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Crop Insurance: Background Statistics on Participation and Results

FAPRI-MU Report #10-10

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This report was prepared in response to requests from the offices of Senator Claire McCaskill and Representative JoAnn Emerson, and as background information for use by Congressional agriculture committees.

All results and conclusions are the responsibility of the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri (MU).

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Summary

Changes in policy and changes in markets have increased the importance of crop insurance relative to other farm programs. Since 2006, grain and oilseed prices have generally been above the levels that would trigger payments under the marketing loan and countercyclical payment programs. These same high commodity prices have increased the value of crops insured and the dollar value of crop insurance premium subsidies.

In response to requests from the offices of Senator Claire McCaskill and Representative JoAnn Emerson, the Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) has compiled background information on crop insurance participation and results.

Crop insurance indemnities received by producers vary from year to year depending on crop yields and prices. In the 2008/09 marketing year, indemnities topped \$8 billion, more than double the previous record. Under the assumptions of the FAPRI-MU 2010 stochastic baseline, indemnities average \$10 billion per year over the next decade. At the same time, projected producer-paid crop insurance premiums average about \$4 billion per year. This \$6 billion in average net indemnities would be greater than all the payments made under the direct payment program, and only slightly less than total payments under the direct payment, countercyclical payment, marketing loan, and average crop revenue election (ACRE) programs combined.

Data on crop insurance participation and results reveals significant difference across regions and across crops. Crop revenue coverage (CRC) and risk assurance (RA), two revenue-based policies, are the dominant policies purchased by corn, soybean and wheat producers. In 2009, yield-based actual production history (APH) insurance was the leading type of policy purchased by cotton producers. Revenue-based products dominate in the Midwest, while yield-based insurance is more common in the South.

Coverage levels also differ greatly across the country. Most of the corn and soybean acres enrolled in the crop insurance program in 2009 had coverage at levels greater than 70%, meaning less than a 30% loss was required to trigger indemnities. In contrast, only about 20% of participating cotton acres had greater than 70% coverage. In general, coverage levels are much higher in the Midwest than in the South. In Arkansas, most participating acres had only catastrophic (CAT) coverage, which only pays indemnities for yield losses greater than 50%.

Between 2000 and 2009, indemnities exceeded producer paid premiums in almost every state. The average ratio of indemnities to producer paid premiums was generally greater in states with lower coverage levels than it was in states where producers obtained higher levels of coverage. For the country as a whole, indemnities have exceeded producer-paid premiums in every year since 1994.

Indemnities, premiums and net outlays since 1989

Crop insurance has dramatically increased in importance over the last 20 years. Between 1989 and 1994, crop insurance indemnities averaged about \$1 billion per year, and federal subsidies accounted for about one quarter of total premiums. Between 2000 and 2009, indemnities averaged about \$4 billion per year, and federal subsidies accounted for 58% of total premiums (Figure 1).¹

Net indemnities (indemnities paid to producers for losses minus producer-paid premiums) have also increased over time, averaging \$1.8 billion per year between 2000 and 2009, and peaking at \$4.5 billion in 2008 (Figure 2). Net outlays by the Federal Crop Insurance Corporation (FCIC) reflect premium subsidies, payments to crop insurance providers, and net losses on operations. FCIC net outlays averaged about \$3.6 billion per year between fiscal years (FY) 2000 and 2009, and peaked at \$7.9 billion in FY 2009.²

Policy and market changes explain the rise in indemnities and outlays. Policy reforms in 1994 and 2000 provided more subsidies for higher levels of coverage than had been available previously. Producers responded by enrolling more acres at higher levels of coverage.

The sharp increase in prices for grains and oilseeds between 2005/06 and 2007/08 increased the value of crops insured. Because premiums and premium subsidies are largely proportional to the value of crops insured, federal crop insurance subsidies also increased.

In the 1990s total crop insurance premiums (including the value of premium subsidies) were approximately equal to indemnities, implying a loss ratio (indemnities divided by total premiums) of about 1.0. Between 2000 and 2009, total premiums exceeded indemnities in most years, and the loss ratio for the decade as a whole was about 0.8. However, note that even though the loss ratio was less than 1.0, premium subsidies meant that indemnities far exceeded producer-paid premiums.

If the loss ratio averages 1.0 over the next decade, it would result in significantly greater net indemnities and FCIC net outlays than if it remains at the lower level experienced over the last ten years.

¹ Crop insurance statistics in this report are based on data reported by the Risk Management Agency, <http://www.rma.usda.gov/data/sob.html>, unless otherwise noted.

² FCIC net outlays are based on data reported in the Monthly Treasury Statement, various issues, <http://www.fms.treas.gov/mts/backissues.html>. FY 2010 final results were not available at the time this report was prepared.

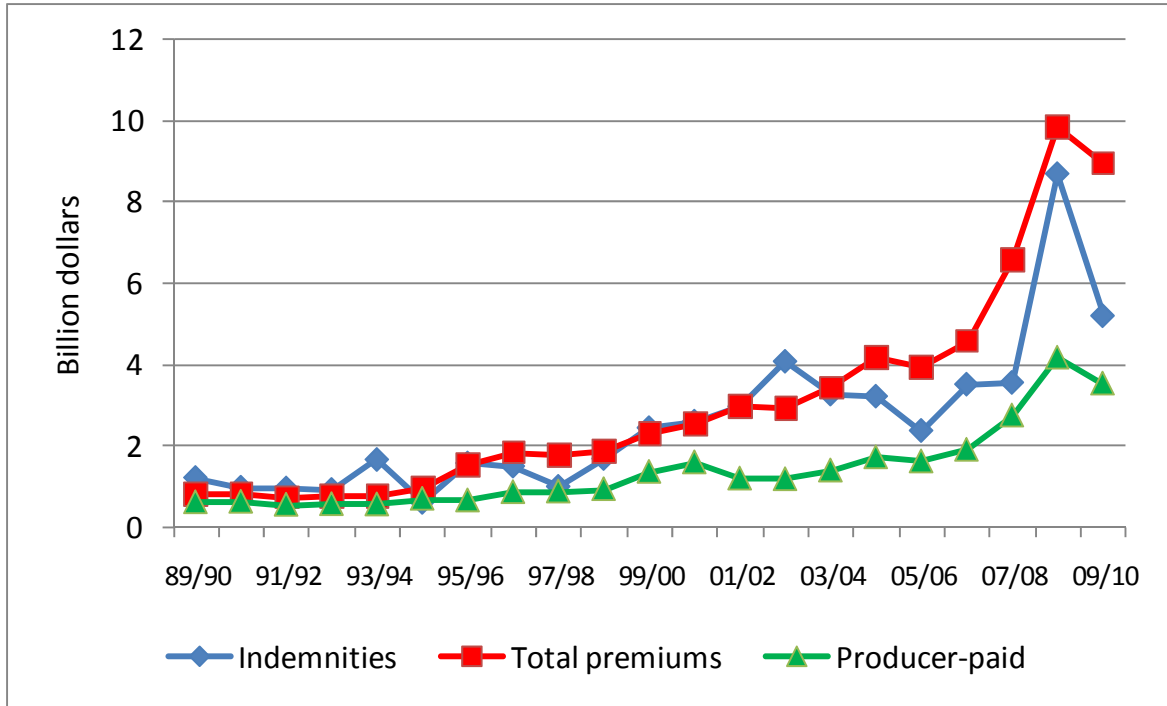


Figure 1. Crop insurance indemnities, total premiums and producer-paid premiums

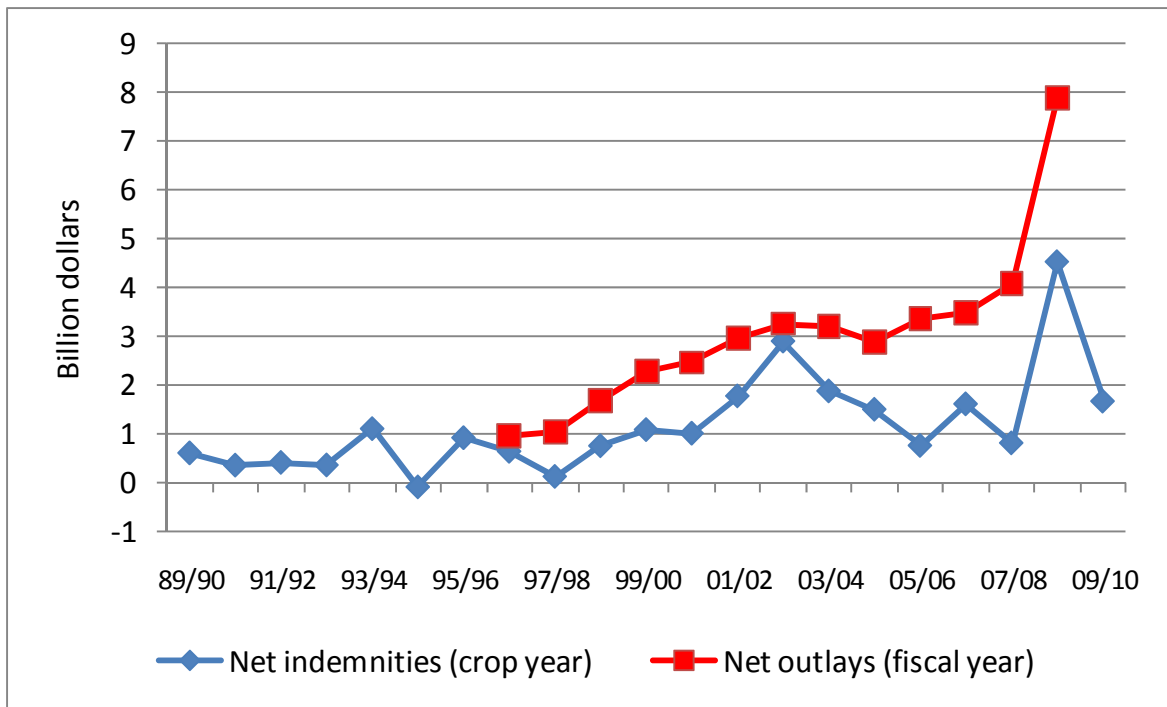


Figure 2. Crop insurance net indemnities and FCIC net outlays

Crop insurance and farm program fiscal results, 1990-2019

Between 1990 and 1999, crop insurance indemnities averaged \$1.33 billion per year and producer-paid premiums averaged \$0.76 billion, so net indemnities averaged \$0.56 billion per year (Table 1).

Over the decade between 2000 and 2009, indemnities increased to \$3.94 billion per year and producer paid premiums averaged \$2.10 billion, so net indemnities averaged \$1.84 billion per year. In comparison, over the same ten-year period, direct payments averaged \$5.04 billion per year, marketing loan benefits averaged \$3.15 billion, and total traditional farm program benefits (direct payments, marketing loan benefits, countercyclical payments, ACRE payments, and crop market loss assistance payments) averaged \$10.84 billion per year. In other words, crop insurance net indemnities were about 17% of traditional farm program benefits over the decade.

In the FAPRI-MU stochastic baseline for 2010-2019, the story is very different. Even averaged across 500 possible market outcomes, grain and oilseed prices are generally high enough to result in only limited average benefits under the marketing loan, countercyclical payment and ACRE programs. In fact total projected payments under those three programs only average about \$1.5 billion per year, compared to \$4.7 billion per year between 2000 and 2009. Adding \$4.85 billion in annual direct payments results in \$6.36 billion per year in traditional farm program payments over the 2010-2019 period.

Meanwhile, projected crop insurance net indemnities increase sharply. Total indemnities average almost \$10 billion per year, based on continued high commodity prices, rising production levels, and an assumed average loss ratio of about 1.0. That assumed 1.0 loss ratio means that total premiums also average about \$10 billion per year. If premium subsidies continue to average about 61% of total premiums, as they did in 2009/10, that would imply that both premium subsidies and crop insurance net indemnities would average just over \$6 billion per year over the next ten years.

In other words, projected crop insurance net indemnities are greater than direct payments and almost as great as all traditional crop program payments combined.

Again, note that this projection depends critically on future loss ratios averaging about 1.0. A lower loss ratio, as experienced between 2000 and 2009, would result in lower net indemnities. On the other hand, a severe drought or a sudden drop in commodity prices could result in a loss ratio far in excess of 1.0 in any given year, resulting in even higher levels of net indemnities.

Table 1. Crop insurance and other farm program fiscal results, 1990-2019

	<u>Marketing year average</u>		
	1990/91- 1999/00	2000/01- 2009/10	2010/11- 2019/20
	Actual	Actual	Projected
	(billion dollars)		
A. Indemnities	1.33	3.94	9.92
B. Total premiums	1.34	4.99	9.97
C. Premium subsidies	0.57	2.89	6.09
D. Producer-paid premiums (B-C)	0.76	2.10	3.88
E. Net indemnities (A-D)	0.56	1.84	6.04
F. Direct payments		5.04	4.85
G. Marketing loan net outlays		3.15	0.46
H. Countercyclical payments		1.51	0.54
I. ACRE payments		0.03	0.51
J. Crop market loss assistance		1.10	0.00
K. Sum (F+G+H+I+J)		10.84	6.36

Sources: 1990-2009 data based on information reported by the Risk Management Agency and the Commodity Credit Corporation. Projections are from FAPRI-MU's 2010 stochastic baseline, and represent the average of 500 possible outcomes for commodity markets. The baseline assumes a continuation of current farm and crop insurance programs, and that the average loss ratio (indemnities divided by total premiums) across the 500 stochastic outcomes and across the 10 years will be approximately 1.0. Note that the average loss ratio for 1990/91-1999/00 was 0.99, and for 2000/01-2009/10, it was 0.79.

Crop insurance and farm program benefits per acre

Crop insurance is expected to increase in importance relative to other farm programs over the next decade, but its importance differs greatly across crops.

Results from FAPRI-MU's 2010 stochastic baseline suggest that crop insurance net indemnities over the next ten years could average \$31 per harvested corn acre (Table 2). That compares to corn direct payments of \$23 per base acre and almost no payments under the corn marketing loan and countercyclical payment programs. For a corn producer with one corn base acre for every acre of corn harvested, projected crop insurance net indemnities account for 54% of total farm program benefits over the next decade.

In the case of soybeans, crop insurance net indemnities are a little lower, averaging about \$20 per harvested acre. However, since other farm program benefits are less on a per-acre basis than for corn, crop insurance net indemnities account for about 60% of projected farm program benefits for a producer with one acre of soybean base for each acre harvested.

Wheat crop insurance net indemnities per acre are lower than for soybeans, averaging a little under \$15 per harvested acre. Wheat direct payments per base acre are greater than for soybeans, but other projected farm program benefits are minimal, as market prices are almost always expected to exceed the levels that would trigger marketing loan benefits or countercyclical payments. Crop insurance net indemnities account for 47% of projected farm program benefits for a producer with one wheat base acre for each acre harvested.

In the case of cotton, projected net indemnities per acre are actually slightly greater than for corn, averaging \$34 per harvested acre. However, other projected farm program payments are also greater. As a result, crop insurance net indemnities only account for 28% of projected farm program benefits over the next decade for a producer with one acre of cotton base for each acre harvested. If cotton prices remain as high as they are in August 2010, marketing loan benefits and countercyclical payments would be zero, altering the story somewhat.

Finally, projected per-acre net indemnities for rice producers are comparable to those for wheat, in spite of much greater rice crop values per acre. This occurs because rice producers typically purchase lower levels of coverage than wheat producers, and indemnities are rarely paid. Meanwhile, projected traditional farm program payments are higher for rice than for other major crops, so crop insurance net indemnities only account for 9% of projected farm program benefits for a producer with one acre of rice base for each acre harvested.

Net indemnities are only a measure of the pure "subsidy" aspect of crop insurance, and do not consider the value to producers of reducing downside risks.

Table 2. Average projected market receipts and farm program benefits per acre for 2010-2019

	Corn	Soybeans	Wheat	Cotton	Rice
(dollars per harvested acre)					
A. Market receipts (price * yield)	657.73	431.05	224.34	622.97	719.07
B. Crop insurance net indemnities	30.73	19.73	14.62	34.24	15.09
C. Marketing loan benefits	0.06	0.08	0.15	31.99	45.56
D. ACRE payments	2.57	2.22	1.44	0.01	0.00
E. Total program benefits tied to production (B+C+D)	33.35	22.04	16.21	66.24	60.66
F. Total receipts tied to production (A+E)	691.08	453.08	240.55	689.21	779.72
G. Variable production expenses	295.78	144.21	125.90	515.44	516.51
(dollars per base acre)					
H. Direct payments	23.18	10.99	14.50	33.59	95.86
I. Countercyclical payments	0.08	0.09	0.36	24.61	13.09
J. Total payments tied to base acreage (H+I)	23.26	11.08	14.86	58.20	108.95
(dollars per acre)					
K. Total receipts (F+J)*	714.34	464.17	255.41	747.41	888.68
L. Total program benefits (E+J)*	56.61	33.12	31.07	124.44	169.61
M. Crop insurance share of total program benefits (B/L)*	54%	60%	47%	28%	9%

*Assumes one acre of base for each harvested acre. In reality, base acreage and harvested acreage can be very different for particular crops or in total.

Source: FAPRI-MU 2010 stochastic baseline, average of 500 outcomes for 2010/11-2019/20.

Crop insurance participation

Most of the acreage devoted to major field crops is enrolled in the crop insurance program. In 2009, program participation rates exceeded 80% for corn, soybeans, wheat, cotton and peanuts (Figure 3). Participation rates were slightly lower for rice and sorghum.

Corn, soybeans and wheat account for most of the acres enrolled in the crop insurance program (Figure 4). Total enrollment in 2009 was 265 million acres.

Approximately 41 million acres were enrolled in pasture, rangeland and forage policies in 2009. These policies pay indemnities triggered by rainfall and vegetative indices, rather than by actual production levels. Per-acre premiums and indemnities are generally much lower for these policies than for other crop insurance policies. For example, producer-paid premiums for pasture, rangeland and forage policies were \$43 million in 2009, or about \$1 per acre. In contrast, producer-paid premiums for corn policies were \$1.4 billion in 2009, or about \$19 per enrolled acre. Pasture, rangeland and forage policies were only introduced in 2007, and still are not available in some parts of the country. Because of their unique features, these policies are excluded from some of the summary statistics on coverage types and levels elsewhere in this report.

Crop insurance is now available on a wide range of crops, with policies available for everything from macadamia nuts to popcorn. Note, however, that the three major field crops and the pasture, rangeland and forage policies account for all but 39 million acres of crop insurance enrollment in 2009. Cotton, rice, peanuts, sorghum, barley, and oats account for about half of those 39 million acres.

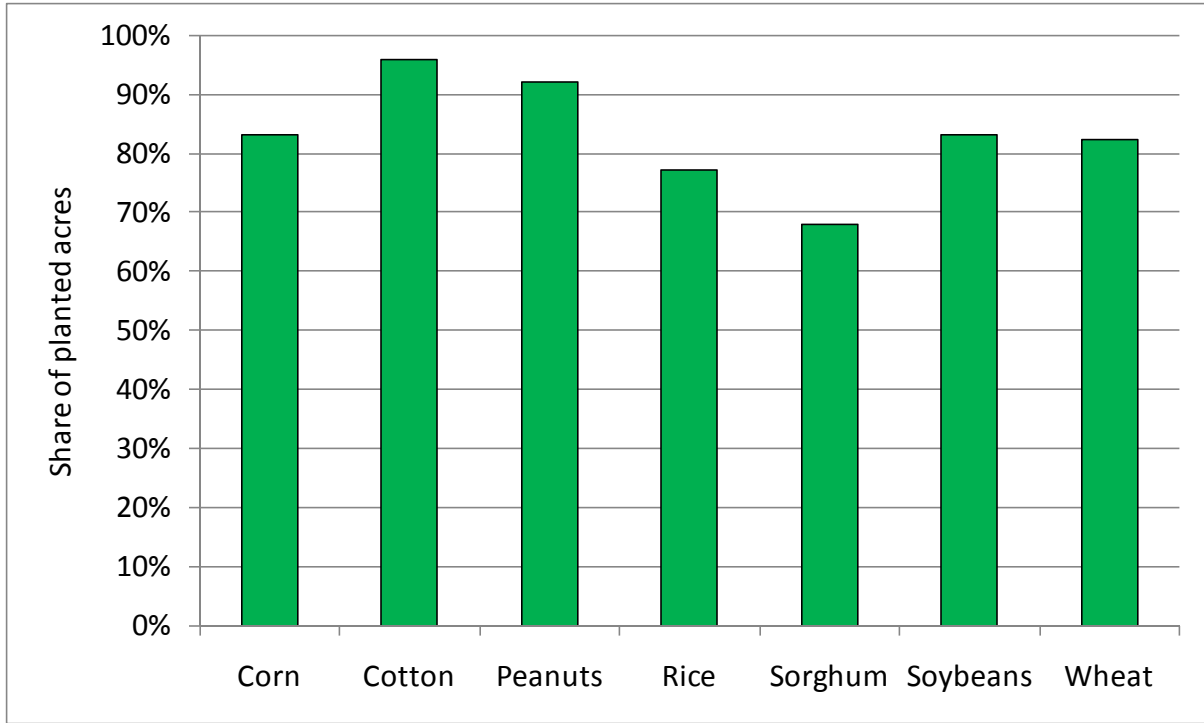


Figure 3. Crop insurance participation rates, 2009 (acres enrolled divided by planted acres)

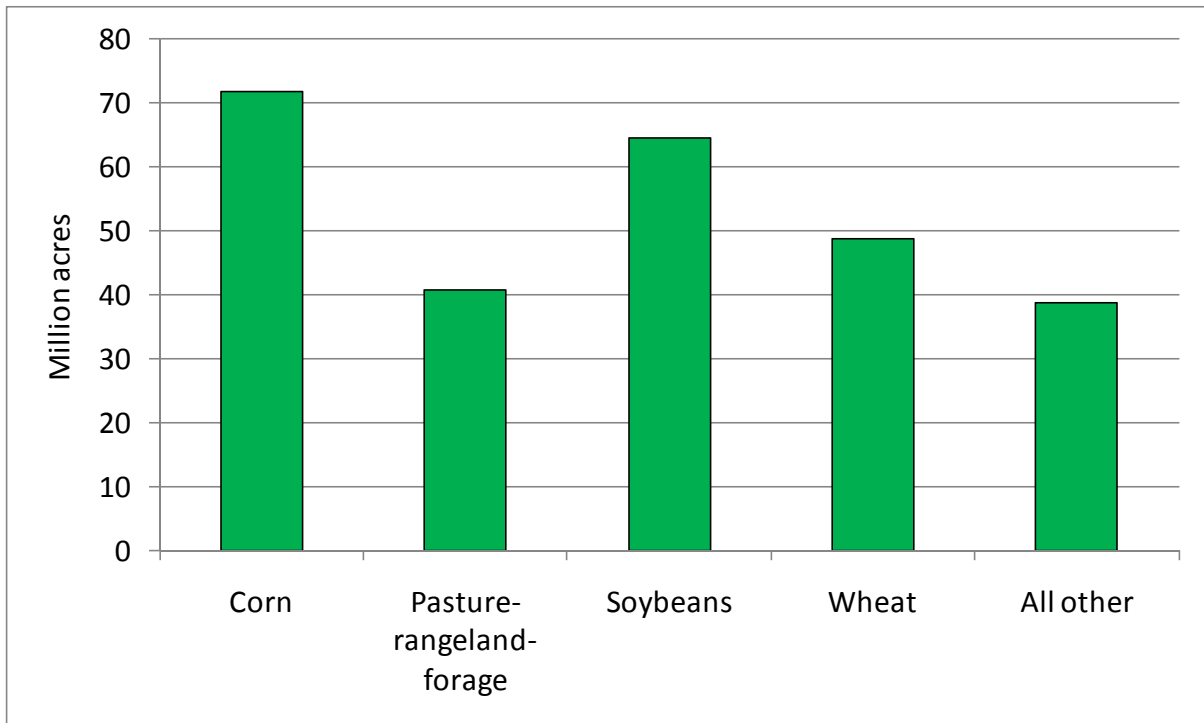


Figure 4. Crop insurance acres enrolled, 2009

Crop insurance by coverage type and level for major crops

In 2009, crop revenue coverage (CRC) and revenue assurance (RA) policies accounted for more than half of the acres enrolled in crop insurance, excluding pasture, forage and rangeland policies (Figure 5). These revenue-based policies accounted for 70% or more of all corn, soybean and wheat acres enrolled in crop insurance. In contrast, the yield-based actual production history (APH) policies accounted for the majority of enrolled cotton acres in 2009.

Nationally, approximately 42% of enrolled acres in 2009 had coverage levels in excess of 70% (Figure 6). On those acres, losses of less than 30% would trigger crop insurance indemnities. Another 39% of nationally enrolled acres are at coverage levels between 65% and 70%, leaving just 18% of enrolled acres at coverage levels below 65%. Note that these estimates exclude pasture, forage and rangeland policies.

Coverage levels differ across the major crops. For corn and soybeans, more than half of the enrolled acres were at coverage levels in excess of 70% in 2009. For wheat, more than half of all enrolled acres were at coverage levels between 65% and 70%, with roughly equal shares at higher and lower levels of coverage. Coverage levels are much lower for cotton; only about 20% of cotton enrolled acreage was at coverage levels in excess of 70%, and almost 40% was at coverage levels below 65%.

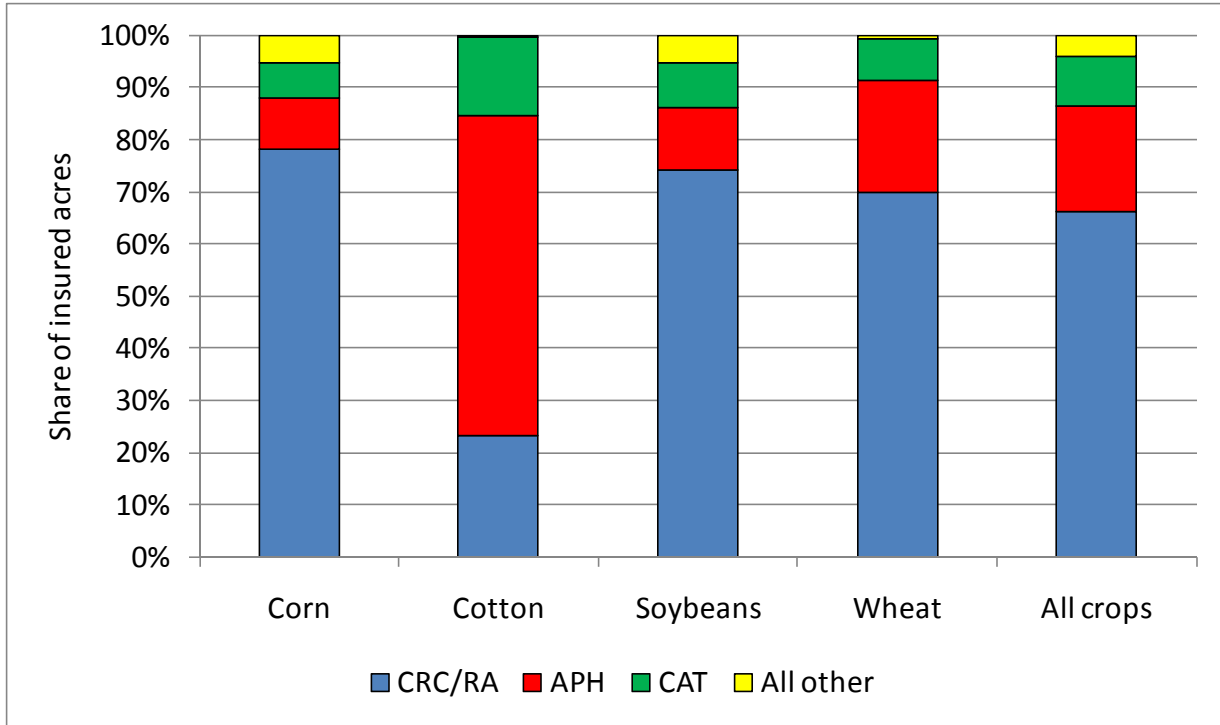


Figure 5. Share of insured acres by coverage type, selected crops, 2009

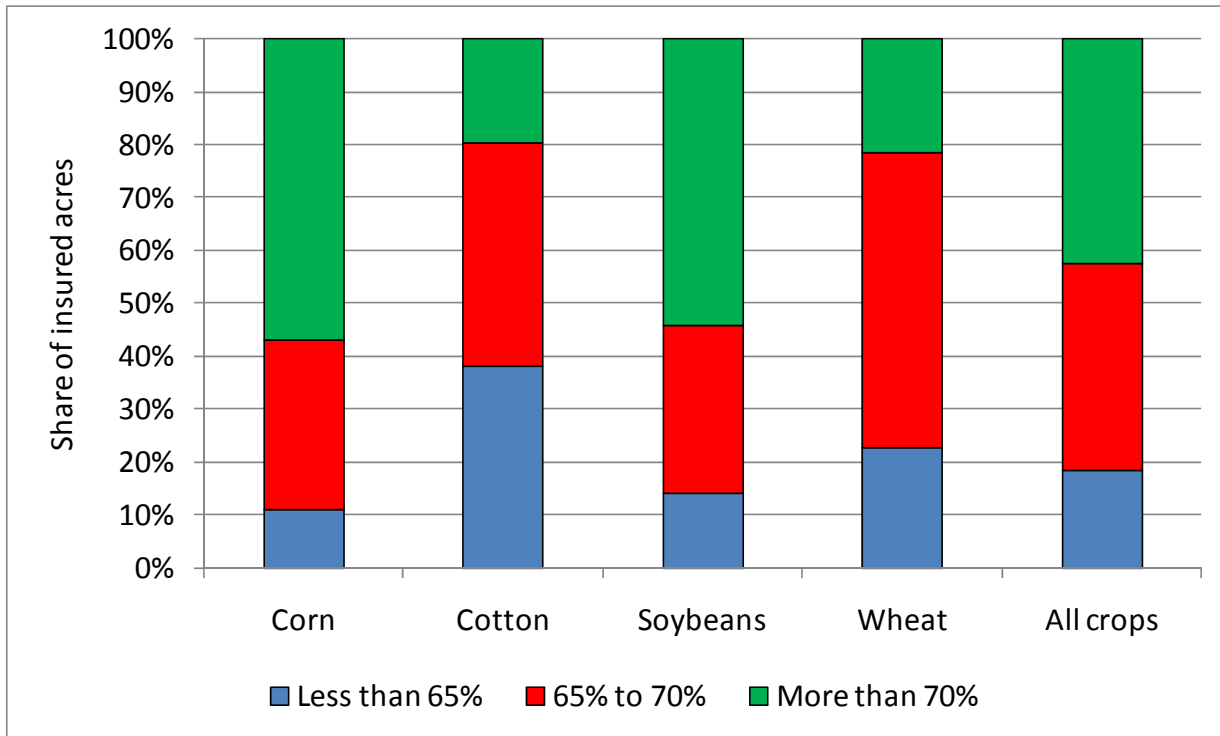


Figure 6. Share of insured acres by coverage level, selected crops, 2009

Crop insurance by coverage type and level for major states

Just as coverage types differ considerably across crops, they also differ greatly across states (Figure 7). In Iowa, Kansas, Minnesota and Nebraska, CRC and RA accounted for more than 80% of enrolled acres in 2009 (excluding pasture, rangeland and forage policies). In contrast, CRC and RA accounted for less than one-third of participating acres in Arkansas and Georgia.

APH policies were a significant share of total enrollment in states with wheat and cotton as major crops, such as Georgia, Montana, North Dakota and Texas. Catastrophic coverage is common in Arkansas, Georgia and Missouri, but less frequently utilized in most other states.

Coverage levels also differ dramatically across the country (Figure 8). In states reaching from Iowa to Ohio, more than 70% of enrolled acres in 2009 (excluding pasture, rangeland and forage policies) had coverage levels in excess of 70%. In contrast, less than one quarter of enrolled acres were at such high levels of coverage in Arkansas, Georgia, Kansas, Montana and Texas.

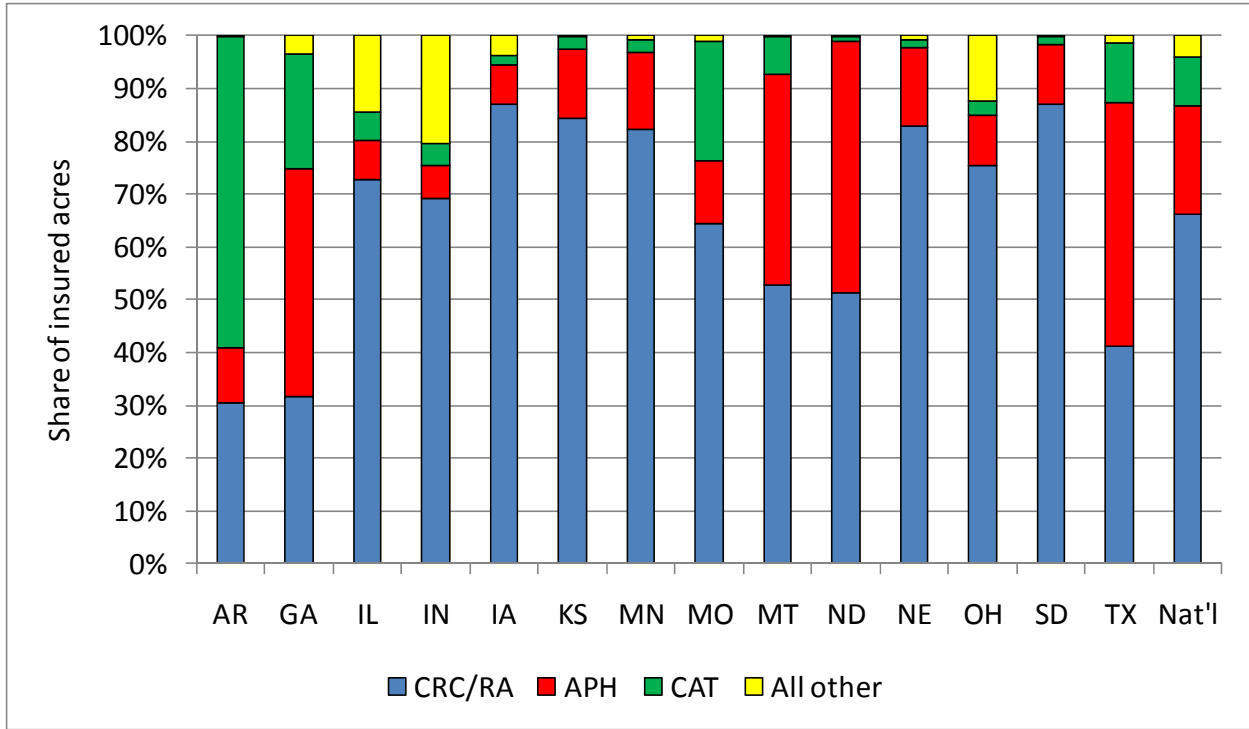


Figure 7. Share of insured acres by coverage type, selected states, 2009

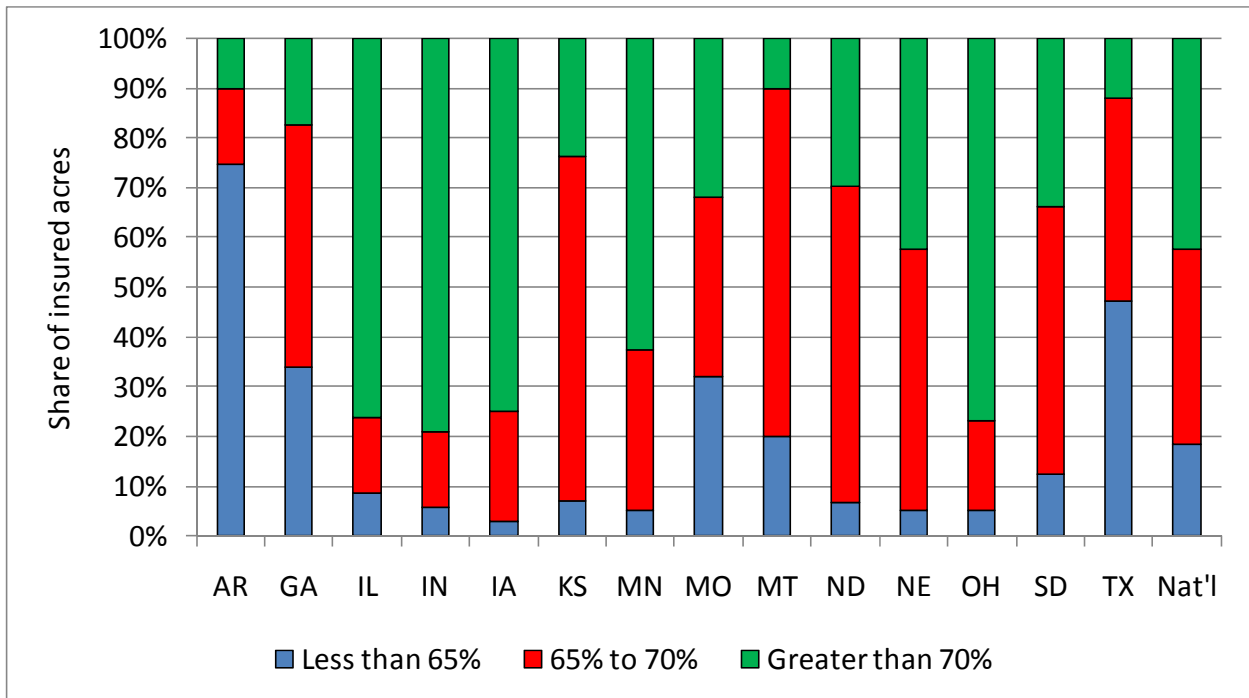


Figure 8. Share of insured acres by coverage level, selected states, 2009

Regional patterns in purchase of catastrophic coverage

The diversity of crop insurance enrollment patterns can be illustrated by looking at regional patterns in the purchase of catastrophic coverage (Figure 9). Catastrophic coverage is available for a small fee, but it only pays indemnities when a loss exceeds 50%. Thus it provides limited protection against only the most severe losses.

In states from Montana to Ohio, catastrophic coverage accounted for less than 10% of enrollment in the crop insurance program in 2009. As discussed previously, coverage levels are very high in many of those states, with the bulk of acreage enrolled at coverage levels in excess of 65% or even 70%.

Catastrophic coverage is much more common in other parts of the country. In fact, it accounted for more than half of all the acres enrolled in the crop insurance program in Arkansas and a few other states in 2009. Rice producers are particularly likely to have catastrophic coverage.

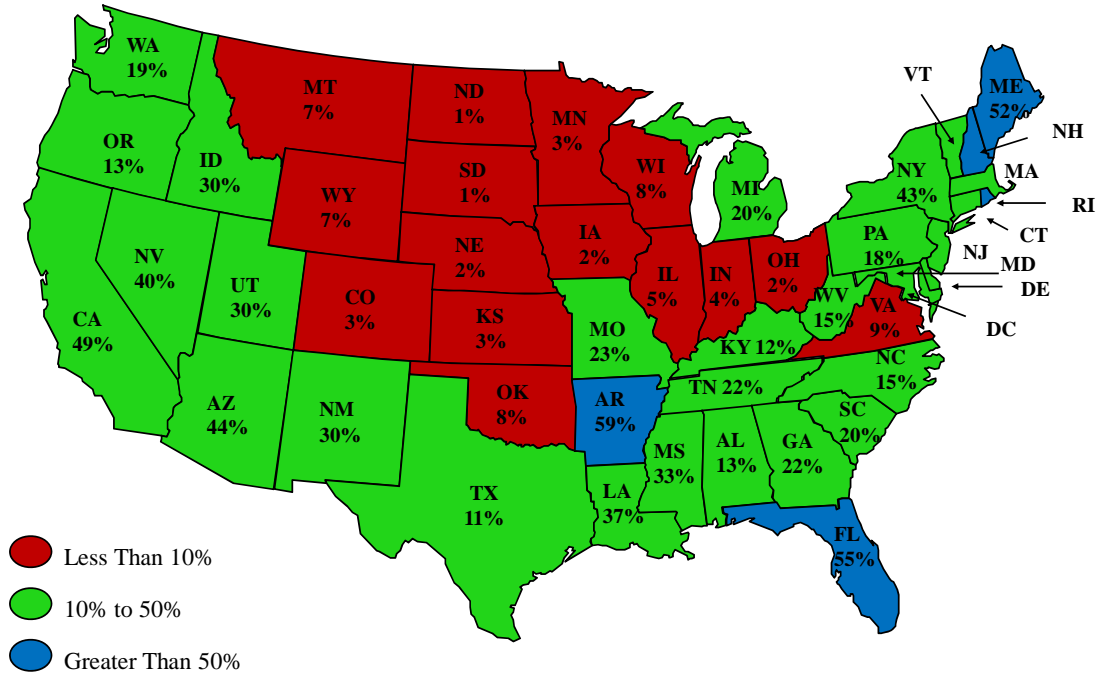


Figure 9. Catastrophic coverage as share of total acres enrolled in crop insurance, 2009

Note: Includes all major crops except pasture, forage and rangeland policies.

Regional patterns in the ratio of indemnities to producer-paid premiums

No attempt is made here to explain why producers do or do not choose to buy particular crop insurance products at particular coverage levels. However, an important question raised frequently is whether crop insurance pays sufficient indemnities to justify the cost to producers of paying the necessary premiums.

Crop insurance results will differ across time and across producers, so there is no single appropriate measure of whether participation in the program is worthwhile to producers. In a particular year or set of years, the weather will be better than or worse than average, and indemnities may be unusually large or small. Likewise, the experience of different producers may vary greatly; some may receive indemnities several times in a ten-year period; others may pay premiums every year but never receive an indemnity.

With all those caveats in mind, Figure 10 shows the average ratio of indemnities to producer-paid premiums over the last ten years. A ratio in excess of 100% means that producers in the state received indemnities between 2000 and 2009 that were greater than the premiums they paid for crop insurance over that same period.

In all but one state, indemnities exceeded producer-paid premiums over the last ten years. Because premiums are subsidized, one would expect indemnities to exceed producer-paid premiums on average. Note that the lowest ratios of indemnities to producer-paid premiums occurred in the Corn Belt states, where participation rates and coverage levels exceed the national average. In contrast, the ratio of indemnities to producer-paid premiums was particularly high in southern states, which tend to be characterized by lower coverage levels.

Again, it is important not to read too much into these estimates; results could be significantly altered by looking at a different time period, and the experience of individual producers may be very different than these state averages.

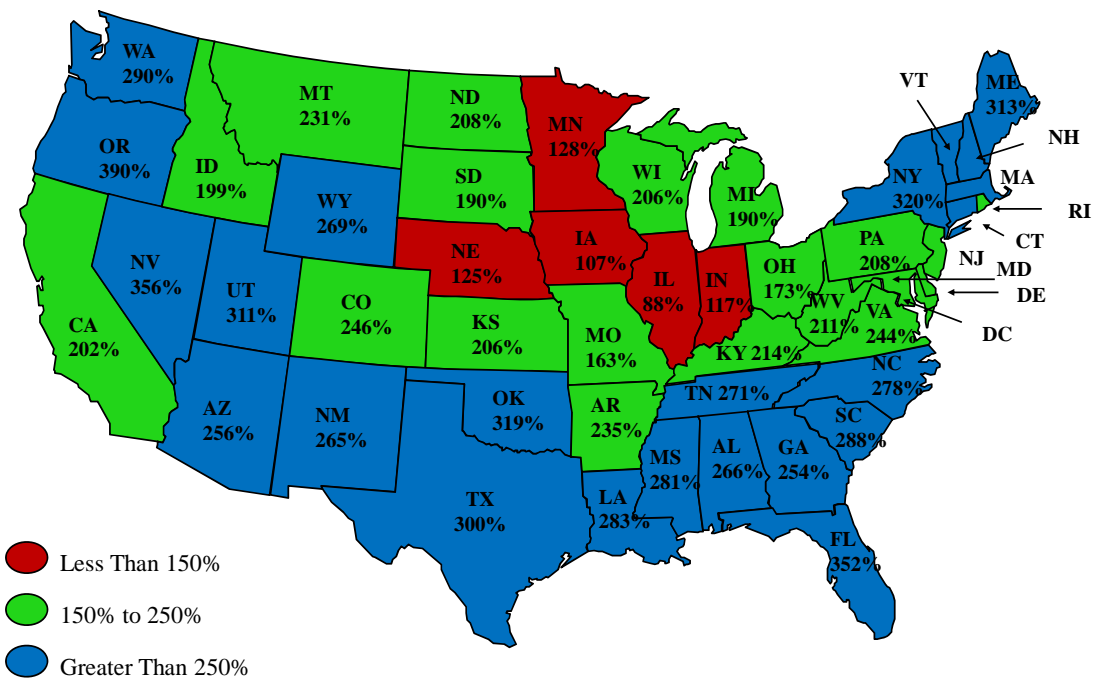


Figure 10. Ratio of indemnities to producer-paid premiums, 2000-2009

Note: Ratios in excess of 100% indicate that producers in a given state received more in crop insurance indemnities than they paid in premiums over the 10-year period. Includes all major crops and types of coverage except pasture, forage and rangeland policies.

Trends in national coverage type and levels

Crop insurance enrollment patterns have changed greatly over time. Until the 1994 program reforms took effect, yield-based APH policies were the only major crop insurance products available (Figure 11). The 1994 reforms created catastrophic coverage and temporarily required almost all program crop producers to have some form of crop insurance coverage. As a result, enrollment in catastrophic coverage boomed in 1995, with more acres enrolled in catastrophic coverage than in traditional APH policies.

The crop insurance purchase requirement was soon eliminated, and enrollment in catastrophic coverage has generally declined over time. Meanwhile CRC first became available in 1996, and revenue-based policies grew quickly in the last half of the 1990s. By 2001, more acres were enrolled in CRC or RA than in APH policies, and these revenue-based products dominate the national market today.

APH coverage at the 65% level dominated crop insurance markets prior to 1995 (Figure 12). The creation of catastrophic coverage resulted in a spike in coverage below the 65% level, but that has generally faded over time. The 2000 reforms provided increased levels of subsidies at higher coverage levels, and producers responded by increasing their purchases of insurance above the 70% level of coverage. In 2009 for the first time, the number of acres enrolled at coverage levels in excess of 70% slightly exceeded enrollment at 65%-70% levels of coverage.

The reported figures exclude pasture, rangeland and forage policies.

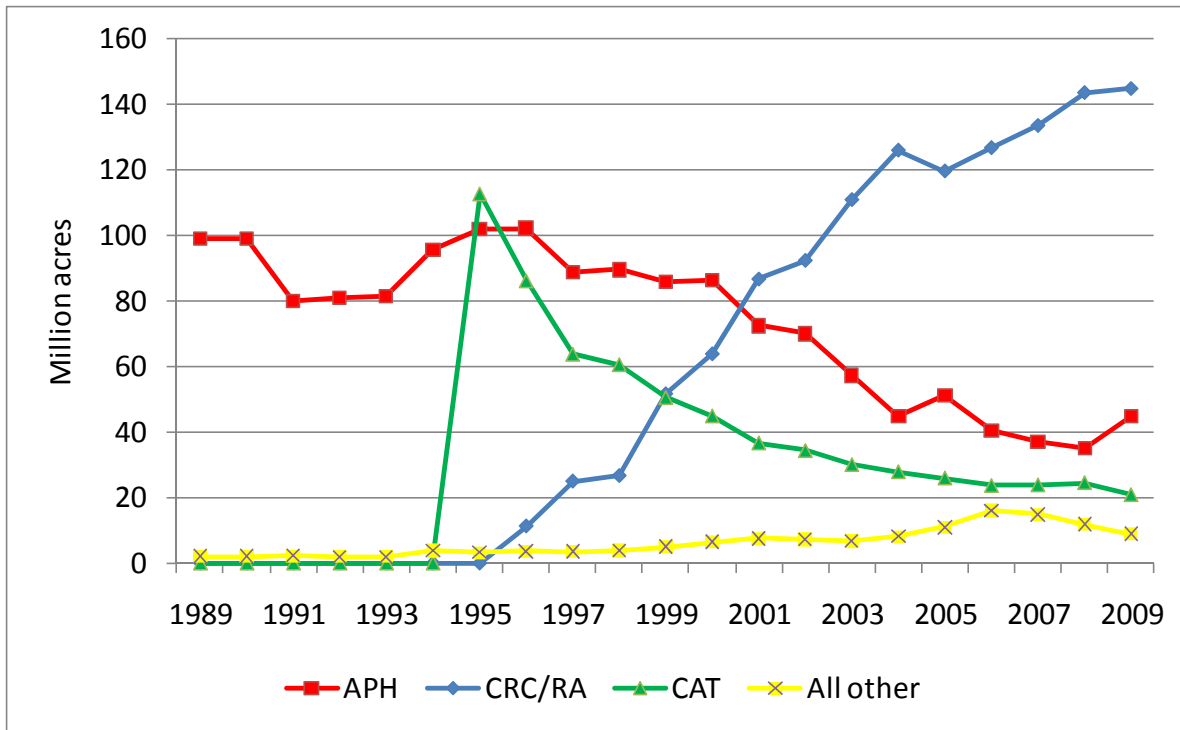


Figure 11. US acres insured by coverage type (excludes forage and rangeland policies)

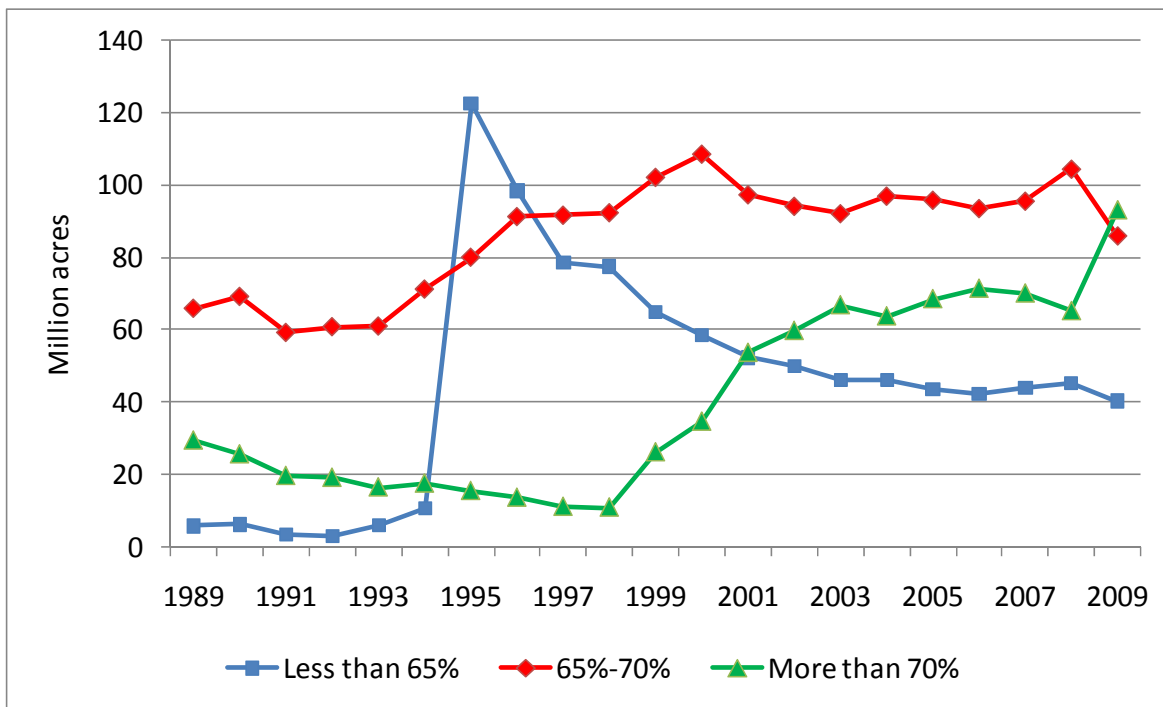


Figure 12. US acres insured by coverage level (excludes forage and rangeland policies)

Trends in enrollment and producer-paid premiums for major crops

For most major crops, enrollment in the crop insurance program jumped in 1995 because of increased premium subsidies and because of a temporary requirement that most producers purchase a policy. Participation for corn, soybeans and wheat remained high even after the purchase requirement was eliminated.

In recent years, the number of acres enrolled in crop insurance has generally followed trends in national planted acreage. For example, in 2007, corn planted acreage expanded at the expense of soybeans, and the number of acres insured follows the same pattern.

Pasture, rangeland and forage policies based on rainfall or vegetative indices were only introduced in 2007, and still are not available in all parts of the country. In addition to the 40 million acres enrolled in these policies in 2009, an additional 4.5 million acres were enrolled in forage production policies.

Producer-paid premium rates can change from year to year for a variety of reasons. In general, higher levels of coverage and increases in the value of the crop insured will both increase premiums. The sharp jump in producer-paid premiums since 2006 can largely be explained by the sharp increase in crop prices.

The average producer-paid premium for pasture, rangeland and forage policies is only about \$1 per acre. The average per-acre value of pasture and rangeland is far lower than the per-acre value of land devoted to corn, soybean or wheat production.

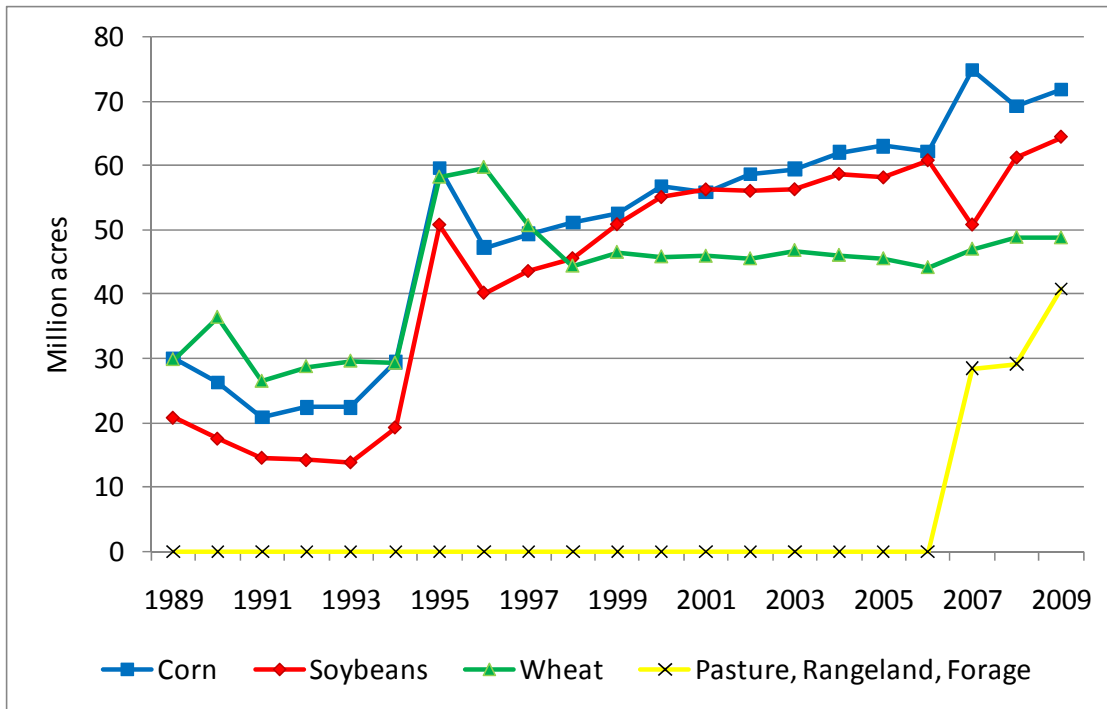


Figure 13. US acres insured for major commodities

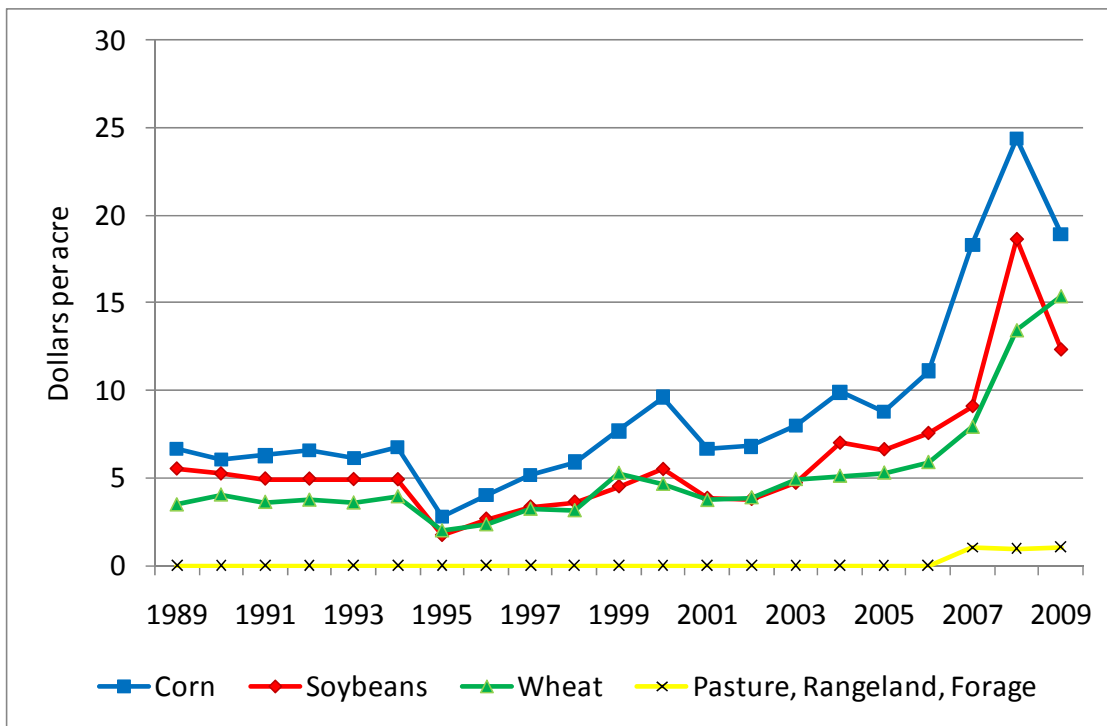


Figure 14. US average producer-paid premiums per acre for major crops

Appendix: Trends in coverage type and levels for four major crops

Figures A.1-A.8 report crop insurance enrollment patterns by crop from 1989-2009. Many of the general patterns are similar across crops. Revenue-based policies have become more popular over time, and coverage levels have generally trended upward since 1995. However, there have been important differences across crops, and sometimes there can be large swings in coverage types or coverage levels from one year to the next.

The reported figures exclude pasture, rangeland and forage policies.

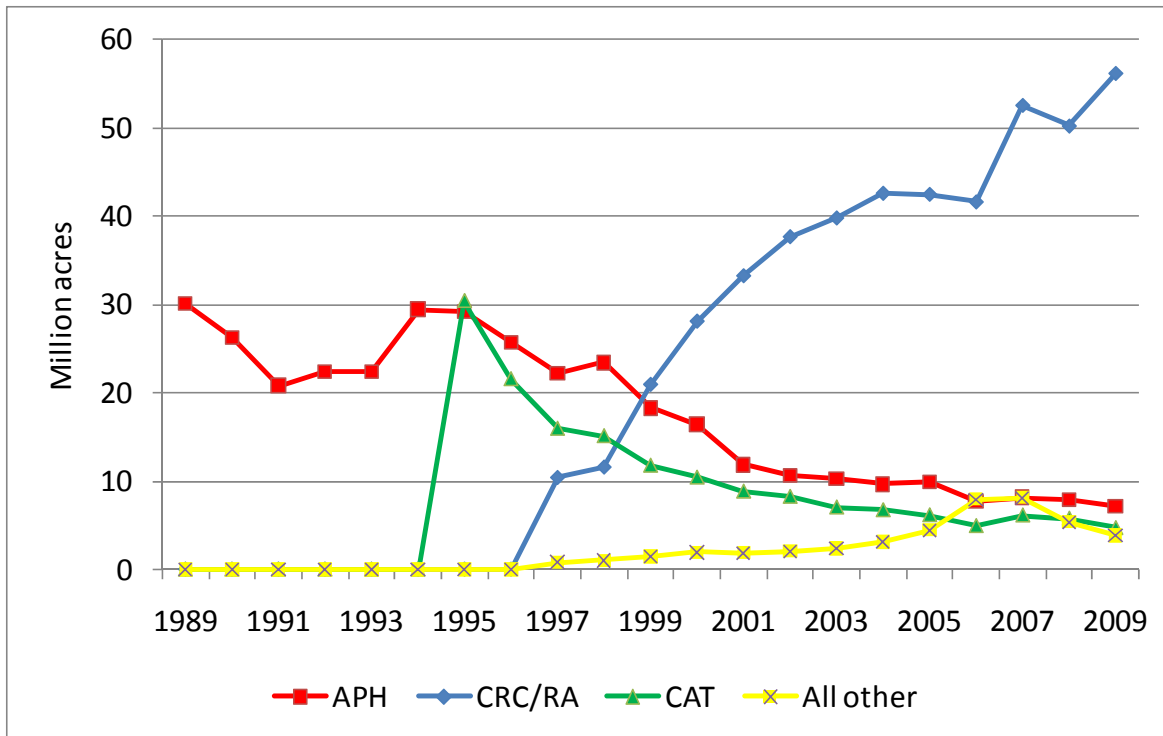


Figure A.1. US corn net acres insured by coverage type

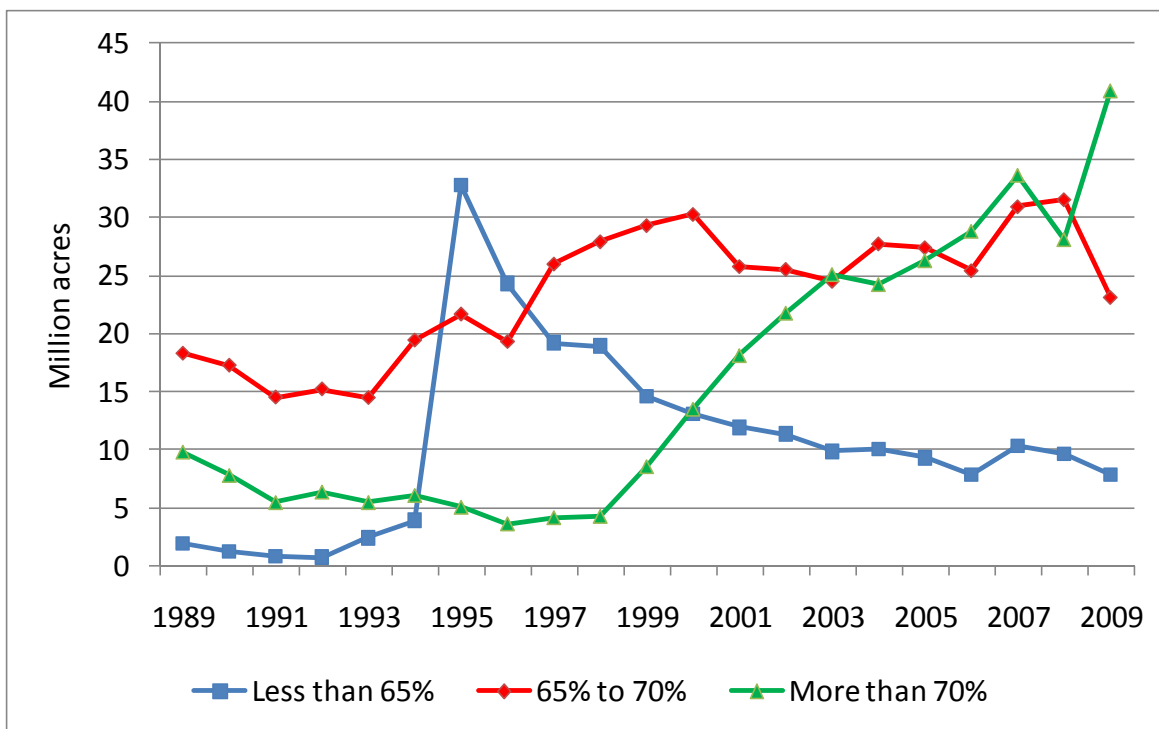


Figure A.2. US corn net acres insured by coverage level

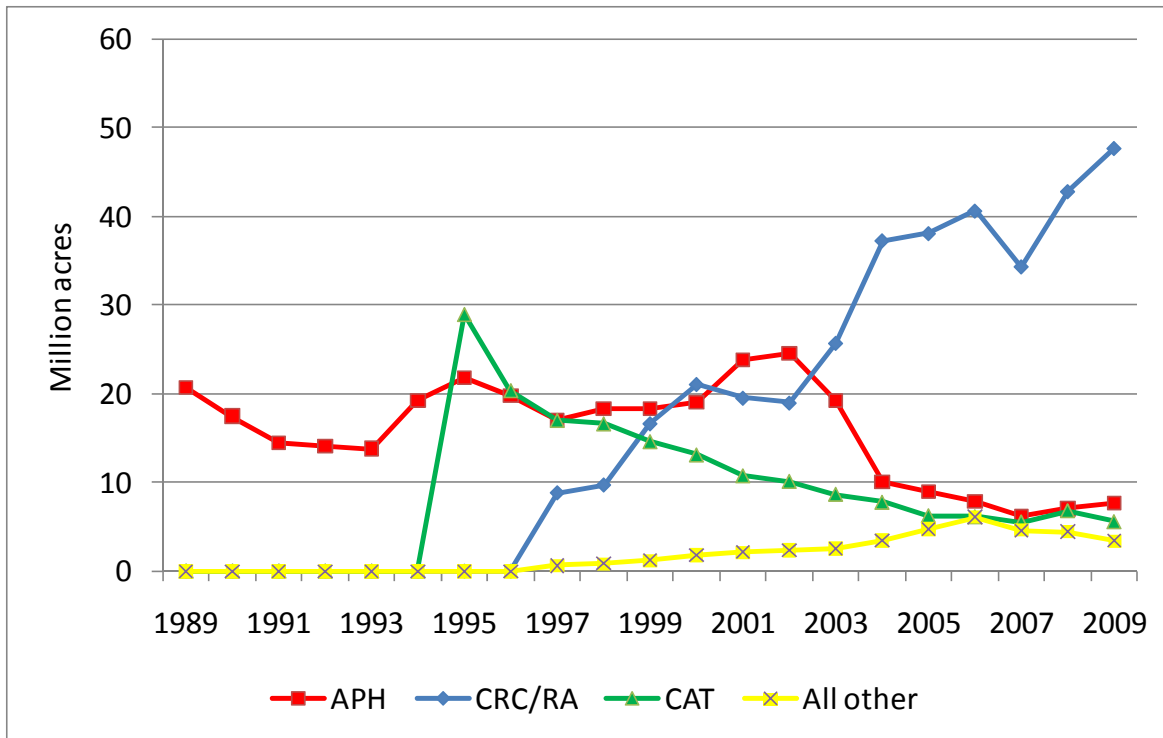


Figure A.3. US soybean net acres insured by coverage type

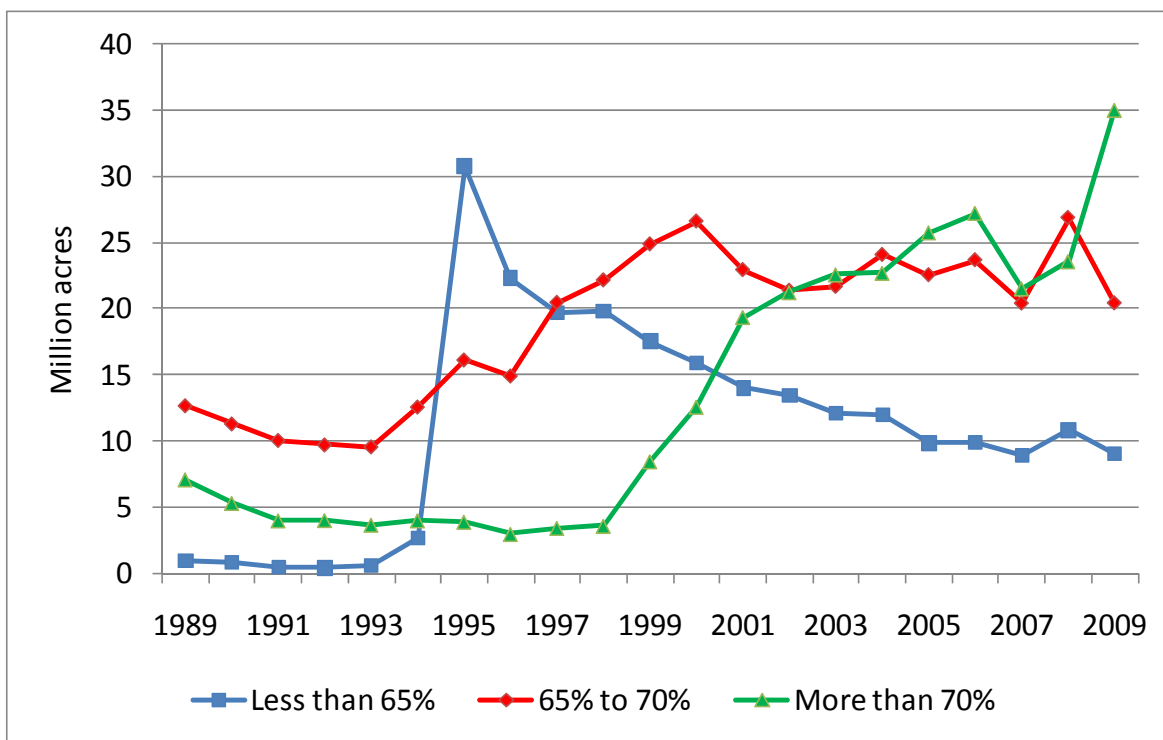


Figure A.4. US soybean net acres insured by coverage level

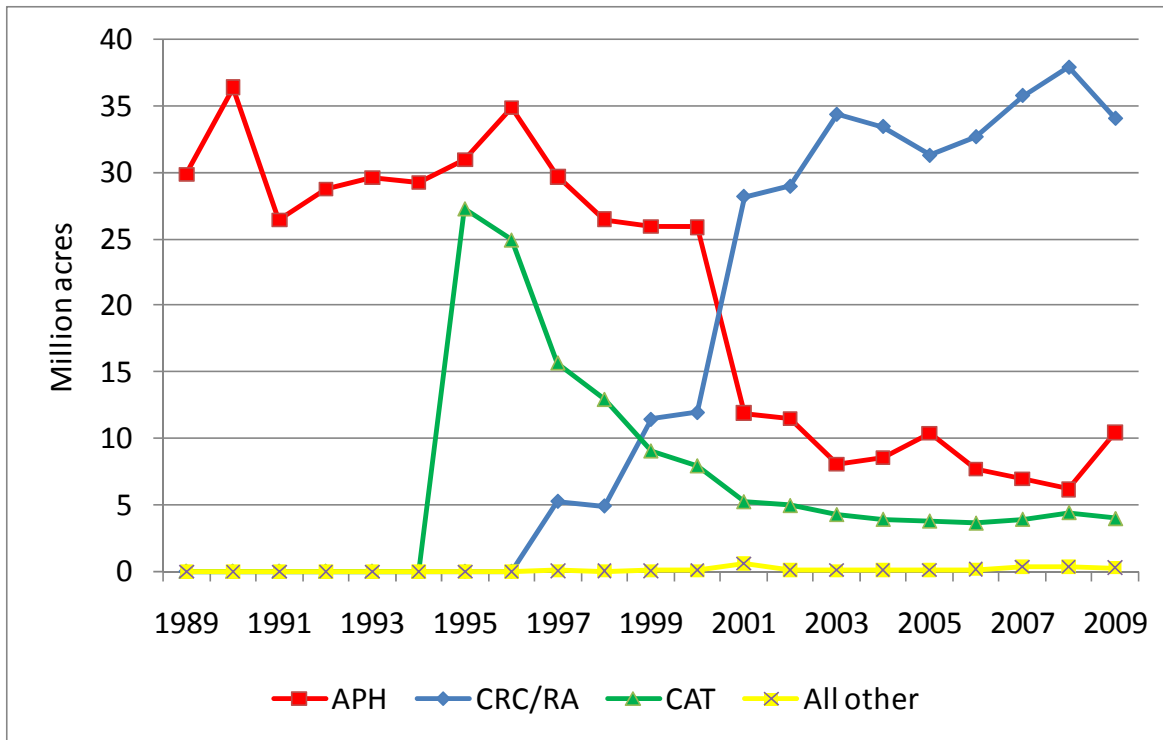


Figure A.5. US wheat net acres insured by coverage type

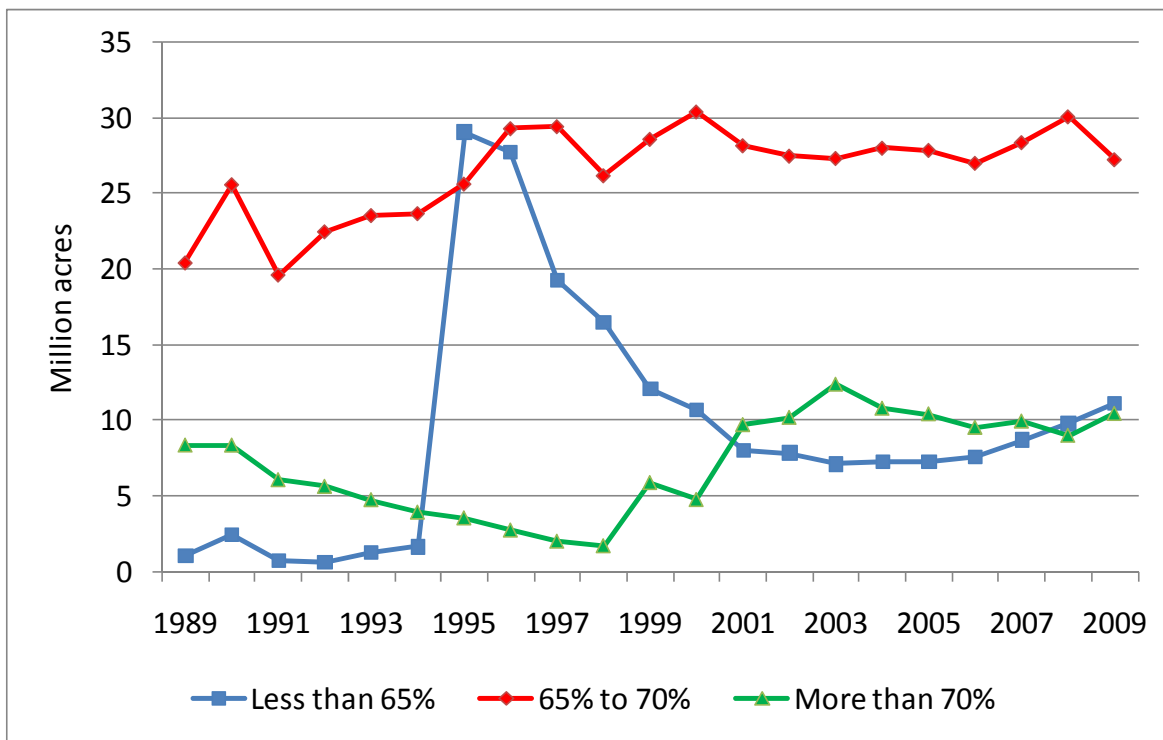


Figure A.6. US wheat net acres insured by coverage level

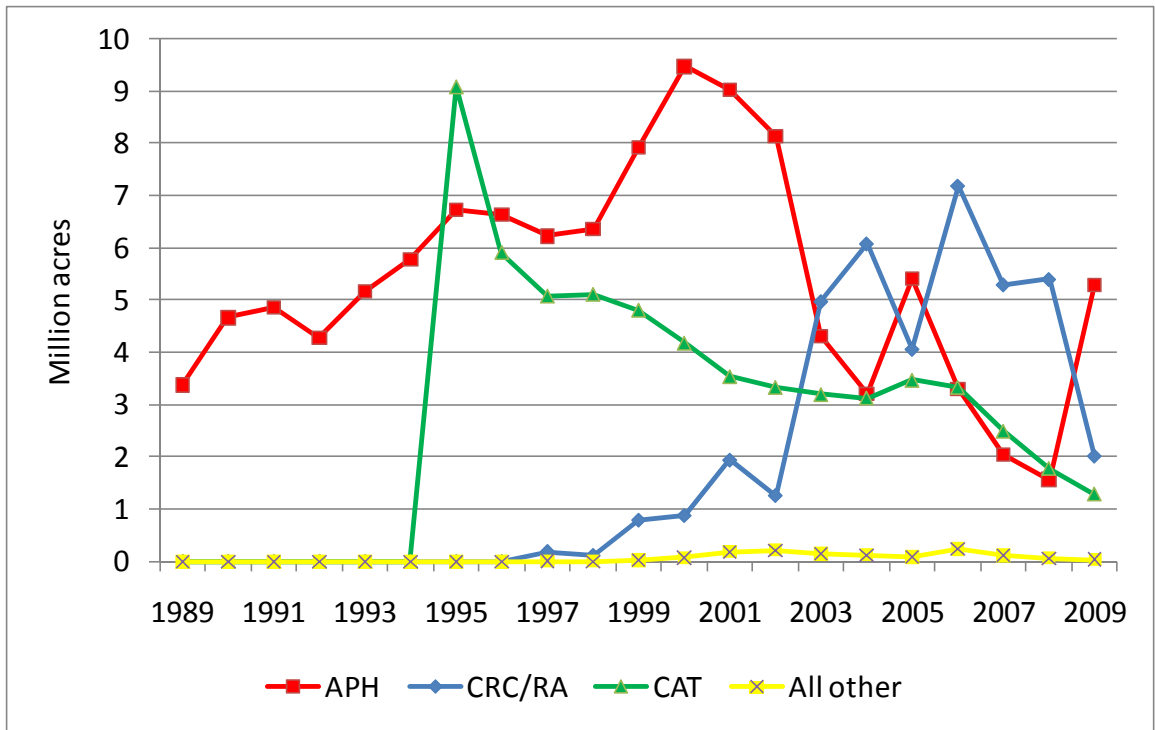


Figure A.7. US cotton net acres insured by coverage type

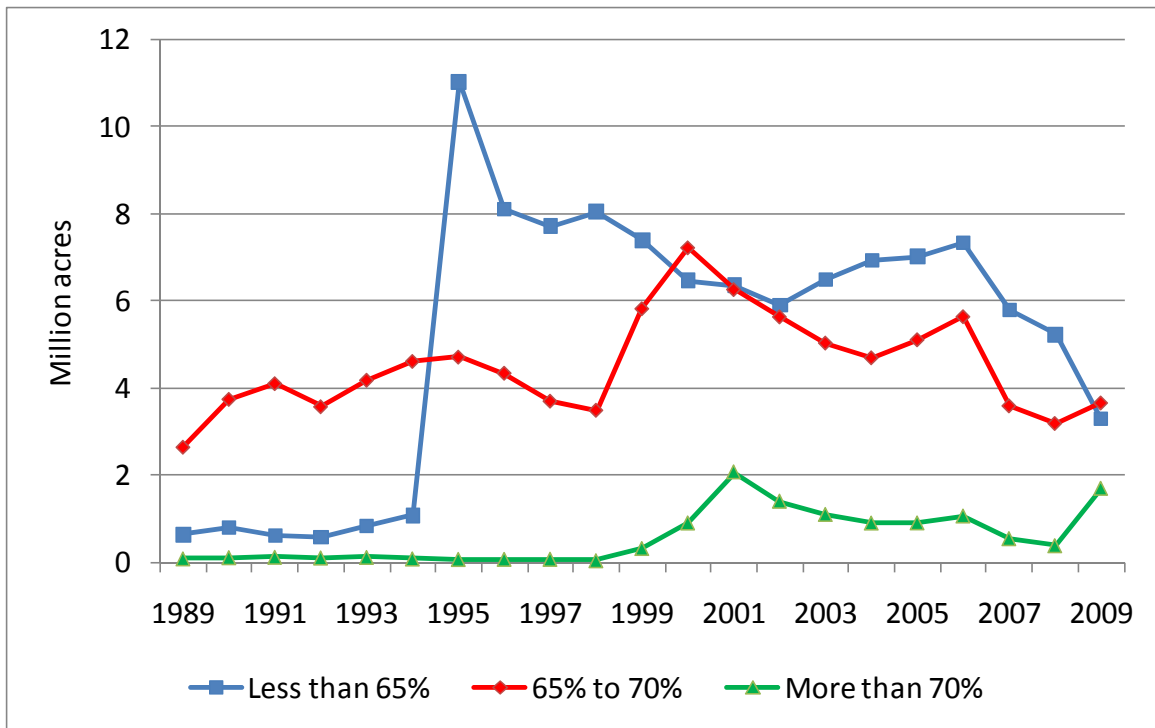


Figure A.8. US cotton net acres insured by coverage level