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# AGRICULTURAL POLICY BRIEF

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## Analysis of the USDA's 2007 Farm Bill Proposal

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### INTRODUCTION

The current farm bill, which was implemented in 2002, will expire on September 30, 2007. If a new farm bill is not agreed on by that date, the law will revert to the permanent legislation of 1949. The 1996 farm bill (FAIR Act), which preceded the current farm bill, was a change in the direction for federal farm policy. Planting restrictions for program crops were removed to allow producers to respond to market signals. Transition payments were made, with the understanding that they would end after seven years, thereby removing government involvement in agricultural policy. The bill was passed during a period of high prices which convinced everyone that governmental support of agriculture was no longer necessary. Shortly after passage, market prices fell for most commodities, which made the major provisions of the FAIR Act unworkable. Beginning in 1998, emergency disaster payments were made each year to producers to increase net farm income and provide support for the commodity producers in the country. The 2002 farm bill was designed to provide a safety net which would provide support when market prices fell. In most sectors, the 2002 farm bill was well received and was viewed positively by lawmakers and producers. Two major changes in the commodity sections of the bill were that the transition payments were converted into direct payments and a counter-cyclical payment program was designed to replace the emergency disaster declarations.

The negotiations for a new farm bill began in 2006, but no major proposals were released until January 2007. Recently the USDA released a proposal for the 2007 farm bill. The objective of this study is to estimate the impact of the USDA's new farm bill proposal on North Dakota agriculture compared to the current farm bill.

The proposal is designed to lower commodity payments, tighten payments limits, and change the way that the counter-cyclical payments (CCP) are determined. The spending target is \$18 billion less than that for the current farm bill over the life (6 years) of the proposed legislation. Besides changes to the commodity section of the farm bill, additional spending is proposed for conservation, renewable energy, rural development, and export promotions. The major provisions of the commodity section of the bill include higher direct payment rates, lower marketing loan rates and the conversion of the price-based CCP into a revenue-based CCP. In addition, the proposed farm bill would limit federal payments based on adjusted gross income (AGI). If an individual's AGI is larger than \$200,000 for three consecutive years, no federal payments would be made. The past farm bills had an AGI limit of \$2.5 million. In theory, the proposed payment limit would impact only a few of the largest producers in North Dakota. The marketing loan program would be changed under the USDA's proposal. Current loan rates would be lowered and the level would be determined each year based on a five-year Olympic average subject to maximum levels. This would allow loan rates to fall in response to low prices but prevent loan rates from rising during periods of higher prices. The CCP program would be changed from a price-based system to a revenue-based system, based on national yields and prices.

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## METHODOLOGY

The North Dakota Representative Farm Model was used to analyze both the current and the new proposed farm bill to estimate the impacts on the various sizes of representative farms. The North Dakota Representative Farm Model divides the state into four regions (Figure 1) with three sizes of farms in each region. Characteristics of the representative farms are summarized in Table 1. The large-size farm in the sample has about 3,500 acres of crop land, while the medium-size farm has about 1,500 acres of crop land. The medium-size farm is typically known as a family farm. The small-size farm generally has less than 500 acres. Major crops produced by these farms are wheat, corn, soybeans, barley, sunflowers, and canola. The model is based on data obtained from the North Dakota Farm and Ranch Business Management Association and prices are linked to historical national prices adjusted to North Dakota basis. A computer software, "Risk" by Palisades, is used to determine uncertainty associated with future prices and yields, which is calculated based on historical changes in prices and yields. Since future prices and yields are not known with certainty, distributions of possible net farm incomes are used to estimate the impact of the proposed farm bill on various sizes of farms.

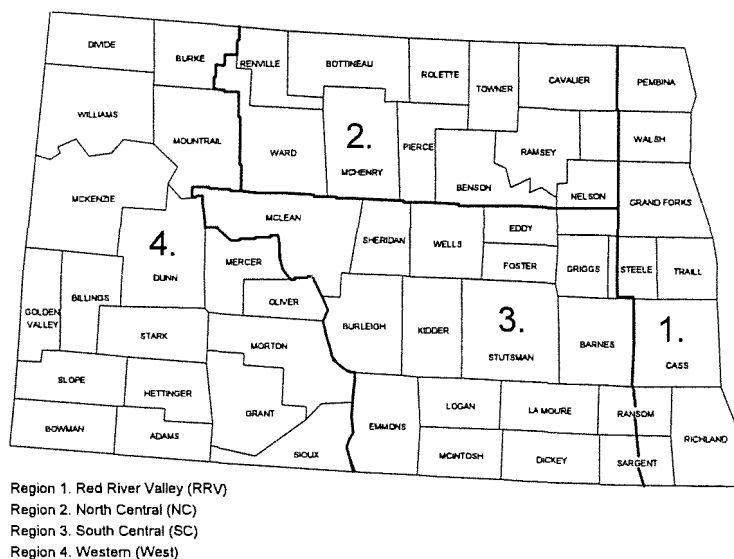


Figure 1. North Dakota Farm and Ranch Business Management Regions

Table 1. Size of North Dakota Representative Farms.

|                     | Large | Medium | Small |
|---------------------|-------|--------|-------|
| Number of Farms     | 130   | 260    | 130   |
| Total Cropland (ac) | 3,434 | 1,426  | 498   |
| Spring Wheat (ac)   | 1,049 | 394    | 115   |
| Durum Wheat (ac)    | 312   | 138    | 17    |
| Barley (ac)         | 294   | 116    | 38    |
| Corn (ac)           | 168   | 79     | 37    |
| Sunflower (ac)      | 221   | 129    | 29    |
| Soybeans (ac)       | 586   | 227    | 85    |

Table 2 shows the means and standard deviations of yields for North Dakota crops which are used in "Risk" to generate distributions of yields for each crop in each region. Each distribution for a particular crop in a region was generated with 1,000 iterations with the corresponding mean yields and standard deviations. To account for the relationship among crop yields, all other crop yields were related to spring wheat yields. It is assumed that individual crop yields were not correlated with the price level. Commodity prices were correlated, indicating that if the price was high for one crop, prices would tend to be high for other crops.

Table 2 also shows the national prices and mean yields used to determine the level of counter-cyclical payments. While the national yields are similar to state yields, the national standard deviations are much less. For example, national wheat yields are 41.3 bushels/acre, while state wheat yields ranges between 50.3 bushels/acre in the RRV to 28.4 bushels/acre in the west region. The standard deviation of national wheat yields is 3.06 bushels/acre, while the state standard deviation is between 10.2 bushels/acre in the RRV and 12.02 bushels/acre in the west. Thus, CCP based on the national average yields may not provide appropriate protection for producers in individual states.

**Table 2. Means and Standard Deviations of Crop Yields for North Dakota and U.S. Farmers.**

|                            | S.Wht             | D.Wht | Barley | Corn  | Soybeans | Sugarbeets | Sunflower        | Canola |
|----------------------------|-------------------|-------|--------|-------|----------|------------|------------------|--------|
|                            | -----bushels----- |       |        |       |          | -tons-     | -----pounds----- |        |
| <b>Mean Yields</b>         |                   |       |        |       |          |            |                  |        |
| <i>North Dakota</i>        |                   |       |        |       |          |            |                  |        |
| RRV                        | 50.3              |       | 63.2   | 130.9 | 33.9     | 19.3       | 1474.9           |        |
| NC                         | 36.2              | 34.7  | 54.8   |       |          |            | 1449.6           | 1504.0 |
| SC                         | 44.0              | 33.6  | 67.4   | 104.6 | 32.2     |            | 1338.2           |        |
| West                       | 28.4              | 26.8  | 40.8   |       |          |            |                  |        |
| <i>United States</i>       | 41.3              |       | 61.6   | 146.4 | 41.0     |            | 1207.3           | 1400.3 |
| <b>Standard Deviations</b> |                   |       |        |       |          |            |                  |        |
| <i>North Dakota</i>        |                   |       |        |       |          |            |                  |        |
| RRV                        | 10.20             |       | 13.04  | 23.51 | 6.43     | 2.25       | 286.48           |        |
| NC                         | 10.89             | 10.27 | 18.17  |       |          |            | 450.02           | 472.58 |
| SC                         | 11.37             | 8.24  | 17.82  | 29.29 | 9.20     |            | 381.28           |        |
| West                       | 12.02             | 11.54 | 17.55  |       |          |            |                  |        |
| <i>United States</i>       | 3.06              |       | 3.68   | 15.17 | 3.22     |            | 132.87           | 97.93  |

Table 3 shows the average commodity prices and standard deviations used in "Risk" to generate a price distribution for each crop. Current market prices are higher than prices used for the study, but it was assumed that prices will return to a normal level. If prices remain near the current levels, there will be no counter-cyclical revenue payments made to producers.

Table 4 shows the target prices and the current and proposed direct payments rates and loan rates. The correlation listed in the last column is the correlation between North Dakota and national yields. This correlation is important, mainly because revenue payments are made on the basis of deviations from national average yields. Except for corn, North Dakota yields are not highly correlated with national yields. This means that North Dakota producers may not receive much yield protection under this proposal.



Table 3. Prices Used for the Analysis

|              |           | Average | Standard Deviation |
|--------------|-----------|---------|--------------------|
| Spring Wheat | \$/bushel | 4.35    | 0.56               |
| Durum Wheat  | \$/bushel | 4.50    | 0.96               |
| Barley       | \$/bushel | 2.78    | 0.45               |
| Corn         | \$/bushel | 2.65    | 0.38               |
| Soybean      | \$/bushel | 5.65    | 0.89               |
| Sugarbeets   | \$/ton    | 42.00   | 3.80               |
| Sunflower    | \$/cwt    | 13.25   | 1.95               |
| Canola       | \$/cwt    | 11.33   | 1.64               |

Table 4. Target Price, Direct Payment Rates, Loan Rates and Correlations Between North Dakota Yields and National Yields

|                         | Target Price | Direct Payment |           | Loan Rates |          | Yield Correlation |
|-------------------------|--------------|----------------|-----------|------------|----------|-------------------|
|                         |              | Current        | Proposed* | Current    | Proposed |                   |
| -----Dollar/bushel----- |              |                |           |            |          |                   |
| Wheat                   | 3.92         | 0.52           | 0.56      | 2.75       | 2.58     | 0.513             |
| Barley                  | 2.24         | 0.24           | 0.26      | 1.85       | 1.70     | 0.575             |
| Corn                    | 2.63         | 0.28           | 0.30      | 1.95       | 1.89     | 0.7181            |
| Soybeans                | 5.80         | 0.44           | 0.50      | 5.00       | 4.92     | 0.4205            |
| -----Cents/lbs-----     |              |                |           |            |          |                   |
| Sunflowers              | 0.101        | 0.008          | 0.00857   | 0.093      | 0.087    | 0.8562            |
| Canola                  | 0.101        | 0.008          | 0.00857   | 0.093      | 0.087    | 0.7596            |

\*The proposed direct payment rates begin in 2010 and then return to current rates after 2012.

Examples for the calculation of revenue-based counter-cyclical payments are taken directly from the USDA website (Table 5). The target revenue is calculated by taking the Olympic-average yield times the difference between the target price and the direct payment as

$$TR = (TP - DP) * OY$$

where  $TR$  is target revenue,  $TP$  is target price,  $DP$  is direct payment rate, and  $OY$  is the Olympic-average yield.

In this example for corn, the target revenue is \$344.04 per acre. Counter-cyclical revenue payments are the difference between target revenue and actual revenue. Actual revenue ( $AR$ ) is calculated by multiplying actual price by actual yield. For example, if the actual price is \$2.00 per bushel and current national average yield is 170 bushels per acre, then the actual revenue is \$340 per acre ( $\$2.00 \times 170$ ). Then the payment rate is calculated as follows:

$$PR = (TR - AR) / PY = (\$344.04 - \$340) / 114.3 = \$0.035 / \text{bushel}$$

where  $PR$  is the payment rate and  $PY$  is program yield.

Table 5. Calculation of Counter-Cyclical Payments: Price-Based Versus Revenue-Based

| U.S. Data             | Current Price Based | U.S. Data                     | Revenue Based |
|-----------------------|---------------------|-------------------------------|---------------|
| Target Price          | \$2.63              | Target price                  | \$2.63        |
| Direct Payment        | \$0.28              | Direct Payment                | \$0.28        |
| Price Guarantee       | \$2.35              | Difference                    | \$2.35        |
| Program Yield (bu/ac) | 114.3               | Olympic-Average Yield (bu/ac) | 146.4         |
|                       |                     | Target Revenue                | \$344.04      |

A second example shows the impact of low national yields combined with higher prices. The target revenue for corn remains the same at \$344.04, while the actual revenue is \$299.00 if actual price is \$2.30 per bushel and the actual yield is 130 bushels per acre. The per acre revenue-based payment is the difference between the target revenue and the actual revenue, \$45.04. The per bushel payment under this scenario is \$0.394, which is paid to producers based on 85% of their program yield.

The CCP payment for corn under the current farm bill is calculated as the target price minus direct payment minus the larger of the loan rate or market price (\$2.63-\$0.28-\$2.00). The CCP payment rate under the first example would be \$0.35/bushel compared to \$0.035/bushel under the USDA's proposal. In the second example, the CCP payment for corn under the current program would be \$0.05/bushel compared to \$0.394/bushel under the USDA's proposal.

## RESULTS

The North Dakota Representative Farm Model is adapted to calculate the revenue-based counter-cyclical payment instead of a price-based counter-cyclical payment. The model is run through 1,000 iterations to develop a distribution of prices and yields to generate a distribution of incomes. Two sets of yield distributions are drawn, national and state, based on the individual means, standard deviations, and correlations between state and national yields. Yields for the four regions are used to calculate actual crop returns while the national yields are used to calculate the revenue-based counter-cyclical payment. National and state prices are highly correlated. As a result, the only difference in price is the basis.

Three scenarios plus a base scenario are developed to analyze the impact of the new farm bill proposal. The base scenario uses the current target price, loan rate, direct payment rate, counter-cyclical payment rate, and payment limitations. Alternative scenario 1 uses the proposed loan and direct payment rates and the counter-cyclical revenue payment rate without any payment limit (no limit). Alternative scenario 2 uses the same proposed payment rates as scenario 1 along with the \$200,000 adjusted gross income limitation for payments. Alternative scenario 3 uses the same proposed payment rates as scenario 1 along with the \$200,000 adjusted gross income limitation for husband and wife separately (the \$400,000 AGI limitation).

Table 6 shows the net farm income and government payments for large-, medium-, and small-size farms under the four scenarios. Under the base scenario, net farm income for the large-size representative farm averages \$142,269 with a standard deviation of \$63,251. The medium-size farm has a net farm income of \$85,064 and the small-size has a net farm income of \$42,493.

Under the no limit scenario (scenario 1), net farm income for the large-size farm is \$25,456 less than under the base scenario, due mainly to lower loan rates and CCP levels. Under scenario 2, net farm income for the large-size farm averages \$36,266 less than under the base scenario. The AGI limit reduces net farm income, on average, for the large-size farm by \$10,810. The probability that the large-size farm will have an AGI above the \$200,000 limit is about 27%. Net farm income for the medium-size farm is \$10,631 lower under the no limit scenario and \$11,211 lower under scenario 2. The probability that the medium-size farm will have AGI above \$200,000 is only 3%. The net farm income for the small-size farm is \$3,420 less under the proposed farm bill (scenario 2) compared to the current farm bill. The decrease in net farm income is mainly due to lower loan rates.

The impacts of the lower loan rates and the revenue-based CCP levels are larger than the impacts of the payment limit. The difference in net farm income between the current farm bill and scenario 2 is \$36,266 for the large-size farm. Of that, \$10,810 is due to the payment limit and over \$25 thousand is due to lower loan rates and the revenue-based CCP. Under scenario 3, net farm income for the large-size farm is \$655 less than the no-limit scenario, indicating that the impact of payment limits under this scenario is very small. The impact of the payment limits for the medium-size farm is very small and it has no impact for the small-size farm.

Government payments for the large-size farms are 33%, 47% and 34% less under scenario 1, scenario 2 and scenario 3, respectively. Payments for the medium-size farms are 31%, 33% and 31% less, respectively. Payments for the small-size farm are 27% less under all scenarios. The difference in government payments between scenarios 1 and 2 and that between scenarios 1 and 3 represent payment reduction due to payment limitations. The payment limitation mainly affects large-size farms.

#### SUMMARY AND CONCLUSION

The proposed farm bill would lower government payments to most North Dakota farms. The proposal would have a greater impact on larger farms in the state. Under the \$200,000 AGI limitation (scenario 2), payments could average about \$11/acre less for the large-size farms than under the base (current) scenario. With the \$400,000 limitation (scenario 3), payments could average about \$8/acre lower for the large-size farm compared to the base scenario. The medium-size farm could receive about \$8/acre less under scenario 2 and \$7/acre less under scenario 3. The small-size would receive about \$7/acre less in government payments in both scenarios 2 and 3. However, only a small percentage of farmers in North Dakota would be affected by the payment limitations.

**Table 6. Net Farm Income and Government Payments and Standard Deviations for North Dakota Farm under Various Scenarios**

|                      | Net Farm Income     |                    |                   | Government Payments |                   |                   |
|----------------------|---------------------|--------------------|-------------------|---------------------|-------------------|-------------------|
|                      | Large               | Medium             | Small             | Large               | Medium            | Small             |
|                      | -----dollars-----   |                    |                   |                     |                   |                   |
| Base: Current        | 142,269<br>(63,251) | 85,064<br>(25,472) | 42,493<br>(7,612) | 77,686<br>(15,410)  | 33,803<br>(6,218) | 12,509<br>(2,014) |
| Scenario 1: No Limit | 116,813<br>(70,627) | 74,433<br>(28,781) | 39,073<br>(8,661) | 52,230<br>(16,967)  | 23,172<br>(6,550) | 9,089<br>(2,168)  |
| Scenario 2: 200      | 106,003<br>(62,235) | 73,853<br>(27,644) | 39,073<br>(8,661) | 41,420<br>(16,114)  | 22,592<br>(6,521) | 9,089<br>(2,168)  |
| Scenario 3: 400      | 116,158<br>(69,076) | 74,433<br>(28,781) | 39,073<br>(8,661) | 51,515<br>(16,927)  | 23,172<br>(6,550) | 9,089<br>(2,168)  |

Standard Deviations in Parentheses

If a husband and wife each qualifies for a \$200,000 AGI payment limit, the proposed farm bill would reduce state average net farm income by about \$7/acre, or approximately \$126 million, which would be a 3% drop in gross farm returns. Nearly all of this reduction in payments would be due to lower loan rates or the revenue-based CCP, rather than the payment limit. The legal interpretation of the \$200,000 AGI, however, has not been clarified. A more restrictive interpretation, which could reduce payments to some large farms, could reduce the state net farm income by about \$9/acre or \$171 million.

Under scenario 2, the large-size farms could lose about 47% of the government payments. The medium-size farm would lose about 33% of the government payments, and the small-size farm would lose about 27% of the government payments. Under scenario 3, the large-, medium-, and small-size farm would lose 34%, 33%, and 27% of government payments, respectively.

Several observations can be made concerning the proposed USDA farm bill proposal. First, the proposed farm bill provides limited yield protection since national yields are not highly correlated with state or individual yields for most crops. The standard deviation of net farm income, a measure of variability, increases in scenarios 1, 2, and 3 for farms of all size. A larger standard deviation indicates more variation in income levels, indicating less stability.

Secondly, producers in North Dakota may receive smaller government payments compared to the current farm bill if prices return to normal levels. At current price levels, no CCP payments would be made, so the proposed farm bill would have little or no impact. Finally, the AGI limit should have limited impact on most North Dakota producers.

This study probably over states the impacts of the proposed farm bill in two ways. First, the law would be written that if the three-year average of AGI is over \$200,000, no federal payments would be made. However, our study only looks at a one year level to determine whether payments are made. Secondly, if a producer is close to the AGI limit, tax measures could be taken before the end of the year to prevent AGI from rising over the limit. The conclusions of this study are as follows:

- 1.) Because of the proposed revenue-based CCP and lower loan rates, net farm income in North Dakota under the USDA's proposal is lower than that under the current farm program.
- 2.) The proposed revenue-based CCP does not provide adequate protection for North Dakota producers since yields in North Dakota could be very different from national average yields. A revenue-based CCP would likely provide better protection if it was based on regional average yields.
- 3.) The payment limitation of \$200,000 (AGI) may affect large-size farms in North Dakota, but it has no significant effect for medium- and small-size farms. Thus, this study supports the payment limitation of \$200,000 based on the limited impact on most farms in North Dakota.

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