Crop Insurance Challenges and Prospects for Southern Irrigated Farms: the case of Arkansas

Vuko Karov[a]
Rice Research and Extension Center (RREC), 2900 Hwy 130 East, Stuttgart, AR 72160 (near Almyra); Phone: 870-673-2661; Email: vkarov@uark.edu

Eric J. Wailes
Department of Agricultural Economics & Agribusiness, 217 Agriculture Building, University of Arkansas, Fayetteville, AR 72701; Phone: 479-575-2256; Email: ewailes@uark.edu

and

K. Bradley Watkins
Rice Research and Extension Center (RREC), 2900 Hwy 130 East, Stuttgart, AR 72160 (near Almyra); Phone: 870-673-2661; Email: kbwatki@uark.edu

[a] The authors are Program Associate, L.C. Carter Endowed Chair and Distinguished Professor of Agricultural Economics, and Research Assistant Professor of Agricultural Economics at the Department of Agricultural Economics and Agribusiness - University of Arkansas (Fayetteville), respectively. We gratefully acknowledge the funding for this research provided by the Arkansas Rice Research and Promotion Board.

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Abstract

This paper presents an analysis of the current use and explanation for participation in various crop insurance programs for irrigated crop farms in Arkansas. The study uses representative farms to simulate MVE distributions of prices, yields and costs to evaluate the probability of receiving indemnity payments. We find that current crop insurance programs are rather unsuitable for Arkansas irrigated crop producers because these programs do not cover the systemic risks associated with energy-related costs of production. Pumping costs, fuel, fertilizer and other energy-related costs are a significant component of irrigated crop costs of production in Arkansas. As such, participation has been low. As the farm bill safety net appears to be directed at relying more heavily upon crop insurance for protection of farm producers' incomes, a more suitable type of insurance such as a "gross margin" insurance product needs to be developed and made available for irrigated crop producers.

Key words: crop insurance, Arkansas, irrigated crops

Introduction

Crop insurance products are becoming an increasingly important risk management tool for United States (U.S.) crop producers. In the U.S., crop insurance products are managed by the U.S. Department of Agriculture's Risk Management Agency (USDA/RMA), while producer-paid premiums are subsidized by taxpayers through the Federal Crop Insurance Corporation (FCIC). For the 2012 crop year, eight different crop insurance products were available for purchase by U.S. producers. These products provide farmers with risk protection against low crop yields and/or market prices. As Table 1 shows, five of eight products provide coverage at the individual (farm)-level, while three provide area (county)-level coverage (Edwards, 2011).[1]

Table 2 illustrates 23-year historical (1989-2011) information related to the U.S. crop insurance program obtained from the USDA/RMA Summary of Business (SOB) reports and data (USDA, RMA, 2012). Total U.S. net acres enrolled in crop insurance have increased sharply, from 101.6 million in 1989 to 265.8 million in 2011.[2] The total number of crop insurance policies purchased by U.S. producers has also increased, from 1.05 million (1989) to 2.07 million (2011). Total U.S. crop insurance indemnities received have increased from $1.21 billion in 1989 to $10.84 billion in 2011. Total net indemnities received by U.S. producers also have increased, from nearly $600 million (1989) to $6.3 billion (2011). In relative terms, both categories reached historical highs in 2008 and 2011.[3] Total U.S. crop insurance farmer-paid premiums

[1] Karov, Wailes and Watkins (2012) provide an in-depth summary of crop insurance products available for purchase by Arkansas producers for the 2012 crop year. The full report is available online at: http://www.aragriculture.org/agfoodpolicy/CropInsuranceBrief_09.07.2012.pdf

[2] The big increase between 1994 and 1995 is due to the introduction of the Catastrophic Insurance (CAT) product that was available for purchase starting in the latter year.

[3] This is explained by adverse weather conditions (droughts and floods) and relatively high crop prices in these two crop years that directly drive the receipt of such payments. The 2012 crop year is again expected to be a record crop year for both categories due to the major drought.

increased from nearly $609 million in 1989 to about $4.5 billion in 2011. Total premium subsidies also increased, from just below $205 million (1989) to nearly $7.5 billion (2011). As a result, total U.S. crop insurance premiums paid increased from $814.3 million in 1989 to almost $12 billion in 2011. In relative terms, total premiums reached historical highs in 2008 and 2011.[4] Historically, the loss ratio has a negative trend and has declined from about 150% in 1989 to 91% in 2011.[5] This ratio reached a 23-year high in 1993, 219%, and has stayed below 100% from 2003 to 2011. Finally, the subsidized share of total premiums, increased from 25% in 1989 to 62% in 2011, but has remained virtually constant from 2001 to 2011 at around 60%.

Current crop insurance products focus on yield and revenue protection only. However, systemic risks of potentially increasing energy-related costs are not protected. As Tables 3 and 4 illustrate, energy expenses are of particular importance for eastern Arkansas irrigated crop farms. In 2010, nearly 6.34 million acres of rice, soybeans, corn, cotton, wheat and sorghum were harvested in eastern Arkansas (Table 3). Eighty-four percent of these acres were under irrigation with all of the rice acres and 94% of the cotton acres being irrigated. This results in a notably different composition of on-farm direct costs for eastern Arkansas irrigated crop producers as compared to producers of crops grown in other regions. For instance, as Table 4 shows, corn and soybeans produced in Iowa in 2010 are not subject to any irrigation expenses (University of Arkansas, Cooperative Extension Service, 2010; Iowa State University, Cooperative Extension Service, 2010; USDA, NASS, 2010).

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[4] This is explained by adverse weather conditions (droughts and floods) and relatively high crop prices in these two crop years that directly drive the value of premiums paid. Preliminary data for 2012 shows that total premiums paid are $11.06 billion while total premium subsidies are $6.9 billion. Please note that in some crop years, premiums are additionally subsidized through cost sharing, state subsidies, and premium discounts. We exclude these additional data in the analysis.

[5] The loss ratio is defined as the ratio of total indemnities received to total premiums paid, and is greater than 1 (or 100%) in crop years in which more total indemnities are received by producers than total premiums are paid.

With this in mind, notable differences emerge when comparing crop insurance participation rates across states, crops, and products. In 2011, 85% of the U.S. rice, corn and soybeans planted acres were under crop insurance. In addition, 88% and 93% of the U.S. wheat and cotton planted acres were also insured, respectively. In the same year, in Arkansas, almost an equal share of the rice and corn planted acres were insured: 84% and 86%, respectively. However, a lower share of the soybeans, wheat and cotton planted acres were under crop insurance: 75%, 70%, and 87%, respectively. When looking at the shares of total net acres under crop insurance by program for 2011, major disparities emerge among states (Figure 1). Overall, Yield Protection (YP) products dominate the south while Revenue Protection (RP) products dominate the Midwest. In Arkansas for example, the share of the Catastrophic Insurance (CAT) product, a yield protection-type policy, of the total is considerably greater than in any other state. On the other hand, the RP product's share is significantly greater in Midwest states such as Iowa. Finally, in California and Texas, the three main product categories (RP; CAT; Buy-Up YP) jointly account for less than 40% of the total net acres insured in 2011. Even though RP accounts for less than 40% of all Arkansas net acres insured in 2011, it accounts for more than 70% of all indemnities received in the same year (Figure 2). With the exception of California, this product accounts for the lion's share (at least 60%) of the total indemnity payments received in 2011.[6] Differences are also notable when looking at the shares of total crop insurance net acres insured by program across different state-crop combinations. In 2011 for example, 49% of the Arkansas rice net acres were insured under the CAT product. However,

[6] The California phenomenon may be explained by the possibility that different crop insurance policies in this state are typically purchased for fresh fruits and vegetables instead of grain. Please remember that crop insurance in the U.S. is currently available for more than 100 commodities.

only 3%, 1% and 4% of the Texas-cotton, Iowa-corn and Illinois-soybeans net acres were covered by this policy in the same year, respectively. On the other hand, only 40% of the Arkansas rice net acres under crop insurance were covered by the RP product.[7] This compares to 79%, 88% and 73% of the Texas-cotton, Iowa-corn and Illinois-soybeans net acres under crop insurance covered by the RP policy, respectively. Finally, when looking at the shares of total indemnities received by product in 2011 across the same state-crop combinations, RP always accounts for the major share (at least 73%). The CAT's share is in all cases only around 1%, with the exception of the Arkansas-rice combination (10%) (USDA, RMA, 2012).

The 2008 Farm Bill (P.L. 110-246)[8] expired on September 30, 2012. During the process of negotiating a new five-year legislation in the 112th U.S. Congress, the Senate and House Committee on Agriculture passed their versions of the 2012 Farm Bill this past summer: the Agriculture Reform, Food, and Jobs Act of 2012 (S. 3240)[9] and the Federal Agriculture Reform and Risk Management Act of 2012 (H.R. 6083)[10], respectively. Both bills include notable changes to Titles I and XI safety net programs of the 2008 legislation, and propose a transition from traditional farm programs to a greater reliance on risk management. In addition, both bills rely on a relatively new philosophical approach of providing coverage of "shallow revenue" losses. This is accomplished through the proposal of programs specifically designed to complement crop insurance and its delivery mechanisms. Reluctance by the House leadership to bring the bill to the floor left the 2012 Farm Bill process in limbo until the end of 2012. On January 1, 2013, in conclusion of the negotiations to address the nation's debt issue focused on

[7] From 1999 to 2011, this share has traditionally been lower than 20%, but it has sharply increased since 2009. During the same period, the CAT share has declined from nearly 70% to just below 50%.
[8] Available online at: http://www.gpo.gov/fdsys/pkg/PLAW-110publ246/pdf/PLAW-110publ246.pdf
[9] Available online at: http://www.gpo.gov/fdsys/pkg/BILLS-112s3240pp/pdf/BILLS-112s3240pp.pdf
[10] Available online at: http://www.gpo.gov/fdsys/pkg/BILLS-112hr6083rh/pdf/BILLS-112hr6083rh.pdf

spending cuts and tax increases, the House and Senate passed a bill to temporarily avoid the so-called "fiscal-cliff" titled "American Taxpayer Relief Act of 2012" (H.R. 8).[11] It provides a one-year extension of the 2008 Farm Bill. In 2013, as part of a potentially broader national deficit reduction effort in the 113th U.S. Congress, most interest groups expect a new five-year bill to be passed. S. 3240 and H.R. 6083 proposed programs are a likely starting point when lawmakers begin to write the 2013 Farm Bill. As a result, crop insurance will likely play a greater role in providing risk protection for U.S. farmers in future.

The goal of this study is to evaluate the economic impact of the potential purchase of the RP and YP crop insurance products by five Arkansas representative panel farms during the five-year period 2012-2016. Specifically, we address the following two questions (scenarios):

1) *What is the average annual probability of receiving an indemnity payment (by product/farm/crop/yield coverage level)?*
2) What is the average annual net indemnity payment received *(by product/farm/crop/yield coverage level)*?

Arkansas row crop producers face three main types of risk: price, yield, and cost. Price and cost risks are systemic-they affect all farmers equally since crop prices and prices of inputs are determined on the free market and all producers are price takers. Yield risk, on the other hand, is random since it may impact specific producers only. Due to the latest policy developments, a strong need emerges for farmers to better understand the risks they are facing. The second analysis statistically examines the three main risk types affecting Arkansas crop producers (prices, yields, and costs) for the period 2013-2017.

[11] Available online at: http://www.gpo.gov/fdsys/pkg/BILLS-112hr8enr/pdf/BILLS-112hr8enr.pdf

Methods and Data

This study employs the Arkansas representative panel farms framework. Representative farms are developed based on data collected by extension economists from the University of Arkansas Cooperative Extension Service and Texas A&M University's Agricultural Food and Policy Center. Every two to three years, these professionals work with panels of farmers to update (or construct new) representative farms sharing common features with farms of a certain geographical location. During this process, information such as (but not limited to) planted acreage, crop mix, land tenure arrangements, participation in Federal farm programs, base acreage, historical yields, location-specific price wedges relative to the mean national prices, assets, costs, loan interest rates, and depreciation method is collected (Hignight, 2007). Table 5 shows characteristics for the five eastern Arkansas representative panel farms providing the framework for this analysis. The smallest farm is located in Wynne, Cross County. It is a 1,400 acre rice-soybeans farm. The largest and most-diversified farm is located in McGehee, Desha County. It is a 7,500 acre rice-soybeans-cotton-corn-wheat farm.

Following Richardson, Klose and Gray (2000), a procedure for developing multivariate empirical (MVE) probability distributions for farm-related variables is used. Specifically, ten-year historical data are used to develop empirical distributions for: futures market projected and harvest crop prices; and farm-specific crop yields. Simetar is used to simulate stochastic baseline projections for the period 2013-2017 with 500 iterations per variable per year.

Historical futures market projected and harvest prices were obtained from USDA/RMA (USDA, RMA, 2012), and actual historical farm-specific crop yields during the panel farm interview process. Premium rates, based on which the per acre premium costs are calculated,[12] and data on producer and government shares of premiums paid (by yield coverage) were obtained from a private crop insurance company based in Arkansas. The August 2011 "Baseline Update for US Agricultural Markets" by the Food and Agriculture Policy Research Institute (FAPRI)-University of Missouri is used to obtain projected national mean crop prices around which the stochastic baseline projected and harvest price projections are simulated (FAPRI, 2012). Projected farm-specific crop yields, on the other hand, are calculated by the authors by assuming farm and crop-specific growth trends based on historical data.

The second analysis also uses the Arkansas representative panel farm framework. In this case, we use ten-year historical data to develop empirical distributions for: national average farm crop prices; futures market projected and harvest crop prices; farm and county-specific crop yields; and farm input costs (urea, potash, diesel fuel, electricity, and phosphate).

Historical national average farm crop prices are obtained from the United States Department of Agriculture's National Agricultural Statistics Service (USDA/NASS) (USDA, NASS, 2012), the USDA's Economic Research Service (USDA/ERS) Rice Yearbook (USDA, ERS, 2012a) and Rice Outlook (USDA, ERS, 2012b). Historical futures market projected and harvest crop prices were obtained from USDA/RMA (USDA, RMA, 2012). Historical farm-specific yields, on the other hand, are obtained during the panel farm interview process while historical county-specific yields are obtained from USDA/NASS (USDA, NASS, 2012). Finally, historical input cost

[12] Premium rates vary by crop/county/program/yield coverage. Such rates are based on enterprise insurance units which differ from basic or operational units (Karov, Wailes and Watkins, 2012). Since they allow for a greater overall risk protection, RP premium rates are higher than corresponding YP premium rates.

data (diesel fuel, potash, urea, and phosphate) are obtained from USDA/NASS and the U.S. Energy Information Administration (electricity) (USDA, NASS, 2012; EIA, 2012).

The FAPRI-University of Missouri "March 2012 U.S. Baseline Briefing Book" is used to obtain projected crop prices. An earlier version of the same publication (March 2011), on the other hand, is used to obtain projected indices of prices paid by farmers (FAPRI, 2012). Finally, projected farm/county-specific crop yields are calculated by the authors by assuming farm/county and crop-specific growth trends based on historical data.

Results and Conclusions

Tables 6 through 9 summarize the results. The findings are reported as annual averages for the period 2012-2016 on a by farm, crop and yield coverage level basis.[13] Tables 6 and 7 summarize the results from the first scenario for the YP and RP program, respectively. At the 70% yield coverage level for the YP program for the Stuttgart farm (Table 6), the stochastic iterations do not result in any indemnities for long-grain rice and irrigated soybeans. For wheat however, indemnities occur but on average only in 7.6% of the 500 annual random draws. At the 85% yield coverage level, any indemnities are again not received for long-grain rice and irrigated soybeans. For wheat on the other hand, indemnities are received, but on average only in 12.4% of the annual random draws. There is a greater chance for indemnities to be received with participation in the more expensive RP program (Table 7). At the 70% yield coverage level, 7.6% of the annual random draws on average result in an indemnity for long-grain rice, 27.3% for wheat, but only 0.6% for irrigated soybeans. At the 85% yield coverage level, the average

[13] Yield coverage levels vary from 50% to 85% in five percentage point increments.

annual probabilities of observing an indemnity are as follows: 21.5% (long-grain rice), 47.9% (wheat) and 4.0% (irrigated soybeans).

Tables 8 and 9 summarize the findings from the second scenario for the YP and RP program, respectively. In this case, we report the minimum, maximum and mean average annual net indemnity payments on a per acre basis under a 70% and 85% yield coverage level. Assuming 70% yield coverage level for the YP program for the McGehee farm (Table 8), there is no chance of observing a positive net indemnity for any of the farm's crops. For instance, the minimum average annual per acre net indemnity for corn is -$8.4 while the maximum is -$4.6. In this crop's case, there is nearly an 80% chance of observing a net indemnity between -$8.5 and -$5/acre for any of the sample years. At the 85% yield coverage level, there is no chance of observing a positive net indemnity for rice, full-season and double-crop soybeans. However, there is some probability of observing a positive net indemnity for corn, wheat and irrigated cotton. For example, there is close to a 10% chance a positive net indemnity for wheat will occur for any of the sample years. At 70% yield coverage participation in the RP program (Table 9), the probabilities of observing a positive net indemnity across the farm's crops are as follows: close to zero percent for irrigated cotton, full-season and double-crop soybeans, nearly 30% for wheat, and close to 10% for corn and long-grain rice. The mean annual per acre net indemnities at this coverage level are negative for corn, irrigated cotton, full-season and double-crop soybeans while they are positive for rice and wheat. At 85% coverage participation in the program, the chances of observing a positive net indemnity are higher (nearly 20% for long-grain rice, corn and cotton, close to 40% for wheat, and close to zero for full-season and double-crop soybeans), even though the mean annual per acre net indemnities are again positive for only two of the farm's crops (rice and wheat).

Conclusively, probabilities of receiving an indemnity payment are low across all farm-crop combinations. However, such probabilities are typically relatively higher for the RP product as compared to the YP product. In cases when indemnities are indeed received, there is a far greater chance that the farmer-paid premiums for these policies will be greater than the indemnities received, ultimately resulting in negative net indemnities.

In the second analysis, we compare coefficients of variation (CVs) from the stochastic simulation of all farm-related variables to determine the risks facing Arkansas producers.[14] First, long-grain rice national average farm prices are less variable than prices for medium-grain rice, corn, and cotton, but more variable than prices for wheat and soybeans. In addition, rice futures projected and harvested prices are considerably less variable than futures prices for other crops. Third, irrigated crops have lower yield variability than non-irrigated crops. Finally, when looking at input costs, simulated CVs are typically higher than in the case of prices and yields. Since most of the production on the representative farms is irrigated, we conclude that the primary systemic risks affecting these producers are crop market prices and energy costs.

"Gross Margin" Crop Insurance Product

Since interest by Arkansas and southern irrigated crop producers in the most important crop insurance products (RP and YP) has been limited, and because crop insurance is likely to play an increased role in providing risk protection for U.S. farmers in future, we propose a novel

[14] The CV is calculated as a ratio of the standard deviation to the mean. Hence, higher standard deviation results in a higher coefficient of variation. The CV is a measure used to illustrate the amount of variation around the mean.

“gross margin” crop insurance product specifically targeted at meeting the needs of these producers. The product would be similar in spirit to the livestock gross margin (LGM) dairy policy, which is designed to protect producers from unexpected declines in the market value of their milk minus feed costs. It uses adjusted futures prices to determine the difference between expected gross margin and the actual gross margin. Producers can purchase LGM dairy insurance monthly and have the option to buy protection for a period of 1 to 11 months.

Equations 1 through 8 (as reported in Figure 3) summarize the proposed product. The gross margin guarantee would be determined as the product of the coverage level (which can vary from 50% to 100% in five percentage point increments) and the difference between the revenue guarantee and the energy cost guarantee. In this case, the revenue guarantee would be determined as the product of the projected price and the APH yield, while the energy cost guarantee (projected energy cost) as the product of the projected prices and quantities used of the following inputs: diesel fuel, urea, potash, phosphate, electricity, and mixed fertilizer. The actual gross margin would be the difference of the actual revenue and the actual energy cost. In this case, the actual revenue would be the product of the harvest price and the actual yield, while the actual energy cost (actual value of the energy cost) will be the product of the actual prices and quantities used of the following inputs: diesel fuel, urea, potash, phosphate, electricity, and mixed fertilizer. Finally, the gross indemnity payment would be the difference between the gross margin guarantee and the actual gross margin, and the net indemnity payment the difference between the gross indemnity payment and the farmer-paid premium.[15]

[15] The higher the coverage levels selected, the higher the farmer-premiums paid.

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Tables and Figures

Table 1: Overview of Available Crop Insurance Products for the 2012 Crop Year

#	Product	Abbreviation	Coverage Level
1	Yield Protection	YP	Individual
2	Revenue Protection	RP	Individual
3	Revenue Protection with Harvest Price Exclusion	RP-HPE	Individual
4	Catastrophic Insurance	CAT	Individual
5	Supplemental Coverage	SC	Individual
6	Group Risk Plan	GRP	County
7	Group Risk Income Protection	GRIP	County
8	Group Risk Income Protection with Harvest Price Option	GRIP-HPO	County

Source: Edwards, 2011

Table 2: U.S. Crop Insurance Program Historical (1989-2011) Data

Year	Net Acres Enrolled (millions)	Policies Purchased (millions)	Indemnities Received (billions)	Net Indemnities Received (billions)	Farmer-Paid Premiums (billions)	Premium Subsidies (billions)	Loss Ratio	Subsidized Share of Total Premiums
1989	101.63	1.05	$1.21	$0.60	$0.61	$0.20	1.49	25%
1990	101.36	1.11	$0.97	$0.35	$0.62	$0.22	1.16	26%
1991	82.35	0.91	$0.96	$0.41	$0.55	$0.19	1.30	26%
1992	83.10	0.84	$0.92	$0.36	$0.56	$0.20	1.21	26%
1993	83.71	0.79	$1.65	$1.10	$0.56	$0.20	2.19	26%
1994	99.64	1.05	$0.60	-$0.09	$0.69	$0.25	0.63	27%
1995	220.51	2.45	$1.57	$0.91	$0.65	$0.89	1.02	58%
1996	204.86	2.23	$1.49	$0.64	$0.86	$0.98	0.81	53%
1997	182.19	1.85	$0.99	$0.12	$0.87	$0.90	0.56	51%
1998	181.83	1.74	$1.68	$0.75	$0.93	$0.95	0.89	50%
1999	196.92	1.80	$2.43	$1.52	$1.36	$0.95	1.05	41%
2000	206.47	1.94	$2.59	$1.40	$1.59	$0.95	1.02	37%
2001	211.33	1.91	$2.96	$1.77	$1.19	$1.77	1.00	60%
2002	214.86	1.89	$4.07	$2.89	$1.17	$1.74	1.39	60%
2003	217.41	1.92	$3.26	$1.87	$1.39	$2.04	0.95	59%
2004	221.02	1.99	$3.21	$1.50	$1.71	$2.47	0.77	59%
2005	245.86	1.97	$2.37	$0.76	$1.61	$2.34	0.60	59%
2006	242.08	1.95	$3.50	$1.61	$1.90	$2.68	0.77	59%
2007	271.63	1.93	$3.55	$0.81	$2.74	$3.82	0.54	58%
2008	272.26	1.96	$8.68	$4.52	$4.16	$5.69	0.88	58%
2009	264.78	2.05	$5.23	$1.70	$3.52	$5.43	0.58	61%
2010	256.28	2.03	$4.25	$1.37	$2.88	$4.71	0.56	62%
2011	265.82	2.07	$10.84	$6.34	$4.51	$7.46	0.91	62%

Source: USDA, RMA, 2012

Table 3: Eastern Arkansas Harvested Cropland Acres by Crop, 2010[16]

Crop	Irrigated	Non-Irrigated	Total	Irrigated Percent	Non-Irrigated Percent
Rice	1,758,000	0	1,758,000	100%	0%
Soybean	2,289,000	706,300	2,995,300	76%	24%
Cotton	706,300	46,700	753,000	94%	6%
Corn	557,055	149,245	706,300	79%	21%
Wheat	0	128,100	128,100	0%	100%
Sorghum	10,750	19,850	30,600	35%	65%
Total	***5,310,355***	***1,030,345***	***6,340,700***	***84%***	***16%***

Source: USDA, NASS, 2010

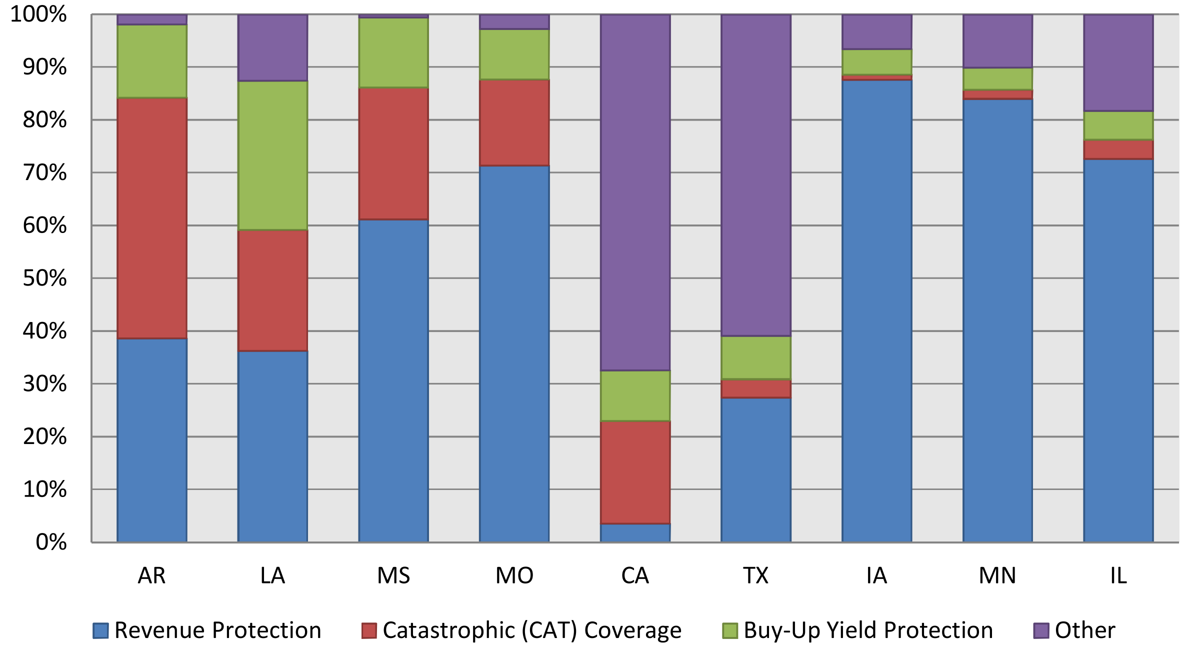
Table 4: Direct Expenses for Specific Items, Eastern Arkansas and Iowa, 2010

Crop Enterprise	Irrigation Fuel, Repairs, Maintenance ($/Acre)	Machinery Fuel, Repairs, Maintenance ($/Acre)	Fertilizer ($/Acre)	Pesticides ($/Acre)	Total Select Expenses ($/Acre)
			Eastern Arkansas		
Conventional Rice	107	49	137	91	385
Furrow Irrigated Cotton	43	67	101	89	299
Furrow Irrigated Corn	54	38	213	17	322
Furrow Irrigated Soybeans	43	31	51	53	178
			Iowa		
Corn	---	28	136	38	203
Soybean	---	24	59	24	107

Sources: University of Arkansas, Cooperative Extension Service, 2010; Iowa State University, Cooperative Extension Service, 2010

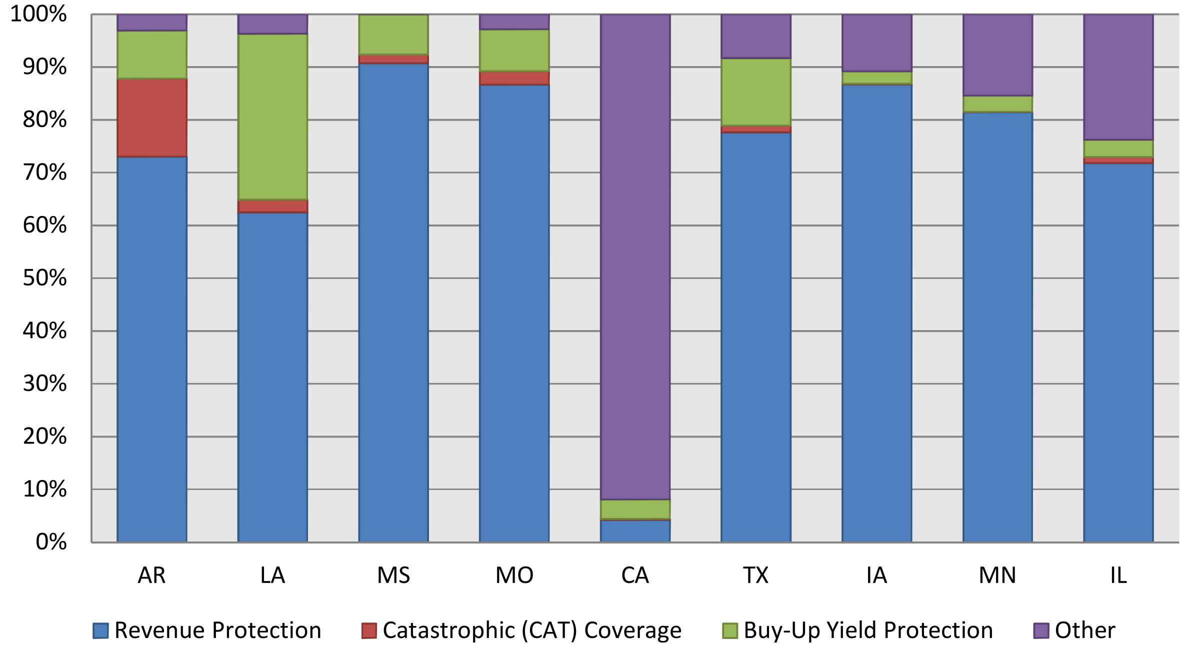
[16] 2010 Irrigated and non-irrigated acre splits for corn and sorghum based on percent irrigated and non-irrigated cropland splits reported in 2007 Census of Agriculture.

Figure 1: Selected U.S. States: Share of Total Crop Insurance Net Acres Insured, by Program (2011)



Source: USDA, RMA, 2012

Figure 2: Selected U.S. States: Share of Total Crop Insurance Indemnities Received, by Program (2011)



Source: USDA, RMA, 2012

Table 5: Arkansas Representative Panel Farm Characteristics

Farm Location County	Hoxie Lawrence	Leachville Mississippi	McGehee Desha	Stuttgart Arkansas	Wynne Cross
Medium Grain Rice	150	0	0	0	0
Long Grain Rice	1,300	0	1,875	1,620	700
Irrigated Soybeans	1,125	0	1,625	1,296	650
Full-Season Irrigated Soybeans	*0*	*0*	*1,625*	*0*	*0*
Double-Crop Irrigated Soybeans	*0*	*0*	*750*	*0*	*0*
Dryland Soybeans	125	0	0	0	50
Corn	300	0	1,500	0	0
Irrigated Cotton	0	4,750	1,500	0	0
Dryland Cotton	0	250	0	0	0
Wheat	0	0	1,000	324	0
Total Planted Acres	**3,000**	**5,000**	**7,500**	**3,240**	**1,400**

Figure 3: Proposed "Gross Margin" Crop Insurance Product Summary

1 Gross Margin Guarantee=Coverage Level*(Revenue Guarantee-Energy Cost Guarantee)
2 Revenue Guarantee=Projected Price*APH Yield
3 Energy Cost Guarantee=Projected Energy Cost
4 Actual Gross Margin=Actual Revenue-Actual Energy Cost
5 Actual Revenue=Harvest Price*Actual Yield
6 Actual Energy Cost=Actual Value of the Energy Cost
7 Gross Indemnity Payment=Gross Margin Guarantee-Actual Gross Margin
8 Net Indemnity Payment=Gross Indemnity Payment-Farmer-Paid Premium

Table 6: Annual Average Probabilities of Receiving an Indemnity Payment for the Yield Protection Program (2012-2016), by Farm, Crop and Yield Coverage Level

	Stuttgart			Wynne			Leachville		Hoxie				McGehee					
Coverage	**R**	**IR SB**	**W**	**R**	**IR SB**	**DL SB**	**IR CT**	**DL CT**	**R**	**CN**	**IR SB**	**DL SB**	**R**	**CN**	**W**	**IR CT**	**FS SB**	**DC SB**
50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
65%	0.00%	0.00%	6.08%	0.00%	0.00%	8.44%	0.00%	0.00%	0.00%	0.00%	0.00%	8.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
70%	0.00%	0.00%	7.56%	0.00%	0.00%	13.08%	0.00%	0.00%	0.00%	0.00%	2.52%	9.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
75%	0.00%	0.00%	8.76%	0.00%	0.00%	21.24%	0.00%	0.00%	0.00%	0.00%	16.00%	12.08%	0.00%	0.00%	0.00%	11.64%	0.00%	0.00%
80%	0.00%	0.00%	10.44%	0.00%	0.00%	29.40%	0.00%	0.00%	0.00%	0.00%	19.52%	15.52%	0.00%	5.48%	9.52%	17.88%	0.00%	0.00%
85%	0.00%	0.00%	12.40%	0.00%	0.00%	37.08%	0.00%	0.00%	0.00%	0.00%	26.16%	26.72%	0.00%	8.68%	19.52%	22.08%	2.28%	6.00%

Note: R, IR SB, W, DL SB, IR CT, DL CT, CN, FS SB and DC SB denote rice (payment rates do not vary by rice type), irrigated soybeans, wheat, dryland soybeans, irrigated cotton, dryland cotton, corn, full-season soybeans and double-crop soybeans respectively.

Table 7: Annual Average Probabilities of Receiving an Indemnity Payment for the Revenue Protection Program (2012-2016), by Farm, Crop and Yield Coverage Level

	Stuttgart			Wynne			Leachville		Hoxie				McGehee					
Coverage	**R**	**IR SB**	**W**	**R**	**IR SB**	**DL SB**	**IR CT**	**DL CT**	**R**	**CN**	**IR SB**	**DL SB**	**R**	**CN**	**W**	**IR CT**	**FS SB**	**DC SB**
50%	0.00%	0.00%	5.20%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.20%	0.16%	0.48%	0.12%	0.40%	6.28%	0.00%	0.00%	0.00%
55%	0.76%	0.00%	8.60%	1.12%	0.00%	0.96%	0.00%	0.00%	0.96%	0.88%	0.44%	1.72%	1.48%	1.20%	10.28%	0.00%	0.00%	0.00%
60%	2.56%	0.00%	13.24%	2.80%	0.00%	1.92%	0.00%	0.00%	2.56%	2.64%	0.76%	6.44%	3.12%	3.56%	15.24%	0.00%	0.04%	0.08%
65%	4.60%	0.20%	20.72%	5.60%	0.08%	10.52%	0.00%	0.00%	5.32%	5.32%	1.48%	9.04%	5.92%	6.48%	23.04%	0.16%	0.32%	0.56%
70%	7.56%	0.60%	27.28%	8.24%	0.80%	16.08%	0.00%	0.00%	7.84%	9.52%	5.40%	11.28%	8.48%	11.04%	29.72%	0.32%	1.16%	1.20%
75%	10.40%	1.20%	33.44%	11.28%	1.96%	24.28%	0.00%	0.00%	10.52%	14.20%	17.84%	13.92%	12.44%	16.56%	37.64%	11.88%	2.16%	1.96%
80%	14.12%	2.60%	40.52%	17.12%	2.88%	32.32%	0.48%	0.12%	15.40%	20.12%	21.92%	18.68%	17.84%	24.76%	46.92%	18.00%	3.00%	3.76%
85%	21.52%	3.96%	47.92%	25.08%	4.72%	40.20%	1.36%	0.84%	22.64%	25.44%	29.08%	29.52%	25.44%	32.36%	56.08%	22.40%	7.04%	8.92%

Note: R, IR SB, W, DL SB, IR CT, DL CT, CN, FS SB and DC SB denote rice (payment rates do not vary by rice type), irrigated soybeans, wheat, dryland soybeans, irrigated cotton, dryland cotton, corn, full-season soybeans and double-crop soybeans respectively.

Table 8: Annual Average Minimum, Maximum and Mean Net Indemnity Payments/Acre for the Yield Protection Program (2012-2016), by Farm, Crop and Yield Coverage Level

		Stuttgart			Wynne			Leachville		Hoxie				McGehee					
Coverage		**R**	**IR SB**	**W**	**R**	**IR SB**	**DL SB**	**IR CT**	**DL CT**	**R**	**CN**	**IR SB**	**DL SB**	**R**	**CN**	**W**	**IR CT**	**FS SB**	**DC SB**
70%	Min.	-6.06	-5.41	-10.84	-7.61	-5.66	-7.81	-5.41	-7.04	-10.19	-12.14	-5.09	-5.46	-7.68	-8.40	-6.81	-8.62	-6.41	-5.72
	Max.	-3.26	-2.93	32.27	-4.10	-3.06	26.17	-3.53	-4.60	-5.49	-6.65	-1.89	32.72	-4.14	-4.60	-3.52	-5.63	-3.46	-3.09
	Mean	-4.09	-3.77	-5.63	-5.13	-3.94	-3.33	-4.52	-5.88	-6.87	-9.01	-3.48	-1.74	-5.18	-6.24	-4.75	-7.19	-4.46	-3.98
85%	Min.	-30.12	-32.25	-39.49	-38.10	-33.83	-44.00	-21.42	-29.40	-46.04	-53.43	-30.50	-31.01	-37.51	-39.40	-25.26	-40.87	-31.32	-28.95
	Max.	-16.22	-17.43	79.66	-20.52	-18.29	49.60	-13.99	-19.20	-24.79	-29.27	64.33	53.26	-20.20	17.47	12.34	109.24	-16.31	-13.05
	Mean	-20.31	-22.46	-20.42	-25.70	-23.57	-18.12	-17.88	-24.55	-31.05	-39.66	-9.16	-14.73	-25.30	-26.30	-14.25	-14.65	-21.78	-19.95

Note: R, IR SB, W, DL SB, IR CT, DL CT, CN, FS SB and DC SB denote rice (payment rates do not vary by rice type), irrigated soybeans, wheat, dryland soybeans, irrigated cotton, dryland cotton, corn, full-season soybeans and double-crop soybeans respectively.

Table 9: Annual Average Minimum, Maximum and Mean Net Indemnity Payments/Acre for the Revenue Protection Program (2012-2016), by Farm, Crop and Yield Coverage Level

		Stuttgart			Wynne			Leachville		Hoxie				McGehee					
Coverage		**R**	**IR SB**	**W**	**R**	**IR SB**	**DL SB**	**IR CT**	**DL CT**	**R**	**CN**	**IR SB**	**DL SB**	**R**	**CN**	**W**	**IR CT**	**FS SB**	**DC SB**
70%	Min.	-11.22	-7.40	-13.79	-13.30	-7.63	-8.95	-14.09	-13.32	-16.05	-16.84	-7.15	-6.43	-13.53	-12.69	-9.48	-19.05	-8.94	-7.58
	Max.	248.76	25.67	181.04	292.97	20.70	79.96	-9.20	-8.70	280.48	160.58	113.85	62.58	328.19	204.74	168.79	28.79	47.17	42.79
	Mean	1.02	-5.02	5.00	1.88	-5.20	-2.24	-11.76	-11.12	-1.10	-6.73	-3.49	-1.20	2.64	-1.56	10.01	-15.76	-5.93	-4.95
85%	Min.	-55.13	-41.05	-50.83	-64.98	-44.44	-50.53	-56.62	-54.04	-71.62	-70.84	-41.16	-36.06	-64.85	-58.55	-36.48	-82.03	-43.03	-37.37
	Max.	437.97	72.23	219.13	489.84	82.72	97.70	-0.08	-26.89	465.07	240.32	180.07	84.98	533.14	304.82	221.13	309.75	119.31	90.01
	Mean	-2.15	-26.89	2.35	-0.88	-28.48	-16.06	-46.76	-44.95	-10.08	-26.24	-9.51	-14.47	2.38	-8.61	17.82	-32.10	-26.83	-23.12

Note: R, IR SB, W, DL SB, IR CT, DL CT, CN, FS SB and DC SB denote rice (payment rates do not vary by rice type), irrigated soybeans, wheat, dryland soybeans, irrigated cotton, dryland cotton, corn, full-season soybeans and double-crop soybeans respectively.