

Risk Management Series

The Concept of Risk



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ABSTRACT

The major sources of risk in agriculture are production and yield risks, market and price risks, business and financial risks, technology, casualty loss risk, legal risk, and human risk. How we deal with these is called "management". Evaluating the possible "what ifs" will help you determine the economic impacts of adverse events. Our response depends on our willingness to bear risk. Risk management involves bringing your goals together with your economic expectations, and business survival together with your ability and willingness to assume risk.

Sources of Risk

Almost everyone defines risk differently. We all face varying degrees of risk each day of our lives. The term "risk" is often used in a loose way to refer to any sort of uncertainty which is viewed as an unfavorable event. If this were truly the case, no one would want to take risks. Risk has both downside and upside characteristics. Managing risk means that you weigh the downside effects against the upside. Both can occur with some degree of probability. If the manager believes the upside outweighs the downside, the event or action may be considered.

Risk changes the nature of our decisions and how we make decisions. Risk often forces us to make different decisions. For example, assume that a farmer determines that weather patterns have changed and the chance of having adverse weather is now greater than before. Probably this farmer will include strategies in the management plan that will reduce the financial effects of adverse weather. When faced with a risky decision, our first response should be to start asking questions. We ask "what if" questions about possible outcomes to our various strategies. Often, we may have several goals and they may be in conflict. For example, the production of our most profitable crop may be at risk so that income may not be as high as previously budgeted. In order to stabilize income but at a lower level, income may have to be forgone. The analysis should be evaluated using "critical success factors," what matters most.

Nelson, Casler and Walker described the major sources of risk in agriculture to be:

1. **Production and yield risk.** Farmers have certain expectations of results as they plant their seeds to watch how they will develop into a marketable commodity. Many hazards exist during the growing season that can spoil those expectations. With various strategies, farmers manage to reduce their production and yield risks. Some basic strategies used for guarding against adverse events are shown in Table 1.
2. **Market and price risk.** Farmers are price takers. There are many very similar products being sold in a competitive market. Market prices for some commodities are supported by the government. Although there are government programs for the major feed and food grain crops, farmers are still at the mercy of the marketplace to establish prices. Bountiful harvests and the expectations of bountiful harvests bring reduced price expectations at the marketplace. Farmers can undertake several strategies that can compensate for market risk. These strategies include forward pricing decisions using forward contracting, hedging, options, contracting and timing of sales (Table 1).
3. **Business and financial risk.** Despite their production capabilities and marketing skills, farmers face business and financial risk. Many farmers, highly leveraged while expanding farm size in the 1980s, found themselves in financial trouble due to conditions of the financial world in which they had no part. Credit became tight, and crop prices and land prices fell as farmers struggled to stay in business. Today, the farmer's capital market and credit needs are determined not at the local bank but on the international capital markets.
4. **Technology and obsolescence.** How many of us have bought something new only to discover a few months later that something newer and better is available? Now our old outdated product is no longer in demand and has lost its value. Farmers, too run the risk of purchasing machinery and equipment that can quickly become obsolete. Computers are a good example of this phenomenon. A computer is purchased and three months later

TABLE 1: An Example of Evaluation and Management Risks in Agriculture

Sources of Risk	Chance of Loss (no. years out of 25)	Extent of Loss Use Index (0-100, no. years out of 25)	Chance of Loss (no. of years out of 10)	Extent of Loss Index (0-100, no. years out of 10)	Types of Losses You and/or Neighbors Have Had	Management Controls at Your Means to Protect Against Risk
Drought	5	30-70	3	10-40		Irrigate, spread out production areas, crop mix, Multiple Peril Crop Insurance (MPCI)
Excess Moisture	3	10-20	2	5-10		Tile drains, waterways, tillage practices, MPCI
High Temperature at Pollination	2	20-50	2	10-25		Irrigate, spread planting dates, crop mix, Variety Selection, MPCI.
Flood	4	5-50	2	2-25		Dikes, crop type, MPCI
Wind						Type of crop, hybrid selection, MPCI
Hail	6	2-10	3	1-6		MPCI, Specified Peril Insurance (SPI), spread out production area
Frost						Crop selection, MPCI
Insects	3	5-20	2	1-7		Spray, crop mix spread out production, MPCI, crop monitoring
Diseases	2	5-10	1	2-8		Spraying, hybrid selection, crop monitoring, MPCI
Fire	1	10-15	1	1-2		Spread out production areas, safety practices, MPCI, SPI
Price	5	20-45	4	5-35		Forward Contract, Hedge, price options livestock enterprise crop mix
Financial	6	10-45	4	5-25		Crop mix, smooth out variance in annual cash flows, work with banker, develop your own financial pool, insure, periodic financial analysis
Health	2	20-30	1	1-6		Health insurance, diet, exercise, life insurance
Environmental					Potential to be economically devastating	Be educated on issues, government inspection and control of food chain, proper management of toxic substances, business insurance
Social						Family understanding and togetherness, group activities, political representation, church, friends

a newer and faster model is available. The newer computer may actually cost less. The purchase decision must be made based on what the computer is needed to do and the increased returns, reduced costs, or time save that it will provide.

5. **Casualty loss risk.** This refers to the common source of risk of losing assets due to accident, fire, wind, hail, flood, or theft. A good example of this type of risk is the risk associated with driving a car. Our actions or the actions of others can cause accidents in which we are involved. The risks involved from unexpected casualties are hard to measure.
6. **Social and legal risk.** Environmental risks associated with pesticide use, pollutants, and feed additives are common examples of social risks facing farmers. Farmers provide the basics of our food supplies from our very precious land base. Our food products and our land are being monitored very closely to protect the consumer and preserve our quality of life. Occasionally a problem may be linked back to the farmer, which causes concern and damages that the farmer must rectify.
7. **Human risk.** Our health is often taken for granted. We are aware that one's health can deteriorate quickly due to a disease, an accident or some disabling event that may put a farm operation in jeopardy. In addition, we are often dependent on others such as spouses, children, and hired help whose health is important to the farm operation.

All of the above mentioned risks are common to every business and business manager. How we deal with these risks and our approach to them is called management. Some level of risk has to be borne by the individual. This depends on the type of risk the manager is willing to take, the belief in the occurrence, the severity of adverse conditions, and the financial ability to protect yourself through an adverse event. Several examples are shown in Table 1.

Without some sort of protection in certain areas, the farmer is economically vulnerable to the adverse consequences that may result if tragedy strikes. Usually farmers can protect themselves in each of these areas through management schemes, diversification, knowledge and education. The farmer can also pay someone else to assume the risk through insurance. Sometimes there is a direct cost for the protection such as a change in technology or the purchase of insurance. Sometimes protection can be attained through a change in a method of doing something, a change in attitude, or an action which alleviates much of the risk commonly assumed by the individual. Table 1 includes some alternatives for managing risks.

We can respond to risk in two ways, by adapting or by overcoming. First, we can adapt to the risky situation by developing a greater degree of flexibility or by purchasing insurance. Secondly, we may try to overcome the threat of a risky situation by devoting resources to obtain more information or to negotiate away some uncertainty.

The proper procedure for analysis of a risky situation is to develop a set of contingency rules. Evaluate the possible range of levels of key performance indicators such as yield, rate of gain, price expectations, etc. The simplest analysis may be one of evaluating a "worst case," "average case," and "best case" scenario. A more sophisticated method is to

develop many scenarios and attach a probability of occurrence to evaluate the economic effects of an adverse event happening.

Using probabilities, your "what if" analysis can be evaluated using a general economic budget which keys in on your critical success factors. Evaluate each event and determine the economic outcome. You may want to consider some protection strategies such as crop diversification, irrigation, or a change in management practices or insurance. Then budget each set of events with the protection strategies to determine the economic outcomes. Compare the strategies and determine if you are satisfied with the level of risk, possible economic outcomes, and the cost of the protection strategy.

Two people faced with the same protection strategies may not make the same choice. The decision depends upon the individual's perception of risk, his/her willingness to bear the risk, and their ability to bear the risk.

There are four categories of entrepreneurs that can be classified according to their willingness to bear risk.

1. **Risk Taker.** This individual will choose the strategy with the highest average return from the list of protection strategies. For example, if the cost of the protection leaves this individual with a lower economic return, they will most often choose to forgo the protection strategy.
2. **Pessimist.** This individual will choose the strategy with the highest return from the worst possible outcome. Their analysis will center on the lowest expectation from their critical success factors which will provide them the greatest economic outcome. The economic outcome may be negative, but the pessimist is drawn to the strategy with the greatest protection at the low end of possible outcomes.
3. **Optimist.** The optimist will choose the strategy with the best, highest outcome. This individual only sees high yields, high prices and above average critical success factors. The strategy that provides the greatest possible economic outcome will most likely be the one chosen.
4. **"Safety Firster".** A "safety firster" will choose the strategy that will provide only acceptable risks. From the possible strategies providing acceptable levels of risk, they will choose the one with the highest average return over the range of possible and acceptable economic outcomes.

Managing risk is an important aspect of any business enterprise. Planning with respect to risk involves decisions with a multitude of outcomes, each having some probability of occurrence. You must consider the various sources of risk in your planning actions then compare the possible outcomes of each strategy. Your decision will depend on how you look at the world and your willingness to assume risk.

These outcomes must then be weighed against the goals you'd like to attain. Many farmers may be in a position to take on risks. It depends on your willingness to assume risk, financial situation, and goals toward retirement. Many farmers are in a position to "self insure" against risk. Financially they are able to survive an adverse event. However, one adverse event may have the possibility of financially affecting future plans, goals and retirement expectations. Risk management involves bringing your goals together with your economic

expectations and business survival with your ability and willingness to assume risk.

Managing risk is a very personal thing. Individuals vary with respect to their perception of risk and their willingness to take risk. Many variables enter into the decision making process. How these risks are managed can vary from taking no risk to one of outright gambling on a hunch. Even if two individual's perception to a risk situation were identical, there is a good chance that their financial situations may dictate different strategies.

As an individual goes through a life cycle of farming, the willingness and perception of risk will change. During the growth stage, a person may be more willing to take risks but not be financially able to do so. During the expansion and productive stage (the middle of the cycle), farmers must weigh their risks against their assets and chances of survival in farming. At the final stage where a farmer looks toward retirement and either selling or turning over the farm to the children, there is more caution used when making risky decisions. Although they may be financially able to shoulder taking on the possibility of the downside to their decisions, they need to consider the effects of a decision gone bad and

the effect on their family goals. Making decisions that involve risk is not an easy task.

References

This fact sheet is one of a series produced by FCIC/Extension Advisory Council, February 1993.

Other fact sheets in the series include:

- Prescriptions for Managing Risks
- What is Multiple Peril Crop Insurance (MPCI)?
- Analysis of the MPCI Purchase Decision
- Crop Insurance: New Features of MPCI
- Managing Risk with a Marketing and Crop Insurance Plan
- How Do You Calculate the Actual Production History (APH) Yield?
- A Guide to Supplemental Crop Insurance

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