CENTER FOR AGRICULTURAL POLICY AND TRADE STUDIES
NORTH DAKOTA STATE UNIVERSITY

NEWSLETTER

Issue 07-5 October 2007

2007 North Dakota Agricultural Outlook: Representative Farms, 2007-2016

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The 2007 North Dakota Agricultural Outlook projects changes in net farm income and debt-to-asset ratios for different sizes of representative farms for 2007 through 2016. The report also evaluates the reaction of cropland prices and cash rental rates to changes in farm income. The model includes risk analysis, where mean values for yields and prices are replaced with distributions with known standard deviations and means. Details of the model can be found in the full report.

Table 1 presents the net farm income projections for farms by size. The net income for the large-size farm is projected to increase from the 2004-2006 average of $132 thousand to $162 thousand in 2016, which is a 23% increase. Net farm income for the medium-size farm, which averaged $57 thousand for 2004-2006, increases to $59 thousand in 2016, and net farm income for the small-size farm, which averaged $25 thousand from 2004 to 2006, decreases in the early years of the projection period and then slowly increases to $24 thousand in 2016. State average net farm income over the 10-year period is $147 thousand for the large-size farm, $54 thousand for the medium-size farm, and $21 thousand for the small-size farm. These income levels imply that most farms in North Dakota will have enough net income to survive under the current farm bill and international market conditions, except small-size farms may need off-farm income to supplement family living.

The increases in net farm income from 2007 to 2016 result from increases in 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. In the model, producers are protected from price declines below loan rates specified in the 2002 farm bill. Any drop in prices below loan rates will be offset by an increase in governmental subsidies. Further price protection is available through counter-cyclical payments, which are triggered when the national average price is less than the target price minus the direct payment rate. The slow increase in farm size (2% per year) assists 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.

Table 1. State Average Net Farm Income for Different Size Representative Farms

	Large	Medium	Small
		––––dollars––––	
2004-06 Avg	131,685	57,147	24,526
2006	132,201	52,699	16,695
2007	132,622	49,428	16,946
2008	133,794	49,849	17,605
2009	136,689	50,275	18,772
2010	141,120	53,117	20,089
2011	145,077	52,387	20,617
2012	149,773	54,393	21,511
2013	152,531	56,370	22,084
2014	155,296	57,880	22,829
2015	158,625	58,906	23,593
2016	161,681	58,993	23,935

Table 2 shows the average forecasted net farm income along with the standard deviation, maximum and minimum levels, and the 90% confidence interval for the medium-size representative farms. The standard deviation, an indication of variation, is large for the state, averaging 86% of net farm income. The large standard deviation makes long-range planning difficult as future incomes are likely to have large fluctuations. The 90% confidence inter-

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Table 2. Results of the Simulation for the Medium-Size Representative Farm Model, Net Farm Income

	Mean	Std Deviation	Minimum	Maximum	90% Confidence Interval
	————————-dollars————————				
2007	49,429	42,235	-45,152	217,875	-101 to 103,184
2011	52,387	49,624	-55,758	243,485	-2,087 to 114,195
2016	58,993	53,162	-65,192	251,185	985 to 123,738

val gives a range for which the net farm income will be within 90% of the time. The extreme width of the confidence interval indicates that net farm income within the state is subject to wide variation and is very difficult to predict.

Debt-to-asset ratios for all representative farms fall throughout the forecast period. These ratios decline by 13.5%, 12.4% and 7.1% for the large-, medium-, and small-size representative farms, respectively (Table 3).

Table 3. State Average Debt-to-asset ratios for Different Size Representative Farms

	Large	Medium	Small
2006	0.348	0.355	0.508
2010	0.317	0.334	0.492
2016	0.301	0.311	0.472
2007-2016 Avg	0.313	0.329	0.488

Table 4 presents land values and cash rents for representative farms in North Dakota. Land values differ between the regions, with the highest values in the Red River Valley and the lowest in the west. Land values are expected to increase by 4.8% over the forecast period. Land values are based on return to crop acres. Other factors are not considered. Therefore, the land values shown in Table 4 may not reflect market values.

Table 4. North Dakota Land Values for Representative Farms

	Land Value	Cash Rent
	----------$/acre--------	
2006	592.39	39.54
2010	606.67	40.54
2016	619.13	41.42
2007-2016 Avg	606.23	40.72

(For more details, see Agribusiness & Applied Economics Report No. 618)

Globalization, Growth and the Environment

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The environmental consequences of trade liberalization have been among the most important issues debated in international trade policy over the last decade. Proponents of trade liberalization argue that, since environmental quality is a normal good, trade-induced income growth causes people to increase their demand for a clean environment, which in turn encourages firms to shift towards cleaner techniques of production. Hence, trade liberalization provides a win-win situation in the sense that it improves both environment and economy. By contrast, opponents of trade liberalization fear that, if production methods do not change, then environmental quality deteriorates as trade increases the scale of economic activity. Moreover, developing economies tend to adopt looser standards of environmental regulations to attract more foreign investment. Trade liberalization thus may lead to more growth of pollution-intensive industries in developing countries as developed countries enforce strict environmental regulations. As a result, trade liberalization would have a significant adverse effect on environmental quality.

A number of studies have analyzed the environmental consequences of economic growth and trade liberalization over the last decade, but few studies have analyzed the possibility that environmental quality and income may simultaneously affect trade. In addition, most of the studies have used data for groups of countries for their analysis, while not enough attention has been given to country-specific data. In this study, therefore, we attempt to investigate dynamic relationships between trade liberalization, income growth, and the environment using a dataset consisting of per capita sulfur emissions (SO_2), per capita income, and trade openness (ratio of the value of total trade to GDP) for 50 individual countries (25 developing and 25 developed countries) over the last five decades.

A negative long-run relationship is generally found between per capita SO_2 emissions and per capita income for developed countries, suggesting that pollution levels tend to decrease as a country's economy grows. For developing countries, on the other hand, per capita SO_2 emissions have a positive long-run relationship with per capita income, indicating that economic growth tends to worsen environmental quality. The findings are related to changes in emissions intensity, which is a ratio of per capita SO_2 emissions to per capita income. An increase in the emissions intensity implies that SO_2 emissions tend to increase as income grows, while a decrease indicates that emissions decline. In fact, while the emissions intensities of developed countries (for example, United States and United Kingdom) have significantly improved over the last 50 years, those of developing countries (for example, Mexico and Turkey) have improved little or even have risen over the same period (Figure 1).

A negative long-run relationship is also found between SO_2 emissions and trade openness for developed countries, indicating that air pollution tends to decrease as a country's exposure to international markets increases. The result support the so-called *gains-from-trade* hypothesis for developed countries. A rise in income growth through trade gradually tends to increase the use of cleaner techniques of production, thereby improving environmental quality. For developing countries, on the other hand, SO_2 emissions have a positive long-run relationship with openness, supporting for the so-called *race-to-the bottom* hypothesis. Confronted with international competition, poor open economies have incentives to adopt excessively lax environmental standards in an effort to attract multinational corporations and export pollution-intensive goods. As a result, trade is the cause of environmental degradation in developing countries.

Finally, it is found that, for developed countries, trade openness and/or income significantly influence SO_2 emissions, but are not affected by SO_2 emissions. This implies that trade liberalization and income growth may cause people in developed countries to increase their demand for a cleaner environment, thereby enforcing strict environmental regulations. For developing countries, on the other hand, SO_2 emissions significantly affect trade openness and income, but are not influenced by trade openness and income. This suggests that trade liberalization tends to create an incentive for pollution-intensive industries (so called dirty industries) to relocate to developing countries with lower environmental standards as developed countries adopt tighter environmental protection, thereby deteriorating environmental quality.

(For more details, see the forthcoming Agribusiness & Applied Economics Report)

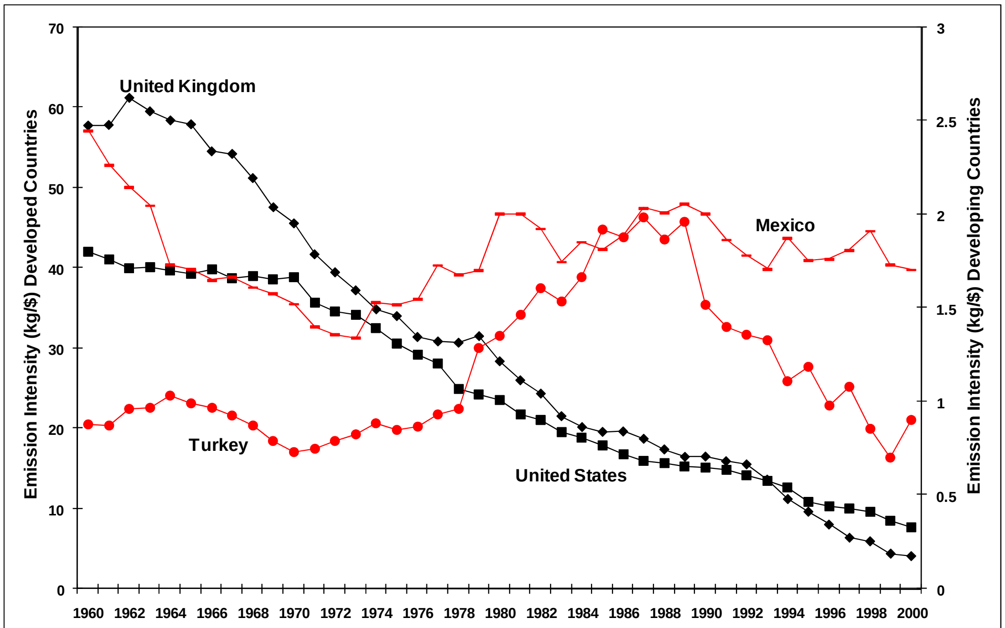

Figure 1. Emissions Intensities for Developed and Developing Countries

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Recent Publications

An Analysis of the U.S. House of Representative's 2007 Farm Bill, by Richard D. Taylor and Won W. Koo, Agricultural Policy Brief No. 15, August 2007.

2007 Outlook of the U.S. and World Wheat Industries, 2006-2016, by Won W. Koo and Richard D. Taylor, Agribusiness & Applied Economics Report No. 610, August 2007.

2007 Outlook of the U.S. and World Sugar Markets, 2006-2016, by Won W. Koo and Richard D. Taylor, Agribusiness & Applied Economics Report No. 614, September 2007.

2007 North Dakota Agricultural Outlook: Representative Farms, 2007-2016, by Richard D. Taylor, Won W. Koo, and Andrew L. Swenson, Agribusiness & Applied Economics Report No. 618, September 2007.

A Comparison Between Senator Harkin's Proposal and the 2007 House Farm Bill, by Richard D. Taylor and Won W. Koo, Agricultural Policy Brief No. 16, September 2007.

Implications of the U.S.-Korea Free Trade Agreement for Agriculture and other Sectors of the Economy, by Renan Zhuang, Jeremy W. Mattson, and Won W. Koo, Agribusiness & Applied Economics Report No. 619, October 2007.

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