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How Farm Managers Make Risky Decisions

Agriculture is a high-stress industry. The management of farm and ranch businesses is fraught with risk and uncertainty. Agricultural managers must consider the risks associated with the ever-changing political, social, economic, and ecological environment in which they operate. Farm managers face the risk that it will not rain—that it will rain but at the wrong time—that the old tractor will break down—that the new irrigation system will become obsolete—that the farm program will change—that new regulations will increase costs—that the employee will quit.

Living with Uncertainty

Uncertainty, a situation where a number of different outcomes are possible, is what makes our lives both interesting and frustrating. If it were not for uncertainty, there would be little reason to watch a football game or stay until the end of a suspenseful movie. The frustration associated with uncertainty is because of the risk it involves. Among the uncertain outcomes may be some negative consequences, which we

would prefer to avoid. Risk, then, refers to the chance of adverse outcomes associated with an action. The greater the uncertainty, the greater the risk.

Agricultural managers cannot make decisions without considering the future, and the uncertainty and risk that the future holds. Because the future is unpredictable, we cannot eliminate risk, even if we wanted to. Eliminating risk would also eliminate the potential profits. Successful farm management depends on taking risks that are consistent with the goals and financial position of the business. The key to success is to take the right risks. Identifying these right risks requires better understanding of the various sources of risk, their chances of occurrence, and their implications for the economic performance of the business.

Types of Risks

Identifying the different events or sources of risk that affect the outcome of a decision is a crucial step in the decisionmaking process. The relative importance of the sources of agricultural risk differs among enterprises and

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changes over time. The following checklist is a guide to identifying your risks:

- **Market Risk.** The variability and unpredictability of the prices that farmers receive for their products and that they pay for production costs are market risks. In short, fluctuating supply and demand conditions result in price variations.

- **Production Risk.** This source of risk is a result of the variability in production caused by such unpredictable factors as weather, disease, pests, genetic variations, and timing of practices. Examples include variations in crop yields, machinery breakdowns, and feed conversion efficiencies.

- **Financial Risk.** Financing assets that the business controls creates risk. The increased use of borrowed capital leaves the operator vulnerable to not having enough cash to meet obligations or of not having adequate credit. Other examples of this source of risk include the possibility of losing the lease on the land and the ultimate disaster—bankruptcy.

- **Obsolescence Risk.** The rapid development of new technology can make current production methods obsolete shortly after important investments have been made. The possibility of adopting new technologies too soon or too late is a risk farmers face.

- **Casualty Loss Risk.** This is a traditional source of risk referring to the loss of assets as a result of such events as fire, wind, hail, flood, and theft.

- **Legal Risk.** Governmental laws and regulations are a growing source of uncertainty for farmers. Changing social attitudes have resulted in laws and regulations governing environmental protection, water quality, food safety, and other farm-related matters. In addition,

there is the risk of lawsuits resulting from accidents and other events.

- **Human Risk.** The character, health, and behavior of individuals are unpredictable and contribute to the risk in farm management. The possibility of losing a key employee during a critical production period is one example of this type of risk. Dishonesty and undependability of business associates are other examples. Also, family needs and goals change, sometimes unpredictably.

Psychological studies have shown that business managers tend to overlook risk considerations as they make decisions. They do not deal with risk explicitly. In fact, ignoring risk may be a natural tendency to protect our sanity. For example, consider your decision to drive to town. You know there is always a chance that you will be injured in an automobile accident on the way. By ignoring this risk, you avoid having to anguish over the probabilities and consequences of this decision. However, past good luck does not guarantee future success. And when it comes to making decisions in today's risky agricultural climate, the wise farm manager must explicitly consider various sources of risk.

Profiles in Risk-Taking

Managers respond to risk in different ways. Just as we classify people as being optimistic or pessimistic, conservative or liberal, we can also classify people according to their attitudes about taking risks—risk avoiders or risk takers.

Let us use two hypothetical examples to illustrate these two types of managers.

Risk Takers. The risk takers are the plungers, the more adventurous types who willingly make risky decisions.



Farm management is fraught with risk and uncertainty. This mature ear of drought-stricken corn from a farm in Lamon, IA, reveals poor pollination and stunted growth. (USDA photo by Ron Nichols, 88BW1562-12)

They are willing to accept greater risk in return for the small chance of a higher income.

Roy Riggins is a risk taker. He rents his 600-acre corn and soybean operation in western Illinois. The operation consists of three tracts that he leases on a 50-50 crop-share basis from two retired farmers and a widow. He is single with no family, and, as a result of a small inheritance and a couple of favorable production years, his debt-to-asset ratio is down to less than 10 percent. He owns all of his machinery and hires part-time labor to help with field operations during the critical seasons.

With the crop-share lease, Roy feels that his risk exposure in case of poor weather and low yields is relatively low.

Therefore, he does not purchase multiple-peril crop insurance. When it comes to marketing, he uses a mix of strategies, including cash sales and forward contracting. Although he does not speculate on the futures market, he speculates with the grain he produces by holding a portion of the crop in storage in an attempt to get the best possible price.

Roy has analyzed his financial situation, and, based on his net worth, he feels that he is in a strong enough financial position to weather a few low-income years and still stay in business.

Risk Avoiders. These managers are the more conservative types who have a preference for less risky decisions. Risk avoiders are willing to sacrifice

the small chance of higher income for less risk.

Bill Boyer tries to avoid risk whenever possible. He has a family with two small children and is buying his farm in eastern Oregon. He has a diversified, irrigated operation producing potatoes, alfalfa, wheat, and corn. To purchase his operation, Bob had to take out a sizable mortgage. As a result, his debt-to-asset ratio is just above 50 percent. He also has to borrow to meet operating capital needs; as a result, his cash-flow situation is very tight.

Bill has concentrated on improving the management of his irrigation system in order to reduce production risk and costs. He purchases crop insurance to protect against crop failures. His marketing strategies include forward contracting whenever possible. Bill is more interested in selling at a price that will meet his cash-flow needs than he is in receiving the highest possible price.

For these two managers to be happy with their decisions, they have to make choices that are consistent with their attitudes toward risk. Their attitudes probably will change over time. This is to be expected because people's goals, as well as the financial positions of their businesses, change over time. Their reaction to a particular risky decision will also depend on the possible gains and losses associated with that decision. Thus, as is characteristic of much hu-

man behavior, it is difficult to predict how individuals will react to risky situations.

Classifying decisionmakers according to their attitudes about risk is not a judgment about their managerial ability. There are successful farm managers who tend to be risk takers, and there are successful farm managers who are more comfortable avoiding risk. They each have their own management style—proving that there is more than one way to successfully manage a farm business.

The Payoff Matrix

The framework for making risky decisions described in this chapter is based on the fact that farm managers must choose among alternative actions, the outcomes of which depend on events which are beyond their control. The outcomes of each combination of choices and events is known as a payoff.

Constructing a table showing potential actions, events, and payoffs can help a farm manager explicitly consider risk in the decisionmaking process. This table, called a payoff matrix, is helpful when considering a number of choices, and it can give you an idea of the range of possible consequences of each action.

Table 1 is an illustration of this approach. First, list the decision alternatives: in this case, whether to apply 20

Table 1. The Payoff Matrix: Net Returns for a Fertilizer Application Decision

Event	Decision alternatives: Amount of fertilizer to apply		
	20 units	40 units	60 units
	Net returns in dollars per acre		
Low rainfall	74	70	63
Normal rainfall	116	118	117
High rainfall	134	160	168

units, 40 units, or 60 units of fertilizer. To build the matrix, chart the decision choices against the possible events: in this case, whether there will be low, normal, or high amounts of rainfall. We estimate the crop yields in bushels per acre for each combination of decision alternatives and events. Then, multiply each yield by the expected net selling price of the crop. Since we are concerned with net payoffs, it is necessary to subtract fertilizer costs per acre from each figure.

We now have a payoff matrix. By itself, a payoff matrix cannot dictate the best decision, but it does provide a convenient guide, summarizing the information to be considered. By organizing the decision in this way, it is easier to focus on what can be controlled (the alternative actions) and what cannot be controlled (the possible events).

Budgeting in this framework involves preparing budgets for each action and event combination. With careful budgeting of all of the possibilities, the actual outcome should be no surprise. Potential outcomes will have been considered before arriving at a decision.

Assessing Probabilities

Along with the payoff matrix, another valuable tool for considering risk in decisionmaking is the use of probabilities. Probabilities provide a means of summarizing what we believe and know about the future. Although the most extensive use of probabilities has been in the area of weather forecasting, there is great potential for their use in business management.

Probabilities based on a decisionmaker's personal beliefs about the chance of an event occurring are called personal probabilities. In estimating these personal probabilities, decisionmakers should consider their own ex-

perience, the opinions of experts, and the available data. Personal probabilities allow decisionmakers to summarize everything known about a future event with numbers so they can deal with risks explicitly. Techniques have been developed to help managers estimate their personal probabilities.

Putting It All Together

The payoff matrix guides the budgeting process and summarizes the components of the decision problem, the alternative actions, and the events. Personal probabilities summarize what the manager believes about the future. By combining personal probabilities with the payoff matrix, the farm manager can evaluate the risk associated with the decision alternatives.

These steps help farm managers explicitly spell out the thought processes that they already use intuitively in making risky decisions. Many decisions are too complex and important to be handled by intuition alone. A more formal approach provides the discipline to ensure that all available information has been utilized.

Risk analysis does not simplify decisionmaking or eliminate the agony of making difficult choices. More importantly, risk analysis does not eliminate risk, but it can help the farm manager select the right risks to take in the often uncertain world of U.S. agriculture.

For further information on risk-taking in farming, see *Farm Business Management: The Decision-Making Process*, third ed., Chapter 8 by Emery N. Castle, Manning H. Becker, and A. Gene Nelson, Macmillan Publishing Co., New York, 1988.