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RESULTS OF THE NORTH DAKOTA LAND VALUATION MODEL FOR THE 2003 AGRICULTURAL REAL ESTATE ASSESSMENT WITH THE REVISED CAPITALIZATION RATE

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ABSTRACT

This report summarizes the results of the North Dakota Land Valuation Model using a capitalization rate of 9.5 percent. The 2003 North Dakota Legislature amended the statute that defines the capitalization rate to be used in this analysis. This legislative change places a minimum of 9.5 percent for the capitalization rate if the calculated value falls below this level. For 2003, the capitalization rate formula yielded a rate of 8.53 percent, thus the minimum of 9.5 percent was used.

This model is used annually to estimate average land values by county, based on the value of production from the land. The county land values developed from this procedure form the basis for the 2003 valuation of agricultural land for real estate tax assessment. The average all land value from this analysis is multiplied by the total acres of agricultural land on the county abstract to determine each county's total agricultural land value for taxation purposes. The State Board of Equalization compares this value with the total value assessed to agricultural property in each county. Each county is required by state statute to assess a total value of agricultural property within 5 percent of this value.

The average value per acre of all agricultural land in North Dakota decreased by 5.3 percent in this analysis. The increase in the capitalization rate alone accounted for an average decrease in land values of 6.2 percent.

Key Words: Land valuation, real estate assessment, agricultural land

NORTH DAKOTA LAND VALUATION MODEL

State statute mandates that the Department of Agricultural Economics, now the Department of Agribusiness and Applied Economics, at North Dakota State University annually compute an estimate of 1) the average value per acre of agricultural lands on a statewide and countywide basis, and 2) the average value per acre for cropland and non-cropland. These estimates are provided to the State Tax Department.

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The model determines agricultural land values as the landowner share of gross returns divided by the capitalization rate. *Landowner share of gross returns* is the portion of revenue generated from agricultural land that is assumed to be received by the landowner, and is expected to reflect current rental rates. The Legislature has specified that the landowner share of gross returns is 30 percent of gross returns for all crops except for sugar beets and potatoes (20 percent), non-cropland (25 percent), and irrigated land (50 percent of the dryland rate).

Capitalization Rate

The capitalization rate is an interest rate that reflects the general market rate of interest adjusted for the risk associated with a particular investment or asset (in this case, agricultural land in North Dakota). The Legislature specified the gross Federal Land Bank (AgriBank, FCB) mortgage interest rate for North Dakota be used as the basis for computing the capitalization rate. The capitalization rate used in the North Dakota Land Valuation model is a 12-year rolling average with the high and low rates dropped.

The 2003 North Dakota Legislature amended the statute that defines the capitalization rate to be used in this analysis. This legislative change places a minimum of 9.5 percent for the capitalization rate if the calculated value falls below this level. The value derived from this formula yielded a rate of 8.53 percent. Therefore, the minimum of 9.5 percent was used in this analysis.

This rate represents a 6.62 percent increase from the rate used for 2002. As the capitalization rate increases, the result is an downward movement in calculated land values. If the landowner share of gross returns remained unchanged from the previous year, the increase in the capitalization rate alone would have resulted in an average decrease in land values of 6.2 percent. With the average statewide decrease being 5.3 percent, the increase in the capitalization rate was partially offset by increased revenue per acre.

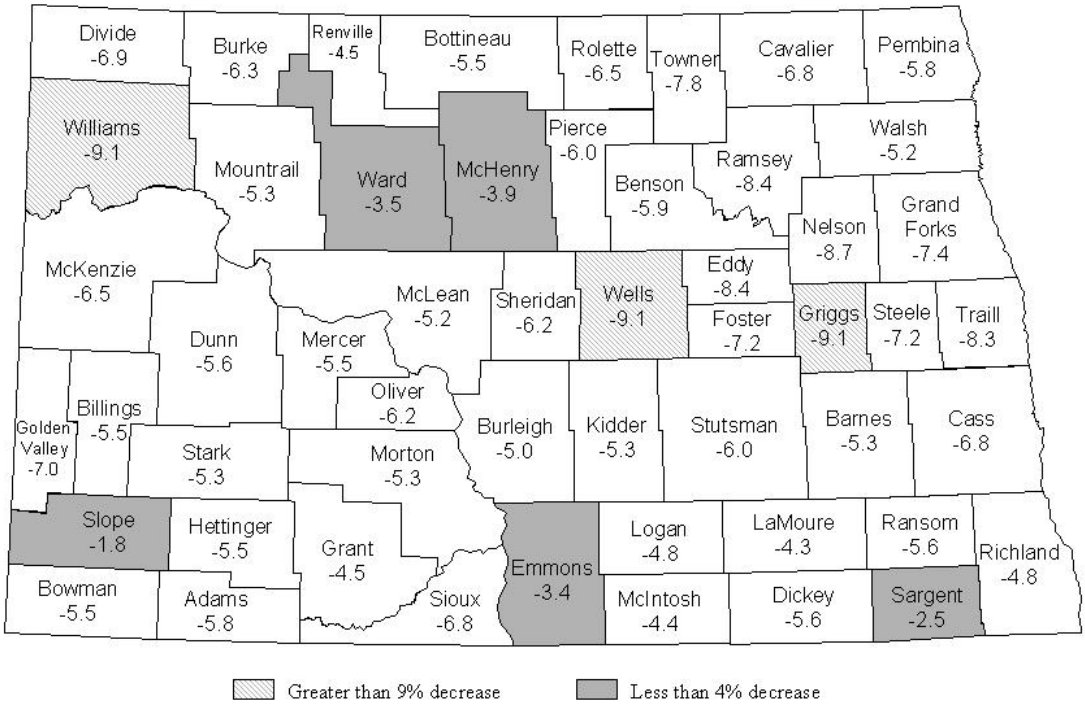
Cost of Production Index

Beginning with the analysis for the 1999 assessment, a cost of production index was added to the land valuation model to account for the increasing proportion of the total cost of production represented by variable costs. The source of data for this index is the *Items Used For Production* from the *Prices Paid Index* published by National Agricultural Statistics Service. The index developed for this analysis was determined by averaging the latest 10 years' values after dropping the high and low values; and dividing this value by the base index. The base index was developed by averaging the index values from the years 1989 through 1995 after dropping the high and low values. The base index value is 102. The resulting index value used in the 2003 analysis is 109.8, which results in a reduction in the landowner share of gross returns of 8.93 percent. The landowner share of gross returns is the amount that is capitalized to determine the land values. Therefore, this means land values are 8.93 percent lower than they otherwise would have been if the cost of production index was not included in the model. The index used for 2003 increased from 107.2 in 2002, for a one-year change of 2.43 percent.

RESULTS - ALL AGRICULTURAL LAND VALUE

Valuation of all agricultural land in North Dakota, for the year 2003 assessment, decreased by 5.3 percent or $14.11 per acre over the previous year. All counties decreased in value with Slope County having the smallest decrease at 1.8 percent followed by Sargent County at 2.5 percent, Emmons County at 3.4 percent, Ward County at 3.5 percent and McHenry County at 3.9 percent. The largest decreases were in Griggs, Wells and Williams Counties. Values of all agricultural land declined by 9.1 percent in all three counties. Results are shown in Figure 1.

Figure 1. Percent Change in Average Value of All Agricultural Land, 2002-2003



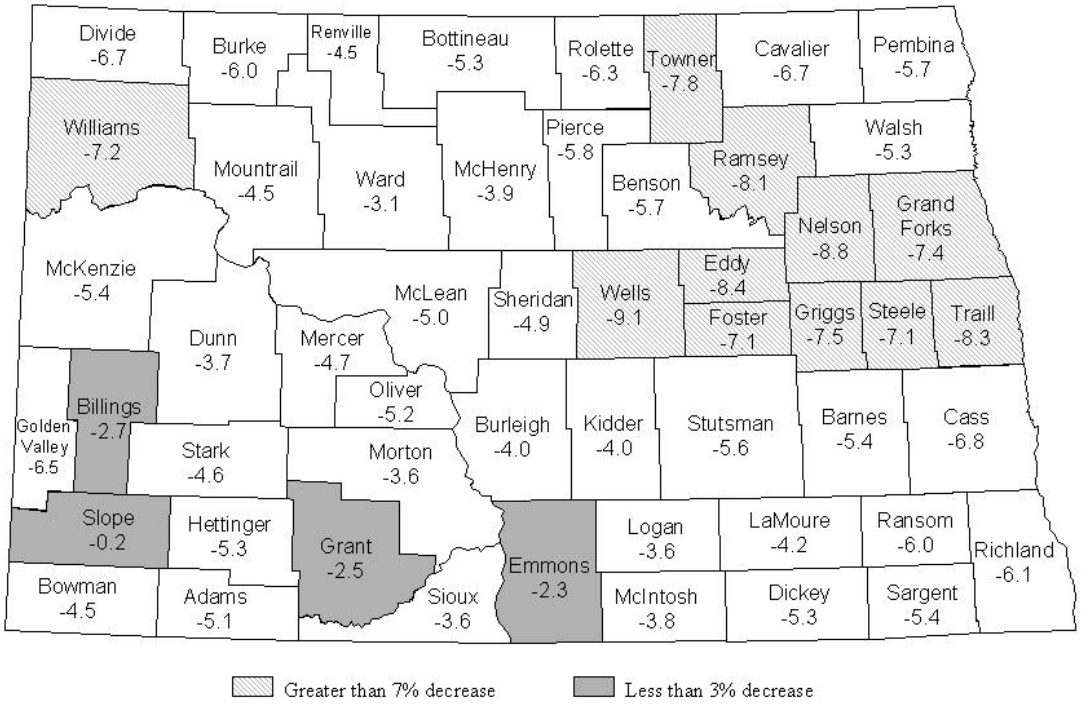
The value for all agricultural land is a weighted average of cropland and noncropland in each county. Calculated values for cropland generally are three to five times the value of noncropland in each county. Therefore, a shift in acres between these two categories will alter the all-land value even if all other factors remain unchanged. County Directors of Tax Equalization are surveyed each year to determine total taxable acres of cropland and noncropland as well as inundated land for each county. Changes in reported acres tend to be minimal. However, this year some counties reported substantial changes in acres. Williams County reported a decrease in cropland of 35,149 acres and an increase in noncropland of 22,307 acres. Thus the percentage decrease in all land value for Williams County was greater than the decrease in value for either category alone. Griggs County was similar, reporting a decrease in cropland of 8,750 acres and an increase in noncropland of 7,988 acres. Sargent County was the opposite, reporting an increase in cropland of 68,790 acres and no change in noncropland. This resulted in the

percentage decrease in all land value being less than the decrease in either category. Likewise, McHenry County reported an increase of 9,616 acres of cropland and a decrease of 9,640 acres on noncropland.

RESULTS - CROPLAND VALUE

The average value of cropland in North Dakota decreased by $17.19 per acre or 5.0 percent. Individual county values varied greatly. The smallest percentage decrease in cropland value by county occurred in Slope County at 0.2 percent. The values for three other counties decreased less than 3 percent; Emmons at 2.3, Grant at 2.5 and Billings at 2.7 percent. At the other end of the range, the average value of cropland in Wells County decreased by 9.1 percent and Nelson County by 8.8 percent. Along with Wells and Nelson, Eddy, Foster, Griggs, Steele, Traill, Grand Forks, Ramsey and Towner, formed a contiguous set of ten counties with the largest decreases in value, all over 7.0 percent. Williams County was the only other county with a decrease greater than 7.0 percent. See Figure 2.

Figure 2. Percent Change in Average Value of Crop Land, 2002-2003



This is an area of the state that has experienced several below-average crops in the past 10 years due to excessive moisture. Part of the revenue shortfall to producers has been replaced with crop insurance indemnity payments, however these payments are not included in the model.

The increased moisture in recent years that has hurt crop yields and quality in the northeastern part of the state has been beneficial to the more arid western and southern regions of the state. Nearly all of the counties with the smallest declines in cropland value are in southern and western North Dakota. It should be noted the data set included in this analysis covers 1992 through 2001, so the severe drought that occurred over much of this area in 2002 is not a factor in this analysis.

Changes in the capitalization rate and cost of production index impact all counties equally. The increase in the cost of production index reduces the landlord share of gross returns and therefore results in lower calculated land values. The net impact of the changes in the capitalization rate and the cost of production index for 2003 is a decrease in cropland values of 8.43 percent from 2002. The third component that determines value is gross returns. This component increased, leaving the net decrease in cropland value for the state at 5.0 percent.

RESULTS - NONCROPLAND VALUE

The value of noncropland (grazing land) decreased by 8.7 percent for the 2003 assessment. The value of noncropland is derived by calculating the value of the beef produced from grazing. The carrying capacity and the production per cow are held constant in the model. As a result, all change in noncropland value is due to changes in the price of calves and cull cows and changes in the capitalization rate and the cost of production index. All of these factors apply equally across all counties, therefore all counties showed an 8.7 percent reduction in noncropland values over 2002.

The prices of calves and cull cows are used to determine the value of an animal unit month (AUM) of grazing. AUM is used as the measure of productivity of grazing land. Based on the prices of calves and cull cows, an AUM had a value of $60.58 for the 2001 marketing year, the most recent year added to the data set. This was down from $63.20 the previous year. The value calculated for noncropland, like cropland, is based on the average of the latest 10 years after dropping the high and low years. Therefore, the average gross return is heavily influenced by the comparative values for the latest year added to the data set, relative to the year just removed from the data set. The average value per AUM for the year 1991, the year rolled out of the data set for this analysis, was $63.00.

Two tables are provided comparing county values for 2002 and 2003. Table 1 shows North Dakota Capitalized Average Annual Values Per Acre by County for 2003. Table 2 shows North Dakota Capitalized Average Annual Values Per Acre by County for 2002.

Table 1. North Dakota Capitalized Average Annual Values Per Acre by County for 2003 Assessment

County	Cropland	Noncropland	All Agricultural Land
Adams	210.85	72.47	158.47
Barnes	404.91	100.68	349.03
Benson	295.06	89.14	250.75
Billings	186.34	67.84	104.47
Bottineau	301.25	86.26	264.93
Bowman	207.73	59.86	133.54
Burke	248.23	79.32	197.16
Burleigh	241.15	79.56	168.19
Cass	508.35	102.36	497.05
Cavalier	369.28	87.48	329.21
Dickey	396.76	100.43	302.59
Divide	237.10	78.87	195.33
Dunn	210.44	72.28	124.64
Eddy	271.04	89.51	216.74
Emmons	278.63	78.80	193.47
Foster	337.94	86.16	291.88
Golden Valley	221.18	59.38	137.75
Grand Forks	479.90	100.48	447.58
Grant	212.33	72.65	134.35
Griggs	347.08	87.80	288.78
Hettinger	261.13	72.10	214.12
Kidder	236.41	80.35	165.78
LaMoure	395.27	103.86	356.90
Logan	262.52	79.29	174.05
McHenry	248.29	85.69	198.74
McIntosh	247.89	78.84	180.48
McKenzie	246.14	72.58	142.25
McLean	287.19	79.05	251.09
Mercer	235.32	72.25	164.71
Morton	248.50	72.42	145.86
Mountrail	260.82	78.76	184.77
Nelson	307.44	87.33	269.78
Oliver	276.55	72.63	156.30
Pembina	601.12	104.61	537.21
Pierce	264.49	85.70	226.52
Ramsey	307.05	89.79	267.55
Ransom	435.70	98.92	359.75
Renville	316.97	85.95	299.17
Richland	570.25	101.64	502.38
Rolette	279.82	87.18	246.91
Sargent	465.57	101.44	401.97
Sheridan	256.70	78.83	187.44
Sioux	200.72	72.48	97.47
Slope	230.32	66.04	160.26
Stark	238.54	72.80	177.01
Steele	437.45	89.21	389.40
Stutsman	319.13	99.22	249.66
Towner	302.90	89.54	293.39
Traill	549.63	101.44	515.26
Walsh	551.21	93.61	502.62
Ward	312.88	78.75	258.10
Wells	319.85	86.49	278.04
Williams	216.05	78.98	164.98
State	327.13	77.63	249.94

Table 2. North Dakota Capitalized Average Annual Values Per Acre by County for 2002 Assessment

County	Cropland	Noncropland	All Agricultural Land
Adams	223.09	79.58	168.76
Barnes	427.93	110.56	368.54
Benson	313.21	97.88	266.72
Billings	192.02	74.49	110.82
Bottineau	318.16	94.72	280.40
Bowman	219.03	65.74	142.12
Burke	263.90	87.10	210.44
Burleigh	251.23	87.37	177.18
Cass	544.91	112.41	532.87
Cavalier	395.68	96.06	353.08
Dickey	418.82	110.29	320.78
Divide	253.05	86.60	209.04
Dunn	219.03	79.37	132.30
Eddy	296.00	98.30	236.86
Emmons	285.30	86.53	200.36
Foster	364.31	94.62	314.98
Golden Valley	237.95	65.21	148.88
Grand Forks	517.91	110.34	483.20
Grant	217.67	79.78	140.75
Griggs	375.61	96.42	317.87
Hettinger	275.60	79.18	226.74
Kidder	246.16	88.24	175.23
LaMoure	412.60	114.06	373.09
Logan	272.71	87.07	183.11
McHenry	258.69	94.10	207.12
McIntosh	257.66	86.58	188.82
McKenzie	261.27	79.70	152.62
McLean	302.86	86.81	265.27
Mercer	247.58	79.34	174.72
Morton	257.83	79.53	154.05
Mountrail	272.99	86.48	195.08
Nelson	337.24	95.89	295.57
Oliver	292.10	79.76	166.88
Pembina	637.26	114.88	570.02
Pierce	281.04	94.11	241.28
Ramsey	334.23	98.60	292.15
Ransom	463.37	108.63	381.21
Renville	331.95	94.39	313.58
Richland	607.00	111.61	527.94
Rolette	298.62	95.74	264.08
Sargent	492.21	111.39	412.21
Sheridan	270.11	86.56	200.00
Sioux	208.39	79.59	104.69
Slope	230.87	72.52	163.33
Stark	251.22	79.94	187.64
Steele	471.16	97.96	419.66
Stutsman	338.26	108.95	265.71
Towner	328.65	98.33	318.38
Traill	598.80	111.39	561.43
Walsh	582.52	102.80	530.61
Ward	322.93	86.48	267.59
Wells	351.43	94.97	305.41
Williams	232.57	86.72	181.41
State	344.52	85.24	264.24

CONCLUSIONS

Valuation of all agricultural land in North Dakota decreased by 5.3 percent for the 2003 assessment as compared to the previous year. The average value of all agricultural land decreased in all counties, as well. The range of decrease was from 1.8 percent to 9.1 percent.

The average value of cropland in North Dakota decreased by 5.0 percent. County level decreases were from 0.2 percent to 9.1 percent. Noncropland values for all counties decreased by 8.7 percent over the previous year. Productivity of noncropland does not change from year to year. The prices of cull cows and calves, cost of production index and the capitalization rate are applied uniformly across all counties. Therefore, the change in noncropland value is the same for all counties.

The capitalization rate used for the 2003 assessment was set at 9.5 percent due to changes made to the statute by the 2003 North Dakota Legislature. This rate is 64 basis points higher than the previous year.

The cost of production index increased by 2.6 points over the previous year to 109.8. This index reduced the landowner share of gross returns by 8.93 percent before this value is capitalized.

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We would be happy to provide a single copy of this publication free of charge. You can address your inquiry to: Carol Jensen, Department of Agribusiness and Applied Economics, North Dakota State University, P.O. Box 5636, Fargo, ND, 58105-5636, Ph. 701-231-7441, Fax 701-231-7400, e-mail cjensen@ndsuext.nodak.edu . This publication is also available electronically at this web site: http://agecon.lib.umn.edu/.