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# Center for Agricultural Policy and Trade Studies North Dakota State University

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## AGRICULTURAL POLICY BRIEF

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### **Impacts on North Dakota Farms under Potential Changes In Federal Crop Insurance Subsidies**

*Richard D. Taylor*  
*Won W. Koo\**

The main topic influencing the recent discussions of the 2013 Farm Bill has been the federal budget deficit. The current federal budget deficit is \$1.089 trillion. It is projected to be \$991 billion in 2013. The deficit amounted to 31% of total federal spending in 2012 and will be 27% in 2013. Most recent spending bills have been reviewed closely to determine areas where spending can be removed from the legislation. Farm bill spending on the commodity title has been limited recently to direct payments, since commodity prices have been well above target prices. However, both the premium subsidies and actuarial soundness of the federal crop insurance program has come under review as a possible source of further budget reductions.

Nationwide, the federal crop insurance premium subsidy amounted to about \$26 per acre or 38% of the premium. In North Dakota the premium subsidy was about \$32 per acre or about 38% of the premium. In 2012 and 2011 the total federal crop insurance premium subsidy nationwide was \$7.0 billion and \$7.5 billion, respectively. In North Dakota the subsidy was \$618 million in 2012 and \$679 million in 2011.

The object of this study is to evaluate the potential impacts on North Dakota agriculture of changes in crop insurance premium subsidies. A Base model and two alternative scenarios were developed to estimate the impact on North Dakota farms if the federal crop insurance premium subsidies were discontinued. The Base Model was used to represent the current situation with established subsidies. The first alternative scenario, W/O, was developed without the premium subsidies. In this scenario producers would buy insurance at a lower coverage level compared to the current situation. For example, a RRV corn producer who purchased coverage for corn at the 83.74% level with subsidy would, with the loss of the subsidy, purchase coverage level of 65.33%. The out-of-pocket cost would be the same under both conditions. Scenario 2, Pay Diff, the producer would carry the same level of coverage but pay the difference. For example, a NC canola grower would carry 74.22 % coverage level under this scenario and would pay the additional \$26.53 per acre for the insurance.

The North Dakota Representative Farm Model, operational at the Center for Agricultural Policy and Trade Studies at North Dakota State University will be used to estimate the impacts of the removal of federal crop insurance premium subsidies to producers. @Risk computer program is used to generate 1000 observations, using the standard deviation and mean of commodity yields, to represent producer's crop production variation. The Base and alternative scenarios were compared and the results are reported below.

*\* Research Scientist, and Professor and Director, respectively, in the Center for Agricultural Policy and Trade Studies in Fargo, North Dakota.*

The North Dakota Representative Farm model divides the state into four regions (Figure 1). They are the Red River Valley (RRV), North Central (NC), South Central (SC), and Western (West) (Figure 1). The farms in each region are representative of the average, high, and low-profit farms; and small, medium, and large-size farms enrolled in the North Dakota Farm and Ranch Business Management Education Program

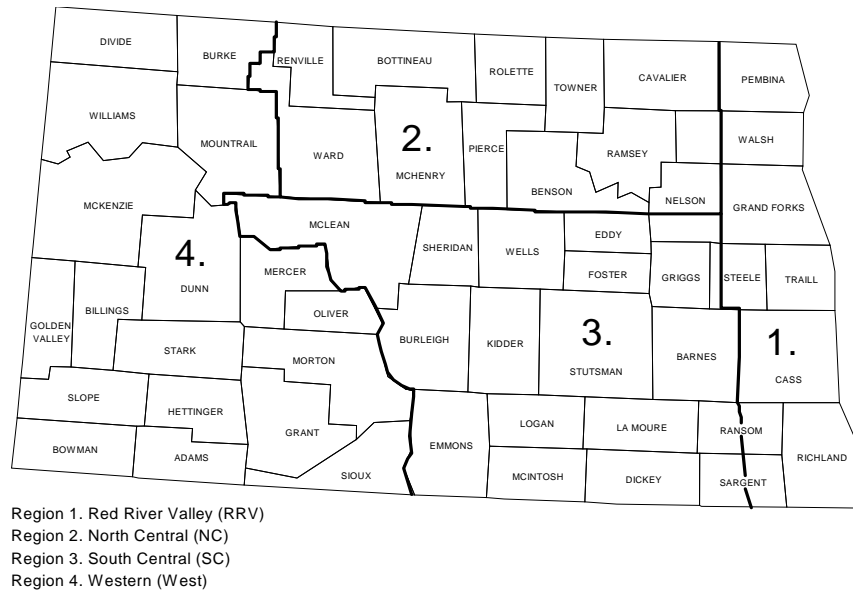


Figure 1. North Dakota Farm and Ranch Business Management Regions

Table 1

shows the average federal crop insurance premiums and premium subsidies for North Dakota Representative Farms. Insurance premiums and subsidies are the highest for corn and the lowest for wheat. Insurance coverage for corn averages about \$500 per acre compared to \$230 for wheat. In the RRV, the average premium for corn is \$78 per acre which provides \$564 per acre coverage which amounts to a premium coverage ratio of 13.8%. The premium coverage ratio for soybeans in the NC region is 16.8% and the premium coverage ratio for wheat in the West region is 16.6%. Crops which carry larger risk of loss will also carry higher premium coverage ratios.

The four medium size farms in the North Dakota Representative Farm Model were used for this study. They averaged 1,460 insured acres in the RRV, 1,926 acres in the NC region, and 1,540 acres in the SC region and, 2,394 acres in the West region. Table 2 shows the per-acre premium subsidy and total subsidy for each representative farm. The highest subsidy is in the RRV and the lowest is in the West region.

**Table 1. North Dakota Average Federal Crop Insurance Premiums and Subsidy Level by Crop and Region**

		Actual Premium Paid	Subsidy
		-----dollars-----	
RRV	Wheat	38.11	21.94
RRV	Soybeans	29.64	18.08
RRV	Canola	34.18	20.75
RRV	Barley	32.68	20.00
RRV	Corn	62.96	39.98
NC	Soybeans	30.95	20.25
NC	Wheat	29.41	18.99
NC	Sunflowers	50.23	31.26
NC	Barley	28.69	18.30
NC	Canola	31.83	20.26
NC	Corn	62.01	42.17
SC	Sunflowers	46.13	28.11
SC	Soybeans	32.55	20.54
SC	Wheat	26.53	17.12
SC	Barley	27.76	18.22
SC	Corn	52.62	36.11
SC	Canola	26.90	17.19
West	Corn	39.53	27.09
West	Sunflowers	38.78	25.45
West	Canola	26.29	16.24
West	Wheat	24.14	15.23
West	Barley	26.27	17.23

**Table 2. Total and Per Acre Crop Insurance Subsidy for North Dakota Representative Farms by Region**

	Total Subsidy	Per Acre
	dollars	dollars/acre
RRV	38,476	26.35
NC	49,003	25.44
SC	36,319	23.58
West	44,377	18.54

Table 3 shows the estimated insurance coverage levels without premium subsidies. The coverage levels were estimated with an econometric technique using data from the Risk Management Agency website (Survey of Business data base). For most crops and most locations, the reduction in crop insurance coverage without the subsidies is 12%-14%. However, the crop insurance coverage is about 22% lower for corn.

The Base scenario uses the current coverage ratio while the W/O scenario uses the coverage ratio without premium subsidies. It is expected that the W/O scenario will provide less income protection, lower average incomes, and more volatile distribution of income.

**Table 3. Current Coverage Level and Estimated Coverage Level Without Premium Subsidy by Region and Crop**

		Current Coverage %	Coverage % Without Subsidy
RRV	Barley	75.40	65.71
RRV	Soybeans	72.61	63.60
RRV	Wheat	72.91	62.70
RRV	Corn	83.74	65.33
RRV	Canola	74.36	64.34
NC	Wheat	72.94	63.60
NC	Soybeans	71.47	61.80
NC	Barley	73.16	64.14
NC	Canola	74.22	64.41
NC	Corn	83.35	63.97
NC	Sunflowers	74.61	61.27
SC	Canola	74.05	65.39
SC	Barley	74.06	64.94
SC	Wheat	72.34	63.68
SC	Corn	81.99	65.09
SC	Soybeans	71.48	61.71
SC	Sunflowers	72.98	60.72
West	Canola	72.84	64.48
West	Sunflowers	70.07	58.73
West	Wheat	71.67	63.63
West	Corn	76.04	63.12
West	Barley	71.87	63.09

Table 4 shows the average and maximum crop insurance payments and the number of times payment were made during the 1000 observations run under the Base and alternative scenarios. Under the Base scenario, the average payment ranged between \$5,510 in the RRV and \$14,465 in the West. In the alternative scenario, W/O, the average payment ranged between \$1,098 in the

RRV and \$5,290 in the West. The payment range for the Pay Diff scenario is the same as the Base scenario because the level of insurance coverage is the same.

Under the Base scenario the frequency of payments varied between 73 times in the RRV and 223 times in the NC region per 1000 observations. Under the alternative scenario, W/O, the frequency of payments dropped to 24 times in the RRV and 108 times for the NC region, because of lower coverage levels. The frequency of payments under the Pay Diff scenario are the same as the Base scenario because of similar coverage levels.

Insurance provides protection for the catastrophic event. The maximum payments made under both the Base and Pay Diff scenarios are \$241 thousand in the RRV, \$225 thousand in the West region, \$168 thousand in the SC region and \$144 thousand in the NC region. Because of lower coverage, the maximum payments fall to \$142 thousand in the RRV, \$168 thousand in the West region, \$100 thousand in the SC and \$97 thousand in the NC region. Maximum insurance payments dropped 41% for the RRV and 25% in the West region.

**Table 4. Average and Maximum Federal Crop Insurance Payment and Number of Payments Made by Region**

Payment and Number of Payments Made by Region				
	RRV	NC	SC	West
	-----dollars-----			
<b>Average Payment</b>				
Base	5,510	11,302	7,411	14,465
W/O <sup>a</sup>	1,098	3,699	1,211	5,290
Pay Diff <sup>b</sup>	5,510	11,302	7,411	14,465
<b>Maximum Payment</b>				
Base	240,949	144,079	168,201	225,390
W/O <sup>a</sup>	142,346	97,437	100,180	168,497
Pay Diff <sup>b</sup>	240,949	144,079	168,201	225,390
<b>Number of Payments</b>				
Base	73	223	141	218
W/O <sup>a</sup>	24	108	38	106
Pay Diff <sup>b</sup>	73	223	141	218

a W/O represents a scenario with reduced insurance coverage due to the loss of government subsidies

b Pay Diff represents a scenario with the same level of insurance coverage by paying higher premiums

Table 5 shows the average net farm income, the standard deviation, the minimum and maximum level of net farm income under the Base and alternative scenarios. Average net farm income is \$9,174 lower in the West region under the alternative scenario (W/O) compared to \$7,603 lower in the NC region, \$6,201 lower in the SC region, and \$4,412 lower in the RRV. Under the Pay Diff scenario, net farm income is lower due to the higher crop insurance premiums.

Net farm income is more volatile under the W/O scenario because of the lower crop insurance coverage. The standard deviation increased by 6% in the RRV and between 9% and 10% in the rest of the state.

Under the Base scenario, the minimum net farm incomes for the North Dakota representative farms are never below zero. However, under the alternative scenario, W/O, net farm income fall as low as -\$83,645 in the RRV. While under the other alternative scenario, Pay Diff, net farm income falls as low as -\$36,570 in the West region. The maximum net farm income level is the same for the base and W/O scenarios as crop insurance payments are not made. The maximum net farm income under the Pay Diff scenario is lower by the additional crop insurance premium payments.

**Table 5. North Dakota Representative Farm Average Net Farm Income, Minimum and Maximum Net Farm Income and Standard Deviation of Net Farm Income by Region**

	RRV	NC	SC	West
<b>Average</b>	-----dollars-----			
Base	222,854	125,951	148,602	139,046
W/O <sup>a</sup>	218,442	118,348	142,401	129,872
Pay Diff <sup>b</sup>	184,378	76,948	112,283	94,669
<b>Standard Deviations</b>				
Base	131,272	92,533	108,293	120,227
W/O <sup>a</sup>	139,301	102,191	117,718	131,319
Pay Diff <sup>b</sup>	131,272	92,533	108,293	120,227
<b>Minimum</b>				
Base	14,958	18,913	1,575	7,807
W/O <sup>a</sup>	(83,645)	(27,729)	(66,445)	(49,085)
Pay Diff <sup>b</sup>	(23,518)	(30,090)	(34,744)	(36,570)
<b>Maximum</b>				
Base	613,167	414,123	464,611	575,206
W/O <sup>a</sup>	613,167	414,123	464,611	575,206
Pay Diff <sup>b</sup>	574,691	365,120	428,292	530,829

a W/O represents a scenario with reduced insurance coverage due to the loss of government subsidies

b Pay Diff represents a scenario with the same level of insurance coverage by paying higher premiums

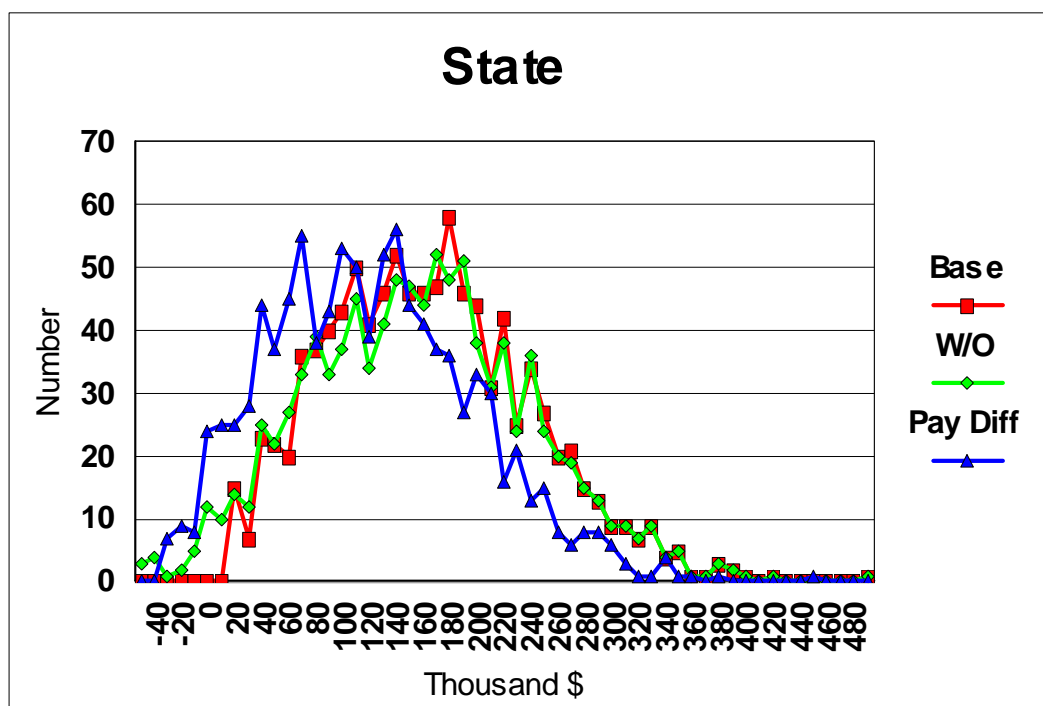


Figure 2. Distribution of State Average Net Farm Income Under the Base and Alternative Scenarios

Figure 2 shows the state average net farm income under the three different scenarios. The main difference between the Base and W/O scenarios occurs at income levels below \$60 thousand. At the levels above that, there are very few differences. Differences between the Base scenario and Pay Diff scenario are apparent at all levels of income as the loss of the premium subsidy is an additional expense for the producer.

### Summary

North Dakota farmers insure about 23 million acres per year under the federal crop insurance programs. The premium subsidy for 2012 was \$618 million. If producers chose to carry a similar amount of coverage, the loss of that subsidy would lower net farm income by that amount. Compared to North Dakota net farm income in 2011, the most recent data available, the loss of premium subsidies would amount to a 16.6% reduction in North Dakota net farm income. Producers who chose to reduce insurance coverage would not see their net farm income drop as far. However, the increased volatility of net farm income would provide additional financial risk to North Dakota producers.

The alternative scenario where producers reduced the insurance coverage provides slightly lower average incomes, between \$7,000 and \$10,000 with greater volatility. The potential for large net income losses is greater under this scenario. The alternative scenario where producers purchased similar coverage level, provides the same coverage as the Base scenario; however, the operating expenses increase by the amount of the subsidy.

Whether a producer should pay the higher premiums or reduce coverage is up to the producer. In general, this study found that the scenario with the lower level of insurance coverage provides



higher income level than the scenario where producers pay higher premiums; however the lower level of insurance allows more income volatility and higher risks to be transferred to the producer.