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**Center for Agricultural Policy and Trade Studies**  
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# **AGRICULTURAL POLICY BRIEF**

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## **The Impact of the 2014 Farm Bill On North Dakota Net Farm Income**

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### **INTRODUCTION**

The U.S Congress passed a new farm bill in February of 2014. The bill is titled the Agricultural Act of 2014. The bill focuses on protection from the volatile nature of agriculture and repealed direct payments, counter-cyclical payments (CCP), Average Crop Revenue Election (ACRE) and Supplemental Revenue Assistance Payment program (SURE) programs, which were the core programs in recent farm bills. They are replaced with the Agricultural Risk Coverage (ARC), the Price Loss Coverage (PLC), and the Supplemental Coverage Option (SCO).

This study evaluates the impacts of the new farm bill on North Dakota net farm income, by focusing of the differences in the PLC and the ARC options.

### **Brief Summary of the 2014 Farm Bill**

The 2014 farm bill reduces commodity program spending by \$14.3 billion over the 10-year period. The bill increases crop insurance spending by \$5.7 billion over that period. Producers have a one time option of choosing between the PLC and the ARC program. Producers have to choose between the two options as the default is no program participation and no payments in 2014. In 2015 through 2018 the default program is the PLC. Producers have the one time option to update base acres.

The sugar program is maintained while the dairy program is overhauled. The bill slightly loosens the current planting restrictions on fruits and vegetable on acres receiving commodity payments.

The 2014 bill has a \$125,000 (\$250,000 for married couple) payment limit and a provision where individuals with an adjusted gross income exceeding \$900,000 would lose government payments.

Under the new farm bill three new programs were created; the Agricultural Risk Coverage (ARC), the Price Loss Coverage (PLC) and the Supplemental Coverage Option (SCO). The SCO is an insurance program which is not considered in this study. The SCO is an insurance product which will be purchased from a crop insurance agency. It is available for crops which are enrolled in the PLC and will not be available until 2015. It will provide county level protection

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which the government will pay 65% of the premium. The producer is required to purchase a minimum level of catastrophic insurance coverage (CAT) or higher. The ARC is similar to the old ACRE program as it is a revenue protection program. However there are two main differences, the ARC is calculated on the county while the ACRE was calculated on the state level and paid on planted acres. The ARC has two options which producers can choose from; a county option where revenue loss is based on county revenue and a farm option where revenue loss is based on farm revenue. The protection level for the county option is 85%, while the protection level for the farm option is 65%.

The PLC is similar to the old counter-cyclical program. The PLC has a series of reference prices which act as a minimum price for the determination of government payments, while the ARC is based on a five year Olympic average prices and yields.

The producer has a one-time option of choosing either the PLC or the ARC county option. It is a crop by crop decision. The ARC farm option includes all crops grown on the farm. The PLC provides price protection based on the reference prices, while the ARC provides revenue coverage based on an Olympic average of county yields and national prices.

Table 1 shows the reference prices for the PLC program. Payments are made to producers when the national market prices fall below reference prices. Payments for each crop are calculated under the PLC option as follows:

PLC Payment = (Reference Price - NAMP) \* (Base acres \* (0.85) \* PLC yield) where NAMP is national average market price. PLC yield is the same as the countercyclical yields, however they can be updated.

The payment for each crop under the ARC is based on the 5-year Olympic average of national prices of commodities and county crop yields if actual revenue is less than 86% of benchmark revenue. The payments are calculated as:

$$\text{ARC Payment} = (0.86 * \text{BR} - (\text{annual NAMP} * \text{annual yield}) * 0.85 * \text{Base Acres}$$

where BR = benchmark revenue (5-year Olympic price \* 5-year Olympic yield). One payment constraint is that the ARC payment cannot exceed 10% of the benchmark revenue. For the farm option under the PLC, the payment is based on whole farm revenue and made on 65% of the base acres.

The producer may choose different options for different crops as long as they choose the county option under the ARC. Both the PLC and ARC county options are based on base acres, not planted acres.

| <b>Table 1. Price Loss Coverage (PLC) Reference Prices</b> |          |  |
|--|----------|--|
|  | - \$/bu- |  |
| Wheat  | 5.50     |  |
| Corn   | 3.70     |  |
| Barley   | 4.95     |  |
| Soybeans   | 8.40     |  |
|  | -\$/cwt- |  |
| Minor Oils   | 20.15    |  |

### Congressional Budget Office Estimate Spending

The congressional budget office (CBO) has estimated that spending cuts from the farm bill would amount to \$956 billion over a ten year period. Most of that savings would come from nutrition programs (\$756 billion). Table 2 shows the changes in spending for the commodity title of the farm bill for the years 2014 through 2018. Savings from the repeal of the Direct Payments amounts to the majority of the budget savings. Estimated annual savings are \$4.538 billion for the five year total of \$18.2 billion. Savings from the repeal of the CCP and ACRE amounts to \$489 million and \$2.5 billion over the five year period. Estimated spending for the PLC is \$5.1 billion compared to \$6.5 billion for the ARC. The CBO estimates no PLC or ARC payments will be made for either 2014 or 2015, however payments may be earned in 2015 but not paid until 2016.

| <b>Table 2. Congressional Budget Office Spending Estimates, 2014-2018</b> |                     |         |         |         |         |          |
|---|---------------------|---------|---------|---------|---------|----------|
|   | 2014                | 2015    | 2016    | 2017    | 2018    | Total    |
| Programs  | -----million\$----- |         |         |         |         |          |
| Repeal Direct Payments  | 0                   | (4,538) | (4,538) | (4,538) | (4,538) | (18,152) |
| Repeal Countercyclical Payments   | 0                   | 0       | (117)   | (182)   | (190)   | (489)    |
| Repeal ACRE   | 0                   | 0       | (1,336) | (2,494) | (462)   | (2,494)  |
| Price Loss Coverage   | 0                   | 0       | 1,652   | 1,755   | 1,708   | 5,115    |
| Agricultural Risk Coverage  | 0                   | 0       | 2,115   | 2,327   | 2,086   | 6,528    |
| Dairy Program   | 81                  | (51)    | 59      | 23      | 130     | 242      |
| Supplemental Agricultural Disaster Assistance                             | 897                 | 364     | 314     | 296     | 295     | 2,166    |
| Other   | 95                  | 581     | 25      | 18      | 32      | 751      |
| Total   | 1,073               | (3,644) | (1,826) | (997)   | (939)   | (6,333)  |

Source: Congressional Budget Office



**ANALYTICAL METHOD- NORTH DAKOTA REPRESENTATIVE FARM**

The North Dakota Representative Farm Model is used to analyze the economic effects of the new farm bill on farm income and protection level from risk stemming from market prices and crop yields. The model is a stochastic simulation model designed to analyze changes in farm income under alternative market conditions and farm policies for ND farmers. The model projects average net farm incomes, debt-to-asset ratios, cash rents, and cropland prices for representative farms producing six major crops: wheat, barley, corn, soybeans, canola and sunflowers. However, this study focuses on the differences in net farm income for representative farms under the ARC and PLC options of the farm bill. The model is linked to the USDA and North Dakota econometric simulation models, and it uses the prices of the crops generated from these models. The model uses an average trend yield based on historical data and average predicted prices received by farmers based on the historical relationships between the national prices and North Dakota prices. In addition, macro variables (GDP growth rate and exchange rate), trade policies, and agricultural policies are incorporated into the model. This study focuses on impacts of the two options of the new farm bill on North Dakota net farm income.

The model has 24 representative farms: six farms in each of the four regions of North Dakota. These regions are the Red River Valley (RRV), North Central (NC), South Central (SC), and Western (West). 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. This study is based on average net farm income for the average profit farm. The model consists of four components: net farm income, debt-to-asset ratio, land price and cash rent.

The model is based on the 2012 crop year since the production data for 2013 was not available. However, the price levels in the models were updated to reflect 2013 prices.

The Model uses the software program @Risk for stochastic simulation. All yield variables are assumed to have a normal distribution with the mean value and standard deviation. Likewise, the prices of commodities are assumed to be log-normal distribution. The model is simulated 3,000 times, which allows the output to develop stable means and distribution (see Policy Brief No.22 for details).

Table 2 shows the crop mix of the representative farms in the model. The average size of the RRV is 1,731 acres while the NC, SC and West farms average 2,036, 1,780 and 1,942 acres, respectively.

| <b>Table 2. Crop Mix of Average Profit North Dakota Representative Farms, 2012</b> |                 |       |        |      |          |        |           |       |
|--|-----------------|-------|--------|------|----------|--------|-----------|-------|
|  | Swt             | Durum | Barley | Corn | Soybeans | Canola | Sunflower | Sugar |
|  | -----acres----- |       |        |      |          |        |           |       |
| RRV  | 263             | 0     | 3      | 340  | 664      | 0      | 30        | 144   |
| NC   | 479             | 48    | 114    | 0    | 252      | 206    | 21        | 0     |
| SC   | 277             | 8     | 87     | 265  | 515      | 0      | 55        | 0     |
| West   | 494             | 101   | 20     | 0    | 0        | 0      | 166       | 0     |

It is assumed that Federal crop insurance is carried at the 75% level. The North Dakota commodity prices for crops are obtained from the North Dakota Farm and Ranch Business Management Association reports. The 5-year Olympic national price was calculated for each

crop from the data obtained from the USDA. Variation in commodity prices (the standard deviation) was calculation from the national marketing year price for each crop. Those standard deviations were used in the model to estimate potential revenue variations.

Crop yields in each region were obtained from the North Dakota Farm and Ranch Business Management Association reports. The standard deviations of the yields were estimated from the data. Other data needed for the model are obtained from the North Dakota Farm and Ranch Business Management Association (farm record system data).

Even though estimated commodity prices are higher than the reference prices, PLC payments may be made in some situations because the software randomly chooses commodity prices based on the mean and standard deviation of each price. As the average price falls, the chance of a selected price being lower than the reference prices increases. Thus average PLC payments will increase.

## RESULTS

The results present an annual average NFI for the 5 year period of the farm bill (2014-2018) (Table 4). The Table shows the differences in net farm income for the four regions of the state. Under the ARC option, the RRV farm has an average NFI of \$117,425 compared to \$112,286 under the PLC. Likewise, NFI is higher in the NC, SC, and West regions under the ARC compared to the PLC. Average government payments for the farms are larger under the ARC than the PLC. Payments are also made more frequently under the ARC than the PLC. Over the five years of the farm bill, under the estimated price levels, the ARC provides higher NFI than does the PLC option.

| <b>Table 4. Estimated NFI, Average Payment and Frequency of Government Payments Under the ARC and PLC Options</b> |          |              |         |
|---|----------|--------------|---------|
|   | Scenario | ARC          | PLC     |
|   |          | -----\$----- |         |
| Net Farm Income   | RRV      | 117,425      | 112,286 |
|   | NC       | 101,832      | 98,256  |
|   | SC       | 115,482      | 110,256 |
|   | West     | 97,256       | 94,256  |
| Average Payment   | RRV      | 8,578        | 3,565   |
|   | NC       | 6,425        | 3,482   |
|   | SC       | 7,532        | 2,953   |
|   | West     | 5,482        | 2,485   |
|   |          | -----%-----  |         |
| Frequency of Payments   | RRV      | 22           | 12      |
|   | NC       | 26           | 16      |
|   | SC       | 21           | 14      |
|   | West     | 36           | 22      |

Table 5 shows the estimated commodity prices from the USDA, the NFI under both options and the amount of government payments by year from 2014 through 2018. USDA expects commodity prices to stay above reference prices for 2014. However, wheat prices are expected to fall below reference prices in 2015 and 2016. Corn and soybean prices fall but they are expected to remain above reference prices.

| <b>Table 5. Estimated Commodity prices, NFI and Government payments under the ARC and the PLC Options in the 2014 Farm Bill</b> |                 |      |          |               |               |                           |        |
|---|-----------------|------|----------|---------------|---------------|---------------------------|--------|
|   | Wheat           | Corn | Soybeans | NFI Under ARC | NFI Under PLC | Government Payments Under |        |
|   |                 |      |          |               |               | ARC                       | PLC    |
|   | -----\$/bu----- |      |          | -----\$-----  |               |                           |        |
| 2014  | 6.20            | 4.40 | 12.50    | 120,249       | 110,764       | 7,104                     | 2,047  |
| 2015  | 5.39            | 3.92 | 11.25    | 108,652       | 109,855       | 9,356                     | 12,762 |
| 2016  | 5.34            | 3.96 | 11.36    | 96,562        | 99,365        | 9,053                     | 11,632 |
| 2017  | 5.50            | 4.07 | 11.59    | 102,524       | 99,842        | 8,965                     | 5,126  |
| 2018  | 5.67            | 4.23 | 11.82    | 107,482       | 101,925       | 7,459                     | 2,762  |
| Average   | 5.62            | 4.12 | 11.70    | 107,074       | 104,350       | 8,387                     | 6,866  |

Average state NFI under the ARC option is expected to be higher in 2014 than under the PLC option as commodity prices are above the reference prices. In 2015 all commodity prices are expected to fall from the 2014 levels according to the USDA projections of commodity prices. That reduction in the price levels will increase average PLC payments above ARC payments, thus the PLC will provide higher net farm incomes than the ARC in both 2015 and 2016. The expected increases in commodity prices for 2017 will reduce PLC payments and allow the NFI under the ARC option to provide higher protection. In 2018 the ARC will also provide higher incomes. In general the impact of the two options depends upon movements of commodity prices during the next five years. If the prices of commodities remain stable at the current level, the ARC may provide better income protection than the PLC. However, if the prices of commodities continue to decline, the PLC option could provide better protection.

### Summary and Implications

Both options of the 2014 farm bill address the problem of the volatile nature of agriculture, but from different directions. The ARC payments are based on a 5-year Olympic average which provides higher support with higher commodity prices, however that support fades if commodity price falls for several years in a row. The PLC option is based on a series of reference prices which provides a floor under the market to support the minimum price protection. This study shows that over the life of the farm bill the ARC provides higher support than the PLC, however during the two years of low commodity prices, the PLC provides more short term support. Crop insurance will continue to provide the majority of revenue protection for producers.

The decision for the producer regarding choosing either the ARC or the PLC option has to be based on his or her perception of future prices. If prices remain near the current levels, the ARC will provide higher support. However, if price levels fall near or below reference price levels for several years, then the PLC will provide higher levels of support.

## References

Aakre, Dwight and Andrew Swenson. 2014 Farm Bill "The Agricultural Act of 2014. Departmental Seminar. February 2014. North Dakota Extension Service. NDSU. Fargo ND.

Congressional Budget Office. Letter Addressed to Honorable Frank D Lucas, dated January 28, 2014. U.S. Congress Washington D.C.

Federal Agriculture Reform and Risk Management Act of 2013. National Farmers Union. Summary, House Agricultural Committee Farm Bill Draft. May 10, 2013.

National Council of Farmer Cooperatives. Farm Bill: Agricultural Act of 2014. Washington DC.

North Dakota Farm and Ranch Business Management Annual Reports 2011 and 2012. North Dakota State Board for Vocational Education, Bismarck, ND.

Taylor, Richard D., Won W. Koo and Andrew L. Swenson. 2013. 2013 North Dakota Agricultural Outlook: Representative Farms, 2013-2022. Agribusiness & Applied Economics Report No. Pending, Center for Agricultural Policy and Trade Studies. North Dakota State University, Fargo.

Taylor, Richard D. and Won W. Koo. An Economic Analysis of the Revenue Loss Assistance Program. Agricultural Policy Brief. No. 22. April 2012. Center for Agricultural Policy and Trade Studies. North Dakota State University. Fargo.

Taylor, Richard D., and Won W. Koo. Economic Comparison of the Senate and House Versions of the 2012 Farm Bills. Agricultural Policy Brief. No. 25. May 2013. Center for Agricultural Policy and Trade Studies. North Dakota State University. Fargo.

Taylor, Richard D., and Won W. Koo. Economic Comparison of the Senate and House Versions of the 2013 Farm Bills. Agricultural Policy Brief. No. 30. August 2013. Center for Agricultural Policy and Trade Studies. North Dakota State University. Fargo.



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