistent with your individual risk tolerance level and that it provides the maximum return for the risk you’re accepting. In other words, it should be as “risk efficient” as possible.
- Your business’s ability to bear risk may not match your personal risk tolerance profile. For example, you may be only slightly risk averse but the nature of your business or its financial structure may require that investments must be at the lower end of the risk–return continuum.

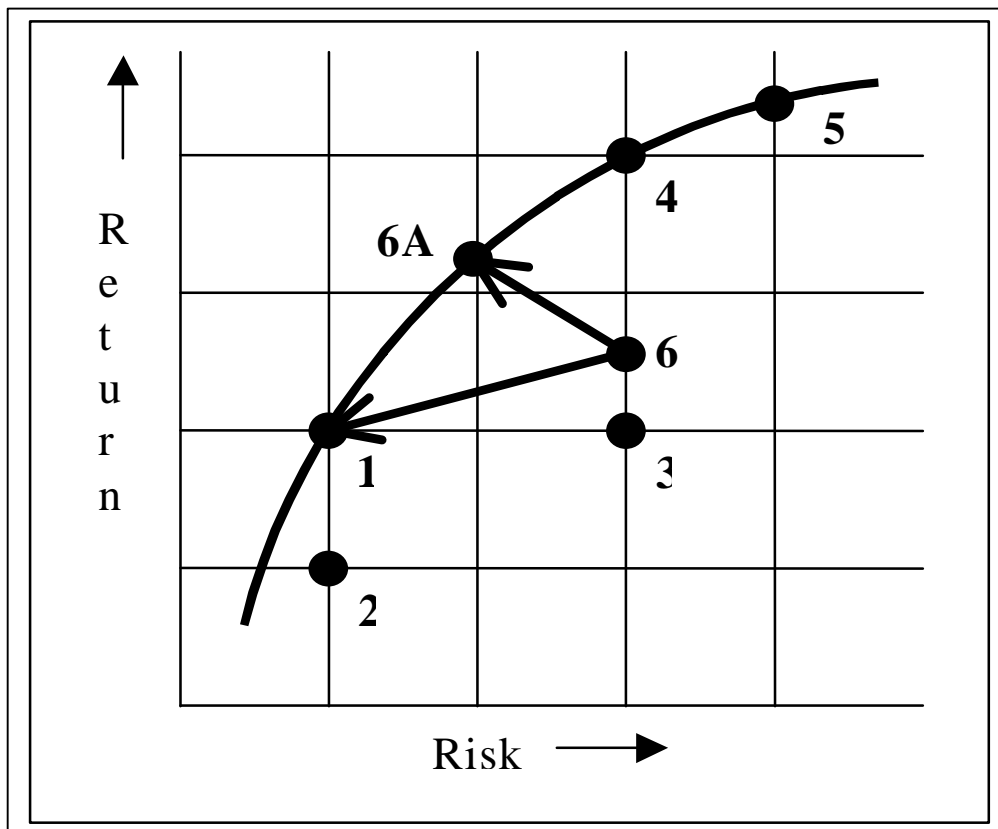
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<sup>5</sup> Hillson, David, Extending the Risk Process to Manage Opportunities. Presented at the Fourth European Project Management Conference, PMI Europe 2001, London UK, 6-7 June 2001, (Used with permission).

- These concepts are relevant in other areas as well as economics. A mountain climber accepts a relatively high level of risk, but believes that the risk is outweighed by the rewards. For the rest of us, a walk in the park provides the same risk-return ratio.

Refer to Figure #1 (below). This diagram plots risk versus return. Note that risk increases as we move to the right; return increases as we move up. Instead of risk and return, we might have used the terms likelihood and impact, or mean and standard deviation. The first term (risk, for example) is a measure of the variability and the second (for example, return) indicates the expected value. As a general rule, any point above and to the left of a second point is more desirable. In other words, any point northwest of a second point is preferable because it offers more return with less risk. In Figure 1, point 6A dominates (is more desirable than) point 6 and 3, but not 1,2,4 or 5. This depiction is sometimes called an E – V space diagram (expected value and variance). Note that this process can be used to make choices among diversified investments, portfolios or enterprises, but should not be used to rank individual investments such as crops. For more about this process, refer to the module “Identifying Risk Attitudes.” Figure #1 – Identifying Risk Attitudes, Len Bauer and Don Bushe.

Figure #1 Risk Vs. Return



## Identifying Risk Sources

Dr. Michael Boehlje, in his paper “Positioning the Farm Business<sup>6</sup>”, classifies risk into two major categories: strategic and operational.

### Strategic Risk

- Strategic risk focuses on the direction a company is heading in relation to the overall business climate. Strategic risk begs the question, “Are We Doing the Right Things?” or “Are We In the Right Business?” Strategic Risk includes:
  - Political, government policy, macro-economic, social and natural contingencies
  - Industry dynamics involving product markets, competitive and technological uncertainties.
  - In general, strategic risk cannot be transferred to others by conventional means such as insurance or hedging.

### Operational Risk (also known as tactical risk)

Operational risk is divided into the subcategories of financial risk and business risk. It is more easily managed or transferred using conventional risk management strategies such as insurance, futures markets and diversification. Operational risk prompts the question, “Are we doing things right?” Operational risk is often the only type of risk considered by business owners and managers.

#### Financial Risk

- Financial risk is the uncertainty that is associated with debt financing, or leverage. Leverage amplifies both profits and losses, and therefore adds to overall risk exposure. Also included are uncertainties surrounding the cost and availability of capital, loan limits, security requirements, etc.

#### Business Risk

- Business risk is the operational uncertainty that exists if there is no debt. The main component of business risk is the variability of prices and yields, or commodity risk. Crop insurance, the Canadian Agricultural Income Stabilization Program (CAISP), forward contracting and, hedging on the futures market are examples of commodity risk mitigation and transfer strategies. Business risk deals with uncertainties that are internal to the business; examples include: extreme weather events, fire, human resources, product liability, cost volatility, market uncertainty and market access. Any risk that can be insured against or transferred to someone else is likely business risk.

### So What?

While it may seem like a purely academic pursuit, it’s important to understand the general concepts that relate to risk as well as its individual components. Unless we know what it is, it’s pretty difficult to begin to manage it. See Dr. Boehlje’s paper, pages 16 & 17 (figures 6 & 7) for examples of sources of risk, both strategic and operational.

### Measuring Degrees of Risk

Measuring risk involves a determination of both the likelihood that the risk event will occur as well as its potential impact. For events for which we have data, likelihood and impact can be

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<sup>6</sup> Miller, Alan; Boehlje, Michael and Dobbins, Craig; Positioning the Farm Business, Staff Paper #98-9, Department of Agricultural Economics, Purdue University, June 1998. (<http://agebb.missouri.edu/ncext/ncr134/risk/businessorganization/Publications.htm> Used with permission)

described using mathematics, statistics and economics. When we have little or no data, the only option is to estimate likelihood and impact subjectively. AAFRD is working on two new tools in the area of risk, one demonstrating the subjective (or non-quantifiable) approach and the other demonstrating the objective (or quantifiable) method.

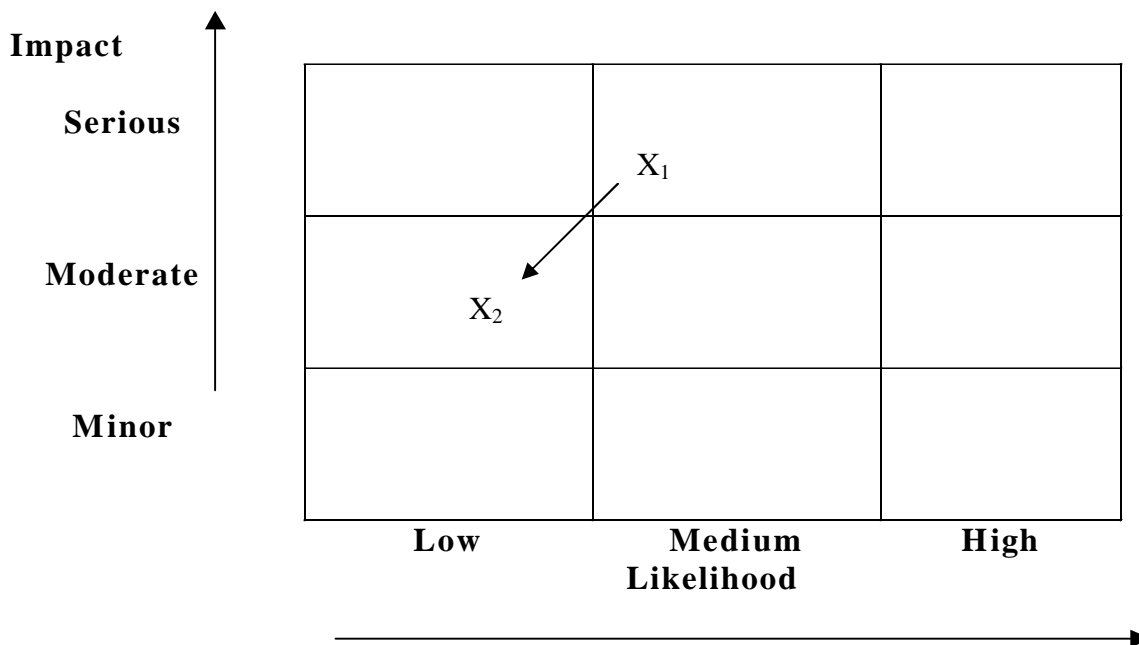
### **The Risk Matrix Tool – A Big Picture Look at Measuring Risk.**

Over the past decade many corporations and other organizations have developed comprehensive approaches to managing risk. It is largely subjective (or descriptive) and provides a systematic process by which to identify risks and rank them by importance, so that some action can be taken.

A common feature in most risk frameworks is a grid or matrix that has “Impact” on one axis and “Likelihood” on the other. Through a system of information gathering and sorting, risks are identified and ranked as high, medium or low (for both likelihood and impact). Results are plotted on the grid. The importance and ranking of each event becomes more evident and risk responses can be planned and implemented.

For example, in Figure 2 below, the task is to develop risk management strategies that will reduce the likelihood and impact of risky event “X” until it is judged as acceptable.

**Figure 2 - The Risk Matrix**



The attractions of such a tool for use in primary agriculture are several:

- It moves agriculture in a direction already taken by other industries. For example, risk frameworks and matrices are used routinely in oil and gas exploration, the high tech industry, and in food safety (HACCP uses similar concepts).

- It's a big picture look at all of the issues of concern to the business owner/operator. Issues as unrelated as the key operator getting injured to the inability to meet cash commitments can be considered and ranked for action.
- It provides a way to get issues and concerns out of people's heads and down on paper, where the management team and other stakeholders can help.
- Coupled with tools that deal with specific and measurable risky issues such as crop yields and prices (see the CropChoice\$ decision model below), this approach helps us present a complete and integrated picture of risk and risk management.

This tool is targeted at agricultural business owner/operators, consultants and other stakeholders. A draft version of the Risk Matrix Tool is currently available from AAFRD's Business Management Innovations Branch at Olds. The initial public version will be published on Ropin' the Web in January 2005.

### **The CropChoice\$ Planning Tool**

Alberta Agriculture, Food & Rural Development is developing a crop budgeting tool based on the principles of risk and risk management. While this tool is specific to Alberta cropping enterprises, it demonstrates a technical approach to managing risk, an approach that can be applied to other ventures. It is presented here as an example.

The first version of CropChoice\$ is now available for free download on Ropin' the Web, and it was used by many Alberta producers to make their 2004 cropping decisions. The development of this program marks our first attempt to create a computerized tool that is capable of measuring the degree of risk to which a cropping enterprise is exposed. It can also measure the effectiveness of various risk management strategies such as crop diversification, crop insurance, and various land rental options. A more comprehensive version is slated for release in January of 2005.

This tool demonstrates a technical approach to measuring risk and evaluating risk management strategies. Figure 3 shows an example of a report and graph produced by CropChoice\$.

Figure 3 - Graph from Crop Choice\$

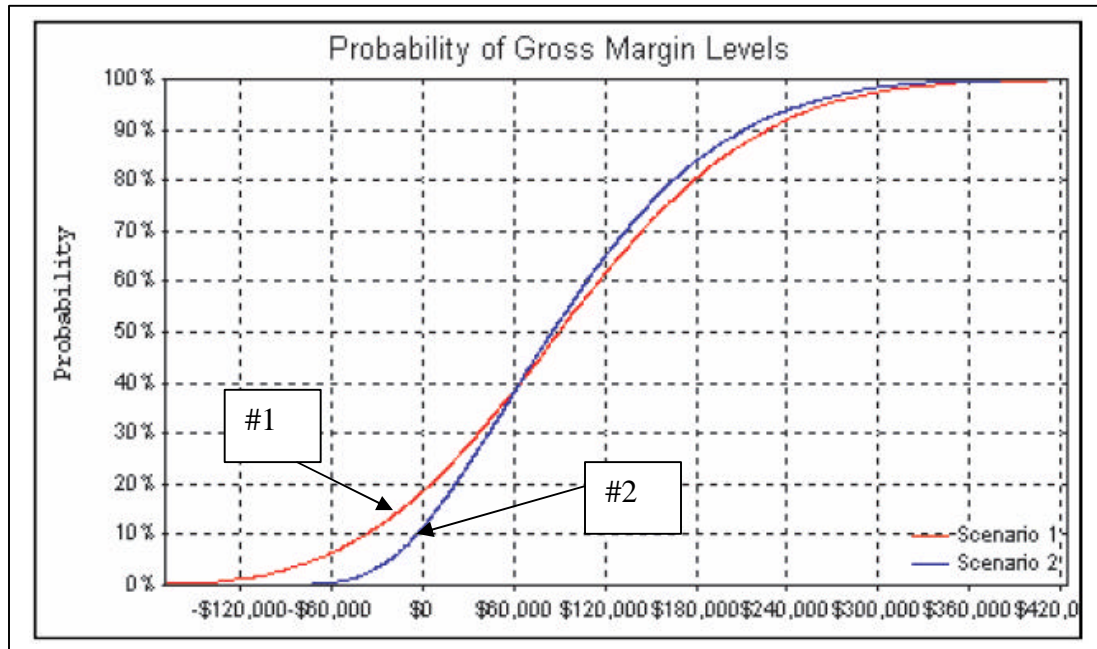


Figure 3 (above), shows the probability that a fictitious cropping enterprise will *fail* to reach specific targets. It shows two scenarios: #1 without crop insurance (red line), and #2 with crop insurance (blue line). Without crop insurance there is about a 7% chance of losing \$60,000 or more, while with crop insurance the chance of losing that amount falls almost to zero. With crop insurance, this operation will fail to break even just one year out of ten. Without crop insurance, losses will be about \$45,000 or more, one year out of ten. CropChoice\$ uses this same process to compare up to 8 different risk management strategies.

These two risk identification, measurement, and management tools demonstrate both the big picture subjective approach and the more-focused technical and quantifiable method.

#### Designing Risk Management Strategies

There's an old saying that goes, "What gets measured, gets managed." As our ability to measure risk improves, it's much easier to design and evaluate strategies that help to manage risk.

The two measurement tools described above have the evaluation of risk management strategies integrated into their design. The Risk Matrix Tool first considers inherent risk, or risk without mitigation. The next step is to search for and select strategies that will reduce the impact or the likelihood that the risk event will occur. The risk event is reconsidered with the mitigation strategy in place. The CropChoice\$ tool allows you to consider a base case scenario, and then evaluate the effect of various risk management strategies including varying your crop mix, crop insurance, different land rental options etc.

### Considering Financial Risk

Business risk is not affected by financing: just like return to assets (ROA) is independent of debt levels. However, financial risk amplifies business risk, producing significant effects on total operational risk. Financial risk management is an integral part of financial statement analysis. An excellent option is the Alberta Business Analyzer (ABA)<sup>7</sup>, available for free download from AAFRD's Ropin' the Web.

To better understand the effect of leverage, the main component of financial risk, consider the formula in Figure 4.

Figure 4 - The Effect of Financing Levels on Returns to Equity

$$r_E = r_A + L(r_A - r_D)$$

Where:

$r_E$  represents per cent return on equity,

$r_A$  is the percent return on assets,

$r_D$  is per cent return to debt holders or the rate of interest

L is the leverage ratio.

The leverage ratio (debt / equity) has the same effect on overall risk as it does on return to equity. If the leverage ratio is large, both profits and losses will be amplified.

### Conclusion

Understanding, measuring and managing risk is a key issue in today's economic environment. As the industry becomes more vulnerable to increasing variability, governments seem to back away from traditional types of financial support. This leaves individual producers with a bigger role to play in managing their own risk. In the end, the goal is to help producers make better decisions about the future operations of their businesses, with the clear knowledge that a better chance of survivability and long-term profitability will be the result.

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<sup>7</sup> Alberta Business Analyzer (ABA). Ropin' the Web: click on "Calculators," then "Farm Management," or follow this link: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/bus3001?opendocument](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/bus3001?opendocument)