Staff Paper

RISK MANAGEMENT PLAN - WHY & HOW?

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by

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INTRODUCTION

Agriculture in the United States continues to evolve and change. First came the era of the pioneers and settlers. The settlement phase was followed closely by the Industrial Revolution which started to mechanize many of the tillage, planting, and harvesting tasks. The initial mechanical development era was followed by the genetic revolution for plant and animal stock with one of the landmark developments being hybrid corn. The biological revolution continues, and is joined by a revolution in knowledge base technology including computers, monitoring, and communications. Off-farm structural changes, including the globalization of the agricultural economy have increased awareness of the impact of imports and exports upon domestic commodity prices. Likewise, the potential off-farm impacts of agricultural practices and consumer's perceptions of the safety of food raise new uncertainties. All these changes have impacted farm decision-makers in that they need to be aware of not only what happens on the farm but also what happens beyond the farm gate.

The developmental eras cited above have brought about change. Change creates unexplored frontiers of knowledge. The lack of certainty about occurrence of future events creates risk. Risk by definition is the "exposure to the chance of injury or loss". Profit can be viewed as a return to management of these uncertain events that create exposure to losses. Many would contend that without uncertainty and risk, there is no opportunity for profit. Farmers of today and tomorrow need to manage this risk.

With our increased technological base, the pace of change appears to be increasing. We now appear to be in the era of an information explosion. Farm managers much stay informed or become outdated and less competitive. Management or the ability to make wise decisions in our rapidly changing world is critical for individual farm survival and growth. We couch this necessary ability for success in agriculture as "risk management".

SOURCES OF RISK

One of the first steps in developing a "risk management" plan is to identify the sources of risk that might impact your well-being. Agricultural managers face a multitude of events that create risks. All risks emanate from change. These sources include changes in public policy, technology, weather, biological processes, human

behavior, and others. Most of these changes result in the amount and/or price of commodities produced or inputs purchased being different than expected. The decade of the 1980's made clear to many farmers their exposure to risk. Adverse weather ranging from drought to floods caused yield reduction in several major agricultural regions of the United States. These events combined with export demand swings resulted in wide commodity price changes. Declining land values combined with increased interest rates resulted in a terminal financial condition for some farmers and threatened the survival for many highly leveraged farms.

There are many ways to categorize the sources of risk that farm business face. One such sort or listing should include the following ten sources of risk.

1. **Production Risk:** Farmers' yields per planted acre will nearly always be different than anticipated. Sources of downside production risk include too little moisture, too much moisture, flood, excessive temperatures at pollination, hail, wind, fire, weeds, insects and disease.

2. **Input Performance Risk:** Most managers place this risk under production risk, but some managers prefer to sort out passive impacts like drought or flood from those more closely related to input choices. For example, crop varieties within a species differ in their tolerance to frost risk or drought. Also, herbicide performances are affected by weather, and opportunities for rescue operations will vary.

3. **Commodity Prices and Access to Market:** Prices of widely traded commodities change every day, and certainly from year to year. These prices vary because of changes in economic factors as institutional programs, weather, health concerns and other factors that influence the demand and supply for a particular commodity.

4. **Input Price and Availability:** Input prices vary for inputs such as fertilizer, chemicals, feeder livestock and feed. One of the basic tenets in managing this risk source as with all others is staying informed in order to understand and anticipate changes that might occur.

5. **Borrowed Capital Price and Availability:** Interest rates, like commodity prices, have shown tremendous variability in recent decades. For example, many growers found themselves paying high nominal interest rates long after inflation pressures subsided.

   Availability of credit is also relevant. Some credit sources are very sensitive to agricultural earnings cycles. These lenders enter during prosperity and disappear in tough financial times. Select a creditor who believes in the long-run future of agriculture.

6. **Technology:** New technological developments often make current methods obsolete or inefficient. Choice and timing of investments in new technology can make or break a farmer. Premature adoption can be risky if the new technology does not work as anticipated or is too costly or too inflexible. The flip side is that new technology often reduces cost per unit produced. Farmers that are late adopters can have higher production costs than their neighbors.

7. **People:** Most agriculture in the United States is characterized by owner and family involvement in the day-to-day management and operation of farms. Farmers should make provisions for back-up management capacity in the event that a key member of their operation falls ill, becomes disabled or dies. Similarly, plans to deal with ownership dissolution (husband/wife or partner/partner) have become increasingly important in recent times.

8. **Legal:** In our legalistically-oriented society, farmers need to protect themselves from catastrophic lawsuits. Having formal liability insurance protection can be proclaimed as a necessity for farmers of today and tomorrow.

9. **Institutional:** Agriculture can be profoundly influenced by changes in institutions. Examples include government price and income support programs, income tax legislation, OSHA, EPA, etc. Farmers need to be aware of how these policies influence their own farm business. An early warning system can help anticipate these changes in programs and enable opportunities to exploit advantages or minimize downside risks.

10. **Macroeconomics:** This category includes factors which influence inflation, exchange rates, trade and access to commodity markets, access to labor markets, etc. These risks are beyond the control of farmers, but sometimes changes can be anticipated so that farmers position themselves to benefit from them, or at least avoid harm.

    It is clear from the above list, that their is no shortage of risks faced by the American farmer. Let's now focus on some suggestions to help farmers manage risk, rather than allowing risk to manage them.

DETERMINE RISK-BEARING CAPACITY

Having identified the sources of risks, a second step that a farmer needs to complete in developing a risk-management plan is to evaluate his/her/their capacity and willingness to bear risk.

The primary financial document relating to risk-management capacity is the Net Worth Statement (also known as the Balance Sheet). This statement lists the assets owned and the liabilities incurred as of a specific date. The difference between the value of the assets and the debts or liabilities in called net worth or equity. This amount shows the margin by which the farm debts could be covered if the farm business was liquidated by sale of its assets.

For example if a farmer had total assets with market value of $350,000 and total liabilities of $178,000, the equity would be $172,000. With that level of equity, he/she would be in no immediate danger of being foreclosed on, but when one divides total liabilities ($178,000) by total assets ($350,000), that farmer's debt-to-asset percentage is just over 50 percent. This example farmer is using quite a bit of financial leverage and the caution light should go on. If one divides the farmer's total liabilities by the farm's net worth, the result is the debt-to-equity ratio (also known as financial leverage). This example farm has debt-to-equity ratio just over 1 to 1. This leverage ratio indicates that the lender has just as much at risk as does the farmer.

Another useful aspect of the balance sheet is to help farmers determine the ability of the farm business to meet financial obligations in a timely manner should an adverse event arise. The balance sheet measures how liquid a farmer's business is.

DETERMINE RISK - ITS MAGNITUDE and PROBABILITY

For each source of risk that can be managed, a third step in developing a risk-management plan is to determine potential loss exposure. For each risky or uncertain event, the size or magnitude of the potential dollar loss should be estimated. This estimation process requires not only establishing a dollar value associated with occurrence of each risky event; but also needed is an estimate of the probability or chance of its occurrence.

Availability of estimates on the magnitude and probability of a potential loss should enable the decision-maker to evaluate the trade-offs between various risk-management strategies.

IDENTIFY ALTERNATIVE RISK-MANAGEMENT STRATEGIES

For each risk source that is identified as a potential adversary to financial survival and growth, a risk-management strategy ought to be employed. Recognize that the size of loss or chance of loss for some risky events can be sufficiently low such that it may be more prudent to pursue a self-insure risk-management plan.

Development and evaluation of the risk-management strategies under the chances of alternative net returns should be in a risk/return framework. For example, self-insure can be compared with those resulting from a risk-transfer mechanism which would reduce the level of net returns in the good years but provide down-side protection in those catastrophic years. An alternative risk-management strategy may be avoidance of the risky situation which would eliminate the opportunity for profit and also the chance for loss.

Although the following discussion separates production strategies from marketing, we need to recognize that these areas are not isolated but are interrelated in conducting business and both have financial implications. A wise marketing strategy often starts with asking what the market is demanding as reflected in current and predicted prices.

A. Production/Financial Strategies

For the production/financial risk sources, some alternative risk-management strategies include: diversification, spatial dispersion, enterprise selection, production management schemes, insurance, resource reserves, control of resource services, flexibility, crop insurance, and consideration of government programs. An adequate knowledge base including farm record data, a farmer's own managerial expertise, and use of outside information sources when a lack of knowledge is perceived are crucial too.

Diversification only works if the profits from two or more enterprises do not have a high positive correlation. Corn and soybeans are often influenced in the same way by growing conditions. For example, drought will probably reduce yields of both although the timing of the rainfall or lack thereof can influence them a bit differently because of differences in the definiteness of their respective flowering periods. By adding winter wheat to a row-crop corn-soybean farm, the farm becomes more diversified. In a risk-management context, such a change can make sense because winter wheat yields on mid-western farms are not highly correlated with corn and/or soybeans yields which do have a high positive correlation.

Diversification into another crop or livestock enterprise also requires a set of knowledge and skills for those new enterprises and the possible need for increased capital investment. Farmers diversifying into something in which they have no knowledge might result in increased risk. Also, diversification into volatile enterprises that have a wide range of earnings would increase a farmer's risk.

Alternative methods to control resources can also be part of a risk-management plan. To illustrate, consider some alternative land control schemes. Farmers that cash rent land retain all of the yield and price risk on their balance sheets. Share renting is an alternative that allows sharing of this risk with landlords. A written contract, regardless of the rental method, clarifies responsibility for both farmers and landlords.

Control of machinery services is another important area that has important ramifications for production and financial risk management. Ownership is one method to obtain absolute control of the machinery services. Usually there is a risk/returns tradeoff in the evaluation of any strategy. With machinery ownership, the guarantee of machinery services may be a higher cost alternative than custom hire or contracting. Contracting for machinery services may also allow farmers to reduce their machinery investment and strengthen their balance sheet if new machinery debt can be avoided or old debt reduced. Selection of the cultural practices influences the machinery requirement and also the risk of yield loss. Illustrative of this decision are the choices between conventional tillage and a host of alternative tillage practices ranging from no-till to ridge-till.

Purchase of *crop insurance* is another risk-management strategy. Crop insurance provides a guaranteed gross income per acre insured. If actual yields are less than the guarantee, the crop insurance indemnity payment makes up the difference. With the possible decline of federally financed disaster payments, crop insurance may become more important as a risk-management tool.

In evaluating risk-management strategies, the farmer needs to ask how much of an adverse event; e.g. low yields, low prices, lawsuits, etc., would it take to "eat-up" the equity of the business. The on-going fixed costs of doing business and required family living expenditures that create out-going cash flows need to be included in evaluating the impact of adverse events upon the resultant equity position of the farm business.

Another measure of farmers risk-bearing capacity is their liquidity. Are dollars available from current assets to service debt obligations due in the next 12 months? One measure of liquidity is the current ratio; that is, current assets relative to current liabilities.

A very important management tool for evaluating a farmer's ability to meet forthcoming cash flow obligations is the projected cash flow.

First consider the following definition for cash flow on a farm producing program crops:

$$(D * Py + P*Q + L) - (C + P\&I + FL) = \text{Net Cash}$$

Where:

D	= Deficiency Payment per unit of yield
Py	= Program Yield
P	= Price of the Crop
Q	= Quantity of Crop Produced
L	= Loans
C	= Cost of Producing the Crop
P&I	= Principal and Interest
FL	= Family Living Costs

Clearly from the cash flow definition, there are two major events that farmers have difficulty in predicting as they project their cash flows for the upcoming crop year. Those two risky events are (1) downside price risk and (2) downside yield risk on the commodity that is being grown.

When developing a projected cash flow budget farmers should first consider the component parts of the net cash flow statement in their risk evaluation. With a program crop the revenue side of the cash flow equation includes deficiency payments times the program yield plus the price of commodity times the quantity of the commodity that is produced. New loans are also a cash inflow item. For cash outflow there is the cash expense from producing the crop, principle and interest payments to service debt, and family living expenses.

As farmers look at this particular cash flow equation they will discover there is really only one item in the equation that is fixed; i.e. the program yield, which is specific to a particular farm. Deficiency payments run inverse to commodity price and the yield that is produced can vary greatly. There is also some variability in costs

and interest rates but for most farmers input prices and quantities are easier to estimate than price and yield. Family living expenses may be adjusted slightly but in most cases it is difficult for families to reduce the cash spent on family living for a very long period of time.

Farmers that produce a crop with a very low yield will in most cases need to draw cash inflow from dis-savings or borrowing. In many cases farmers are not in a position to significantly reduce family living costs, principle and interest and many of the costs have already been spent in the production of the commodity itself leaving the only sources to balance the cash flow equation are government payments or new loans. In order to limit the risk exposure on their cash flow, farmers may enroll in the government's commodity programs that limits downside price risk.

Farmers producing non-program crops do not have the government program to provide downside income protection. The projected yield is even more important when evaluating their risk exposure.

Studies suggest that farmers, on the average, overestimate gross income by 10 to 20 percent when making cash flow projections. Farmers tend to remember good years and discount the bad ones. Accurate farm records of past production and financial performance are the best sources of information for farmers when projecting next years cash flow.

B. Pricing/Financial Strategies

An initial point is that the day of product delivery and the day of establishing product price can be quite different days. Some commodities have several pricing strategies that farmers can use to establish their product prices before delivery. Illustrative of these techniques are forward contracting, hedging using the futures markets, or buying price insurance through "put" options. All these techniques are methods of transferring risk of price change to someone else. Farmers with a cash-marketing strategy are carrying all of the price risk. Farmers that add a storage strategy lengthen out the time period in which they can establish price, but they are also assuming all the risk of condition loss associated with storage. Each of those strategies have certain costs as loss of flexibility, brokerage fees, and other costs. Still farmers need to determine if these strategies can be employed by them. Each year is different and may require a different strategy. Farmers should not lock themselves into the same pricing strategy each year. The market conditions change and a farm business manager must be aware of these changes and adjust their individual strategy to the changing environment.

Some of those same pricing strategies can also be used for purchasing inputs. Forward purchases with contracts that specify terms including price, use of the futures to lock-in a price for inputs traded on the exchange, and fixed interest rate notes are all examples of strategies to reduce input price variability. The risk/returns trade-off again needs to be evaluated. It is possible that some farmers will be better off to self-insure, i.e. to carry the risk themselves. Farmers always need to consider the impact on their balance sheets and cash flows.

C. Financial and Personal Strategies

In addition, farmers have some general financial risk-management strategies. Farmers will need to maintain credit reserves and adequate liquidity. Also, when borrowing money, farmers need to maintain a high proportion of self-liquidating loans. That is, borrow money with appropriate interest rate and length of loan repayment terms such that the debt service obligations can be paid for from income generated by that activity for which the money was borrowed.

The final and perhaps most important risk management consideration is protection of the farm family's health. Farmers need to carry health insurance. Farmers handle chemicals and machinery that subject them to risk of injury, so they need to be careful but also have some back-up managerial capacity.

SUMMARY

It should be obvious that the total environment influencing agriculture provides no shortage of risk for today's farm business manager. This chapter has stressed many things, not the least of which is the importance of realism in planning. Having an adequate set of on-farm records to provide data on past performance is one important ingredient. Only with such data can probabilistic estimates be made that are truly representative and honestly realistic. Of equal importance is the ability to recognize the need for managing any risks that can prohibit farmers from achieving their goals.

We have attempted to put some order to the vast array of risks facing farmers by classifying them into several categories from production to macroeconomic risks. Some events represent large catastrophic losses that seldom occur as contrasted to smaller loss events that occur more frequently. It should be pointed out the need, to not only recognize the possible occurrence of risk events, but also be aware of how each might influence the farm business. We've established the importance of the first line of defenses by assessing the farmers capacity

and willingness to bear risk. But in the end each farmer must decide if a potential loss is sufficient to employ an explicit risk-management strategy or whether the self-insuring strategy is preferable.

We've introduced and reviewed many key concepts. We hope they will help farmers manage risk, instead of risk managing them. That is, of course, the ultimate decision.