



EVALUATING RISK STRATEGIES



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A scenic photograph of a rural farm at sunrise or sunset. In the foreground, there is a wooden fence and tall green grass. Behind the fence is a large field of yellow wildflowers. In the middle ground, a large red barn with a blue roof and white trim stands next to two metal silos. The background features rolling green hills and mountains under a clear blue sky with a warm, golden glow from the low sun.

I. Introduction to Risk Strategies

INTRODUCTION TO RISK

Under the classical description of risk, risk is described as a special case of uncertainty: where the outcomes and probabilities are known. In popular usage, risk is generally understood to mean future events where the outcomes are uncertain. Stated in another way, risk is the effect of uncertainty on objectives. (*ISO 31000:2009 Risk Management Principles and Guidelines*. International Organization for Standardization, 2009).

Not all uncertainty is created equal, however. Risk might be described as a case where the uncertainty matters; if the outcome did not matter there would be no risk. Risk does not always imply a negative or bad outcome. Uncertain future events may result in good, bad, or neutral outcomes. The likelihood of one or more outcomes may also be unknown.

1. FIVE SOURCES OF RISK

Traditionally, the sources of risk to agricultural businesses include five distinct sources: market risk, production risk, institutional risk, human risk and financial risk. Marketing and price risks include the prices of inputs or outputs that change after the manager has committed to a plan of action. Production risks might be described as uncontrollable events such as weather, pests or disease that make yields, quality, or unpredictable outputs. Institutional risks include government or other institutional rules, regulations and policies which effect profitability through costs or returns. Human risk arises from the character, health or behavior of the people involved in the business. Finally, financial risk is the extra risk that is attached to borrowing outside capital to make the business function. It may be thought of as the added variability resulting from debt financing.



2. RISK TERMINOLOGY

Absolute risk = Description of a risk outcome in terms of the absolute improvement (worsening) over the previous situation. See Relative Risk (Risk Savvy: How to Make Good Decisions. Gigerenzer, 2014).

Attitude = A state of mind, mental view or disposition with regard to a fact or state (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Decision = Noun, a: the act or process of deciding · the moment of decision has come, b: a determination arrived at after consideration | conclusion made · the decision to attend graduate school (Merriam-Webster Dictionary, online 2018).

Decision analysis = A family of methods developed to assist choice in an uncertain world (Coping with Risk in Agriculture, 2nd ed. Hardaker, et al., 1997).

Effectiveness = Relates to the extent to which a measurable result is obtained from a process using inputs to generate outputs (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Efficiency = Describes the application of resources as inputs in order to generate outputs with minimal waste (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Heuristics = Rules of thumb, often enable us to make a decision quickly without searching for information (Risk Savvy: How to Make Good Decisions. Gigerenzer, 2014).

An approach to inferring a solution to a problem by reasoning from previous experience, when no relevant data exists (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Management = Noun, the act or art of managing | the conducting or supervising of something | judicious use of means to accomplish an end (Merriam-Webster Dictionary, online 2018).

Mean = The sum of the values in a set of numbers divided by the number of values in the set. The average of a set of numbers (Modern Elementary Statistics, 5th ed. Freund. 1979).

Median = The value of the middle item in a set of numbers when the values are arranged in increasing (decreasing) order (Modern Elementary Statistics, 5th ed. Freund. 1979).

Mode = The value that occurs most often in a set of numbers (Modern Elementary Statistics, 5th ed. Freund. 1979).

Perception = Verb, to attain awareness or understanding of (Merriam-Webster Dictionary, online 2018).

Probability = Probability is about:

1. Frequency: for example, counting the number of days with rainfall;
2. Physical design, a symmetrical die has an equal chance of rolling any one of the six sides; and
3. Degrees of belief, which can be based on anything from experience to personal impression (Risk Savvy: How to Make Good Decisions. Gigerenzer, 2014).

Probability Density Function (PDF) = A PDF is one way of describing risk outcomes and likelihoods.

Relative risk = A measure of a risk outcome in terms of the relative improvement (worsening) over the previous situation. See Absolute Risk (Risk Savvy: How to Make Good Decisions. Gigerenzer, 2014).

Risk = Uncertain consequences (Coping with Risk in Agriculture, 2nd ed. Hardaker, et al., 1997). OR Risk is uncertainty that matters (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Risk attitude = A chosen response to uncertainty that matters, driven by perception. It is important to consider that these may not reflect reality (Understanding and Managing Risk Attitude. Hillson and Murray-Webster, 2007).

Risk averse = When faced with significantly risky incomes or wealth outcomes, a person who is risk averse will be willing to forgo some expected return for a reduction in risk (Coping with Risk in Agriculture, 2nd ed. Hardaker, et al., 1997).

The tendency to prefer a sure option over a less certain one (Risk Savvy: How to Make Good Decisions. Gigerenzer, 2014).

Risk management = The systematic application of management policies, procedures, and practices to the tasks of identifying, analyzing, assessing, treating, and monitoring risk (Coping with Risk in Agriculture, 2nd ed. Hardaker, et al., 1997).

Strategy = Noun, a careful plan or method | a clever stratagem | the art of devising or employing plans or stratagems toward a goal (Merriam-Webster Dictionary, online 2018).

Uncertainty = Imperfect knowledge (Coping with Risk in Agriculture, 2nd ed. Hardaker, et al., 1997).

3. HOW IS RISK ESTIMATED?

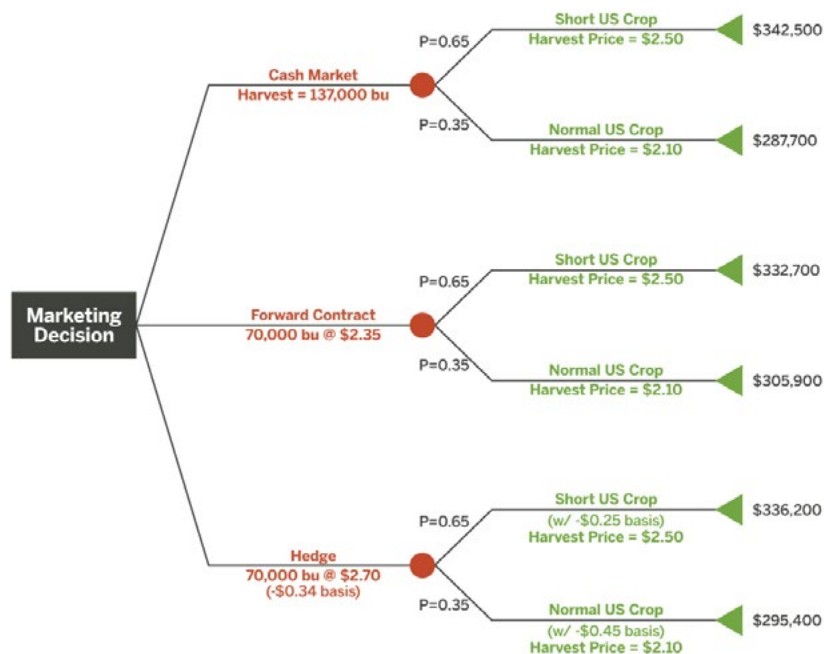
Where risk involves uncertainty about the future, it is challenging to describe to those who are uncomfortable with the concepts and implications. The terminology and concepts are focused on events and outcomes that have not yet taken place. Many decision makers live in the reality of today and find forecasting the future difficult, if not impossible.

The fact that risk is focused on uncertain outcomes is clear. However, a closer look suggests that those outcomes may be uncertain because it is difficult to describe how *likely* they are to occur (probability) or because it is difficult to determine the *quality* of the outcome (how much, how often, good or bad, etc.)

In general, risk is estimated by making projections about the probability and the potential impact on the person or business. Such estimates can then be used to prioritize the risks for management attention. Simple ratings of high/medium/low probability and associated impact can be presented in a 3x3 payoff table to help decision makers compare high probability-high impact to low probability-low impact methods.

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

An alternative approach is to estimate the threat represented by alternative risks using a quantitative method. In this case, the decision maker makes an estimate of the probabilities associated with alternative outcomes, as well as assign values for the quantity of output. The outcomes and branches of this type of decision tree may be evaluated by mathematical approaches to suggest numerically-better alternatives.





Uncertain Value 1: Cover one XXXX XXXX
 Uncertain Value 2: Weed XXXXX XXXXX

Return

Carried even further, decision analysis of this type relies on the description of possible outcomes using statistical measures of mean, deviation, variance and other measures to describe the outcomes. This approach, when taken to its logical conclusion, can be used to estimate risk in terms of mathematical functions that provide a description of probability for the various outcomes designated by the decision maker.

What is risk management?

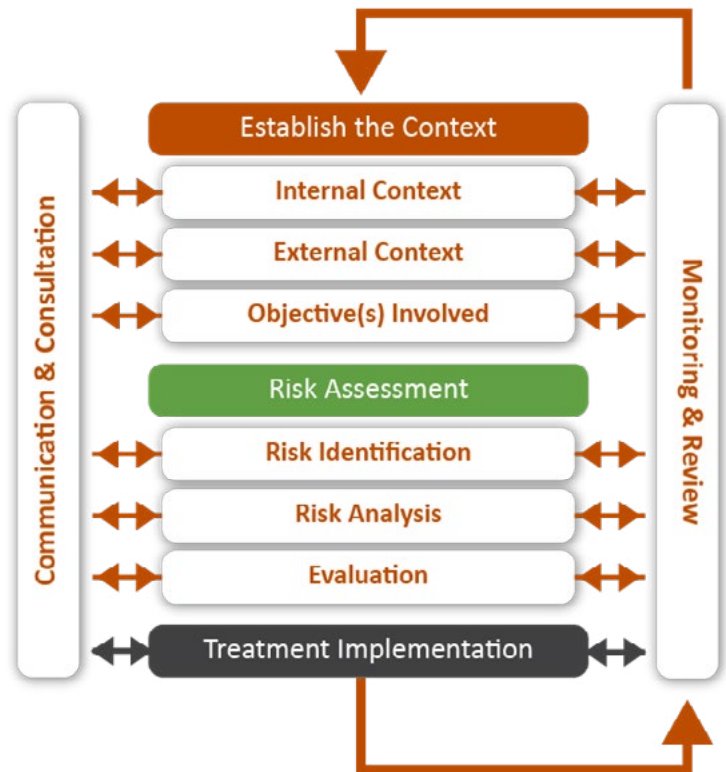
Most people would prefer certainty over uncertainty and risk in many aspects of life. However, almost nothing is certain and, instead, uncertainty should be expected. Risk management can be thought of as one or more strategies created with the goal of reducing the consequences of negative outcomes, or to increase the likelihood of positive outcomes.

Process for risk management

A good risk management process can be used and re-used on a regular basis as a part of making management decisions. It starts by establishing where you are and where you want to go. This involves describing the internal and external contexts within which the decisions are made.

Steps within a risk management process should include:

1. Establish Context, including: a. internal context, b. external context, and c. objectives involved or risk criteria; **2. Risk Assessment**, including: a. risk identification, b. risk analysis, and c. risk evaluation; and **3. Treatment Implementation**, including: a. describe treatment options, b. evaluate treatment effectiveness, c. select treatment, d. implement treatment; These steps will ideally be completed within a context of ongoing: Communication and Consultation, as well as Monitoring and Review.





II. Risk Management Strategies

WHAT IS A STRATEGY?

The Greek word strategos describes a military general, or someone who commands a stratos, or army. Put another way, “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” (*Strategic Action Planning NOW!* Gates, 1998).

In popular usage, strategy is often used to describe the means by which a person/business plans to use resources to reach the desired ends. In this way, strategy implies: 1. a goal, 2. resources, and 3. a method or approach for action.

1. ESTABLISHING RISK MANAGEMENT GOALS AND OBJECTIVES

Setting goals and objectives are one method for describing what that future should look like. The process of drafting the goals can be very helpful in determining what exactly is required to get from here to there. In other words, thinking through the steps can help the people involved see what resources will be required, what changes must be made in current operations, and what some of the milestones might be along the way.

Most farm and ranch operations have some idea of where they are headed; fewer have formal, written plans. An even smaller number have well-articulated, written goals that are shared with everyone concerned. Formal goals can provide the basis for monitoring business activity, give input to management decision making, and offer insights into appropriate contingency responses when external forces require mid-course corrections (*Applied Risk Management in Agriculture*. Hoag, et al. 2010).



2. ESTABLISHING RISK MANAGEMENT POLICIES AND PLANS

In the military, a strategy is a maneuver designed to deceive or surprise an enemy. It is an approach directed at winning. As such, it requires all levels of management and labor to be aligned with the general strategy to ensure success. The desired outcome, which is the focus of the individual or business activities, constitutes the risk management plan in mind: a step-by-step approach used to reach that desired outcome. Moving toward the desired outcome in a stepwise manner implies an order; some activities necessarily come first and others follow.



Planning provides a means for communicating the common vision, goals and objectives for individuals or a business. With this common understanding, a plan allows the people involved to react similarly to changes in the environment. Change may be either positive or negative and may be either anticipated or unanticipated. Regardless of the source or nature of change, a well-orchestrated planning process and resulting planning documents can lead to a more resilient business.

Risk management plans are concerned with describing the specific steps and timetable required for reaching the goals. Risk planning deals with the how and when of the process. Sometimes this phase is called action *planning, programming, or implementation*. Whatever the term, it refers to the outline of activities that must be accomplished in order to achieve the risk goals and the timing of these activities over the near term. Risk plans often include a listing of the action steps, a timeline for completion, who is responsible for completion of each step and some indicator to show the step has been completed.

Risk management strategies in agriculture

Strategies for managing risk or the consequences of a negative event, should it occur, vary by source of risk and level of protection already in place. In general, the options range from avoiding the risky practice entirely (minimizing the risk) to accepting the risk (self-insuring). Between these two extremes are several possibilities for managing the risk to a more acceptable level by: reducing the risk, transferring the risk or increasing the capacity to bear the risk.

1. Avoid the risk

Risk avoidance is concerned with reducing or eliminating the possibility of events with unfavorable consequences occurring. With foresight and the adoption of preventative measures, many situations can and should be avoided. When considering both the risks and possible preventative measures to take, to be effective, the process of considering should include both familiar and unfamiliar sources of risk (*Coping with Risk in Agriculture, 2nd ed.* Hardaker et al., 2004).



Avoiding the risk is accomplished when a manager makes an active decision to not engage in a particular practice or activity due to the level of risk that is involved.

Avoiding risk is simply not doing something that exposes the business to the risk. For example, if the decision maker is not comfortable with the risk of growing a particular crop, they can avoid it by simply not growing the crop. If they don't grow it, they don't have the expenses associated with growing it nor are any resources tied up in growing it. To evaluate this strategy, one must compare the benefits of not growing the crop against the lost potential income and the uncertainty around it.

2. Transfer the risk

Transferring risk is an approach for shifting risk from one party to another, usually outside the business, that can be accomplished through insurance policies, by contracting, or through other types of agreements with a third-party willing to share in the negative consequences in return for a premium paid in advance.

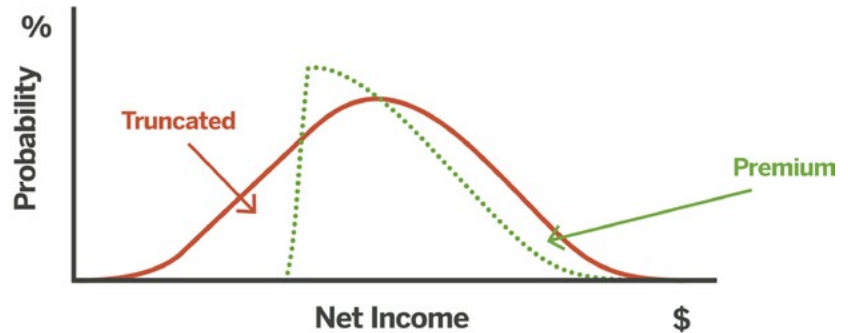


Evaluating insurance and marketing contracts can be frustrating if one only does so after the fact. Once the outcome is determined, it is tempting to declare the decision good or bad based on whether the contract worked out in one's favor. That is a bad habit to get into. Managers should always make a sincere effort to evaluate the decision at the time it is made in terms of what it costs in premium and, in the case of marketing contracts, upside potential against the premium cost associated with transferring the risk to a party outside of the farm or ranch organization.

Insurance

Insurance is a mechanism for risk management where the risk is transferred from an individual to a corporation or some other party that can more readily tolerate the risk. The purchaser pays more than the expected indemnity to avoid the risk. The party accepting the risk earns income

from the risk premiums. It can afford to pay for accidents and catastrophes because it is pooling risk over many people or types of coverage. Even insurance companies are required by law to reinsure so they maintain diversified pools. A company that specializes in hurricane insurance, for example, swaps some of its coverage with a company that covers automobile accidents, so neither company is caught short should a crisis occur (*Applied Risk Management in Agriculture*. Hoag, et al. 2010).



Insurance contracts have the effect of truncating net income distribution on the downside in exchange for subtracting the insurance premium expense from every outcome. Marketing tools like a put option work exactly the same way.

Contracting

Contracting is another approach for transferring risk from one person/business to another. The futures and options markets are examples of this type of transaction. Forward contracts for livestock and selling grain to an elevator before harvest are other examples of contracting. Incentives must exist for each

side in the exchange for the parties to see an advantage to locking-in a sale agreement and giving-up the flexibility to do something different at a later date.



A marketing contract that locks-in a price on some or all of a farm's production would have the effect of squeezing the distribution of net income into a tighter range of possibilities. The risk associated with the full range of possibilities is transferred to the party on the other side of the contract, in exchange for a risk premium that is collected up front by offering a contract price that is slightly in its favor compared to what they expect the actual price to be at the end of the contract period. The more locked-in, the tighter the range. Also, more risk is transferred away, shifting more upside potential and more risk premium to the other party in exchange for also transferring more of the downside risk to them.

3. Control the risk

Controlling risk is by far the most active form of managing risk. However, it is very important that the decision maker keep in mind the goal of risk management is to manage risk to a more acceptable level, not minimize risk, when evaluating alternative measures for controlling risk. In many situations this can be best accomplished by finding strategies that improve the level of expected returns, rather than those that reduce the variation in outcomes.

Controlling risk can be achieved by taking management action designed to change the outcomes for an event by:
1. Making negative outcomes less likely or 2. Reducing the consequences should they occur. Very seldom can one do both.



Controlling Probability

Managing with the intent to reduce the chances of bad events happening is likely just good, common sense for most ag operators. For example, a piece of machinery may break down at any moment. The risk of a machinery breakdown can be controlled by properly maintaining the machine, reducing the chance it will break down and extending its useful life, as well as saving money on a costly repair. The manager must compare the extra expense of maintaining the machine versus the effect it has on reducing the probability of a breakdown to evaluate if this is a good strategy,

Of course, methods for reducing the chances of bad events are not free, nor can they cover every situation. Some bad events are simply too expensive to reduce the chances for. Other events are so unlikely that the manager for all intent and purposes does not need to worry about managing the chances of them happening. With limited financial resources, however, most managers do spend time and effort to balance expenditures for chance-reduction against the benefits they expect those expenses to bring.

Controlling Impact

Controlling the impact of risk involves using strategic risk management tools like diversification, keeping extra reserves on hand and maintaining flexibility to reduce the impact of a bad outcome or increase the benefits of a good outcome.

Increase reserves

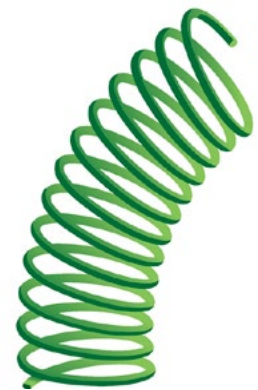
Having extra cash reserves on hand will reduce the impact of poor revenue in a given year. Evaluating this strategy is a matter of considering what it costs in potential income to keep cash reserves on hand versus the earnings they might bring in another use. In addition, the associated piece-of-mind that having reserves brings with it should also be taken into account.



However, holding extra reserves has a cost. The value of this strategy should be compared with others available before simply selecting it as best. For example, extra hay on hand can help when bad weather or high hay prices threaten to have a negative impact on the business. The decision maker might argue that holding the hay is worth it. Another possible approach would be to sell the extra hay and hold extra cash reserves in the case where more hay is needed.

Maintain flexibility

There are circumstances where the decision maker may feel that there is not enough information at hand to justify making a clear choice. It may be clear that doing nothing is not the best course either. In such 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. In this way, the manager is attempting to remain proactive in circumstances that suggest that change is needed, while retaining the capacity to more-fully respond as better data or clearer signals become available.



Diversification

The familiar strategy diversification is likely already clear to the reader. 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 when markets turn down or production levels are lower than expected. Some decision makers will go even further by banking with more than one bank, using equipment from more than one manufacturer, or in stratifying marketing by selling calves, bred heifers, stockers/yearlings and seed-stock bulls from the same livestock herd.



As with the other strategies for reducing impact, diversification comes with a unique set of costs. Managing a farm with multiple crops, requiring separate equipment, each with a separate marketing window and management challenges, creates additional overhead. Similarly, managing an ag business with both sheep and cattle or both livestock and crop enterprises creates additional management, labor and other resource availability issues. Such operations are clearly more resilient in a changing economy. However, they also limit the possibilities for participating in upward-trending markets because their strategy restricts their production to only a portion of the total possible in any one market.

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 accept the risk as a cost of doing business with the idea that the business will cover the entire cost, should a negative event occur. This approach is sometimes referred to as self-insuring.

Risk is usually associated with a potential reward. Producers speculate on risk all the time. That's where a lot of the profit in farming and ranching exists. However, this should be done with careful evaluation of the potential impacts and the willingness to accept the probability of their occurrence.



A scenic landscape at sunset or sunrise. In the foreground, there is a lush green grassy field. A rustic wooden fence with three rails runs across the middle ground. Behind the fence, a large, dark green pine tree stands prominently, with its branches silhouetted against the sky. The sky is filled with dramatic, golden light from the setting or rising sun, creating a warm, orange glow. The overall atmosphere is peaceful and natural.

III. Evaluating Risk Strategies

EVALUATING DECISIONS

A decision can be described as the outcome of a process that selects a preferred option or a course of action. In fact, "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" (The Cognitive Process of Decision Making. *Int'l Journal of Cognitive Informatics and Natural Intelligence*. Wang and Ruhe. 2007). Viewed from another perspective, decisions are the process by which strategy is implemented. They are the basic units of choice exercised by management to move the business forward.

There are several points raised in the previous description:



1. First, where a decision is about moving forward, this implies that the direction forward has previously been selected. In other words, management has chosen a direction by some process of weighing and considering available alternatives. Of course, the act of choosing direction is also a decision.



2. Second, from the first point, not all decisions are equal in nature. Some are of a higher, strategic nature, while others are concerned with day-to-day carrying-out of the strategy or implementation.



3. Third, all types of decisions involve taking management action after considering the alternatives, how it will be carried out, and when it will be completed (*Business Models: A Strategic Management Approach*. Afuah. 2004).

Evaluating a specific decision is best done by considering how it does or does not contribute to the success of the strategy it is intended to support. Obviously, some decisions are not made with conscious consideration of which strategy they may be tied to.

1. RECOGNIZING STRATEGIC DECISIONS

Strategic decisions might be classified as a sub-set of broader business decisions that are focused on selecting where the business should go in the future. Deciding *direction* (goals) and selecting the strategy for *how* forward progress is to be made are *strategic decisions*. A decision becomes strategic when the choice being made will guide future decisions.

This approach comes from a formal view of strategic management and its corresponding five steps: 1. Select goals; 2. Identify external opportunities and threats; 3. Identify internal strengths and weaknesses; 4. Select strategies that build on strengths, correct weaknesses, take advantage of opportunities and counteract threats; and 5. Implement the strategy (*Strategic Management: An Integrated Approach*. Hill and Jones. 2008).



Another view is that strategic planning and a purposeful selection of strategies leading to a prescribed set of decisions and supporting actions on the part of management is too constraining for managing a business in today's environment. Evidence cited in support of this view include: 1. There is often a mismatch between the timing of strategy selection and planning and the more dynamic process of decision making by management; 2. The process of reviewing the strategy selected for the business is fraught with problems, not the least of which is an incentive for politics to enter into the formula used for selection; and 3. Most emphasis in the overall process is placed on the budget and operating plans, rather than on strategy selection (*Strategic Management*. Saloner, Shepard, and Podolny. 2001).

The old adage still applies, however, "*When you don't know where you are going, any road will get you there.*" In order to make progress in moving the business forward, the direction forward must be defined. This suggests that management has carefully considered the goals they would like the business to pursue. For these goals to remain relevant, they must be reconsidered on some periodic basis. That basis may be annually or at periods longer than one year. In addition, this process should involve all the individuals who have a vested interest in the business achieving those goals.

Commitment

As noted under the preceding discussion of strategy, with a set of strategic goals in hand, management must next take steps to make sure that the *quantity* of resources is available for achieving those goals at the time when the resources are needed. This not only requires that the individuals involved continually monitor business activities (planting, cultivation, harvest, birthing, feeding, pasture rotation) but must also take *action* when the appropriate time arrives. This may involve a significant amount of effort to prepare for the action in anticipation of performing the needed steps.



As this process unfolds over time, there remains the ever-present threat that the responsible individuals might waver in their commitment to complete these activities in the best and most efficient manner. It is also possible that other factors (weather, pests, disease, cash flow, manager-capacity) may influence when and how well the steps are carried out. The level to which the commitment is maintained and the various factors and forces governing how well the actions are carried out will determine how completely the goals are achieved.

Irreversibility

Many strategic decisions have an element of irreversibility to them. Decisions that select between big-picture alternatives typically are accompanied by the requirement for a large quantity of resources, and a correspondingly larger number of implementation steps and management actions. As a result, once the business starts down the path to purchase a neighboring farm or to transition from commercial to seed-stock production, the cost of reversing may be quite high.

Irreversibility does not imply that strategic decisions should never be reconsidered. On the contrary, as noted in the preceding discussion of risk management goals and objectives, choices made about direction and resources committed should be reconsidered periodically, perhaps annually.

Irreversibility is an important element in recognizing the strategic aspect of a decision. However, this does not make irreversible decisions strategic. Conversely, the degree of irreversibility suggests that decisions that inform and guide irreversible decisions are more strategic (*A Formal Theory of Strategy. Management Science. Van den Steen. 2017.*).

For example, a farmer or rancher developing a marketing strategy may decide to use one or more contracting tools to lock-in prices by mid-summer to cover at least 50 percent of expected production costs.

This is a strategic decision that informs and guides future marketing decisions, many of which are irreversible, such as the choice to select a forward cash delivery contract to deliver grain to a local elevator at harvest time. The more irreversible the marketing decision, the more the decision maker must ensure that it aligns with the overall marketing strategy.

The aspect of irreversibility for individual marketing decisions does not make them strategic decisions. They do not guide future decisions. The marketing decisions may involve several choices from among the alternatives that could be made to implement the overall marketing strategy. They are not strategic decisions by themselves, but their irreversibility makes it very important that they align with the marketing strategy.



Keep in mind at all levels that the greater the degree of irreversibility, the greater care and diligence should be taken to ensure that the decision is the best possible at the time it is made. This implies care in developing a list of alternatives, evaluation of their cost, as well as time spent in analysis of the potential benefits they may offer under differing assumptions about the future.

What are strategic/tactical/operational choices (decisions)

Another perspective on decision making that may be helpful are the differences that exist between strategic, tactical and operational choices. Strategic decisions tend to be those that choose direction for the business over a longer period of time. These include selecting the type of operation (livestock, crop or combinations), where to locate the business, what strategies to follow and many others. Strategic decisions are centered on *what* the business does.

Tactical decisions are focused on *how* the strategic decisions will be carried out. These include details about which resources to tap, when they will be needed, who will have the responsibility for organizing and overseeing the actions, etc.

Operational decisions highlight the details needed for implementing the management actions. These include scheduling laborers, coordinating work activities across enterprises, monitoring performance, ensuring that adequate resources are available, and more on a day-to-day and week-to-week basis. This level of decision making and management is about making sure that the actions needed to carry out the tactical decisions and, ultimately the strategic choices selected, are completed.

What is a decision? What is a strategy?

Decisions, as outlined previously, are the outcome of a process that selects a preferred option or a course of action. The choice is normally made from among many alternatives, some of which may lead to the same outcome. However, each alternative has its own unique set of resource requirements and management oversight needed in order to reach the desired result.

Strategies, as described earlier, are the means by which the business intends to use resources to reach the ends they desire. Strategies include one or more goals, resources, and a method or approach for action. Beyond this, strategies are typically thought of as taking some time to accomplish. As such, strategies require multiple decision points to bring them to conclusion. These decision points are necessarily guided by the strategies selected to reach the goals outlined.

For example, to transition from a corn-wheat crop rotation to a mixed-farm operation that includes fresh vegetables, a roadside stand, and livestock enterprises would require many management changes, several new strategies, and numerous decision points along the way. By comparison, selecting between the option of delivering wheat from bin #2 or bin #3 for delivery to the elevator this week is a straight-forward decision and requires little time to address, with no subsequent decision points to follow.



Making the selection

Making a choice is the point in the decision process where the alternatives are weighed and comparisons are considered regarding how well the option would achieve the stated goals. Many assessments are based purely on the financial consequences. However, non-financial resource and management demands must also be taken into account. Alternative strategies may not only require more (or less) resources and management time, but may also differ in terms of the timing of those demands.

When choosing between risk management strategies, one should carefully consider what the choice will mean for the resulting distribution of outcomes over time. 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?

To repeat, the selection process should be guided by how well the alternative will achieve the desired outcome. Consideration should also be given to the tradeoff between costs, in terms of resources and management time required, and the estimated benefits.

Evaluating strategies

Risk management is a necessary, but sometimes frustrating, activity. Very good risk management strategies can still lead to bad outcomes because of the uncertainty involved with how the future will actually turn out. That is why it is important to judge the quality of a risk management strategy on the information available at the time the strategy is selected and not solely on the final results.

Results are obviously important, but even high-quality risk management strategies don't come with guarantees in the face of significant uncertainty. However, they should lead to more positive results more consistently.

Another point to keep in mind is that a strategy is not carried-out by a single decision. As such, a series of decisions is required to keep things on track to achieve the desired outcome. Multiple decision points require management to remain committed to the strategy across time and in the face of changing conditions. As a result, strategies can fail for a number of reasons, but likely most often flounder where decision points across time do not add up to provide consistent support for the strategy selected. This would be especially true where various decisions are made and carried out by more than one member of the management team. Where there are more individuals involved, the greater the variation in understanding of the level of commitment and the level of personal conviction by the individuals that the selected strategy is the best course forward.



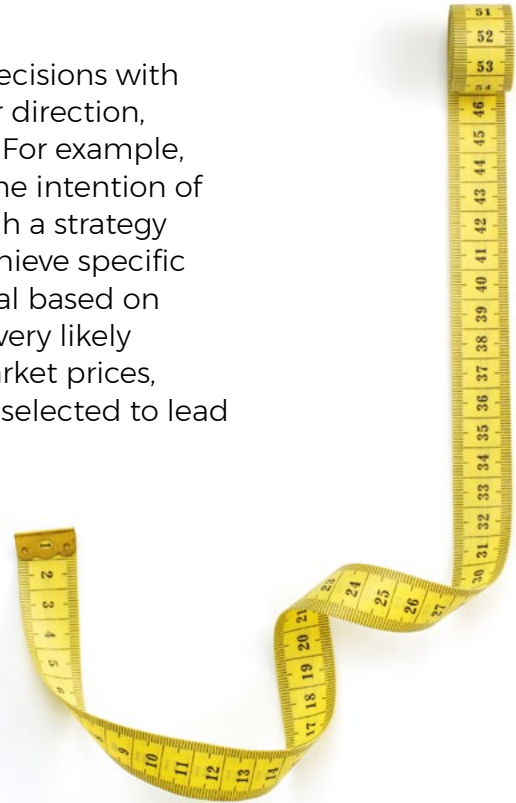
It may seem elementary, but it is worth repeating. Good strategies don't always work out. It is okay to consider past results when making the next decision, but don't let them suggest that a better choice was available for the previous decision. Risk management strategies are focused on the future. Too much focus on the past can lead to biased decisions and fatal results. Just because a cropping decision turned out poorly does not mean that the entire crop rotation must be reconfigured.

Measuring progress and accomplishments

Managing any business is challenging. Managing an agricultural business, with its inherent dependence on weather and associated production and market risks, can be very challenging, even to those with a great deal of experience. The primary reason for these difficulties is that the past does not predict the future. Although weather patterns typically follow regular seasonal movements, as do commodity market prices, these patterns can be significantly influenced by other factors outside the manager's experience.

Many agricultural managers make management decisions with the intention of moving the business in a particular direction, rather than to reach a specific performance target. For example, they are more likely to select a crop rotation with the intention of making an overall profit and to manage risk through a strategy of diversification (control impact), rather than to achieve specific target earnings on each crop or a particular risk goal based on the field where the crop is raised. In addition, they very likely have taken into account soil health and fertility, market prices, knowledge of which crops do best following those selected to lead the rotation, and a host of other considerations. The point is, that risk is inherent in the decision process. As a result, most manage with the objective of making progress toward their overall goals, rather than develop a laser-focus on managing the risk within a specific decision.

Clearly, some management strategies have a greater chance of success than others. Managers that lack decades of management training via the proverbial school-of-hard-knocks are interested in increasing their chances of success without the corresponding need to experience years of losses to get it. It is also true that not all management decisions are equal in the level of analysis and attention to risk. Those decisions of high financial magnitude, or that frequently reoccur, are two cases where careful consideration is likely warranted.



Another important point is that not all individuals view risk in the same light. Managers, employees, laborers, even spouses and other family members are very likely to have a different outlook on risk than others they interact with in the business and around the community. For this reason, it can be challenging to reach a consensus about what the goal might be for managing risk to some new level. What is even more important to recognize, is that their perspectives on risk have a great deal to do with shaping their definition of success, especially over a series of years.

As a result, it is very important that the decision makers for the business reach some level of consensus about their risk goals and objectives. These can be extremely helpful in not only deciding between alternative strategies, but also discerning whether or not the business is even heading in the right direction.

As noted earlier, risk can be measured loosely or in very precise terms. The time and effort needed to evaluate its impact increases as more detail is added. Comparing strategies is more easily accomplished where higher levels of analysis has been completed. However, it may be enough for the decision makers to understand that certain strategies will move the business in what all agree is the correct direction, without needing a more precise estimate of the expected increase in average profitability or associated variance that accompanies the estimate.

2. CHANGING STRATEGIES

Many aspects of agriculture repeat from season to season. While there are obvious differences one year to the next, planting, cultivating, and harvest of this year's crop of corn is very likely to be similar to last year. 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. This too, is a risk management strategy, where not everything is changed overnight, even with the prospect of high earnings.

Incorporating learning

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. For many in agriculture, this concept is most readily associated with advances in technology, especially in recent decades. In the past, changes in irrigation alternatives, new fertilizers, availability of new and highly-effective chemicals for controlling both weeds and insects, let alone mechanization, have all left their indelible mark on agriculture.

These advances have given managers greater flexibility with the production approaches available to them, as well as often increasing their chances of success. These new techniques and controls also offer managers greater flexibility in managing the risk and associated variability. As such, approaches used in the past may become outdated in terms of how effective they are or in terms of the benefits they return. Today's competitive agricultural managers must continue to evaluate strategies and approaches that become possible with new technologies and methods for resource management, in order to remain competitive.

Updating goals and objectives

In certain circumstances and for some operations, the continuing need to update and revise management approaches can lead to decisions to drop practices followed in the past. It may even mean no longer growing crops or raising livestock of the type traditional for the operation. Such choices may be very difficult to make for the individuals involved.



In other cases, the decision makers may decide that the goals pursued in years past, perhaps by a previous generation of owners, is no longer possible or relevant. As a result, it may be more appropriate to change the goals and objectives for the operation, rather than change the approach used. This can be especially true in recent years with so many advances in technology and labor-saving approaches for traditional agricultural enterprises.

Updating policies and plans

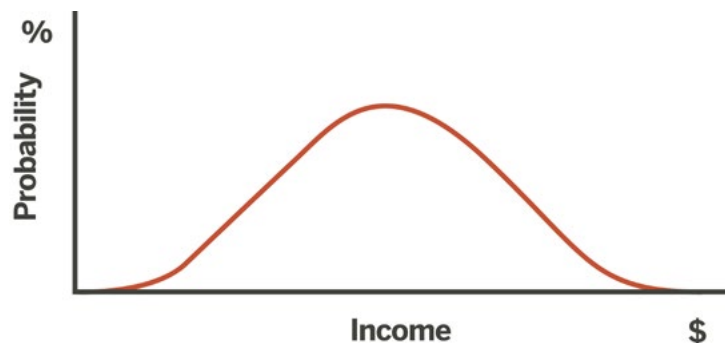
New approaches and techniques may offer implications for resource management, the criterion used to evaluate performance, as well as imply change for future planning. With the ability to better-track progress and to understand the implications for profit, the bar is now higher for managers of all types of business activities. This may imply that past approaches are no longer best, or even more significantly, are too expensive to continue in the future. In order to realize the benefits from improved alternatives, managers must devote time to evaluating alternatives, with an eye to adjusting business policies and plans where action is justified. This includes prospects for improved risk management through new risk controls, insurance options, and other risk transfer possibilities.



3. QUANTIFYING VARIATIONS IN OUTCOMES

Once a risk strategy has been selected and has been tried once, twice, or maybe several times, the decision maker should take time to assess how well the strategy is working. A decision should be made regarding whether the strategy is leading the operation in the desired direction or away from it.

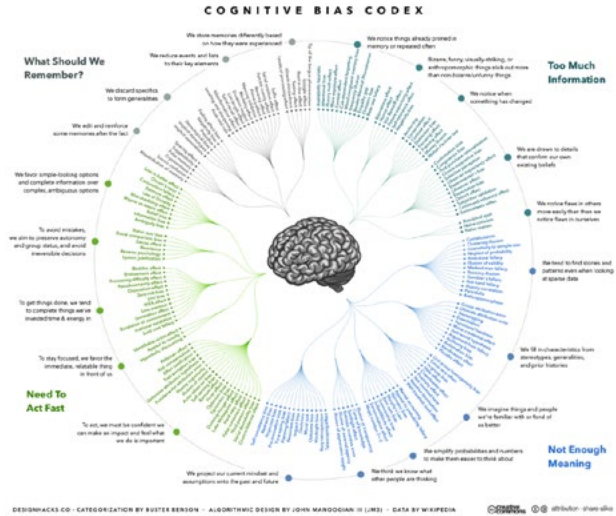
Seldom is that direction easy to read. Often the results of following a selected strategy are variable. For example, selling a portion of the expected grain harvest by forward contract and another portion on the cash market may have seemed like a good strategy three years ago. After following the strategy and experiencing the trend of contract prices and subsequent cash prices, there may be doubts about how good the strategy was in the first place. Given variable results, it can be tricky to decide whether a good strategy was selected or if there might have been a better alternative available.



Decision makers may prefer certainty over not knowing, but variability in results is the more likely outcome. For this reason, it becomes important for decision makers to think through their responses to change that may work against their position. They should also develop an approach to assess decisions where the results are a set of variable outcomes. This would typically be done by taking an average or by evaluating the range of results by measuring the variance or standard deviation (measures of variation) or some other estimate of dispersion. 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. Recent research by behavioral economists, neural physiologists, psychologists, sociologists and others has led to development of lists of biases. In fact, one source lists 188 cognitive biases that can shape how individuals view the challenges ahead of them.



Anchoring bias – when a person relies too much on the first piece of information and do not consider newer data.



Availability heuristic – when a person relies too much on the information at hand, rather than from wider sources.



Outcome bias – where a person judges their choices based on the outcome rather than the choice process.



Overconfidence – where a person takes on more risk, overestimating their ability to handle it.

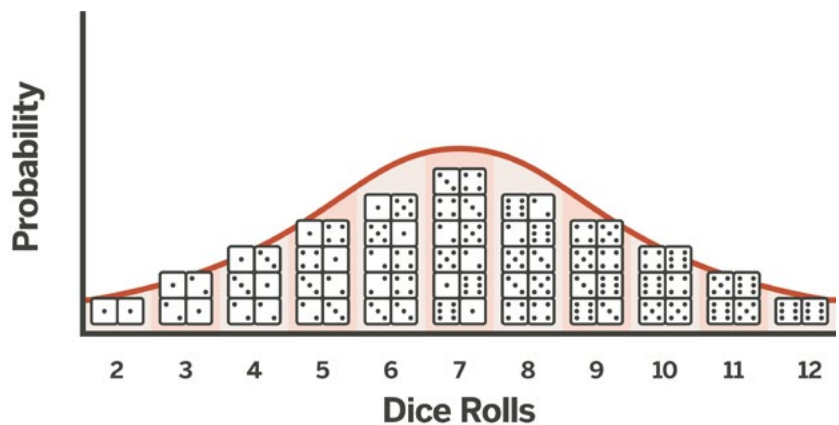
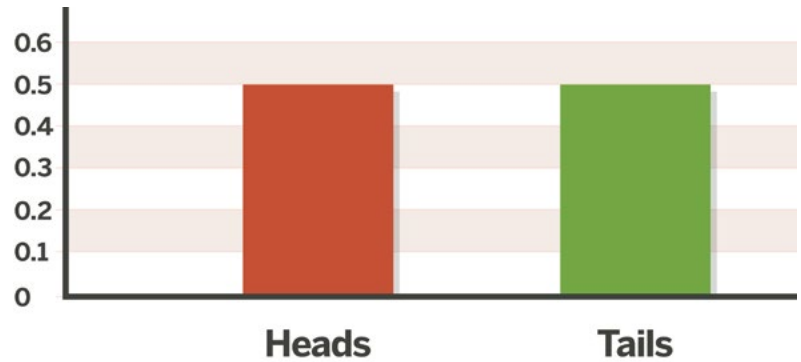
Obviously, there are many other risk biases beyond the basic examples offered here.

Describing risk outcomes

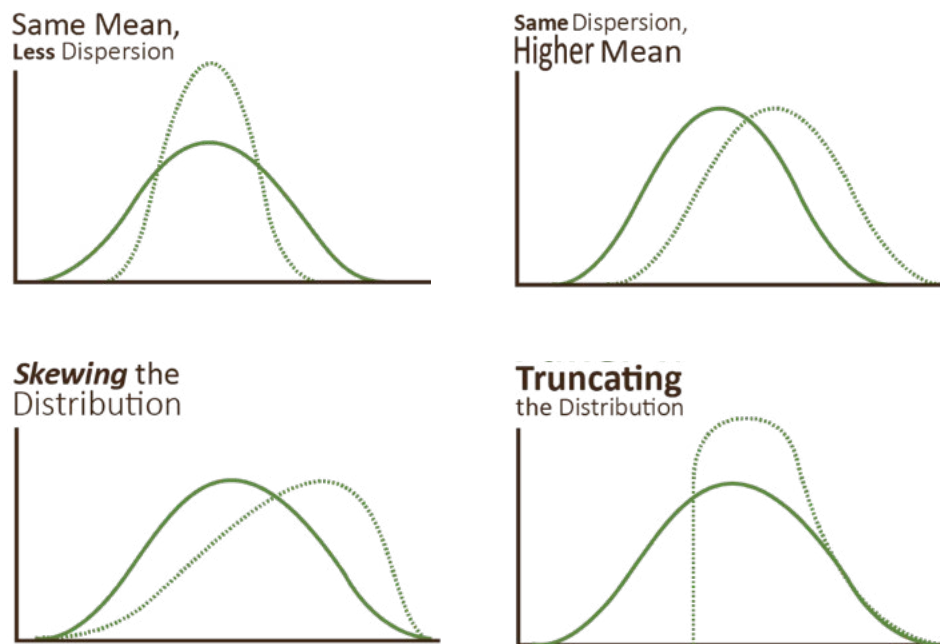
To better understand and communicate risk outcomes and their likelihood when a particular action is taken, it can be worth learning a few basic statistical concepts. A histogram is simply a graph with a bar for each possible outcome that is as tall as its probability. In the case of a graph depicting a coin toss, each bar is 0.5 high. The probabilities for all of the outcomes will always add up to 1.0.

This simple coin-toss example can be expanded by adding additional bars when there are more outcomes.

Consider rolling a pair of dice. The possible outcomes are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Only one combination yields a 2 and only one combination would deliver a 12. But there are six combinations that yield a roll of 7. The outcomes -- numbers between 2 and 12 -- can be plotted in a histogram. The vertical axis measures the number of rolls that leads to those numbers. If the tops of the bars are connected with a solid line, the result is known as a probability density function (PDF). A PDF is one way to describe risk outcomes and likelihoods. Most people know a PDF by the term bell-shaped curve and have likely seen one in a textbook somewhere.



The middle section of the PDF shows the outcome that is most likely; rolling two dice has the greatest probability of resulting in numbers that total 7. However, it is also possible to roll combinations on either side of the most likely outcome by rolling something other than 7. The statistical properties of the PDF can be calculated, too. The mean (average), median and mode, for example, are 7 for the roll of two dice. Measures of dispersion, like the variance, indicate the range of the outcomes, or the spread; in this case, the outcomes range from 2 to 12.



Decision makers can use the information provided by a PDF to both better understand how risky a particular decision is, as well as to weigh the benefits and costs of managing a specific risk. A PDF with higher mean/median/mode may be better where they imply that there is a better chance for a good outcome. PDFs that are more squeezed toward the middle suggest that there is lower risk compared to those that are more spread out, as they have a narrower range of outcomes. A PDF with a longer tail on the left side is less preferred because when a rare event happens, its outcome will lower the average. The reverse would be true for a PDF with a longer tail to the right side.

4. EVALUATING DECISIONS LOOKING IN THE REAR-VIEW MIRROR

Farm and ranch decision makers make thousands of decisions every day. These decisions shape lives and determine futures, some of them in very significant ways. However, some argue that the ability to make good quality decisions is contrary to human nature (Spetzler, et al.). Stress, time constraints, and uncertainty can amplify this situation and lead to mistakes that are difficult to overcome. The following draws from the work of Hammond, et al. (1999) and Spetzler et al. (2016) to present the seven characteristics of good decisions (*Seven Characteristics of a Good Decision*. Cornhusker Economics. Parsons. 2016).

An appropriate decision frame

To make a good decision, decision makers need more than just a list of choices. An appropriate decision frame captures the context in which the decision is being made. This includes both the internal environment and the external environment. Above all, it also includes the objective(s) the decision maker is trying to accomplish by making the decision. With an appropriate decision frame, the list of choices can be as large as needed to find the best alternative.



Clear values to adhere to and objectives to accomplish

Identifying the objective(s) to accomplish is part of properly framing a decision. These objectives need to be clear and align with the decision maker's values. Why is this so important? Because the objectives form the decision criteria, help determine what information to seek, help explain the decision choice to others, and help determine how important the decision is to the people involved, as well as how much time and effort should be spent in making it. Looking back on a decision, the decision maker should clearly see how the choice made helped fulfill key objectives and adhere to the values better than the other alternatives available at the time.

Creative alternatives to choose from

Two basic principles should be kept in mind when generating alternative choices: First, the choice selected can never be better than the best of the alternatives available to choose from. Second, the decision maker can never choose an alternative not considered. Looking back on a decision, the decision maker wants to be able to say that he/she generated an innovative list of alternatives, thought outside the box, and iterated some original alternatives into better alternatives. It is much better to have too many bad alternatives on the list than not enough good ones. At the end of the day, it is much easier to make a good decision when trying to decide between several good choices.

Good information

We live in the information age, but determining which information is important and reliable can sometimes be a challenge. Individuals can easily become overwhelmed with information that is either not reliable or not relevant to the decision. A good decision uses reliable and relevant information, while properly accounting for uncertainties. A laser focus on the objectives can help achieve this task.

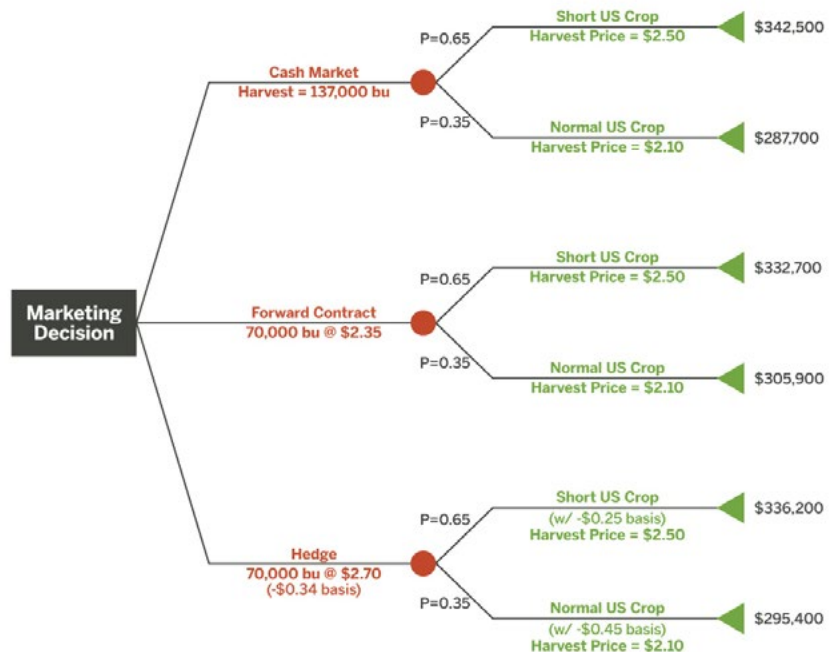
It is also important to remember that there are no future facts. At best, good factual information only describes the present and the past. Decisions are concerned about the future, and the future is full of uncertainties. The manager should use experts wisely to help gather relevant information about what the future could look like, but do so with a realistic view concerning uncertainty. When looking back on a decision, a manager wants to be able to say that all the relevant facts available at the time and the best information about what the future could hold were incorporated when making the choice.

Clear tradeoffs and sound reasoning

One of the most difficult challenges in making decisions is grappling with tradeoffs involving multiple objectives. This is one of the reasons people often try to monetize everything and treat decisions as profit maximizing choices. However, seldom can this be done without some difficult discussions about what something is worth. In other words, grappling with tradeoffs between objectives can be difficult and requires sound reasoning. For example, if it is more important to have the capacity to harvest a crop within 10 days than it is to save \$2,000 in interest, then that should be reflected in the reasoning used to make the decision.

Sound reasoning and evaluating tradeoffs also extends to consideration of downstream decisions. A decision made today usually impacts future decision opportunities and available choices.

Decision trees can be useful in describing connections between alternative choices under consideration and the impact they have on downstream decisions.



Finally, these tradeoffs and reasoning take place in a world that is filled with uncertainty. This must also be reflected in the process. Appropriate scales should be used and the tradeoffs should reflect the accuracy of those scales. It is sound reasoning to treat two values as equal if they are close enough given the uncertainty surrounding them. As a decision is considered, the decision maker will want to say that sound reasoning was used in evaluating how well each alternative choice would help accomplish the objectives for making the decision.

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.

Often, it is too easy to focus on a single objective that begins to dominate the selection process. A quick reflection on choice alignment with values and objectives can help prevent the decision from mirroring an imbalance among the priorities.

Committed implementation

Finally, a good decision must be accompanied by a commitment to implement it. When the decision maker evaluates the decision, she/he should carefully consider on how committed they are to fully implement the choice. The decision maker will want to be able to say that the choice was implemented completely and that a committed effort was made to make it a success.

It is important to realize that even with all seven of these characteristics in place, good decisions can still lead to bad outcomes because of uncertainty. That is why the quality of a decision should not be judged solely on the results. Results are obviously important, but habits that produce these seven characteristics of good choices are even more important because they will more consistently produce good results.



5. IS THE STRATEGY SUCCESSFUL?

Consider again the description of strategy: the means by which a person/business plans to use resources to reach the ends they desire. In this way, strategy implies: 1. a goal, 2. resources, and 3. a method or approach for action. Within this context, success would likely be described as goal attainment with minimal resources and action required.

Where a goal has a high priority, the consequences for failing to reach the goal are high, or the probability of a bad outcome increases where the goal is not reached, suggests that more resources and more action would be justified. However, as mentioned earlier, some goals, certain levels of resource use, and beyond some level of action, goal attainment cannot be justified.

In this light, evaluation of the success or failure of a particular strategy is an exercise in weighing the result (benefit) versus the cost of that success. Certainly, where management has decided to pursue a given strategy, that cost/benefit balance was likely considered. However, planning and the reality that follows often differ. A strategy is not accomplished through a single decision, rather it requires one or more strategic decisions to kick things off, followed by a series of decision points to keep things moving toward the desired goal.

In this way, evaluating the success or failure of a strategy is not accomplished by looking closely at individual stages or decisions, but rather by weighing everything together in an attempt to evaluate whether the collective benefits outweigh the identifiable costs. Did the strategy deliver the results that management had in mind when the choice was made?

A final point to keep in mind is that, while a strategy may be judged a success after a period of time has elapsed, there may be adjustments needed for that strategy to continue working or alternative strategies may have become available that were not an option when the original choice was made. As such, proactive and forward-looking managers should reevaluate their mix of management strategies for the current enterprise mix on some periodic basis.

This might best be done by involving other members of the management team to increase the opportunities of gaining new insights, or of looking at the same management challenges but seeing an alternative strategy as a possible solution. Where the management team is small, with limited outside experience, it may be justified to hire an outside consultant or other expert for their unique perspective on the challenges and suggestions for alternative strategies.



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