

Center for Agricultural Policy and Trade Studies
North Dakota State University

NEWSLETTER

Issue 06-4

August 2006

North Dakota Agricultural Outlook: Analysis of Representative Farms

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This article summarizes the North Dakota agricultural outlook for the 2006-2015 period, based on the baseline results produced by the Food and Agricultural Policy Research Institute (FAPRI) model and the North Dakota Global Wheat Policy Simulation Model. The model projects average net farm incomes, debt-to-asset ratios, cash rents, and cropland prices for representative farms producing five major crops: wheat, barley, corn, soybeans, and sunflowers. The base model assumes an average trend yield based on historical data and average predicted prices received by farmers based on the historical relationships between FAPRI prices and North Dakota prices. In addition, macro policies, trade policies, and agricultural policies are incorporated into the model directly or indirectly. For the outlook, policies are assumed to remain constant.

Table 1 shows the North Dakota baseline price estimate for selected years. This analysis does not include the impact of the current weather on markets. Prices for 2006 are based on historical trends and not current prices.

Table 1. North Dakota Baseline Price Estimates from the Projected FAPRI Baseline

	Spring Wheat	Durum Wheat	Malting Barley	Sunflower	Soybeans	Corn	Canola
	-----\$/bu-----			-\$/cwt-	----\$/bu----	-\$/cwt-	
2005	3.60	3.45	1.80	11.40	5.30	1.80	9.40
2006	3.56	3.69	2.50	11.60	4.65	1.83	9.56
2009	3.61	4.05	2.69	11.94	4.87	2.04	9.93
2012	3.75	4.26	2.69	11.83	4.97	2.12	9.85
2015	3.83	4.37	2.74	11.80	4.93	2.14	9.84

Table 2 presents net farm income for farms by size and profitability. The average net income for North Dakota representative farms varies, depending upon the size of farm and its profitability. The net income for the large-size farm will increase from the 2003-2005 average of \$132 thousand to \$138 thousand in 2015, which is a 5% increase. Net farm income for the medium-size farm, which averaged \$58 thousand for 2003-2005, will increase to \$68 thousand in 2015. Net farm income for the small-size farm averaged \$29 thousand for 2003-2005 and will increase to \$43 thousand in 2015. State average net farm income over the 10-year period is \$131 thousand for the large-size farm, \$66 thousand for the medium-size farm, and \$39 thousand for the small-size farm. This result implies that most farms in North Dakota will have enough net income to survive under the current farm bill and international market conditions, although the small-size farm may need off-farm income to supplement family living.

Table 2. State Average Net Farm Income for Different Size and Profit Representative Farms

	Large	Size Medium	Small	High	Profit Average	Low
	-----dollars-----					
2003-2005 avg	131,537	57,620	28,807	183,790	66,526	-12,652
2005	112,521	60,222	32,837	169,815	57,456	-20,551
2006	120,144	64,305	36,917	159,139	64,001	-14,867
2009	127,419	65,423	38,718	167,661	66,672	-15,560
2012	136,075	66,860	40,970	161,545	61,226	-18,104
2015	138,311	68,110	42,767	163,101	59,304	-19,399

The increases in net farm income from 2006 to 2015 result from increases in future yields and prices, which make up for any increases in expenses. Future crop production in the United States and around the world is predicted to be

consistent with annual trend line increases, while demand is predicted to increase slowly, limiting upward pressure on prices. Producers are protected from price declines below loan rates specified in the 2002 farm bill. Any drop in prices below loan rate will be offset by an increase in governmental subsidies. Further price protection is available through counter-cycle payments, which are triggered when the national average price is less than the target prices minus the direct payment rate. The counter-cyclical payment is decoupled from actual production and based on historical yields and 85% of base acreage. Yield protection is available through the Federal Crop Insurance program. Producers are able to obtain various levels of protection. The model assumes a yield protection level of 70%.

Net farm income for the high-profit farm is projected to be \$170 thousand in 2006 and is expected to decrease to \$163 thousand in 2015. Net farm income for the average-profit farm is \$57 thousand in 2006 and is projected to increase to \$59 thousand in 2014. The low-profit farm is expected to show a net operating loss in 2006, and those losses are projected to continue throughout the forecast period. The low-profit farm may not have the financial resiliency to survive without outside income. State average net farm income over the 2006-2015 period is \$164 thousand for the high-profit farm, \$64 thousand for the average-profit farm, and -\$17 thousand for the low-profit farm. This implies that efficient management is the key for profitable farm operation. The low-profit farm may not be able to survive, mainly because their operation is too expensive compared to the other farms.

The slow increase in farm size (2% per year) improves net farm income, but the increase in expenses each year eliminates much of the benefit. Increases in energy costs also weigh heavily on potential profits. Net farm income for 2006 is expected to be slightly higher than in 2005, because poor small grain yields in the RRV are expected to return to normal in 2006. It is also expected that row crop yields return to normal in 2006.

Figure 1 shows the state average net farm income and 80% confidence interval over time when mean values for price and yields are replaced by distributions with known standard deviations and means. Risk analysis was conducted to estimate the variability in net farm income, because future prices and yields are not known with certainty. The confidence interval widens over time as more variations accrue in the model. By 2015, the 80% confidence interval for average net farm income is \$20,000 to \$133,000, with the mean at \$73,000.

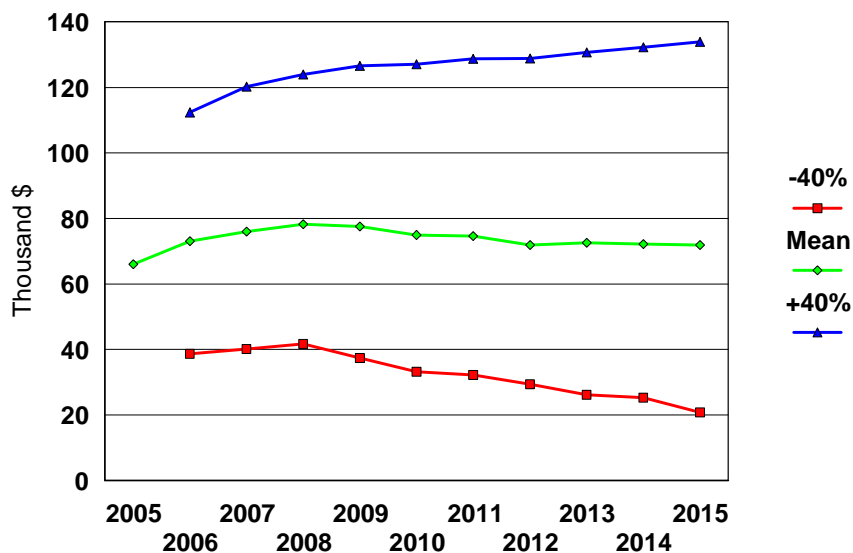


Figure 1. Average Net Farm Income and 80% Confidence Interval for Profit Representative Farms, 2005 to 2015

Debt-to-asset ratios for all representative farms fall throughout the forecast period, except for the low-profit farm. The debt-to-asset ratio for the low-profit farm increases from 0.56 in 2005 to 0.60 by 2015, which indicates that these farms will most likely not be able to obtain new credit. Higher debt-to-asset ratios for the low-profit farms, when coupled with negative net farm income, suggest serious problems in sustaining the farm business unless substantial off-farm income is earned. Without additional off-farm income to provide family living requirements, it is unlikely that the low-profit farm can survive or be able to obtain operating credit. The farm operator may wish to investigate another investment opportunity with a possibility of higher returns or markedly restructure the farming operation to improve its profitability.

For more details, see the forthcoming report, *2006 North Dakota Agricultural Outlook: Representative Farms, 2006-2015*.

U.S. and World Sugar Markets for the Next Decade

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This report summarizes the U.S. and world sugar markets, 2005-2015, using the Global Sugar Policy Simulation Model. This model was run utilizing 2005 data, but consideration was given to the high prices in late 2005 and early 2006. The outlook projection is based on an assumption that farm and trade policies adopted by sugar exporting and importing countries remain unchanged.

During late 2005 and the first quarter of 2006, world sugar price increased from about \$0.12/lb to over \$0.18/lb, indicating that either production decreased or consumption increased. Since world production and consumption data are available only on an annual basis, the exact reason behind the price increase is not clear. One reason could be that because of the recent rise in world oil prices, Brazil has increased ethanol production, reducing the exportable supply of sugar.

The Caribbean raw sugar price is usually considered to be the world market price for sugar. Except for years with high world market prices, there has been a substantial wedge between the U.S. wholesale price of raw sugar and the world market price. Over the last decade, U.S. wholesale prices fluctuated between \$0.22 and \$0.29 per pound. World market prices ranged between \$0.06 per pound and \$0.13 per pound. Both real Caribbean raw sugar prices and U.S. raw sugar import prices have long-term downward trends, despite the recent increases. In 2003, the Caribbean sugar price averaged \$0.07/lb. By 2005, it had risen to \$0.12/lb, and it was \$0.18/lb in June 2006. The high Caribbean sugar price has also increased the U.S. wholesale price to over \$0.30/lb.

The volatility of world sugar prices could be due to the nature of supply response to price changes stemming from high fixed costs of sugar production. An increase in sugar production in response to rising sugar prices requires significant investments in processing facilities, and it takes some time until new production capacity becomes available. Once the facilities are in place, they tend to be used at full capacity to spread the fixed costs. Thus, when prices fall, production remains at full capacity. Sugar production is relatively unresponsive to price in the short run; however, sugar price does respond to changes in consumption.

World sugar price is projected to increase about 59%, from 11.35 cents/lb in 2005 to 18.05 cents/lb in 2015, because of substantial ethanol production. The higher prices of world sugar will raise the domestic wholesale price of U.S. sugar from 27.04 cents/lb in 2005 to 32.70 cents/lb in 2015. Sugar beet prices are forecasted to rise from \$40 per ton in 2005 to \$42.31 in 2015. Sugar cane prices are also expected to increase. The expected increases in U.S. sugar imports tend to reduce the gap between world and U.S. wholesale prices.

U.S. import quotas on sugar were converted into tariff-rate quotas (TRQs) under the Uruguay Round Agreement, meaning that a specified amount of sugar can be imported at the lower of two alternative duty rates. The amount of raw cane sugar subject to the lower duty rate must be no less than 1,117,195 metric tons in a fiscal year. This amount, however, was increased to 1,231,497 metric tons for 2005, due to production losses resulting from hurricane Katrina.

NAFTA allows a rapid reduction in the second-tier duty for Mexican sugar over the next several years. The second-tier duty for Mexican sugar will be reduced from 16.11 cents per pound in 1995 to zero in 2008. Duties for most countries will remain at 15.36 cents per pound for raw cane sugar and 16.21 cents per pound for refined sugar. This implies that Mexico is in a unique position to increase its sugar exports to the United States above the allocated quota. Mexico produced 6.0 million metric tons of sugar in 2005 and consumed 5.4 million metric tons in the same year. Its net exports were 243 thousand metric tons for the year. If Mexico starts to use High Fructose Corn Sweetener (HFCS) for beverages, more of its sugar could be exported to the United States. Currently, there are transportation and use taxes on HFCS in Mexico. Mexico has been declared an excess sugar producer, which will allow additional exports into the United States.

The United States signed a trade agreement with the Central American countries of El Salvador, Guatemala, Honduras, Nicaragua, Costa Rica, and the Dominican Republic that allows 107,000 metric tons of additional sugar to be imported into the United States in the first year of the agreement, with additional increases of about 3,000 metric tons per year. This increase, however, does not have a significant impact on the price of U.S. sugar or world trade flows. The recent trade agreement with Australia did not include an expansion of sugar trade between the two countries.

Total world sugar trade is projected to increase 3%, from 32.0 to 33.0 million metric tons over the 2005-2015 period. The largest exporter, Brazil, is expected to reduce exports, but sugar exports from other countries will increase. Sugar exports will increase 23.4% for Thailand, and 13.8% for Australia.

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Table 3 shows the production, consumption, imports, and ending stocks of sugar for the United States. U.S. sugar production is predicted to increase to 8.1 million metric tons in 2015. Imports are predicted to decrease slightly from the 2003-05 average. However, the predicted import level may change, depending on sugar imports from Mexico. The high world sugar price will provide other markets for excess sugar supplies. U.S. sugar consumption is predicted to increase 7.2%, from 9.2 million metric tons (the 2003-2005 average) to 9.8 million metric tons in 2015. Ending stocks are also predicted to decrease 14.6%.

Table 3. U.S. Sugar Production, Consumption, Imports, and Carry-over Stock, 2005-2015 Average

	Average (2003-2005)	2005	2015	% Change (2003-05) to 2015
-----1,000 metric tons-----				
Production	7,736	6,889	8,054	9.94
Beet	4,192	4,056	4,922	17.44
Cane	3,134	2,833	3,132	-0.08
Net Imports	1,826	2,354	1,787	-2.15
Per capita	64	64	62	-2.66
Consumption				
Consumption	9,160	9,267	9,819	7.19
Carry-over Stocks	1,380	1,197	1,178	-14.61

For more details, see Agribusiness & Applied Economics Report No. 589, *2006 Outlook of the U.S. and World Sugar Markets, 2005-2015*, (forthcoming).