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The Potential for Revenue Insurance Policies in the South

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ABSTRACT

The 1996 Farm Act and the 1994 Crop Insurance Reform Act are recent examples of policy changes that have increased risks for U.S. farmers. New products are emerging to help farmers manage risks. This article examines some of the policy changes, farmer responses, and new risk-sharing products. The focus turns to the new revenue insurance products and their potential in the South. While there are reasons to believe revenue insurance should be attractive in the South, any revenue products that use existing crop insurance rates will face difficulties since poor actuarial performance in the South has resulted in relatively high rates.

Key Words: agricultural policy, crop insurance, revenue insurance, risk, southern agriculture.

Significant changes have occurred in U.S. farm policies. The most recent changes are embedded in the 1996 Farm Act. The 1996 act altered the government's role in providing support to producers, and has renewed interest in agricultural risks and alternative ways to mitigate those risks. While farmers have many choices for managing risk, new alternatives have emerged. The U.S. Department of Agriculture's (USDA's) Risk Management Agency and its private insurance partners have added several choices just since 1993. These new risk-sharing products have prompted much interest and many questions, particularly questions about the new revenue insurance programs. This article explores producer in-

terest in and the potential for alternative strategies, with a focus on the South and the new revenue products.¹ We begin with a review of some recent policy changes and the choices now available to farmers. Next we examine the potential effectiveness of these alternatives for the South in reducing income risk, using participation and premium rate data, and research on the effectiveness of various risk-management tools.

Each revenue insurance program has special nuances, and each has aspects that relate to the Federal Multiple Peril Crop Insurance (MPCI) program. Thus, it is important to understand the history of poor MPCI actuarial performance in the South and the resultant increases in premium rates. Since the crop revenue coverage (CRC) form of revenue insur-

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¹ For this article, the South includes Virginia, Kentucky, Missouri, Oklahoma, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas.

ance uses existing crop insurance premium rates, fixing problems with the existing crop insurance program in the South is critical to the success of CRC in the South. While three basic revenue products are now available, there are other types of products that have been, and will be, considered. We conclude by discussing some of the alternatives.

Federal Policy Changes in the FAIR Act

The 1996 Farm Act dismantled the complex system of deficiency payments and annual supply management programs that were in place since 1973, affecting expected returns and the income variability confronted by grain producers. Because deficiency payments were made when national average prices for program crops were low, income variability was, in certain locations, reduced significantly (Glauber and Miranda). These payments were most effective when year-to-year market incomes fluctuated greatly (e.g., where the price-yield correlation is weak), and deficiency payments served to even out and minimize the effects of variability. In locations with a strong natural hedge (e.g., areas with a strongly negative price-yield correlation that served to inherently stabilize revenues), year-to-year revenue variability was not dampened significantly for certain individual farms, and not at all in other cases (Glauber and Miranda).

In contrast to the deficiency payment system, participating farmers under the 1996 Farm Act receive contract payments that are fixed in the aggregate for each of the years 1996–2002. Although contract payments are sizeable, they do not vary inversely with market prices, and thus they do not directly affect producers' income risk in any location. These payments result in significant income enhancement, particularly in the early years of the act, but taper off in the final years. The outlook for payments beyond 2002 is uncertain. Most analysts believe that payment continuation (in some form) will largely depend on the market outlook in the early part of the next century.

Without deficiency payments to compensate for commodity price variability, farmers' revenues should be more risky. This new

source of risk for crop growers may be compounded by the new freedom to plant any crop based on price expectations. Since producers also have greater flexibility in switching crops from year to year, price variability may increase. The question about whether the new policies will result in greater or lower price variability is hotly debated among economists [Organization for Economic Cooperation and Development (OECD) 1997a, b]. Understanding price variability is a critical issue in rating revenue insurance products.

Strategies Have Changed with Farm Policy

There is much interest about how farmers are adapting to the new risk environment created by the 1996 Farm Act, and their use of alternative risk-management tools. For example, in the most recent (as of February 1998) Agriculture and Resource Management Study (ARMS), the U.S. Department of Agriculture asked producers whether or not they had increased their use of various strategies (or were considering adopting use of those strategies) because of changes in the 1996 Farm Act. Four strategies were among the options listed for producers: (a) diversification, (b) forward contracting, (c) hedging, and (d) keeping a line of credit open.

At the U.S. level, the results are fairly modest. As figure 1 reveals, fewer than 5% of U.S. farmers indicated that they increased their use of any of the four strategies in 1996 in response to changes in the 1996 act. For each category, an additional 1–2% responded that they had not used the strategy, but were considering adopting it in the future. Responses were fairly consistent across regions.

These results suggest that some farmers (albeit a small percentage) are aware of the need for new strategies and ways of managing risk. This awareness is due not only to the 1996 Farm Act, but has also developed in light of greater trade liberalization, an increasingly integrated world economy, and other changes in the world marketplace. Because the new revenue insurance products were first introduced in limited areas in 1996, the ARMS had

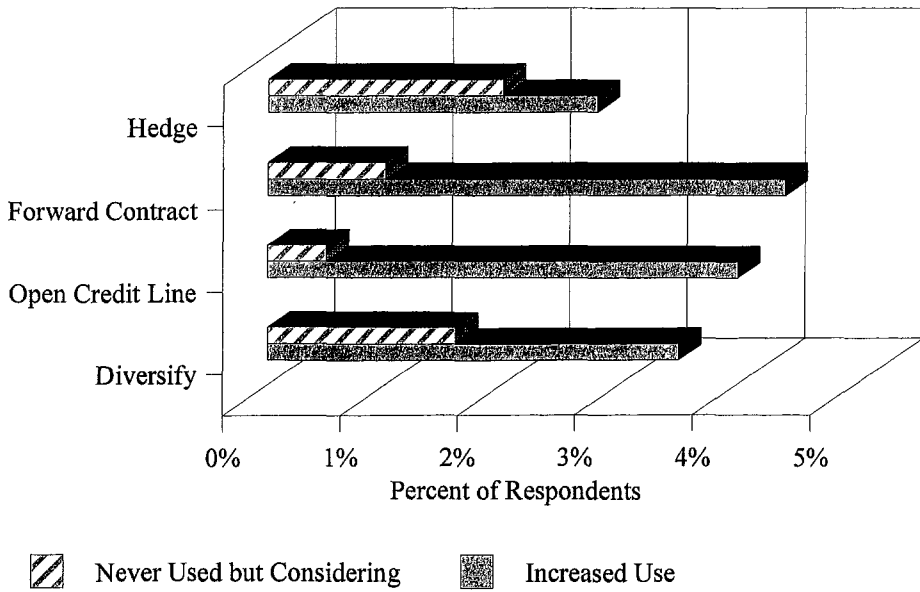


Figure 1. Percentage of respondents changing risk-management strategies due to farm bill changes

not yet included any questions regarding farmers’ interest in these new tools. However, producer interest in many areas was quite strong, as discussed below.

New Risk-Management Programs Available from USDA

An understanding of changes in government policy—particularly regarding crop insurance—is an important context for understanding the pressures for, and the resulting forms of, alternative revenue insurance and other risk-management products. While the government has attempted to reduce its role in providing price and income support, there has been a continual and increasing emphasis on agricultural insurance, starting with the 1980 Crop Insurance Act. Although subsidized crop insurance was available from 1981 to 1994, low participation, poor actuarial performance, and the existence of ad hoc disaster assistance (for which U.S. crop growers received over \$12 billion) resulted in pressure for reform.

The Federal Crop Insurance Reform Act of 1994 addressed this dual system of federal crop insurance and ad hoc disaster assistance by forcing any future spending on emergency

ad hoc crop disaster payments into the federal budget. Future emergency crop disaster payments will increase the federal budget deficit unless offset by tax increases or spending cuts elsewhere. This discipline makes it less likely that Congress will pass disaster aid bills in the future. Again, just as the FAIR Act forces growers to consider price risk management, the 1994 Federal Crop Insurance Reform Act forces growers to consider ex post alternative methods (such as MPCCI) for protection against natural disasters.

Changes in Crop Insurance

As part of the 1994 Federal Crop Insurance Reform Act, Congress introduced catastrophic (CAT) crop insurance coverage. Growers pay no premium for CAT coverage. Rather, they must pay an administrative fee of \$50 per crop, with a limit of \$200 per farm per county. CAT policies essentially offer free disaster assistance, providing a low-level safety net for producers. The major difference between CAT and ad hoc assistance is that, in the former case, the grower must pay an administrative fee and provide evidence as to his or her yield potential and the acreage planted to the crop.

Such requirements should reduce the type of fraud that occurred with the ad hoc payments of recent years (U.S. General Accounting Office). CAT policies pay for losses below 50% of the grower's historical average yield, with payments made at a rate of 60% of the price election offered by the Risk Management Agency. In the first year, Congress required that any farmer receiving selected government subsidies (including deficiency payments, certain Farm Service Agency loans, and new Conservation Reserve Program contracts) obtain coverage at the CAT level or higher. This concept of linkage was eliminated, however, in the 1996 FAIR Act. Now, producers can choose in each year whether or not they will obtain coverage, independent of their participation in other USDA programs.

When crop insurance is not available for a specific crop, growers are eligible for the Non-insured Assistance Program (NAP). This program allows farmers in areas experiencing natural disasters to receive payments if both the area (typically defined as a county) and the individual producer suffer losses. Farmers must sign up for NAP before they plant the crop (Lee, Harwood, and Somwaru). Recently, Secretary Glickman has emphasized that all NAP policies should be converted to CAT policies by the year 2000, which will require a sizeable expansion in the number of insured crops. The individual-level triggers for CAT and NAP are identical. The advantage of CAT, however, is that it is based only on individual-level losses; the area need not have a loss before farmers can collect payments.

In addition to legislative changes, significant administrative changes have been made to the basic crop insurance program, starting in the mid-1980s. Individualized coverage was introduced in the mid-1980s. Growers can now prove their yields with certifiable records and receive coverage based on the simple average of 4–10 years of these historical records. This 4–10 year average is referred to as the producer's actual production history (or APH) yield, and forms the backbone of the multi-peril crop insurance program. APH insurance is available for farm units, meaning that a grower with several farms in the same county

can insure different APH yields (and thus levels of the guarantee) on each unit. Those farmers who do not have four years of records are assigned a discounted APH yield, typically based either on their program yield or on the county average yield.

Growers can select among a wide variety of coverage levels under the crop insurance program. More specifically, a grower can obtain APH crop insurance at levels between 50% and 75% of his or her APH yield, using 5% increments. The grower also can select a price level between 60% and 100% of the established price set by USDA's Risk Management Agency. The basic CAT level of coverage is 50/60 (with the first number referring to the yield coverage level, and the second number referring to the price coverage). Coverage above the CAT level, up to a maximum of 75/100, is termed "buy-up" coverage.

As an example, consider a corn grower with an APH yield of 125 bushels per acre who selects the 65% coverage level and the maximum price election of \$2.45 in a given year. In this example, the liability is 125 bushels per acre \times 0.65 \times \$2.45 per bushel = \$199 per acre. If the grower's yield is zero, his or her indemnity payment would total \$199. Before the 1994 Federal Crop Insurance Reform Act, growers received a premium subsidy of 30% for policies up to the 65/100% coverage level. Now, growers receive a premium subsidy of 41.7% at the 65/100 level of coverage, with the subsidy percentage varying according to the exact level of coverage chosen by the producer. Administrative costs are reimbursed for the private companies selling federal crop insurance, currently at a rate of 27% of total premium.

Group Risk Plan Insurance

The introduction of revenue insurance in 1996 is not the government's first effort at offering a new alternative insurance to the APH program. The "Group Risk Plan" crop insurance program, introduced in 1993, was the first attempt at diversifying the portfolio of subsidized agricultural insurance available to producers. The Group Risk Plan (GRP) uses

USDA estimates of county average yields as the basis of payment. Payments are based on the liability a farmer selects, multiplied by the percentage by which the county average yield (as reported by the USDA) falls below the trigger yield selected. Trigger yields can be 70%, 75%, 80%, 85%, or 90% of the expected county yield. GRP expected yields were the first USDA yields used within agricultural insurance that are adjusted for trends in technology.

The GRP was designed to address some of the traditional problems of adverse selection and moral hazard associated with individualized (APH) crop insurance. Because it is based only on county average yields, GRP insurance has distinct features that producers should understand before they decide upon coverage. For example, farmers can have a loss and not be paid if their own yield is low, but the county yield does not fall below the critical level required for payment. GRP policies are considered "buy-up" policies, and are subsidized in a similar fashion to APH policies. A farm's yield must be correlated with the county's yield for GRP insurance to provide adequate risk protection to the producer (Miranda; Skees, Black, and Barnett).

Revenue Insurance in the United States

Along with changes in the federal crop insurance program, Congress and the Administration set the stage for revenue insurance in the United States in the early 1980s. In the 1981 Farm Act, for example, Congress mandated a study on the feasibility of revenue insurance. The final report, which was delivered in 1983, raised many questions about adverse selection and moral hazard. In nearly every act since 1981, the Congress mentioned revenue insurance. In both the 1994 Federal Crop Insurance Reform Act and the 1996 FAIR Act, Congress provided clear signals to the USDA Risk Management Agency about pilot testing revenue insurance.

Over the past two decades, numerous studies have examined various aspects of revenue insurance (Babcock and Hennessy; Heifner; Heifner and Coble). Meanwhile, the Canadi-

ans introduced two forms of revenue protection, the Gross Revenue Insurance Program (GRIP) and the Net Income Stabilization Account (NISA) program (see below). Also, prior to the 1995 Farm Bill debate, the Iowa Farm Bill Task Force recommended the introduction of a "revenue assurance" program. Congress has also expressed a desire for insurance based on costs of production, but evaluations have indicated that such a program would be fraught with implementation problems. Specifically, costs of production vary widely across farmers in the same region who produce the same crops or livestock, depending on many factors including the practice type (irrigated versus nonirrigated crops) and land ownership type (owned versus rented).

Three revenue insurance products currently are available to producers in selected areas. These products complement many strategies, such as the use of diversification, and provide a more comprehensive alternative to using multi-peril crop insurance. In examining revenue insurance alternatives, policy makers, program officials, and private insurance companies in the United States have benefited greatly from witnessing Canada's experience. Specifically, Canada's GRIP program (first introduced in 1991) was quite costly and interfered with market signals, largely because it used long-term average prices in establishing the guarantee. Based on observing the Canadian experience, all U.S. revenue insurance products use an intra-year, futures-based price in establishing the guarantee, rather than a long-term average price.²

² The Canadian GRIP program paid indemnities based on a 15-year moving average of crop revenue. The guarantee was set on a crop-specific basis. For example, if the 15-year moving average income (price times yield) were \$300 per acre and the guarantee was based on 70% of average revenue, the grower would be indemnified any time revenue dropped below \$210, so as to make the revenue equal to \$210. GRIP ran into early problems, as the guarantee was based on a long-run guarantee that reflected higher prices in earlier years. Because international commodity prices were low when GRIP was introduced, the revenue guarantee was too high to sustain. The program was more of an income-enhancement program than an insurance program. This points to a significant problem in providing guarantees for longer-term incomes.

U.S. revenue insurance products were first introduced in 1996. In that year, the income protection (IP) product was developed by USDA's Risk Management Agency in response to language in the Federal Crop Insurance Reform Act of 1994. Crop revenue coverage (CRC), also introduced in 1996, was designed by Redland Insurance, a private company. These programs were expanded from limited coverage in 1996 to new geographic areas in 1997. A new product—revenue assurance (RA)—was also offered in 1997 for corn and soybeans in Iowa.³

While these three plans have many similar features, they also, in many ways, are unique. All of the products are based on the concept of combining price and yield risk protection in one program that provides downside revenue risk protection to producers. They are also similar in their use of the terms associated with basic coverage under APH insurance. Each product requires producers to pay a premium for coverage. Premiums are subsidized by the federal government in a manner similar to the APH program. The government also reinsures companies against a portion of the losses associated with each product. The uniqueness of each product, as described below, is found in the specification of the guarantee, the rating methodology, and the producer's ability to subdivide acreage into individual parcels.

The Income Protection (IP) Plan

Income protection offers a "revenue guarantee" that protects producers against low yields, low prices, or a combination of both. The level of the guarantee is unique to each producer, and is based on sign-up time future prices for harvest-time delivery, the farmer's expected yield, and the coverage level chosen by the farmer (ranging from 50–75%). The farmer must insure all of his/her acreage in the crop in the county as a single parcel, termed an "enterprise unit." The farmer receives an

indemnity if the harvest-time price, multiplied by the farm's APH yield in that year, falls below the guarantee. Because the guarantee is based on the early-season price projection for harvest time, IP protects against shortfalls in actual revenue below the expected revenue for the particular season.

As an illustration, consider how IP might work for the corn grower (with a 125-bushel APH yield) discussed earlier in this article. The guarantee, based on the average futures price quote for December corn traded during the month of February, may be quite different than the maximum APH price election. Let's assume that the average February quote on the December contract is \$2.85 per bushel. If the grower selects 70% coverage, payments are made when the product of the harvest-time quote on the December contract and the producer's actual yield in the given year are less than 70% of $125 \times \$2.85$, or \$249 per acre. Thus, if the November average quote for the December futures contract is \$2, and the grower has a yield of 120 bushels per acre, a payment of \$9 per acre would be made ($\$249 - \240).

In the above illustration, prices are relatively low and yields are at near-normal levels. Conversely, harvest-time prices could be high, and low yields could trigger a payment. For example, assume the producer's actual yield is 70 bushels per acre and the harvest-time future quote is \$3 per bushel. The farmer's actual revenue is \$210 per acre, and a payment of \$39 would be forthcoming ($\$249 - \210).

While CRC availability has spanned broad geographic areas, IP availability typically has been limited to a small number of counties in any given state. In 1997, for example, IP was limited to 14 corn and soybean counties in Illinois, Indiana, and Iowa; eight spring wheat counties throughout Minnesota and North Dakota; and 18 winter wheat counties in Kansas, Montana, and Washington. In the South, IP coverage was available in 42 Arkansas soybean counties, four Alabama cotton counties, four Georgia cotton counties, and 25 Texas grain sorghum counties.

The IP premium rating methodology reflects historical yield variation and variations

³ Since RA is not available in the South, it is not discussed in this article. RA is more similar to IP than to CRC.

in gross income due to yield and price movements during the growing season. More specifically, the rating model includes the correlation of national prices and county yields, the relationship between APH yields and the county average yield in that year, and the year's projected price level. Consequently, premium rates vary across counties and among producers within a given county. The dollar value of the IP premium subsidy (paid by the government) is about equal to that for APH coverage.

As with APH, the producer-paid premium equals the premium rate multiplied by the liability, less the premium subsidy. In general, IP premiums in the South, using soybeans as an example, range from 5% to nearly 10% of the producer's liability. This is considerably higher than IP rates for soybeans in the Corn Belt, which are in the 2–4% range. This differential reflects greater yield variability for soybeans in the South, as well as the weaker price-yield correlation in that region.

Overall, premiums tend to be lower for IP than for traditional APH crop insurance. This is because prices and yields are negatively correlated, reducing the likelihood of IP payments. In addition, the longer-term weather (reflected in the longer-term series of county yields) used to rate IP is less variable in some regions than the experience used to rate APH. When IP rates are expressed as a proportion of APH premium rates, the ratio resulting for soybeans in the South is at about the same level as in the Corn Belt, ranging from about 40% to 80% of the APH rate in 1997.⁴ The premium rate differentials tend to vary nearly as much within a given state as across different states. For cotton, IP premium rates generally tend to fall within the range of 80–85% of APH rates.

Relative IP and APH rates are likely an important factor explaining IP purchases, particularly with regard to Arkansas soybeans. Of the Arkansas soybean acreage covered by some type of federally subsidized crop insurance in 1997, about 40% was in IP. This is a

very strong showing for a product in its first year, particularly since IP was introduced late in the sales season. It is important to note that the range, however, was quite diverse. In five counties, IP accounted for more than 60% of total insured acreage, while IP accounted for less than 5% of total insured acreage in 17 of the 42 counties in Arkansas. These differences might be the result of agent knowledge and promotion of IP. For certain farmers, IP may provide an attractive option, particularly where APH premium rates are at relatively high levels.

The Crop Revenue Coverage (CRC) Plan

Crop revenue coverage is more complicated than IP, offering two coverage components to farmers. The first component, similar to IP, offers a revenue guarantee based on spring-time futures quotes on the harvest-time contract and farmers' expected yields. If the producer's actual revenue (based on the harvest-time futures price and the producer's actual yield) falls below the guarantee, he or she is eligible for a "revenue indemnity." The second component offers "replacement coverage," whereby coverage can increase during the season if futures price quotes rise. That is, if a farmer has a short crop and the price is higher at harvest time than the preharvest projection, the producer's crop yield loss is indemnified at the higher harvest-time price, allowing the producer to buy "replacement" bushels in the marketplace. The producer receives the higher of the "revenue indemnity" or "replacement coverage indemnity."

As an illustration, consider the corn grower used in the IP example above. This grower will receive the greater of the IP payment (calculated as above) or a replacement payment. Recall that, for a 70-bushel yield and a price of \$3 per bushel, the IP payment would be \$39 per acre. Under CRC, the crop insurance dimension, along with the movement in the futures price over the season, would be considered. With coverage at 70% of the 125 APH, payment is made for yields below 87.5 bushels per acre. Using the harvest price of \$3 per bushel, multiplied by the 17.5 bushel shortfall,

⁴ Rates are calculated as the premium for buy-up coverage divided by liability.

provides a replacement payment of \$52.50. Since this amount is greater than the revenue payment, the producer receives \$52.50 per acre.

CRC geographic coverage, initially encompassing all counties in Iowa and Nebraska for corn and soybeans in 1996, was expanded significantly in 1997. In 1997, CRC was available for corn and soybeans in producing counties from Texas and Oklahoma through Minnesota, and eastward through Ohio. Wheat coverage was offered from Texas through North Dakota, and in Washington and selected counties in Montana. Cotton CRC was offered in Arizona, Georgia, Oklahoma, and selected counties in Texas, while grain sorghum CRC was offered in Colorado, Nebraska, Oklahoma, and certain counties in Kansas. As can be seen from this list, CRC coverage was available in limited counties in the South, and mainly for cotton and wheat.

CRC coverage has expanded rapidly. In 1998, CRC coverage encompassed virtually all U.S. planted acreage in corn, soybeans, wheat, and cotton, except in the Northeast. Once approval for subsidies and reinsurance is obtained from the Federal Crop Insurance Corporation board of directors, Redland Insurance is planning to offer CRC for rice (tentatively in 1999). Moreover, the company is investigating the insurability of canola, peanuts, and citrus under CRC (Cleveland).

Premium rates are set very differently for CRC than for IP. Unlike IP premium rates, CRC rates are based on the underlying APH rate for the crop, with the CRC rate, in addition, adding a load for the price risk component. IP rates assume a nonzero price-yield correlation, while the rating methodology for CRC assumes that the correlation is zero.⁵ The producer premium subsidy is paid only on the yield risk portion of CRC coverage, which is

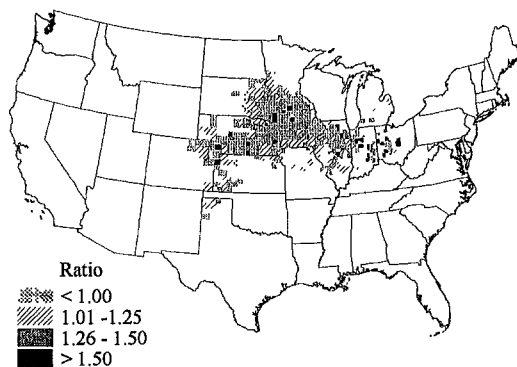


Figure 2. Corn buy-up insurance premium rates paid by farmers = CRC/APH, 1997

approximately the same dollar amount as coverage under the APH policy. Thus, the proportion of the CRC premium that is subsidized is less than for IP or APH.

CRC premium rates are always higher than APH rates, largely because of the “replacement coverage” component of the policy (figure 2). In most CRC corn and soybean counties, regardless of their location, premium rates were 20–40% higher than APH rates. In a significant number of corn counties in the Midwest, CRC premium rates were about 50% higher than APH rates. For cotton, premium rates tended to average up to 40% higher than APH rates, with certain counties in Oklahoma and Georgia experiencing the highest rates.

Despite the higher rates associated with CRC, sales were strong relative to APH in 1997 in many areas. Indeed, little correlation appears to exist between premium rates (relative to APH) and the portion of federally subsidized acreage covered by CRC. CRC sales were particularly strong for corn and soybeans in Iowa and Nebraska. Two factors likely explain this result. First, Iowa and Nebraska were the only states having prior experience with CRC in 1996, and producers were more familiar with the product than in locations where 1997 was the first year of coverage availability. Second, Iowa and Nebraska have a sizeable Redland Insurance (the CRC developing company) sales force, and agent enthusiasm was likely strong.

Cotton and wheat are the only crops where CRC had a significant presence in the South

⁵ While the assumption of zero correlation seems troublesome, the methods used provide some offsetting effects that make it less of a problem. With low prices, a negative price-yield correlation means lower rates than a zero correlation. With high prices, a negative price-yield correlation means higher rates than a zero correlation. CRC pays under certain conditions for either a low price or a high price.

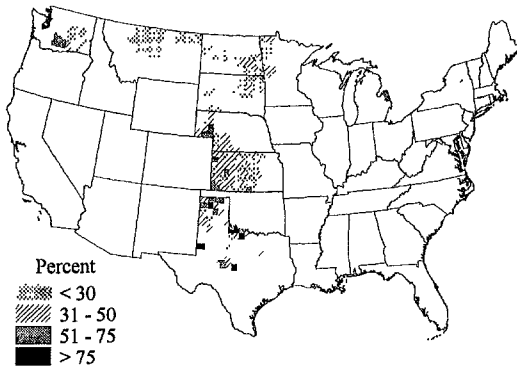


Figure 3. Proportion of wheat CRC acres to all buy-up insured wheat acres, 1997

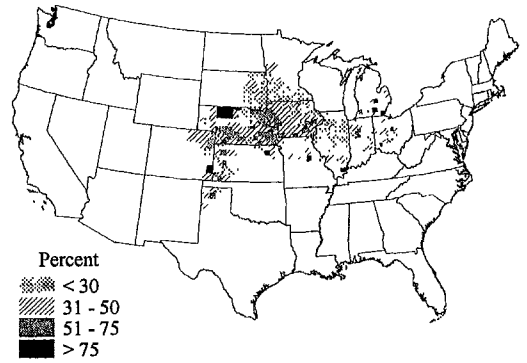


Figure 4. Proportion of corn CRC acres to all buy-up insured corn acres, 1997

in 1997. For cotton, CRC tended to account for less than 30% of the federally insured crop acreage in 1997 in most areas in Texas and Georgia.⁶ In three Georgia counties, CRC acreage accounted for more than 60% of total insured acreage. Surprisingly, in two of these counties, premium rates were more than 60% higher than APH rates. As explained previously, such anomalies are likely attributable to producer exposure and agent enthusiasm in introducing the product. For wheat, CRC acres as a percentage of total insured acres were quite variable, ranging from less than 30% in certain counties to more than 80% in others (figure 3).

The only overlap between CRC and IP availability in 1997 was in several counties in Illinois, Indiana, and Iowa. In those counties, IP sales were weak relative to CRC. A number of factors could explain this. Again, agent enthusiasm for CRC was likely greater than for IP as CRC was a privately developed product. It also may be that many producers prefer the greater flexibility in CRC coverage, which allows producers to subdivide their acreage according to section line, practice (irrigated versus nonirrigated), and crop type. With IP, producers must insure all of their acreage in

one crop as a single unit. In addition, IP was newly offered in many areas in 1997, and did not have the widespread exposure that was afforded CRC. In many corn and soybean areas in 1997, CRC sales accounted for a large share of total federally insured acreage (figures 4 and 5).

Revenue Insurance Could Be Effective in the South

Since the South does not dominate production of many crops, there is little or no correlation between prices and yields. Low levels of correlation, as well as inherent levels of yield variability, suggest that revenue insurance could be more attractive in the South than in the rest of the U.S. Recent research has examined the effectiveness of various risk-management alternatives (crop insurance, revenue

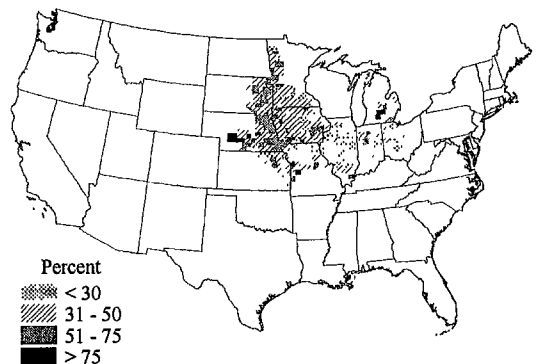


Figure 5. Proportion of soybean CRC acres to all buy-up insured soybean acres, 1997

⁶ Participation is expressed as CRC insured acres divided by total insured acres across all federally subsidized agricultural insurance products (including APH, IP, GRP, etc.). Counties with less than a certain acreage level were omitted from the analysis (e.g., less than 500 cotton acres, less than 5,000 wheat acres, etc.).

insurance, and forward contracting) in reducing revenue risk for corn producers in various locations, including representative areas in the South (including North Carolina). This research assumes farmers pay rates that are equal to the expected return from the various risk-sharing alternatives. Under these conditions, the probability of revenue being less than 70% of expected is about 23% in North Carolina if a producer chooses to sell his/her corn crop at harvest for the local market price. With the use of either crop insurance or forward contracting alone, the probability of a low revenue is reduced to 18%. In addition, with revenue insurance (or the combination of a forward contract and crop insurance), the probability of a low revenue is about 7% (Harwood et al.).

Revenue insurance (or contracting and crop insurance) can be quite attractive in such situations in the South for two basic reasons. First, yield variability is at relatively high levels for crops such as corn and soybeans in the Southeast, when compared to lower risk areas in the Midwest. Second, the price-yield correlation (or "natural hedge") is relatively weak for North Carolina corn and for various other crops in the South. That is, low prices and low yields (or high prices and high yields) are more likely to occur for corn in the Southeast than in the Corn Belt. This situation makes revenues inherently more variable, as these areas have less impact than does the Corn Belt on national output and prices. In short, stabilizing revenue variability through programs such as revenue insurance can have a major impact in areas where revenue is inherently unstable.

How Is the South Different?

While the research above suggests that revenue insurance can be more effective in the South than in many other parts of the U.S., keep in mind that the work was performed with the assumption that premium rates equal the relative risk. If the majority of farmers in the South must pay more for the risk protection than is represented by the relative risks, the results may not hold. This is important

since summary statistics illustrate that experience with crop insurance clearly has been different in the South than in the rest of the United States. One measure of performance is the loss ratio, which is calculated as the sum of all payouts (indemnities) divided by the sum of total premiums (including the premium subsidy). From 1981–96, the loss ratio for buy-up insurance is 1.70, and 1.14 for the rest of the United States. While loss experience in recent years has improved, the gap remains. The buy-up loss ratio from 1990–96 is 1.49 for the South and 1.06 for the rest of the country. When the implicit premium subsidy associated with CAT policies is included, the 1990–96 loss ratio (both CAT and buy-up policies) is lower, at 1.28 in the South and .98 for the rest of the United States. The lower loss ratios in the 1990s largely have been the result of underwriting changes and higher premium rates.⁷ The premium rates paid for buy-up crop insurance have remained relatively constant for the rest of the U.S. during the 1980s and 1990s (about 6%). In contrast, rates paid in the South have increased from 6.3% in 1981 to over 10.7% in 1997. At the same time, the South's share of total exposure in the crop insurance program (liability) has declined from over 40% in the early 1980s to just above 20% in 1997 (figure 6).

Another comparison of participation in the South versus the rest of the U.S. is with acres insured as a proportion of acres planted. The most striking example of this difference is with soybeans (figure 7). In the early 1980s, the South had nearly 20% of its soybean acres insured, while the rest of the U.S. had just over 10%. By 1996, southern participation was at 17% even though the rest of the U.S. had 44% participation rates. During this period, the South's share of U.S. soybean acreage went from nearly 50% to under 30%. While many factors explain the decline in southern soybean acreage, is it possible that one factor is the difference in the relative benefits of the

⁷ Rates are the total premium paid divided by the coverage or liability in force during the period. They are converted to dollars of premium paid per \$100 of coverage.

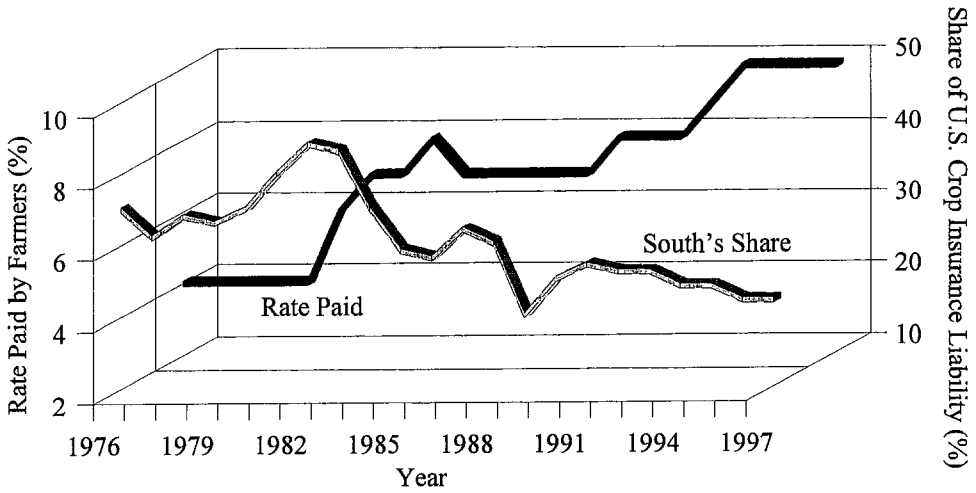


Figure 6. Southern crop insurance experience: Rate increases vs. declines in share of insurance, 1976-97

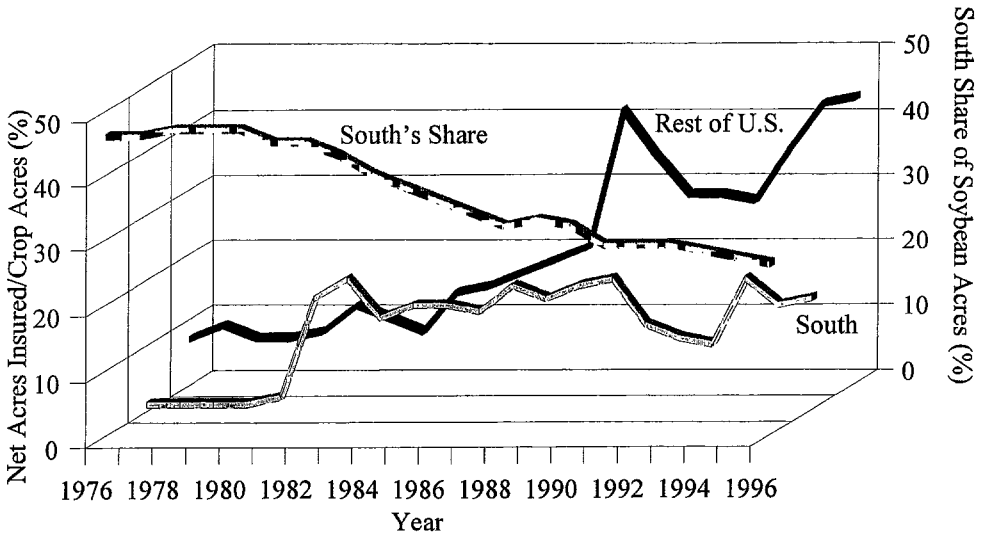


Figure 7. Soybean participation (net acres insured/planted acres) for the South vs. rest of U.S., 1976-96

crop insurance program in the South versus the rest of the U.S.?

Corn participation in the South and the rest of the U.S. was roughly 10% in the early 1980s; by 1996, participation in the South was only 24% versus 47% for the rest of the U.S. (figure 8). Again, the South's share of acreage declined significantly during this period. Sorghum has exhibited a different pattern, since both the South and the rest of the U.S. have had similar participation throughout the last

couple of decades, moving from approximately 10% in each region to 45% by 1996. The South's share of sorghum acres also has remained relatively constant at nearly 50% throughout the period. Wheat participation in the South always has been lower than that of the rest of the U.S. The 1996 rates are 24% in the South versus 48% in the rest of the U.S. The South's share of wheat acreage has remained at around 30%.

The higher proportion of implicit premi-

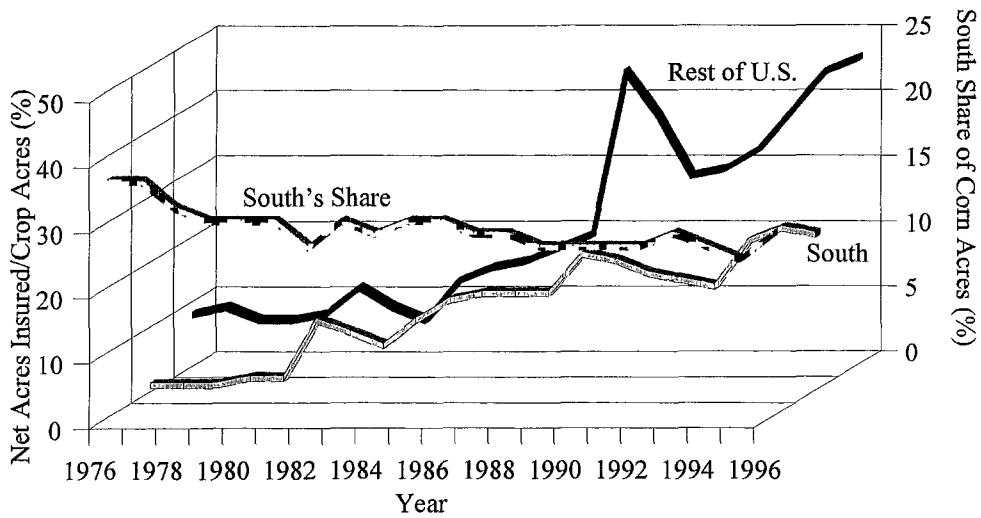


Figure 8. Corn participation (net acres insured/planted acres) for the South vs. rest of U.S., 1976-96

ums associated with CAT policies provides another indication of differences in the South. In the South, 28% of the 1997 premium was associated with CAT policies. In the rest of the U.S., 15% of the total premium was accounted for by CAT. Similarly, over one-half of all insured acres in the South are in CAT, while less than one-third of the acres insured in the rest of the United States are CAT policies.

Major problems with actuarial performance are equally concentrated in a few state-crop combinations. Texas is by far the dominant state in an examination of excess losses (indemnities minus total premium). Of the \$2.9 billion dollars of excess loss incurred from 1981-96, Texas accounted for \$827 million, or nearly one-third of the total. Texas cotton has been a continual challenge, with \$477 million in excess losses. Seven of the top 11 states for excess losses were in the South over this period. Georgia accounted for \$285 million and Louisiana had \$172 million in excess losses. Peanuts in Georgia accounted for \$221 million in excess losses. Excess losses for tobacco in North Carolina totaled \$129 million. Soybeans in Louisiana, Mississippi, and Arkansas each accounted for over \$100 million, and Texas wheat was also over \$100 million.

A major problem in the 1980s was southern soybeans. In Louisiana, Arkansas, and

Mississippi, crop insurance payments were made on well over half of the acres insured. This is a very disturbing statistic. Since the maximum protection available is 75% of the average yield, and only a fraction of the policies were sold at this level, it would take a very risky yield to result in payments more than even 25% of the time. Over a long period, it should be statistically impossible to receive payments on over half of the acres insured.

Spurlock et al. recently completed a study using the USDA Risk Management Agency's Mississippi cotton and soybean APH records for 1986-95. While these data are nonrandom, they represent growers who purchase insurance and have a long series of individual yield records. The farm-level data were used, in combination with county data, to develop farm-level probability density functions (PDFs). These PDFs were used to develop breakeven insurance rates for different coverage levels. Finally, the *subsidized* rates that would be charged to these farmers were compared to the breakeven rates from the PDFs. For nonirrigated cotton, the *subsidized* rate was over three and one-half times the breakeven rate. *Subsidized* nonirrigated soybean rates were two and one-half times the breakeven rate.

Spurlock et al. use these data to simulate

farm viability for a typical Mississippi farm. They conclude: "Buy-up APH coverage reduces expected ending net worth without greatly reducing the standard deviation of ending net worth. Purchasing the highest level of APH coverage actually increases the probability of eventual insolvency" (p. 16). These are not new findings (see Skees and Nutt for similar findings). Other researchers also have raised questions about the premium rates charged to farmers in the South.

Why Might the South Be Different?

Before the rapid expansion of crop insurance in the 1980s, crop insurance performance between the South and the rest of the U.S. was roughly the same: participation rates, actuarial performance, and premium rates were about equal. Thus, a critical question must be answered before we can move forward with effective revenue insurance in the South: Why is southern experience with crop insurance so different than in the rest of the U.S. since the early 1980s? Many researchers agree that there have been serious contract design problems (as discussed below) that allowed for program abuse in the South, prompting rate increases during the 1980s and early 1990s.

More specifically, individual-coverage APH policies were designed for the South using Agricultural Stabilization and Conservation Service (ASCS) program yields in establishing the guarantee for those producers who did not report their own yields. This procedure worked adequately for establishing individual coverage in the Midwest, but not in the South. This is because insurance is based on planted acres, while ASCS yields are more closely related to harvested acre yields. In the North, planted and harvested acres are nearly identical in most years. In the South, however, abandonment can be significant, and the use of ASCS yields resulted in an overinflated initial yield on frequently abandoned acreage. If coverage is initially overestimated, large losses—and higher premium rates—are likely. Cotton, in particular, has experienced many such examples where farmers were assigned yield guarantees at levels higher than warranted.

Soybeans in the South also suffered many contract design problems. Producers who did not report individual yields were assigned yields that were pegged to ASCS corn yields. Again, the yields offered to producers in the South were overinflated, while the same procedure applied to establishing soybean yields proved to be quite effective in the North.

In addition, the effects of irrigating soybeans in the South cannot be easily compared with the rest of the U.S.—another difference that was not recognized in the early years of the APH program. Specifically, southern growers could receive discounted rates for "irrigated" soybeans based on principles from the Midwest. Growers also were allowed to prove yields on a few acres and then apply those proven yields to new and, at times, more marginal acres. The South is simply not as homogeneous as the Midwest. Thus, major differences in farms and land suitability demanded different rules for establishing insurable yields. These lessons were hard to learn. While improvements have been made to rectify these problems, the history of losses due to poor contract design is imbedded in existing rates.

The South has other unique features that have not been adequately considered as well. Insect and disease problems are more prevalent in the South. Although farmers can address insect and disease problems, it is nearly impossible to anticipate how they will respond. In effect, providing insurance against insects and diseases largely insures management, which invites both adverse selection and moral hazard. It is impossible to insure management. Yet, to offer effective insurance in the South, one must consider the extra cost associated with trying to fight insects and diseases. This situation may require a totally different policy than the present APH policy. These issues relate not only to APH insurance, but to revenue insurance in the South as well.

Ideas for the Future

Although the current revenue insurance programs have gained much attention recently, other programs are also under investigation

that may be attractive to producers in the South. Currently, the USDA's Risk Management Agency is working on a revenue product that would make payments to producers based on their whole-farm income as reported on tax forms (more specifically, the Schedule F). Such an idea may be particularly attractive to those who produce a wide variety of crops and livestock. However, considerable care must be taken to design a policy that cannot be abused.

The income stabilization account idea is also tied to whole-farm income as reflected in income tax forms, and has been in place in Canada in the form of the Net Income Stabilization Account concept since 1991. Under this concept, each participating farmer would have an interest-earning income stabilization account. Farmers would be allowed to contribute a portion of their eligible net farm income in good years and draw from this fund in bad years. The Canadian government provides matching funds up to a specified level, and a premium on interest rates.

The American Farm Bureau and others have expressed an interest in this type of program in the past year, and some farmers have raised issues regarding changes in tax policy that could also provide income-averaging benefits over time. While the program is attractive in that it is based on whole-farm income and does not favor any one crop or enterprise, problems in implementing NISA are significant. How does one monitor changes in farm income? What checks and balances are in place to prevent fraud? Who would be qualified for the program? And will cash accounting still be allowed for filing taxes?

Finally, other strategies are emerging from the private sector. Risk sharing can take many forms. Contractual arrangements with input or output firms and growers can and will have features that mimic insurance. Commodities that were once homogeneous are increasingly differentiated with genetics. Firms supplying genetically superior seed are finding new ways of guaranteeing growers income. Input suppliers are investigating weather event policies to give growers the comfort to try their products. Agribusinesses who purchase raw products are increasingly aware of the importance

of giving growers opportunities to forward price products. Combinations of contractual arrangements, forward pricing, and traditional crop insurance may prove superior to government revenue insurance for some commodities in the South.

Conclusions

Revenue insurance has the potential to provide farmers with greater protection against low revenues without increasing government costs and without changing average levels of farm income compared to the pre-1996 Farm Act system of price supports, target prices, and deficiency payments. Further, revenue insurance offers the possibility for combining existing price and yield guarantee programs into a single program that may be easier to administer and easier for farmers to use. As government transfers to U.S. agriculture are reduced further in the future, revenue insurance might serve to lessen the decline in the safety net provided for farmers' incomes.

At the same time, revenue insurance raises new questions about equitable treatment of growers across crops and regions. At the present, revenue insurance in the South is at a disadvantage relative to the Midwest. Currently, the revenue insurance program that is most widely available is CRC, which bases premiums on APH rates. Prior bad history associated with the APH program in the South, and the resulting high premium rates, make CRC less attractive to southern growers. Until these issues are addressed, or until programs such as IP that do not use APH rates are more widely available in the South, it is likely that the southern region will be disadvantaged relative to the Midwest. Nonetheless, no matter what revenue insurance policies are tried in the South, both the government and the private sector are well advised to be cautious and to recognize the differences in the South. Learning from the crop insurance experience is essential before new revenue insurance products developed with the Midwest in mind are tried in the South.

Despite these challenges, however, the underlying relationships between prices and

yields, as well as inherent levels of yield variability, suggest that revenue insurance could be an attractive prospect in the South. Recent research has examined the effectiveness of various risk-management alternatives, including revenue insurance, in reducing revenue risk in various locations, including representative areas in the South. These results indicate that producers who purchase revenue insurance in areas of the South having relatively high yield variability, and where the price-yield correlation is relatively weak, should realize substantially reduced income risk.

References

- Babcock, B.A., and D. Hennessy. "Input Demand Under Yield and Revenue Insurance." *Amer. J. Agr. Econ.* 78(May 1996):416-27.
- Cleveland, B. Senior Vice-President, American Agrisurance, Inc., Council Bluffs IA. Personal communication, January 1998.
- Glauber, J.W., and M.J. Miranda. "1996 Price Stabilization, Revenue Stabilization, and the Natural Hedge." Unpub. Manu., Office of the Chief Economist, USDA, Washington DC, and Dept. of Agr. Econ., Ohio State Univ., 30 October 1996. (30 pp.)
- Harwood, J., D. Heifner, K. Coble, and J. Perry. "Strategies for a New Risk Environment." *Agr. Outlook*, no. 234(October 1996):24-30.
- Heifner, R. "Price Analysis for Determining Revenue Insurance Indemnities and Premiums." Report to the Risk Management Agency, USDA/Economic Research Service, Washington DC, November 1996.
- Heifner, R., and K. Coble. "The Effects on Farmers' Risks of Combining Forward Pricing with Crop or Revenue Insurance." Work. Pap., USDA/Economic Research Service, Washington DC, Fall 1977.
- Lee, H., J. Harwood, and A. Somwaru. "Implications of Disaster Assistance Reform for Non-Insured Crops." *Amer. J. Agr. Econ.* 79(May 1997):419-29.
- Miranda, M.J. "Area Yield Insurance Reconsidered." *Amer. J. Agr. Econ.* 73(May 1991):233-42.
- Organization for Economic Cooperation and Development. "Impact of Selected Agricultural Policy Instruments on International Price Variability." Work. Pap., OECD, Paris, 11 December 1997a.
- . "Price Variability in Cereal Markets and Risk Management Strategies for Market Participants." Work. Pap., OECD, Paris, 15 September 1997b.
- Skees, J.R., J.R. Black, and B.J. Barnett. "Designing and Rating an Area Yield Crop Insurance Contract." *Amer. J. Agr. Econ.* 79(May 1997):430-38.
- Skees, J.R., and P.J. Nutt. "The Cost of Purchasing Crop Insurance: Examining the Sensitivity of Farm Financial Risk." *Agr. Fin. Rev.* 48(1988):37-47.
- Spurlock, S.R., B.J. Barnett, S. Dhar, O. Isengildina, S. Meerungruang, G. Mumma, and O. Murova. "Evaluating Crop and Revenue Insurance Purchase Decisions in the Mid-South." Paper presented at the annual meetings of the Southern Agricultural Economics Association, Little Rock AR, 31 January-3 February 1998.
- U.S. General Accounting Office. "Performance Comparisons: ASCS and FCIC." GAO Internal Rep., Washington DC, 1993.

