



Risk and Resilience in Agriculture

Crop Insurance as a Tool

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There are several approaches to address income variability associated with production risk. One approach is to produce more than one product to avoid having your income totally dependent on the production and price of one product. We have already discussed how you might analyze and use product diversification to reduce income variability (“Enterprise Diversification: Will It Reduce Your Risk?”, “Choosing the Right Enterprise Mix to Reduce Your Risk: A Case Example in Wyoming’s Big Horn Basin”). We have discussed enterprise budgeting as a way of analyzing an enterprise and how well an enterprise mix might help you reach an income target level or threshold (“Enterprise Budgeting”; “Partial Budgeting”; “Enterprise Diversification: Will It Reduce Your Risk?”; “Choosing the Right Enterprise Mix to Reduce Your Risk: A Case Example in Wyoming’s Big Horn Basin”). Another tool that can reduce income variability or meet cash flow requirements in the face of production risk is crop insurance.

The first decision you must make on crop insurance is whether you have enough financial reserves to cover a disastrous crop

year. If the answer is no, then crop insurance may be an option you should consider in your management plan. Crop insurance can insure a reliable level of cash flow and insured production can be forward-priced with a reduced chance of not being able to meet contractual obligations. The question becomes which crop insurance product will meet your goals.

Types of Crop Insurance

Insurance companies offer a wide variety of crop insurance products and protection levels. These products are often subsidized to help reduce their cost to you. The Federal Crop Insurance Reform Act of 1994 increased the level of premium subsidy to producers as a way to encourage producer participation (Harwood et al., 1999). Catastrophic (CAT) coverage was offered after the passage of the 1994 Crop Insurance Reform Act. Producers are only required to pay an administrative fee of \$60 for this coverage. CAT policies pay for losses below 50% of a producer’s average yield, which is based on a 4 to 10 year Actual Production History or APH (Harwood et al.,

1999). If production losses fall below 50% of the APH, payments to the insured, also known as indemnity payments, are made at a rate of 55% of the maximum price set by the USDA Risk Management Agency. The indemnity payment is based on the guaranteed yield (50%) minus the actual yield, multiplied by 55% of the USDA price. For example, if you have an APH yield of 35 bushels to the acre, and your actual yields were 10% of your APH with a USDA price of \$4.00 per bushel, the indemnity payment you would receive would be $\$30.80$ per acre $((50\% * 35) - (10\% * 35)) * (55\% * \$4)$, or $14 \text{ bu/ac} * \$2.20/\text{bu}$. Given the importance of your APH in calculating your indemnity payment, it follows that records of your crop production are very important.

Probably the most familiar insurance products are crop hail and multiple peril crop insurance (MPCI). Crop hail insurance is an unsubsidized product that provides protection against hail damage only, while multiple peril insurance provides coverage against most natural disasters. Yield protection in additional multiple peril crop insurance coverage beyond CAT is again based on your own production history (APH). A producer can obtain multiple peril crop insurance at levels between 50% and 75% of his or her APH yield, using 5% increments (Harwood et al., 1999).¹ In the case of multiple peril coverage you can also elect what percent of price you wish to guarantee up to 100% of the established USDA price. Again, the indemnity payment you could receive would be based on the guaranteed yield minus the actual yield, multiplied by the elected percent of the USDA price. Federal multiple peril crop insurance also encourages participation by providing subsidies which lower the cost of the insurance to producers.

¹ Starting in 1999, APH coverage is available at 85% yield coverage for selected areas and selected crops (Harwood et al., 1999).

Group Risk Protection (GRP) is similar to the protection you can receive in the basic multiple peril insurance except yield guarantees and indemnity payments are based on county yields rather than individual farm yields (Harwood et al., 1999). This type of coverage is attractive to producers whose farm yields follow closely with county yields and or are located where wide geographical areas are often affected by natural disasters (Miranda, 1991; Skees, 1994; Glauber, Harwood and Skees, 1993). However, producers may find themselves unprotected if damage is limited and county yields are unaffected or do not warrant benefit payments to producers. GRP insurance is available on over 60 crops at this time (USDA, 1997).

There are three different types of revenue insurance products currently available to producers in various geographic locations. These products are Crop Revenue Coverage, Revenue Assurance and Income Protection. Each of these products combines price and yield risk protection in one program. Indemnity payments under each plan equal the amount, if any, by which guaranteed revenue exceeds the revenue realized at harvest (Harwood et al., 1999).

Crop Revenue Coverage (CRC) uses APH yield and the average of the new crop daily closing futures price in February for spring planted crops (Edwards and Barnaby, 1998). The planting time price, i.e., the average February futures price, multiplied by the APH yield is the way the expected revenue is calculated for which the guarantee is made. Revenue coverage options are 50, 55, 60, 65, 70 and 75% of the expected revenue. At harvest, the expected revenue is recalculated using a harvest price which equals 95% of the average daily closing price for the nearby futures contract during the month prior to contract expiration (Edwards and Barnaby, 1998). If the harvest time revenue is higher

than the minimum revenue guarantee at planting, the grower receives the higher guarantee at no additional premium charge. It is important to note that limits are placed on the maximum allowed increase for the insurable price. Indemnity payments are made if the producer's actual gross revenue, calculated as the actual yield multiplied by the harvest price, is below the guaranteed revenue level. Thus, payments to producers can be the result of various combinations of prices and yields.

Revenue Assurance (RA) is a product developed by the Iowa Farm Bureau, and it is currently only available in Iowa (Harwood et al., 1999; Edwards and Barnaby, 1998). It may be expanded at some point in the future, however. This product also guarantees a minimum gross revenue per acre for corn or soybeans. The major difference between RA and CRC is how the price for the revenue guarantee is derived. The price used to calculate the revenue guarantee is the average of the new crop futures price in February minus the historical difference between the same futures price at harvest and Farm Service Agency's (FSA) posted county price at harvest (Edwards and Barnaby, 1998). The revenue guarantee chosen can range from 65 to 75% of the expected revenue. At harvest, the price used to calculate the actual revenue is the FSA posted county price where the insured unit is located. October is the month of the harvest price for soybeans, and November is the month the harvest price is based on for corn. Provisions for late or delayed planting or replanting are the same as for multiple peril crop insurance.

Income Protection (IP) uses 100% of the new crop futures prices prior to sales closing to set the level of gross revenue protection (Edwards and Barnaby, 1998). However, protection levels do not increase if prices rise by harvest as is the case in CRC and RA products. It is

important to note that under all three revenue insurance products, if prices decline from planting to harvest, even a small yield loss may trigger indemnity payments to producers. The major difference in these products comes from how prices are derived to determine expected revenue.

For those crops that are not insured in your area or not insured at all, producers can apply for the Noninsured Assistance Program (NAP). NAP provides coverage roughly similar to the CAT level of crop insurance (USDA, 1997). There is no administrative fee, but it must be applied for prior to planting through your local USDA Farm Service Agency office (USDA, 1997).

CAT coverage and multiple peril are the most widely available crop insurance products for Colorado, Montana and Wyoming at this time (Table 1). Group Risk Plan coverage is limited primarily to forage and wheat for these states. Montana currently has GRP pilot coverage for rangeland, as well. CRC coverage is available for corn and wheat in Wyoming and Montana. Colorado has CRC coverage that is available for grain sorghum in addition to corn and wheat. Montana currently has IP coverage on a test or pilot basis for wheat and barley. As mentioned previously, RA coverage is currently only available in Iowa. Before making your decision on which type of insurance product you want to use, you should contact your local crop insurance agent or your regional Risk Management Agency representative to find out what products are available given the location of your crop production.

How Do I Decide What Coverage I Need?

The first several questions to ask yourself when looking at crop insurance should be: 1) what is the minimum cash flow I need to meet my debt obligations and stay in business; and 2) what are the major sources of crop risk in my area? Once you have answered these two

questions, you can then decide on a crop insurance product that will meet your minimum cash flow needs and cover you for the type of production risks you face in your area. Just as is the case with car insurance, the more coverage you ask of your insurance, the higher the premium you will pay. Thus, it is usually better to set some minimum level of coverage rather than overinsure.

If you are considering crop insurance to reduce your income risks, you should call your insurance agent early in the planning process and get information on the types of insurance available, the levels of coverage available, premium costs and closing dates after which those products will no longer be available. This information coupled with an estimate of your minimum cash flow requirements and major sources of production risk gives you an excellent starting place to develop a plan for using crop insurance to your advantage.

Another piece of information that might be useful is to assess how often you might have a disastrous or below average yield year. One way to do this would be to calculate an average of your own yields. If you do not have 7 to 12 years of APH yield data, you can use county yield data which can be obtained from your state statistical bulletin. Once you calculate your average yield, look at how many years yields were below average.

Another approach is to assess how many years yields are what you consider well below average. This can be done by using a target level of yield. The target yield should be some level that you don't think you can afford to have production fall below. Once this target level of yield is determined, you can look at how many years yields actually fell below the target for the years you have data. This gives you an idea of how often you think your cash flow might be unacceptable. This

probability of a low yield can be coupled with price outlook and long term weather projections to help you decide on crop insurance from year to year. Unfortunately there is no set rule for when to buy insurance, you will have to decide whether you are willing to accept the risk of loss, given the information you have gathered.

Once you have determined the probability of loss and some minimum level of cash flow you need, you can work through the types and levels of coverage that will meet your goals. This can be done by working through a quick cash flow analysis of different types of coverage. Table 2 gives you an example of a worksheet you might use to do this. To figure out total cash flow you would multiply the net cash flow per acre by the number of acres of each crop. You can set this up in a spreadsheet on your computer or estimate by hand several different cash flow scenarios with the type of coverage you are considering and different possible yields. After working through several scenarios you will have to decide which coverage level insures your cash flow requirements, given your expected chance of having a low yield.

A final step in the analysis is to develop a risk management plan incorporating both enterprise mix and crop insurance alternative strategies. The plan should be based on deciding what impacts different strategies will have on your financial health (Smith and Dawson, 1995). Not meeting your cash-flow needs often reduces the equity in your operation. If you do not have a large amount of equity or any cash reserves, having no risk management strategy can be devastating to the business in a disastrous year. You will have to assess how much risk your firm can withstand, and then you will have to determine which risk management plan will reduce your risk to acceptable levels.

Table 1. Insurance Products Available in Colorado, Montana and Wyoming by Crop.*

Type of Insurance	Colorado	Montana	Wyoming
CAT	All program crops	All program crops	All program crops
MPCI (elections beyond CAT)	All program crops	All program crops	All program crops
GRP	Forage, Wheat	Forage, Range, Wheat	Forage, Wheat
CRC	Grain sorghum, Corn, Wheat	Corn, Wheat	Corn, Wheat
IP		Wheat, Barley	

* Available in at least some counties in the state as of 1999.

Table 2. Per Acre Cash Flow Worksheet For Use in Crop Insurance Purchase Decision.

Crop/Practice Ex. Wheat/ Dry Land	Example Coverage		Your Numbers	
	Typical Year	Disaster Year	Typical Year	Disaster Year
Cash Receipts / Acre				
1. <u>Expected Yield/acre</u>	35	12		
2. <u>Expected price of crop at harvest.</u>	\$ 3.25	\$ 3.25		
3. <u>Crop receipts:</u> <u>Line 1 x Line 2</u>	\$ 113.75	\$ 39.00		
4. <u>Other receipts</u> <u>(pasture, straw, deficiency</u> <u>payment, etc.)</u>	\$ 31.50	\$ 31.50		
5. <u>Total receipts:</u> <u>Line 3 + Line 4</u>	\$ 145.25	\$ 70.50		
Cash Requirements				
6. <u>Preharvest cash operating expense</u>	\$ 36.10	\$ 36.10		
7. <u>Harvest cash expense for yield on Line 1</u>	\$ 22.75	\$ 7.80		
8. <u>Debt service, family living, and other cash requirements</u>	\$ 41.45	\$ 41.45		
9. <u>Total cash requirements:</u> <u>Line 6 + 7 + 8</u>	\$ 100.30	\$ 85.35		
APH Criteria				
10. <u>Enter Approved APH yield</u>	35	35		
11. <u>Coverage level: 50%, etc.</u>	65%	65%		
12. <u>Price election: 60%, etc.</u>	\$ 3.15	\$ 3.15		
13. <u>Fee or premium</u>	\$ 2.43	\$ 2.43		
Projected Indemnity Payment				
14. <u>Yield guarantee (line 10 x 11)</u>	22.8	22.8		
15. <u>Yield difference: (Line 14 – 1[enter a zero if answer is negative])</u>	0	10.8		
16. <u>Payment received:</u> <u>Line 12 x Line 16</u>	\$ 0.00	\$ 34.02		
NET CASH FLOW:				
Line 5 – Line 9 – Line 13 + Line 16	\$ 42.52	\$ 16.74		

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