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An Analysis of Whole Farm Revenue Safety Net Options in Agriculture

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James W. Richardson
Edward G. Smith
Ronald D. Knutson



Agricultural and Food Policy Center
Department of Agricultural Economics
Texas Agricultural Experiment Station
Texas Agricultural Extension Service
Texas A&M University

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College Station, Texas 77843-2124
Telephone: (979) 845-5913
Fax: (979) 845-3140
Web Site: <http://www.afpc.tamu.edu/>

Executive Summary

An Analysis of Whole Farm Revenue Safety Net Options in Agriculture

Despite many years of experience, the federal government continues to seek a farm program that holds the potential for providing a politically acceptable safety net for farmers. This study demonstrates that, with the 2002 Farm Bill, AMTA, and marketing loan provisions continuing, a whole farm revenue safety net has the potential for simplifying existing farm programs, while enhancing the financial position of US farmers. There remains the need for further analysis of the impacts of the options analyzed on supply response by farmers.

The study compared the performance of three revenue options with current CAT, MPCI, and no insurance options. Due to the problems of establishing actuarially sound rates in the absence of actual experience with the revenue options analyzed, it was assumed that the government provided all of the six options with a 100 percent subsidy. The three whole farm revenue options included:

- Total farm revenue as reported on the Internal Revenue Service (IRS) income tax schedule for farmers (Schedule F/Form 4835), hereinafter referred to as the Schedule F option.
- Total farm revenue as reported on the Internal Revenue Service (IRS) income tax schedule for farmers (Schedule F/Form 4835) minus all government payments, hereinafter referred to as the Schedule F minus payments option.
- Total farm revenue based on national average prices received by farmers rather than actual individual farmer prices, hereinafter referred to as the calculated revenue option.

Each of these three options was analyzed with payments to farmers being triggered at 70 and 90 percent of the five-year Olympic average level of farm revenue. The eight representative farms analyzed were typical of a Iowa corn/soybean farm; a Texas North Plains irrigated corn, sorghum and wheat farm; a North Dakota wheat, barley and sunflower farm; a southwest Kansas wheat farm; a Texas South Plains cotton farm; a Texas Rolling Plains cotton farm; a Texas Coastal Bend cotton farm; and an Indiana corn/hog farm.

Results

Based on the authors' subjective ranking, it was concluded that the calculated revenue option offered farmers the greatest flexibility, with the lowest risk of moral hazard, and did not require farmers to surrender their tax return.

Based on the quantitative analysis, it was concluded that higher levels of revenue protection were preferred. This should not be surprising inasmuch as the government was assumed to be absorbing the cost. Questions remain as to whether the 90 percent option would be preferred if farmers had to bear the extra cost. Farmer preferences were split between the schedule F option and the calculated revenue option. Farmers located in higher risk areas tended to prefer the

schedule F option, while those located in lower risk areas preferred the calculated revenue option.

The probability of the government having to pay an indemnity was found to be less for a whole farm than for CAT or MCPI 65/100 coverage. This result was expected because whole farm revenue in a multi-enterprise operation would logically be expected to be less variable than individually insured crop yields. Thus a higher level of protection can be provided with the same level of government expenditures using whole farm revenue as the safety net compared with conventional coverage. However, guaranteeing whole farm revenue at the 70 or 90 percent of the five-year Olympic average was demonstrated to be more costly than either CAT or MPC I 65/100 coverage.

An Analysis of Whole Farm Revenue Safety Net Options in Agriculture

Historically, the US government has implemented a wide range of policy initiatives to support rural areas, farm production, and the agricultural economy. Since 1933, its efforts to provide an income safety net to American agriculture have focused primarily on farm programs to support individual commodity production. Over the past 70 years, most domestic farm programs were designed to stabilize agricultural prices and income through such mechanisms as supply management, counter-cyclical income transfers (through the target price and marketing loan), nonrecourse loans to enhance orderly marketing and stabilize (set minimum) prices and decoupled federal crop subsidies.

In the preface to the CBO's 1983 report titled *Farm Revenue Insurance: An Alternative Risk-Management Option for Crop Farmers* by Director Alice M. Rivlin substantial insight into past farm policies and future economic conditions was shown when she stated:

In the years ahead, crop farmers are likely to face greater financial risks and long-term income instability than in the past. This is because their dependence on export markets exposes them to other nations' farm, economic, trade and foreign policies, and to the vagaries of global weather. Although the public has long shared some of the risks in crop farming through commodity programs and federal crop insurance, commodity policy has undergone a long-term transition that has made farmers more dependent on markets. Moreover, beyond their expense, current programs are not very effective in reducing the income instability caused by international events and conditions.

Given the current farm structure, it is clear that farmers and ranchers need a sustainable opportunity to mitigate downside risks facing their agricultural operations due to adverse markets as well as adverse weather conditions and disease—all of which are beyond their control. From a sharp drop in the price of a single commodity to a localized weather disaster that destroys the farm production in a growing season, America's farmers continue to face the hazard of serious

business interruption even when they practice the best possible production and risk management practices.

The farm safety net debate is focused on a way to provide an assured counter-cyclical policy to support farmers through the difficult periods of low market prices, low production, or a combination of the two.

Farmers have a wide range of risks to manage that are not transferable through traditional private insurance. To assist them in managing those risks through a viable, sustainable Federal safety net for production agriculture, two questions need to be answered:

- What level of federal safety net should be provided through taxpayer dollars and what should be provided by the private sector?
- What type of safety net can provide the desired economic support to the farm sector in the most cost effective manner?

The objective of this study was to analyze the potential for providing a whole farm revenue safety net as a means of reducing farmers' production and market risk in the context of the current set of farm programs.

Experience with Crop Insurance

Insurance has been one of several tools utilized by the Federal government to manage crop production risk. Insurance currently is being provided by private insurers through the Risk Management Agency (RMA) with premiums subsidized by the Federal Government.

RMA asserts that USDA subsidies to private insurers are effectively providing the required public/private partnership to manage the risk. The programs being offered have low premium costs relative to the indemnification offered and, in the case of the Crop Revenue Coverage Program (CRC), effective coverage of real, individual farm price/yield loss. However, neither

CRC nor Revenue Assurance (RA) protect long-term revenue. Instead, these products are price change coverages. The past several years have demonstrated that the Federal government has been required to pay substantial ad hoc supplemental safety net payments in addition to the insurance premium subsidies. No existing product provides protection against situations in which market prices may be below long-term equilibrium. Such long-term protection is what some are seeking.

To protect farm incomes from natural disasters or weather-induced yield risks, Federal involvement in crop insurance began in 1938 with the Crop Insurance Act (CBO). An American Enterprise Institute (AEI) monograph on *The Economics of Crop Insurance and Disaster Aid* (Goodwin and Smith) detailed the four periods of multi-peril federal crop insurance programs since its inception. The following summarizes these periods, but truncates the fourth period in 1988 and adds two additional periods:

- *Period One 1938-44:* The initial program covering a limited number of commodities was discontinued in 1944 after large subsidies were required to cover net losses.
- *Period Two 1945-73:* The program was expanded to cover additional crops, although in 1947 severe geographic restrictions were placed on the scope of Federal Crop Insurance Corporation (FCIC) operations.
- *Period Three 1974-80:* The 1973 Farm Bill established a mandatory federal disaster relief program, which operated in competition with the federal insurance program. Disaster payments substantially reduced farmers' incentives to purchase crop insurance, unless they were forced to do so.
- *Period Four 1981-87:* With the enactment of the 1980 Federal Crop Insurance Act, the mandatory federal disaster program was rendered inapplicable whenever federal crop

insurance was available for the crop in the county. Therefore, ad hoc disaster payments were made in 1981, 1982 and 1983. The 1980 Act was expanded to cover many more commodities in additional regions of the country. Private insurance companies and agents were allowed to sell and service crop insurance.

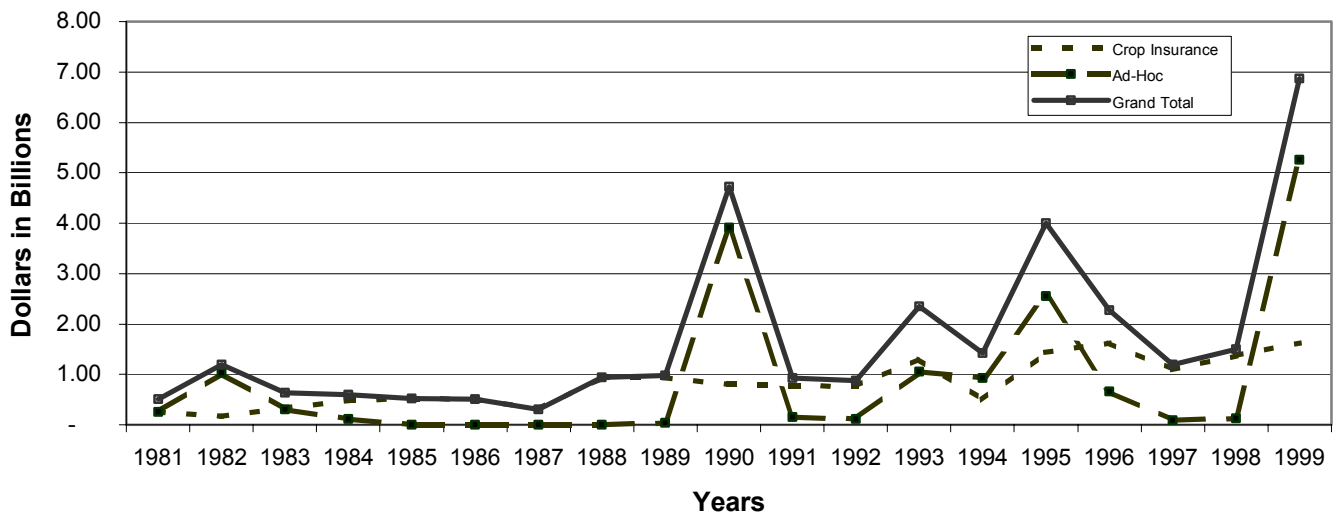
- *Period Five 1988-95:* Weather adversities in 1989, forced Congress to abandon the policy of no disaster payments. Therefore, periodically throughout this period ad hoc disaster payments were instituted as politically necessary. Disaster payment recipients were required to obtain crop insurance in the subsequent year.

- *Period Six 1996-present:* Pilot revenue insurance programs were mandated.

Deteriorating price conditions combined with weather adversities resulted in combined weather and price-related disaster payments. Subsidies were substantially increased to encourage the purchase of crop insurance.

Figure 1 summarizes the history of experience with the government cost of crop insurance and disaster payments since 1981. It clearly reflects the magnitude of instability associated with farm production and, in recent years, farm prices.

Figure 1. Government cost of crop insurance and disaster assistance, 1981-99.¹



¹ Source: RMA and FSA

1999 includes \$3.011 billion in market loss assistance payments.

In 1998 and 1999, a total of \$15.1 billion in ad hoc emergency disaster assistance and market loss payments were appropriated to indemnify farmers experiencing the effects of adverse weather and declining prices. In 1998, not only did Congress approve \$2.5 billion for crop and forage losses, but they also added another \$3.5 billion for crop revenue losses, in addition to other payments for commodities such as dairy. The total \$6.1 billion ad hoc disaster package of 1998 was an all-time record for disaster programs. But in 1999, ad hoc disaster relief legislation totaling \$9 billion was enacted and signed into law. However, from 1980-1997, ad hoc disaster programs averaged only \$0.6 billion.

The unprecedented ad hoc disaster packages of 1998 and 1999 were considered necessary to support farm revenues, despite the Catastrophic Crop Insurance (CAT) and the proliferation of crop-specific insurance policies. The primary cause of the ad hoc packages was low prices that adversely affect farm income. Most of the outlays authorized under those packages were

allocated to income support, not compensation for crop damage. Existing insurance products do not compensate for prices that are below the long-run levels. The result, in 2000, was legislation to again reform and restructure crop insurance.

To deal with low income issues the farm program "safety net" includes fixed AMTA payments, farm commodity price supports, loan deficiency payments (LDPs) and/or marketing loan gains (MLGs), and income tax averaging. A range of Federal crop insurance programs exist to deal with issues of crop failure and more recently to facilitate hedging in the event of crop failure. Congress has reacted to market adversities with ad hoc government assistance. It can be debated whether this system is more complicated than past programs having acreage bases and various types of production controls. Despite all these numerous program initiatives, there is an increasing call from American agriculture for a sustainable counter-cyclical safety net.

These demands for a viable, sustainable farm safety net have grown due to recent global market developments, and the realization that neither the FAIR Act nor existing crop insurance programs could provide sufficient counter-cyclical support for American agriculture. It is this history, more than anything else that has resulted in the need to review the safety net concept as applied to agriculture.

Experience with Revenue Insurance

Since the early 1980s, there has been considerable interest in alternative forms of revenue insurance. Serious debate and studies on the issue of farm income or revenue insurance began in earnest during the first half of the 1980s when American agriculture was suffering from a farm recession and when the cost of farm programs was rising. At the same time, there was interest in examining whether private or government revenue insurance could replace farm programs as the safety net for agriculture.

Under 1981 Farm Bill provisions, Congress directed the Secretary of Agriculture to establish a Task Force to investigate the concept of income insurance in order to determine its feasibility as an acceptable alternative or substitute for existing farm/commodity programs. The result was the formation of the Farm Income Protection Task Force, which issued its report in 1983.

In its letter of transmittal, this Task Force concluded that due to outstanding questions about "...Its design, feasibility and implementation..." a substitution of farm income insurance for all Federal agricultural support programs was not advisable at that time. However, a detailed reading of the Task Force's work provides very important insights into the political and economic considerations that drive and shape farm programs and policies.

The Task Force report specifically considered the conditions and terms for insurance covering gross farm production income:

Gross farm production income is defined here as the quantity of agricultural commodities produced multiplied by the prices of these respective commodities. Gross farm production income, however, is not identical to gross farm income since it does not include income from such sources as:

Custom work; land, pasture, or building rentals/changes in the value of inventories; and other types of gross farm income...

It is the sense of this Task Force that any income insurance program for US agriculture should be based upon measures of gross farm production income as broadly defined above.

The Task Force further recommended that any income insurance program be expanded to cover all crops and livestock. This would expand coverage to fruits, vegetables, nuts, hay, pasture, dairy, and livestock.

With regard to the moral hazard issue, the Task Force concluded:

An income insurance program should be structured such that it does not unduly increase risk taking in production practices. That is, the plan should not provide protection to any farmer from adverse production and/or price changes resulting from imprudent or careless production or marketing decisions. Consequently, whenever gross receipts are below insured levels, it would be necessary to distinguish losses attributable to uncontrollable forces from those resulting from adoption of risky or imprudent production practices.

Importantly, the Task Force emphasized that:

The most direct means of discouraging excessive risk taking in production is to confine the level of income protection to genuine disaster relief. Income protection sufficiently high to allow coverage of all costs, including profits, would tend to subsidize the adoption of risky practices.

A 1984 paper by Offutt, an analyst for The Farm Income Protection Insurance Program

Task Force, provided further insight into its deliberations and recommendations by stating:

The escalating cost of these traditional programs and concern over their apparently diminishing effectiveness has sparked interest in the income insurance idea...

Proponents of income insurance have argued that it may be used to accomplish the same objectives addressed by existing programs but at a lower cost to the Federal Government and with reduced government involvement in the day-to-day decisions of commodity producers...

Under income insurance, a producer would receive payment if income fell below the stipulated insured level, whether the shortfall were caused by low prices, low yields, or both. In contrast, current support programs provide protection against declines in yield (through crop insurance) and price (through the loan rate and deficiency payments) without explicit coordination to meet an income goal. Thus, income insurance would directly address the issue of farm income maintenance and stabilization...

Income insurance differs from the programs currently available to commodity producers in that income is explicitly identified as the target variable.

Since this analysis nearly two decades ago, the Government's approach or policies have emphasized more income protection without explicitly setting income as the target variable.

Several revenue insurance options developed by the private sector and USDA in recent years also contain variations of gross farm revenue coverage. Such programs operating today include:

- Income Protection (IP) protects producers against reductions in gross income when a crop's price and/or yield deviates from early-season national price expectations.
- Crop Revenue Coverage (CRC) is similar to IP except that it also contains replacement cost coverage to protect the farmer against losses when market prices rise between planting and harvest. It also contains a high price coverage option.
- Adjusted Gross Revenue Pilot (AGR) Insurance Program insures the revenue of the entire farm, rather than an individual crop, by guaranteeing a percentage of average gross farm revenue, including a small amount of livestock revenue. This program has been available in certain counties in Florida, Maine, Massachusetts, Michigan, and New Hampshire.
- Revenue Assurance (RA) is also similar to IP except that RA also offers multi-crop coverage in a single dollar guarantee, the only product on the market that does so. This differs from AGR in three respects: (1) the guarantee is formed with an actual production history for each crop, (2) the planting period prices are determined on current markets rather than relying on historical tax records that report gross revenue, and (3) various combinations of crops can be insured under the multi-crop coverage while others may be insured or not at all. With the high price option, RA is virtually identical to CRC for individual crop coverage with the exception of the multiple crop unit offered under RA.
- Group Risk Income Protection (GRIP) adds a price protection feature to the AGR by making payments to participating farmers when county revenue falls below a trigger

revenue level that is selected by the farmer. The program was initially available in 1999 only on corn and soybeans in Indiana, Illinois and Iowa where GRP has been available.

These current revenue or income-directed insurance programs are the direct result of continuing demand for government efforts to build a sustainable safety net for the farm sector.

Purpose of Study

The overall objective of this study was to analyze the potential for providing a whole farm revenue safety net as a means of reducing production and market risk facing farmers in the context of the current set of farm programs. Specific study objectives included:

1. To define a set of whole farm revenue safety net options.
2. To develop a set of representative crop and livestock farms including a realistic history of experience with yield and price variability.
3. To evaluate the whole farm revenue safety net options on a whole farm basis against scenarios that reflect the current set of farm price, income and risk reduction programs.
4. To draw conclusions regarding the economic impacts of whole farm revenue safety net policies.

Options for Analysis

By prior agreement with the Risk Management Agency, a total of nine different safety net program alternatives were evaluated to determine their economic impacts on selected representative farms. The alternative levels of coverage were analyzed for three different safety net options. In addition, CAT, MPCl and a No Insurance option were analyzed as reference points.

- The A series whole farm safety net option defined whole farm revenue as the total farm revenue reported on the Internal Revenue Service (IRS) income tax schedule for farmers (Schedule F or Form 4835). This definition of whole farm revenue includes all farm receipts, such as market crop and livestock receipts, AMTA (or PFC) payments, loan deficiency payments, disaster payments, CRP payments, and income earned from other farming activities. The two A series options analyzed assumed trigger levels of 70 and 90 percent of the 5-year Olympic average for total farm revenue. The Olympic average is defined as the simple average of the 3 years remaining after the highest and lowest values are excluded from the five years. For example, under the 70 percent option, when annual total revenue fell below the trigger level of 70 percent the farm received a safety net payment equal to the difference between realized total revenue and 70 percent of the 5-year Olympic average of total revenue.
- The B series whole farm safety net option defined whole farm revenue as the total farm revenue reported on Schedule F and Form 4835 minus government farm program payments of all kinds. Thus the total revenue for the B series was the revenue earned from the market for both crop and livestock enterprises. The two B series options analyzed assumed trigger levels of 70 and 90 percent of the 5-year Olympic average for market revenue. For example, under the 90 percent option, when annual market revenue fell below the trigger level of 90 percent, the farm received a safety net payment equal to the difference between realized market revenue and 90 percent of the 5-year Olympic average of market revenue. It is important to note that while the B series excludes the impact of other forms of government payments from the determination of the program payment for this safety net option, the farms still receive these other government payments.

- The C series whole farm safety net option defined whole farm revenue as the total value of production based on farm level yields and national average prices rather than on the price received on an individual farm. A 5-year Olympic average of this total value of production was calculated based on the farm's certified planted acres for each crop in the current year, 5 years of actual or county average assigned yield for each crop, and 5 years of historical national prices. Similar calculations were performed for livestock farms to arrive at a 5-year Olympic average of total value of production. The two C series options analyzed assumed trigger levels of 70 and 90 percent of the 5-year Olympic average for total value of production. For example, under the 90 percent option, when total value of production fell below the trigger level, the farm received a safety net payment equal to the difference between realized total value of production and 90 percent of the 5-year Olympic average. This option does not require reliance on IRS tax returns, but does require planted acreage and yield data.
- The MPCCI 65/100 program was included as a point of comparison. The level of coverage analyzed for the MPCCI option was the 65 percent yield election at the 100 percent price election or 65/100. Because premiums were not available for the A, B, and C options, MPCCI was analyzed under the assumption that the product had a 100 percent subsidy, i.e., MPCCI was free.
- The CAT program was included to provide another reference point. The CAT premium was assumed to be set to zero for the analysis.
- The No Insurance scenario assumed that the farm had no safety net program, not even hail insurance. This option becomes the baseline option for comparing the benefits to be

derived for the alternative whole farm safety net programs, as well as for free MPCl and CAT.

Trigger Levels

The 70 and 90 percent trigger levels were set based on a preliminary analysis of whole farm safety net options where trigger levels in the range of 50 to 95 percent were analyzed. At trigger levels less than 70 percent (50, 55, 60, and 65 percent), whole farm revenue safety net programs provided virtually no safety net for the majority of the representative farms analyzed. The reason for this result is that total revenue is less variable than yields, so the low trigger levels used for MPCl (50, 55, 60, 65 percent) did not provide an adequate safety net for revenue.

At the upper end, a 90 percent trigger was used because, based on AFPC experience, it was concluded that higher trigger levels would foster increased production, inflate land values and distort economic incentives to maintain competitiveness.

Definitions of Guaranteed Revenue

The A series option used a total revenue definition for guaranteed income. This value was easily determined from the Schedule F or Form 4835 income tax form. However, it included three kinds of risk: production risk on yield, price risk from marketing, and farm program risk. There is also the risk that the farmer would change the enterprise mix, which in this analysis was held constant. Farm program payments have reduced revenue risk by providing payments in low income years and letting the market determine revenue in good years. The counter-cyclical nature of disaster payments and market loss adjustment payments (double AMTAs) over the past three years provide evidence of this phenomena. Insuring such a revenue series could be double jeopardy for the Congress, increasing government payments is costly but it reduces safety net payments, and cutting government payments saves money but increases safety net payments.

The B series option removed the government payments for income support and disaster assistance from the guaranteed revenue determination. The resulting guaranteed revenue is impacted only by production and marketing risk and does not depend on the income support payment policies of Congress. In practice, the values for this definition of guaranteed revenue can be obtained from the income tax schedule for a farm. However, this insurable revenue, like Series A, does not adjust for short-run changes in crop mix or farm size. A farmer would not likely receive safety net payments for several years if the farm added acres or switched to higher-valued crops. Similarly, a farmer could virtually guarantee a safety net payment by reducing acreage and/or switching to lower-valued crops.

The C series option used a definition for guaranteed revenue that excluded disaster and income support payments, and values current production at national prices. Total guaranteed revenue was calculated based on 5 years of actual yields (or county average yields if actuals are not available for each crop), multiplied by the national average price for each of the 5 preceding years and the current year's acres planted to the crop. Once revenue was determined under this process for each of the previous 5 years using the current certified acreage, then an Olympic average was determined. In the case of livestock the previous 5 years number of head sold or pounds of milk sold per animal unit constituted the average production values. The current year's intended production was based on current herd size, so year-to-year adjustments in number of sows or cows were accounted for in the calculation of guaranteed value of production. The appropriate years' national price was used for valuing historical and current crop and livestock production, to avoid the problem of different regional prices, different marketing periods, and different marketing abilities of farmers.

An additional adjustment to the C series guaranteed value of production was made to correct for the adverse effect that catastrophic losses can have on the 5-year Olympic guaranteed revenue average. Farms who experienced a loss received a positive adjustment to the 5-year Olympic average value of production equal to the safety net payment. This adjustment compensated for the downside effect that an occasional catastrophic loss had on the general long-term guaranteed value of production.

Methodology

A whole farm simulation model (FLIPSIM) developed by AFPC scientists and used for farm level policy analyses was modified and used for the present study. The economic impacts of alternative whole farm safety net options on the viability of farms were simulated by the model. Representative farms were simulated for different production regions to determine the likely impacts of a whole farm safety net program on actual farming situations in major production regions. Inferences as to the effects of the different safety net options were made, based on the simulated effects on selected economic indicators for farm viability.

Monte Carlo simulation was used because a large database of historical revenues for farmers was not available for this analysis. The Monte Carlo procedure used to simulate the representative farms insured that each safety net option was simulated for the same stochastic prices and yield variability for each farm in a region. The stochastic prices and yields for the crops and livestock enterprises were simulated using multivariate empirical distributions estimated from 10 years of local yields and national prices.

The simulation period was for 2001-2005 and mean annual prices for these years came from the January 2000 FAPRI Baseline, which assumes continuation of the 1996 Farm Bill. Each farm was simulated for 100 iterations over the 2001-2005 planning horizon. The results of

simulating the safety net options were reported for 2005 to avoid biasing the result by reporting a transition year in a program that used a 5-year Olympic average.

For each study area 100 representative farms were simulated to estimate the information necessary to define the distribution of economic payoffs/benefits for the alternative safety net options. Because each farm was simulated 100 times for 2005, the simulated data base consisted of 10,000 observations for each safety net option. The resulting database provided the necessary information to present the results in a probabilistic context. Probability distributions for the safety net payments and annual net cash farms income are presented in the results section. Additionally, summary statistics were calculated for key output variables such as probability of the farm having a cash flow deficit and the probability of the farm losing real net worth.

Representative Farms

The AFPC maintains representative crop and livestock farms in major production regions across the country. These representative farms were developed from producer panel interviews and have been validated with the farmers on the panels. The farms were developed to represent commercial scale farms in the selected production regions. Panel members were selected based on their farm size, crops or livestock produced, history of participating in extension programs, and recognition as local leaders in their communities. Local county agricultural extension agents were asked to identify panel members and to facilitate the panel farm meetings. A list of facilitators and farmers who helped develop the representative farms for this study is included as Appendix II to this report.

By prior agreement with the Risk Management Agency, representative farms in North Dakota, Iowa, Kansas, Texas and Indiana were included in the study. Each farm was representative of large-scale commercial farms in their area and was operated as a family farm.

The representative farms produced the typical crops and in the normal crop mix for the region and used the typical production practices for these crops. The representative farms were updated during 1999-2000. The characteristics for the representative farms used for the study are summarized in Table 1.

To account for differences in crop yield risk across farmers the representative farm structure was replicated to make 100 farms, each having different yield histories and thus yield risk for the crops. Actual 10-year yield histories of producers who purchased MPCl in the counties where the representative farms are from were the source of different yield histories. Actual yield histories for farms purchasing crop insurance were obtained from RMA. Each representative farm was setup to have multiple units (multiple fields of each crop) and the 10-year yield histories for actual producers' fields were used to populate the yield histories for the different units on the 100 farms derived from each representative farm.

The representative dairy farm structure simulated for this study was derived by making 100 representative dairy farms, each with a different milk production history. Ten-year yield histories for annual milk production per cow on dairy farms in Texas were obtained from DHIA milk production records. The milk production histories were used to populate the yield histories for the 100 replications of the typical 825 cow Central Texas dairy farm.

The representative 1200 sow hog farm structure in Indiana was derived by making 100 representative farms with different production histories. Crop yield histories for corn, soybeans and wheat were treated like the other crops farms. The annual number of pigs sold per sow was made stochastic using the actual variability in hog production for farms in the Indiana and Illinois area that was reported by Boland.

Table 1. Characteristics of Representative Farms Used for the Analysis.

Farm	Acres Owned	Acres Leased	Cash Receipts in 1999 (\$1,000)	Crops and Acreage	
IAG2400	380	2,020	598	Corn	1,200
				Soybeans	1,200
TXNP6700	1,100	5,600	1,606	Corn	3,350
				Sorghum	335
				Wheat	1,675
NDW4850	1,701	3,149	679	Wheat	2,585
				Barley	470
				Soybeans	705
				Sunflower	940
KSSW3180	330	2,850	331	Wheat	2,258
				Sorghum	625
				Corn	56
				Soybeans	87
				Hay	127
TXSP3697	1,627	2,070	1,067	Cotton	2,665
				Peanuts	285
TXRP2500	400	2,100	233	Cotton	1,240
				Wheat	825
TXCD825	460	0	3,335	Cows	825
				Silage	430
				Haylage	20
INH1200	1,038	2,162	2,740	Sows	1,200
				Corn	2,066
				Soybeans	1,034
				Wheat	100

Source: Richardson, J.W., et. al. Representative Farms Economic Outlook for the January 2000
FAPRI/AFPC Baseline, TAMU, Department of Agricultural Economics, AFPC WP 00-1, January 2000.

Criteria for Program Comparison

In this study each of the program alternatives was measured based on the following criteria:

- Simplicity
- Flexibility
- Program integrity
- Revenue risk
- Ability to protect net cash farm income
- Reduce probability of a cash flow deficit
- Reduce probability of a loss in real net worth
- Government cost

The first three criteria are subjective/qualitative and based on the authors' experience. The last five are quantitative and based on the results of the simulation analysis.

Subjective/Qualitative Criteria Comparison

Simplicity

The program should be easily understood and implemented without undue paperwork for the participating producers. In Table 2 the authors assess the simplicity of each of the five general program alternatives on a rank-order basis with 1 being the simplest to understand and administer and 5 being the most complicated. Obviously from an understanding and paperwork perspective, the No Insurance alternative is the simplest due to a lack of government involvement. CAT/MPCI were judged to be the most complex with the whole farm revenue options falling between.

Table 2. Subjective/Qualitative Rank Ordering of Program Alternative Relative to Simplicity, Flexibility and Integrity.

	A Series	B Series	C Series	Insurance CAT-MPCI 65/100	No Insurance
Simplicity	3	2	4	5	1
Flexibility	5	4	2	3	1
Program Integrity	4	5	2	3	1

* 1 is highest, 5 is lowest based on the specific criteria.

The B series would be rated second due to the participating entity only having to provide the market sales information included on Schedule F of their tax return if they are an operator and/or Form 4835 if renting land on a share basis.

The A series would be rated only slightly more complicated than the B series due to having to report the inclusion of all government payments and insurance indemnities. This information, however, is also readily available in the Schedule F and Form 4835, respectively.

The C series is more complicated than either the A or B series because the participating entity would be required to certify planted acreage and yields by farming practice before guaranteed payment levels could be calculated. Since market price would be determined at the national level, as the average for the preceding five years, price reporting would not be a burden on farmers.

The free CAT and MPCI 65/100 insurance alternatives would have basically the same complication as the C series in that the entities would have to certify planting yields and farming practices. However, since the price guarantee has to be made prior to the insurance decision, these alternatives are rated slightly more complex than the C series.

Flexibility

One of the most universally accepted provisions of the 1996 FAIR Act was the inclusion of production flexibility for the major crop producers (with the exception of fruits and vegetables

where there is no production history). The No Insurance alternative would be the most flexible since there would be no more restriction on the planting decisions of producing entities than currently exist in order to receive AMTA contract payments.

The C series would be the second most flexible alternative since income guarantees would be based on certified acreage, yields and an observed national price (Table 2). Planting of fruits and vegetables would not be any more constrained under this option than currently exists in order to receive AMTA contract payments.

The free CAT and MPCCI 65/100 insurance alternatives would rank third in flexibility provisions primarily because of the projected price used in establishing the guarantee. The price relationship among projected prices for each commodity would influence planting decisions.

The B series would be fourth because flexibility decisions could be distorted. That is, since a program payment would be triggered based only on the market value of commodities produced there would be a disincentive for switching from lower value to higher value production. Conversely, there may be an incentive for switching from high value to lower value production. In addition, the adoption of yield enhancing technologies could be slowed.

The A series possesses all the same flexibility problems as the B series with the addition of the impact government programs have on the calculation of guaranteed revenue. Government program payments paid in the base calculation years will impact the types of crops grown and exacerbate the incentive to move from higher value to lower value production or vice-versa.

Program Integrity

This rating is based on the author's view of how easy it would be to monitor the program to lessen any moral hazard or fraud. Obviously, since the No Insurance would only have current

AMTA and marketing loan provisions it would be the least likely to suffer from moral hazard or fraud.

The C series would be second in the ability to maintain program integrity. Since acreage and yield are certified for the whole farm, there is less chance of selective farming practices or moving production that may exist in the insurance program, which pays, based on farming units.

The CAT/MPCI insurance programs would be ranked third overall followed by the A series. The biggest problem with the A series is that many entities use cash accounting in reporting Schedule F and Form 4835 revenue. Therefore, there would be substantial opportunity to adjust revenue from year to year. In addition, operations can change from higher value to lower value production, which could trigger program payments in the near term. The use of actual market receipts also offers the potential for trading and program manipulation.

The B series has all the problems associated with the A series. It is ranked last because there is no government monitoring at all since the guarantee level of revenue is based on market receipts and does not include other forms of government payments. Thus, the B series would have the least ability to exercise oversight.

Quantitative Criteria Comparison

Each program alternative was simulated based on the price and yield risk for the eight selected farms maintained by AFPC. A representative sample of yield risk was applied to the basic farm structure to generate 100 farm operations with unique historical yield risk. Each of these 100 farms in each area was then simulated for 100 iterations based on observed risk. Therefore, for each of the eight farms the following quantitative results are based on 10,000 observations (100 farms x 100 iterations) reflecting the range of yield and price risk in the region.

Since all the revenue triggers for the A, B and C series included guarantees calculated on a 5-year Olympic moving average, this report focuses on the results for 2005. This year was selected because its revenue guarantees are calculated over the period 2000-2004 dropping the high and low revenue. The results, therefore, are not impacted by ad hoc emergency disaster and market loss assistance that may come into play for transition years. AMTA and marketing loan provisions in the 1996 farm bill were assumed to be continued at 2002 levels for the period 2003-2005.

Revenue Risk

The level of risk associated with total receipts is detailed in Table 3. The A 90 scenario refers to A series whole farm revenue insurance at the 90 percent level (Table 3).

As one would expect, the total receipts were found to be the lowest and the variability, as measured by the coefficient of variation (CV), the highest for the No Insurance scenario.

Comparing the CV across farms under the No Insurance scenario gives an indication of the relative risk faced by farms representative of each region and crop mix. The greatest revenue risk is faced by the Texas Rolling Plains (TXRP) farm with a CV of 37 percent. Dryland cotton and wheat production are highly risky ventures in the region.

The Texas Southern Plains (TXSP) cotton and peanut farm and the Kansas South Central Wheat (KSSW) farm face the next greatest risk with CVs of 26 percent. The TXSP farm has approximately 15 percent of its acreage under irrigation and produces 285 acres of peanuts both of which reduces its risk relative to its TXRP counterpart.

The North Dakota wheat/feedgrains/oilseed farm (NDG) has a CV of 21 percent while the Iowa feedgrain/oilseed farm IAG and the Texas Northern Plains farm feedgrain/wheat (TXNP)

Table 3. Revenue Risk for Selected Representative Farms Under Alternative Whole Farm Safety Net Options.

Farms	Safety Net and Insurance Scenarios								
	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
IAG2400									
Mean (\$1,000)	639.33	651.55	641.66	658.78	641.65	660.79	639.34	643.28	638.38
CV (%)	17.74	15.05	17.23	15.13	17.23	14.84	17.93	17.26	18.06
TXNP6700									
Mean (\$1,000)	1816.89	1844.06	1828.98	1882.89	1866.89	1931.79	1827.97	1848.97	1815.35
CV (%)	18.29	16.54	17.57	15.41	16.22	14.12	17.93	17.19	18.46
NDW4850									
Mean (\$1,000)	779.02	795.36	779.71	795.70	780.04	798.66	783.94	799.57	778.61
CV (%)	20.42	18.11	20.30	18.30	20.24	17.93	20.16	19.32	20.51
KSSW3180									
Mean (\$1,000)	412.14	429.92	413.99	429.79	413.37	430.46	413.93	426.54	408.50
CV (%)	24.74	20.39	24.33	21.17	24.51	20.96	24.86	22.35	26.16
TXSP3697									
Mean (\$1,000)	972.98	1017.81	970.92	998.07	970.89	999.52	979.62	1011.21	963.88
CV (%)	24.16	19.22	24.52	21.55	24.51	21.28	24.00	21.25	25.62
TXRP2500									
Mean (\$1,000)	240.16	256.12	239.20	248.27	239.93	251.30	240.70	251.33	234.72
CV (%)	33.96	27.35	34.48	30.54	34.07	29.28	35.01	31.60	37.30
TXCD825									
Mean (\$1,000)	3813.89	3826.64	3813.87	3823.25	3813.80	3816.51			3813.78
CV (%)	8.48	7.97	8.48	8.08	8.49	8.33			8.49
INH1200									
Mean (\$1,000)	3021.78	3112.45	3021.84	3097.24	3021.57	3088.45			3017.96
CV (%)	13.41	10.60	13.41	11.01	13.44	11.48			13.66

Due to the large number of replications all differences in the values should be assumed to be real. Therefore, it is possible to rank the options by differences in the means and the coefficients of variation.

farms' CV was found to be 18 percent. The TXNP farm is irrigated while the IAG farm has the natural resource and climate base reflective of the Corn Belt.

The two livestock operations have the least revenue variability. The Indiana hog/feedgrain/oilseed operation (INH) experiences a CV of 14 percent. The Central Texas dairy (TXCD) has the lowest CV of 8 percent. Therefore, based on the origination and differential in risk exposure it is unlikely that one risk reduction scenario will dominate all others across all regions.

If the alternative scenarios were evaluated based on average total receipts, the NDW farm would prefer MPC1 65/100, the IAG, KSSW, and TXNP would prefer C series at the 90 percent level (C90), while the TXRP, TXSP, TXCD and INH would prefer A90. If the lowest CV for receipts is the performance variable, then the NDW, IAG and TXNP farms would prefer C90 while the five other farms would prefer A90.

Therefore, of the comparable options, the A90 and C90 scenarios appear to be the most frequently preferred if total revenue and reduction of revenue risk were the target criteria. Both the A series and C series have revenue adjustment mechanisms that stabilize the downside risk associated with an Olympic moving average guarantee.

Ability to Protect Net Cash Farm Income

Because of commercial farms' heavy dependence on purchased inputs, a small change in total receipts can have major impacts on a farm's net margin. Therefore, the ability to generate positive net cash farm income (NCI) was chosen as a performance criteria. Net cash farm income is defined as total receipts including government payments, less all cash expenses. It does not include capital replacement, family living withdrawals, principal payment on loans or accrued taxes. For a farm to survive, NCI must provide for these revenue changes as well as for the future growth of the farm. The average NCI and the probability of a negative NCI is included for each of the eight farming operations across scenarios in Table 4.

If the highest average NCI is the goal of these safety net programs, the C90 scenario would be preferred by the IAG, KSSW, and TXNP operations. A90 would be preferred by TXSP, TXRP, INH and TXCD. MPC1 65/100 is preferred by the NDW farm.

If preventing a negative NCI were the criteria, then the A90 scenario would be preferred by NDW (0%), IAG (0.3%), KSSW (0%), TXSP (0%), TXRP (23.3%), TXCD (0%), and INH (8.3%). The C90 scenario would be preferred by TXNP (1.2%).

The A90 and C90 options appear to be preferred if maintaining the highest level of NCI and preventing a negative NCI are the program goals.

Reducing the Probability of Cash Flow Deficit

The NCI criteria discussed in the previous section excluded capital replacement, family living withdrawals, principal payments and taxes. If the NCI is not sufficient to cover these financial demands, then a cash flow deficit will occur. This deficit would have to be covered by the owners of the operations personal wealth or be refinanced as carryover debt by an external lender. Therefore, a performance measure for the proposed safety net alternatives could be the probability of a cash flow deficit (Table 5).

The C90 scenario would be preferred by IAG (26.7%), KSSW (39.6%), and TXNP (31.4%). A90 would be preferred by TXSP (20.3%), TXRP (84.1%), TXCD (1.2%) and INH (53.8%). MPC1 65/100 is preferred by the NDW (45.7%) farm although it is closely followed by C90 (47.3%). Therefore, the A90 and C90 scenarios appear the most dominate when it comes to preventing a cash flow deficit on the operations analyzed.

Table 4. Ability to Protect Net Cash Income for Selected Representative Farms Under Alternative Safety Net Options.

Farms	Safety Net and Insurance Scenarios								
	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
IAG2400									
Mean (\$1,000)	188.48	204.57	191.43	211.81	191.54	214.52	188.34	193.55	187.12
Prob. Neg. NCI (%)	5.07	0.31	3.57	1.24	3.55	0.85	5.39	3.95	5.62
TXNP6700									
Mean (\$1,000)	385.24	417.18	399.32	459.54	406.89	479.21	397.94	422.13	383.37
Prob. Neg. NCI (%)	8.78	3.05	6.90	2.31	3.24	1.16	6.92	4.14	9.01
NDW4850									
Mean (\$1,000)	241.45	261.22	242.20	260.45	242.45	263.34	246.51	263.64	240.62
Prob. Neg. NCI (%)	2.39	0.00	2.13	0.55	1.97	0.33	1.96	0.74	2.69
KSSW3180									
Mean (\$1,000)	185.20	202.99	187.06	202.86	186.44	203.53	187.00	199.60	181.57
Prob. Neg. NCI (%)	0.22	0.00	0.44	0.01	0.49	0.00	0.93	0.00	2.53
TXSP3697									
Mean (\$1,000)	266.42	318.59	262.78	292.88	263.15	295.93	273.35	310.11	254.85
Prob. Neg. NCI (%)	5.18	0.01	6.28	2.08	6.24	1.07	5.07	0.90	8.99
TXRP2500									
Mean (\$1,000)	25.99	46.13	23.94	34.46	25.16	38.99	26.66	40.93	18.73
Prob. Neg. NCI (%)	41.25	23.33	41.98	33.85	41.50	30.39	40.21	30.63	44.29
TXCD825									
Mean (\$1,000)	987.80	1000.83	987.78	997.40	987.73	991.04			987.69
Prob. Neg. NCI (%)	0.08	0.00	0.08	0.03	0.10	0.03			0.10
INH1200									
Mean (\$1,000)	302.10	399.91	302.15	383.14	311.33	384.15			298.11
Prob. Neg. NCI (%)	19.60	8.32	19.67	9.77	19.03	11.49			20.38

Table 5. Probability of Cash Flow Deficits for Selected Representative Farms Under Alternative Safety Net Options.

Farms	Safety Net and Insurance Scenarios								
	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
IAG2400									
Prob. Deficits (%)	38.18	33.38	36.49	28.43	36.47	26.73	37.95	36.67	38.33
TXNP6700									
Prob. Deficits (%)	49.09	46.1	47.74	35.76	47.83	31.42	47.88	45.2	49.2
NDW4850									
Prob. Deficits (%)	50.89	49.19	50.87	47.66	50.86	47.25	49.99	45.7	50.98
KSSW3180									
Prob. Deficits (%)	48.91	42.69	48.21	40	48.35	39.55	47.69	43.54	48.75
TXSP3697									
Prob. Deficits (%)	38.7	20.25	38.9	30.24	38.9	29.57	36.48	27.08	40.22
TXRP2500									
Prob. Deficits (%)	88.57	84.13	89.13	88.02	88.9	86.42	87.86	84.34	89.47
TXCD825									
Prob. Deficits (%)	1.83	1.16	1.83	1.28	1.85	1.81	1.5	1.11	1.84
INH1200									
Prob. Deficits (%)	65.73	53.81	65.64	56.67	62.08	60.74	54.32	46.87	65.85

Reducing Probability of a Loss in Real Net Worth

Protecting a farm's real wealth is a common performance variable. The information in Table 6 provides the probability that the operators can maintain real net worth when comparing the balance sheet equity on December 31, 2005 against beginning net worth in 2000, after adjusting for inflation over the period.

The A90 scenario is preferred by TXSP (2.2%), IAG (9.4%), NDW (19.6%), and TXRP (65.7%). The INH (10.1%) and TXNP (9.6%) operators prefer the C90 scenario. The TXCD and the KSSW are basically indifferent to the alternative scenarios as the probability of losing net worth is less than 1.3 percent under all scenarios.

Government Cost

In the previous sections the overwhelming favorites by almost any measure are the A90 and C90 alternatives. However, the cost of the program is also an important factor in any decision to adopt a specific safety net policy. The average government cost as well the average cost as a percentage of the observed maximum and the probability of a program payment is indicated in Table 7.

Average government cost is greatest under the A90 alternative for the TXSP (\$53,934), TXRP (\$21,394), TXCD (\$12,861), and INH (\$94,494). To put these values in perspective the TXSP farm received \$62,600 in emergency market loss assistance payments in 2000. The TXRP received \$28,440 in 2000, while the TXCD received \$3,442 and the INH received \$69,890. Thus, for the crop farms the average 2005 government payment from these programs were from 75-85 percent of the emergency payments paid in 2000. Since dairy and hogs do not receive substantial direct government support, the payments under the A90 series are significantly higher.

Table 6. Probability of Loss in Real Net Worth for Selected Representative Farms Under Alternative Safety Net Options.

Farms	Safety Net and Insurance Scenarios								
	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
IAG2400									
Prob. Loss RNW (%)	21.23	9.35	18.47	10.67	18.13	9.37	21.71	17.84	22.54
TXNP6700									
Prob. Loss RNW (%)	26.22	19.52	23.68	14.13	20.14	9.56	23.59	18.37	26.52
NDW4850									
Prob. Loss RNW (%)	36.12	19.56	35.88	25.21	36.17	25.21	34.77	26.37	37.48
KSSW3180									
Prob. Loss RNW (%)	1.10	1.00	1.18	1.00	1.15	1.00	1.07	1.00	1.29
TXSP3697									
Prob. Loss RNW (%)	11.99	2.18	14.69	8.98	14.05	6.34	11.41	3.98	16.59
TXRP2500									
Prob. Loss RNW (%)	75.89	65.66	77.46	73.53	76.84	70.80	75.39	66.57	79.47
TXCD825									
Prob. Loss RNW (%)	1.00	1.00	1.00	1.00	1.00	1.00			1.00
INH1200									
Prob. Loss RNW (%)	15.16	10.22	15.14	10.90	14.57	10.14			15.32

Table 7. Government Costs for Selected Representative Farms Under Alternative Safety Net Options.

Farms	Safety Net and Insurance Scenarios								
	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
IAG2400									
Mean Cost (\$1,000)	0.94	13.17	3.28	20.39	3.27	22.40	0.95	4.90	0.00
Mean Cost/Observed Max	0.90	5.65	2.28	8.00	2.26	8.63	4.76	6.78	0.00
Prob. Indemnity (%)	3.09	20.26	7.52	25.83	7.52	28.26	26.37	47.15	0.00
TXNP6700									
Mean Cost (\$1,000)	1.54	28.71	13.63	67.54	51.53	116.43	12.63	33.62	0.00
Mean Cost/Observed Max	0.28	3.06	2.37	7.18	5.19	8.63	6.78	7.21	0.00
Prob. Indemnity (%)	1.52	19.40	10.33	26.50	75.50	80.30	64.63	73.28	0.00
NDW4850									
Mean Cost (\$1,000)	0.41	16.74	1.10	17.08	1.43	20.04	5.32	20.96	0.00
Mean Cost/Observed Max	0.26	4.99	0.64	5.15	0.86	6.19	9.62	13.68	0.00
Prob. Indemnity (%)	1.15	24.80	2.85	22.76	3.74	27.53	57.92	76.18	0.00
KSSW3180									
Mean Cost (\$1,000)	3.63	21.42	5.49	21.29	4.87	21.96	5.43	18.03	0.00
Mean Cost/Observed Max	2.00	7.02	2.52	6.69	2.35	6.98	9.00	11.78	0.00
Prob. Indemnity (%)	8.86	34.03	12.34	32.59	11.37	33.90	76.19	86.20	0.00
TXSP3697									
Mean Cost (\$1,000)	9.09	53.93	7.04	34.19	7.01	35.64	15.74	47.32	0.00
Mean Cost/Observed Max	2.18	8.04	1.64	5.18	1.77	5.79	12.89	14.96	0.00
Prob. Indemnity (%)	9.81	34.33	7.82	24.82	8.36	27.06	59.99	71.59	0.00
TXRP2500									
Mean Cost (\$1,000)	5.44	21.39	4.47	13.54	5.20	16.58	5.98	16.60	0.00
Mean Cost/Observed Max	3.51	9.41	2.83	6.00	3.18	7.08	17.82	20.05	0.00
Prob. Indemnity (%)	18.16	41.93	16.09	33.02	17.44	35.98	89.23	95.44	0.00
TXCD825									
Mean Cost (\$1,000)	0.11	12.86	0.09	9.47	0.03	2.73			0.00
Mean Cost/Observed Max	0.02	0.97	0.02	0.73	0.01	0.26			0.00
Prob. Indemnity (%)	0.06	6.80	0.06	4.79	0.01	1.49			0.00
INH1200									
Mean Cost (\$1,000)	3.82	94.49	3.89	79.29	3.61	70.50			0.00
Mean Cost/Observed Max	0.43	5.62	0.45	4.95	0.36	3.88			0.00
Prob. Indemnity (%)	2.13	31.63	2.20	31.37	1.78	22.38			0.00

The highest expenditure observed over the 10,000 iterations for each farm under the A90 scenario was \$670,560 for the TXSP operations, \$227,480 for TXRP, \$1,331,950 for TXCD and \$1,682,580 for INH. These high levels of government costs were observed with a probability of 1 percent (see Appendix III Tables 5-8).

Average government cost for the C90 alternative is highest for TXNP (\$116,434), IAG (\$22,402), KSSW (\$21,957) and NDW (\$20,044). These same farms received the following amounts of emergency government assistance in 2000; TXNP (\$123,040), IAG (\$38,110), KSSW (\$42,430) and NDW (\$52,310). Therefore, the average payment under C90 in 2005 relative to emergency payments in 2000, range from 38 percent for the NDW farm to 95 percent for the TXNP operation.

The highest expenditure observed over the 10,000 iterations under the C90 scenario was \$1,348,490 for the TXNP operation, \$259,540 for IAG, \$314,420 for KSSW and \$324,090 for NDW (see Appendix III Tables 1-4).

Summary and Conclusions

Seeking a simplified alternative to current farm programs while protecting the financial integrity of agriculture has proven to be a difficult task, not only in the United States but around the world. Accomplishing this task through the use of a whole farm safety net appears to hold potential.

This study analyzed the farm level impacts of three whole farm revenue options at two levels of coverage (70 percent and 90 percent of the 5-year Olympic average). Comparisons were provided with CAT coverage and MPC1 60/100 coverage and no insurance. The representative farms utilized for analytical purposes were developed by Agricultural and Food Policy Center scientists at Texas A&M University with the assistance of panels of actual producers. Actual yield experiences were obtained from the Risk Management Agency/USDA. Price variability was based on actual market experience.

Whole Farm Options Analyzed

The whole farm revenue options analyzed included:

- Total farm revenue as reported on IRS Schedule F or Form 4835.
- Total farm revenue as reported on IRS Schedule F or Form 4835 minus government payments of all kinds.
- Total value of production based on national average prices, the farm's certified planted acres for each crop, and actual or county average yields.

Subjective Ranking

A subjective/qualitative rank ordering indicated that no insurance was the simplest, provided farmers the most flexibility and, obviously, had no problems with program integrity. However, it also provided no insurance safety net. Among the other options, the whole farm revenue option based on average prices with certified planted acres and yields offered the greatest flexibility with the lowest risk of moral hazard (greatest program integrity). It also did not require that the farmers surrender their income tax returns.

Quantitative Impacts

Quantitatively, the options were evaluated on the basis of their impacts on farm revenue risk, protection of net cash income, probability of a cash flow deficit and the probability of a loss in real net worth with the following summary results:

- The higher 90 percent level of whole farm revenue was preferred over all other options.
- Two whole farm revenue options that were preferred included:
 - Total farm revenue as reported on the relevant IRS farm tax form.
 - Total farm revenue calculated from farms' actual acres, actual yields and national historical average prices.

The results suggested that higher risk farms tended to prefer the use of income defined by income tax schedules while lower risk areas preferred a calculated total farm revenue.

In summary, government costs were generally higher under the whole farm revenue options than under the CAT and MPCCI options, but the probability of a payment was generally lower. Higher levels of protection obviously generated higher government costs, however, the level of government costs can be adjusted by changing the percentage of whole farm revenue coverage. The probability that the government would have to pay an indemnity under whole farm revenue coverage is generally lower than under either CAT or MPCCI 60/100. This is because farm revenue would be expected to be less variable than yields or prices for an individual crop or livestock enterprise.

Unanswered Questions

This study clearly indicates that a whole farm revenue safety net has potential for simplifying existing farm programs while protecting the financial integrity of US agriculture. While this study represents the most complete analysis of whole farm revenue coverage, there are two main issues that need to be addressed:

- This study assumed that the level of aggregate production and prices remains the same.

Except for the no insurance option, these assumptions appeared reasonable. Yet they need to be analyzed.

- This study assumed, except for the no insurance option, that current farm programs remain in place. A study now needs to be completed of the potential for removing certain elements of the existing program under various levels and types of whole farm revenue coverage.

With such an analysis, the tradeoffs on government costs, maintaining the financial integrity of agriculture and program simplicity will become more apparent.

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APPENDIX I

Description of Crop Insurance Programs

Descriptions of Crop Insurance Programs

The Risk Management Agency (RMA) is presently underwriting four crop insurance programs under the authority of the Federal Crop Insurance Corporation (FCIC): Catastrophic (CAT), Multi-Peril (MPCI), Income Protection (IP) and Crop Revenue Coverage (CRC). RMA has also approved a Crop Revenue Assurance Program (RA).

The FCIC Program:

The FCIC program is currently a public/private partnership that provides American farmers with protection against crop losses. The Federal government subsidizes the farmers' premiums and pays all the delivery and loss adjustment costs.

Private companies, through a nationwide network of over 26,000 local insurance agents, sell, service and adjust claims on the policies, and at times, share in the risk of certain losses.

Program Scope:

Policies are available on some 85 different crops that account for 80 percent of the value of national crop production. In 1998, there were 1.24 million policies with premiums on the books. Farmers paid \$931 million out of their own pockets for \$27.9 billion in liability protection. In 1998, the Government's contribution for premiums was \$946 million. The total (farmer paid + Government subsidies) was \$1.877 billion. The Government pays approximately 50.4 percent of the farmers' crop insurance premium. \$1,676 billion was paid for crop losses. Approximately \$452 million went to reimburse the private insurance companies for administrative and delivery expenses, including agent commissions.

The following is a brief description of crop insurance products that are now offered by FCIC.

CAT Program:

The CAT program is a catastrophic crop disaster program that is designed to be a safety net for those producers who do not have other crop insurance coverage. This program was designed to

take the place of the ad-hoc disaster programs of the past. Producers paid a \$60 per crop fee for indemnity coverage on production losses over 50%. To calculate the indemnity payment -- production losses of greater than 50% are multiplied by 55% of the crop market price. Eighty-five crops are eligible for this coverage.

Ad-hoc disaster programs used the same criteria with two important exemptions -- the disaster program was capped at \$100,000 and only producers with incomes of under \$2 million were eligible to participate. CAT has no cap or income eligibility requirements are required.

CAT was designed to be offered for all insured crops and created a Non-Insured Assistance program to cover the crops that were not insurable. This program was designed to take the place of the ad-hoc disaster programs and create a safety net for producers. It is available only from private insurance providers.

RMA has allowed private companies in 14 states to sell CAT policies. In 1998, all states will be added to this list. CAT insurance is 100% funded by the USDA.

FCIC pays an allowance to providers for loss adjustment expenses, but pays no sales commissions for CAT. Providers may elect to pass a portion of the allowance to agents to encourage sales of CAT.

Multi-Peril Crop Insurance (MPCI):

MPCI is the basic insurance plan that USDA has offered for decades. The premium covers only the loss of production. A producer, generally, can choose to cover production losses from 50% to 75% of the crop's production average set for the producer by FCIC. However, coverage up to 85 percent is authorized and is offered for several crops. The indemnity is paid in cash and calculated by multiplying the insured production loss by a standard price for the crop that is set by the FCIC.

Income Protection Program:

The 1994 Crop Insurance Reform Act mandated that the FCIC develop a program that would take into account the market fluctuations as well as production losses of the crop. In 1996, FCIC introduced IP as a pilot program that would assure a fixed price for the commodity as well as up to 75 percent of the average production. However, IP can be offered at levels up to 85 percent, but FCIC has not chosen to do so. FCIC sets a price on the commodity about 2 weeks prior to closing date (which varies from January 31 to March 15 for spring planted crops), and multiplies the price times 60 percent to 75 percent of the average production.

Crop Revenue Coverage Program (CRC):

CRC was first offered in 1996 on a pilot basis by a private crop insurance company called American Agrinsurance (AmA). AmA found that farmers would pay more for a program that truly covered their risk. CRC covers production up to 85 percent and also guarantees a realistic price for the production loss. The production loss is calculated as the guaranteed yield minus the actual yield per acre. Prices loss is determined using commodity futures for various delivery months on several different exchanges depending on the crop and state. CRC now covers 100 percent of the price discovered on the commodity exchange.

APPENDIX II

List of Panel Farm Cooperators

Indiana

Facilitator

Mr. Steve Nichols - Carroll County Agricultural Extension Agent

Panel Participants

Mr. Rick Brown
Mr. Brad Burton
Mr. Richard Skiles
Mr. Allen Stout

Mr. Levi Huffman
Mr. Fred Wise
Mr. Jim Yost

Iowa

Facilitators

Mr. Jim Patton - Webster County Extension Agent

Panel Participants

Mr. Phil Naeve
Mr. Larry Lynch
Mr. Don Sandell
Mr. Bob Anderson
Mr. Larry Lane
Mr. Perry Black
Mr. Britt Shelton

Mr. Loren Wuebker
Mr. Dennis Ammen
Mr. John Ricke
Mr. Virgil Gordon
Mr. Merv Berg
Mr. and Mrs. Jim Carver

Texas - Northern High Plains

Facilitators

Mr. Robert Harris - Moore County Agricultural Extension Agent
Dr. Steve Amosson - Extension Economist - Management, Texas A&M University

Panel Participants

Mr. Ellis Moore
Mr. Tom Moore
Mr. Brent Clark
Mr. Kelly Hays
Mr. Jerry Trussell

Mr. Kelly Williams
Mr. Kerri Cartwright
Mr. Rick May
Mr. Clyde Tims

North Dakota

Facilitators

Mr. Shawn Vachal - Barnes County Extension Agent
Mr. Dwight Aakre - Extension Associate - Farm Management, North Dakota State University

Panel Participants

Mr. Mike Clemens
Mr. Arvid Winkler
Mr. Wade Bruns
Mr. Jack Formo
Mr. Jim Broten

Mr. Ray Haugen
Mr. Anthony Thilmony
Mr. Leland Guscette
Mr. Greg Shanenko
Mr. Charles Triebold

South Central Kansas

Facilitators

Mr. Fred Delano-Farm Management Program, Kansas State University
Mr. Gerald Le Valley - Sumner County Agricultural Extension Agent
Mr. Brad Goehring - Sedgwick County Extension Agent
Mr. Steve Westfahl - Sedgwick County Extension Agent

Panel Participants

Mr. Robert White	Mr. Joe Allen
Mr. Nick Steffen	Mr. Tim Turek
Mr. Donald Applegate	Mr. David Messenger
Mr. Robert Headley	Mr. Rae Reusser
Mr. Dennis Pettigrew	Mr. Jim Stuhlsatz

Texas - Southern High Plains

Facilitators

Mr. John Farris - Dawson County Agricultural Extension Agent
Dr. Jackie Smith - Extension Economist - Management, Texas A&M University

Panel Participants

Mr. Milton Schneider	Mr. Mark Boardman
Mr. Dave Nix	Mr. Lonny Ferguson
Mr. Glen Phipps	Mr. Todd Gregory
Mr. Donald Vogler	Mr. Thomas Holder
Mr. Kent Nix	Mr. Brad Boyd
Mr. Mark Furlow	Mr. Jerry Chapman

Texas - Rolling Plains

Facilitators

Mr. Todd Vineyard - Ellis County Agricultural Extension Agent
Mr. Stan Bevers - Extension Economist - Management, Texas A&M University

Panel Participants

Mr. Ronnie Richmond	Mr. Ronnie Riddle
Mr. Dennis Olson	Mr. Ferdie Walker

Texas - Central

Facilitator

Mr. Joe Pope - Erath County Agricultural Extension Agent

Panel Participants

Mr. Lane Jones	Mr. Lonnie Hammonds
Mr. Leonard Moncrief	Mr. Jack Parks
Mr. Jake Van Vliet	Mr. Owen Sieperda

APPENDIX III

**Summary of Simulation Results for
Selected Representative Farms**

Appendix III Table 1. Summary of Alternative Farm Safety Net Options for IAG2400

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	0.94	13.17	3.28	20.39	3.27	22.40	0.95	4.90	0.00
Std Dev	6.79	34.68	14.91	44.56	14.93	45.83	2.23	8.93	0.00
Coef Var (%)	720.71	263.40	454.88	218.49	456.73	204.57	234.81	182.21	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	105.26	233.20	143.93	254.96	144.45	259.54	19.99	72.31	0.00
Mean/Theoretical Max (%)	0.90	5.65	2.28	8.00	2.26	8.63	4.76	6.78	0.00
P(Indemnity) (%)	3.09	20.26	7.52	25.83	7.52	28.26	26.37	47.15	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0
CDF @ 70% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
CDF @ 75% (%)	0.0	0.0	0.0	4.4	0.0	17.8	0.3	5.9	0.0
CDF @ 80% (%)	0.0	1.0	0.0	31.9	0.0	44.0	1.0	8.6	0.0
CDF @ 85% (%)	0.0	24.1	0.0	58.3	0.0	65.8	2.1	12.8	0.0
CDF @ 90% (%)	0.0	54.8	0.0	84.2	0.0	89.1	4.3	16.3	0.0
CDF @ 95% (%)	0.0	97.5	22.5	128.9	22.3	131.2	6.2	24.6	0.0
CDF @ 99% (%)	35.9	162.9	87.2	193.3	87.4	194.2	9.7	41.0	0.0
Total Receipts (\$1,000)									
Mean	639.33	651.55	641.66	658.78	641.65	660.79	639.34	643.28	638.38
Std Dev	113.38	98.06	110.59	99.65	110.57	98.09	114.62	111.01	115.31
Coef Var (%)	17.74	15.05	17.23	15.13	17.23	14.84	17.93	17.26	18.06
Minimum	359.01	443.78	333.01	391.25	333.01	405.82	326.60	365.16	322.63
Maximum	1067.20	1067.20	1067.20	1067.20	1067.20	1067.20	1067.20	1067.20	1067.20
Net Cash Income (\$1,000)									
Mean	188.48	204.57	191.43	211.81	191.54	214.52	188.34	193.55	187.12
Std Dev	114.06	99.23	111.17	100.72	111.12	98.98	115.29	111.62	116.00
Minimum	-102.56	-26.05	-129.16	-56.23	-129.16	-48.75	-126.42	-93.62	-129.16
Maximum	620.57	620.57	620.57	620.57	620.57	620.57	620.57	620.67	620.57
CDF @ Minimum	-102.56	-26.05	-129.16	-56.23	-129.16	-48.75	-126.42	-93.62	-129.16
CDF @ 1% (%)	-55.17	27.44	-47.66	-6.43	-46.92	3.95	-71.30	-44.29	-77.07
CDF @ 5% (%)	-0.82	66.13	16.38	55.25	16.75	59.17	-4.97	12.57	-8.81
CDF @ 10% (%)	43.47	87.67	51.37	89.70	51.58	94.30	44.11	54.77	41.73
CDF @ 15% (%)	75.56	108.35	79.80	114.63	79.96	118.22	76.32	84.12	74.87
CDF @ 20% (%)	99.45	123.09	102.36	131.09	102.52	135.19	100.41	105.60	98.93
CDF @ 25% (%)	116.89	134.72	121.21	142.97	121.32	146.78	117.26	122.29	116.16
CDF @ 30% (%)	131.61	144.57	135.54	154.36	135.60	158.93	131.70	135.01	130.90
CDF @ 35% (%)	142.71	154.84	146.35	166.47	146.56	170.37	142.88	146.57	142.11
CDF @ 40% (%)	154.89	164.74	158.28	179.06	158.39	182.97	155.04	158.42	154.37
CDF @ 45% (%)	167.07	175.94	169.10	191.11	169.02	194.75	167.26	170.72	166.41
CDF @ 50% (%)	180.66	187.36	181.80	204.52	181.95	207.76	181.15	183.97	180.33
CDF @ 55% (%)	194.42	200.72	195.38	220.00	195.50	221.99	194.92	198.00	193.78
CDF @ 60% (%)	210.66	217.00	211.22	235.08	211.27	236.49	211.08	214.13	210.27
CDF @ 65% (%)	227.22	234.49	227.83	248.43	227.97	249.88	227.22	229.96	226.72
CDF @ 70% (%)	243.54	248.92	244.03	260.33	244.09	261.25	243.73	246.54	243.05
CDF @ 75% (%)	261.31	265.99	261.55	274.32	261.55	275.19	261.76	264.84	260.93
CDF @ 80% (%)	281.51	285.11	281.54	291.82	281.76	292.09	282.10	285.19	280.91
CDF @ 85% (%)	305.98	309.26	306.19	310.61	306.28	310.98	306.95	310.34	305.77
CDF @ 90% (%)	338.29	341.40	338.65	340.64	338.69	341.01	338.99	341.54	338.04
CDF @ 95% (%)	380.87	383.65	381.43	384.26	381.43	384.77	381.12	383.14	380.87
CDF @ 99% (%)	483.87	486.21	484.09	486.36	484.40	486.36	484.14	485.38	483.87
CDF @ Maximum	620.57	620.57	620.57	620.57	620.57	620.57	620.57	620.67	620.57
Probability of Negative Net Cash Farm Income									
Mean	5.07	0.31	3.57	1.24	3.55	0.85	5.39	3.95	5.62
Probability of Cash Flow Deficit									
Mean	38.18	33.38	36.49	28.43	36.47	26.73	37.95	36.67	38.33
Probability of Losing Real Net Worth									
Mean	21.23	9.35	18.47	10.67	18.13	9.37	21.71	17.84	22.54

Appendix III Table 2. Summary of Alternative Farm Safety Net Options for TXNP6700

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	1.54	28.71	13.63	67.54	51.53	116.43	12.63	33.62	0.00
Std Dev	16.66	82.11	50.50	145.68	89.72	185.75	22.23	55.26	0.00
Coef Var (%)	1082.59	286.01	370.44	215.68	174.10	159.53	176.03	164.38	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	548.45	938.02	575.03	940.56	993.66	1348.49	186.18	466.55	0.00
Mean/Theoretical Max (%)	0.28	3.06	2.37	7.18	5.19	8.63	6.78	7.21	0.00
P(Indemnity) (%)	1.52	19.40	10.33	26.50	75.50	80.30	64.63	73.28	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.2	3.2	0.0	0.0	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	2.7	5.7	0.0	1.3	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	4.7	11.5	0.0	3.4	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	8.5	21.5	1.2	5.5	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	14.6	28.4	1.8	9.5	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	23.3	34.2	3.6	15.9	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	28.5	39.4	7.6	23.2	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	33.6	46.0	10.7	27.9	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	38.1	60.1	12.2	32.3	0.0
CDF @ 70% (%)	0.0	0.0	0.0	0.0	42.7	78.1	14.1	36.6	0.0
CDF @ 75% (%)	0.0	0.0	0.0	22.0	52.1	128.1	16.1	40.7	0.0
CDF @ 80% (%)	0.0	0.0	0.0	93.9	66.7	211.4	18.1	47.4	0.0
CDF @ 85% (%)	0.0	45.9	0.0	187.4	83.9	300.2	23.3	59.9	0.0
CDF @ 90% (%)	0.0	107.3	5.8	310.4	144.3	401.7	28.8	74.4	0.0
CDF @ 95% (%)	0.0	203.4	117.0	425.9	249.1	547.0	45.4	134.3	0.0
CDF @ 99% (%)	50.3	408.9	276.5	611.3	428.3	773.7	113.6	275.9	0.0
Total Receipts (\$1,000)									
Mean	1816.89	1844.06	1828.98	1882.89	1866.89	1931.79	1827.97	1848.97	1815.35
Std Dev	332.30	304.95	321.32	290.19	302.82	272.70	327.69	317.88	335.04
Coef Var (%)	18.29	16.54	17.57	15.41	16.22	14.12	17.93	17.19	18.46
Minimum	953.21	1200.09	953.21	995.52	1111.78	1184.68	960.97	1111.78	807.95
Maximum	3119.55	3119.55	3119.55	3119.55	3119.55	3119.55	3119.55	3119.55	3119.55
Net Cash Income (\$1,000)									
Mean	385.24	417.18	399.32	459.54	406.89	479.21	397.94	422.13	383.37
Std Dev	335.14	308.77	324.15	294.25	305.48	276.25	330.21	320.20	337.71
Minimum	-642.27	-350.88	-627.74	-489.32	-455.20	-287.89	-603.11	-441.11	-651.86
Maximum	1674.93	1690.96	1674.04	1686.62	1657.60	1664.93	1681.74	1692.43	1674.04
CDF @ Minimum	-642.27	-350.88	-627.74	-489.32	-455.20	-287.89	-603.11	-441.11	-651.86
CDF @ 1% (%)	-262.14	-95.03	-168.99	-88.25	-94.95	-25.95	-208.22	-125.27	-282.55
CDF @ 5% (%)	-60.12	37.90	-36.42	81.59	38.55	130.92	-34.89	14.63	-75.06
CDF @ 10% (%)	16.66	102.57	48.40	149.78	94.91	185.87	41.24	79.71	15.08
CDF @ 15% (%)	72.77	137.66	105.80	191.42	129.95	221.86	89.64	123.91	71.97
CDF @ 20% (%)	116.67	166.16	144.60	225.28	158.75	253.40	130.02	157.32	116.64
CDF @ 25% (%)	151.97	192.02	174.93	256.73	185.72	284.65	162.33	187.16	151.79
CDF @ 30% (%)	182.88	216.83	205.82	286.58	211.73	315.24	194.05	216.84	182.70
CDF @ 35% (%)	215.80	243.52	233.85	316.52	239.99	347.29	224.31	246.03	215.14
CDF @ 40% (%)	248.44	278.24	266.63	347.90	269.98	379.81	259.20	280.19	247.49
CDF @ 45% (%)	286.95	313.64	301.01	380.77	302.19	409.59	296.92	319.08	286.83
CDF @ 50% (%)	326.87	351.85	338.61	410.18	338.05	437.53	338.48	360.72	326.65
CDF @ 55% (%)	372.11	392.69	380.27	442.78	378.82	467.28	382.66	403.23	371.86
CDF @ 60% (%)	415.36	430.49	420.89	474.43	417.85	494.75	425.99	445.67	414.69
CDF @ 65% (%)	461.26	470.25	463.53	509.80	458.85	524.72	470.11	488.12	460.65
CDF @ 70% (%)	508.92	515.36	510.13	551.76	503.57	561.35	518.89	536.47	508.82
CDF @ 75% (%)	569.13	572.24	569.46	598.86	561.33	606.02	577.13	595.62	568.68
CDF @ 80% (%)	642.93	645.76	643.21	665.79	632.14	665.49	652.45	665.74	642.51
CDF @ 85% (%)	737.57	740.46	738.90	751.73	724.21	745.64	745.68	757.97	737.19
CDF @ 90% (%)	855.12	861.28	857.66	867.22	845.37	858.06	865.74	879.93	855.01
CDF @ 95% (%)	1047.83	1053.49	1050.76	1061.73	1037.49	1046.95	1055.13	1070.71	1047.26
CDF @ 99% (%)	1317.50	1318.87	1319.39	1328.43	1293.66	1298.71	1318.28	1328.62	1317.50
CDF @ Maximum	1674.93	1690.96	1674.04	1686.62	1657.60	1664.93	1681.74	1692.43	1674.04
Probability of Negative Net Cash Farm Income									
Mean	8.78	3.05	6.90	2.31	3.24	1.16	6.92	4.14	9.01
Probability of Cash Flow Deficit									
Mean	49.09	46.10	47.74	35.76	47.83	31.42	47.88	45.20	49.20
Probability of Losing Real Net Worth									
Mean	26.22	19.52	23.68	14.13	20.14	9.56	23.59	18.37	26.52

Appendix III Table 3. Summary of Alternative Farm Safety Net Options for NDW4850

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	0.41	16.74	1.10	17.08	1.43	20.04	5.32	20.96	0.00
Std Dev	5.00	39.24	8.52	41.77	9.43	42.98	7.76	23.78	0.00
Coef Var (%)	1222.71	234.35	773.88	244.48	659.10	214.44	145.68	113.43	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	155.30	335.63	173.15	331.58	165.81	324.09	55.36	153.25	0.00
Mean/Theoretical Max (%)	0.26	4.99	0.64	5.15	0.86	6.19	9.62	13.68	0.00
P(Indemnity) (%)	1.15	24.80	2.85	22.76	3.74	27.53	57.92	76.18	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	9.8	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.6	12.8	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.7	16.3	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	4.0	19.9	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	5.2	23.8	0.0
CDF @ 70% (%)	0.0	0.0	0.0	0.0	0.0	0.0	6.5	28.2	0.0
CDF @ 75% (%)	0.0	0.0	0.0	0.0	0.0	11.1	8.1	33.3	0.0
CDF @ 80% (%)	0.0	21.0	0.0	12.3	0.0	33.3	10.3	37.9	0.0
CDF @ 85% (%)	0.0	42.0	0.0	41.4	0.0	56.1	12.1	45.2	0.0
CDF @ 90% (%)	0.0	69.7	0.0	73.9	0.0	83.5	15.5	55.1	0.0
CDF @ 95% (%)	0.0	109.2	0.0	115.6	0.0	119.1	22.2	70.4	0.0
CDF @ 99% (%)	5.5	178.4	41.0	190.7	49.9	187.9	33.2	97.4	0.0
Total Receipts (\$1,000)									
Mean	779.02	795.36	779.71	795.70	780.04	798.66	783.94	799.57	778.61
Std Dev	159.09	144.08	158.25	145.65	157.91	143.18	158.07	154.49	159.73
Coef Var (%)	20.42	18.11	20.30	18.30	20.24	17.93	20.16	19.32	20.51
Minimum	413.62	562.71	403.36	476.49	391.72	491.45	392.67	456.97	365.05
Maximum	1571.70	1571.70	1571.70	1571.70	1571.70	1571.70	1571.70	1571.70	1571.70
Net Cash Income (\$1,000)									
Mean	241.45	261.22	242.20	260.45	242.45	263.34	246.51	263.64	240.62
Std Dev	160.55	145.07	159.73	147.06	159.44	144.62	159.60	155.82	161.33
Minimum	-146.95	11.66	-153.69	-81.91	-157.48	-57.71	-154.63	-115.73	-199.96
Maximum	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66
CDF @ Minimum	-146.95	11.66	-153.69	-81.91	-157.48	-57.71	-154.63	-115.73	-199.96
CDF @ 1% (%)	-30.00	51.34	-26.19	16.07	-24.25	33.87	-25.25	9.63	-42.05
CDF @ 5% (%)	26.81	84.93	31.41	71.91	32.38	82.10	33.05	58.56	24.15
CDF @ 10% (%)	62.18	107.90	65.21	103.44	66.54	111.98	68.39	88.53	59.84
CDF @ 15% (%)	85.59	125.86	87.81	125.19	88.33	129.96	92.37	112.38	84.84
CDF @ 20% (%)	107.18	140.45	108.80	141.61	108.95	145.56	112.66	131.03	106.56
CDF @ 25% (%)	125.37	154.47	125.96	156.36	126.49	159.50	131.00	147.92	125.01
CDF @ 30% (%)	141.62	168.46	142.04	170.07	142.18	173.31	146.84	164.25	141.05
CDF @ 35% (%)	157.63	180.75	158.00	183.49	158.29	186.52	163.25	179.67	157.15
CDF @ 40% (%)	174.33	194.94	174.68	197.13	174.78	200.11	179.59	196.22	174.01
CDF @ 45% (%)	191.07	208.80	191.28	210.81	191.26	213.60	196.44	215.04	190.65
CDF @ 50% (%)	209.44	224.87	209.61	226.67	209.61	229.12	215.31	232.92	209.08
CDF @ 55% (%)	230.24	240.97	230.26	244.28	230.26	245.49	235.47	252.18	229.87
CDF @ 60% (%)	250.66	258.74	250.81	262.60	250.54	263.62	255.68	274.93	250.40
CDF @ 65% (%)	277.53	282.85	277.61	285.39	277.50	286.21	282.02	299.25	277.17
CDF @ 70% (%)	305.53	309.31	305.59	310.24	305.51	311.68	310.80	326.76	305.28
CDF @ 75% (%)	338.07	340.55	338.55	341.12	338.23	342.13	343.05	357.44	337.79
CDF @ 80% (%)	374.78	378.00	375.03	377.02	374.78	377.50	379.99	394.39	374.78
CDF @ 85% (%)	419.99	422.71	420.04	421.91	420.04	421.88	423.56	438.35	419.60
CDF @ 90% (%)	471.78	476.06	471.78	474.29	471.79	473.87	476.12	486.27	471.78
CDF @ 95% (%)	545.56	547.12	545.56	546.92	545.58	546.28	549.70	559.78	545.38
CDF @ 99% (%)	680.56	681.26	680.56	680.56	680.56	680.56	683.22	689.84	680.36
CDF @ Maximum	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66	1040.66
Probability of Negative Net Cash Farm Income									
Mean	2.39	0.00	2.13	0.55	1.97	0.33	1.96	0.74	2.69
Probability of Cash Flow Deficit									
Mean	50.89	49.19	50.87	47.66	50.86	47.25	49.99	45.70	50.98
Probability of Losing Real Net Worth									
Mean	36.12	19.56	35.88	25.21	36.17	25.21	34.77	26.37	37.48

Appendix III Table 4. Summary of Alternative Farm Safety Net Options for KSSW3180

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	3.63	21.42	5.49	21.29	4.87	21.96	5.43	18.03	0.00
Std Dev	15.50	41.93	19.84	43.04	18.41	42.90	8.00	22.62	0.00
Coef Var (%)	426.83	195.77	361.55	202.21	378.18	195.37	147.33	125.46	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	181.62	305.12	217.44	318.01	207.28	314.42	60.27	153.08	0.00
Mean/Theoretical Max (%)	2.00	7.02	2.52	6.69	2.35	6.98	9.00	11.78	0.00
P(Indemnity) (%)	8.86	34.03	12.34	32.59	11.37	33.90	76.19	86.20	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.0	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	3.0	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	4.5	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.3	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.4	8.3	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.1	10.8	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	3.0	13.8	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	4.3	17.8	0.0
CDF @ 70% (%)	0.0	10.3	0.0	7.5	0.0	11.1	5.7	22.7	0.0
CDF @ 75% (%)	0.0	24.5	0.0	22.0	0.0	25.0	8.0	28.5	0.0
CDF @ 80% (%)	0.0	40.7	0.0	38.1	0.0	41.7	11.0	34.7	0.0
CDF @ 85% (%)	0.0	59.4	0.0	58.2	0.0	61.0	13.8	40.6	0.0
CDF @ 90% (%)	0.0	81.5	11.0	82.7	6.8	83.9	16.6	49.3	0.0
CDF @ 95% (%)	27.2	119.0	42.9	118.0	37.7	116.8	22.4	66.5	0.0
CDF @ 99% (%)	88.0	183.8	103.7	189.3	97.3	185.8	34.5	95.8	0.0
Total Receipts (\$1,000)									
Mean	412.14	429.92	413.99	429.79	413.37	430.46	413.93	426.54	408.50
Std Dev	101.97	87.66	100.72	90.99	101.31	90.24	102.88	95.32	106.87
Coef Var (%)	24.74	20.39	24.33	21.17	24.51	20.96	24.86	22.35	26.16
Minimum	204.61	273.56	197.63	225.89	193.34	239.11	186.66	235.58	142.70
Maximum	943.61	943.61	943.61	943.61	943.61	943.61	943.61	943.61	943.61
Net Cash Income (\$1,000)									
Mean	185.20	202.99	187.06	202.86	186.44	203.53	187.00	199.60	181.57
Std Dev	102.01	87.68	100.75	91.01	101.34	90.26	102.91	95.34	106.90
Minimum	-23.86	45.09	-29.17	-1.25	-33.47	11.96	-41.81	8.52	-85.77
Maximum	716.43	716.43	716.43	716.43	716.43	716.43	716.43	716.43	716.43
CDF @ Minimum	-23.86	45.09	-29.17	-1.25	-33.47	11.96	-41.81	8.52	-85.77
CDF @ 1% (%)	14.60	77.62	11.60	49.79	9.74	54.02	1.60	45.72	-25.22
CDF @ 5% (%)	45.03	96.97	48.42	80.08	46.29	82.05	39.40	73.81	22.36
CDF @ 10% (%)	65.12	111.48	70.17	100.78	68.00	102.74	65.48	92.67	54.23
CDF @ 15% (%)	81.81	121.62	88.02	116.20	86.47	117.56	85.11	106.87	74.90
CDF @ 20% (%)	97.43	131.63	102.84	128.87	101.56	129.95	101.49	119.19	93.45
CDF @ 25% (%)	111.11	139.74	115.92	139.09	115.11	140.09	115.03	130.85	108.53
CDF @ 30% (%)	124.56	147.62	128.31	148.83	127.34	150.35	127.98	141.45	122.57
CDF @ 35% (%)	136.34	155.70	139.43	158.80	139.12	160.46	139.76	151.57	135.11
CDF @ 40% (%)	147.05	164.83	149.86	168.65	149.23	169.59	150.88	161.58	146.52
CDF @ 45% (%)	158.46	173.37	161.27	178.33	160.88	179.05	162.03	171.92	158.28
CDF @ 50% (%)	170.49	182.58	172.06	188.93	171.78	189.19	173.53	182.89	170.23
CDF @ 55% (%)	182.65	193.40	183.98	198.96	183.66	198.98	185.87	194.30	182.47
CDF @ 60% (%)	196.13	204.29	196.77	210.02	196.48	209.90	198.47	206.35	195.96
CDF @ 65% (%)	209.58	216.64	209.91	222.24	209.68	221.55	212.07	219.62	209.51
CDF @ 70% (%)	226.15	231.80	226.29	235.78	226.29	235.10	228.60	235.11	226.15
CDF @ 75% (%)	243.94	247.10	243.94	250.46	243.94	249.78	246.60	252.46	243.94
CDF @ 80% (%)	263.06	264.92	263.06	267.82	263.06	267.63	265.72	271.93	263.06
CDF @ 85% (%)	289.14	289.81	289.14	291.35	289.14	290.98	291.03	296.48	289.14
CDF @ 90% (%)	322.73	323.17	322.73	323.62	322.73	323.60	324.75	329.27	322.73
CDF @ 95% (%)	377.18	377.18	377.18	377.18	377.18	377.18	379.24	382.60	377.18
CDF @ 99% (%)	477.85	477.85	477.85	477.85	477.85	477.85	477.85	481.06	477.85
CDF @ Maximum	716.43	716.43	716.43	716.43	716.43	716.43	716.43	716.43	716.43
Probability of Negative Net Cash Farm Income									
Mean	0.22	0.00	0.44	0.01	0.49	0.00	0.93	0.00	2.53
Probability of Cash Flow Deficit									
Mean	48.91	42.69	48.21	40.00	48.35	39.55	47.69	43.54	48.75
Probability of Losing Real Net Worth									
Mean	1.10	1.00	1.18	1.00	1.15	1.00	1.07	1.00	1.29

Appendix III Table 5. Summary of Alternative Farm Safety Net Options for TXSP3697

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	9.09	53.93	7.04	34.19	7.01	35.64	15.74	47.32	0.00
Std Dev	36.92	101.67	31.81	81.61	30.72	80.31	18.96	52.04	0.00
Coef Var (%)	406.08	188.50	452.00	238.71	438.20	225.37	120.46	109.96	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	417.55	670.56	428.15	660.71	395.20	615.62	122.08	316.36	0.00
Mean/Theoretical Max (%)	2.18	8.04	1.64	5.18	1.77	5.79	12.89	14.96	0.00
P(Indemnity) (%)	9.81	34.33	7.82	24.82	8.36	27.06	59.99	71.59	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	5.0	24.7	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	10.0	33.3	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	13.1	40.4	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	15.8	47.2	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	18.3	56.0	0.0
CDF @ 70% (%)	0.0	30.2	0.0	0.0	0.0	0.0	21.4	67.7	0.0
CDF @ 75% (%)	0.0	68.2	0.0	0.0	0.0	13.0	26.6	78.9	0.0
CDF @ 80% (%)	0.0	108.4	0.0	36.3	0.0	49.4	31.5	92.0	0.0
CDF @ 85% (%)	0.0	155.1	0.0	84.0	0.0	94.7	37.3	107.0	0.0
CDF @ 90% (%)	0.0	209.0	0.0	139.6	0.0	146.8	44.1	124.0	0.0
CDF @ 95% (%)	70.9	282.5	49.7	223.4	51.6	222.4	52.7	148.2	0.0
CDF @ 99% (%)	206.9	431.7	182.1	385.8	173.2	368.2	72.7	198.5	0.0
Total Receipts (\$1,000)									
Mean	972.98	1017.81	970.92	998.07	970.89	999.52	979.62	1011.21	963.88
Std Dev	235.03	195.63	238.04	215.10	237.97	212.71	235.10	214.83	246.98
Coef Var (%)	24.16	19.22	24.52	21.55	24.51	21.28	24.00	21.25	25.62
Minimum	463.55	664.27	405.36	452.39	412.28	536.85	343.55	476.11	265.87
Maximum	1850.57	1850.57	1850.57	1850.57	1850.57	1850.57	1850.57	1850.57	1850.57
Net Cash Income (\$1,000)									
Mean	266.42	318.59	262.78	292.88	263.15	295.93	273.35	310.11	254.85
Std Dev	190.68	157.45	193.83	175.62	193.58	172.43	190.49	172.30	201.65
Minimum	-170.11	-5.27	-218.33	-194.88	-211.58	-88.50	-233.54	-163.75	-304.80
Maximum	998.37	1007.96	998.37	1004.02	998.37	1003.94	1000.56	1004.94	998.37
CDF @ Minimum	-170.11	-5.27	-218.33	-194.88	-211.58	-88.50	-233.54	-163.75	-304.80
CDF @ 1% (%)	-63.95	63.98	-91.81	-24.14	-89.13	-5.26	-77.34	2.22	-121.96
CDF @ 5% (%)	-2.04	109.78	-14.48	43.87	-13.72	58.96	-0.76	69.61	-41.51
CDF @ 10% (%)	43.27	143.50	33.84	86.67	34.44	95.81	46.47	109.37	9.41
CDF @ 15% (%)	70.51	166.84	62.97	116.23	64.25	121.80	77.64	135.17	44.65
CDF @ 20% (%)	95.92	186.41	89.13	141.67	89.68	145.22	102.68	157.41	74.71
CDF @ 25% (%)	118.96	203.96	114.02	164.38	114.28	166.75	126.76	178.08	101.49
CDF @ 30% (%)	142.08	219.00	140.14	185.88	140.25	188.79	153.59	199.29	128.71
CDF @ 35% (%)	166.66	234.67	165.92	205.80	165.49	207.17	178.72	220.92	155.45
CDF @ 40% (%)	191.56	251.56	190.27	223.51	190.45	225.30	202.15	243.11	183.47
CDF @ 45% (%)	214.03	268.91	213.05	245.41	212.84	247.12	227.32	266.96	208.53
CDF @ 50% (%)	239.28	288.34	238.18	270.57	237.78	270.78	251.18	289.44	233.95
CDF @ 55% (%)	269.67	308.15	267.38	293.09	267.36	294.06	279.35	312.60	265.09
CDF @ 60% (%)	296.66	330.25	294.98	317.93	294.89	319.04	306.15	337.02	294.33
CDF @ 65% (%)	326.03	353.59	324.35	345.54	324.83	346.38	335.82	361.71	323.62
CDF @ 70% (%)	358.13	380.77	357.09	374.74	357.50	374.64	366.47	390.85	356.66
CDF @ 75% (%)	393.44	412.31	392.29	403.88	392.46	404.47	400.13	420.95	391.09
CDF @ 80% (%)	429.30	445.48	427.69	437.53	428.07	437.17	434.49	453.09	427.41
CDF @ 85% (%)	475.96	486.95	475.28	479.57	475.34	479.50	478.70	492.77	474.66
CDF @ 90% (%)	527.83	535.71	527.04	529.36	527.33	530.01	531.92	543.16	526.36
CDF @ 95% (%)	608.90	613.95	607.65	609.16	607.94	609.93	610.83	618.85	607.65
CDF @ 99% (%)	772.35	778.04	772.35	774.17	772.35	775.80	774.84	781.74	772.35
CDF @ Maximum	998.37	1007.96	998.37	1004.02	998.37	1003.94	1000.56	1004.94	998.37
Probability of Negative Net Cash Farm Income									
Mean	5.18	0.01	6.28	2.08	6.24	1.07	5.07	0.90	8.99
Probability of Cash Flow Deficit									
Mean	38.70	20.25	38.90	30.24	38.90	29.57	36.48	27.08	40.22
Probability of Losing Real Net Worth									
Mean	11.99	2.18	14.69	8.98	14.05	6.34	11.41	3.98	16.59

Appendix III Table 6. Summary of Alternative Farm Safety Net Options for TXRP2500

	A70	A90	B70	B90	C70	C90	CAT	MPCI	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	5.44	21.39	4.47	13.54	5.20	16.58	5.98	16.60	0.00
Std Dev	15.81	34.69	13.76	26.25	15.24	30.11	5.35	13.41	0.00
Coef Var (%)	290.90	162.15	307.65	193.79	292.98	181.67	89.45	80.77	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	154.72	227.48	157.86	225.69	163.86	234.02	33.54	82.79	0.00
Mean/Theoretical Max (%)	3.51	9.41	2.83	6.00	3.18	7.08	17.82	20.05	0.00
P(Indemnity) (%)	18.16	41.93	16.09	33.02	17.44	35.98	89.23	95.44	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.2	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.5	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.6	5.9	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.2	7.5	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.9	9.0	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	3.4	10.5	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	4.1	12.1	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	4.8	13.8	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	5.5	15.6	0.0
CDF @ 60% (%)	0.0	3.8	0.0	0.0	0.0	0.0	6.2	17.6	0.0
CDF @ 65% (%)	0.0	13.9	0.0	0.0	0.0	1.9	7.0	19.6	0.0
CDF @ 70% (%)	0.0	24.6	0.0	6.3	0.0	12.4	7.9	21.7	0.0
CDF @ 75% (%)	0.0	36.3	0.0	15.9	0.0	23.6	8.9	24.3	0.0
CDF @ 80% (%)	0.0	48.1	0.0	27.5	0.0	35.7	10.1	27.2	0.0
CDF @ 85% (%)	6.9	59.5	2.5	37.9	6.0	47.1	11.5	30.4	0.0
CDF @ 90% (%)	20.2	74.1	15.8	51.4	19.5	61.5	13.4	35.1	0.0
CDF @ 95% (%)	41.0	96.1	35.1	74.0	39.3	84.0	16.5	42.6	0.0
CDF @ 99% (%)	77.3	139.1	67.5	108.6	73.2	125.9	22.3	57.1	0.0
Total Receipts (\$1,000)									
Mean	240.16	256.12	239.20	248.27	239.93	251.30	240.70	251.33	234.72
Std Dev	81.55	70.04	82.47	75.82	81.73	73.58	84.27	79.42	87.55
Coef Var (%)	33.96	27.35	34.48	30.54	34.07	29.28	35.01	31.60	37.30
Minimum	91.45	141.93	79.25	94.47	96.53	112.93	76.30	94.70	57.67
Maximum	600.07	600.07	600.07	600.07	600.07	600.07	600.61	602.98	600.07
Net Cash Income (\$1,000)									
Mean	25.99	46.13	23.94	34.46	25.16	38.99	26.66	40.93	18.73
Std Dev	71.15	61.38	72.06	66.82	71.34	64.71	73.19	68.39	76.42
Minimum	-135.63	-74.26	-141.18	-126.07	-128.37	-97.45	-146.17	-119.23	-162.57
Maximum	338.90	344.02	335.70	341.02	336.49	344.02	337.01	344.18	333.31
CDF @ Minimum	-135.63	-74.26	-141.18	-126.07	-128.37	-97.45	-146.17	-119.23	-162.57
CDF @ 1% (%)	-95.58	-50.78	-102.25	-85.16	-98.10	-73.57	-101.14	-75.99	-117.95
CDF @ 5% (%)	-69.37	-32.74	-74.23	-57.29	-71.42	-47.52	-76.60	-52.63	-91.39
CDF @ 10% (%)	-54.15	-20.90	-57.98	-40.45	-55.21	-32.71	-59.51	-37.28	-72.90
CDF @ 15% (%)	-43.80	-11.92	-46.86	-30.14	-44.52	-23.10	-46.68	-26.56	-58.74
CDF @ 20% (%)	-35.38	-4.26	-38.04	-21.12	-36.00	-14.76	-36.08	-17.69	-47.15
CDF @ 25% (%)	-26.49	1.91	-28.92	-13.42	-27.43	-7.30	-27.34	-9.10	-37.71
CDF @ 30% (%)	-18.09	7.98	-20.42	-5.69	-19.15	-0.47	-17.71	-1.17	-26.96
CDF @ 35% (%)	-10.49	13.84	-12.12	1.92	-11.12	6.43	-8.87	7.01	-17.11
CDF @ 40% (%)	-2.33	20.43	-3.40	9.20	-2.66	13.29	-0.31	14.68	-7.83
CDF @ 45% (%)	5.67	26.83	4.46	16.75	5.43	20.43	8.71	22.59	1.17
CDF @ 50% (%)	14.72	33.79	13.01	24.41	13.66	27.78	16.81	30.07	9.74
CDF @ 55% (%)	23.62	40.78	21.85	32.37	22.86	35.74	25.87	38.82	18.90
CDF @ 60% (%)	32.72	48.41	31.44	40.66	32.04	44.01	35.67	47.52	29.44
CDF @ 65% (%)	42.82	57.94	40.95	49.88	41.72	53.76	45.53	57.58	39.71
CDF @ 70% (%)	53.71	68.03	52.11	59.77	52.77	63.18	56.87	67.90	51.15
CDF @ 75% (%)	66.48	79.04	64.88	71.05	65.47	74.31	69.69	79.83	63.93
CDF @ 80% (%)	81.96	92.41	80.72	84.88	81.23	87.79	84.61	94.43	79.64
CDF @ 85% (%)	100.77	108.89	99.33	102.31	99.92	105.03	102.58	111.58	98.51
CDF @ 90% (%)	127.19	132.22	125.98	127.53	126.42	129.29	129.82	137.85	125.66
CDF @ 95% (%)	163.98	167.62	163.25	163.99	163.42	165.44	165.75	173.03	162.65
CDF @ 99% (%)	226.32	229.82	224.44	226.32	225.08	227.44	226.93	232.69	224.44
CDF @ Maximum	338.90	344.02	335.70	341.02	336.49	344.02	337.01	344.18	333.31
Probability of Negative Net Cash Farm Income									
Mean	41.25	23.33	41.98	33.85	41.50	30.39	40.21	30.63	44.29
Probability of Cash Flow Deficit									
Mean	88.57	84.13	89.13	88.02	88.90	86.42	87.86	84.34	89.47
Probability of Losing Real Net Worth									
Mean	75.89	65.66	77.46	73.53	76.84	70.80	75.39	66.57	79.47

	A70	A90	B70	B90	C70	C80	C90	C95	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	0.11	12.86	0.09	9.47	0.03	0.25	2.73	10.23	0.00
Std Dev	5.48	66.21	4.92	57.51	2.49	9.25	30.38	58.95	0.00
Coef Var (%)	4931.02	514.85	5231.14	607.43	9999.67	3729.17	1111.44	576.19	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	463.69	1331.95	435.19	1295.30	248.69	652.11	1055.52	1257.23	0.00
Mean/Theoretical Max (%)	0.02	0.97	0.02	0.73	0.01	0.04	0.26	0.81	0.00
P(Indemnity) (%)	0.06	6.80	0.06	4.79	0.01	0.14	1.49	6.07	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 70% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 75% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 80% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 85% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 90% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 95% (%)	0.0	62.1	0.0	0.0	0.0	0.0	0.0	27.2	0.0
CDF @ 99% (%)	0.0	358.1	0.0	309.3	0.0	0.0	76.4	316.7	0.0
Total Receipts (\$1,000)									
Mean	3813.89	3826.64	3813.87	3823.25	3813.80	3814.03	3816.51	3824.01	3813.78
Std Dev	323.33	304.90	323.38	308.90	323.59	322.98	317.99	307.11	323.68
Coef Var (%)	8.48	7.97	8.48	8.08	8.49	8.47	8.33	8.03	8.49
Minimum	2707.03	2930.19	2707.03	2768.55	2700.57	2707.03	2900.57	3116.68	2555.59
Maximum	5194.98	5194.98	5194.98	5194.98	5194.98	5194.98	5194.98	5194.98	5194.98
Net Cash Income (\$1,000)									
Mean	987.80	1000.83	987.78	997.40	987.73	988.12	991.04	998.65	987.69
Std Dev	350.84	337.45	350.89	340.80	351.06	350.65	347.00	338.93	351.10
Minimum	-272.09	33.12	-272.09	-214.08	-272.09	-263.96	-79.03	226.27	-272.09
Maximum	2348.16	2348.16	2348.16	2348.16	2348.16	2348.16	2348.16	2348.16	2348.16
CDF @ Minimum	-272.09	33.12	-272.09	-214.08	-272.09	-263.96	-79.03	226.27	-272.09
CDF @ 1% (%)	295.56	379.53	295.56	375.21	293.92	295.56	337.96	387.85	293.92
CDF @ 5% (%)	478.48	525.08	478.48	510.09	478.48	479.21	486.62	508.64	47

Appendix III Table 8. Summary of Alternative Farm Safety Net Options for INH1200

	A70	A90	B70	B90	C70	C80	C90	C95	NOINS
Safety Net and Indemnity Payments (\$1,000)									
Mean	3.82	94.49	3.89	79.29	3.61	18.71	70.50	124.68	0.00
Std Dev	36.60	191.84	35.81	172.16	36.97	89.57	184.23	246.39	0.00
Coef Var (%)	957.14	203.02	921.70	217.14	1023.80	478.77	261.32	197.62	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	899.39	1682.58	857.99	1600.70	994.37	1395.31	1817.79	2029.02	0.00
Mean/Theoretical Max (%)	0.43	5.62	0.45	4.95	0.36	1.34	3.88	6.15	0.00
P(Indemnity) (%)	2.13	31.63	2.20	31.37	1.78	8.03	22.38	35.17	0.00
CDF @ 1% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 5% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 10% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 15% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 20% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 25% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 30% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 35% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 40% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 45% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 50% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 55% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 60% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CDF @ 65% (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0
CDF @ 70% (%)	0.0	21.9	0.0	14.7	0.0	0.0	0.0	72.5	0.0
CDF @ 75% (%)	0.0	92.4	0.0	65.7	0.0	0.0	0.0	144.5	0.0
CDF @ 80% (%)	0.0	170.0	0.0	126.3	0.0	0.0	39.4	225.5	0.0
CDF @ 85% (%)	0.0	272.3	0.0	199.5	0.0	0.0	143.5	330.0	0.0
CDF @ 90% (%)	0.0	381.3	0.0	303.1	0.0	0.0	289.8	477.9	0.0
CDF @ 95% (%)	0.0	519.5	0.0	465.4	0.0	114.1	478.2	672.8	0.0
CDF @ 99% (%)	136.5	832.1	145.4	777.0	139.2	505.5	916.0	1120.0	0.0
Total Receipts (\$1,000)									
Mean	3021.78	3112.45	3021.84	3097.24	3021.57	3036.66	3088.45	3142.63	3017.96
Std Dev	405.10	330.01	405.23	340.89	405.94	388.23	354.61	340.51	412.10
Coef Var (%)	13.41	10.60	13.41	11.01	13.44	12.79	11.48	10.84	13.66
Minimum	1814.99	2187.64	1814.99	2098.11	1741.29	1901.70	2252.66	2332.63	1615.04
Maximum	4570.35	4570.35	4570.35	4570.35	4570.35	4570.35	4570.35	4570.35	4570.35
Net Cash Income (\$1,000)									
Mean	302.10	399.91	302.15	383.14	311.33	327.72	384.15	443.62	298.11
Std Dev	357.06	310.62	357.40	319.97	357.73	347.12	332.99	336.40	361.76
Minimum	-818.66	-514.44	-818.66	-529.11	-803.29	-676.79	-522.26	-495.91	-872.21
Maximum	1448.59	1474.54	1448.59	1489.35	1460.43	1460.43	1628.53	1836.82	1448.59
CDF @ Minimum	-818.66	-514.44	-818.66	-529.11	-803.29	-676.79	-522.26	-495.91	-872.21
CDF @ 1% (%)	-436.82	-215.63	-445.93	-250.91	-444.73	-372.63	-266.06	-192.46	-475.69
CDF @ 5% (%)	-258.95	-82.67	-262.22	-104.65	-250.89	-207.25	-129.57	-63.34	-274.29
CDF @ 10% (%)	-139.14	31.62	-139.77	3.19	-129.11	-103.72	-24.41	26.33	-149.81
CDF @ 15% (%)	-57.54	95.59	-58.00	68.86	-48.84	-27.04	46.32	91.11	-67.51
CDF @ 20% (%)	3.36	144.69	2.98	114.46	11.52	33.60	98.49	153.47	-5.11
CDF @ 25% (%)	50.59	184.69	50.82	155.92	59.79	80.28	147.58	205.15	45.59
CDF @ 30% (%)	98.85	217.44	99.85	196.84	108.31	127.82	195.65	249.34	94.31
CDF @ 35% (%)	145.74	250.63	148.06	231.66	156.55	173.68	234.35	291.08	142.03
CDF @ 40% (%)	192.63	287.18	193.46	269.54	203.18	214.53	272.30	331.93	190.33
CDF @ 45% (%)	231.06	325.47	232.30	307.87	242.31	253.41	312.67	370.56	229.04
CDF @ 50% (%)	276.35	363.05	277.03	342.48	287.71	298.78	351.69	414.82	275.53
CDF @ 55% (%)	319.36	408.55	319.78	382.10	329.73	341.77	393.89	457.31	318.41
CDF @ 60% (%)	364.98	448.72	365.02	429.54	374.34	388.11	438.56	499.03	363.56
CDF @ 65% (%)	415.80	490.87	415.80	477.87	423.88	441.67	483.24	552.11	415.15
CDF @ 70% (%)	474.17	540.36	473.53	534.59	483.38	497.57	536.09	602.79	473.23
CDF @ 75% (%)	538.80	596.65	538.80	588.55	547.51	559.06	595.20	659.75	538.80
CDF @ 80% (%)	608.66	672.83	608.66	660.80	616.68	629.33	669.06	720.40	608.66
CDF @ 85% (%)	694.37	741.76	694.37	739.57	702.55	706.23	749.27	789.99	694.37
CDF @ 90% (%)	787.21	832.29	787.21	836.10	796.13	798.45	847.59	890.47	787.21
CDF @ 95% (%)	939.02	968.39	939.02	962.15	946.76	950.06	980.37	1058.91	939.02
CDF @ 99% (%)	1164.22	1180.93	1164.22	1183.54	1178.16	1178.68	1222.64	1318.40	1164.22
CDF @ Maximum	1448.59	1474.54	1448.59	1489.35	1460.43	1460.43	1628.53	1836.82	1448.59
Probability of Negative Net Cash Farm Income									
Mean	19.60	8.32	19.67	9.77	19.03	17.20	11.49	8.48	20.38
Probability of Cash Flow Deficit									
Mean	65.73	53.81	65.64	56.67	62.08	60.74	54.32	46.87	65.85
Probability of Losing Real Net Worth									
Mean	15.16	10.22	15.14	10.90	14.57	13.19	10.14	8.08	15.32