

Managing Production Risk in Agriculture

Sarah A. Drollette
Department of Applied Economics
Utah State University

Farmers and ranchers deal with a significant amount of uncertainty every day. From not knowing what the weather will be like this year to wondering if market prices will increase or decrease tomorrow, agricultural producers are forced to make decisions based on imperfect information. Born out of this uncertainty is the possibility of injury or loss. Risk can be defined as the possibility of adverse outcomes due to uncertainty and imperfect knowledge in decision making. Each time a farmer plants his fields it is possible the weather will destroy his crops. Each time a feed-lot operation purchases calves, they risk a loss if market beef prices fall. And each time a dairy producer milks cows, he risks being kicked in the face.

Given the changing structure of the agricultural industry, managing risk has become vitally important to the success of agricultural operations. Among the major risks farmers face is production risk. Agricultural producers are in the business of production-taking certain inputs and transforming them into outputs (which outputs are hopefully worth more than the sum-value of the inputs). Some manufacturing companies have the luxury of knowing exactly how many outputs can be produced with a specific number of inputs. Farmers do not have that luxury. In agriculture, production is riddled with risks that can negatively affect production levels and lead to significant losses.

For a crop farmer, planting seeds does not guarantee a profitable yield at the end of the crop season. Output per acre likely varies by acre and year and can be suddenly devastated due to unforeseen weather factors such as drought, fire or frost. Wild animals, insects and other pests can negatively affect crop production levels and weeds can choke out growing crops. Crop disease can also be a significant source of risk in crop production. These and other unpredictable factors create a very real risk for crop producers.

Similarly, livestock and dairy producers must face risks tied to weather and wild animals or pests. Disease is also a very significant risk that could lead to reduced production or, in an extreme case, the shut-down of an entire operation. Unknown or uncertain quality of inputs can also pose risks to production levels.

The presence of any of these unpredictable risk factors can significantly lower production levels and lead to losses. Since production output is the main source of revenue for agricultural operations, it is crucial for farmers to recognize and manage production risk.

Management Tools

There are many tools available to help farmers manage production risk. Which tools a farmer uses should depend on his individual farm situation and risk-bearing willingness and ability. An understanding of the tools available for managing production risk can help agricultural producers develop better marketing plans that can reduce those risks and increase profitability.

Diversification

Product diversification can help lower production risk for agricultural producers. By

producing more than one crop or livestock product, farmers can reduce the risk of a total production loss. For example, a producer who operates a dairy and raises corn is not completely dependent on one product. Thus, his risk of a complete production loss due to an early frost would be less than a farmer who only grows corn.

With diversification, choosing low-risk enterprises can also help reduce overall production risk. Given a farmer's specific location, some crops may have lower yield variability in general reducing the risk of production loss compared to a crop with high yield variability. Similarly, livestock enterprises that do well in warmer climates may introduce higher levels of production risk in colder areas. When making diversification choice, choosing those enterprises with lower risk given the farmer's specific situation can help lower production risk overall.

It is also important to choose efficient and profitable enterprises. While diversification may reduce risk, it may also reduce possible gains from specialization. For example, a livestock producer who adds a wheat enterprise must shift time from managing his livestock enterprise to manage his wheat enterprise. Different machinery may be needed, learning time must be spent, and the new enterprise may increase profits by less than the decrease of profits in the livestock enterprise because of the shift of energy.

It is, therefore, important to understand whether the added enterprise is efficient and profitable. While the yield may have very little variability and low production risk, if that yield is consistently lower than what is needed to cover costs, the whole farm is not being helped by the diversification. Thus, adding an inefficient

enterprise that creates continual losses might not be worth the lowered risk from diversification, and farmers should take these factors into account when making diversification decisions.

Excess Capacity

Production risk can also be reduced by maintaining excess production capacity. For example, in areas where weather conditions commonly postpone planting, a farmer with excess machinery or labor capacity will be able to catch up on planting to avoid that risk of production loss. Similarly, livestock producers with excess feeding capacity can reduce the risk of loss if there is a drought, fire or some other event that makes feed unavailable. As with diversification, the cost of maintaining excess capacity should be weighed against the benefits of lowering production risk when making management decisions.

Lease Arrangements

Utilizing leasing arrangements can also help reduce production risk. With a crop share or livestock share lease, the farmer shares production risk with the landowner. For example, under a crop share agreement, the landowner receives a portion of the crop yield as rental payment. If production yield is significantly reduced, the landowner also receives a reduced quantity and the burden of the loss is shared between landowner and tenant. A similar agreement with a livestock producer would also reduce his production risk by sharing it with the landowner.

Information

Having good and up-to-date information can greatly reduce the risk associated with agricultural production. Agricultural companies, as well as universities, are

constantly doing research to test and develop new and better ways of producing various agricultural commodities. A farmer who is well informed about and follows new and proven production practices can reduce his production risk. For example, a producer who knows and follows proper care and milking practices on a dairy enterprise can help avoid many diseases, significantly lowering the risk of production loss. Similarly, a crop farmer who becomes aware of a recently emerging crop disease can apply disease-resisting pesticides and may save his crop from devastation.

Adopting new technologies can also help reduce production risk. For example, a crop producer who invests in new machinery or irrigation equipment may lower the risk of equipment or water problems reducing his yield. Similarly, biotechnology and the focus of genetic research on improving yield have produced seed varieties that are more resistant to drought and disease and can reduce production risk for farmers.

Insurance

A major tool to reduce production risk is insurance. Multiple Peril Crop Insurance (MPCI) policies are designed to protect farmers against yield loss from natural causes such as adverse weather conditions, disease, and insects. These policies are based upon Actual Production History (APH) figures, and the farmer pays a premium for the insurance relative to the percentage of his APH yield he wishes to guarantee with the insurance. Though many insurance policies are available through private companies, the USDA's Federal Crop Insurance Corporation (FCIC) backs the policies and provides premium subsidies for farmers, significantly lowering the cost of insurance to farmers.

Other types of insurance policies combine commodity yield and price protection, such as Crop Revenue Coverage (CRC) insurance, Income Protection (IP) insurance, and others. These policies are available for many commodities in various areas, but are more expensive than MPCCI policies and less commonly used in Utah. (For county-specific information concerning the historic use of crop insurance policies, please visit the USU agribusiness webpage: <http://www.extension.usu.edu/agribusiness/html/risk>. For more information about insurance policies, see the following USDA Risk

Management Agency website: <http://www.rma.usda.gov/policies/>).

Agricultural production has always been risky, and production risk can be among the most uncertain and potentially devastating to a farmer. There are many risk management tools available to reduce production risk and it is essential to understand the options available when making risk management decisions. By utilizing these and other risk management tools to reduce the many different risks a farmer faces, producers can develop a stable and profitable farming enterprise despite the uncertainties inherent in agricultural production.

Utah State University is committed to providing an environment free from harassment and other forms of illegal discrimination based on race, color, religion, sex, national origin, age (40 and older), disability, and veteran's status. USU's policy also prohibits discrimination on the basis of sexual orientation in employment and academic related practices and decisions.

Utah State University employees and students cannot, because of race, color, religion, sex, national origin, age, disability, or veteran's status, refuse to hire; discharge; promote; demote; terminate; discriminate in compensation; or discriminate regarding terms, privileges, or conditions of employment, against any person otherwise qualified. Employees and students also cannot discriminate in the classroom, residence halls, or in on/off campus, USU-sponsored events and activities.

This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle E. Cockett, Vice President for Extension and Agriculture, Utah State University.