

## Risk Management



USDA photo: Ken Hammond

# U.S. Crop Insurance: Premiums, Subsidies, & Participation

Premium subsidies, a prominent feature of the U.S. crop insurance program since the early 1980s, have increased recently, lowering the cost of crop yield and revenue insurance coverage to producers. Premium discounts were added to existing premium subsidies in 1999 and again in 2000, and the Agricultural Risk Protection Act of 2000 (ARPA) revised subsidy rates and increased government funding of premium subsidies for 2001-05. These increases in premium subsidies were preceded by an expansion in recent years in the variety of insurance coverage available to producers and the maximum insurance guarantee levels. How have producers responded to the changes in available coverage and to the reduction in insurance prices?

Crop insurance programs, traditionally yield-based, added products in the mid-1990s that insure revenue rather than yields, broadening producers' choice of insurance options. The premium discounts of 1999 and 2000 and the revised premium subsidy rates reduced producer costs of both crop yield and revenue insurance products at "buy-up" coverage levels. Buy-up coverage levels are greater than the basic, fully subsidized catastrophic (or CAT) coverage level, which is 50 percent

of expected yield, indemnified at 55 percent of expected price.

Buy-up coverage guarantees up to 75, or in some cases 85 percent, of expected yield or revenue. Producers choose the level of insurance protection, which, along with riskiness of a producer's situation, determines the premium. Producers pay only a portion of the actuarial or risk-based premium plus a small administrative fee. The U.S. government, through the Federal Crop Insurance Corporation, pays the balance of the premium. Premium subsidy rates specify the percentages of total premium paid by the government. These percentages vary by coverage level, and decline as coverage levels increase.

The premium discount instituted in 1999, an additional subsidy that reduced producer costs of buy-up coverage by 30 percent that year, led to an increase in producer purchases of crop insurance. Buy-up participation rates—the shares of planted acres insured at buy-up levels—for each of the top four insured crops (corn, soybeans, wheat and cotton) increased in 1999, reaching about 50 percent of the planted acres of corn and soybeans and about 60 percent of the planted

acres of wheat and cotton. Total acres insured at buy-up levels increased by 19 percent from 1998 to 1999 despite fewer planted acres of corn and wheat.

The premium discount had a greater effect on costs at higher coverage levels, which led many producers to increase their coverage from 1998 to 1999. Total buy-up insurance coverage—yield and revenue insurance—measured by liability, increased 13 percent, despite declines in prices in 1999 at which indemnities would be paid for many major field crops. Moreover, the proportion of acres insured at coverage levels above 65 percent increased from 9 percent in 1998 to 24 percent in 1999. This includes about 2 percent of acres insured at the 80- and 85-percent coverage levels, which were first offered in 1999.

The increase in buy-up participation continued in 2000, despite a decrease in the premium discount rate from 30 percent in 1999 to 25 percent in 2000. Overall buy-up acres increased 9 percent from 1999 to 2000, reflecting moderate increases in planted acres of corn and cotton (3 percent and 5 percent, respectively) as well as increases in buy-up participation rates. The buy-up participation rate for cotton increased from 60 to 65 percent of planted acres, due in part to a reduction in premium rates for cotton insurance in many counties. The soybean participation rate also increased, from 49 to 56 percent of planted acres. For wheat, the buy-up participation rate changed little from 1999 to 2000, while a decline in planted acres reduced the number of acres insured.

Buy-up liability increased 15 percent from 1999 to 2000, reflecting a move to higher coverage levels and revenue products. The effects of the Agriculture Risk Protection Act of 2000 (ARPA), which raised subsidy rates in general and narrowed the difference between available coverage levels, reinforced this trend. Preliminary data for 2001 from USDA's Risk Management Agency (RMA) suggest a continued increase in buy-up participation and movement to higher coverage levels. RMA forecasts a 6-percent increase in insured acres and a 9-percent increase in liability. Also, the proportion of acreage at coverage levels of 70, 75, 80, and 85 percent continues to increase.

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### How Much Do Yield & Revenue Insurance Cost?

Premiums are the prices of crop insurance coverage. They are based on the expected loss or indemnity of crop yield or revenue for an insured producer. Premiums are expressed as rates, which are percentages of the total amount of insurance, called liability.

Premium rates vary with riskiness of a producer's situation. Most crop yield and revenue insurance plans classify a producer's risk by crop grown, location, expected yield (based on recent history), and production practice (irrigated or dryland). Premium rates for crop insurance vary considerably across the U.S., ranging from as low as 2 or 3 percent for producers with above-average yield expectations in low-risk areas to as high as 25 or 30 percent for producers with below-average yield expectations in high-risk areas. In 2000, the average premium rate for all crop insurance policies was about 7 percent.

To calculate dollars of premium, the premium rate is multiplied by dollars of coverage or liability. For a crop insurance policy, liability is determined by the expected yield or revenue multiplied by the percent coverage level. Because expected yields are in units of crop (i.e., bushels) they are converted to dollars by multiplying by the price at which an insurance indemnity would be paid, called the price election. If a producer has averaged 150 bushels per acre of corn over the previous 4 years and the producer selects 65-percent coverage for a crop yield insurance policy, the producer's yield guarantee would be 97.5 bushels. If the producer chooses the maximum price, say \$2 per bushel, then liability would be \$195 per acre. Suppose that the premium rate for 65-percent coverage for this producer is 6 percent, then the total premium would be \$11.70 per acre.

The price paid by producers is the total premium minus the premium subsidy. The dollar amount of the premium subsidy is calculated by multiplying the subsidy rate times the total

premium. The premium subsidy rate for 65-percent coverage is 59 percent in 2001; following the above example, the dollar amount of the subsidy is \$6.90; the producer would pay \$4.80 of the \$11.70 total premium.

Increases in subsidy rates, including premium discounts, and large increases in subsidy rates at higher coverage levels, have reduced producers' insurance costs, especially on higher coverage levels. For example, prior to 1999 the typical premium subsidy on 65-percent APH/MPCI yield insurance coverage was about 42 percent; in 1999 when premium discounts were added, the effective subsidy rate was 59 percent. For the producer in the above example, the cost of 65-percent coverage would have been reduced from \$6.79 to \$4.80 per acre.

The typical premium subsidy rate for 75-percent APH/MPCI yield coverage was about 24 percent prior to 1999. In 1999, premium discounts increased it to 47 percent. In 2001, under the ARPA subsidy structure, the premium subsidy rate on 75-percent coverage increased to 55 percent. Since the liability and premium rate at the 75-percent coverage level would be higher than at the 65-percent level, total premium would be higher. To illustrate, if the liability is \$225 and the premium rate is 9 percent, then total premium would be \$20.25. Under the 24-percent premium subsidy, the producer would pay \$15.39, and under the 55-percent subsidy the producer would pay \$9.11 for 75-percent coverage.

Actual costs to a producer depend on particular features of crop insurance coverage—for example, whether crop acreage is divided into optional units (with different portions of the operation insured separately) and whether features such as prevented-planting coverage or hail and fire coverage are included. To obtain exact price information a producer should contact a crop insurance agent.

### *Participation in Revenue Insurance is Growing...*

Since the introduction of revenue insurance pilot programs for some crops in the 1996 crop year, participation has grown steadily, representing more than 60 percent of buy-up insured corn and wheat acres in 2001 and more than 36 percent of buy-up insured soybean acres. What can explain the significant growth of revenue insurance participation in such a short time?

First, the availability of revenue insurance has expanded rapidly since its introduction. In 1996, revenue insurance was available only in a limited number of

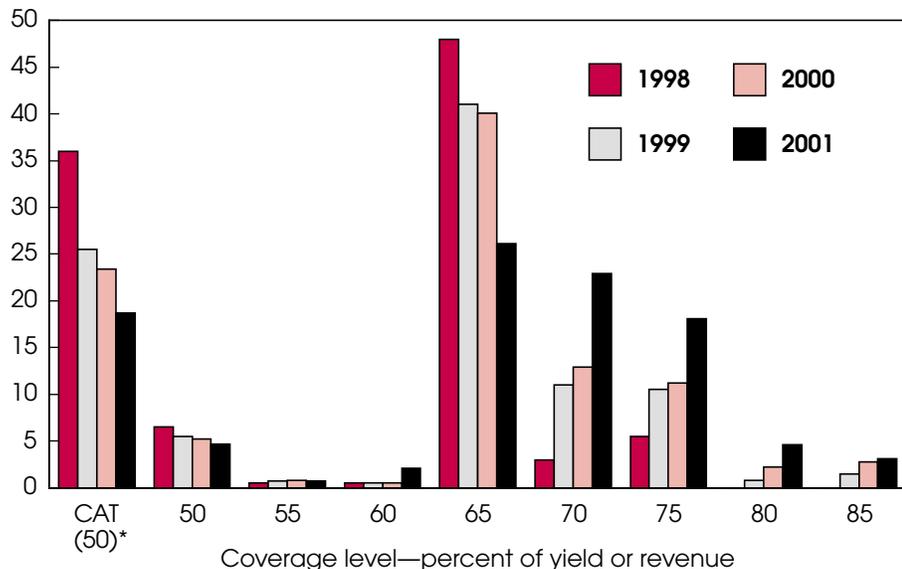
counties in 8 states. Availability greatly increased in 1997 when Crop Revenue Coverage (CRC) was offered in 22 states. However, availability alone cannot explain the large shift in coverage, since some widely available insurance products experience low participation. What other factors have led so many producers to select revenue insurance?

The most obvious explanation is the fact that revenue coverage insures revenue rather than yield. Farmers are ultimately interested in dollars, not bushels, and revenue coverage guarantees a specific revenue level, regardless of whether low revenue results from low yields or from low crop prices.

CRC, by far the most widely available and popular form of revenue insurance, offers a feature that actually increases the revenue guarantee if the harvest price is higher than the "base price," the price used to establish coverage prior to planting. Farmers who believe prices are likely to rise in years when they have yield losses may find this feature appealing. Revenue Assurance with the "harvest price option" (RA-HPO) provides very similar coverage. Income Protection (IP), another revenue insurance product, does not have this feature. Each revenue insurance product has its own terminology for the various components of its coverage. The expected price (similar to price election for yield insurance) established prior to

### A Growing Proportion of Insured Acreage is Protected at Higher Coverage Levels

Percent of insured acres



Includes yield and revenue insurance.  
 \*CAT is the basic catastrophic coverage level: 50 percent of expected yield, indemnified at 55 percent of expected price. All other coverage levels are buy-up.

Economic Research Service, USDA

planting in order to determine coverage is called the “base price” for CRC and the “projected price” for both IP and RA.

Another possible explanation for the popularity of revenue insurance is that the price used to establish the coverage level of CRC has often been higher than the crop prices used to establish the value of the crop under Actual Production History/Multiple-Peril Crop Insurance (APH/MPCI) coverage, which is RMA’s traditional yield insurance product. For revenue insurance, this higher price results in higher revenue coverage.

CRC, RA, and IP establish their coverage using futures market prices, which have tended to be higher than the maximum price elections established by the RMA for yield-based coverage. For corn, the CRC price has consistently been higher than the APH/MPCI price, but the situation has varied over the years for wheat and soybeans.

Insurance sign-up levels for soybeans in 2001 provide some evidence that the crop price component of coverage can play a

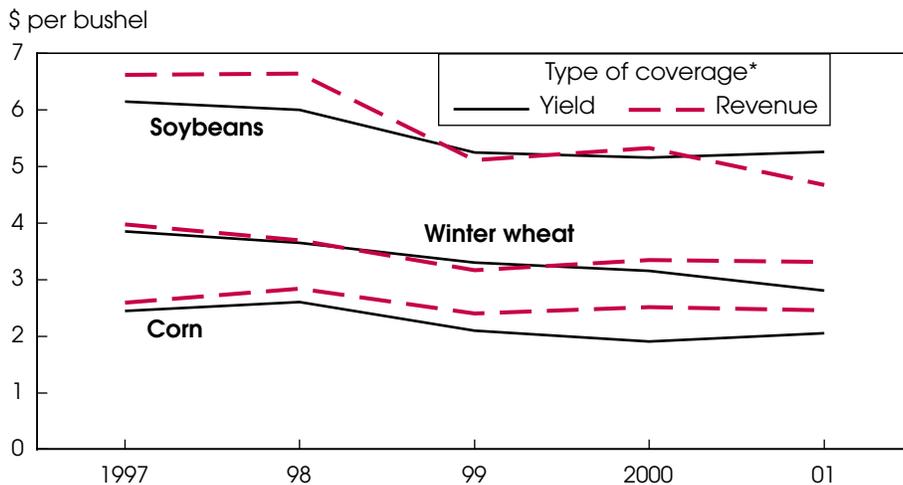
role in farmers’ choice of insurance product. In 2000, the maximum price election for soybean APH coverage was \$5.16 per

bushel, while the CRC base price (an average of prices for the November soybean futures during February) was \$5.32 per bushel. That year, APH/MPCI buy-up covered 34 percent of insured soybean acres, while CRC, RA, and IP covered 39 percent of insured acres.

In 2001 the APH/MPCI price for soybeans was set at \$5.26, equal to the government loan rate, which is the price farmers would effectively receive for any bushel they produce if they claim a government loan deficiency payment or marketing loan gain. In contrast, the CRC base price in 2001 was \$4.67 per bushel, reflecting lower market prices. The share of soybean acres insured under CRC, RA, and IP dropped to 36 percent, while the share for APH/MPCI buy-up coverage increased to 42 percent.

This shift away from revenue coverage in 2001 occurred despite changes in the premium subsidy structure by ARPA, which made subsidy rates for all revenue plans equal to subsidy rates for APH/MPCI buy-up coverage. Prior to ARPA, premium subsidies applied only to the yield component of revenue insurance, but now the subsidy rate applies to the entire premium. Prior to ARPA, at the popular 65-percent coverage level the effective premium subsidy rates for CRC and

### Coverage Price Components for Yield and Revenue Insurance Differ Among Commodities



Coverage price component is the price level used to determine the dollar amount of coverage.  
 \*For yield: the price election for Multiple-Peril Crop Insurance. For revenue: the base price for Crop Revenue Coverage, the most widely available and popular revenue insurance product.

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RA-HPO policies were 7 to 10 percentage points lower than those for yield coverage and other revenue policies.

Even with premium subsidy rates equalized, CRC coverage is more expensive than yield-based coverage. Though it varies by crop and by year, CRC often costs 15 to 20 percent more than APH/MPCI coverage with the same guarantee level. One reason for the higher cost is that CRC must cover losses for some situations in which yield insurance does not pay, notably where revenue guarantee levels rise due to higher harvest prices—the feature offered by CRC and RA-HPO. When CRC uses a higher price, as often occurs, premiums are also higher. IP and RA use different premium rating methods, and their premiums may differ from those of CRC.

The popularity of revenue coverage does not appear to be due to any actuarial advantage favoring farmers. During the relatively short period during which revenue products have been offered, indemnity payments for revenue insurance products have been roughly equal to total premium. Moreover, in those counties where both revenue and yield insurance have been sold for the same crops in 1996–2000, the loss ratio (indemnities divided by total premium) for CRC has been slightly below that of APH/MPCI buy-up yield coverage in each of these years.

However, this is a very short time period from an actuarial perspective. In particular, none of these years experienced a widespread catastrophe large enough to result in significant price increases, a case where CRC and RA-HPO may pay significantly higher indemnities than yield insurance.

### ...As Are Government Costs

While increases in premium subsidy rates and the addition of premium discounts have reduced producer costs and increased participation, they have increased government expenditures. As producers have moved to higher coverage levels and to products with higher premiums, subsidies have increased both as a total dollar amount and a proportion of total premium.

Between crop years 1995 and 1998, premium subsidy rates were constant, and subsidies accounted for 50–57 percent of total premium. Shifts in participation and crop prices, however, changed premium subsidy amounts. In 1995, the first year after enactment of the crop insurance reform that introduced CAT coverage (premium entirely subsidized), premium subsidy expenditures were about \$890 million. The annual premium subsidy amount rose to \$980 million in 1996 as increased buy-up participation and increased crop prices lifted total premium, even though CAT participation declined. In 1997, premium subsidies dropped to about \$900 million as crop prices fell and as CAT participation continued to decline while buy-up participation held steady. In 1998, total premium subsidies increased with a rise in buy-up insured acres.

In 1999 and 2000, premium discounts boosted the government's share of total premium. The 1999 premium discount of 30 percent added \$440 million in premium subsidies, resulting in a total of about \$1.4 billion in government expenditures on insurance premiums. In 2000, the 25-percent discount added \$390 million in premium subsidies for a total of \$1.3 billion.

At the time of its passage, ARPA was estimated to increase spending on premium subsidies by \$8.2 billion during the 2001–05 period, compared with the estimated spending level for that period under previous legislation (not counting the emergency premium discounts in 1999 and 2000).

Aggregate premium subsidies (including discounts) have reached 60 percent of total premium. Although the proportion of total premium paid by producers has declined, producer-paid premiums have gone up, and producers are obtaining more insurance. Buy-up acreage will likely represent just over 80 percent of insured acres in 2001, up from 64 percent in 1997. **AO**

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### December Releases—National Agricultural Statistics Service

The following reports are issued electronically at 3 p.m. (ET) unless otherwise indicated.

[www.ers.usda.gov/nass/pubs/pubs.htm](http://www.ers.usda.gov/nass/pubs/pubs.htm)

#### December

- 4** *Weather - Crop Summary*  
(noon)  
*Dairy Products*  
*Egg Products*
- 5** *Broiler Hatchery*
- 6** *Dairy Products Prices (8:30 a.m.)*  
*Milkfat Prices (8:30 a.m.)*  
*Poultry Slaughter*
- 11** *Cotton Ginnings (8:30 a.m.)*  
*Crop Production (8:30 a.m.)*  
*Weather - Crop Summary*  
(noon)
- 12** *Broiler Hatchery*
- 13** *Turkey Hatchery*
- 14** *Dairy Products Prices (8:30 a.m.)*  
*Milk Production*  
*Potato Stocks*
- 18** *Weather - Crop Summary*  
(noon)
- 19** *Ag Chemical Usage -*  
*Floriculture and Nursery*  
*Broiler Hatchery*
- 20** *National Hop Report (noon)*  
*Cold Storage*
- 21** *Cotton Ginnings (8:30 a.m.)*  
*Dairy Products Prices (8:30 a.m.)*  
*Milkfat Prices (8:30 a.m.)*  
*Cattfish Processing*  
*Cattle on Feed*  
*Chickens and Eggs*  
*Livestock Slaughter*  
*Monthly Agnews*
- 27** *Weather - Crop Summary*  
(noon)  
*Broiler Hatchery*
- 28** *Dairy Products Prices (8:30 a.m.)*  
*Peanut Stocks and Processing*  
*Quarterly Hogs and Pigs*
- 31** *Agricultural Prices*