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RESULTS OF THE NORTH DAKOTA LAND VALUATION MODEL FOR THE 2024 AGRICULTURAL REAL ESTATE ASSESSMENT

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ABSTRACT

This report summarizes the 2024 results of the North Dakota Land Valuation Model. The model is used annually to estimate average land values by county, based on the value of production from cropland and non-cropland. The county land values developed from this procedure form the basis for the 2024 valuation of agricultural land for real estate tax assessment. The average value for all agricultural land in a county 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.

The average value per acre of all agricultural land in North Dakota decreased by **4.61** percent from 2023 to 2024 based on the value of production. The formula cost of production index value used in the 2024 analysis was **231.50**. The formula capitalization rate was **4.32** percent. The capitalization rate had a larger effect on higher valuations compared to recent years.

Cropland value decreased, on average, **5.02** percent. Across individual counties, the cropland valuation ranged from a decrease of 7.30 percent to an increase of 2.42 percent. County values had increases and decreases depending on crop mix and changes in cropland to non-cropland ratios. Non-cropland values decreased **2.69** percent.

Changes in market value are included for comparison. Market value data are from the annual County Rents and Prices survey conducted by the North Dakota Department of Trust Lands.

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

RESULTS OF THE NORTH DAKOTA LAND VALUATION MODEL FOR THE 2024 AGRICULTURAL REAL ESTATE ASSESSMENT

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NORTH DAKOTA LAND VALUATION MODEL

North Dakota state statute mandates that 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 (N.D.C.C. 57-02-27.2). These estimates are provided to the State Tax Department.

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 calculated at 30 percent of gross returns for all crops except sugar beets and potatoes, 20 percent for sugar beets and potatoes, 25 percent for non-cropland and 50 percent of the dryland rate for irrigated land.

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 (Agri-Bank, 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 twelve-year rolling average with the high and low rates dropped. The 2003 Legislature amended the capitalization rate formula by introducing a minimum level of 9.5 percent with no upper limit. The 2005 Legislature amended the capitalization rate formula again, specifying a rate no lower than 8.9 percent to be used for the 2005 analysis. For subsequent years the capitalization rate was not to be lower than 8.3 percent. The 2009 Legislature amended the capitalization rate formula to set a minimum of 8.0 percent for 2009, 7.7 percent for 2010 and 7.4 percent for 2011. The minimum rate was allowed to sunset after 2011.

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The capitalization rate was calculated based on the formula for the 2024 analysis. This rate was 4.32 percent. Increasing the capitalization rate from 4.24 percent for 2023 to 4.32 percent decreases the values by **1.89** percent without any other changes. The interest rate for the latest year in the data set (2022) was 5.91%. This replaces the rate for 2010 which was 4.46%.

Cost of Production Index

Beginning with the analysis for the 1999 assessment, a cost of production index was incorporated into 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, Interest, Taxes and Wage Rates* from the *Prices Paid Index Annual Average* published by the USDA National Agricultural Statistics Service. The index developed for this analysis was determined by averaging the values of the latest ten years 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 index used for 2024 increased from 224.02 in 2023 to 231.50, for a one-year change of 7.48 points. This change in the cost of production index had the effect of reducing calculated land values by **3.34** percent from 2023.

The index value used in the 2024 analysis was 231.50, which resulted in a reduction in the landowner share of gross returns of 56.80 percent. The landowner share of gross returns is the amount that is capitalized to determine the land values. Therefore, land values are 56.80 percent lower than they would have been if the cost of production index were not included in the model.

Combined Effect

The cost of production index and the capitalization rate apply equally to all land in all counties. The net impact of the change in value from the previous year for these two factors was to decrease land values by **5.23** percent. Therefore, any change in county values more or less than a negative 5.23 percent from the 2023 values is due primarily to an increase or decrease in productivity. Values may also be impacted by a shift in the ratio between cropland and non-cropland acres.

RESULTS: ALL AGRICULTURAL LAND VALUE

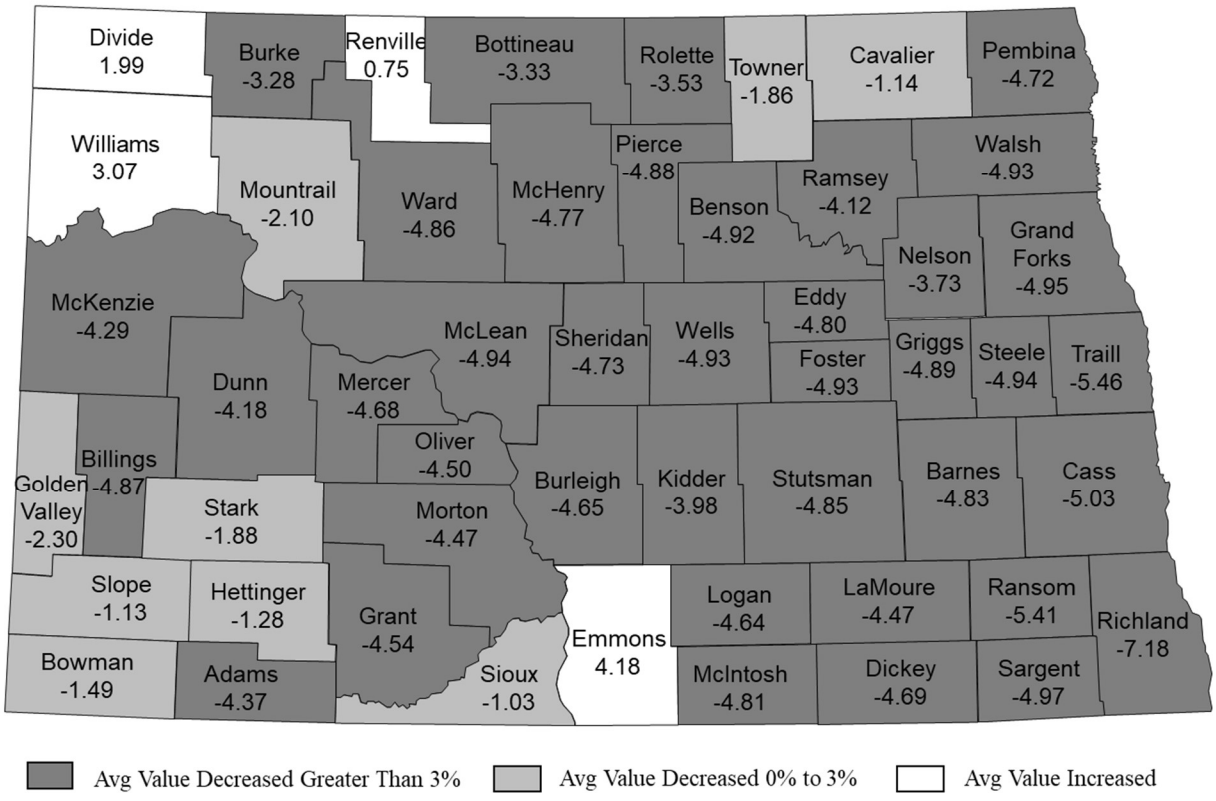
The value for all agricultural land is a weighted average of cropland and non-cropland in each county. Calculated values for cropland generally are three to five times the value of non-cropland in each county. Therefore, a shift in acres between these two categories will alter the “all land” value even if all other factors remain unchanged. County Directors of Tax Equalization are surveyed each year to determine total taxable acres of cropland and non-cropland as well as

inundated land for each category. Changes in reported acres tend to be minimal most years. Shifting acres from cropland to non-cropland results in a lower value for all agricultural land independent of what happens to gross revenue, the capitalization rate and the cost of production index.

Comparison to Previous Year: All Agricultural Land Value

Valuation of all agricultural land in North Dakota, for the 2024 assessment compared to the 2023 assessment decreased by 4.61 percent or $32.59 per acre compared to the previous year. The largest percentage increase occurred in Emmons County at 4.18 percent. The largest decrease was in Richland County with a 7.18 percent decrease. Values decreased greater the 3 percent in forty counties. Values decreased from 0 to 3 percent in nine counties. Values increased in four counties. Results are shown in Figure 1.

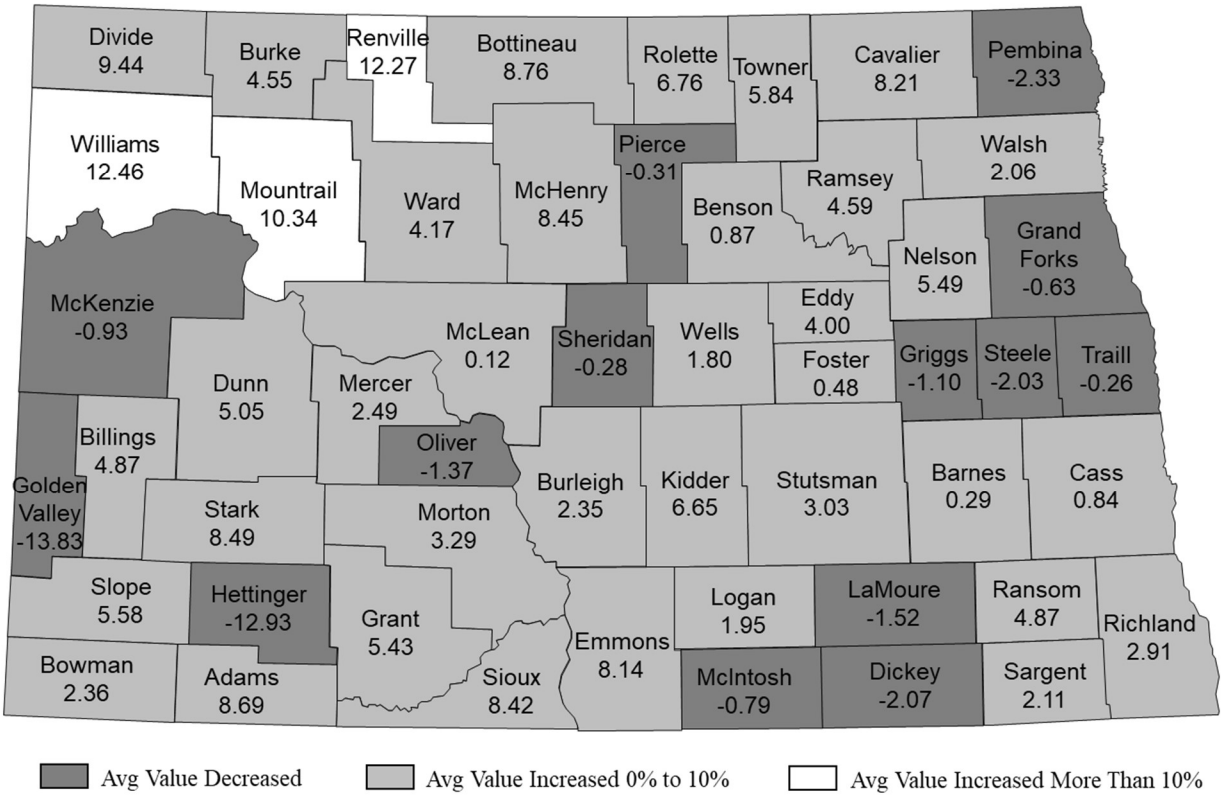
Figure 1. Percent Change in Average Productivity Value of All Agricultural Land, 2023-2024



Five-Year Trend: All Agricultural Land Value

Estimated values for 2024 were compared with values estimated for 2019 to see how they have changed over time. The average value for all agricultural land in North Dakota increased 2.71 percent from 2019 to 2024, with a dollar value increase of $17.79 per acre. The highest value increase was 12.46 percent in Williams County. Golden Valley County had the largest decrease of 13.83 percent over this 5-year period. Fourteen counties had decreases. Thirty-six counties increased between 0 and 10 percent. Three counties increased more than 10 percent. The five-year percentage change in value per acre by county is shown in Figure 2.

Figure 2. Percent Change in Average Productivity Value of All Agricultural Land, 2019-2024



RESULTS: CROPLAND PRODUCTIVITY VALUE

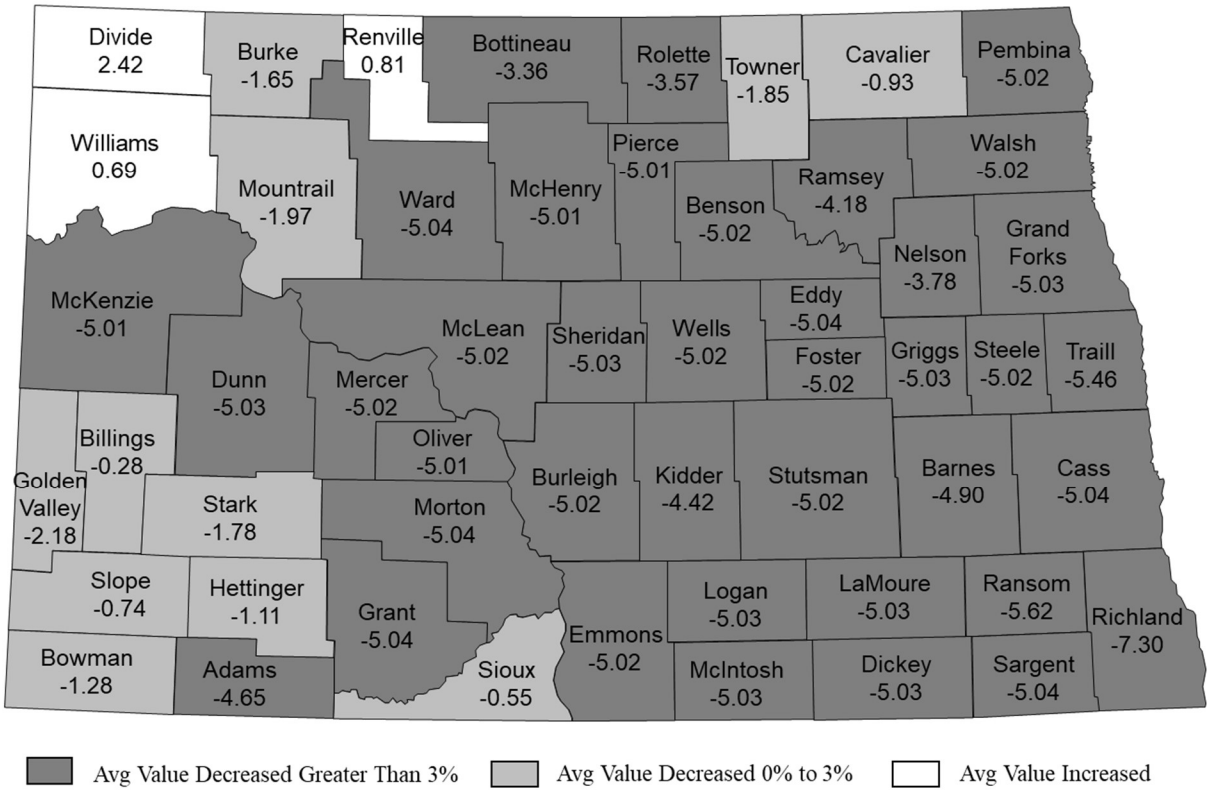
The value for cropland only applies to county acreages that are cropped for cash or feed crops, it does not include non-cropland acreages (pasture and rangeland). Changes in the capitalization rate and cost of production index impact all counties equally. The capitalization rate used for the 2024 analysis was 4.32 percent and the cost of production index used was 231.50 percent. The

change in the capitalization rate decreased values in all counties by 1.89 percent. The increase in the cost of production index resulted in a downward shift in land values in all counties of 3.34 percent from 2023. The net effect of these two components is that cropland values in all counties decreased by 5.23 percent before any changes in productivity were included. Therefore, increases and decreases in gross revenue were primarily due to crop yields, crop prices and crop mix.

Comparison to Previous Year: Cropland Productivity Value

The value of cropland decreased an average of $48.04 per acre across the state for 2024 compared to 2023. This was an average decrease of 5.02 percent over 2023. Divide County had the largest increase at 2.42 percent. Richland County had the largest decrease of 7.30 percent. Values decreased more than 3 percent in thirty-nine counties. Values decreased from 0 to 3 percent in eleven counties. Three counties had increases. The values are shown in Figure 3.

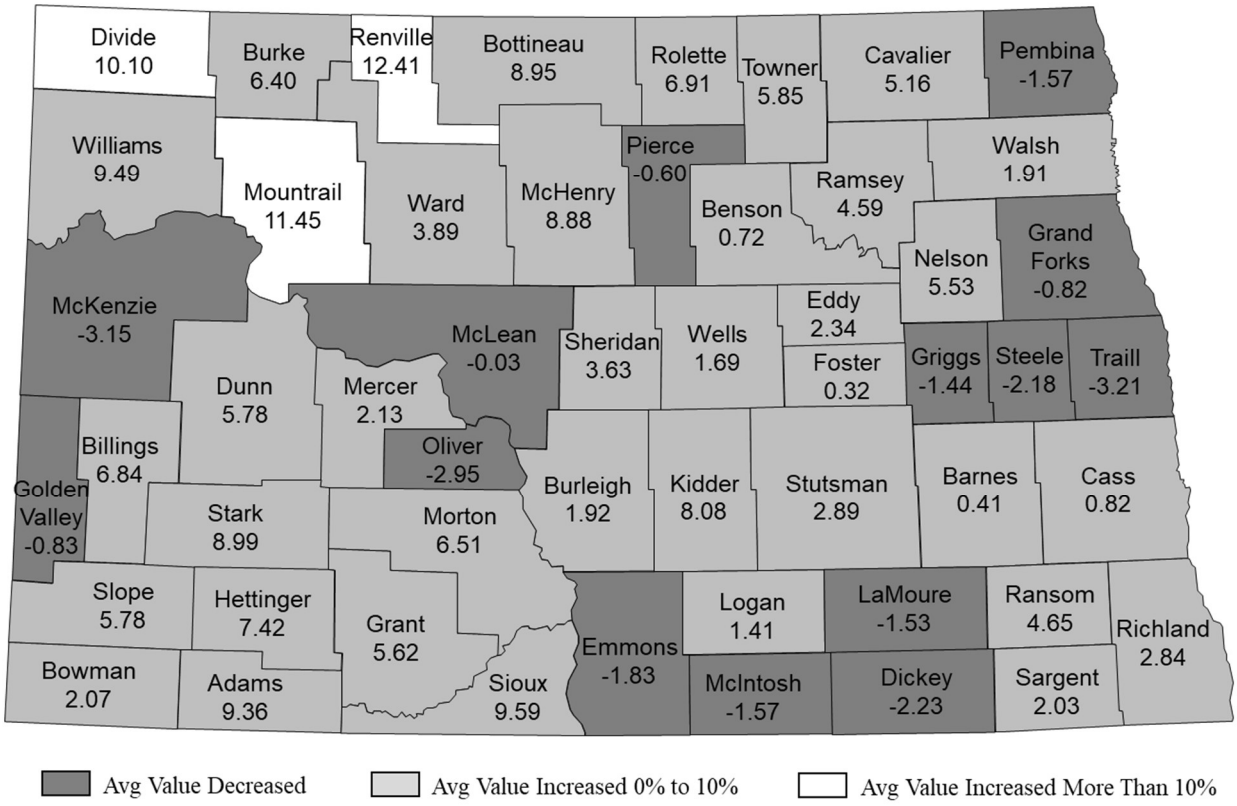
Figure 3. Percent Change in Average Productivity Value of Cropland, 2023-2024



Five-year Trend: Cropland Productivity Value

Cropland value based on the value of production shows an average increased from 2019 to 2024. The cost of production index and the capitalization rate are other factors that influence the overall percentage changes. The average value of North Dakota cropland was 2.95 percent higher in 2024 than in 2019 with an increase of $26.07 per acre. Traill County had the largest decrease of 3.21 percent. The largest increase in cropland value over this 5-year period was in Renville County at 12.41 percent. Fourteen counties had decreases. Thirty-six counties had increases from 0 to10 percent. Three counties had increases above 10 percent. The five-year trend percentages can be seen in Figure 4.

Figure 4. Percent Change in Average Productivity Value of Cropland, 2019-2024



RESULTS: NON-CROPLAND PRODUCTIVITY VALUE

The value of non-cropland (grazing land) based on the value of production decreased by 2.69 percent or $4.47 per acre from the 2023 to the 2024 assessment. The value of non-cropland is derived by calculating the value of the beef cattle produced from grazing. The carrying capacity and the production per cow are held constant in the model. As a result, all change in non-cropland 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, provided no acre changes were reported by the county. Therefore, all counties experienced the same percentage increase in non-cropland values relative to 2023.

Comparison to Previous Year: Non-Cropland Productivity Value

The price 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 price of calves and cull cows, an AUM had a value of $124.70 for the 2022 marketing year, the most recent year added to the data set. The AUM value is up from $105.52 from the previous year (2021). The AUM value used to determine productivity, is based on the average of the last ten years after dropping the high and low years. Therefore, the average gross return is 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 2012, the year rolled out of the data set for this analysis, was $103.01 As a result, the decrease in value for non-cropland is due to a combination of an increase in the value of production, an increase in the cost of production index (which causes a decrease in value) and an increase in the capitalization rate (which causes a decrease in value).

Five-year Trend: Non-Cropland Value

Non-cropland values increased $7.25 per acre from 2019 to the 2024 assessments. This is a 4.70 percent average increase for the state over this five-year period. All counties experienced the same change. Note that the 2014 data year (2016 assessments) was the high non-cropland year in all counties and was not used in the Olympic average the calculations.

CAPITALIZED AVERAGE ANNUAL VALUES PER ACRE BY COUNTY

Two tables are provided to display county values for 2023 and 2024. North Dakota Capitalized Average Annual Values per Acre by County for 2023 are shown in Table 1. North Dakota Capitalized Average Annual Values per Acre by County for 2024 are shown in Table 2.

Table 1. North Dakota Capitalized Average Annual Values Per Acres by County for 2023 Assessments

County	Cropland	Non-cropland	All Agricultural Land
Adams	604.95	154.95	434.19
Barnes	1,162.97	215.09	1,024.53
Benson	951.18	190.57	783.30
Billings	487.03	145.05	257.14
Bottineau	860.14	184.43	746.30
Bowman	523.82	128.07	377.71
Burke	700.94	169.58	538.23
Burleigh	782.31	170.05	504.46
Cass	1,416.51	218.87	1,350.31
Cavalier	1,100.24	187.03	1,004.52
Dickey	1,158.25	214.62	913.96
Divide	628.77	168.63	514.79
Dunn	633.96	154.48	304.23
Eddy	835.61	191.27	628.41
Emmons	941.75	168.40	628.94
Foster	1,037.26	184.20	884.44
Golden Valley	569.58	126.89	285.36
Grand Forks	1,245.05	214.86	1,064.66
Grant	632.31	155.19	389.31
Griggs	975.94	187.74	792.46
Hettinger	748.58	154.01	518.92
Kidder	703.07	171.70	390.22
LaMoure	1,266.98	221.93	1,121.95
Logan	802.12	169.58	496.72
McHenry	740.33	183.25	568.59
McIntosh	816.75	168.63	604.71
McKenzie	550.00	155.19	313.45
McLean	891.27	168.87	780.64
Mercer	723.58	154.48	477.14
Morton	763.44	154.72	400.23
Mountrail	787.26	168.40	512.36
Nelson	829.01	186.56	713.81
Oliver	791.27	155.19	424.34
Pembina	1,459.43	223.58	1,328.90
Pierce	828.54	183.25	684.97
Ramsey	936.56	191.98	759.63
Ransom	1,307.31	211.56	983.34
Renville	879.95	183.73	826.19
Richland	1,566.51	217.22	1,356.36
Rolette	837.03	186.32	732.35
Sargent	1,270.99	216.75	1,111.42
Sheridan	793.63	168.40	531.78
Sioux	624.29	154.95	364.42
Slope	622.88	141.27	368.58
Stark	688.21	155.66	489.37
Steele	1,293.40	190.80	1,135.24
Stutsman	1,065.80	212.03	827.27
Towner	929.01	191.51	893.87
Traill	1,489.15	216.75	1,481.68
Walsh	1,285.61	200.00	1,080.94
Ward	850.71	168.40	644.77
Wells	1,052.12	184.91	894.30
Williams	711.32	168.87	517.16
State	956.37	166.04	706.63

Table 2. North Dakota Capitalized Average Annual Values Per Acres by County for 2024 Assessments

County	Cropland	Non-cropland	All Agricultural Land
Adams	576.85	150.93	415.23
Barnes	1,106.02	209.49	975.04
Benson	903.47	185.65	744.77
Billings	485.65	141.20	244.62
Bottineau	831.25	179.63	721.46
Bowman	517.13	124.54	372.09
Burke	689.35	165.05	520.55
Burleigh	743.06	165.74	481.00
Cass	1,345.14	213.19	1,282.45
Cavalier	1,090.05	182.18	993.11
Dickey	1,100.00	209.03	871.09
Divide	643.98	164.12	525.02
Dunn	602.08	150.46	291.50
Eddy	793.52	186.34	598.24
Emmons	894.44	164.12	655.25
Foster	985.19	179.40	840.82
Golden Valley	557.18	123.61	278.81
Grand Forks	1,182.41	209.26	1,012.00
Grant	600.46	151.16	371.63
Griggs	926.85	182.87	753.67
Hettinger	740.28	150.00	512.28
Kidder	671.99	167.36	374.67
LaMoure	1,203.24	216.20	1,071.85
Logan	761.81	165.05	473.68
McHenry	703.24	178.47	541.46
McIntosh	775.69	164.12	575.61
McKenzie	522.45	151.16	300.01
McLean	846.53	164.58	742.10
Mercer	687.27	150.46	454.81
Morton	725.00	150.69	382.32
Mountrail	771.76	163.89	501.61
Nelson	797.69	181.71	687.20
Oliver	751.62	151.16	405.24
Pembina	1,386.11	217.82	1,266.18
Pierce	787.04	178.47	651.57
Ramsey	897.45	187.04	728.37
Ransom	1,233.80	206.02	930.12
Renville	887.04	178.94	832.36
Richland	1,452.08	211.57	1,258.92
Rolette	807.18	181.48	706.51
Sargent	1,206.94	211.11	1,056.19
Sheridan	753.70	164.12	506.61
Sioux	620.83	150.93	360.65
Slope	618.29	137.50	364.43
Stark	675.93	151.62	480.17
Steele	1,228.47	185.65	1,079.17
Stutsman	1,012.27	206.48	787.15
Towner	911.81	186.34	877.25
Traill	1,407.87	211.11	1,400.85
Walsh	1,221.06	194.91	1,027.60
Ward	807.87	163.89	613.44
Wells	999.31	180.09	850.19
Williams	716.20	164.35	533.03
State	908.33	161.57	674.04

MARKET VALUE OF FARMLAND IN NORTH DAKOTA

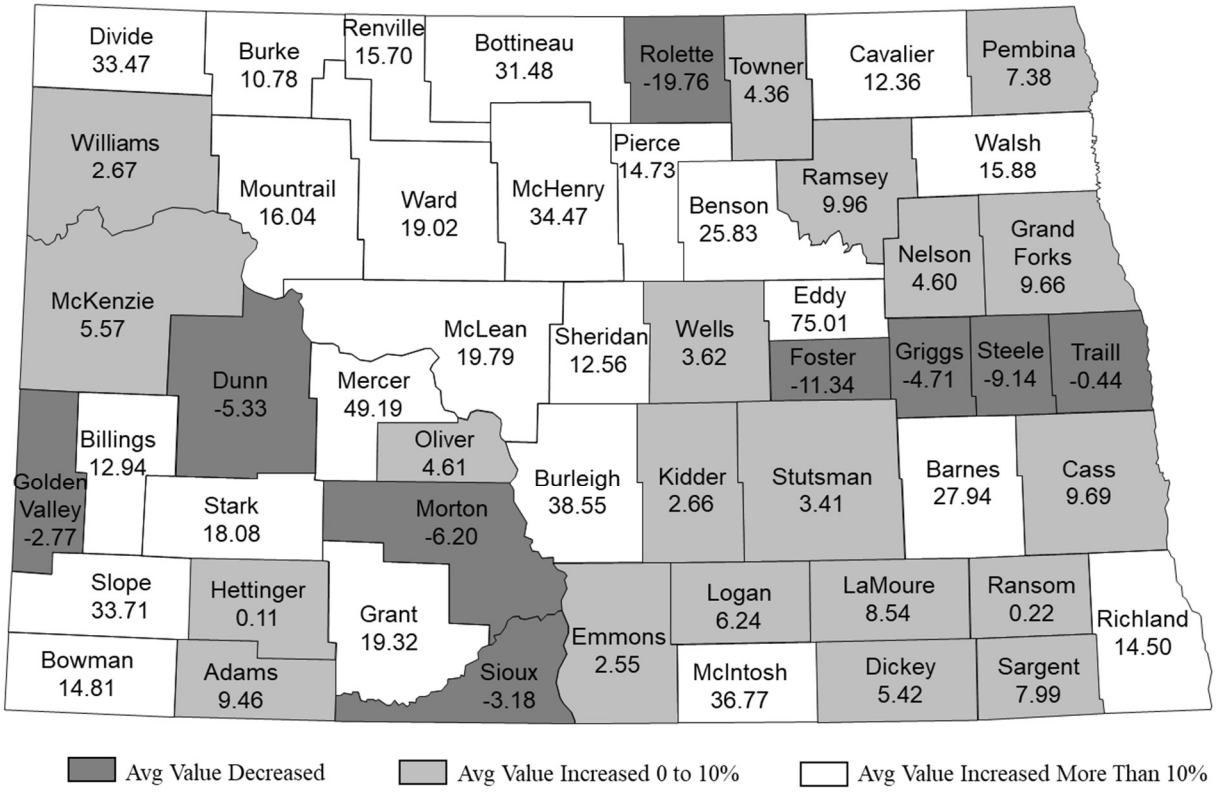
The North Dakota Land Valuation Model was designed to estimate the value of agricultural land depending solely on the revenue generated from the production of crops and beef cattle. The results of this model were not intended to reflect market value. Market value of farm land is influenced by numerous factors in addition to its productivity value. These include farm enlargement to gain economies of scale, land as an investment, recreational uses, development potential and the effect of government fiscal, monetary, and tax policies. As a result, market value and productivity value often differ by a significant amount.

The North Dakota Department of Trust Lands conducted the annual County Rents and Prices survey of farmers and ranchers to obtain rental rates and the price of rented land. The survey is done for cropland, pasture and hay land. This survey is available at: https://land.nd.gov/

Comparison to Previous Year: Market Value of Cropland

The data from the 2024 survey are compared with the 2023 survey for cropland. This survey showed values declined in nine counties. As well, twenty counties increased 0 to 10 percent. Greater than 10 percent increases were reported in twenty-four counties. At the opposite end of the price change spectrum were increases of 75.01 percent in Eddy County (outlier), and a 19.76 percent decrease in Rolette. Percentage changes in market value for cropland by county are shown in Figure 5.

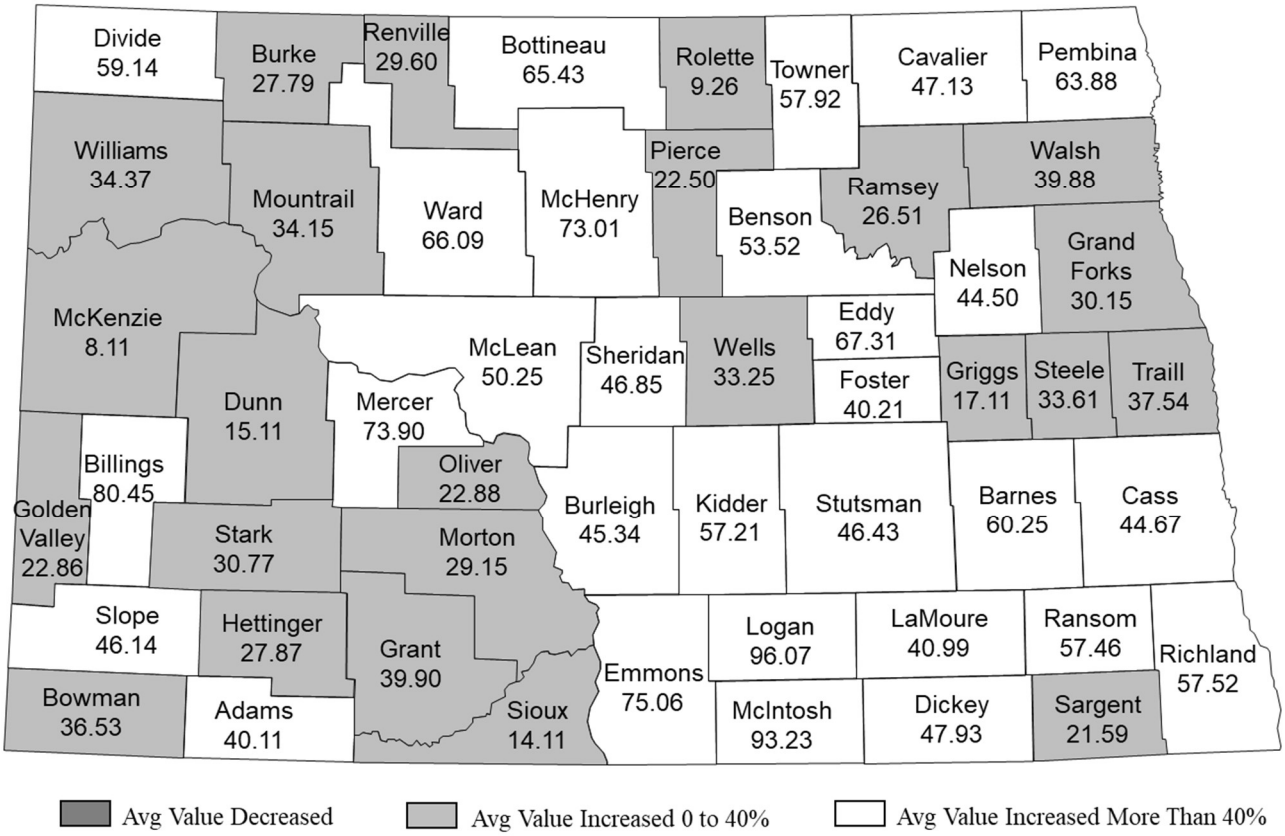
Figure 5. Percent Change in Estimated Market Value of Cropland, 2023-2024



Five-year Trend: Market Value of Cropland

The data from the 2024 survey are compared with the 2019 survey for cropland. Estimated market values had no decreases while twenty-four counties increased from 0 to 40 percent. Greater than 40 percent increases were reported in twenty-nine counties. At the opposite end of the price change spectrum were increases of 90.07 percent (outlier) in Logan County, and a 8.11 percent increase in McKenzie County. Percentage changes in cropland market values by county are shown in Figure 6.

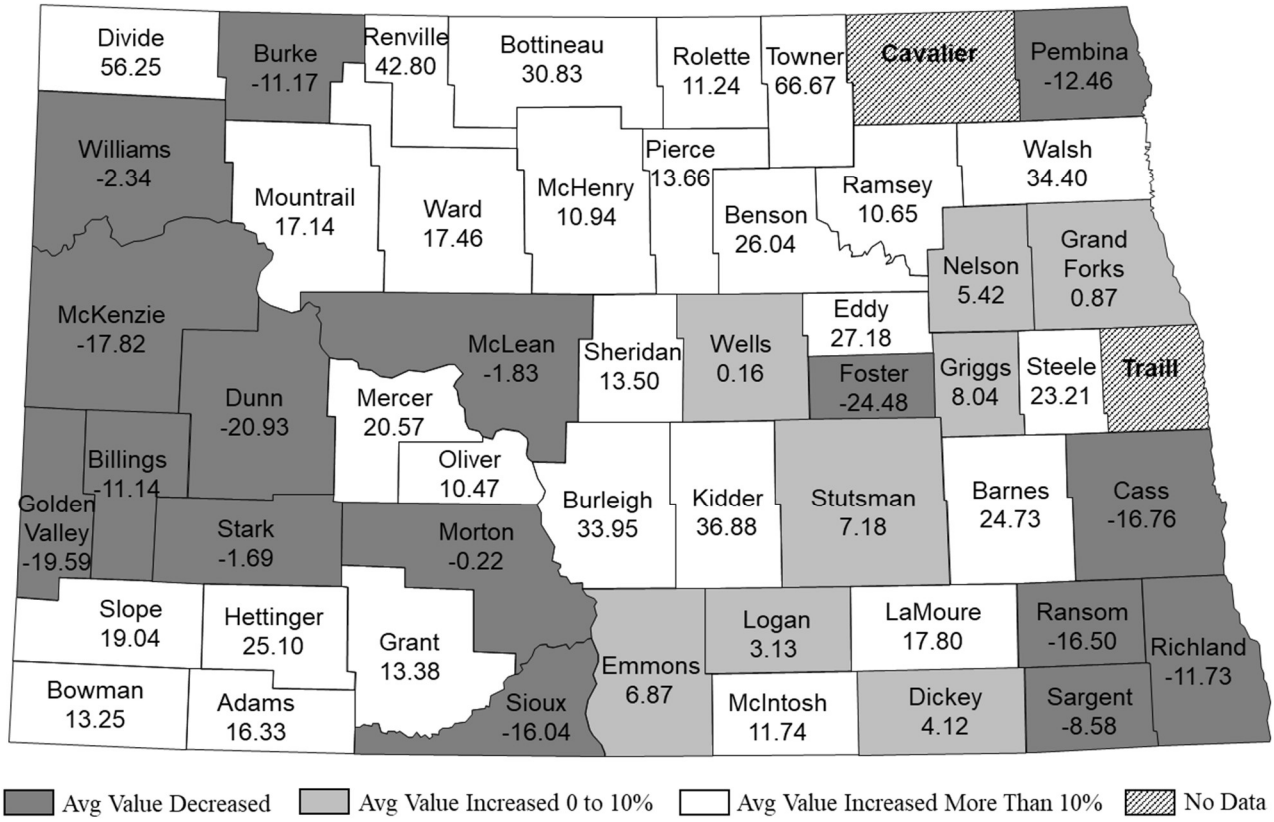
Figure 6. Percentage Change in Estimated Market Value of Cropland, 2019-2024



Comparison to Previous Year: Market Value of Pasture

The data from the 2024 survey are compared with the 2023 survey for pasture. This survey showed values declines in sixteen counties while eight counties increased from 0 to 10 percent. Greater than 10 percent increases were reported in twenty-seven counties. There was insufficient data in two counties, so a percentage could not be calculated. At the opposite end of the price change spectrum were increases of 66.67 percent in Towner County, and a 24.48 percent decrease in Foster County. Percentage changes in the market value of pasture are shown in Figure 7.

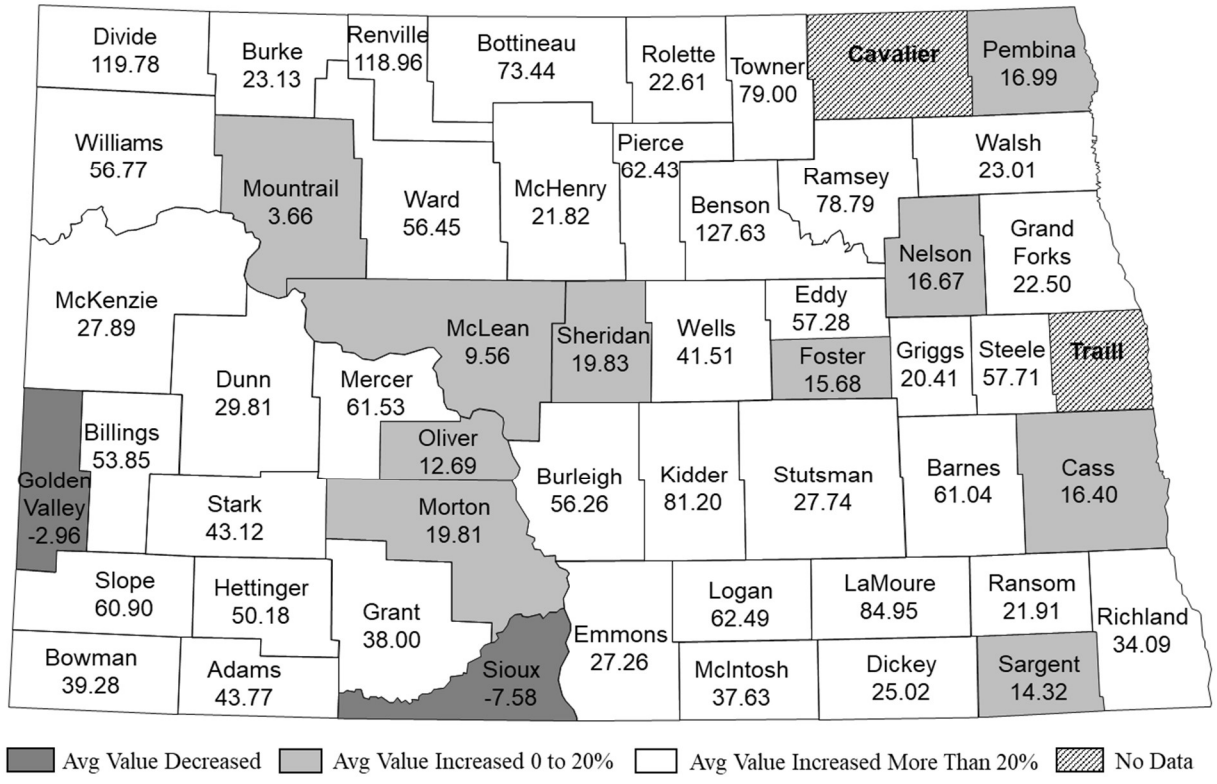
Figure 7. Percent Change in Estimated Market Value of Pasture, 2023-2024



Five-year Trend: Market Value of Pasture

The data from the 2024 survey are compared with the 2019 survey for pasture. Estimated market values decreased in two counties while ten counties increased from 0 to 10 percent. Greater than 10 percent increases were reported in thirty-nine counties. There was insufficient data in two counties, so a percentage could not be calculated. At the opposite end of the price change spectrum were increases of 127.63 percent in Benson County (outlier), and a 7.58 percent decrease in Sioux County. Percentage changes in the market value of pasture are shown in Figure 8.

Figure 8. Percentage Change in Estimated Market Value of Pasture, 2019-2024



CONCLUSIONS

The capitalization rate used for the 2024 analysis was the legislative formula rate of 4.32 percent up from 4.24 in 2023.

The cost of production index increased 7.48 points to 231.50 over the previous year of 224.02. The cost of production index reduced the landowner share of gross returns by 56.80 percent before this value was capitalized.

The analysis for 2024 added data from 2022 and dropped data from 2012. Ten years of data are included in the analysis with the high and low years dropped to calculate an Olympic average. The rise in the capitalization rate resulted in a decrease of 1.89 percent in values. This change was augmented by the increase in the cost of production index. The cost of production index decreased values in all counties by 3.34 percent. This is a net 5.23 percent decrease from both these factors.

Valuation of all agricultural land in North Dakota, based on productivity, decreased by 4.61 percent or $32.59 per acre for the 2024 assessment as compared to the previous year. The largest percentage increase occurred in Emmons County at 4.18 percent. The greatest decrease was Richland County with a 7.18 percent decrease.

Valuation of cropland in North Dakota decreased $48.04 per acre. This was a 5.02 percent decrease over 2023. The change in crop revenue and crop mix caused a change in cropland values from a negative 7.30 percent in Richland County to a positive 2.42 percent in Divide County.

Non-cropland values for all counties decreased by 2.69 percent or $4.47 per acre from the previous year. The production of grazing units is held constant for non-cropland, only the values per unit change from year to year. The price of cull cows and calves, cost of production index and the capitalization rate are applied uniformly across all counties. Therefore, the percentage change in non-cropland value is the same for all counties.

Changes in market value of cropland and pasture, based on the survey of farmers and ranchers by the North Dakota Department of Trust Lands is included for comparison. Reported market values changed considerably more than productivity values from 2023 to 2024. However, market value changes were both negative and positive across the state. This is expected due to the additional factors that influence market values.

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